

The 2016 Subdivision Staging Policy
Planning Board Draft
Technical Appendix

July 21, 2016

CONTENTS: APPENDICES A-K

A. SUBDIVISION STAGING POLICY PEER REVIEW.....	3
B. FORECASTING FUTURE GROWTH.....	15
C. RECENT TRENDS IN REAL ESTATE TRANSACTIONS.....	20
D. OTHER RELEVANT GROWTH MEASURES.....	24
E. TEN-YEAR FORECAST RESULTS AND KEY EMPLOYMENT FACTORS.....	26
F. COOPERATIVE FORECAST METHODOLOGY.....	38
G. DEVELOPMENT OF POLICY AREA TYPES.....	50
H. EVALUATION OF ALTERNATIVE POLICY AREA TRANSPORTATION ADEQUACY METRICS...	55
I. LOCAL AREA TRANSPORTATION REVIEW (LATR) TEST.....	61
J. TRANSPORTATION IMPACT TAX.....	76
K. SCHOOLS.....	102

APPENDIX A - SUBDIVISION STAGING POLICY PEER REVIEW

BACKGROUND

The Planning Department retained Jeff Tumlin of Nelson/Nygaard Consulting Associates, Inc. in March to conduct a brief Peer Review of the Subdivision Staging Policy and related process for reviewing the SSP that occurs every four years. The work was conducted in conjunction with Mr. Tumlin's well received presentation as part of the Department's Winter Speaker Series.

The Peer Review follows and includes the following major sections:

- Existing Policy
- Responses to Scope of Work Questions Submitted in Advance by Staff
- Issues
- Recommendations

The complete report follows this Introduction. This Introduction is intended to provide staff responses to the points raised in the Peer Review – particularly as they relate to the SSP review.

STAFF RESPONSE

Staff is in general agreement with many of the points and recommendations in the Peer Review submitted by Mr. Tumlin. For context in the review of the recommendations in the Working Draft, staff would like to expand on selected points raised in the report (in no particular order of priority):

Reasonable Time Interval for Review

The review recommends more frequent reporting on performance and less frequent “deep reviews” that would result in major shifts in approach.

We agree and think the Peer Review's emphasis on regular reporting on things that matter to the public using readily available data is an important point. Examples given include information on development projects approved, mitigations imposed, impacts fees raised, impact fee expenditures, and available trend data on corridor travel times, VMT, and while not mentioned, safety are all important.

Metrics Reflecting Goals and Objectives

The Peer Review notes while that the County has clear goals to reduce auto dependency and manage congestion (among other things) and also has a SSP that is more sophisticated than most jurisdictions, the policies are sometimes not fully in alignment with County goals. The Peer Review notes the current policy's framework that penalizes the “the last one in” as being an example of where the policy is not in alignment with County goals (see pages 6 and 7 of the Peer Review).

The Working Draft recommendations address this issue to some extent by eliminating the local area test in the Core Areas and by providing for mitigation payments in lieu of simply increasing intersection capacity in designated road code areas that place a focus on multi-modal context sensitive street design attributes.

Metrics We Should Be Tracking

The Peer Review (pages 4-6) includes a general discussion on the approach to developing appropriate metrics and a list of potential useful metrics. The list includes some metrics directly related to the transportation network but many that are not (but are related to broader all-encompassing County goals). Interested readers may want to compare the Peer Review list of metrics to the more transportation oriented draft list developed by Fehr & Peers and included in another section of this Appendix.

Staff agrees with the outline of metrics included in the Peer Review and would like to call specific attention to the paragraph on page 5 that notes the data reporting “should be designed to be intuitive to the public and policymakers and should be designed to inform the difficult trade-offs in development policy.” Two classic examples are noted, one being the case where constrained housing production reduces vehicle trips but results in increased rents, and the other where new housing in areas with little traffic reduces impacts on local urban congestion but increases VMT and household transportation costs. The Working Draft recommendation to introduce job accessibility by transit as a primary metric for assessing the relative impact of development across various policy areas is an attempt to highlight some of these trade-offs.

What Role Does the Size of the Area and/or Specific Project Play in the Process?

The Peer Review recommends a focus on metrics that treats all projects the same through metrics that are reflected in per capita or per employee units while acknowledging that there should be some threshold that insures smaller projects are not subject to a data analysis burden that is unreasonable – relative to the project size and likely impact.

Staff agrees that metrics that allow direct comparison between and among projects is important. The recommendations in the Working Draft essentially continue this approach and in the case of the thresholds for smaller projects, expands the exclusion a bit through the conversion to person trips and the consideration of transit and pedestrian trips.

How is VMT Used On a Project Level Basis?

The Peer Review Report notes that the relationship between travel behavior and the built form is well documented and that there are many sketch planning tools available to estimate VMT according to baseline site characteristics. The report also notes that “it would be possible to create a heatmap of the entirety of Montgomery County showing baseline VMT generation down to the parcel level.”

Staff agrees that there is merit in continuing to examine how a VMT metric can best be adapted and used in conjunction with the analysis of the impact of an individual site. While the Department’s current

Guidelines provide for reduced or discounted trip generation rates in three CBDs, the rates have not been updated and the tools referenced in the report would very likely indicate that for new projects in the CBDs, the rates should be even lower. The Department has underway a relatively detailed look at how the rates should be adjusted in recognition of this fact. The more challenging question is how VMT as a metric is utilized in a regulatory context, especially at the parcel level. More discussion on this important issue is presented later in this Introduction.

Level of Service and Critical Lane Volume as Metrics

The Peer Review Report recommends that these metrics be “eliminated or downplayed” because the metrics “assume that personal vehicles alone are the only transportation mode that matters and that streets should serve.”

The set of recommendations in the Working Draft could fairly be described as “downplaying” these metrics. The CLV threshold in the Core has been eliminated and the CLV threshold in areas subject to context sensitive street design standards would not apply in instances where mitigation payments would be more appropriate. Consideration of the speed attainable on any particular roadway corridor as part of the area-wide test as also been eliminated in the recommendations contained in the Working Draft.

Additional Incentives for Unbundled, Priced Parking, and Other TDM Incentives. Fee Discounts for TDM Programs that Reduce VMT such as Reduced Parking

The Peer Review Report notes the incentives in the new CR Zone related to increased density for mixed use development and recommends additional incentives.

The Working Draft recommendations include a new incentive in the form of a discount on the Transportation Impact Rate that is based on the percent of parking spaces below parking minimums.

Eliminate Parking Minimums Countywide

The Working Draft does not include a recommendation to eliminate parking minimums countywide as this potential policy was examined in detailed during the recently completed Zoning Code re-write.

Use Vehicle Miles Traveled (VMT) and Person Hours of Travel (PHT) as key Metrics, Regulate Traffic Generation Through Caps on VMT generation, and Consider Parcel Based VMT caps and a VMT cap-and-trade program

The Peer Review Report recommends a transition to a regulatory protocol that places an emphasis on VMT reduction.

The recommendations in the Working Draft introduce VMT as a new element in SSP by considering – or using – VMT production as a means of determining (impact tax) payment adjustment factors. This is generally consistent with the Peer Review Report’s recommendation that the “transportation basis of impact fees should focus on VMT so the length of vehicle trips is factored in.” The Working Draft does

not include: (1) a recommendation to regulate trip generation through caps on VMT, (2) establish parcel based VMT caps or (3) establish a VMT cap and trade system.

Staff acknowledges there is merit in further consideration of VMT as a more integral part of SSP in the future. The issue – as previously noted – is how best to apply the metric in a specific manner in a regulatory context. This is especially the case when the both the existing and recommended policy implicitly acknowledge there are areas and settings that have lower VMT per capital (e.g., the Core Area) than others.

It is also worthwhile noting the California experience with the introduction of VMT in a regulatory context. A very good summary of the current status is available on the Fehr and Peers web site at <http://www.fehrandpeers.com/opr-releases-update-to-ceqa-guidelines/>. The summary includes recommendations that remain the same and recommendations that have changed since the preliminary discussion draft. Of particular note is the on-going nature of the discussion and the questions that remain for application in a regulatory environment. Perhaps the most progress with introducing VMT in a regulatory environment has been in Pasadena CA. Pasadena, working with Nelson/Nygaard, adopted an approach that evaluates the efficiency of projects in terms of established city-wide thresholds after a four- year review. The approach also includes retaining a modified LOS metric. More information on the Pasadena experience is available on the following link:

http://ww2.cityofpasadena.net/councilagendas/2014%20Agendas/Nov_03_14/AR%2015.pdf.

In summary, the Working Draft recommendations acknowledge both the need for the inclusion of metrics more aligned with the County goals and the challenges associated with the introduction of metrics that may require additional review and time related to application in the regulatory environment and the development of the analysis tools necessary to support the new applications.

EXISTING POLICY

This is a summary of the county’s Subdivision Staging Policy (SSP) as it relates to transportation. The policy also covers school capacity.

All new residential and commercial development in Montgomery County is subject to an impact tax regardless of location, which raises money for capital improvements to support new development. Impact taxes fund improvements for schools and transportation, and are levied based on dwelling unit type and, for transportation improvements, by commercial square footage. The County Council sets the impact tax, while the Department of Permitting Services (DPS) collects the tax, which must be paid before DPS will issue a building permit or use and occupancy permit.

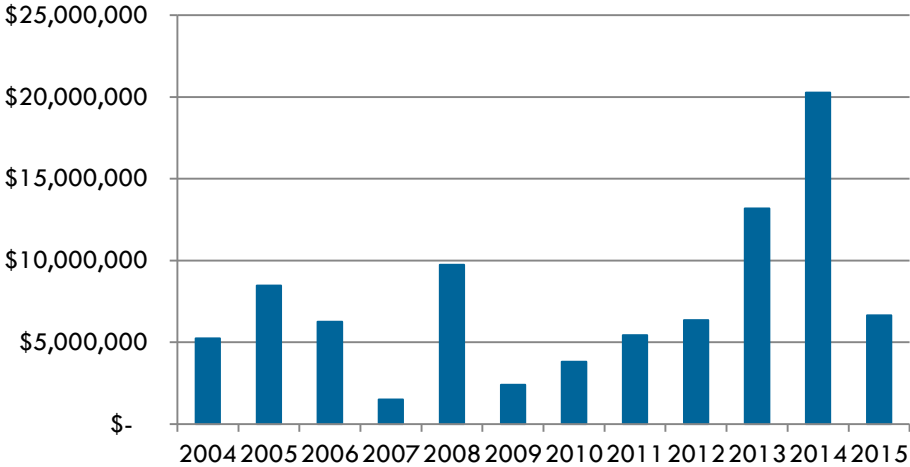
Impact taxes follow a schedule based on the building type or use, and where in the county the development is located. Transportation impact taxes are 50% lower in Metro Station Policy Areas, which are generally in established communities with lower infrastructure needs. In Clarksburg, a new development area in the Upcounty with higher infrastructure needs, impact taxes are between 30% and 200% greater depending on property type/use (except for retail, which is 70% lower than the general fee).

Building Type	Metro Station Policy Area	Clarksburg	General
Single-family detached (per unit)	\$6,984	\$20,948	\$13,966
Single-family attached (per unit)	\$5,714	\$17,141	\$11,427
Multi-family low-mid rise (per unit)	\$4,443	\$13,330	\$8,886
Multi-family high rise (per unit)	\$3,174	\$9,522	\$6,347
Multi-family senior (per unit)	\$1,269	\$3,808	\$2,539
Office (per sqft of GFA)	\$6.35	\$15.30	\$12.75
Industrial (per sqft of GFA)	\$3.20	\$7.60	\$6.35
Bioscience (per sqft of GFA)	\$0	\$0	\$0
Retail (per sqft of GFA)	\$5.70	\$3.70	\$11.40
Place of Worship (per sqft of GFA)	\$0.35	\$0.90	\$0.65
Private School (per sqft of GFA)	\$0.50	\$1.35	\$1.05

Building Type	Metro Station Policy Area	Clarksburg	General
Hospital (per sqft of GFA)	\$0	\$0	\$0
Social Service Agency (per sqft of GFA)	\$0	\$0	\$0
Other non-residential (per sqft of GFA)	\$3.20	\$7.60	\$6.35

Since Fiscal Year 2004, Montgomery County has collected \$89.3 million in transportation impact taxes. Collections vary widely from year to year, ranging between \$1.5 million and \$20.2 million.

Impact Taxes Collected



The SSP uses two tests to assess transportation adequacy and determine an additional transportation mitigation payment for new development: Transportation Policy Area Review (TPAR) and Local Area Transportation Review (LATR). TPAR looks at the “adequacy” of local arterial roads and transit (defined as existing local bus service) in the development’s surrounding community, defined as a policy area. There are 34 policy areas in Montgomery County, ranging in size from a few hundred acres (the Silver Spring CBD policy area) to over one hundred square miles (the “Rural West” policy area).

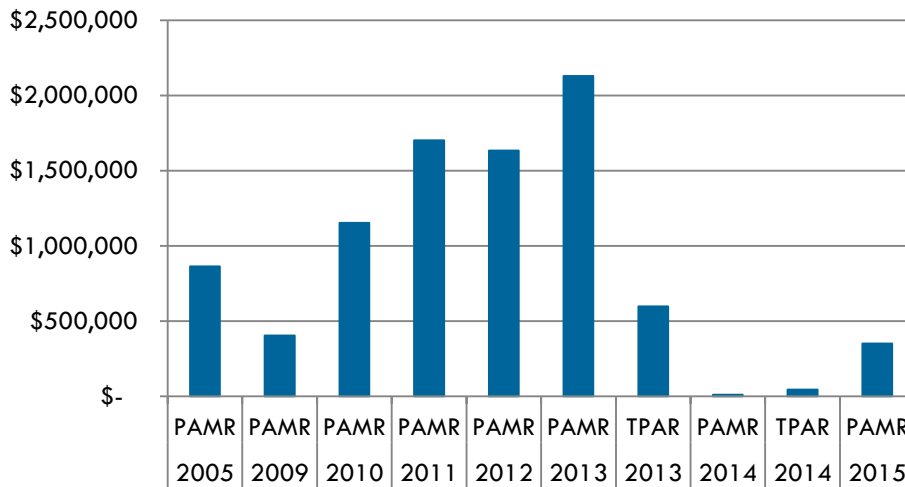
Under TPAR, the congestion level in each policy area is measured by the PM peak period congested speed as a percentage of free flow speed in the peak direction of travel. The “adequate” percentage is 40% in urban areas, 50% in suburban areas, and 60% in rural areas. If the average arterial roadway congestion level falls below that standard, roads in the policy are deemed “inadequate.”

Transit adequacy is determined based on three standards. **Coverage** measures how much of a policy area lies within walking distance of transit, from 50% for rural areas, 70% for suburban areas, and 80% for urban areas. **Headway** measures the frequency of transit service. Policy areas with adequate transit service have 60 minute headways or better in rural areas, 20 minute headways or better in suburban areas, or 14 minute headways or better in urban areas. **Span of service** measures the duration of transit service during a typical weekday. Policy areas with adequate transit service have minimum span of service of 4 hours in rural areas, 14 hours in suburban areas, and 17 hours in urban areas. If any of these three measures are found inadequate, the policy area is considered inadequate for transit.

Where roads or transit are inadequate, the fee is 25% of the impact tax; where both are inadequate, the fee is 50% of the impact tax.

LATR tests the capacity of nearby intersections and is applied to all projects estimated to generate 30 or more peak hour trips, according to the *Local Area Transportation Review/Transportation Policy Area Review Guidelines*. It uses Level of Service (LOS) as a measure of an intersection’s ability to move vehicle traffic. If an intersection receives a “failing” grade, the developer must either provide transportation improvements, such as adding road or transit capacity, or provide a payment that covers the cost of the improvement. Developers can also agree to implement a trip reduction program. In some cases, developers can purchase “trip credits” at a rate of \$12,000 per vehicle trip.

Transportation Mitigation Payment Estimates



In 2016, the County Council gave direction for updating the Subdivision Staging Policy to make it a more accurate reflection of the county’s planning goals:

- Refine the Metropolitan Washington Council of Governments’ (MWCOG) regional transportation model to make it more applicable to Montgomery County.
- Update trip generation rates used in LATR (Local Area Traffic Review), last updated in 1989, to reflect how mixed-use development and access to active transportation changes travel habits.
- Refine and update the LATR process through the Transportation Impact Study Technical Working Group.
- Refine the transit component of the Transportation Policy Area Review to reflect how Bus Rapid Transit will affect travel habits.

Planning staff is currently exploring alternatives to LATR, including incorporating Vehicle Miles of Travel into the LATR process, and consolidating LATR and TPAR into a single test. Another possibility is expanding the “pro-rata” share concept beyond White Flint and White Oak.

Planning staff is also looking at ways to change the formulas for infrastructure funding, so that the impact fees levied on new development accurately reflects the cost of that development on the public. Proposals include updating impact fees based on current construction cost, using transportation impact fees within the local area of a project (as is currently done for school impact fees), changing the recordation tax rate, and considering options for public-private partnerships.

The SSP review process began in December 2015 and will culminate in a working staff draft in May 2016. If the Planning Board approves the draft in July 2016, the County Council will take it up in the fall before voting on it no later than November 2016.

RESPONSES TO SCOPE OF WORK QUESTIONS

This section addresses the specific questions the County provided about its current review process.

What is a reasonable time interval for the review?

Scheduling major policy reviews involves difficult trade-offs, particularly weighing the cost of the staff time burden against the benefits of building public trust and incremental policy improvement. There is no correct schedule, but we generally recommend more frequent reporting on performance, and less frequent deep reviews that would result in a major shift in approach.

We recommend bi-annual reporting on performance. It is critical for the gaining of public trust that the county report regularly on how the policy is helping to meet key goals. This should be a simple, report-card style document identifying, for example:

- Development projects approved
- Mitigations imposed
- Impact fees raised
- Impact fee expenditures
- Available trend data on corridor travel time, bus delay, transit capacity, person delay, person capacity, vehicle miles traveled, etc.

Given staff and budget constraints, it is important to make annual reporting focused on existing and readily available data. Requiring major data collection efforts can make timely reporting impossible.

Following any major change in policy, we also recommend continual internal evaluation of performance for at least one year, focused on identification and correction of unintended negative consequences. That is, staff should work to identify any unexpected problems with the new approach. If significant problems arise, these should be reported and solutions identified.

For programs that are generally meeting their intended goals, a deeper review every five years is generally sufficient. Given the increased pace of change of major issues affecting new development (climate change, demographic shifts, market shifts, etc.), more frequent reviews should be undertaken anytime it becomes clear that the program is no longer producing the desired outcomes.

Does the process used for evaluating the existing metrics reflect the county's goals and objectives?

The county has clear goals goal to decrease automobile dependency, protect agricultural lands, manage congestion, and focus new development in compact, transit-oriented, mixed-use, and walkable communities. While the county's subdivision staging policy is more sophisticated than most jurisdictions, its policies are not fully in alignment with its goals. These policies unintentionally exacerbate traffic levels, and maintain unnecessary obstacles against low-impact development. See additional recommendations below.

What metrics are useful to track that are not easily applied in a regulatory context?

First, we reiterate the importance of using existing or readily available data in order to reduce data collection costs. Existing data also makes it easier to track historic trendlines.

Second, we would point out that all policy goals and objectives must have a data strategy to determine the degree to which they are being achieved. Goals without data will be ignored and will rightly result in public mistrust.

Third, data reporting should be designed to be intuitive to the public and policymakers, and should be designed to inform the difficult trade-offs in development policy. For example, constraining housing production may reduce vehicle trips, but may also result in increased rents. Similarly, new housing production in areas with little traffic may reduce impacts on local urban congestion, but would result in overall higher VMT and significantly higher household transportation costs. The data should reveal the tensions between goals and help policymakers make policy decisions that reflect local values.

Given the scale of the county, most data should be mapped in GIS and presented in the form of heatmaps. In addition to mapping current conditions, the county should identify change over time and, where possible, predictions of future conditions under different scenarios. Where in the county is moving toward meeting the goal, and where is moving further away?

Some potential metrics that may be useful:

Economic development

- Net new jobs created and lost
- Net new housing created and lost
- Real estate value per acre
- Total retail sales, and retail sales per square foot
- Retail sales and other expenditures reinvested in local community
- Workforce accessible within 30 minutes by transit and all modes
- New infrastructure costs per unit or employee
- Agricultural land lost, and agricultural production
- Person capacity by transportation corridor
- Peak period person throughput by transportation corridor
- Peak period average vehicle, transit vehicle, and person speed by transportation corridor

Quality of Life

- Household accessibility to grocery stores, schools, rapid transit, daycare, parks, and other key services
- Jobs accessible within 30 minutes by transit and all modes
- Percent tree canopy
- Transportation injuries and fatalities, total and by exposure rate
- Transportation personal and personal property crimes, total and by exposure rate
- Active transportation usage
- Obesity and cardiovascular disease rates

Environment

- Greenhouse gas emissions per capita and per employee
- VMT per capita and per employee
- Non-permeable surface per capita
- Potable water use per capita

- NO_x, SO_x, CO and particulate exposure per capita

Social Equity

- Density of communities of concern, particularly race, income, and age
- Most of the above data factors, parsed by communities of concern demographics. To what degree, for example, do communities of concern have access to jobs and services, or face added pollution burdens?
- Housing plus transportation costs, particularly for households in bottom quintile income

How does the applicability of any set of metrics vary by the size of the area or specific project under consideration?

In order to avoid having developers simply shrink their projects to avoid paying their fair share, we prefer metrics that treat all projects the same, regardless of size. This means focusing on per capita or per employee metrics that render project size irrelevant.

That said, larger projects should face greater scrutiny since their potential impacts are greater, and very small projects may have significantly less or no analytical burden, since it is inappropriate to require a massive data analysis exercise for a small project.

How exactly does urban design influence VMT on a project level?

The relationship between travel behavior and built form is well documented, and many sketch planning tools are now available to estimate VMT according to baseline site characteristics (density, distance to transit, destination accessibility, street pattern design, mix of uses, etc.), and adjust based upon the specifics of the project (parking supply and management, Transportation Demand Management, etc.). For a summary of the sketch planning tools California recommends for calculating VMT, see Appendix F at

https://www.opr.ca.gov/docs/Final_Preliminary_Discussion_Draft_of_Updates_Implementing_SB_743_080614.pdf. For more detail on California's efforts generally, see https://www.opr.ca.gov/s_sb743.php.

It would be possible to create a heatmap of the entirety of Montgomery County showing baseline VMT generation down to the parcel level.

For more detail, see the Victoria Transport Policy Institute's meta-analysis at <http://www.vtppi.org/landtravel.pdf>.

ISSUES

The current Subdivision Staging Policy, while creating a mechanism to allow development to pay for the infrastructure it uses, does not fully reflect the county's goals to promote active transportation and transit, nor to focus development in town centers. The current policy penalizes the "last one in" for new development, as projects that can reduce car trips may be blocked if roads in the policy area is deemed "inadequate." Development just outside congested areas is unintentionally rewarded, and development in urban cores is discouraged, even if the former results in significantly greater VMT. It also encourages road widening and reduced density as mitigation strategies, which only results in more vehicle traffic while discouraging active transportation.

Below is a list of recommendations that can be used to make the Subdivision Staging Policy a closer fit to the county's stated policy goals while allowing growth to occur where and how the county wants it to.

RECOMMENDATIONS

- The metrics used to measure transportation performance should reflect the county's planning goals: to direct new development to established communities and town centers; to preserve parkland and agricultural areas; to provide options for transportation other than driving. Level of Service and Critical Lane Volume assume that personal vehicles alone are the only transportation mode that matters and that streets should serve. These metrics should be eliminated or downplayed.
- Use Transportation Demand Management as a development incentive. The new CR Zone allows increased density for mixed-use development if the project participates in a Trip Mitigation Agreement, provides less than the maximum number of parking spaces, shares parking, or improves pedestrian or transit access. Additional incentives should be provided for, unbundled and priced parking, and other key TDM incentives.
- Develop a strong parking management program to ensure adequate availability in commercial districts at all time, and protect existing low density neighborhoods from real or perceived spillover parking. Such programs will eliminate parking search traffic, and make it easier to avoid over-supplying parking.
- Eliminate minimum parking requirements county-wide, and ensure existing parking maximums are set at a rate that balances the development market against traffic management goals. Facilitate parking management districts in commercial areas.
- Require the unbundling of the price of parking from residential and commercial leases, allowing tenants to rent as little or as much parking as they like. Currently, unbundling of parking from residential multi-family development provides a reduction in the amount of required parking; however, it is not a requirement.
- Eliminate indirect subsidies for parking, and have the cost of parking borne by motorists, not society at large. In new development, consider a \$1 per hour/\$5 per day price floor for parking, either directly paid or through parking cash-out.
- Use vehicle miles traveled (VMT) as a measure of congestion and person hours of travel (PHT) as a measure of travel time. Measure VMT on a per capita basis for residential development, per employee for employment, and on a net total basis for retail and services. These measures reflect the county's goal to reduce congestion from personal vehicles while also reducing time spent in transit.
- Recognizing that the county can never eliminate traffic congestion except through congestion pricing or economic collapse, the county should develop policies to locate congestion in places with the least negative impact on economic development opportunities, neighborhood quality of life, and social justice. San Francisco, for example, intentionally locates its highway capacity bottleneck in the center of its downtown, in order to favor trips with a downtown destination, and disfavor trips cutting through downtown. Santa Monica locates its bottlenecks at the first signalized intersection at its freeway on- and off-ramps, in order to minimize traffic backing up into its neighborhoods.
- Impact fees should fully reflect the public cost of development. New suburban development requires totally new transportation infrastructure while burdening the transportation system in established communities. Currently, impact fees for urban areas are half the cost in suburban and rural areas, while the actual costs are significantly less than half. Impact fees should reflect the actual cost of development in suburban and rural areas, including new roads, utility lines, and public facilities like schools.

- The transportation basis of impact fees should focus on VMT, so the length of vehicle trips is factored in. Fee discounts should be given based upon TDM and other programs that reduce VMT, such as reduced parking.
- Transportation fee revenue should be used not to accommodate more auto trips, but rather to solve the congestion problem through VMT reduction.
- The county should transition away from using density controls like Floor Area Ratio as a proxy for community character or traffic generation. Rather, community character should be regulated through design controls. Similarly, traffic generation should be regulated directly through caps on VMT generation. Existing property owners should be rewarded for trip reduction efforts through additional development entitlement. The county should not only consider parcel-based VMT caps, but also a VMT cap-and-trade program that would allow property owners to get entitlement credit for off-site vehicle trip reduction. Such programs require ongoing mitigation monitoring programs and strong enforcement tools to ensure ongoing compliance. For more detail, see, for example, the Stanford University General Use Permit, or the Mountain View, California, North Bayshore Precise Plan.

APPENDIX B - FORECASTING FUTURE GROWTH

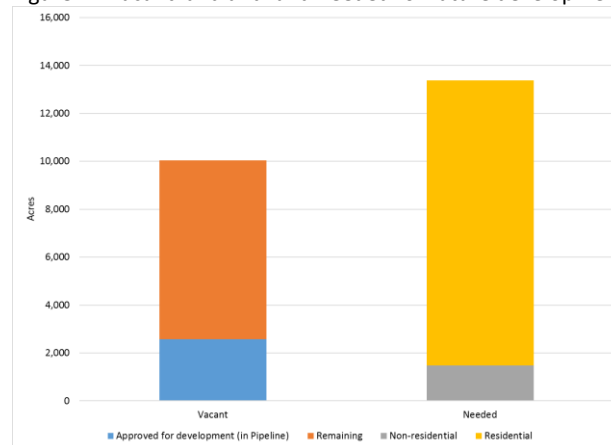
BACKGROUND

Since 1973 Montgomery County has undertaken the evaluation of whether County public facilities are adequate to meet the needs stemming from increases in its population and employment. The County's Subdivision Staging Policy governs the timing and conduct of this analysis. To help inform the Subdivision Staging Policy, this appendix adds context to the County's growth by shedding light on the amount of land needed to accommodate projected growth and identifying where gaps exist between the projected growth and the availability of land needed to accommodate it.

ACCOMMODATING FUTURE GROWTH

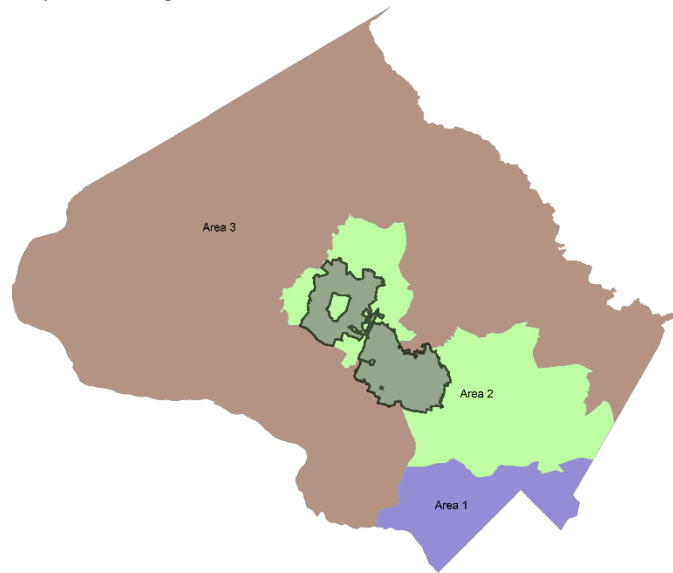
The Round 9.0 cooperative forecast assumes that within the portions of the County subject to Subdivision Staging policy—outside of the jurisdictions of Rockville and Gaithersburg—it will take approximately 11,900 acres to accommodate future housing units for household and population growth from 2010 to 2045. Likewise, in the same period it is expected that just over 1,470 acres will be needed to construct the commercial space, or other non-residential square footage, required for future employment growth. This need for acreage to accommodate future growth cannot be met by available vacant land which is in short supply. As of a Spring 2016 assessment of County land outside of Rockville or Gaithersburg, only about 10,000 acres of vacant land is developable—although this figure does not take into account natural hindrances on development, such as steep slopes—and of that amount, approximately 2,600 acres (or 26%) already has an approved pipeline project. The net result of this difference is that the portion of the County subject to Subdivision Staging policy has a deficit of about 3,300 acres needed to accommodate future jobs and residences in the 2010 to 2045 forecast horizon period, see Figure 1.

Figure 1. Vacant land and land needed for future development



The impact of the net discrepancy between available vacant land relative to land needed to accommodate future jobs and residents will not be experienced uniformly throughout the County. Rather, this impact is expected to vary spatially throughout County areas subject to Subdivision Staging Policy, see Map 1.

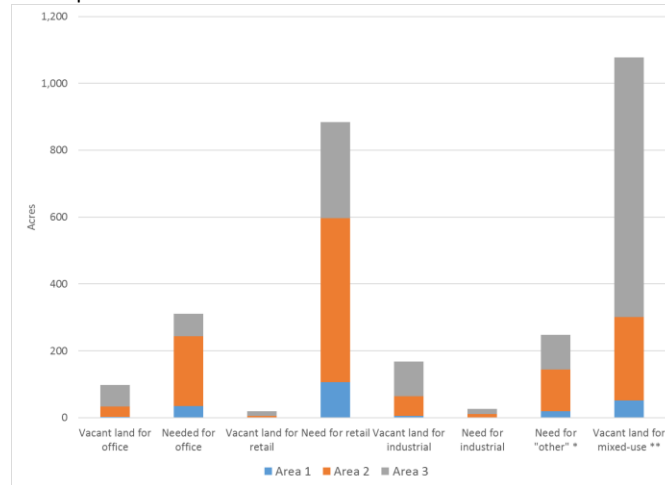
Map 1. Planning Team Areas 1, 2, and 3 and Rockville and Gaithersburg



When comparing vacant land by non-residential use and the comparable need according to the Round 9.0 forecast, see Figure 2, it is evident that, for the most part, the need for land outstrips the existing supply of vacant land, but also that some of the deficit is felt in some Planning Areas more than others. For example, the differential between the need for office acreage and vacant land currently zoned for office is expected to be felt most acutely in Area 2, which includes neighborhoods such as White Flint and White Oak, where the need exceeds vacant available land by 177 acres. Conversely, in Area 3 the differential between the need for land to accommodate office space and vacant land zoned for office is only 4 acres. The exception to this pattern of needed land exceeding vacant land is found among industrial uses, where the inverse is true. In Areas 1, 2 and 3, vacant land zoned for industrial use exceeds the need for industrial land by 5, 47, and 88 acres, respectively.

It should be noted that in the aggregate there are approximately 1,080 acres of vacant land categorized as mixed-use. This reflects the Commercial Residential (CR) class of zoning, that can be developed as a combination of commercial or residential uses. Vacant mixed-use land, thus, can serve to moderate some of the redevelopment pressures that can arise when analyzing the difference between a commercial use and its zoning-specific vacant equivalent, such as office uses that can be accommodated in vacant land zoned specifically for office or can also be, theoretically, accommodated in vacant land with CR zoning.

Figure 2. Vacant land and land needed for future non-residential development

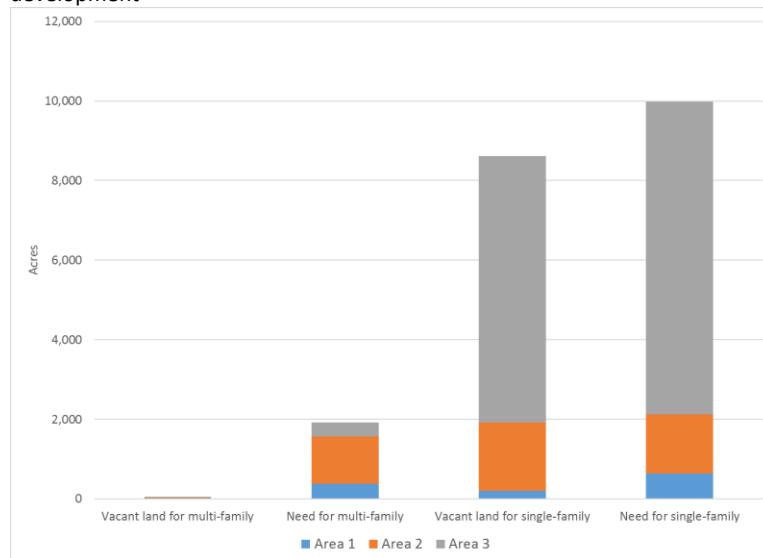


* This assessment did not quantify "other" vacant land because institutional or civic land owners whose building space would fall into the categorization of "other", for example MNCPPC, WMATA, or the Board of Education, were not considered candidates for redevelopment and were excluded from this analysis.

** Vacant land with mixed-use zoning is not categorized as a specific commercial or residential use since it can be developed as a combination of commercial or residential uses according to a vacant parcel's zoning.

The differential between needed land and equivalently zoned vacant land can also be assessed for residential uses among Planning Team Areas. The severity of the deficit of vacant land zoned for multi-family residential uses relative to the need for land that can accommodate these residential units varies by Planning Team Area, see Figure 3.

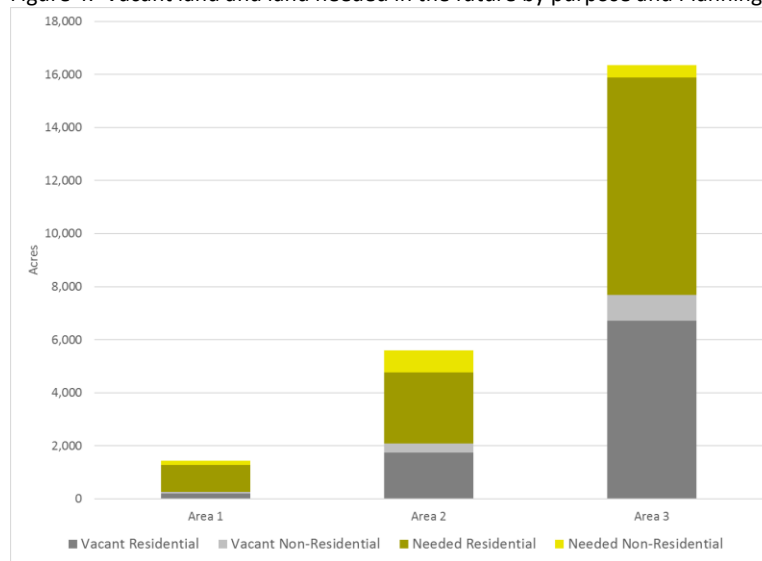
Figure 3. Vacant land and land needed for future residential development



This deficit is felt most acutely in Area 2 where the need for land exceeds vacant land by approximately 1,150 acres, followed by Area 1 where the deficit is 380 acres, and lastly Area 3, where the deficit is

around 330 acres. This pattern of net deficits is not as uniform among the Planning Team Areas when it comes to land dedicated for single-family residential units. The deficit is most pronounced in Area 3, where the need for single-family land exceeds vacant land zoned for this unit type by approximately 1,160 acres. This is followed by Area 1, where the deficit is around 440 acres. Area 2, meanwhile, bucks the trend since its vacant land zoned for single-family units exceeds needed land by roughly 230 acres. It must be noted, though, that in theory some of the 1,080 acres of vacant land that is classified as mixed-use could be purposed for residential uses and moderate the pressures on redevelopment for multi-family construction. Regardless, the Round 9.0 cooperative forecast assumes that in all three Planning Team Areas the aggregate of land needed for residential and non-residential purposes exceeds the vacant land zoned for residential, non-residential, and mixed-use densities, see Figure 4.

Figure 4. Vacant land and land needed in the future by purpose and Planning Area



METHODOLOGY FOR PROJECTING FUTURE LAND USE NEEDS

How do we determine the amount of land needed to accommodate future growth?

The process of calculating the amount of acreage needed to accommodate future residential and employment growth is done through a two-part process of assessing the amount of net new square footage or units needed to yield the forecasted jobs or population, respectively. That square footage or units are then converted to the requisite acreage needed for those uses based on historical average floor area ratio (FAR) or units per acreage factors.

In the Round 9.0 cooperative forecast, the process of allocating residents and employment to Transportation Analysis Zones (TAZ) was done by calculating the yields—based on occupancy rates and factors of jobs per occupied square footage or persons per occupied residential unit—stemming from assumed future net new non-residential densities and residential units. The assumed net new densities and units were derived from various sources, including the pipeline of approved projects; submitted plans, such as Preliminary and Site Plans; or parcels identified by Planning staff as likely to redevelop. It is worth noting that not all new employment was assumed to be yielded from net new non-residential square footage. Some future jobs involved the utilization of currently vacant office space and, as a

result, these spaces are not listed as “needed” square footage for future construction. Table 1, below, summarizes “needed” units or space by type in the future according to the Round 9.0 forecast:

Table 1. Net new units or non-residential square feet needed to accommodate future population or employment

	Square Feet (Thousands)				Units	
	Office	Retail	Industrial	Other	Multi-Family	Single-Family
Net New Required (Rounded)	18,771	12,090	636	3,966	51,800	21,200

With the Round 9.0 forecast’s required net new square footage and residential units calculated, these are then converted to acreage of needed land by applying factors for non-residential average floor area ratios (FAR), by use type, and units per acreage. Floor area ratio (FAR) is the ratio of a building’s gross area to the size of the parcel on which the building sits. The larger the FAR indicates the more intensely (or densely) a structure is built on a parcel of land. The factors for FAR or units per acreage which were developed to quantify the amount of acreage needed for each use was developed by looking at residential and non-residential construction from 2006 to the present (April 2016). The non-residential FAR factor was developed by calculating an average ratio between a structures’ built gross area and the parcel area used by that structure. This analysis was done for four types of structures, using the Maryland State Department of Assessment and Taxation (SDAT) parcel file’s land use code categories, that includes office, retail, industrial and other (uses that do not fall under strictly commercial uses, such as institutional or civic uses). Likewise, the residential factor for single- and multi-family residential was developed by calculating an average ratio between a residential buildings’ units and the parcel acreage corresponding to those residential structures. The factors used to convert future net new residential units and non-residential densities to needed acreage for these buildings types are noted in Table 2.

Table 2. Average residential units per acre by Planning Area and average Floor Area Ratio (FAR) for Montgomery County

	Average Dwelling Unit Per Acre			Average Floor Area Ratio (FAR) *
	Single-Family	Multi-Family		
Area 1	4.5	43.4	Office	1.38
Area 2	4.5	24.3	Retail	0.31
Area 3	1.5	18.2	Industrial	0.54
County *	2.4	27.1	Other	0.37

* These ratios are based on parcels within Montgomery County, but outside the municipalities of Rockville and Gaithersburg.

APPENDIX C - RECENT TRENDS IN REAL ESTATE TRANSACTIONS

RESIDENTIAL REAL ESTATE TRANSACTIONS

Montgomery County homes sales, for all housing types (single-family, multifamily, new and pre-owned) peaked in 2006 with a median sales price of \$516,123. Over 16,000 units were sold that year, with a near even split of between attached (townhouses, condos, and housing cooperatives) and detached units sold. The number of days on market averaged 57 days.

Montgomery County continues to recover from the financial crisis of 2008. In 2015, the median sale price for Montgomery County was \$400,000. The reported prices consist of purchases from single-family, multi-family, new and pre-owned housing units. Compared to the market peak in 2007, prices are still down 23 percent, but higher than the low in 2011 of \$368,793. The number of days on market has also rebounded to the 2006 number of 57 days. Accompanying this rebound in median sales prices, the numbers of units sold, both attached and detached, is at its highest level since 2006.

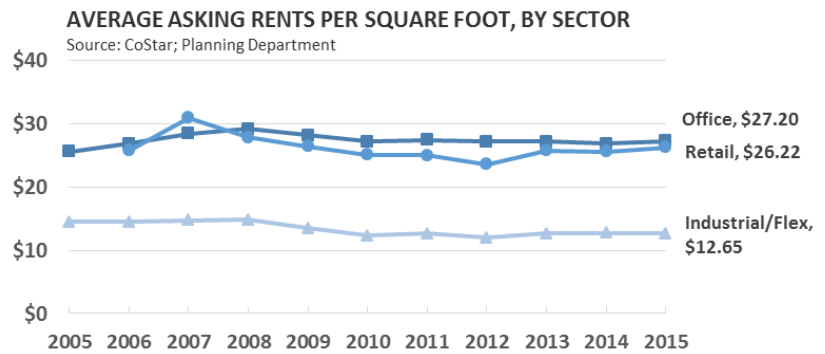
Montgomery County	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Change From Peak (2006)	Year Change
Average Sold Price	\$501,305	\$503,956	\$509,058	\$480,560	\$476,231	\$480,019	\$479,748	\$554,791	\$628,931	\$621,989	\$615,311	-19.4%	-0.5%
Median Sold Price	\$400,000	\$400,475	\$406,971	\$379,898	\$368,793	\$380,434	\$375,626	\$434,837	\$507,546	\$516,123	\$515,782	-22.5%	-0.1%
Units Sold	12,191	10,976	11,461	10,155	9,500	10,408	10,375	8,519	10,355	13,494	16,909	-9.7%	10.0%
Average Days on Market	57	50	47	67	78	66	91	103	81	57	25	0.0%	12.3%
Average List Price for Sold	\$510,680	\$513,883	\$517,083	\$492,779	\$491,708	\$493,957	\$497,898	\$576,004	\$644,225	\$631,731	\$613,191	-19.2%	-0.6%
Attached Average Sold Price	\$323,142	\$316,579	\$318,629	\$299,722	\$287,659	\$303,133	\$310,147	\$363,261	\$420,359	\$418,289	\$423,405	-22.7%	2.0%
Detached Average Sold Price	\$644,775	\$653,265	\$658,477	\$614,147	\$631,227	\$628,553	\$617,017	\$709,358	\$818,080	\$817,438	\$805,935	-21.1%	-1.3%
Attached Units Sold	5,438	4,848	5,039	4,303	4,284	4,743	4,637	3,802	4,924	6,605	8,427	-17.7%	10.8%
Detached Units Sold	6,753	6,128	6,422	5,846	5,215	5,661	5,736	4,715	5,430	6,885	8,478	-1.9%	9.3%
Source: MRIS/RBI													
** All numbers have been adjusted for inflation to 2015 numbers using Bureau of Labor Statistics' CPI Inflation Calculation http://www.bls.gov/data/inflation_calculator.htm													
* Attached Units includes townhouses and condos													

COMMERCIAL REAL ESTATE TRANSACTIONS

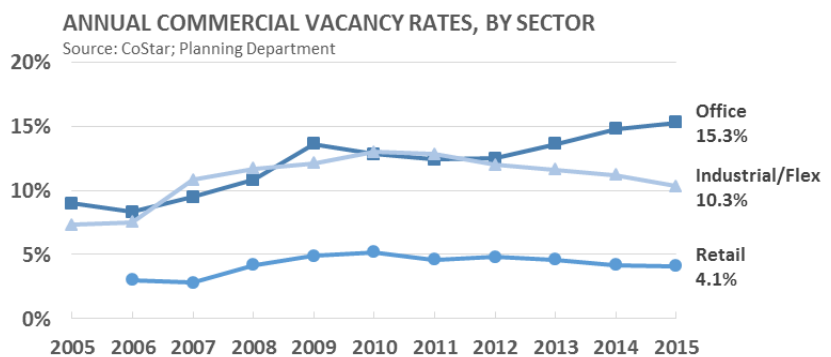
All segments of Montgomery County's commercial real estate market weathered the Great Recession relatively well, with occupancy and rents falling less sharply compared to most major markets nationwide. Recovery has been generally slow but steady.

- More office, retail and industrial/flex space was under lease in 2015 compared to 2010.
- New construction was underway during 2015 in each category.

Other indicators, however, show that the recovery is not complete.



- Asking rents essentially are flat across the board when inflation and changes in product mix are taken into account.
- Vacancy rates remain above pre-recessionary levels, indicating that space added or vacated over the past decade has not been fully absorbed.
- Office vacancies continue to rise. At 15.3 percent, the 2015 vacancy rate was above the 13.6 percent peak vacancy rate during the recession.



More detailed data for each market segment is below.

OFFICE SPACE

As detailed in the 2015 *Office Market Assessment* that Partners for Economic Solutions (PES) prepared in collaboration with the Planning Department’s Research & Special Projects Division, the office market in Montgomery County and the Washington, DC metro region is undergoing an unprecedented series of challenges. Cuts in federal spending and budget turmoil have hit the region’s economic engine, much of which is office-based. Projects already in the pipeline added another roughly half a million square feet to the inventory just as demand softened. In 2015, more than 11 million square feet of office space was vacant countywide.

Structural shifts in the office market—driven by federal mandates to reduce the government’s physical footprint (especially in leased space), but also by changing location preferences and space usage patterns among public and private tenants alike—have further undercut office demand. The market assessment showed that area tenants increasingly prefer high-end space in mixed-use, transit- or highway-accessible places; increased telecommuting, reduced file storage needs and other factors also enable them to use less space per employee.

New construction in preferred locations and continuing lack of demand for isolated, obsolete office space are expected to keep office vacancy rates high for at least the next 5-10 years.

OFFICE MARKET TRENDS (2005 to 2015)

MONTGOMERY COUNTY, MARYLAND

Source: Research & Special Projects Division analysis of CoStar Property data

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
EXISTING											
Buildings	1,526	1,525	1,526	1,526	1,536	1,538	1,537	1,526	1,526	1,522	1,511
<i>New</i>	7	5	3	3	3	3	12	9	10	11	8
Leasable square feet	73,036,000	72,917,000	71,824,000	71,580,000	70,678,000	70,678,000	70,664,000	69,409,000	68,679,000	67,718,000	67,198,000
<i>New</i>	153,000	1,194,000	373,000	955,000	38,000	128,000	1,258,000	900,000	1,053,000	520,000	284,000
UNDER CONSTRUCTION											
Buildings	5	9	7	7	4	4	2	13	13	10	13
Leasable square feet	335,000	463,000	1,242,000	1,455,000	730,000	396,000	108,000	1,308,000	1,598,000	1,134,000	846,000
DEMAND											
Net change in leased square feet	-258,000	32,000	-586,000	736,000	301,000	569,000	-840,000	-243,000	11,000	948,000	1,362,000
Vacant square feet	11,186,000	10,809,000	9,748,000	8,918,000	8,752,000	9,052,000	9,608,000	7,513,000	6,539,000	5,589,000	6,017,000
<i>Vacancy rate</i>	15.3%	14.8%	13.6%	12.5%	12.4%	12.8%	13.6%	10.8%	9.5%	8.3%	9.0%
Occupied square feet	61,850,000	62,108,000	62,076,000	62,662,000	61,926,000	61,625,000	61,056,000	61,896,000	62,140,000	62,129,000	61,181,000
<i>Occupancy rate</i>	84.7%	85.2%	86.4%	87.5%	87.6%	87.2%	86.4%	89.2%	90.5%	91.7%	91.0%
Average Asking Rent	\$27.20	\$26.79	\$27.18	\$27.18	\$27.45	\$27.16	\$28.16	\$29.12	\$28.37	\$26.79	\$25.61

RETAIL SPACE

Demand is picking up at a more robust pace in the retail sector. At 4.1 percent, retail vacancies remain relatively low, though still above the very low 2.8 percent rate in 2007 just before the recession hit. At \$26.22 per square foot, average asking retail rents are below their 2007 peak, when they approached \$31 per square foot. In 2016, the Research & Special Projects division is launching a comprehensive retail study to assess the long term outlook for retail demand in Montgomery County, including the overall amount, location and type of retail most likely to thrive here.

RETAIL MARKET TRENDS (2005 to 2015)

MONTGOMERY COUNTY, MARYLAND

Source: Research & Special Projects Division analysis of CoStar Property data

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
EXISTING											
Buildings	2,358	2,354	2,342	2,333	2,339	2,334	2,327	2,325	2,331	2,321	N/A
<i>New</i>	8	20	16	8	13	14	8	5	13	16	N/A
Leasable square feet	40,881,989	41,434,689	41,289,839	41,176,383	41,092,644	41,112,284	40,871,193	40,556,366	40,517,443	40,057,473	N/A
<i>New</i>	88,445	535,658	503,034	137,398	284,002	274,455	406,829	90,324	518,204	291,387	N/A
UNDER CONSTRUCTION											
Buildings	5	7	19	16	8	9	14	7	5	12	N/A
Leasable square feet	527,800	132,545	566,384	716,386	195,912	201,166	254,718	393,027	388,324	798,834	N/A
DEMAND											
Net change in leased square feet	-494,717	312,811	166,353	699	244,410	100,534	-6,696	-528,715	555,188	56,475	N/A
Vacant square feet	1,684,152	1,742,135	1,910,096	1,962,993	1,879,953	2,144,003	2,003,446	1,686,831	1,119,193	1,214,411	N/A
<i>Vacancy rate</i>	4.1%	4.2%	4.6%	4.8%	4.6%	5.2%	4.9%	4.2%	2.8%	3.0%	N/A
Occupied square feet	39,197,837	39,692,554	39,379,743	39,213,390	39,212,691	38,968,281	38,867,747	38,869,535	39,398,250	38,843,062	N/A
<i>Occupancy rate</i>	95.9%	95.8%	95.4%	95.2%	95.4%	94.8%	95.1%	95.8%	97.2%	97.0%	N/A
Average Asking Rent	\$26.22	\$25.59	\$25.72	\$23.57	\$24.98	\$25.04	\$26.39	\$27.85	\$30.92	\$25.70	N/A

INDUSTRIAL/FLEX SPACE

Industrial and flex space vacancies have fallen steadily from a high of 13 percent in 2010 to 10.3 percent in 2015, only halfway to the 7.3 percent vacancy rate in 2007. A recent industry market assessment, also prepared by PES for the research division, indicated that pressure to convert industrial land is very high, especially in areas of the county where there is growing demand for housing and mixed use developments and transit accessibility. The study highlighted the essential role that this space plays in accommodating a wide array tenants providing key goods and services to area residents and businesses. After years of shrinking inventory, falling rents and no new construction, roughly 200,000 square feet was under construction in 2015, suggesting that the market is responding to continued demand for this product.

INDUSTRIAL/FLEX MARKET TRENDS (2005 to 2015)

MONTGOMERY COUNTY, MARYLAND

Source: Research & Special Projects Division analysis of CoStar Property data

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
EXISTING											
Buildings	912	913	915	916	917	917	918	920	922	922	918
<i>New</i>	0	1	0	0	0	0	1	1	1	4	3
Leasable square feet	25,703,358	25,808,358	25,878,678	25,988,678	25,999,426	25,999,426	26,109,986	26,235,434	26,223,224	26,158,724	25,838,170
<i>New</i>	0	13,600	0	0	0	0	13,000	65,000	91,000	320,554	439,912
UNDER CONSTRUCTION											
Buildings	3	0	1	0	0	0	0	1	0	1	3
Leasable square feet	200,080	0	13,600	0	0	0	0	13,000	0	91,000	209,994
DEMAND											
Net change in leased square feet	140,074	51,798	5,196	188,251	44,393	-321,887	-218,827	-217,463	-814,967	250,998	579,135
Vacant square feet	2,643,668	2,888,742	3,010,860	3,126,056	3,325,055	3,369,448	3,158,121	3,064,742	2,835,069	1,955,602	1,886,046
<i>Vacancy rate</i>	10.3%	11.2%	11.6%	12.0%	12.8%	13.0%	12.1%	11.7%	10.8%	7.5%	7.3%
Occupied square feet	23,059,690	22,919,616	22,867,818	22,862,622	22,674,371	22,629,978	22,951,865	23,170,692	23,388,155	24,203,122	23,952,124
<i>Occupancy rate</i>	89.7%	88.8%	88.4%	88.0%	87.2%	87.0%	87.9%	88.3%	89.2%	92.5%	92.7%
Average Asking Rent	\$12.65	\$12.74	\$12.66	\$11.93	\$12.61	\$12.31	\$13.48	\$14.82	\$14.70	\$14.45	\$14.48

APPENDIX D - OTHER RELEVANT GROWTH MEASURES

RENTAL HOUSING STUDY

The Montgomery County Council, in recognition of the importance of housing issues to the future of the County, approved a FY16 work program item for the Maryland National Capital Park and Planning Commission (MNCPPC) and Montgomery County Department of Housing and Community Affairs (DHCA) to undertake a comprehensive Rental Housing Study. The purposes of the study are multifaceted with an overarching goal to identify Montgomery County's rental housing issues and needs, and offer holistic and sustainable approaches to meeting them. The project is envisioned to take approximately 18-24 months to complete. The data collection, background research, identification/testing of options would be completed during FY 16, while the policy analysis, recommendations, and final report would be completed during FY 17. Currently, preliminary and secondary analysis is completed or near completion, and next steps include interview and stakeholder outreach, typology analysis, financial feasibility model, policy analysis, and strategy formulation.

[For more information, please visit Montgomery County's Rental Housing Study Webpage.](#)

Preliminary analysis for Montgomery County's Rental Housing Study indicates an urban/rural dichotomy in development patterns with development intensifying inside the Intercounty Connector (ICC) and along the I-270 corridor. Rental housing accounts for 30 percent of all units in Montgomery County, concentrated on Metro lines and employment centers.

Montgomery County's rental stock has a high concentration of large units, and almost 40 percent are 3+ bedroom units. Only 25 percent of the 3+ bedroom units are apartments, due to the large amount of conversion units in the housing stock. The rental housing supply is older (55 percent built prior to 1980, only 14 percent constructed since 2000), which leads to a creation of "natural" affordability, while also providing a diverse unit size.

Montgomery's County rental population is diverse and diversifying. 37 percent of renter households have 3+ persons and over 66 percent of rents are over 35-years old. More than 50 percent of renter households earn less than 100 percent AMI (Area Median Income), with households earning below 50 percent of AMI accounting for 38 percent of demand. Only 19 percent of rental units are affordable to households earning less than 50 percent of AMI. Affordability is greatest in smaller units, with only 12 percent of larger (3+ bedroom) units affordable to households earning less than 80 percent of AMI. Over 50 percent of all renter households are cost burdened, with cost burdening much greater for lower incomes.

Potential market considerations include the impact of removing conversions on the balance of units due to market forces making it more lucrative to sell the rentals and also the impact of the Purple Line on the rental market equilibrium.

RETAIL TRENDS STUDY

The Research & Special Projects is undertaking a Retail Trends Study to better understand how to promote and enhance successful retail across the County. E-commerce and evolving consumer preferences are disrupting today's retail industry. Large retail developments are being constructed across the Washington D.C. region at a rapid pace which can compete with Montgomery County's commercial centers. At the same time, neighborhood and mixed-use retail projects continue to be built across our County. The Retail Trends Study plans to assess our County's strengths, limitations, and competitive position of our retail sector in the County, to incorporate as policies into our planning practice. A large part of this study will involve evaluating existing conditions, and project future capacity for retail growth. This study will last approximately 1 year, from August 2016 – May 2017.

EMERGING INDUSTRIES; FUTURE JOB TYPES and WORKPLACES; DESIGN and PLANNING IMPLICATIONS

Recent research undertaken by the Planning Department indicates that many existing and planned commercial buildings and centers in Montgomery County and elsewhere do not meet changing user needs. This mismatch threatens the county's ability to compete for enterprises, jobs and revenues in key sectors of the region's economy. The Research & Special Projects Division will initiate an in depth assessment of tools and strategies for responding to this economic challenge. Focusing on industries that economic developers have targeted for retention and expansion, the study will look at workforce demographics, cluster economics, technology changes, workplace design trends and other dynamics that are reshaping business location preferences. The analysis then will identify zoning, master plan, urban design, transportation, infrastructure, amenities and other land use policy options that may help channel development into more competitive patterns. This study will commence in fiscal year 2017.

APPENDIX E - TEN-YEAR FORECAST RESULTS AND KEY EMPLOYMENT FACTORS

The Round 9.0 Cooperative Forecast is the latest in a series of forecasts stretching back to 1976, for which the Montgomery County Planning Department has provided household, population, and employment figures to the Metropolitan Washington Council of Governments (MWCOC) for inclusion in a region-wide forecast. Round 9.0 has a time horizon that extends from 2010 to 2045, but in this section the narrative will be on a near-term time horizon from 2015 to 2025.

AT-PLACE EMPLOYMENT FORECAST

In the ten-year period from 2015 to 2025 the total at-place employment in Montgomery County is expected to increase from approximately 520,200 jobs to 572,500, an increase of 52,300 jobs or 10%. Total at-place jobs include wage and salary jobs covered by unemployment insurance, wage and salary jobs not covered by unemployment insurance, the self-employed, and non-civilian military personnel. Not all at-place jobs growth will be distributed uniformly throughout the County, see Table 1. In the period between 2015 to 2025, White Flint is expected to be the employment growth leader with a net gain of about 13,600 jobs, followed by White Oak with an increase of about 5,200 jobs. The largest at-place employment gains, from a percentage gain perspective, is Clarksburg, with a jobs increase of around 139%, or 4,300 jobs. This large percentage increase stems from the expectation that Clarksburg will experience a net job increase larger than its relatively small employment base of approximately 3,100 jobs in 2015.

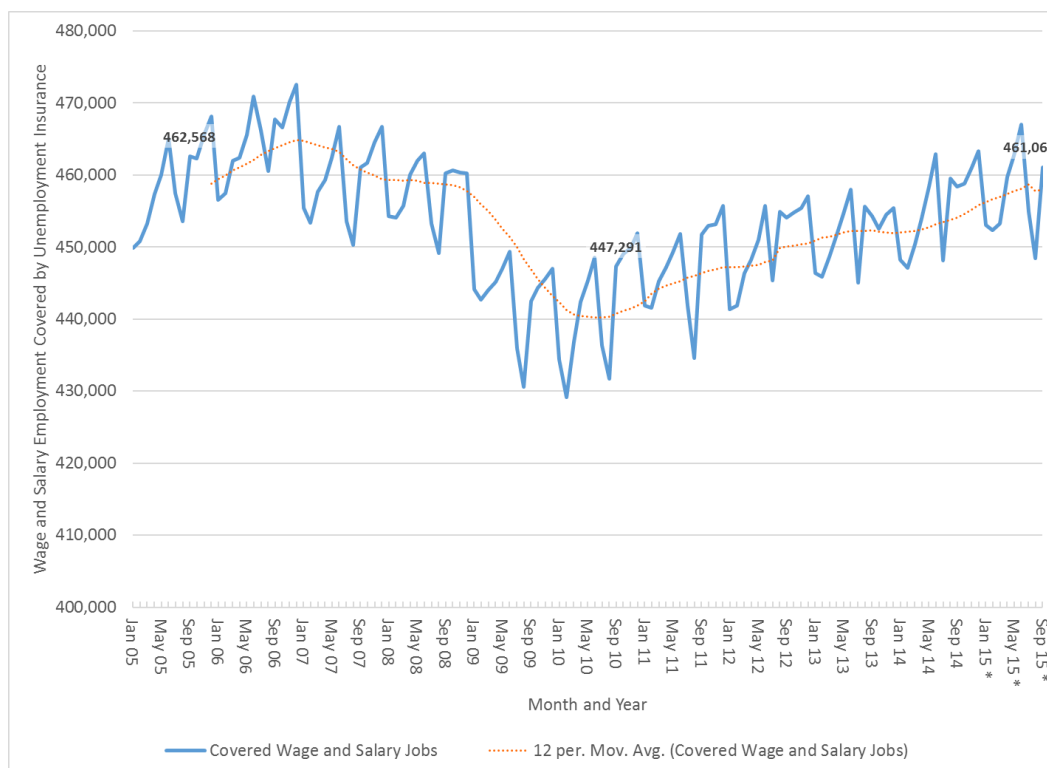
Table 1. Round 9.0 Cooperative Forecast for at-place employment by Policy Area from 2015 to 2025

Policy Area	2015	2025	Change	Percent Change
Aspen Hill	9,100	9,300	200	2.2%
Bethesda CBD	37,700	39,700	2,000	5.3%
Bethesda/Chevy Chase	41,900	42,900	1,000	2.4%
Clarksburg	3,100	7,400	4,300	138.7%
Cloverly	2,200	2,200	0	0.0%
Damascus	2,500	2,500	0	0.0%
Derwood	14,900	15,000	100	0.7%
Fairland/Colesville	13,700	14,100	400	2.9%
Friendship Heights	9,000	10,200	1,200	13.3%
Gaithersburg City	49,100	52,400	3,300	6.7%
Germantown East	11,500	14,400	2,900	25.2%
Germantown Town Center	3,600	3,700	100	2.8%
Germantown West	10,500	11,000	500	4.8%
Glenmont	500	800	300	60.0%
Grosvenor	600	600	0	0.0%
Kensington/Wheaton	20,400	20,800	400	2.0%
Montgomery Village/Airpark	15,000	15,800	800	5.3%
North Bethesda	39,300	40,500	1,200	3.1%
North Potomac	4,100	4,200	100	2.4%
Olney	9,700	9,900	200	2.1%
Potomac	18,100	18,800	700	3.9%
R&D Village	19,400	22,500	3,100	16.0%
Rockville City	53,800	56,200	2,400	4.5%
Rockville Town Center	15,900	16,300	400	2.5%
Rural East	11,200	11,400	200	1.8%
Rural West	4,700	4,800	100	2.1%
Shady Grove Metro Station	4,900	5,100	200	4.1%
Silver Spring CBD	22,300	24,800	2,500	11.2%
Silver Spring/Takoma Park	18,600	18,900	300	1.6%
Twinbrook	12,200	15,900	3,700	30.3%
Wheaton CBD	6,200	7,200	1,000	16.1%
White Flint	20,300	33,900	13,600	67.0%
White Oak	14,100	19,300	5,200	36.9%
Total *	520,200	572,500	52,300	10.1%

* Policy Areas employment may not sum to totals due to rounding.

The 2015 to 2025 forecasted at-place employment growth is expected to be part of the continuing trend of County economic recovery from the Great Recession, which nationally lasted from the fourth quarter of 2007 to the second quarter of 2009. Figure 1, below, reports on monthly Montgomery County at-place employment counts for wage and salary jobs covered by unemployment insurance and shows that some of the worst effects of the recession on our local economy happened in 2010, after the national Great Recession was officially over. Please note this data excludes wage and salary jobs not covered by unemployment insurance, the self-employed, and non-civilian military personnel.

Figure 1. Montgomery County monthly wage and salary employment covered by unemployment insurance, January 2005 to September 2015



* The January to September 2015 employment figures are considered as preliminary as of April 18, 2016.

Source: US Bureau of Labor Statistics (BLS), Quarterly Census of Employment and Wages (QCEW), data downloaded April 18, 2016.

When comparing the second quarter of every year since the 2007 Great Recession to 2015, the last year for which there is data available as of this writing, the nadir in counts of wage and salary jobs covered by unemployment insurance occurred in the second quarter of 2010. To understand the employment dynamics that helped pull the County into growth since 2010, it is illustrative to compare employment industry change from 2010 to 2015. Table 2, below, shows that in the 2010 to 2015 second quarter periods, the driver of employment growth was the private sector, with a net gain of approximately 11,500 jobs. Meanwhile, Government—local, state, and federal—accounted for 35 percent of total County job growth in the same period, producing a net increase of roughly 6,100 jobs. When government jobs are disaggregated further, 66 percent of the total employment gain of about 6,100

jobs is accounted for by the Local Government industry. Likewise, when private sector jobs are assessed for changing industry components, the Education and Health Services industry accounted for nearly 61 percent of the total net gain of about 11,500 private sector jobs. This was followed in growth impact by jobs in the Leisure and Hospitality industry that accounted for 44 percent of total private sector job growth. Additionally, during this period, the office occupying employment industries of Information, Financial Activities, and Professional and Business Services were down an approximate 1,000 jobs from the second quarter 2010 to 2015.

Table 2. Employment industry change for wage and salary jobs covered by unemployment insurance, second quarters 2010 and 2015

	Quarterly Average		Change	Percent Change
	2Q10	2Q15		
TOTAL EMPLOYMENT	445,312	462,931	17,619	4.0%
GOVERNMENT SECTOR - TOTAL	85,929	92,018	6,089	7.1%
Federal Government	45,133	47,157	2,024	4.5%
State Government	1,200	1,269	69	5.8%
Local Government	39,596	43,592	3,996	10.1%
PRIVATE SECTOR - TOTAL ALL INDUSTRIES	359,383	370,913	11,530	3.2%
GOODS-PRODUCING	35,941	35,277	-664	-1.8%
Natural Resources and Mining	952	277	-675	-70.9%
Construction	22,427	23,457	1,030	4.6%
Manufacturing	12,561	11,543	-1,018	-8.1%
SERVICE PROVIDING	323,442	335,636	12,194	3.8%
Trade, Transportation, and Utilities	57,152	57,394	242	0.4%
Information	12,804	12,519	-285	-2.2%
Financial Activities	30,844	30,670	-174	-0.6%
Professional and Business Services	99,674	99,136	-538	-0.5%
Education and Health Services	63,310	70,294	6,984	11.0%
Leisure and Hospitality	37,753	42,875	5,122	13.6%
Other Services	21,906	22,748	842	3.8%

Source: Maryland Department of Labor, Licensing & Regulation (DLLR), Quarterly Census of Employment and Wages (QCEW), County Industry Series, data downloaded April 18, 2016.

DEMOGRAPHIC TRENDS AND TEN-YEAR POPULATION FORECAST

With over one million people, Montgomery County, like most populous and more developed counties, settled into a slower growth phase as dwindling supplies of developable land and transportation capacity no longer sustained rapid growth. The County's annual growth rate of 1 percent is projected to slow even further over the upcoming decades. The key drivers of the County's growth, international migration and births, not only add population, but more importantly, are major influencers of demographic change in addition to the inevitable aging of residents. The changing character of Montgomery County's residents is now more notable than its population growth. The important

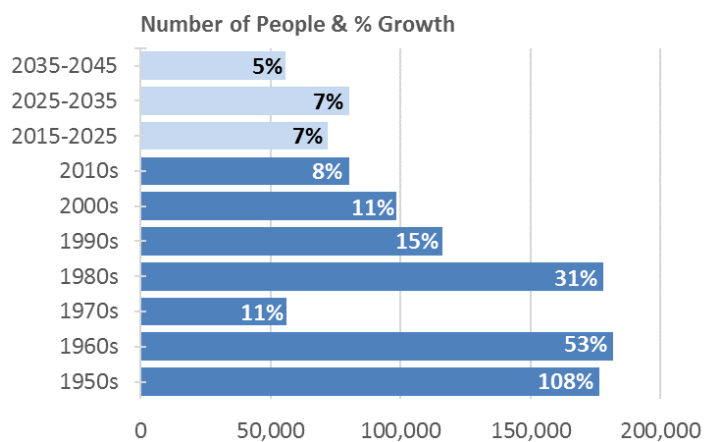
historical and near future demographic trends shaping the character of the County are described in the following report.

Slower growth ahead for mature, populous County

Montgomery County crossed a demographic milestone of over one million residents in 2012, joining the select few 43 most populous of 3,100 counties nationwide. Over the next 30 years, no other jurisdiction in the Washington, D.C. region is expected to break the million mark and join Fairfax and Montgomery Counties. Nor will Montgomery County ever again experience the foundation of rapid growth following World War II.

The County’s population growth was high during the decades of 1950s gaining 176,500 people, peaking in the 1960s at 182,000, and in the 1980s adding 178,000 residents (Figure 2). The 1990s marked more modest population growth with a 15 percent increase, half the rate of the 1980s, followed by slower growth in 2000s of 11 percent adding fewer than 100,000 residents that decade. After 2010, with annual growth rates under 1 percent, Montgomery County entered a slower growth phase typical of populous, more developed counties responding to diminishing resources of developable land and transportation capacity needed to sustain rapid growth.

Figure 2. Montgomery County Population Gains and Percent Rate of Growth, 1950-2045



Source: 1950-2010 U. S. Census; 2015-2045 COG Cooperative Forecast, Rnd. 9.0

The latest population forecast produced by the Montgomery County Planning Department projects a 7 percent increase adding 72,000 residents to total 1,087,300 by 2025. In the long term between 2015 and 2045, Montgomery County is projected to add 208,000 people, 87,100 households, and 158,500 jobs – equating to a daily addition of roughly 19 new residents, 8 new households, and 14 new jobs over the next 30 years.

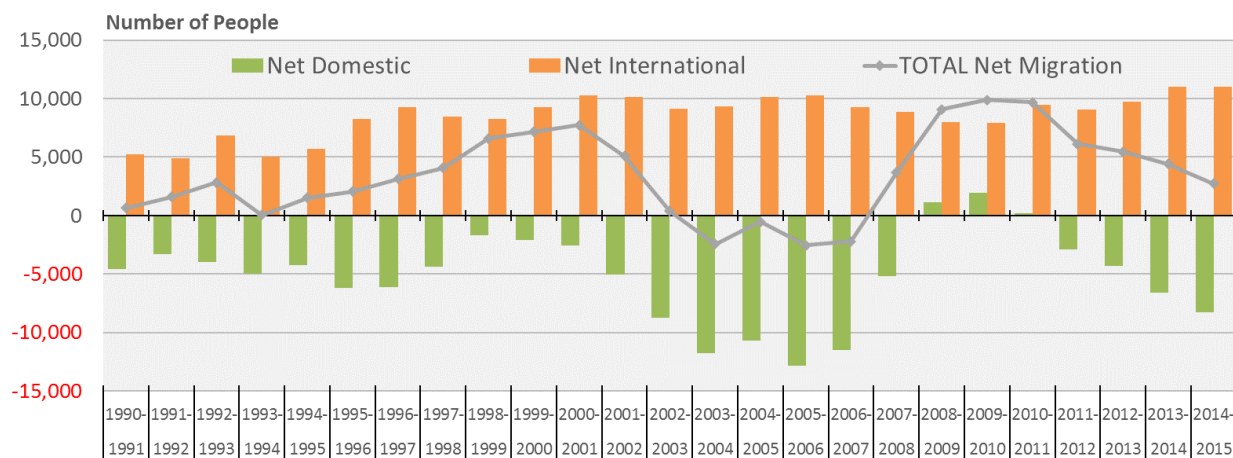
Foreign immigration offsets domestic out-migration

The movement of people in and out of Montgomery County is a potent driver of population growth and the flow is instrumental in changing the character of the residents. International migration is a significant source of cultural diversity and its consistent net influx of people from abroad counters the usual net domestic out-migration where more residents move out of the County than people move in. Over the span of 15 years since 2000, people moving into the County from abroad contributed an annual net gain of 9,600 people, offsetting the average net domestic migration loss of 5,800 people per year relocating within the Washington, D.C. region or elsewhere in the United States. More recently as the economy is showing signs of recovery, the net international migration of 52,310 people more than cancelled out the net loss of 21,450 residents from domestic out-migration, resulting in an overall addition of 30,860 people between 2010 and 2015.

Typically, domestic out-migration occurs during a good economy when there are more job opportunities and the housing market offers upgrade options. Before the Great Recession, from 2003 to 2007, the

County was averaging annual net domestic migration loss of 11,700 people (Figure 3). When the recession started nationwide and locally, people delayed moving due to the difficulty in selling a home after the housing bubble burst, and the lack of job prospects elsewhere. For the first time in 20 years, more people moved into the County from other parts of the United States than residents left during 2008 to 2010. With an improving economy, that trend of domestic migratory gains turned around, and the County’s net domestic out-migration has been increasing over the past four years with the most recent outflow of 8,265 people in 2015 being the largest in 8 years.

Figure 3. Population Migration, 1990-2015



Source: 1990-2015 Population Estimates Program, U.S. Census Bureau.

Montgomery County, with the draw of its large foreign-born population base, economic opportunities, and welcoming social and political environment, is expected to continue to attract international immigrants at levels reflecting improving conditions. After dipping during the Great Recession, international migration into the County set a record net gain of 11,000 foreign immigrants in 2015. The level of foreign immigration into the County is contingent on world and national politics and regional and global economic cycles. Nationally, the U.S. Census Bureau’s population projection assumes a modest decline in the overall rate of net international migration for 2014 to 2060.

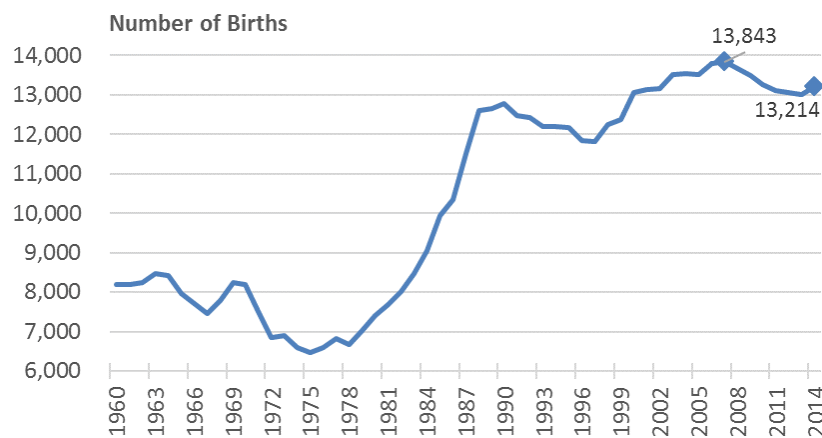
In the near term, domestic migration will probably continue its return to typical levels of out-migration associated with a good economy with net losses approaching 12,000 people. Montgomery County’s domestic out-migration losses will be tempered, but not outstripped by contributions from foreign immigration resulting in diminishing net gains dropping from 2,700 people in 2015 to possible annual losses in the order of 600 to 1,900 people as domestic out-migration picks up.

Births drive population growth and diversity

After peaking at the onset of the recession at 13,800 births in 2007, births in the County declined by 6 percent over six years of slow economic recovery until the first upturn to 13,214 births occurred in 2014 (Figure 4). Between 2007 and 2014, the number of births per 1,000 people dropped from 14.9 to 12.8, the lowest rate since 1979 at 12.2, but not matching the record low of 11 births per 1,000 people during

the recession of 1975. In Montgomery County, as in the rest of the country, women of the millennial generation are delaying childbirth. Birthrates for local women ages 25 to 34--typically, those with the highest rates--continued dropping to new lows since 2007, while birthrates for older women have slightly fluctuated. In 2007, birthrates of 131 births per 1,000 women age 25 to 29 and 149 births per 1,000 women age 30 to 34 dropped to 86 births and 130 births, respectively, in 2014. During this period, birthrates of mothers age 35 to 39 hovered around 82 births per 1,000 women of this age. The number of births are expected to increase gradually as fewer young women postpone motherhood, and the forecasted number of women of child-bearing age increases over the next 20 years. The forecasted number of births in 2025 is roughly 14,000, a 10 percent increase coinciding with a 5 percent increase, 11,400 additional females of child-bearing age between 2015 and 2025.

Figure 4. Number of Births, 1960-2014



Source: Maryland Department of Vital Statistics

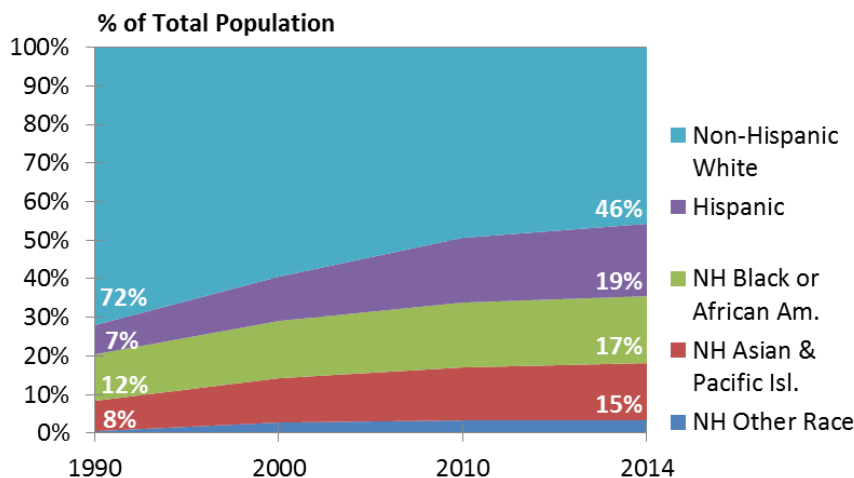
Births, more than double the number of deaths in the past decade, is a major component of the County's population growth. Natural increase, births minus deaths, accounted for more than half of the County's 68,000 population gain between 2010 and 2015. However, it made a comparatively smaller contribution due to the decline in births during the recession. In the next 10 years, increasing births provide a greater contribution to population growth by augmenting the net gains of international migration which counters the expected losses of domestic out-migration typically accompanying an improving economy.

In addition to contributing to the population's growth, births change the racial and ethnic composition of Montgomery County. In 1990, the combined percentages of Hispanic, African-American, and Asian births in the County totaled 40 percent, rising to 63 percent of all births in 2014. During this period of increasingly diverse in-migration and births, the County's minority population (any group other than non-Hispanic white) increased from 28 percent in 1990 to 54 percent in 2014. General fertility rates of women in the County vary by maternal race and Hispanic origin. Hispanic women had the highest birthrate at 77.6 births per 1,000 Hispanic women age 15 to 49 compared to 65.5 for African American women, and 59.8 for non-Hispanic white women in 2014. As the minority population continues to grow over the decades, 22 percent forecasted in the next 10 years, the number of Hispanic, African American, and Asian babies are expected to increase as well.

Diversity, hallmark of change

Increasing racial and ethnic diversity outpaced the County's overall population growth since the 1990s, steadily increasing the minority share of the total population (Figure 5). Between 1990 and 2014, the minority population added 350,360 people compared to gains of 273,420 in the total population. By 2010, the percent share of the County's largest racial group, non-Hispanic whites, dropped below half, 49.3 percent, creating a plurality among racial and ethnic groups where no single group was a majority. The Hispanic population more than tripled in size since 1990 reaching 192,900 people or 19 percent of the County's population in 2014. Hispanics, the fastest growing group over the past 25 years, became the largest minority group surpassing the number of African Americans in the County. Between 1990 and 2014, the African American population increased from 12 percent to 17 percent to about 178,800 residents. The percentage of Asians almost doubled from 8 percent to 15 percent gaining 91,000 people over 24 years to reach 152,000 in 2014. The non-Hispanic white population dropped from 548,500 in 1990 to 471,500 in 2014, a 14 percent loss. In 2014, minorities comprised 54 percent of the total population making Montgomery County more diverse than the nation (38 percent) and Maryland (48 percent). While similar in the level of diversity compared to the Washington, D.C. region (53 percent), the County has more equal percentage distribution among the minority groups.

Figure 5. Race and Hispanic Origin, 1990-2014



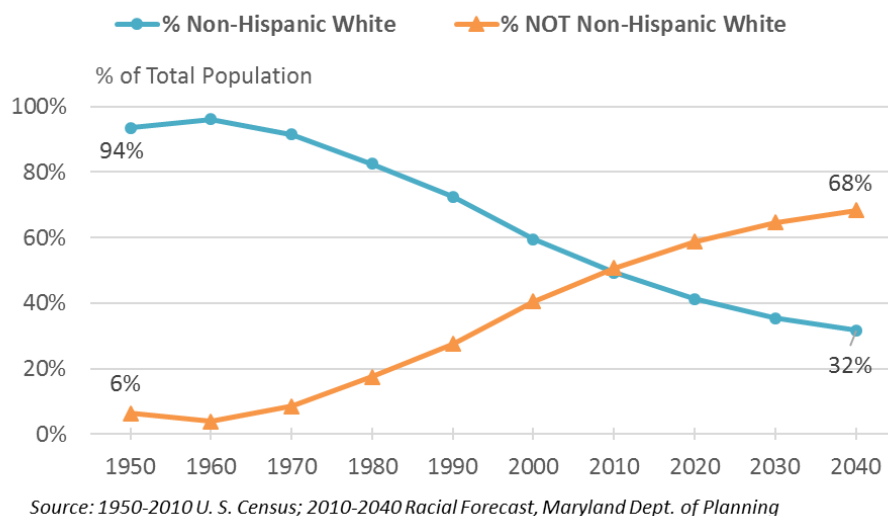
Source: 1990-2010 U.S. Census, 2014 American Community Survey

Near and long term trends of increasing racial and ethnic diversity in Montgomery County are expected to continue, assuming sustained migration patterns of racially and ethnically diverse populations moving into the County and additional minority births. Continuing levels of residents moving into the County from abroad--the net international migration averages nearly 10,000 new residents per year--is expected within the parameters of regional and global economies and world and national politics. The origin of the County's foreign-born residents is widely diverse with 38 percent arriving from Latin America and 36 percent from Asia. The revolving door of people moving in and out of Montgomery County increases the mix of people. New residents moving into the County, 57 percent African American, Hispanic, and Asian, were more diverse than people leaving; less than half of those moving out were minorities in 2014.

Natural population increase and the composition of births and deaths contributes to Montgomery County’s changing racial and ethnic make-up. Increasing diversity over the decades is partly attributed to the rising share of Hispanic, African American and Asian babies, which are now the majority of babies being born (63 percent in 2015). This trend reflects increases in the number of minority women of child-bearing age and the varying birthrates associated with maternal race and Hispanic origin that are higher than birthrates of non-Hispanic White women. The number of minority babies is expected to continue increasing commensurate with the forecasted growth of Hispanic, African Americans, and Asian women. The share of minorities in the County will also shift upwards as elderly residents, the majority non-Hispanic white (69 percent), move from the County or die.

A 30-year forecast of Montgomery County’s non-Hispanic white population is produced by the Maryland Department of Planning staff (Figure 6). In the next 10 years, the County’s minority groups--that is, everyone who is not non-Hispanic white--is projected to grow by 22 percent rising to 62 percent of the total population in 2025. Between 2015 and 2040, the minority population is forecasted to increase by 46 percent and make up 68 percent of the County’s population. Montgomery County’s population gained majority minority status in 2010, more than three decades before the minority population becomes the majority across America in 2044 according to the projections by the United States Census Bureau.

Figure 6. Historical and Forecasted Racial Change in Montgomery County, 1950-2040



Life-cycle events of an aging population

The “Baby Boom” generation, born between 1946 and 1964, remains an enduring agent of demographic change, locally and nationally, as they age through life-cycle events toward retirement. The leading edge of the boomer generation turned 65 in 2011 and by 2030, all will be 65 and older. The aging boomers will drive growth in the 65 plus population from about 120,000 residents, 12 percent of the population in 2010 to 18 percent in 2030 - a 69 percentage increase over 20 years. The swelling of the senior ranks

by boomers with high home ownership rates (79 percent) and comprising almost half of all homeowner households in 2010 has the potential to transform the housing market in the County.

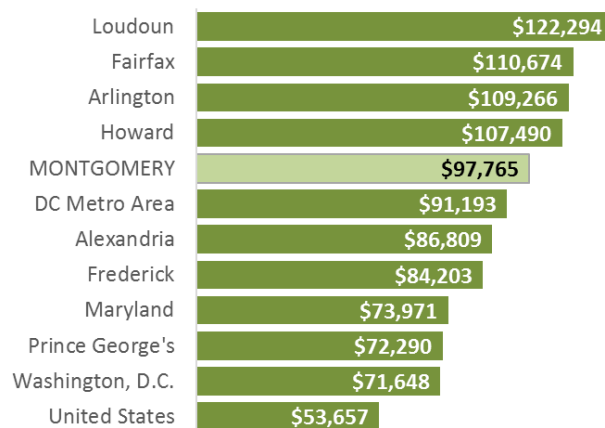
Depending on the boomer’s housing decisions and timing, the potential exists for a significant number of houses to enter the resale market as boomers choose to downsize, relocate in retirement, or eventually die. In the next 10 years, the release of housing may coincide with the likely housing demand of young adults, known as the millennial generation, who have previously delayed homeownership and other decisions such as getting married and starting families. Millennials fall into the age group most likely to move (20 to 34 years old), and correspond to the age of the typical new resident moving into the County. Montgomery County remains competitive for this young adult and family market, offering job opportunities, housing choices spanning rural and suburban neighborhoods to walkable, transit-oriented communities, all with a highly regarded public school system, and desirable quality of life.

Alternatively, the baby boomer household may choose to age in place after postponing retirement, either by choice or financial necessity. If a significant number of seniors decide to age in place or delay moving out, these actions may depress housing turnover in the neighborhood, stalling the traditional “housing ladder” opportunity for young families to move into and revitalize the area. The limited supply of houses reaching the market may increase the difficulty for younger buyers to find or afford a home. The next 10 years will tell whether economic and housing market conditions will promote competing housing needs or ample housing market supply as aging baby boomers and young adult millennials debate their next life-cycle decision.

Household income not recovering from recession

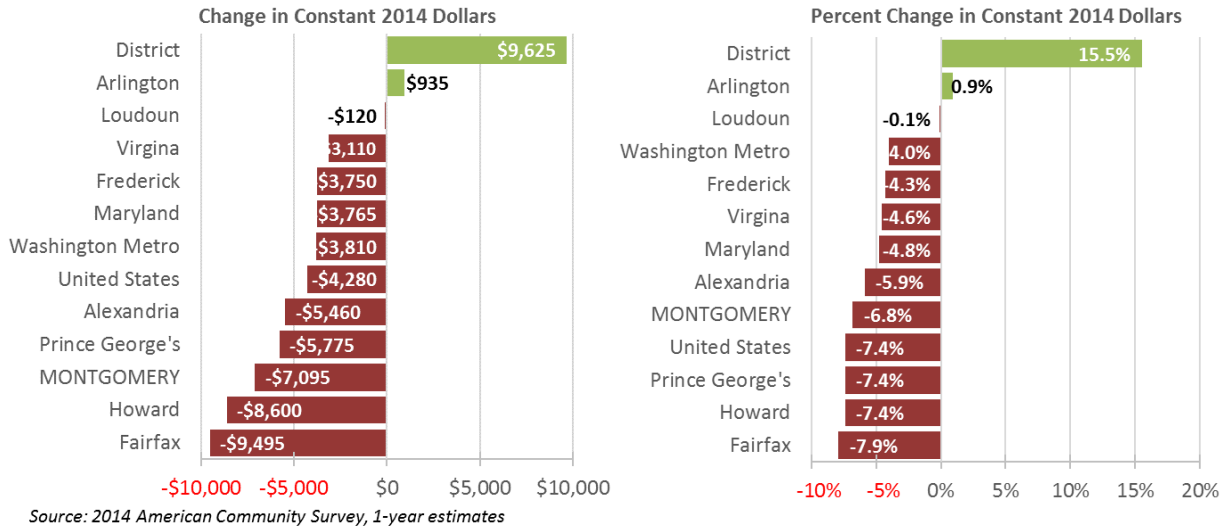
The Washington, D.C. region continues its reign as an affluent area—four local counties top the national ranks of median household income-- but most local jurisdictions have not regained monetary losses in household income since the Great Recession (Figure 7). Montgomery County’s household income, stagnant since 2010, has not recovered from the recession and remains below its inflation adjusted 1999 median. In constant 2014 dollars, the median household income in 2014 was \$3,933 (-3.9 percent) below the 1999 levels at \$101,698. The County’s median household income peaked in 2007 at \$104,860, increasing 3.1 percent from 1999 levels (Figure 8). Between 2007 and 2014, income declined by \$7,095 (-6.8 percent) to \$97,756. In the region, only two jurisdictions had increases in median household income since 2007, Washington, D.C. and Arlington gaining 16 percent about 1 percent, respectively.

Figure 7. Regional Median Household Income, 2014



Source: 2014 American Community Survey, 1-year estimates

Figure 8. Change in Regional Median Household Income, 2007-2014



While there are many competing economic factors making it unclear how long household income will remain stagnant in Montgomery County, the influences of population migration and the aging population also affect the length of recovery. On the positive side, Montgomery County attracts well-educated new residents with earning potential. New residents are highly educated (33 percent with advanced degrees) and they are joining an established concentration of well-educated adults. In 2014, 3 out of 5 adults age 25 and older in the County had at least a bachelor's degree and 32 percent held advanced degrees. A segment of new residents brings wealth into the County as a higher percentage of people with household incomes of \$100,000 or more moved into the County than left (44 and 38 percent, respectively). A slightly higher percentage of people leave the County with household incomes below \$34,000, 18 percent, compared to the 15 percent of people who move in.

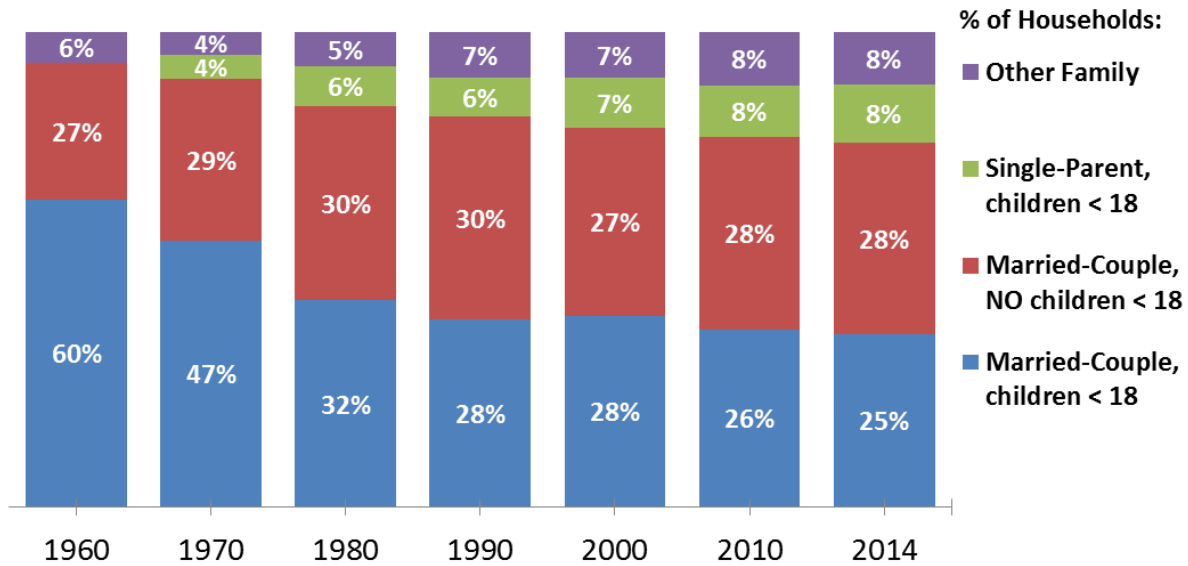
The County's aging population may assert downward pressure on household incomes. Over the next 10 years, the majority of baby boom generation, ages 51 to 69 in 2015, will transition from prime wage earners to leaving the work force and likely lower retirement income. In 2014, the average retirement income at \$62,418 was one-third of the County's average income, \$131,746. Between 2015 to 2025, the 44 to 64 age group, prime wage earners, will drop 5 percent from 28 percent. Montgomery County may expect a 28 percent increase driven by baby boomers aging into the 60 to 79 age cohort by 2025. With the movement of the baby boomers out of the workforce, the worker to senior dependency ratio changes from 4.5 in 2015 to 3.5 in 2025.

Evolving household types outpace married-couples with children

Over many decades, the types of family and non-family households in Montgomery County shifted, responding to societal changes, broader housing choices, and an aging population. The 1950s traditional family of husband, housewife, and several children is no longer the household norm as family formation became more varied. The County's share of married-couple households with children under 18 dropped dramatically from 60 percent of all households in 1960 to 25 percent in 2014 (Figure 9). Married-couple households with *no children under 18* (101,961) outnumbered married-couples *with children under 18* (91,173) in 2014. Between 2000 and 2014, married-couple households with children under 18 had a

negligible change of 1.3 percent, roughly 1,200 families, in contrast to married-couples with no young children growing by 14.3 percent, gaining 12,700 households.

Figure 9. Household Types, 1960-2014



Source: 1960-2010 U.S. Census, 2014 American Community Survey

Aging within families explains some of this shift in married-couple households. As children become adults, parents become “empty nesters” with all of the children gone or they house “failed to launch” or “boomerang” adult children. These households, now with no children or adult children, fall into next category, married-couple, no young children, bumping up this group’s percentage share. Also, young married-couples heeding the millennial generation trend to postpone having children contribute to this group.

Coinciding with the drop in the traditional family type, comes a rise in the shares of single-parents and “other family”, both family types doubling since 1970 with each at 8 percent of the County’s population in 2014. Since 2000, the number of single-parent households with children under 18 increased by 6,900, a 29 percent jump to 30,600 families.

In the near term, the number of married-couples with children under 18 may only slightly increase, and the percentage share of this family type will probably continue its decline begun in 2000. Aging of the baby boom generation, combined with growth in non-family households serve to limit the share of married-couple with young children, relative to the overall growth in households. Montgomery County will continue to attract new families, and married residents will continue to have babies, but not at a rate to replace baby boomer households shedding children in the next ten years. By 2025, 29 percent of the County’s residents are projected to be 55 and older and living in a child-free home. The 17 percent growth in the 55 plus age cohort between 2015 and 2025 is projected to outpace the 2 percent gain in children under the 20 years old. Aging baby boomers will boost the number and the percentage share of married-couples without young children in the next ten years.

The percentage of non-family households in the County, which includes singles, young and old, and unrelated individuals living together, increased from 8 percent of all households in 1960 to 30 percent in 1990 and subsequently plateaued. This rapid increase of non-family households, jumping from 7,200 to

84,000 households from 1960 to 1990, coincided with the addition of multi-family units to the County's housing stock broadening the choice of housing, a housing type which appeals to singles and other non-family households.

In 2000, non-family households became the most common household type with over 100,000 households and 31 percent of all households. Nonfamily households capturing over one-third of all household growth between 2000 and 2014, remain the leading type gaining another 13,200, a 13 percent increase since 2000. Given that most of the new housing in the development pipeline is multi-family units for the next 10 years and the current rental housing market trend for smaller units, studios and one bedrooms, it is possible the share of non-family household types may slightly increase, and it will undoubtedly increase in number by 2025.

APPENDIX F - COOPERATIVE FORECAST METHODOLOGY

Montgomery County's forecast of households, population, and employment provides a framework for conducting the analysis of pace and pattern of growth (see Appendix A 1). The forecast is completed in two stages. The first stage provides County-wide guidance for probable employment, population, and households growth based on the best currently available data inputs and assumptions. The second stage allocates the Countywide first stage forecast to smaller boundaries known as Transportation Analysis Zones (TAZ), based on historical or expected residential and commercial construction. The Metropolitan Washington Council of Governments (MWCOC)—which aggregate's each County's forecast into one regional cooperative forecast—considers the TAZ-level forecast as the final and official forecast which may vary from the first stage produced forecasts.

STAGE 1: COUNTY LEVEL OVERVIEW

The first stage forecast determines guidance for the overall amount of household, population, and job growth likely to occur in the County from 2010 to 2045. During the first stage process, an age cohort-component of change model and a shift-share analysis model are used to forecast population and employment respectively. This effort develops forecasts that are independent of any existing County master planning exercise or the pipeline of approved projects.

The region's cooperative forecast of households, population, and employment is a collaborative effort between MWCOC and local jurisdictions. MWCOC employs a regional econometric model that provides an independent forecast of region-wide growth for households, population, and employment. At the same time that MWCOC prepares its econometric model forecasts, each member jurisdiction also prepares its own separate forecast of local growth, independently of MWCOC. The jurisdictions then work with MWCOC to ensure that the sum of all the independent jurisdictional forecasts are within three percentage points of MWCOC's econometric model totals through a reconciliation process.

STAGE 1: EMPLOYMENT FORECAST

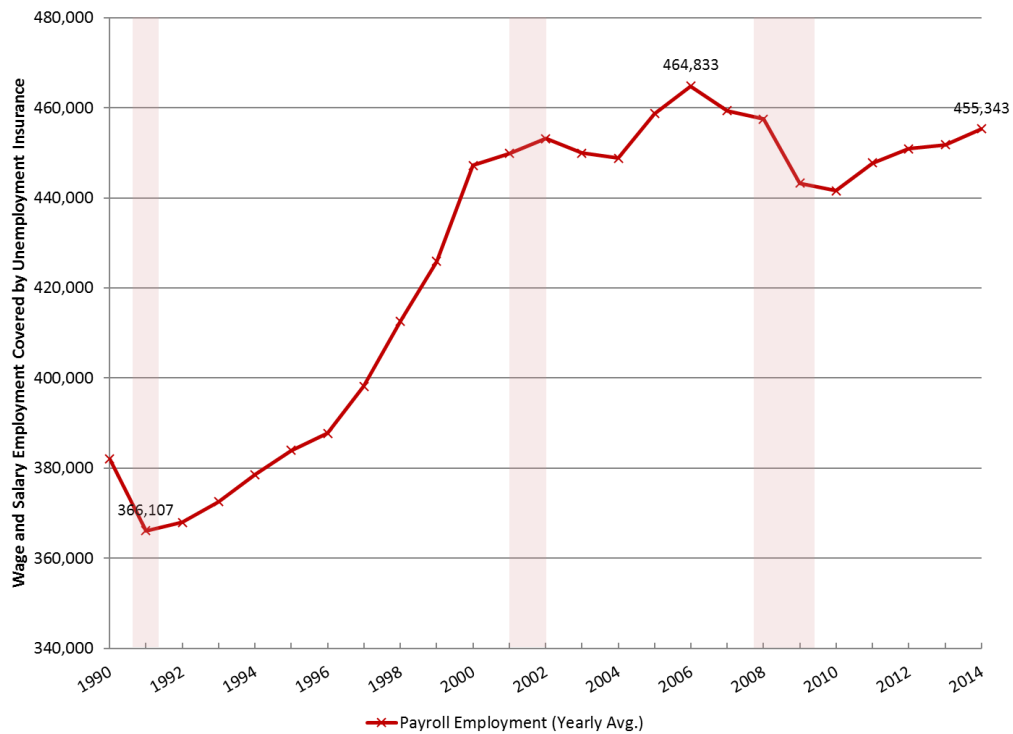
The first stage Round 9.0 employment forecast, which offers guidance on probable future employment trends, were calculated in a two-part process. The first step is to calculate expected wage and salary jobs covered by unemployment insurance through a shift-share method. The second step is to apply MWCOC factors to the covered employment to arrive at wage and salary jobs not covered by unemployment insurance and the self-employed. Lastly, assumptions were made about non-civilian military employment.

The shift-share method was developed in the 1960s and assumes that a local employment industry's growth is affected by its own local industry trends, as well as by that industry's historical and expected regional or national dynamics. The shift-share method includes a "shift-term" that "account[s] for [the] differences between local and reference region growth rates that cause an industry's employment to shift into or out of a region" (Klosterman, "Community Analysis and Planning Techniques", 1990). The shift-share method is widely used for employment industry projections, in fact it was recently used by the Montgomery Business Development Corporation (MBDC) for its "Target Market Assessment" (2015) study.

A key input to this shift-share model is historical information, in this case historical wage and salary employment covered by unemployment insurance. Historical information is important to developing a forecast because it not only inform about the current, near-term trajectory, but it can also inform about trends that are possible in the future, their range of variation, and the external factors that contributed to prior changes that can occur still.

Over the past two decades Montgomery County has grown considerably; from 1991 to 2014 it gained 89,236 covered jobs or grew by 24.4% (see Figure 1). This employment gain has not been experienced as a consistent growth trajectory, but has varied and been mediated by booms and busts, including shallow and prolonged recessions.

Figure 1. Yearly average wage and salary employment covered by unemployment insurance, 1989 to 2014



Note: Highlighted time periods denote recessions.

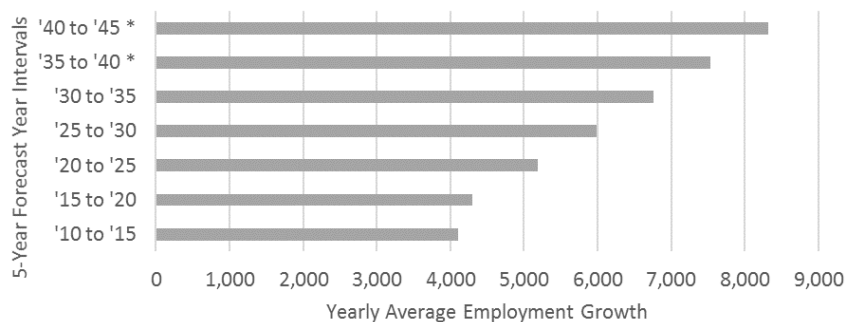
Source: US Bureau of Labor Statistics (BLS), Quarterly Census of Employment and Wages (QCEW), 1990 to 2001 data <http://www.bls.gov/cew/datatoc.htm>. Maryland Department of Labor, Licensing & Regulation (DLLR), Quarterly Census of Employment and Wages (QCEW), 2002 to 2014 data.

The twenty-three-year average covered employment growth from 1991 to 2014 has been around 3,880 jobs, but the post five-year average growth after the tail-end of the last three recessions—in 1991, 2001, and 2009—has varied respectively from 4,325, 2,990, and 2,408 average jobs annually. When comparing these post-recession five-year annual average covered job gains it is evident that the average employment recovery has been weakening after the end of each successive recession. The one observation to note is that the current shallow recovery which has averaged an annual average gain of 2,408 jobs from 2009 to 2013 proceeded an especially prolonged and severe recession, known as the “great recession.” The “great recession” severely crippled the real estate market and led to a credit crunch in the financial markets that necessitated extraordinary financial stimulus responses, some of which are still with us because of continued economic weakness, such as the near-zero federal funds rate.

In preparing historical covered employment inputs for the shift-share model, a key assumption was that in the thirty-five year forecast horizon we will have cyclical booms and busts, but that none of these will be as exceptionally prolonged and as deep as the 2007 to 2009 recession. Thus, trends for wage and salary jobs covered by unemployment insurance were excluded from the shift-share model if they occurred just before, during, and immediately after the Great Recession. As a consequence, the shift-share model inputs include employment change by industry at the Montgomery County and Transportation Planning Board (TPB) regional levels from 1991 to 2000. Another key assumption that was used by the shift-share model was the expected TPB regional employment industry change which was sourced from IHS Inc., a proprietary data provider widely used in the region, such as by GMU’s Center for Regional Analysis.

The above model inputs were also mediated by assumptions on possible near and future employment trends in the County. In the near term and extending to about 2020, planning staff assume that the County’s employment recovery will continue to be modest but consistent. This assumption is based on an assessment that the County and regional economy might encounter some uncertainty resulting from federal sequestration and federal contracting activity. Because of these considerations and the inputs used, the first stage Round 9.0 Forecast calculates that the average annual covered employment growth from 2015 to 2020 will be modestly improved relative to that already experienced in the post-2010 recessionary recovery period, see Figure 2. Thereafter, average annual growth is expected to improve because of stimulus coming from new transportation infrastructure that will connect workers and be a catalyst of new commercial activity and development; improved employer recruiting resulting from a revamped and dynamic County economic development group; growth in the life sciences campuses in Great Seneca and White Oak; and improved federal procurement monies for contractors’ services. These yearly-average employment growth projections are within ranges supported by historical growth trends. For example, in the 1983 to 1987 period, employment growth was 22,600 jobs per year (see “Highlights of the Round 7.0 Cooperative Forecast”, MNCPPC).

Figure 2. Shift-share method model outputs for yearly average covered employment growth, 2010 to 20145



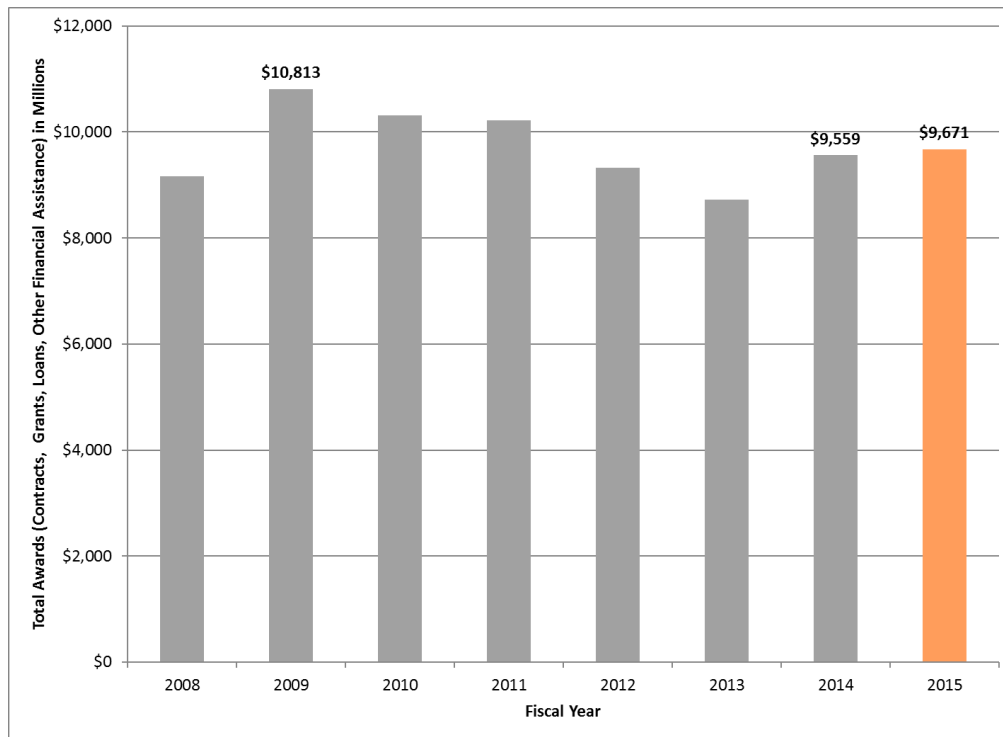
* The yearly average employment figures were amended at the request of the MWCOG through the regional forecast reconciliation process.

Federal contracting is worth noting because starting in the 1980s it became an increasing source of job growth and well-paying employment, many classified in the professional and business services industry, as the federal workforce started declining and contractors were retained to provide services. In fact, George Mason University’s Center for Regional Analysis attributes some of our recent regional slow growth to a contraction in federal spending for contractors in a recent report.

From 2010 to 2013, though, Federal contracting activity decreased by \$13.5 billion, a 16 percent decline. This trend has both slowed job growth and shifted it to lower-wage sectors and occupations. With additional Federal cutbacks expected in the future these trends will likely continue unless action is taken to improve the region’s ability to compete in the global marketplace. (“Improving the Washington Region’s Global Competitiveness”, 2014)

Fortunately, starting in 2014 the trend in Federal monies spent on federal contracts, grants, loans, and other financial assistance in Montgomery County might have started to improve after years of declines since 2009 (see Figure 3). As mentioned earlier, the first stage Round 9.0 forecasts assumes that this upwards trend will continue in the future and provide a stimulus to contractor employment growth.

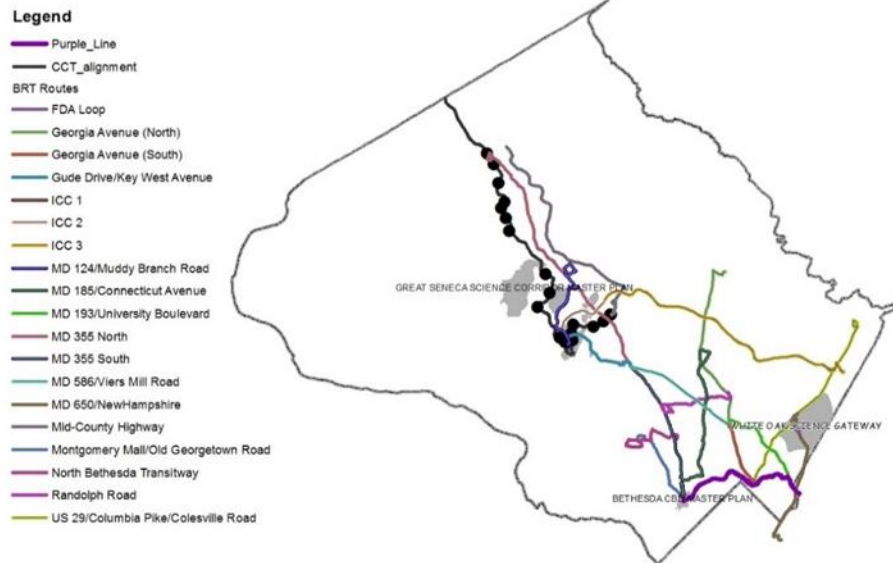
Figure 3. Federal expenditures for contracts, grants, loans, and other financial assistance in Montgomery County



Source: USAspending.gov, downloaded April 19, 2016.

Another assumption for continued growth in the County relies on the construction of transformative capital transportation projects, such as the Purple Line, the Corridor Cities Transitway (CCT), and Bus Rapid Transit (BRT), see Map 1. The Round 9.0 first stage employment forecast assumes that the development of light rail and bus rapid transit will lead to economic and employment growth by efficiently connecting workers to jobs, the greater ability for existing commercial area to access workers will lead to these areas attracting employers, and this in turn this will lead to vacancies declining in those areas and spur new construction. These effects are not unprecedented in our region, for example the Silver Line helped Fairfax County attract new office tenants like Cvent and Intelsat, S.A. with access to Metro and it has improved office leasing within a quarter-mile of stations in Tysons. The forecast assumes that the Purple Line will be operational by 2021; that the CCT phase I will be complete by 2030 and Phase II by 2035; and that the rest of the BRT system will be functioning by 2040.

Map 1. Major Transportation Infrastructure Projects



Besides overall employment growth, the shift-share model also calculate the types of jobs that will grow in the County in the thirty-five year forecast horizon. Based on the data inputs and the assumptions that mediated those inputs, the shift-share model’s output indicate most industries will gain employment, with the notable exceptions the Federal Government and the Information industries. A contraction of federal government employment is also a trend that MWCOG’s econometric model predicts for the region’s future. In addition, with services continuing a shift to contractors the Professional and Business Services are expected to expand. In fact, the forecast calculations call for the Professional and Business Services to expand the most in numbers by about 63,400 jobs in the forecast horizon period.

After future wage and salary employment covered by unemployment insurance are calculated through the shift-share model, factors were applied to that employment at 5-year intervals to arrive at total employment at those 5-year intervals. It must be noted that the base year, 2010, employment does not derive from the shift-share model, but rather, it is an estimate from the Maryland Department of Labor, Licensing & Regulation’s (DLLR) Quarterly Census of Employment and Wages (QCEW) for covered wage and salary employment. Factors are also applied to the 2010 estimate of covered employment to arrive at total employment for 2010. These factors were developed by the Metropolitan Washington Council of Government (MWCOG) and tailored to each jurisdiction, including Montgomery County. You can learn more about these factors in MWCOG’s technical memorandum, “Suggested Approach for Preparing Baseline Employment Estimates”, at this [URL](#). The first factor accounts for workers not accounted for in the Wage and Salary employment data series because they are not covered by unemployment insurance—for example persons employed by religious institutions or railroad workers. This factor was developed by MWCOG using BLS’ Current Employment Statistics (CES) and Quarterly Census of Employment and Wages (QCEW) data. Montgomery County’s unique factor for these jobs is 1.045 and should be applied to the total wage and salary covered by unemployment insurance jobs figure. MWCOG also developed a second factor for self-employed persons that should be multiplied to the product of covered wage and salary jobs and the 1.045 factor. The County’s unique factor for calculating the number of self-employed

persons is 1.06 and was developed using the Census Bureau’s American Community Survey (ACS) Public Use Microdata Sample (PUMS) files. Lastly, assumptions about non-civilian military employment was made for the County using the Department of Defense’s (DOD) “Base Structure Report: A Summary of the Real Property Inventory” reports that tabulates military personnel by base. The sum of all this employment is then used as the first stage County forecast which is used for guidance for the allocation of future employment to Transportation Analysis Zones (TAZ) by forecast year.

Lastly, the first stage Montgomery County employment, household, and population forecasts were submitted to MWCOG for inclusion in the region-wide cooperative forecast. During this process, the region-wide forecast produced by all MWCOG member jurisdictions was compared to the results of the independent econometric model. When the combined member produced regional forecast for either households, population, or employment differs from the econometric model by plus or minus three percentage points, then that forecast is subjected to the reconciliation process. For Round 9.0, Montgomery County’s forecast for household and population was not subject to the reconciliation process, but MWCOG staff requested changes to the employment forecast in the further-out years. This request was not isolated to Montgomery County, but was also made of other jurisdictions such as Fairfax and Loudon Counties in Virginia or the District of Columbia. The reconciliation process was triggered because the combined member jurisdictions’ regional employment forecasts in the later years were above the three percentage points threshold from the econometric model. Subsequently, in consultation with planning staff from Gaithersburg, Rockville and the MWCOG, Montgomery County planning staff agreed to lower their employment forecast by 1.9 percent in 2040 and 4.8 percent in 2045 to maintain a County employment regional share consistent with that observed in the 2030 to 2035 forecast period.

STAGE 1: COUNTY-LEVEL POPULATION FORECAST

The county-level population forecast utilizes an age cohort-component method and assumptions based on historical demographic trends in Montgomery County. The population projection captures the dynamics of the County's major components of growth: natural population increase (typically, number of births are double deaths), and the movement of people in and out of the County.

The age cohort-component model producing county-level results starts with an estimated base household population by age and sex for January 2010 derived from the U.S. Census Bureau’s Population Estimate Program adjusted by estimates of group quarters from the decennial 2010 U.S. Census. The components of population change are projected separately for each 5-year age cohort based on past trends. For each 5-year time period, 2010 to 2045, the population is advanced 5 years of age using the age-specific survival rates (2010 national rates) and migration rates averaged across 2000 to 2007 purposely excluding the Great Recession and the years following. Nationwide and locally, people delayed moving during the recession due to the difficulty in selling a home, and the lack of job prospects elsewhere. For the first time in 20 years, more people moved into the County from other parts of the United States, than residents left during 2008 to 2010. With an improving economy, that trend turned around, and the County’s net domestic out-migration has been increasing over the past four years and the most recent outflow was the largest in 8 years. International migration is a significant source of the County’s growth and cultural diversity, contributing a net gain of 9,600 people per year over a span of 15

years, offsetting the average net domestic migration loss of 5,800 residents relocating within the region or elsewhere in the United States. After dipping during the Great Recession, international migration into the County responded to an improving economy, steadily climbing to a record net gain of 11,000 foreign immigrants in 2015. With the draw of its large foreign-born population base, economic opportunities, and a welcoming social and political environment, Montgomery County is expected to continue to attract international immigrants, levels moderated by world and national politics and regional and global economic cycles.

A new birth cohort is added to the population model by applying averaged, age-specific general fertility rates to the child-bearing female population. After peaking at the onset of the recession at 13,800 in 2007, births in the County declined by 6 percent over six years of slow economic recovery until the first uptick to 13,200 births occurred in 2014. In Montgomery County, as reported nationally, the generation of Millennial women are delaying childbirth as birthrates for local women ages 25 to 34 -- typically, with the highest rates -- continue dropping to new lows since 2007, while birthrates for older women have slightly fluctuated. The number of births are expected to gradually increase as young women no longer postpone motherhood and the forecasted number of women of child-bearing age increase over the next 20 years.

Projected group quarters for the 5-year time periods is added to the modeled household population to derive the total population forecast for Montgomery County.

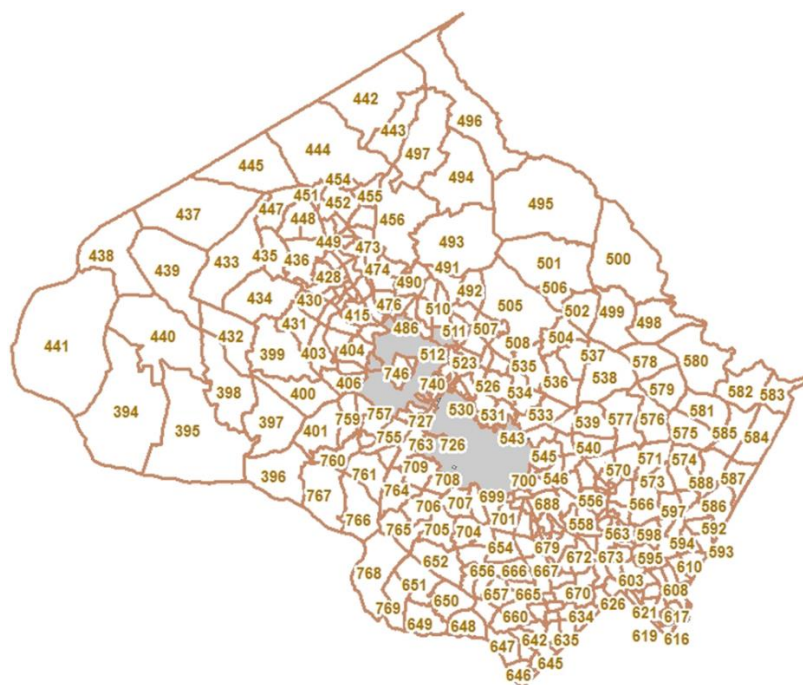
County-Level Household Forecast

The household projections for the county-level exercise is derived using a headship rate method which assumes that the number of people who head a household is equal to the number of households. The data for the headship rate method utilizes county level householder age estimates from the decennial 2000 and 2010 U.S. Census and the 2005 to 2014 American Community Survey, 1-year estimates. For each 10-year householder age cohort for the adult population age 15 and older, headship rates are calculated by dividing the number of householders in the age cohort by the household population in the same cohort. The average headship rate for period 2000 to 2014 is applied to the forecasted household population in respective age cohorts to estimate the number of households for each age cohort for the forecast year. The forecasted households are summed across the adult age cohorts calculating the total households for the forecasted year. The household projection holds the headship rate by age cohort constant across the forecast period. The change in the number of households is attributed to population growth and changes in the age structure of the population over time.

STAGE 2: ALLOCATION OF EMPLOYMENT, HOUSEHOLD, AND POPULATION FROM THE STAGE 1 FORECASTS

Once the first stage forecasts—which offer guidance on likely growth for County households, population, and employment—are established, these then have to be allocated to Transportation Analysis Zones (TAZ). This work is done in conjunction with the jurisdictions of Rockville and Gaithersburg who perform their own independent allocation work for TAZs. Out of 376 TAZs in the County, the MNCPPC Montgomery County Planning Department is responsible for the allocation of 321 TAZs, see Map 2. MWCOG considers the sum of the TAZ forecasts as the final forecast, superseding the preliminary first stage forecasts, and allows some variation between the two.

Map 2. Transportation Analysis Zones for which the MNCPPC Montgomery County Planning Department allocates forecasted households, population, and employment



Because the forecast allocation is done among three independent entities, the first stage in the allocation process was to establish a baseline of households, population, and employment that would be distributed among Gaithersburg, Rockville, and MNCPPC. This baseline, though, evolved among the three entities as the allocation of population and at-place jobs had to contend with the actual amount of construction possible in every five-year forecast interval. For example, MNCPPC's allocation of households between 2010 and 2015 was impacted by the fact that in this period actual residential construction yielded only 12,374 households, which was 5,352 households lower than what was expected by the age cohort-component of change model's forecast for this period. Likewise, the jurisdiction of Rockville had assumed it would allocate 37,009 households in 2035¹, but the allocation process only allowed it to accommodate 33,999 households at the TAZ level.

Among the TAZs for which MNCPPC is responsible, the allocation process of households and population was done in stages. The first stage involved spatially matching those MNCPPC TAZs with the US Census' 2010 Decennial Census counts of household and population by Census blocks. The Census data was then aggregated to the MNCPPC portion of TAZs to attain a 2010 base of households and population at the TAZ-level. The second stage was to distribute the net change of households, by 5-year intervals, for the MNCPPC apportionment of future households. Households were calculated by applying an occupancy factor for single- and multi-family units, see Table 1. Household

¹ As of March 16, 2016

net changes were allocated by 5-year increments in accordance to the agreed upon apportionment of households for the MNCPPC TAZ areas, except for the 2010 to 2015 and 2040 to 2045 intervals. As mentioned earlier, in the 2010 to 2015 interval, not enough residential construction actually occurred among the MNCPPC TAZs to yield the expected household net change from the household apportionment. In the 2040 to 2045 interval, residential redevelopment assumptions made for allocation purposes resulted in a shortfall of 90 households. Otherwise, each 5-year interval from 2015 to 2040 had household net changes as prescribed by the households apportioned to the MNCPPC TAZ portion of the County.

The third stage in the process was to apply a factor of persons per occupied unit to future occupied net new single- or multi-family unit. The factors used to yield households and population from assumed future single- and multi-family construction is below:

Table 1. Occupancy and persons per occupied unit factors

Unit Type	Occupancy Rate	Average Household Size
Single-Family	0.97	3.07
Multi-Family	0.93	2.09
Total	0.95	2.75

Source: MNCPPC Montgomery County Planning calculations based on the 2010-2014 American Community Survey 5-Year Estimates.

Employment was allocated in a similar fashion where the 2010 to 2045 employment apportioned to the MNCPPC TAZ portion of the County was distributed among TAZs based on net growth by 5-year intervals. Among those MNCPPC TAZs, the 2010 wage and salary jobs covered by unemployment insurance were allocated among TAZs based on a geocoded—or mapped—address-level April 2010 employment from the Maryland Department of Labor, Licensing, and Regulation’s (DLLR) Quarterly Census of Employment and Wages (QCEW) dataset. To this allocation were added an estimate of the self-employed apportioned according to a TAZs share of total population and an estimate of wage and salary jobs not covered by unemployed insurance apportioned according to a TAZs share of total covered employment and the self-employed. Thereafter, for each forecast 5-year interval employment was predominantly based on yields stemming from assumed future non-residential space construction and the application of occupancy rate factors and an employee per square feet of occupied space factors, see Table 2.

Table 2. Non-residential space occupancy rates and employees per square feet

Non-Residential Space Type	Occupancy Rate	Employees Per Sq. Ft.
Office	0.88	225
Retail	0.96	400
Industrial	0.92	450
Other	1.00	500

Note: Occupancy rates based on CoStar vacancy rates from 2005 to 2015 for office space and 2006 to 2015 for retail and industrial usages. This forecasts assumes full occupancy of “other” space.

Not all 5-year employment net gains came from new non-residential construction. The allocation of some office employment was yielded from the utilization of select vacant office space. The selection of these office building with vacancies was guided by the Planning Department's 2015 "Office Market Assessment" which found that high-quality vacant space in urban areas in proximity to Metro or suburban areas with good road access would fare better in terms of future occupancy rates and rent-growth than lower-quality office without these attributes. With this guidance, office buildings with CoStar's quality rating of 4 star or greater and within a one-half mile proximity buffer to Metro stations (including proposed Purple Line stations) or a one-mile proximity buffer to state route and interstate interchange nodes were chosen. These buildings' office employment yields were based on the assumption that their occupancy rate would stabilize at a rate of 88%. Additionally, these select buildings were assumed to fill-up to the 88% occupancy rates between the years of 2015 and 2030.

During the allocation process employment was disaggregated by TAZ into four major land use categories: office, retail, industrial, and other (mostly employment in institutional or civic spaces). One challenge with working with base year 2010 QCEW employment data is that this dataset's jobs can have a myriad of employment industry categories that do not readily lend themselves to a simple land use equivalent. In fact, some employment industry categories might have components whose activities lend themselves to different land use equivalents. For example, the printer that might do retail sales in the front of a printing shop, which lends itself to the retail land use category, might also engage in printing work in the back of the shop, which lends itself to an industrial land use category. In order to disaggregate QCEW data into the four major land use categories, each job's 2-digit North American Industry Classification System (NAICS) code was used to apportion the respective job's industry into the four land use categories. For this purpose, a NAICS to land use category translation table was employed that was previously shared by the Fairfax County Planning Department's Policy & Plan Development Branch, see Table 3. Prior to this NAICS code translation table, former forecasts relied on a 1985 produced² Standard Industrial Classification (SIC) code to land use factors—unfortunately SIC codes were superseded by NAICS codes in 1997.

² "Relationship between employment by Standard Industrial Classification code and Employment by land use type", June 30, 1985, Metropolitan Washington Council of Governments. See [URL](#) for more information.

Table 3. 2-digit North American Industry Classification System (NAICS) code to land use equivalents translation table

NAICS	Industry	Office	Retail	Industrial	Other
11	Agriculture, Forestry, Fishing & Hunting		0.05	0.95	
21	Mining		0.05	0.95	
22	Utilities	0.7		0.25	0.05
23	Construction	0.66		0.34	
31	Manufacturing			1	
32	Manufacturing			1	
33	Manufacturing			1	
42	Wholesale Trade	0.05	0.05	0.9	
44	Retail Trade		0.96		0.04
45	Retail Trade		0.96		0.04
48	Transportation and Warehousing	0.7		0.25	0.05
49	Transportation and Warehousing	0.7		0.25	0.05
51	Information	0.98			0.02
52	Finance and Insurance	0.98			0.02
53	Real Estate and Rental and Leasing	0.98			0.02
54	Professional and Technical Services	0.98			0.02
55	Management of Companies and Enterprises	0.98			0.02
56	Administrative and Waste Services	0.7		0.25	0.05
61	Educational Services	0.1	0.05		0.85
62	Health Care and Social Assistance	0.7			0.3
71	Arts, Entertainment, and Recreation		0.1	0.1	0.8
72	Accommodation and Food Services	0.2	0.65	0.15	
81	Other Services, Ex. Public Admin	0.68	0.18		0.14
92	Public Administration	0.4			0.6

Note: Table modified from original by the inclusion of the “institutional” category into the “other” land use equivalent

Source: Fairfax County Planning Department’s Policy & Plan Development Branch

The apportionment of employment into land use equivalents also applies when allocating wage and salary jobs not covered by unemployment insurance and the self-employed. When allocating these jobs to TAZs, not covered employment was assumed to have land use equivalents similar to NAICS code 52 and the self-employed to NAICS code 62.

Land use conversion factors did not need to be used for employment yielded from assumed new construction or redevelopment where the non-commercial space type was known—this constituted the source of the majority of employment in Round 9.0. The assumed new construction was also the source for housing units by type that would subsequently be converted to households and population. The sources for assumed new construction with known density types and residential unit types had multiple sources, including new construction from the parcel file; a vetted pipeline of approved projects; sites identified by Planning Staff that specialize in select sector plans; site plans; preliminary plans; project plans; current plans; sketch plans; vacant parcels with calculated yields of residential unit and non-residential space, based on existing zoning and parcel ownership; and parcels that are assumed to redevelop—according to zoning, land-to-improvement ratio, and parcel ownership—to yield net gains in residential units and non-residential space relative to what is on the ground today. The yields for these projects were calculated in a combination of software: GIS to assign the project to a TAZ and Excel to calculate the net gain in households, population, or employment. It is worth noting that for all the sources of new construction or redevelopment, except for the pipeline, it was possible for there to be net losses of employment for a particular project. For example, if a retail-strip is assumed to redevelop as town-homes in the future, then there would be a loss of employment on that parcel. That loss would come from subtracting the QCEW jobs, by land use equivalents, from the relevant parcel and TAZ.

With all the components of growth for population and employment growth assigned to TAZs —derived from new construction, the parcel file, staff input regarding sector plans, various submitted plans, select

vacant parcels, and select parcels that are assumed to redevelop—, the last step in the allocation process is to assign these projects a probable development year. Some of these projects were identified for a probable construction completion date by Planning staff based on that staff person’s specialization in certain areas of the County and their conversation with developers or land owners. Other projects, mainly in the early forecast period, were assigned completion dates based on the fact that construction at a site has commenced. Other types of projects without an assigned completion date at the outset of the process were given an assumed completion date based on a hierarchy: early forecast period years were given to pipeline projects based on the amount of residential and commercial already built, such that the more phases have been completed the earlier the project is assigned a forecast year; further out years are assigned to site, preliminary, project, current, sketch plans without an assigned forecast year; and lastly, projects yielded from vacant or redeveloped parcels were assigned to the furthest-out forecast years. The exception to this hierarchy was the assumption that some major pipeline projects, or other expected projects, in the vicinity of the Great Seneca Science Corridor or the White Oak Science Gateway will not be fully completed until the CCT and BRT are mostly to fully functional, assumed to occur in the period between 2030 and 2040 for forecasting purposes. Thus, a number of projects in these areas without an assigned year at the outset of the process were assumed to be complete in the further out period of the forecast, between 2035 and 2045.

APPENDIX G - DEVELOPMENT OF POLICY AREA TYPES

BACKGROUND

The current Subdivision Staging Transportation Policy Area Review (TPAR) is administered within a framework that groups the 32 existing policy areas by four major categories or place types – (1) CBD’s and Metro Station Policy Areas, (2) Urban Areas, (3) Suburban Areas, and (4) Rural Areas. During the development of the Working Draft the Planning Board directed staff to explore ways to (1) potentially combine the policy area and local area tests and (2) reduce or eliminate reliance on arterial travel time comparisons (the primary variable in TPAR) as a metric for the policy area test and critical lane volume (CLV) for the local area test. Instead, the Planning Board encouraged more emphasis be placed on non-auto driver mode share (NADMS), per capita vehicle miles of travel, accessibility via transit, parking management, and other factors or variables that are more clearly aligned with County policy and better reflect current and future conditions among the different place types within the County.

In considering the above, the Planning Board requested staff consider examining how policy areas might be grouped using a more empirical or quantitative approach related to more than (as an example) whether the area has an existing Metro Station. In addition, the Planning Board was interested in how the eventual typology or grouping would compare with the General Plan place typology.

In developing an alternative concept for both the grouping of the Policy Areas and the eventual metrics to be considered for application in those areas, staff attempted to keep in mind three overriding objectives to address stakeholder concerns most often expressed at that time in the process:

Clarity

The methodology or approach should be as clear and simple as possible to understand (even while recognizing the complexity of the subject at hand). The clarity should extend through development of the new approach and to, and beyond, application.

Relevance

The approach should reflect the County’s goals and policies as they vary among different place types – including those areas in transition and in doing so, it should specifically recognize the County’s different contexts with respect to land use and transportation infrastructure – both existing and future.

Transparency

The approach should be transparent and the results should be readily recognized as something that intuitively “makes sense”. An important part of transparency is that the assumptions and data sources are well documented through development and generally accessible to most stakeholders with a reasonable amount of effort.

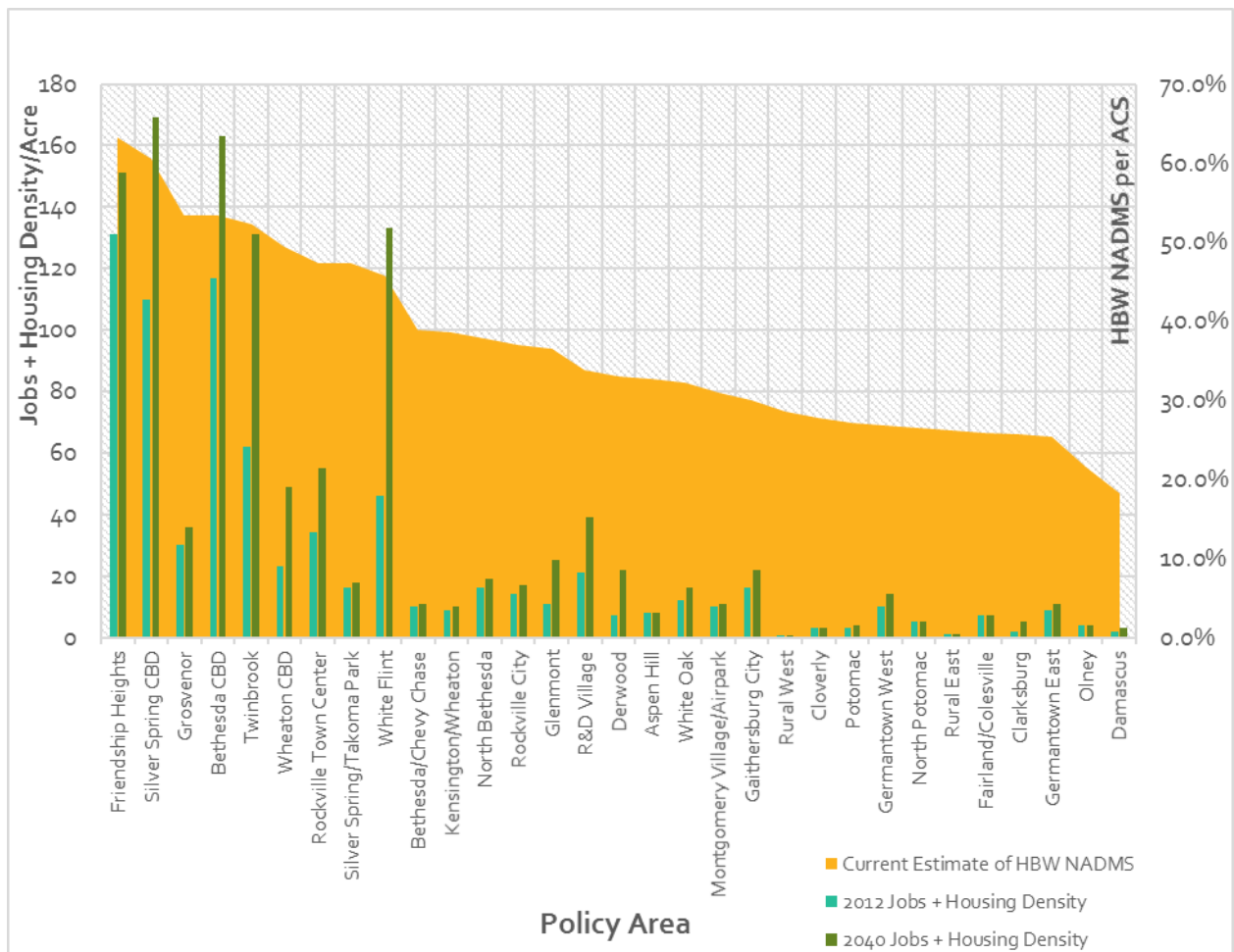
APPROACH

Staff initially presented an approach for grouping the Policy Areas at a Planning Board work session on February 4, 2016. The first step in the approach was to plot the Policy Areas against three variables:

- Existing Land Use Intensity – jobs + households per acre (from the Cooperative Land Use Forecast)
- Future Land Use Intensity – jobs + households per acre (from the Cooperative Land Use Forecast)
- Existing Non - Auto Driver Mode Share (NADMS) – home based work trips by any means (including telecommute) other than one person driving alone in a vehicle (from the American Community Survey)

The resulting graph is shown below in Figure 1.

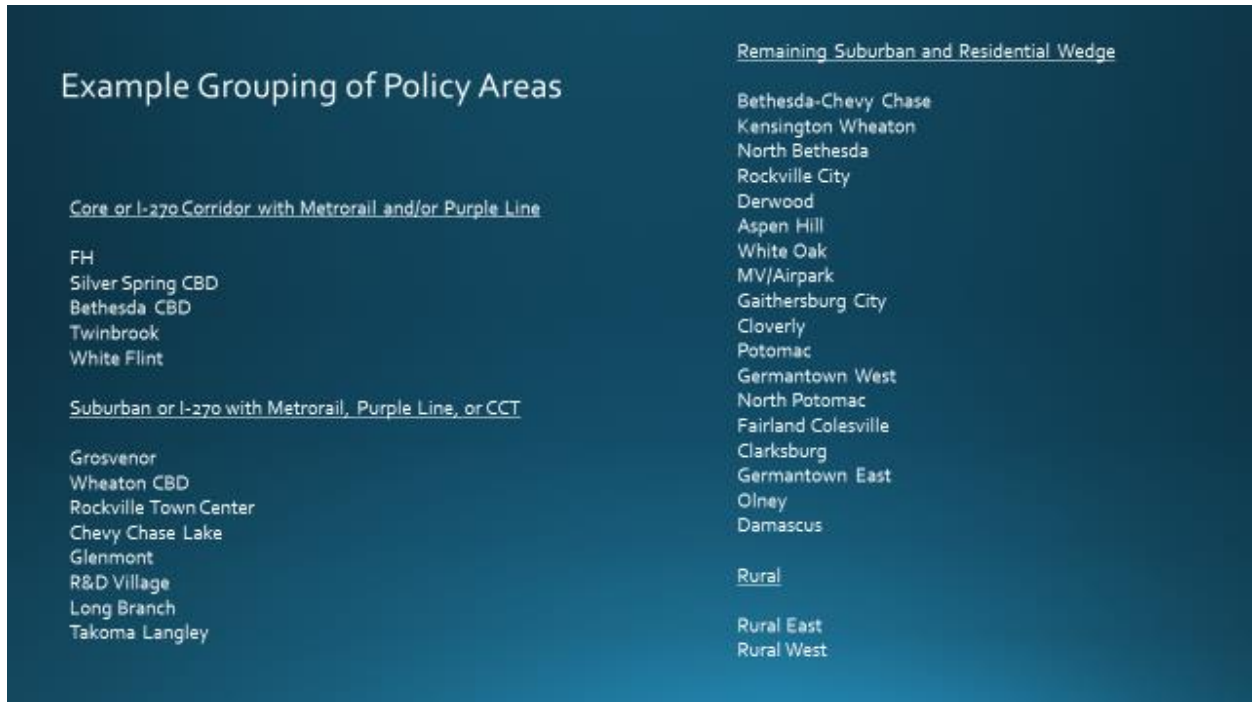
Figure 1 – Policy Area Comparison



The next step in the process was to group the Policy Areas that generally exhibit similar characteristics with respect to the three variables. This part of the process is somewhat subjective but it does bring some notable differences into view. As an example, it clearly brings into focus the difference between Grosvenor, Glenmont, Wheaton, and Rockville Town Center and other CBD's and MSPA's.

The initial grouping of the Policy Areas (based upon this approach) is shown below in Figure 2.

Figure 2 – Initial (Example) Grouping of Policy Areas

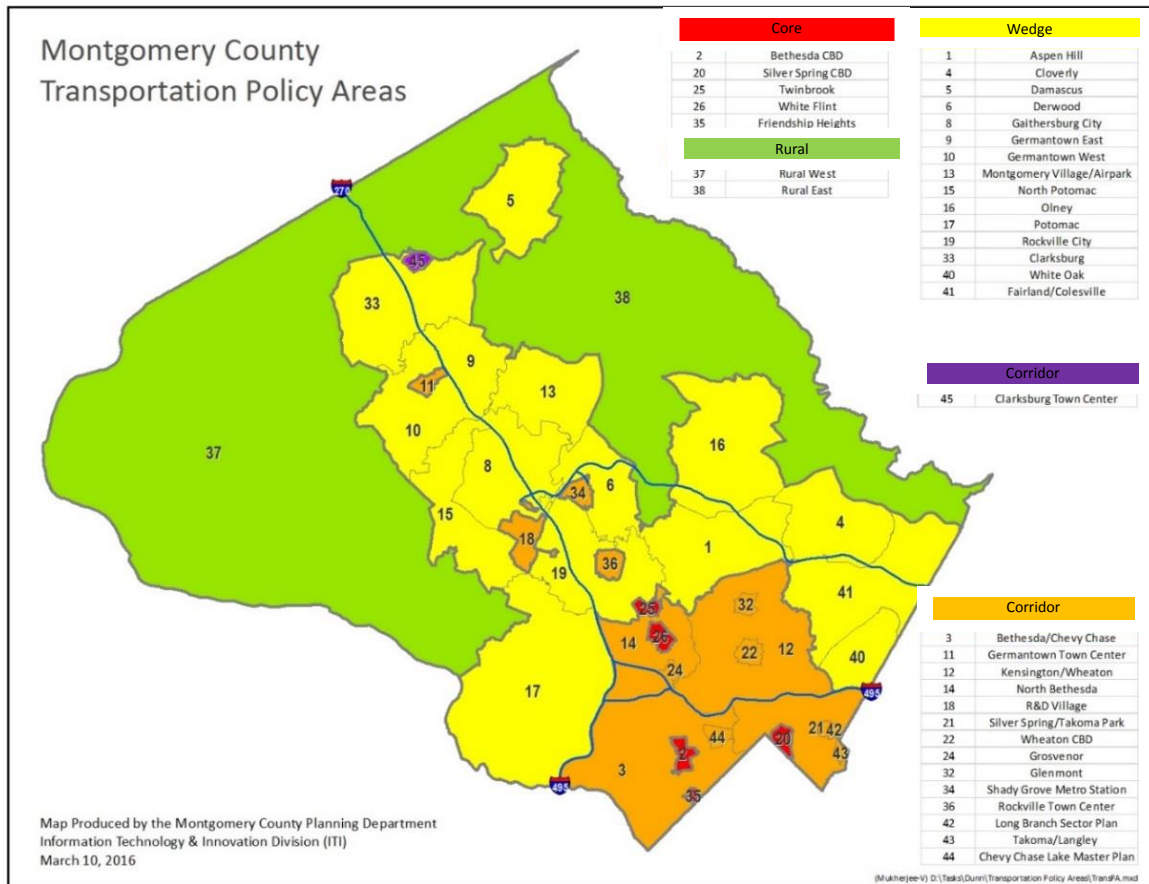


PUBLIC HEARING DRAFT GROUPING

The eventual grouping of the Policy Areas included in the Public Hearing Draft differed slightly from that shown above in Figure 2. One change involved changing the group names or labels to better reflect place type and relate to the General Plan. Another change involved Clarksburg Town Center being added in recognition of its designation as the County's northern most "Corridor City."

The grouping as included in the Public Hearing Draft is shown in Figure 3 for comparison purposes.

Figure 3 – Grouping of Policy Areas in Public Hearing Draft



RELATIONSHIP OF RECOMMENDED POLICY AREA GROUPS TO POLICY AREA TEST, LOCAL AREA TEST, AND TRANSPORTATION IMPACT TAX

It should be noted that the eventual recommended grouping of the Policy Areas is utilized in multiple aspects of the Public Hearing Draft:

- In the Policy Area test, the Core and Rural Policy Area Groups are exempt.
- In the Local Area test, the Core Areas are exempt and the other Policy Area Groups are used to differentiate among differing scoping, testing, and mitigation requirements.
- The Recommended Transportation Impact Tax is based in part on multiples that take into account per capita VMT and NADMS by Policy Area Group. In certain cases, reductions in the Transportation Impact Tax could be realized through the application of multipliers established for different Policy Area groups that are related to parking supply below the baseline minimum.

In summary, the recommended Policy Area grouping could be used more broadly than the current approach.

APPENDIX H - EVALUATION OF ALTERNATIVE POLICY AREA TRANSPORTATION ADEQUACY METRICS



A key element of the 2016 Subdivision Staging Policy was the identification of an appropriate policy area-wide transportation adequacy metric that is less focused on auto-centric travel and clearly reflects the travel implications of the introduction of high-quality transit service over time – including light rail transit (LRT) and bus rapid transit (BRT).

In this regard, Planning staff’s consideration of alternative policy area transportation adequacy measures focused on the evaluation of the following three (3) transportation system performance metrics:

- **Transit Accessibility** – Defined as the number of regional jobs accessible within 60 minutes by walk-access transit from households in each policy area.
- **Non-Auto Driver Mode Share (NADMS)** - Defined as the percentage of trips to work by modes other than the single-occupant automobile (i.e., walk, bike, transit and auto passenger) from households in each policy area.
- **Vehicle Miles of Travel (VMT)** - Defined as the average trip length by auto drivers from households within each policy area.

These metrics were derived from the application of the regional travel demand model. This tool was used to produce traffic analysis zone (TAZ)-level data aggregated to policy area totals.

The utility of each metric was evaluated in the context of an analysis designed to test:

- **Ability to forecast** in terms of the intuitive “reasonableness” of the results
- **Sensitivity** in terms of responsiveness to land use and transportation changes
- **Relevance to master plan implementation** in terms of measuring the level of achievement of master plan vision

The results of this exercise are summarized and described below.

TRANSIT ACCESSIBILITY

The performance of transit accessibility was evaluated in the context of the following three (3) land use/transportation scenarios:

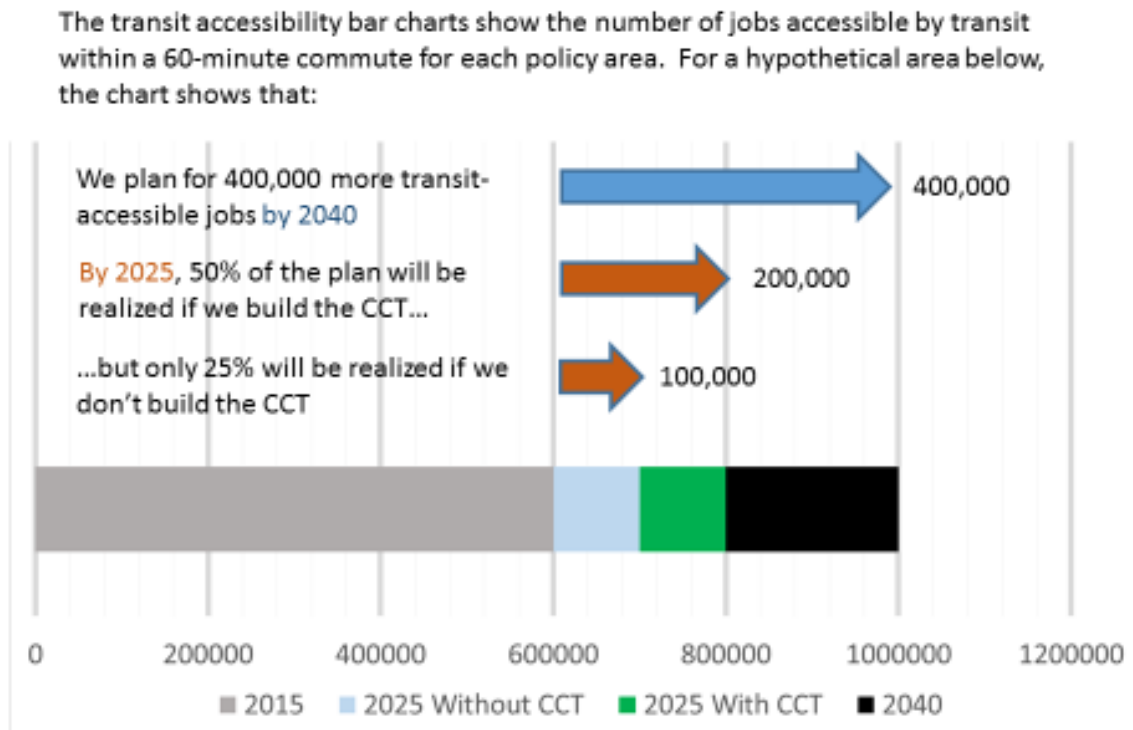
- **Scenario I:** Year 2015 network in combination with year 2015 land use (Existing conditions)
- **Scenario II:** Year 2040 Constrained Long Range Plan (CLRP)³ network in combination with year 2040 land use

³ It should be noted that planned Bus Rapid Transit (BRT) service in the County is **not** reflected in the CLRP.

- **Scenario III:** Scenario II (as described above) **with the Purple Line and Corridor Cities Transitway (CCT) removed.**

Transit accessibility is logically and highly responsive to changes in high quality transit service **and** changes in land use mix and density. Figure 1 provides a conceptualization of how the results of the transit accessibility analysis are portrayed for a **hypothetical** policy area.

Figure 1: Conceptualization of Transit Accessibility Analysis



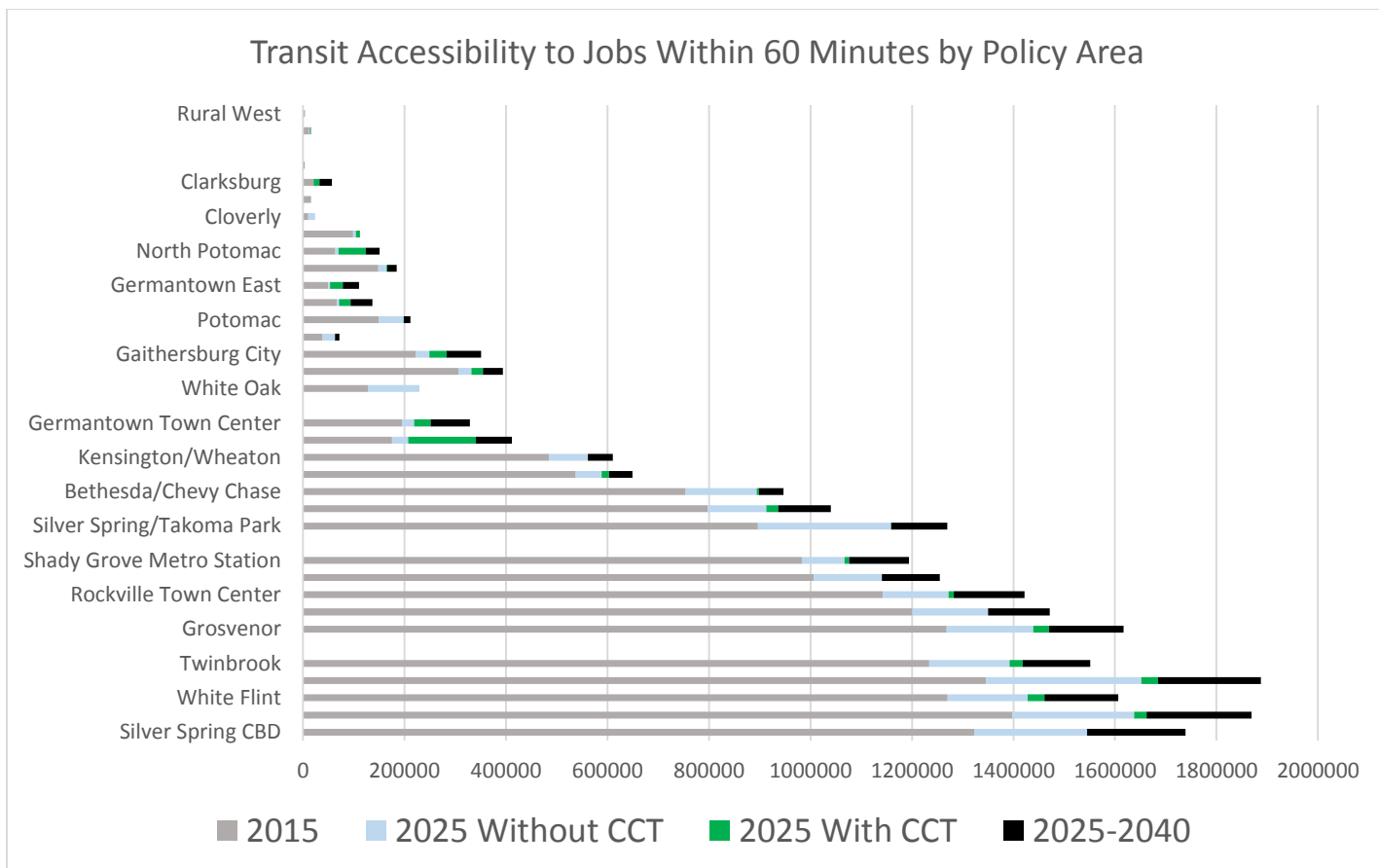
The policy area results of the transit accessibility analysis are summarized below in Figure 2. The horizontal bars depicted in the chart report increments of policy area transit accessibility associated with the land use/transportation scenarios described above. As can be observed, down County “Core” policy areas served by Metrorail exhibit relatively high transit accessibility. Conversely, low-density “Wedge” and “Rural” policy areas exhibit relatively modest or negligible transit accessibility. “Corridor” policy areas exhibit transit accessibility results that fall between these two extremes.

The 10-year regulatory horizon (from 2015 to 2025) is 40 percent as long as the 25-year planning horizon (from 2015 to 2040). In this context, policy areas that have at least 40 percent of their planned 2015-2040 transit accessibility by 2025 are considered to be “on pace” with respect to reaching a key indicator of future non-auto travel options and are therefore considered “adequate.” The remaining areas are “behind pace” and are considered to have inadequate transit accessibility.

Some key observations drawn from the analysis include:

- The Purple Line has the greatest effect on the Silver Spring/Takoma Park policy area.
- The Purple Line connection to Metrorail has transfer related benefits along the eastern leg of the Red Line between Silver Spring and Glenmont.
- The CCT doubles transit accessibility in the R & D Village policy area.
- The Purple Line and CCT both contribute to changes in accessibility along the western leg of the Red Line between Bethesda and Shady Grove.
- Transit accessibility doubles in the White Oak policy area as more transit-oriented development is implemented within a 60-minute travel shed, without the benefit of planned BRT service in the area.

Figure 2: Transit Accessibility Evaluation Summary



The results demonstrate transit accessibility is a highly desirable transportation system performance metric in that it: (1) exhibits sensitivity to both land use and transit system changes; (2) yields intuitively

reasonable forecast results and; (3) measures progress towards transit system implementation which is a key transportation system performance element relevant to the realization of master plans.

NON-AUTO DRIVER MODE SHARE (NADMS)

The performance of NADMS was evaluated in the context of the following three (3) land use/transportation scenarios:

- **Scenario I:** Year 2010 network in combination with year 2010 land use (Existing conditions)
- **Scenario II:** Year 2040 Constrained Long Range Plan (CLRP)⁴ network in combination with year 2040 land use
- **Scenario III:** Scenario II (as described above) **with the Purple Line and Corridor Cities Transitway (CCT) removed.**

The policy area results of the NADMS analysis are summarized and reported below in Table1. Observation of this information indicates sensitivity to the introduction of Purple Line and the Corridor Cities Transitway (CCT) on NADMS in some areas such as Shady Grove and R & D Village which are relatively dense, mixed-use areas and benefit from a direct transit connection to each other. However, a comparison of the Scenario II and Scenario III results indicates that NADMS generally exhibits a modest response to changes in land use and transportation. Finally, it should be noted that the relevance of this metric with respect to master plan implementation is limited to those areas where NADMS goals are explicitly specified by policy.

⁴ It should be noted that planned Bus Rapid Transit (BRT) service in the County is **not** reflected in the CLRP.

Table 1: Non-auto Driver Mode Share (NADMS) Evaluation Summary

Policy Area	Name	NADMS (Productions)				NADMS (Attractions)			
		2010	2040 Without PL/CCT	2040 With PL/CCT	Effect of PL/CCT	2010	2040 No PL/CCT	2040 Base	Effect of PL/CCT
		1 Aspen Hill	32.09%	35.26%	35.28%	0.02%	14.59%	16.75%	16.81%
2 Bethesda CBD	58.73%	64.04%	64.38%	0.34%	46.77%	54.98%	55.47%	0.49%	
3 Bethesda/Chevy Chase	42.18%	40.15%	40.33%	0.17%	34.73%	42.68%	42.85%	0.17%	
4 Cloverly	26.16%	27.92%	27.98%	0.07%	9.01%	10.46%	10.50%	0.03%	
5 Damascus	21.61%	27.83%	27.81%	-0.02%	7.86%	8.43%	8.45%	0.02%	
6 Derwood	30.55%	33.48%	34.26%	0.78%	16.64%	20.33%	20.71%	0.38%	
8 Gaithersburg City	32.56%	38.34%	39.40%	1.07%	17.50%	21.59%	22.53%	0.94%	
9 Germantown East	27.55%	32.20%	32.83%	0.63%	14.06%	17.70%	18.29%	0.59%	
10 Germantown West	28.07%	32.48%	33.55%	1.06%	14.01%	17.65%	18.79%	1.15%	
11 Germantown Town Center	32.89%	38.68%	39.95%	1.27%	16.62%	20.77%	21.50%	0.73%	
12 Kensington/Wheaton	40.88%	45.78%	45.83%	0.05%	19.49%	24.22%	24.36%	0.14%	
13 Montgomery Village/Airpark	29.76%	33.42%	33.79%	0.37%	13.85%	15.45%	15.59%	0.13%	
14 North Bethesda	41.36%	45.08%	45.18%	0.10%	22.27%	29.81%	29.93%	0.12%	
15 North Potomac	23.19%	26.22%	27.66%	1.44%	9.81%	12.30%	12.91%	0.61%	
16 Olney	25.77%	27.71%	27.80%	0.09%	9.82%	10.95%	10.98%	0.03%	
17 Potomac	26.28%	26.93%	27.08%	0.15%	13.83%	18.94%	19.05%	0.11%	
18 R&D Village	32.47%	37.28%	40.63%	3.35%	18.20%	23.65%	26.43%	2.78%	
19 Rockville City	35.54%	38.38%	39.43%	1.05%	18.04%	23.58%	25.17%	1.59%	
20 Silver Spring CBD	61.34%	68.19%	68.57%	0.38%	50.20%	56.41%	56.89%	0.48%	
21 Silver Spring/Takoma Park	49.74%	57.14%	57.15%	0.00%	33.71%	41.47%	41.93%	0.46%	
22 Wheaton CBD	51.82%	57.26%	57.30%	0.04%	26.28%	31.81%	31.95%	0.14%	
24 Grosvenor	50.49%	55.77%	55.98%	0.21%	24.49%	30.34%	30.50%	0.16%	
25 Twinbrook	45.35%	56.63%	56.88%	0.25%	28.42%	34.50%	34.63%	0.13%	
26 White Flint	49.55%	53.86%	54.04%	0.18%	28.86%	35.48%	35.61%	0.13%	
32 Glenmont	46.63%	50.75%	50.76%	0.01%	23.77%	28.55%	28.60%	0.05%	
33 Clarksburg	22.07%	27.49%	28.24%	0.75%	7.30%	11.38%	11.48%	0.09%	
34 Shady Grove Metro Station	39.35%	48.15%	51.02%	2.88%	21.25%	24.62%	25.25%	0.63%	
35 Friendship Heights	64.27%	66.00%	66.05%	0.05%	48.83%	57.51%	57.56%	0.05%	
36 Rockville Town Center	44.95%	50.10%	50.29%	0.19%	26.42%	31.76%	31.87%	0.11%	
37 Rural West	18.99%	21.33%	21.88%	0.54%	7.56%	10.57%	10.69%	0.12%	
38 Rural East	22.95%	26.57%	26.77%	0.20%	8.70%	10.29%	10.33%	0.03%	
40 White Oak	40.03%	46.71%	46.86%	0.14%	15.58%	21.28%	21.43%	0.15%	
41 Fairland/Colesville	29.87%	35.24%	35.39%	0.15%	13.42%	18.70%	18.82%	0.11%	
99 County	35.98%	39.88%	40.37%	0.48%	25.19%	30.91%	31.53%	0.62%	

VEHICLE MILES OF TRAVEL (VMT)

The performance of VMT was evaluated in the context of the following three (3) land use/transportation scenarios:

- **Scenario I:** Year 2010 network in combination with year 2015 land use (Existing conditions)
- **Scenario II:** Year 2040 Constrained Long Range Plan (CLRP)⁵ network in combination with year 2040 land use
- **Scenario III:** Scenario II (as described above) **with the Purple Line and Corridor Cities Transitway (CCT) removed.**

The policy area results of the VMT analysis are summarized and reported below in Table 2. Observation of the results derived for Scenarios II and III indicates virtually no effect of the Purple Line and CCT on

⁵ It should be noted that planned Bus Rapid Transit (BRT) service in the County is **not** reflected in the CLRP.

VMT. The magnitude of change between base year 2010 and year 2040 VMT results derived in Central Business District (CBD) areas such as Silver Spring and Bethesda appears counter-intuitive and raises some concerns about the ability of the regional model to adequately reflect latent demand in small areas. These observations suggest that VMT may not be an appropriate metric that is relevant to the evaluation of master plan implementation and policy area transportation adequacy determination.

Table 2: Vehicle Miles of Travel (VMT) Evaluation Summary

Policy Area	Name	2010	2040 Without Purple Line/CCT	2040 With Purple Line/CCT	Effect of Purple Line/CCT
3	Bethesda/Chevy Chase	24.4	25.7	25.8	0.1
35	Friendship Heights	18.1	9.2	9.3	0.0
2	Bethesda CBD	19.7	8.3	8.3	0.0
21	Silver Spring/Takoma Park	24.5	15.2	15.1	0.0
20	Silver Spring CBD	20.6	7.0	6.9	0.0
12	Kensington/Wheaton	27.0	21.5	21.5	0.0
22	Wheaton CBD	24.4	12.5	12.4	0.0
32	Glenmont	25.9	19.6	19.6	0.0
14	North Bethesda	25.3	20.9	21.0	0.0
24	Grosvenor	23.9	14.4	14.3	0.0
26	White Flint	22.1	10.1	10.1	0.0
25	Twinbrook	20.5	9.9	9.9	0.0
19	Rockville City	25.9	20.7	20.6	0.0
36	Rockville Town Center	23.5	13.7	13.7	0.0
6	Derwood	27.4	29.9	30.1	0.2
34	Shady Grove Metro Station	23.6	16.3	16.1	-0.1
10	Germantown West	35.6	33.9	33.7	-0.2
11	Germantown Town Center	32.8	24.3	24.1	-0.2
1	Aspen Hill	29.4	22.3	22.4	0.1
4	Cloverly	36.3	38.7	38.7	0.0
5	Damascus	47.1	49.9	50.0	0.1
8	Gaithersburg City	28.5	25.5	25.5	-0.1
9	Germantown East	33.2	33.1	33.0	0.0
13	Montgomery Village/Airpark	30.9	30.3	30.4	0.1
15	North Potomac	31.2	39.2	38.8	-0.4
16	Olney	36.6	40.6	41.2	0.5
17	Potomac	30.5	39.6	39.6	0.0
18	R&D Village	28.3	21.0	20.6	-0.4
33	Clarksburg	40.6	44.4	44.6	0.1
37	Rural West	47.5	59.8	59.8	0.0
38	Rural East	47.3	50.8	51.0	0.2
40	White Oak	28.1	19.1	19.0	-0.1
41	Fairland/Colesville	32.9	26.7	26.6	0.0
99	Total	29.6	25.9	25.9	0.0

APPENDIX I - LOCAL AREA TRANSPORTATION REVIEW (LATR) TEST

The following paragraphs provide additional descriptions and examples of the proposed changes to the LATR process. These changes will ultimately be established within the Planning Board's "Local Area Transportation Review Guidelines" that will follow the County Council's adoption of the Subdivision Staging Policy (SSP) scheduled for November 2016.

The Planning Board draft of the SSP expands 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. The proposed changes to the SSP also introduce three new quantitative measures of adequacy for pedestrians, bicyclists, and transit. These proposed adequacy measures are described below and are only proposed for the application of LATR as suggested below and to be incorporated in the Planning Board's LATR Guidelines completed after Council adoption of the SSP. Other multimodal elements of the LATR process, notably the requirement for all LATR studies to incorporate a qualitative pedestrian-bicycle impact statement, are proposed to remain as currently scoped.

In each case, the proposals in the SSP recognize that the effect of introducing new metrics on the types and cost of mitigation can generally be estimated, and this is a role that the members of the Transportation Impact Study Technical Working Group (TISTWG) have discussed in more than a dozen meetings since fall 2014. The actual effects on study outcomes will not become known until the guidelines have been in place and those active in the development review process (including applicants and their consultants, interagency staff members, and interested members of the public). This is part of the value of delegating the administration of these details to the Planning Board in the execution of LATR Guidelines; the judgment necessary to evaluate guidelines application is appropriate on a case-by-case basis. The material in this Appendix provides contextual guidance for the current thinking of the Planning staff and the Planning Board for LATR Guidelines changes based on the overall approach in the Planning Board Draft SSP. Should the Council desire significant changes to the SSP, it is expected that the approaches described in this Appendix would need to be adjusted accordingly.

The TISTWG considered many additional technical and policy approaches during their two years of discussion. These approaches are described within TISTWG meeting materials available at the following location:

http://www.montgomeryplanning.org/transportation/latr_guidelines/workinggroup.shtm

This Appendix is organized into two sections that describe the proposed changes to:

- LATR scoping, which is now multimodal in nature with the proposed shift to person trip generation, and
- LATR adequacy and mitigation, which are also multimodal, but wherein each modal definition of adequacy and how to achieve it can be disaggregated from the other modes.

While the focus of the Planning Board Draft of the SSP and this Appendix is on significant changes proposed for the LATR process, it is worth noting that many key elements of the SSP are not proposed to have any changes, notably:

- Defining the geographic scope of an automobile analysis in terms of the number of “rings” of intersections based on the number of peak hour vehicle trips generated by the site.
- Defining adequacy as based on conditions during typical weekday AM (6:30 - 9:30) and PM (4:00 – 7:00) peak periods with the peak hour conditions being those during the four consecutive 15-minute periods with the highest total site trip generation.
- Emphasizing the mitigation of vehicle impacts by providing non-auto facilities as mitigation at an established value per vehicle trip.
- Including a qualitative pedestrian-bicycle impact statement as part of every LATR study regardless of the number of non-motorized trips generated.

SCOPING

The LATR process uses context-sensitive trip generation and mode split analyses to determine the need for an LATR Transportation 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 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 the information in Tables 1a through 1c found at the end of this Appendix. Table 1 below describes the application of Tables 1a through 1c using a hypothetical 100,000 GSF office building in the Germantown East Policy Area:

Table 1. LATR Guidelines Appendix References for Trip Generation

Appendix	Title/Purpose	Primary Use	Example Case
1	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.
2	Trips by Mode for Developments With Significant Impact	Identify whether site has significant impact (and therefore requires an LATR Study)	For Germantown East, the context-sensitive vehicle trip generation rates exceed the 34.0 threshold that equates to 50.0 person trips so an LATR Study is required
3	Mode Split Assumptions by Policy Area	Identify which modes require quantitative analysis.	<p>The number of vehicle trips exceeds the threshold of 50 so that a quantitative auto analysis is required.</p> <p>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.</p> <p>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 100 so that quantitative pedestrian or bicycle analyses are not required.</p>

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

One area of particular interest in applying the new trip generation rates is associated with retail uses. The ITE vehicle trip generation rates, and the policy area factors in Appendices 1 through 3, 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).

The TISTWG members considered two other options for reducing assumed vehicle trip generation rates associated with mixed use development in urban areas of the County. One of these concepts with included the idea that a nominal amount of ancillary ground floor retail in a mixed use building that was predominantly residential or office (considered for up to 15,000 GSF in a building with at least 90% of the FAR devoted to non-retail uses) could be assumed to have no vehicular traffic associated with that initial level of retail as long as no parking spaces were associated with it in the site plan. A second concept was to designate a “Very Low VMT” development. The study team conducted analyses to demonstrate that in jobs-heavy central business districts like Bethesda or Silver Spring, a new residential building with limited parking could be shown to reduce total areawide VMT by facilitating CBD employees choosing to live closer to where they work. These two concepts are not explicitly carried forward as part of the LATR processes for the Planning Board’s SSP simply because they would be most applicable (if not exclusively applicable) in Metro Station Policy Areas where the Board’s SSP vision eliminates LATR studies entirely.

Transit Proximity

Based on the 2005 WMATA Development Related Ridership Survey findings (Table S-2), sites that are located within 1,000’ of a Metrorail 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 Metrorail station portal, 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 (TMAs)

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).

ADEQUACY AND MITIGATION

The LATR process introduces adequacy standards for vehicular delay that correspond to policy area CLV standards as well as standards for pedestrian, bicycle, and transit adequacy.

Adequacy Standards for Vehicular Delay

The Planning Board Draft SSP recommends operational analyses for intersections that exceed the applicable CLV standards with 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. The SSP describes 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

The establishment of vehicle delay thresholds for policy area CLV standards between these thresholds, as well as for the 1800 CLV standard for Metro Station Policy Areas is established by fitting a curve through these points. That curve is described by the formula:

$$Y = 0.0001111X^2 - 0.1722X + 71.111$$

Where Y is the average delay in seconds per vehicle and X is the CLV value.

Under the Planning Board draft SSP, no LATR studies are required for development sites within MSPAs, but the 1800 CLV and corresponding 120 seconds / vehicle average delay are established for analysis of intersections within or on the boundary of MSPAs in LATR studies that may be required of development outside MSPAs.

While the SSP proposes to eliminate LATR studies for developments within MSPAs, the retention of both CLV standards and equivalent delay-based measures of adequacy are important to both provide guidance to Maryland SHA for access management approvals on state highways within MSPAs (which continue to rely on CLV standards of adequacy) as well as to provide guidance should a development located outside an MSPA need to consider adequacy of an intersection within, or on the boundary of, an MSPA.

Pedestrians

The proposed adequacy standards for pedestrians apply to crosswalks at study area intersections for sites that generate more than 100 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 proposed approach to defining adequacy considers pedestrian delay and crosswalk adequacy independently:

- For intersections studied as part of a quantitative pedestrian analysis, crosswalks must provide at least 10 square feet per pedestrian (LOS D as defined by the 2000 Highway Capacity Manual and retained in Exhibit 18-24 of the 2010 Highway Capacity Manual as a means of qualifying pedestrian circulation performance but no longer carrying the LOS designation as an independent measure of quality).
- 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.

Mitigation would be required to achieve either the 10 square feet per pedestrian or the amount in the background (or total future) condition. Expected types of mitigation could 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) or widening the crosswalk (thereby increasing the capacity for the pedestrian flow).

Bicyclists

The proposed 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



LEVEL OF SERVICE D
Freedom to select walking speed and pass others is restricted; high probability of conflicts for reverse or cross movements.



LEVEL OF SERVICE E
Walking speeds and passing ability are restricted for all pedestrians; forward movement is possible only by shuffling; reverse or cross movements are possible only with extreme difficulty; volumes approach limit of walking capacity.

LOS	Pedestrian Space (ft ² /p)	Expected Flows and Speeds		
		Avg. Speed, <i>S</i> (ft/min)	Flow per Unit Width, <i>v</i> (p/ft/min)	<i>v/c</i>
A	≥ 35	260	0-7	0.0-0.3
B	25-35	250	7-10	0.3-0.4
C	15-25	240	10-15	0.4-0.6
D	10-15	225	15-20	0.6-0.8
E	5-10	150	20-25	0.8-1.0
F	< 5	< 150	Variable	Variable

process is still in development in Montgomery County and the Department is not aware that it 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' 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/>

Transit

The proposed 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 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 Transit Capacity and Quality of Service Manual 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.

As proposed for the LATR approach, an application for any site generating 50 peak hour transit users would be required to consider the following elements of transit system adequacy:

- Identify bus stops within 1,000' 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

Transit Capacity and Quality of Service Manual—2nd Edition

LOS	Load Factor (p/seat)	Standing Passenger Area		Comments
		(ft ² /p)	(m ² /p)	
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.

Exhibit 3-26
Fixed-Route Passenger Load LOS

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 WMATA or 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).

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.

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%

Table 1c. Trips by Mode for Developments With Significant Impact

Policy Area #	Development Type	Auto Driver	Auto Passenger	Transit	Non-Motorized	Total	
2	Aspen Hill	Residential	31.3	12.9	2.7	3.2	50.0
		Office	37.1	9.1	1.4	2.4	50.0
		Retail	36.1	11.7	0.7	1.6	50.0
		Other	37.0	9.1	1.3	2.6	50.0
3	Bethesda CBD	Residential	38.2	15.6	8.8	12.5	75.0
		Office	35.9	9.5	17.8	11.8	75.0
		Retail	33.2	12.7	8.2	20.9	75.0
		Other	35.5	9.9	17.3	12.3	75.0
4	Bethesda/Chevy Chase	Residential	28.1	11.8	3.8	6.3	50.0
		Office	30.9	8.7	5.8	4.6	50.0
		Retail	30.8	12.3	1.6	5.2	50.0
		Other	30.2	8.5	6.3	4.9	50.0
6	Cloverly	Residential	32.1	13.2	1.7	3.0	50.0
		Office	38.4	9.5	0.4	1.7	50.0
		Retail	36.4	12.5	0.1	1.0	50.0
		Other	38.3	9.6	0.4	1.7	50.0
7	Damascus	Residential	32.7	13.3	1.1	2.9	50.0
		Office	38.1	10.2	0.0	1.7	50.0
		Retail	36.3	12.7	0.0	1.0	50.0
		Other	38.0	10.2	0.0	1.7	50.0
8	Derwood	Residential	30.5	13.3	2.8	3.4	50.0
		Office	35.7	10.2	1.8	2.3	50.0
		Retail	31.7	14.4	1.1	2.8	50.0
		Other	35.7	10.2	1.9	2.3	50.0
11	Gaithersburg City	Residential	28.4	13.4	2.7	5.6	50.0
		Office	32.7	11.7	2.0	3.5	50.0
		Retail	26.8	16.3	1.2	5.0	50.0
		Other	32.2	12.2	1.9	3.7	50.0
12	Germantown East	Residential	30.7	13.4	2.2	3.7	50.0
		Office	34.0	12.1	1.4	2.4	50.0
		Retail	34.5	13.3	0.7	1.5	50.0
		Other	34.5	11.7	1.3	2.4	50.0
14	Germantown West	Residential	30.2	13.4	2.1	4.3	50.0
		Office	33.1	12.5	1.6	2.9	50.0
		Retail	33.2	13.8	0.6	2.4	50.0
		Other	33.5	11.8	1.7	3.1	50.0
13	Germantown Town Center	Residential	27.6	13.6	2.8	5.9	50.0
		Office	33.8	10.0	2.7	3.6	50.0
		Retail	28.1	15.0	1.7	5.2	50.0
		Other	33.5	10.2	2.8	3.5	50.0
17	Kensington/Wheaton	Residential	29.5	12.7	4.1	3.7	50.0
		Office	34.8	9.3	3.0	2.8	50.0
		Retail	34.9	11.9	1.0	2.2	50.0
		Other	34.9	9.3	2.8	2.9	50.0
18	Montgomery Village/Airpark	Residential	30.0	13.4	2.3	4.3	50.0
		Office	38.8	7.6	1.5	2.1	50.0
		Retail	33.9	12.6	0.9	2.7	50.0
		Other	38.7	7.6	1.4	2.3	50.0
19	North Bethesda	Residential	26.9	13.0	4.0	6.1	50.0
		Office	32.9	9.2	4.3	3.6	50.0
		Retail	25.8	14.2	3.0	7.0	50.0
		Other	31.2	9.8	4.7	4.3	50.0
20	North Potomac	Residential	31.5	13.5	1.5	3.5	50.0
		Office	37.9	9.3	0.4	2.4	50.0
		Retail	36.2	12.0	0.3	1.5	50.0
		Other	37.9	9.4	0.5	2.2	50.0

Table 1c. Trips by Mode for Developments With Significant Impact

Policy Area #		Development Type	Auto Driver	Auto Passenger	Transit	Non-Motorized	Total
21	Olney	Residential	32.1	13.2	1.6	3.0	50.0
		Office	38.1	9.7	0.4	1.8	50.0
		Retail	36.1	12.4	0.2	1.3	50.0
		Other	38.1	9.8	0.3	1.8	50.0
22	Potomac	Residential	31.3	13.4	2.0	3.2	50.0
		Office	37.2	9.6	1.1	2.1	50.0
		Retail	34.9	12.8	0.9	1.4	50.0
		Other	37.4	9.7	1.0	1.9	50.0
23	R&D Village	Residential	28.7	13.6	2.9	4.8	50.0
		Office	33.4	11.7	2.2	2.7	50.0
		Retail	29.0	17.0	1.0	3.0	50.0
		Other	34.4	11.2	1.9	2.5	50.0
24	Rockville City	Residential	28.4	13.3	3.2	5.1	50.0
		Office	35.8	8.7	2.7	2.8	50.0
		Retail	31.4	12.8	1.7	4.1	50.0
		Other	37.3	7.7	2.4	2.6	50.0
29	Silver Spring CBD	Residential	37.6	14.1	10.2	13.1	75.0
		Office	37.2	6.8	19.9	11.1	75.0
		Retail	31.8	9.5	15.7	18.0	75.0
		Other	36.9	6.5	20.1	11.4	75.0
30	Silver Spring/Takoma Park	Residential	27.0	10.5	5.0	7.5	50.0
		Office	31.5	5.4	7.5	5.6	50.0
		Retail	29.7	8.6	3.4	8.2	50.0
		Other	31.9	5.3	7.0	5.8	50.0
32	Wheaton CBD	Residential	41.5	18.6	8.7	6.2	75.0
		Office	48.2	11.3	9.8	5.6	75.0
		Retail	41.1	18.9	5.7	9.3	75.0
		Other	48.1	11.3	9.8	5.7	75.0
16	Grosvenor	Residential	39.2	19.3	8.9	7.5	75.0
		Office	47.6	12.4	10.0	5.1	75.0
		Retail	41.0	20.6	6.3	7.1	75.0
		Other	45.8	12.9	11.6	4.8	75.0
31	Twinbrook	Residential	39.2	19.6	7.3	8.8	75.0
		Office	45.6	12.9	10.3	6.3	75.0
		Retail	40.2	20.8	5.4	8.6	75.0
		Other	45.1	13.1	10.4	6.4	75.0
33	White Flint	Residential	38.6	19.7	8.0	8.7	75.0
		Office	44.4	13.4	10.8	6.4	75.0
		Retail	39.1	21.2	6.2	8.5	75.0
		Other	44.6	13.4	10.5	6.4	75.0
15	Glenmont	Residential	43.8	18.6	7.5	5.1	75.0
		Office	52.1	12.6	6.1	4.2	75.0
		Retail	52.1	17.0	3.0	2.9	75.0
		Other	51.8	12.7	6.3	4.2	75.0
5	Clarksburg	Residential	32.2	13.6	1.3	2.9	50.0
		Office	38.3	10.0	0.0	1.7	50.0
		Retail	36.2	12.9	0.0	1.0	50.0
		Other	38.1	10.2	0.0	1.7	50.0
28	Shady Grove Metro Station	Residential	43.3	19.8	6.5	5.4	75.0
		Office	50.3	15.5	5.1	4.2	75.0
		Retail	41.9	21.9	2.9	8.3	75.0
		Other	50.2	15.5	5.4	3.9	75.0

APPENDIX J - TRANSPORTATION IMPACT TAX

BASIS AND GENERAL PURPOSE FOR THE TAX

The authority to impose a Transportation Impact Tax on new development is in Chapter 52 (Article VII – Development Impact Tax for Transportation Improvements) of the County Code. The purpose of the tax is to provide funds to increase the capacity of the transportation network (through a combination of approaches) so that trip making associated with new residential and commercial growth can be adequately accommodated.

GUIDING INTENT OF THE TAX

The Code contains policy guidance that provides context for any review of the tax. Examples include the following:

- The amount and rate of growth in certain policy areas will place significant demands on the County for provision of major highways to support and accommodate that growth.
- Imposing a tax that requires new development to pay its pro-rata share of the costs of the improvements necessitated by that development in conjunction with other public funds is a reasonable method of raising funds.
- The County retains the power to determine the impact transportation improvements to be funded by development impact taxes, to estimate the cost of such improvements, to establish the proper timing of the construction of the improvements to meet Adequate Public Facilities Ordinance (APFO) standards in areas where they apply, and to determine when changes to the Capital Improvement Program (CIP) are necessary.

In summary, the tax is needed to contribute to the funding of improvements to accommodate new development with the understanding that the amount of the tax and the programming of the funds generated by the tax are set by County policy and can change over time. There is also an acknowledgement that other public funds will likely be necessary to fund the improvements which indirectly would suggest there is also an acknowledgement that some of the improvements are likely to be needed for reasons other than just the accommodation of new development (e.g., mitigate existing conditions).⁶

CURRENT FUNDING PROFILE

The Transportation Impact Tax is collected at the time of a filing for a building permit to be issued by the Department of Permitting Services. The tax varies by District and the type of land use. The current rates by District are shown below in Table 1.

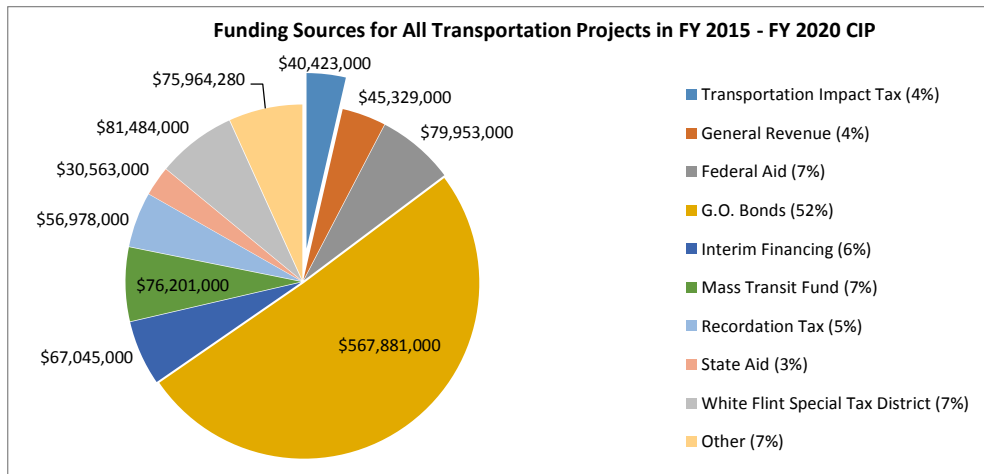
⁶ This important question is explored in more detail later in this narrative.

TABLE 1 – TRANSPORTATION IMPACT RATES EFFECTIVE JULY 1, 2015

Building Type	Metro Station	Clarksburg	General
Single Family (SF) Detached Residential– Per Dwelling Unit (DU)	\$6,984	\$20,948	\$13,966
SF Attached Residential – Per DU	\$5,714	\$17,141	\$11,427
Multifamily Residential (Garden Apartments) – Per DU	\$4,443	\$13,330	\$8,886
High Rise Residential – Per DU	\$3,174	\$9,522	\$6,347
Multifamily – Senior Residential – Per DU	\$1,269	\$3,808	\$2,539
Office - Per Square Foot (GFA)	\$6.35	\$15.30	\$12.75
Industrial – Per Square Foot (GFA)	\$3.20	\$7.60	\$6.35
Bioscience Facility – Per Square Foot (GFA)	\$0	\$0	\$0
Retail – Per Square Foot (GFA)	\$5.70	\$13.70	\$11.40
Place of Worship – Per Square Foot (GFA)	\$0.35	\$0.90	\$0.65
Private Elementary and Secondary School – Per Square Foot (GFA)	\$0.50	\$1.35	\$1.05
Hospital – Per Square Foot (GFA)	\$0	\$0	\$0
Social Service Agency – Per Square Foot (GFA)	\$0	\$0	\$0
Other Non-Residential - Per Square Foot (GFA)	\$3.20	\$7.60	\$6.35

The FY 2015 – FY 2020 County Capital Improvement Program (CIP) program reflects an assumption that the tax will provide about 4% of the total amount of funds (about \$1.1 billion) dedicated for all transportation improvements (see below) over that six-year period.

FIGURE 1 – FUNDING SOURCES FOR ALL TRANSPORTATION PROJECTS IN THE CIP



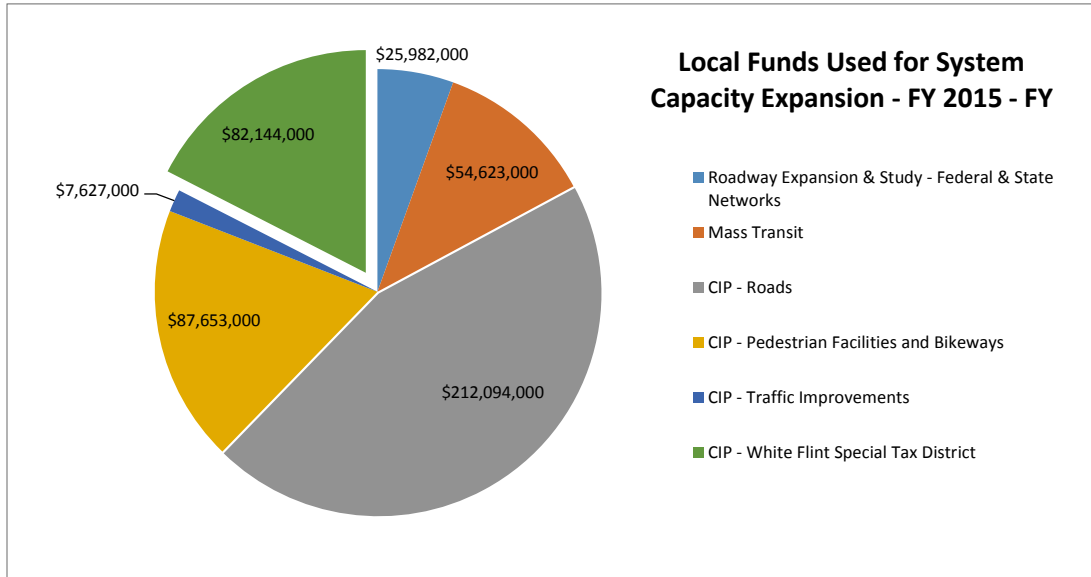
Since the tax is intended to support projects that increase network capacity it is useful to review assumptions related to that aspect of the funding profile. The specific types of improvements the tax is to be used for are noted in Section 52-58 of the Code:

- New road, widening of an existing road, or total reconstruction of all or part of an existing road required as part of a widening of an existing road, that adds highway or intersection capacity or improves bicycle commuting;
- New or expanded transit center or park and ride lot;
- Bus added to the Ride On fleet, but not a replacement bus;
- New bus shelter, but not a replacement bus shelter;
- Hiker-biker trail used primarily for transportation;
- Bicycle locker that holds at least 8 bicycles;
- Bikesharing station (including bicycles approved by the Department of Transportation);
- Sidewalk connector to a major activity center or along an arterial or major highway; or
- The operating expenses of any transit or trip reduction program.

The tax receipts (estimated at \$40.4 million over the CIP period as noted above) represent about 9% of the total local funds allocated for system or network capacity expansion as shown in the chart below.⁷

⁷ The total of the local funds shown in the pie chart is approximately \$470 million. The exclusion of the White Flint Special Tax District (the \$82.1 million “piece” of the pie) reduces the total to about \$388 million and the percentage the impact tax represents of total local funds dedicated to system expansion increases to a little over 10%.

FIGURE 2 – ALLOCATION OF LOCAL FUNDS IN THE CIP FOR SYSTEM CAPACITY EXPANSION



The specific projects for system capacity expansion (excluding those to be funded by through the White Flint Special Tax District) that are programmed for funding in the current CIP are shown below in Table 2.⁸

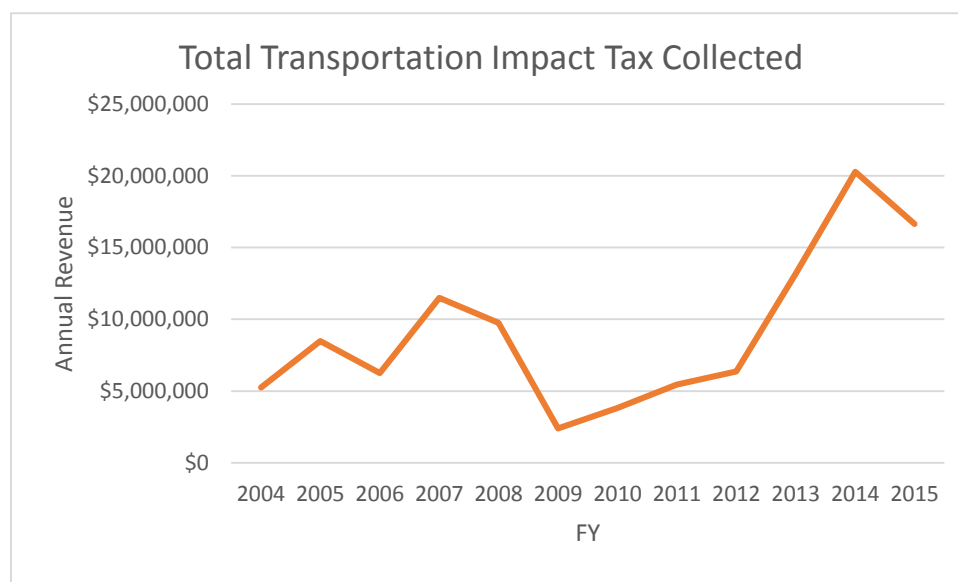
⁸ The projects under the “Roadway Expansion & Study - Federal & State Network” are from the regional Transportation Improvement Program (TIP). The MD 586 BRT Study funding is also from the TIP.

TABLE 2 – PROJECTS TO EXPAND SYSTEM CAPACITY PROGRAMMED IN FY 2015 – FY 2020 CIP	
Project	Total Local Funds
Roadway Expansion & Study - Federal & State Network	
Watkins Mill Interchange @ I-270	\$3,163,000
MD 124 Corridor Study PE	\$5,000,000
MD 355 @ Randolph Road Interchange PE	\$6,728,000
Brookville By-Pass	\$9,467,000
Montgomery Hills / MD 97 Study	<u>\$1,624,000</u>
Sub Total	\$25,982,000
Mass Transit	
MD 586 BRT Study	\$4,402,000
Bethesda Metro South / Purple Line Entrance	\$48,910,000
Montgomery Mall Transit Center	<u>\$1,311,000</u>
Sub-Total	\$54,623,000
Roads	
Burtonsville Access Road	\$2,412,000
Chapman Avenue Extended	\$6,293,000
Clarksburg Transportation Connections	\$10,000,000
Goshen Road South	\$63,292,000
Montrose Parkway East	\$50,785,000
Platt Ridge Dive Extended	\$3,180,000
Snouffer School Road North Webb Tract	\$12,268,000
Snouffer School Road	\$20,539,000
State Transportation Participation (Local Funds)	\$5,673,000
Subdivision Road Participation	\$6,914,000
Facility Planning - Transportation	\$10,713,000
Ripley Street	\$730,000
Bethesda CBD Streetscape	\$7,116,000
East Gude Drive	\$2,586,000
Seminary Road Intersection Improvements	\$7,258,000
Wapakoneta Road Improvements	\$945,000
Public Facilities Roads	\$600,000
Maryland / Dawson Extended	\$250,000
Rainbow Drive - Thompson Road Extended	<u>\$540,000</u>
Sub-Total	\$212,094,000
Pedestrian Facilities / Bikeways	
Capital Crescent Trail	\$77,356,000
Metropolitan Branch Trail	<u>\$10,297,000</u>
Sub-Total	\$87,653,000

TABLE 2 – CONTINUED	
Intersection & Spot Improvements	\$7,224,000
Redland Road	\$403,000
Sub-Total	\$7,627,000
	=====
TOTAL - LOCAL FUNDS FOR NETWORK EXPANSION	\$387,979,000

Another important aspect of the current funding profile is the extent to which the total transportation impact tax collections can vary by year. There are a number of factors that can contribute to the variation. The overall economic environment is a primary reason for the variance and is clearly evident in the graph below where collections during the Great Recession were well below other years.

FIGURE 3 – ANNUAL TRANSPORTATION IMPACT TAX COLLECTED SINCE 2004



Source: Montgomery County Finance Department

Other factors that contribute to the variation include geographical areas and/or types of development that are either exempt from the tax or pay a reduced rate. Examples include:

- Moderately Price Dwelling Units (MPDU's) built under Chapter 25A (exempt)
- Any development located in an enterprise zone (exempt)⁹

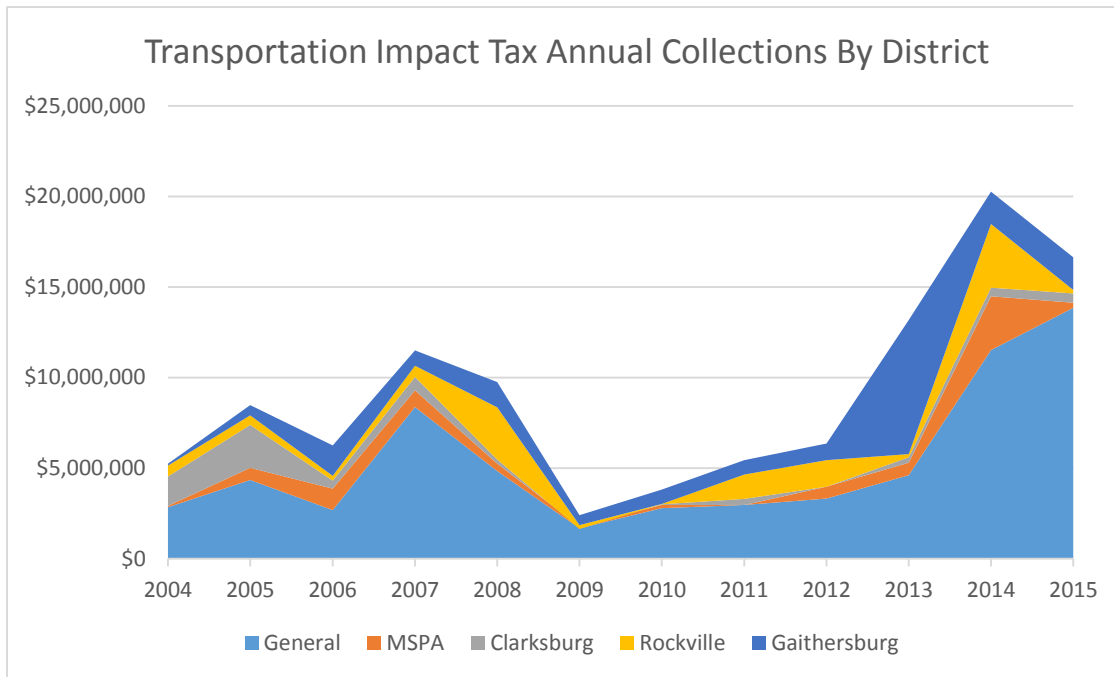
⁹ State designated enterprise zones include Burtonsville, Glenmont, Long Branch, Wheaton, and Olde Town in the City of Gaithersburg.

- Any building located within one-half mile of a MARC station (payment reduced to 85% of rate)

Impact tax credits are also available to property owners that provide additional network capacity in the form of the type of improvements the tax is intended to fund (see bullet list above).

Finally, it should be noted that the revenue shown in the line graph above includes revenue collected within the Cities of Gaithersburg and Rockville. Funds collected within Gaithersburg and Rockville are designated for projects within those jurisdictions. The annual amounts of the revenue attributable to the Cities and the respective impact tax districts within the County since 2004 are shown in the graph below.

FIGURE 4 – TRANSPORTATION IMPACT TAXES COLLECTED BY DISTRICT SINCE 2004



Source: Montgomery County Finance Department

TRANSPORTATION IMPACT TAX RATE UPDATE

The tax in its current form with a full rate was first levied during the last half of FY 2004. The rates were raised significantly (70% across the board) on December 1, 2007 after the review of the Subdivision Staging Policy (or Growth Policy) in the spring and fall of that year. While the rate increase resulted in an increase in overall collections for FY 2007, it was introduced at the beginning of the recession. The total revenue collected did not reach FY 2007 levels again until FY 2013 (largely due to the significant increase in the amount collected within the City of Gaithersburg).

The rate increases introduced in 2007 are shown below in Table 3.

TABLE 3 – COMPARISON OF PRE-2007 RATES AND 2007 RATES

Land Use	General District		Metro Station Areas		Clarksburg District	
	Pre-2007 Rates	2007 Rates	Pre-2007 Rates	2007 Rates	Pre-2007 Rates	2007 Rates
Residential (per DU)						
SF Detached	\$6,264	\$10,649	\$3,132	\$5,325	\$9,396	\$15,973
SF Attached	\$5,125	\$8,713	\$2,563	\$4,357	\$7,688	\$13,070
Garden Apartments	\$3,986	\$6,776	\$1,993	\$3,388	\$5,979	\$10,164
High-Rise Apartments	\$2,847	\$4,840	\$1,424	\$2,420	\$4,271	\$7,261
MF Senior	\$1,139	\$1,936	\$569	\$968	\$1,708	\$2,904
Non Residential (per SF – GFA)						
Office	\$5.70	\$9.69	\$2.85	\$4.85	\$6.85	\$11.65
Industrial	\$2.85	\$4.85	\$1.40	\$2.43	\$3.40	\$5.78
Bioscience	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Retail	\$5.10	\$8.67	\$2.60	\$4.34	\$6.15	\$10.46
Place of Worship	\$0.30	\$0.51	\$0.15	\$0.26	\$0.40	\$0.68
Private School	\$0.45	\$0.77	\$0.20	\$0.39	\$0.60	\$1.02
Hospital	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Social Service Agencies	N/A	\$0.00	N/A	\$0.00	N/A	\$0.00
Other Non-Residential	\$2.85	\$4.85	\$1.40	\$2.43	\$3.40	\$5.78

WHAT IS A “REASONABLE RATE” FOR THE TRANSPORTATION IMPACT TAX?

As previously noted, the last time the rate was examined was during the review of Subdivision Staging Policy in 2007. The methodology used in support of the analysis at that time is summarized in Table 4 below and involved the following steps (referencing the respective rows in Table 4):

- Row A – the capital funding requirements (local funds) contained in the CIP and regional Constrained Long Range Plan (CLRP) for projects adding network capacity and assuming that a similar level of funding (on an average annual basis) will be needed over the next 25 years.
- Rows B, C, and D - the forecast growth in County households (single family and multi-family) and jobs (office, retail, industrial, or other) from the Regional Cooperative Land Use Forecast
- Rows E and F - the estimate of the new daily trips generated by the new growth
- Row G – the cost attributable to that specific land use based upon the proportion of trips
- Estimate Tax Rate (last row) – the computed rate by land use based on the allocated costs (Row G) divided by the number of units (Row C) for residential land use or square feet (Row D) for commercial land use as applicable

TABLE 4 – ARRIVING AT AN INITIAL GENERAL RATE FOR THE TRANSPORTATION IMPACT TAX

A	County Capital Improvement Program (CIP) – Local \$ for Projects adding Network Capacity Expansion – 25 Year Estimate					
B	New Residential 25 Year Growth Estimate		New Commercial Growth 25 Year Growth Estimate			
C	Residential Units		Office Jobs	Retail Jobs	Industrial Jobs	Other Jobs
D	Single family	Multi-Family	Office SF	Retail SF	Industrial SF	Other SF
E	Trip Rate	Trip Rate	Trip Rate	Trip Rate	Trip Rate	Trip Rate
F	New Daily Trips	New Daily Trips	New Daily Trips	New Daily Trips	New Daily Trips	New Daily Trips
G	Cost (A) Allocated by Trips (F)	Cost (A) Allocated by Trips (F)	Cost (A) Allocated by Trips (F)	Cost (A) Allocated by Trips (F)	Cost (A) Allocated by Trips (F)	Cost (A) Allocated by Trips (F)
Est. Tax Rate	G/C	G/C	G/D	G/D	G/D	G/D

The next series of tables present a comparison of 2007 and the present using essentially the same methodology used in the review of the Transportation Impact Tax in 2007.¹⁰ A summary of the variables and resultant unit rates (for broad land use categories) for the present is shown in Table 5.

TABLE 5 – UPDATED CALCULATED 2016 RATES USING THE 2007 METHODOLOGY

Variable	SF Residential	MF Residential	Office	Retail	Industrial	Other Commercial
Forecast Growth 2015-2040 ¹¹	11,218 DU	71,419 DU	128,822 Jobs	30,697 Jobs	12,180 Jobs	11,418 Jobs
SF of Commercial ¹²			32,205,500	12,278,800	5,481,000	5,709,000
Vehicle Trip Gen Rate ¹³	9.52 per DU	6.65 per DU	3.32 per job	21.47 per KGSF	2.77 per job	2.77 per job
Daily Vehicle Trip Ends	106,795	474,936	427,689	263,626	33,739	31,628
% of Total Trip Ends	8.0%	35.5%	32.0%	19.7%	2.5%	2.4%
Proportional Allocation of \$1.6 Billion ¹⁴	\$129M	\$574M	\$517M	\$318M	\$41M	\$38M
Calculated Unit Impact Tax Rates	\$11,499 per DU	\$8,032 per DU	\$16.04 per GSF	\$25.93 per GSF	\$7.43 per GSF	\$6.69 per GSF

¹⁰ While staff has not conducted a comprehensive review of the methodology used in other jurisdictions, the approach of considering the capital costs of projects programmed or planned, the growth in households and commercial building space, the application of trip rates, and the eventual calculation of a rate at least in part related to the type of land use is relatively common.

¹¹ Round 8.3 Regional Cooperative Land Use Forecast – Montgomery County Growth Only

¹² Estimate arrived at by applying SF factor by job type (250 SF/job for Office, 400 SF/job for Retail, 450 SF/job for Industrial, and 500 SF/job for Other Commercial).

¹³ ITE Trip Generation Manual, 9th Edition

¹⁴ \$1.6 Billion estimate is arrived at by dividing the \$388 million total shown in Table 2 by the number of years in the CIP (6) and multiplying that annual number by 25 – the number of years the forecast growth is based upon.

A comparison of how the calculated rates in Table 5 for 2016 compare with (1) the rates calculated in 2007 using this same methodology and (2) the current rates is shown in Table 6 below.

TABLE 6 – COMPARING CALCULATED 2016 and 2007 RATES WITH CURRENT RATES

Variable	SF Residential	MF Residential	Office	Retail	Industrial	Other Commercial
Calculated Unit Impact Tax Rates – 2015-2040	\$11,499 per DU	\$8,032 per DU	\$16.04 per GSF	\$25.93 per GSF	\$7.43 per GSF	\$6.69 per GSF
2007 Calculated Unit Impact Tax Rates 2005-2030 ¹⁵	\$8,380 per DU	\$5,884 per DU	\$11.56 per GSF	\$18.80 per GSF	\$5.39 per GSF	\$4.85 per GSF
Current-General	\$13,966 per DU	\$8,886 per DU	\$12.75 per SF GFA	\$11.40 per SF GFA	\$6.35 per SF GFA	\$6.35 per SF GFA
Current-Metro Station	\$6,984 per DU	\$4,443 per DU	\$6.35 per SF GFA	\$5.70 per SF GFA	\$3.20 per SF GFA	\$3.20 per SF GFA
Current - Clarksburg	\$20,948 per DU	\$13,330 per DU	\$15.30 per SF GFA	\$13.70 per SF GFA	\$7.60 per SF GFA	\$7.60 per SF GFA

A look at comparative percent increases of key variables is useful in attempting to arrive at any conclusion with respect to what might be a “reasonable” rate. In doing so, staff focused on two primary questions:

- How does the difference between the two calculated rates (2007 and 2016 using the 2015 – 2040 data set) compare with the difference in the actual rate increase over the same time period?
- Does the current rate meet the fair-share or pro-rata objective of the Code?

¹⁵ The eventual adopted rates were not the same as the calculated rates arrived at during the review of 2007 Subdivision Staging (Growth) Policy. See Table 3 for the actual adopted rates.

In its simplest form, the first question can be addressed by comparing the rates for the single family dwelling units:

- The calculated rate resulted in the single family dwelling unit rate increasing from \$8,380 per unit in 2007 to \$11,499 per unit now, an increase of 37% over 8 years or an average of 4.6% per year. Roughly the same percentage increase applies to the other residential and commercial land use type as the data inputs (percentage increase in capital costs of the network improvements, growth forecast, and the actual trip rates) do not vary that much.
- The current rate for a single family dwelling unit has increased from \$10,649 per unit in 2007 to \$13,966 per unit in 2015, an increase of 31% over 8 years or an average of 3.9% per year.

The rate of the increase between the calculated rate and the current rate is relatively close and all other things being equal, one could therefore conclude that there may be a basis for an increase around ½ percent (but not much more) as the increase in the current rate trails the increase in the calculated rate by a small amount.

The second or pro-rata question might be addressed by comparing the growth forecast with the percentage of the expansion projects funded by the Transportation Impact Tax.

- The Round 8.3 Regional Cooperative Forecast for Montgomery County households estimates an increase from 377,500 in 2015 to 460,200 in 2040, an increase of 22 percent or 0.90 percent per year. Over a six year CIP period, this would amount to a total increase of 5.4 percent.
- The same forecast for employment for Montgomery County estimates an increase from 532,000 in 2015 to 715,000 in 2040, an increase of 34 percent or an average of 1.4 percent per year. Over a six year CIP period, this would amount to a total increase of 8.4 percent.

As previously noted (see Figure 1), the Transportation Impact Tax is estimated to provide \$40,423,000 in funds over the six- year life of the current CIP. Excluding the White Flint Special Tax District projects, this amount of revenue represents 10.4 percent of the total \$388 million in local funds used over the six- year period.

In terms of the percent of local funds supporting transportation projects that expand network capacity, one could conclude the current level of the Transportation Impact Tax (based on the estimates in the current CIP) is contributing slightly above its pro-rata share by somewhere between 2 and 5 percent when compared to the overall growth forecast (comparing the 10.4 percent portion of the CIP with the 5.4 or 8.4 percent increase for households and employment, respectively).

The comparison of the increase in the calculated rates (2007 vs 2016) therefore suggests an increase of about ½ percent may be in order; however, comparing the percent of local funds the tax provides with the growth forecast suggests the tax is covering (or exceeding) that “share” by a margin of between 2 to 5 percent. **Given the potential variances in the growth forecast, construction costs and timing, and other factors, there does not appear to be a strong argument for recommending any significant change in the rates at this time other than to update the impact tax rates using current transportation**

facility costs, land use forecasts and ITE trip generation rates in the same manner as the 2007 SSP review.¹⁶

In summary, it appears the Transportation Impact Tax is at a reasonable level, i.e., the current level is estimated to provide funding reasonably consistent – on a historical percentage basis - with anticipated growth and programmed capital costs for system expansion met through local funding sources.

Given that the historical relationship between the calculated and actual rates don't appear to vary significantly, a recommended set of Base (General District) Rates for 2016 was arrived at by applying the percentage change between the 2007 calculated and adopted rates to the 2016 calculated rates. Table 7 below reflects how the recommended set of Base Rates for 2016 is arrived using that approach.

TABLE 7 – RECOMMENDED BASE (GENERAL DISTRICT) RATES USING DIFFERENCE BETWEEN 2007 CALCULATED and 2007 ADOPTED RATES

Land Use	2007 Calculated Rates	2007 Adopted Rates	% Difference From Applicable 2007 Calculated	2016 Calculated Rates	2016 Rates When Applying 2007 Percentage Adjustment to 2016 Calculated Rates
Residential					
SF Detached	\$8,380	\$10,649	127.08%	\$11,499	\$14,613
MF Residential	\$5,884			\$8,032	
SF Attached	\$6,856	\$8,713	127.09%	\$9,359	\$10,208
Garden Apartments	\$5,884	\$6,776	115.16%	\$8,032	\$9,250
High - Rise Apartments	\$4,204	\$4,840	115.13%	\$5,739	\$6,607
Multi-Family Senior	\$1,682	\$1,936	115.10%	\$2,296	\$2,643
Commercial					
Office	\$11.56	\$9.69	83.82%	\$16.04	\$13.45
Industrial	\$5.39	\$4.85	89.98%	\$7.43	\$6.69
Bioscience		\$0.00		\$0.00	\$0.00
Retail	\$18.80	\$8.67	46.12%	\$25.93	\$11.96
Place of Worship		\$0.51	10.52%		\$0.70
Private School		\$0.77	15.88%		\$1.06
Hospital		\$0.00			\$0.00
Social Service Agencies		\$0.00			\$0.00
Other Non Residential	\$4.85	\$4.85	100.00%	\$6.69	\$6.69

Beyond the more quantitative (but still high level given the complexity of the issue) preceding look at the impact tax are questions that also might inform decision-making on the level and application of the impact tax. Four common questions are briefly explored below.

¹⁶ It should be noted that the calculated resultant rates are generally below the corresponding residential rates and above the corresponding existing commercial existing commercial rates. The final rates set in 2007 established this pattern (when compared to the calculated rates at that time – see Table 3 and second row of Table 6).

HOW DOES MONTGOMERY COUNTY COMPARE WITH OTHER MARYLAND JURISDICTIONS?

Because Maryland counties collect impact taxes, fees or surcharges related to new development under different statutes and methods (i.e., different units are used to compute the tax or fee) comparisons can be difficult and imprecise. Nevertheless, it is known that 75.6% of these development charges were targeted for education related expenses and 21.0% were targeted for to transportation projects – the two leading government uses for these revenues.¹⁷

A comparison of the estimated FY 15 revenues from these impact taxes, fees, or surcharges - on a per capita basis – the majority of which are for either education (school construction, libraries, and community colleges) or transportation related purposes in presented below in Table 8.

¹⁷ County Development Impact Fees and Building Excise Taxes in Maryland, Amounts and Revenues, Department of Legislative Services 2014, page 4.

TABLE 8 – COMPARISON OF IMPACT TAXES BY COUNTY

County	Type	Rate Per SF DU	Estimated Revenues FY 15 ¹⁸	Population	Per Capita Rev
Anne Arundel	Impact Fee	\$11,896	\$8,420,000	560,133	\$15.03
Calvert	Excise Tax	\$12,950	\$3,128,314	90,613	\$34.52
Caroline	Excise Tax	\$5,000	\$60,000	32,538	\$1.84
Carroll	Impact Fee	\$533	\$318,000	167,830	\$1.89
Charles	Excise Tax	\$13,366	\$9,250,767	154,747	\$59.78
Dorchester	Excise Tax	\$3,671	\$82,770	32,578	\$2.54
Frederick	Impact Fee / Excise Tax	\$14,208	\$10,508,724	243,675	\$43.13
Harford	Impact Fee	\$6,000	\$2,500,000	250,105	\$10.00
Howard	Excise Tax / Surcharge	\$2.40 / SF	\$14,414,904	309,284	\$46.61
Montgomery	Impact Tax	\$39,450 ¹⁹	\$58,407,000	1,030,447	\$56.68
Prince George's	Surcharge	\$22,803	\$26,104,650	904,430	\$28.86
Queen Anne's	Impact Fee	\$4.84 / SF	\$1,555,000	48,804	\$31.86
St. Mary's	Impact Fee	\$4,500	\$2,187,500	110,382	\$19.82
Talbot	Impact Fee	\$6,804	\$200,000	37,643	\$5.31
Washington	Excise Tax	\$1.00 / SF	\$543,000	149,573	\$3.63
Wicomico	Impact Fee	\$5,231	\$771,142	101,539	\$7.59

Source: County Development Impact Fees and Building Excise Taxes in Maryland, Amounts and Revenues, Department of Legislative Services 2014, page 5.

Montgomery County therefore is the second highest on a per capita basis, trailing only Charles County.

There are only seven counties in Maryland that collect an impact tax or fee related to transportation improvements. A similar comparison of those counties is shown below in Table 9.

¹⁸ The estimated revenue is the total for all types of uses (residential and commercial), not just single family dwelling units.

¹⁹ Fiscal 2015 amount represents \$13,506 for transportation and \$25,944 for schools.

TABLE 9 – COMPARISON OF TRANSPORTATION IMPACT TAXES BY COUNTY

County	Transportation Impact Tax Revenue - FY13	Population	Per Capita Revenues
Anne Arundel	\$5,915,870	560,133	\$10.56
Calvert	\$913,446	90,613	\$10.08
Howard	\$6,990,924	309,284	\$22.60
Montgomery	\$13,179,898	1,030,447	\$12.79
St. Mary's	\$160,425	110,382	\$1.45
Talbot	\$30,938	37,643	\$0.82
Washington	\$202,749	149,573	\$1.36

Source: County Development Impact Fees and Building Excise Taxes in Maryland, Amounts and Revenues, Department of Legislative Services 2014, page 8.

Montgomery County therefore falls in the middle range of the Maryland Counties that specifically collect impact taxes for the funding of transportation projects.

HOW DOES MONTGOMERY COUNTY COMPARE WITH THE REGION?

It is also difficult to compare jurisdictions within the region as the fundamentals of the process itself (proffer jurisdiction or formula based, negotiated agreements for improvements beyond transportation and schools or not, etc.) varies by State, District, or County. A 2012 report by George Mason University's Center for Regional Analysis offers the following interesting insight into some aspects of this question:

- Locally imposed costs on development tend be lower in Maryland than in Virginia.
- Montgomery County has the highest published impact taxes in the Washington region.
- Within the County, the combination of the fees and review process can add \$30,000 - \$50,000 to the cost of a new single family or townhouse unit and \$10,000 - \$20,000 to the cost of a multi-family unit. These costs are generally in line with other suburban jurisdictions within the region.²⁰

MITIGATING EXISTING CONDITIONS OR ADDING CAPACITY FOR PAST & FUTURE GROWTH – OR BOTH?

Determining the fair share of the estimated cost for expanding network capacity attributable to new development requires consideration of the fact that the projects listed in Table 2 are also expected in

²⁰ Impact of Local Regulatory Processes and Fees On Ability to Delivery New Housing Units, Montgomery County MD, George Mason University Center for Regional Analysis, Artemel & Associates, June, 2012,

some degree to address both (1) existing conditions created in part by past growth and/or insufficient funding resources and (2) anticipated impacts upon the network of future growth. Accepting that fact would mean that impact tax should be set at rates that generate some (likely smaller) increment of the total local funding burden which is the case with the current rate structure (i.e., the estimated revenue is about 10% of the total local funding set aside for these projects that add capacity to the network). The question of how large or small of an increment is not addressed in the above analysis other than to note that the percentage of the local share of funds generated by the impact tax is close to the percentage increase of the forecasted growth in households and employment (converted to building size).

At least one state (Texas) has in place a statutory requirement to examine this question in some detail. Chapter 395 of the Texas Local Government Code requires an analysis of the question that takes into consideration how planned projects relate to existing network, usage and needs and compares that with the future network, usage and needs on a project by project basis within service areas. An examination of how the statute was applied in the case of the City of Fort Worth indicates consideration of the following variables (among others):

- Total Vehicle Miles of Capacity Added by Projects
- Total Vehicle Miles of Existing Demand
- Total Vehicle Miles of Existing Deficiencies
- Net Amount of Vehicle Miles of Capacity Added

One consideration in subsequent reviews of the Transportation Impact Tax rate structure could be the consideration of similar more detailed approaches for attempting to determine that portion of programmed projects that could be considered as necessary to mitigate existing conditions as opposed to providing capacity necessary to accommodate future growth. If undertaken, a case could potentially be made that the findings would provide a more accurate comparison of whether the current 10% contribution of the local funds allocated for network expansion is a reasonable share for the Transportation Impact Tax. The converse argument, of course, is that any methodology (because new growth is incremental and many of the projects are capital intensive and expensive) is not likely to result in a finding that significantly increases the current percentage contribution for the impact tax.

SHOULD WE EXPECT AN IMPACT TAX TO PROVIDE SIGNIFICANT FUNDING OF NETWORK EXPANSION PROJECTS?

This is a question related at least indirectly to the prior discussion. The County Code requires the Transportation Impact Tax to be collected by specific Districts and the revenues expended within – or adjacent to – those Districts, if feasible.²¹ The revenues are not used to back bonds in part because of the variation of the collections in any one year and the variation by District (see Figure 4). The growth that generates the revenue is inherently incremental and many of the related network improvements that provide capacity are capital intensive, require significant lead time, often cross district and

²¹ Funds collected as a result of development in Gaithersburg and Rockville must be dedicated to projects in those jurisdictions, not adjacent to those jurisdictions.

jurisdictions, and may require a significant level of funding from other sources (federal, state, etc.). These competing factors (incremental and somewhat unpredictable growth and availability of the revenue source(s) to fund projects that are capital intensive with phasing challenges) result in the revenue contributing a relatively small portion of the overall cost of the programmed projects. This is not to say some jurisdictions take the approach that any amount is a needed contribution and support specific major projects (like light rail or bus rapid transit) with impact taxes earmarked for that purpose. The issue however is the proportion of the total project cost the impact tax revenue provides – it remains very small as a result of factors inherent with the impact tax and the capital project.

ADJUSTMENTS TO BASE RATE

The current transportation impact tax rate varies by District and land use. The variance in the rates in relation to the General Rate is shown in the table below. As an example, the rates in Metro Station Areas are 50% of the rate in the rest of the County (excluding Clarksburg which is higher). The basis for the variation is a general acknowledgement that on a unit basis, it costs more to provide public facilities for development in areas of lower density.

TABLE 10 – CURRENT LOCATIONAL ADJUSTMENT FACTOR TO TRANSPORTATION IMPACT TAX BASE (GENERAL DISTRICT) RATES

District	SF Residential	MF Residential	Office	Retail	Industrial	Other Commercial
Current – General	1.0	1.0	1.0	1.0	1.0	1.0
Current – Metro Station	0.5	0.5	0.5	0.5	0.5	0.5
Current - Clarksburg	1.5	1.5	1.2	1.2	1.2	1.2

The extent to which the rates in Metro Station areas and Clarksburg vary from the rest of the County has been a point of discussion over the years and as a result, it is worthwhile to consider whether other metrics are available to consider and/or if the variance should remain the same or change to better align with County goals

The Planning Department retained a consultant in March 2016 to conduct a brief Peer Review of the SSP process. The Peer Review Report recommended a transition to a regulatory protocol that places an emphasis on Vehicle Miles of Travel (VMT) as one important way to better align the process with County goals and further noted that the “transportation basis of impact fees should focus on VMT so the length of vehicle trips is factored in.”²² In response staff recommended consideration of current estimated Vehicle Miles of Travel (VMT) for trips to work as a readily available – and relevant – measurement to use in establishing Policy Area specific rates for residential development.²³ A similar and complementary metric for commercial development is the non-auto driver mode share (NADMS) for trips to work.

The recommended stratification of the adjustment factor for new residential and commercial development is depicted in the table below. The stratification is based on the extent the Policy Area groups vary from the County average for these two metrics (Per Capita VMT and NADMS).

²² See Appendix X – Introduction to Nelson Nygaard Subdivision Staging Policy Peer Review

²³ Trips to work are referred to as Home Based Work (HBW) trips because they have home at one end of the trip and work at the other.

TABLE 11 – RECOMMENDED LOCATIONAL ADJUSTMENT FACTORS TO TRANSPORTATION IMPACT TAX BASE RATES

Policy Area Type	Residential HBW VMT	Ratio of impact to County Average	Proposed as Policy	Commercial HBW NADMS	Ratio of impact to County Average	Proposed as Policy
County Average	11.45			32.6		
Red (MSPAs)	4.27	37%	0.25	45.2	81%	0.75
Orange	9.01	79%	0.75	28.3	106%	1.00
Yellow	15.39	134%	1.25	16.6	124%	1.25
Green	25.84	226%	2.00	10.2	133%	1.25

Comparing Existing Rates with New Recommended Rates Derived by Applying Recommended Locational Adjustment Factors Related to Per Capita VMT and NADMS

A comparison of the current General District rates and the recommended rates as they would vary by Policy Area group is provided in Table 12 below.

TABLE 12 - COMPARISON OF RECOMMENDED RATES BY POLICY AREA GROUPS WITH BASE RATES

General District Rate Comparison		New 2016 Rates After Locational Factors Applied to the 2016 Adjusted Rates			
Land Use	2016 Base Rates When Applying 2007 Percentage Adjustment to 2016 Calculated Rates	Core	Corridor	Residential	Rural
Residential Locational Adjustment Factors		0.25	0.75	1.25	2.00
Residential Uses					
SF Detached	\$14,613	\$3,653	\$10,959	\$18,266	\$29,225
MF Residential					
SF Attached	\$10,208	\$2,552	\$7,656	\$12,759	\$20,415
Garden Apartments	\$9,250	\$2,312	\$6,937	\$11,562	\$18,499
High - Rise Apartments	\$6,607	\$1,652	\$4,955	\$8,259	\$13,214
Multi-Family Senior	\$2,643	\$661	\$1,982	\$3,303	\$5,286
Commercial Locational Adjustment Factors		0.75	1.00	1.25	1.25
Commercial Uses					
Office	\$13.45	\$10.08	\$13.45	\$16.81	\$16.81
Industrial	\$6.69	\$5.01	\$6.69	\$8.36	\$8.36
Bioscience	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Retail	\$11.96	\$8.97	\$11.96	\$14.95	\$14.95
Place of Worship	\$0.70	\$0.53	\$0.70	\$0.88	\$0.88
Private School	\$1.06	\$0.80	\$1.06	\$1.33	\$1.33
Hospital	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Social Service Agencies	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Other Non Residential	\$6.69	\$5.02	\$6.69	\$8.36	\$8.36

COMPARING CURRENT RATES AND NEW RATES ACROSS POLICY AREAS AND LAND USES

A final review of the Transportation Impact Tax recommendations involves consideration of how the recommended new rates compare with the existing rates across each land use and Policy Area. This comparison is provided in Table 13 below.

TABLE 13

Comparison of Current and Proposed Transportation Impact Tax Rates

SUMMARY OF IMPACT TAX AMOUNTS

Without Proposed Parking Reduction Factor

Prior to Application of MSPA Commercial Policy Adjustment (MCPB June 30 Worksession)

Policy Area Num Type	Difference (Proposed as Percentage of Current) per Unit							
	Single Family Detached	Single Family Attached	Garden Apartments	High Rise Apartment	Multi Family Senior	Office	Industrial	Retail
2 1 Bethesda CBD	52%	45%	52%	52%	52%	159%	157%	157%
35 1 Friendship Heights	52%	45%	52%	52%	52%	159%	157%	157%
32 1 Glenmont	52%	45%	52%	52%	52%	159%	157%	157%
24 1 Grosvenor	52%	45%	52%	52%	52%	159%	157%	157%
36 1 Rockville Town Center	52%	45%	52%	52%	52%	159%	157%	157%
34 1 Shady Grove Metro Station	52%	45%	52%	52%	52%	159%	157%	157%
20 1 Silver Spring CBD	52%	45%	52%	52%	52%	159%	157%	157%
25 1 Twinbrook	52%	45%	52%	52%	52%	159%	157%	157%
22 1 Wheaton CBD	52%	45%	52%	52%	52%	159%	157%	157%
26 1 White Flint	52%	45%	52%	52%	52%	159%	157%	157%
3 2 Bethesda/Chevy Chase	78%	67%	78%	78%	78%	105%	105%	105%
33 2 Clarksburg	52%	45%	52%	52%	52%	88%	88%	87%
6 2 Derwood	78%	67%	78%	78%	78%	105%	105%	105%
8 2 Gaithersburg City	78%	67%	78%	78%	78%	105%	105%	105%
11 2 Germantown Town Center	78%	67%	78%	78%	78%	105%	105%	105%
12 2 Kensington/Wheaton	78%	67%	78%	78%	78%	105%	105%	105%
14 2 North Bethesda	78%	67%	78%	78%	78%	105%	105%	105%
18 2 R&D Village	78%	67%	78%	78%	78%	105%	105%	105%
19 2 Rockville City	78%	67%	78%	78%	78%	105%	105%	105%
21 2 Silver Spring/Takoma Park	78%	67%	78%	78%	78%	105%	105%	105%
40 2 White Oak	78%	67%	78%	78%	78%	105%	105%	105%
1 3 Aspen Hill	131%	112%	130%	130%	130%	132%	132%	131%
4 3 Cloverly	131%	112%	130%	130%	130%	132%	132%	131%
41 3 Fairland/Colesville	131%	112%	130%	130%	130%	132%	132%	131%
9 3 Germantown East	131%	112%	130%	130%	130%	132%	132%	131%
10 3 Germantown West	131%	112%	130%	130%	130%	132%	132%	131%
13 3 Montgomery Village/Airpark	131%	112%	130%	130%	130%	132%	132%	131%
15 3 North Potomac	131%	112%	130%	130%	130%	132%	132%	131%
16 3 Olney	131%	112%	130%	130%	130%	132%	132%	131%
17 3 Potomac	131%	112%	130%	130%	130%	132%	132%	131%
5 4 Damascus	209%	179%	208%	208%	208%	132%	132%	131%
38 4 Rural East	209%	179%	208%	208%	208%	132%	132%	131%
37 4 Rural West	209%	179%	208%	208%	208%	132%	132%	131%

The Planning Board reviewed the comparison during work session and recommended a reduction in the rates for commercial land uses in the Core areas by 33 percent. The resulting comparison of the current rates with the recommended rates is shown below in Table 14.

TABLE 14

Comparison of Current and Proposed Transportation Impact Tax Rates

SUMMARY OF IMPACT TAX AMOUNTS

Without Proposed Parking Reduction Factor

Including Application of MSPA Commercial Policy Adjustment (MCPB June 30 Worksession)

Policy Area Num Type	Difference (Proposed as Percentage of Current) per Unit								
	Single Family Detached	Single Family Attached	Garden Apartments	High Rise Apartment	Multi Family Senior	Office	Industrial	Retail	
2	1 Bethesda CBD	52%	45%	52%	52%	52%	106%	104%	105%
35	1 Friendship Heights	52%	45%	52%	52%	52%	106%	104%	105%
32	1 Glenmont	52%	45%	52%	52%	52%	106%	104%	105%
24	1 Grosvenor	52%	45%	52%	52%	52%	106%	104%	105%
36	1 Rockville Town Center	52%	45%	52%	52%	52%	106%	104%	105%
34	1 Shady Grove Metro Station	52%	45%	52%	52%	52%	106%	104%	105%
20	1 Silver Spring CBD	52%	45%	52%	52%	52%	106%	104%	105%
25	1 Twinbrook	52%	45%	52%	52%	52%	106%	104%	105%
22	1 Wheaton CBD	52%	45%	52%	52%	52%	106%	104%	105%
26	1 White Flint	52%	45%	52%	52%	52%	106%	104%	105%
3	2 Bethesda/Chevy Chase	78%	67%	78%	78%	78%	105%	105%	105%
33	2 Clarksburg	52%	45%	52%	52%	52%	88%	88%	87%
6	2 Derwood	78%	67%	78%	78%	78%	105%	105%	105%
8	2 Gaithersburg City	78%	67%	78%	78%	78%	105%	105%	105%
11	2 Germantown Town Center	78%	67%	78%	78%	78%	105%	105%	105%
12	2 Kensington/Wheaton	78%	67%	78%	78%	78%	105%	105%	105%
14	2 North Bethesda	78%	67%	78%	78%	78%	105%	105%	105%
18	2 R&D Village	78%	67%	78%	78%	78%	105%	105%	105%
19	2 Rockville City	78%	67%	78%	78%	78%	105%	105%	105%
21	2 Silver Spring/Takoma Park	78%	67%	78%	78%	78%	105%	105%	105%
40	2 White Oak	78%	67%	78%	78%	78%	105%	105%	105%
1	3 Aspen Hill	131%	112%	130%	130%	130%	132%	132%	131%
4	3 Cloverly	131%	112%	130%	130%	130%	132%	132%	131%
41	3 Fairland/Colesville	131%	112%	130%	130%	130%	132%	132%	131%
9	3 Germantown East	131%	112%	130%	130%	130%	132%	132%	131%
10	3 Germantown West	131%	112%	130%	130%	130%	132%	132%	131%
13	3 Montgomery Village/Airpark	131%	112%	130%	130%	130%	132%	132%	131%
15	3 North Potomac	131%	112%	130%	130%	130%	132%	132%	131%
16	3 Olney	131%	112%	130%	130%	130%	132%	132%	131%
17	3 Potomac	131%	112%	130%	130%	130%	132%	132%	131%
5	4 Damascus	209%	179%	208%	208%	208%	132%	132%	131%
38	4 Rural East	209%	179%	208%	208%	208%	132%	132%	131%
37	4 Rural West	209%	179%	208%	208%	208%	132%	132%	131%

In addition to a direct comparison of just the existing and recommended rates, consideration was given to comparing (1) the combination of the existing impact tax by land use and the surcharge associated with current applicable Policy Area adequacy as defined by TPAR with (2) the combination of the recommended rate by land use and the surcharge associated with the applicable Policy Area adequacy as defined by the new transit accessibility metric.

A summary of the initial comparison is provided below in Table 15.

TABLE 15

Comparison of Current and Proposed Transportation Impact Tax and Policy Area Mitigation Costs
SUMMARY OF TOTAL DOLLAR AMOUNTS
 Without Proposed Parking Reduction Factor
 Prior to Application of MSPA Commercial Policy Adjustment (MCPB June 30 Worksession)

Policy Area Num Type		Difference (Proposed as Percentage of Current) per Unit							
		Single Family Detached	Single Family Attached	Garden Apartments	High Rise Apartment	Multi Family Senior	Office	Industrial	Retail
2	1 Bethesda CBD	52%	45%	52%	52%	52%	159%	157%	157%
35	1 Friendship Heights	52%	45%	52%	52%	52%	159%	157%	157%
32	1 Glenmont	52%	45%	52%	52%	52%	159%	157%	157%
24	1 Grosvenor	52%	45%	52%	52%	52%	159%	157%	157%
36	1 Rockville Town Center	52%	45%	52%	52%	52%	159%	157%	157%
34	1 Shady Grove Metro Station	52%	45%	52%	52%	52%	159%	157%	157%
20	1 Silver Spring CBD	52%	45%	52%	52%	52%	159%	157%	157%
25	1 Twinbrook	52%	45%	52%	52%	52%	159%	157%	157%
22	1 Wheaton CBD	52%	45%	52%	52%	52%	159%	157%	157%
26	1 White Flint	52%	45%	52%	52%	52%	159%	157%	157%
3	2 Bethesda/Chevy Chase	52%	45%	52%	52%	52%	70%	70%	70%
33	2 Clarksburg	52%	45%	52%	52%	52%	88%	88%	87%
6	2 Derwood	72%	62%	72%	72%	72%	97%	97%	97%
8	2 Gaithersburg City	78%	67%	78%	78%	78%	105%	105%	105%
11	2 Germantown Town Center	78%	67%	78%	78%	78%	105%	105%	105%
12	2 Kensington/Wheaton	78%	67%	78%	78%	78%	105%	105%	105%
14	2 North Bethesda	78%	67%	78%	78%	78%	105%	105%	105%
18	2 R&D Village	78%	67%	78%	78%	78%	105%	105%	105%
19	2 Rockville City	78%	67%	78%	78%	78%	105%	105%	105%
21	2 Silver Spring/Takoma Park	63%	54%	62%	62%	62%	84%	84%	84%
40	2 White Oak	52%	45%	52%	52%	52%	70%	70%	70%
1	3 Aspen Hill	131%	112%	130%	130%	130%	132%	132%	131%
4	3 Cloverly	131%	112%	130%	130%	130%	132%	132%	131%
41	3 Fairland/Colesville	100%	86%	100%	100%	100%	101%	101%	101%
9	3 Germantown East	131%	112%	130%	130%	130%	132%	132%	131%
10	3 Germantown West	131%	112%	130%	130%	130%	132%	132%	131%
13	3 Montgomery Village/Airpark	105%	89%	104%	104%	104%	105%	105%	105%
15	3 North Potomac	109%	93%	108%	108%	108%	110%	110%	109%
16	3 Olney	131%	112%	130%	130%	130%	132%	132%	131%
17	3 Potomac	105%	89%	104%	104%	104%	105%	105%	105%
5	4 Damascus	209%	179%	208%	208%	208%	132%	132%	131%
38	4 Rural East	209%	179%	208%	208%	208%	132%	132%	131%
37	4 Rural West	209%	179%	208%	208%	208%	132%	132%	131%

As noted above, the Planning Board reviewed the comparison during work session and recommended a reduction in the rates for commercial land uses in the Core areas by one-third. The resulting comparison of the current rates with the recommended rates is shown below in Table 16.

TABLE 16

**Comparison of Current and Proposed Transportation Impact Tax and Policy Area Mitigation Costs
SUMMARY OF TOTAL DOLLAR AMOUNTS**

Without Proposed Parking Reduction Factor
Including Application of MSPA Commercial Policy Adjustment (MCPB June 30 Worksession)

Policy Area Num	Type	Difference (Proposed as Percentage of Current) per Unit							
		Single Family Detached	Single Family Attached	Garden Apartments	High Rise Apartment	Multi Family Senior	Office	Industrial	Retail
2	1 Bethesda CBD	52%	45%	52%	52%	52%	106%	104%	105%
35	1 Friendship Heights	52%	45%	52%	52%	52%	106%	104%	105%
32	1 Glenmont	52%	45%	52%	52%	52%	106%	104%	105%
24	1 Grosvenor	52%	45%	52%	52%	52%	106%	104%	105%
36	1 Rockville Town Center	52%	45%	52%	52%	52%	106%	104%	105%
34	1 Shady Grove Metro Station	52%	45%	52%	52%	52%	106%	104%	105%
20	1 Silver Spring CBD	52%	45%	52%	52%	52%	106%	104%	105%
25	1 Twinbrook	52%	45%	52%	52%	52%	106%	104%	105%
22	1 Wheaton CBD	52%	45%	52%	52%	52%	106%	104%	105%
26	1 White Flint	52%	45%	52%	52%	52%	106%	104%	105%
3	2 Bethesda/Chevy Chase	52%	45%	52%	52%	52%	70%	70%	70%
33	2 Clarksburg	52%	45%	52%	52%	52%	88%	88%	87%
6	2 Derwood	72%	62%	72%	72%	72%	97%	97%	97%
8	2 Gaithersburg City	78%	67%	78%	78%	78%	105%	105%	105%
11	2 Germantown Town Center	78%	67%	78%	78%	78%	105%	105%	105%
12	2 Kensington/Wheaton	78%	67%	78%	78%	78%	105%	105%	105%
14	2 North Bethesda	78%	67%	78%	78%	78%	105%	105%	105%
18	2 R&D Village	78%	67%	78%	78%	78%	105%	105%	105%
19	2 Rockville City	78%	67%	78%	78%	78%	105%	105%	105%
21	2 Silver Spring/Takoma Park	63%	54%	62%	62%	62%	84%	84%	84%
40	2 White Oak	52%	45%	52%	52%	52%	70%	70%	70%
1	3 Aspen Hill	131%	112%	130%	130%	130%	132%	132%	131%
4	3 Cloverly	131%	112%	130%	130%	130%	132%	132%	131%
41	3 Fairland/Colesville	100%	86%	100%	100%	100%	101%	101%	101%
9	3 Germantown East	131%	112%	130%	130%	130%	132%	132%	131%
10	3 Germantown West	131%	112%	130%	130%	130%	132%	132%	131%
13	3 Montgomery Village/Airpark	105%	89%	104%	104%	104%	105%	105%	105%
15	3 North Potomac	109%	93%	108%	108%	108%	110%	110%	109%
16	3 Olney	131%	112%	130%	130%	130%	132%	132%	131%
17	3 Potomac	105%	89%	104%	104%	104%	105%	105%	105%
5	4 Damascus	209%	179%	208%	208%	208%	132%	132%	131%
38	4 Rural East	209%	179%	208%	208%	208%	132%	132%	131%
37	4 Rural West	209%	179%	208%	208%	208%	132%	132%	131%

The Planning Board after consideration of the analysis, recommended adoption of the following transportation impact tax rates based on (1) updated transportation infrastructure cost estimates, land use forecasts and trip generation rates, (2) application of new adjustment factors related to per capita VMT and NADMS by policy area category, and (3) applying a one-third reduction to the non-residential tax rates in the “red” or MSPA category. See Table 17 below.

TABLE 17 – RECOMMENDED RATES WITH COMMERCIAL POLICY ADJUSTMENT IN MSPA’S

Land Use	2016 Base Rates When Applying 2007 Percentage Adjustment to 2016 Calculated Rates	Core	Corridor	Residential	Rural
Residential Locational Adjustment Factors		0.25	0.75	1.25	2.00
Residential Uses					
SF Detached	\$14,613	\$3,653	\$10,959	\$18,266	\$29,225
MF Residential					
SF Attached	\$10,208	\$2,552	\$7,656	\$12,759	\$20,415
Garden Apartments	\$9,250	\$2,312	\$6,937	\$11,562	\$18,499
High - Rise Apartments	\$6,607	\$1,652	\$4,955	\$8,259	\$13,214
Multi-Family Senior	\$2,643	\$661	\$1,982	\$3,303	\$5,286
Commercial Locational Adjustment Factors		0.75	1.00	1.25	1.25
Commercial Uses					
Office	\$13.45	\$7.06	\$13.45	\$16.81	\$16.81
Industrial	\$6.69	\$3.51	\$6.69	\$8.36	\$8.36
Bioscience	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Retail	\$11.96	\$6.82	\$11.96	\$14.95	\$14.95
Place of Worship	\$0.70	\$0.37	\$0.70	\$0.88	\$0.88
Private School	\$1.06	\$0.56	\$1.06	\$1.33	\$1.33
Hospital	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Social Service Agencies	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Other Non Residential	\$6.69	\$3.51	\$6.69	\$8.36	\$8.36

ADJUSTMENT TO TRANSPORTATION IMPACT TAX TO INCENTIVIZE REDUCED PARKING

A final recommendation related to the Transportation Impact Tax is the introduction of an incentive that would provide for a Transportation Impact Tax credit based on the percentage of parking supply provided below the County’s applicable baseline minimum for the project in question. Progressive parking management that more accurately reflects the cost and utilization of private and public parking has been shown to be a key component of transportation demand management. The County has a number of incentives currently in place through its zoning code, PLD, and TDM programs. Additional incentives in the form of a reduction in the impact tax could supplement these existing programs.

An example of how this might apply in “reduced parking areas” as defined in the zoning code is shown below.

TABLE 18 – MULTIPLIER FOR TRANSPORTATION IMPACT TAX REDUCTION – PARKING INCENTIVE

Percentage Parking Supply is Below Baseline Minimum	Percentage Reduction in Transportation Impact Tax After Policy Area Adjustment											
	Core Policy Area				Corridor Policy Area				Residential Policy Area			
	Residential	Office	Retail	Other	Residential	Office	Retail	Other	Residential	Office	Retail	Other
X	3X	3X	3X	3X	2X	2X	2X	2X	X	X	X	X

This approach would further incentive development to minimize parking capacity – especially in areas where options may exist for access by modes other than auto.

The specific recommendation is to “allow for transportation impact tax credits based on the percentage of parking supply below the applicable baseline minimum where parking below the baseline minimum is allowed under Section 6.2.3.1 of Chapter 59 of the County Code.”

APPENDIX K - SCHOOLS

STUDENT GENERATION RATES

The Montgomery County Planning Department partners with the Division of Long-Range Planning at the Montgomery County Public Schools (MCPS) to calculate updated and accurate student generation rates. For this Subdivision Staging Policy update, MCPS provided the Planning Department with 2015-16 enrollment data stripped of any confidential information but containing individual student addresses and grade-level information. Planning Research and Development staff joined these data with parcel data that contain information on the type of residential structure associated with every address in the County. The results were generation rates that reflect the actual location and housing structure of virtually every current MCPS student. Specifically, Planning staff were able to match 96.2 percent of MCPS's 156,455 students to a structure type.

Before the student generation rates were calculated, Planning staff excluded age-restricted structures (senior housing, nursing homes, etc.) and the very few students coming from these units. All other structures for which Student Impact Taxes and Student Facility Payments are exempted, such as MPDUs and structures built within Enterprise Zones, were included in the calculation of the student generation rates.

The Table 1 below provides the data used to calculate the student generation rates associated with this Subdivision Staging Policy update.

Table 1. Student Generation Rate Calculation

Number of MCPS Students	Elementary	Middle	High	Total (K-12)
Single Family Detached	37,381	19,961	26,986	84,328
Single Family Attached	15,753	7,224	9,628	32,605
Multi-Family Low to Mid Rise	14,416	5,612	7,357	27,385
Multi-Family High Rise	3,163	1,287	1,702	6,152
TOTAL	70,713	34,084	45,673	150,470

Number of Housing Units	Total
Single Family Detached	182,309
Single Family Attached	67,336
Multi-Family Low to Mid Rise	71,128
Multi-Family High Rise	44,348
TOTAL	365,121

Students Generated per Unit	Elementary	Middle	High	Total (K-12)
Single Family Detached	0.205	0.109	0.148	0.463
Single Family Attached	0.234	0.107	0.143	0.484
Multi-Family Low to Mid Rise	0.203	0.079	0.103	0.385
Multi-Family High Rise	0.071	0.029	0.038	0.139

ANNUAL SCHOOL TEST

The FY2017 Annual School Test was adopted by the Montgomery County Planning Board on June 23, 2016. Table 2 demonstrates the impact the recommendation to include individual school capacity deficit thresholds would have on the results of the FY2017 test. The black font indicates the results of the adopted annual test, and the blue font identifies the additional individual schools that would qualify as inadequate under the recommended hybrid test.

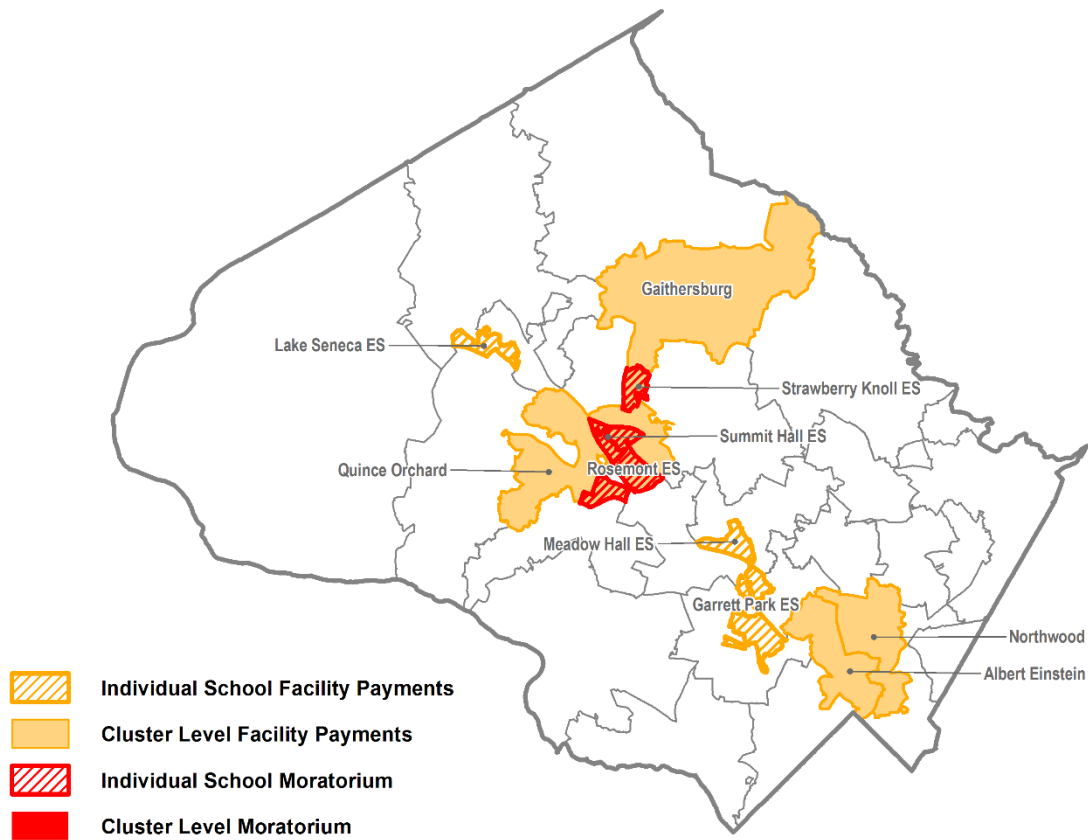
Table 2. FY2017 Annual School Test Results Including Individual School Threshold Tests

Action	Inadequate Outcomes by Level		
	Elementary	Middle	High
School Facility Payment	<ul style="list-style-type: none"> • Einstein Cluster (107.4% utilization) • Gaithersburg Cluster (112.4%) • Northwood Cluster (116.0%) • Quince Orchard Cluster (113.2%) • Meadow Hall ES (-128 seats, 117.0% utilization) in the Rockville Cluster • Lake Seneca ES (-97, 122.2%) in the Seneca Valley Cluster • Garrett Park ES (-106, 130.0%) in the Walter Johnson Cluster 	<ul style="list-style-type: none"> • Gaithersburg Cluster (107.5%) • Rockville Cluster (116.2%) • Wheaton Cluster (110.7%) 	<ul style="list-style-type: none"> • Blair Cluster (116.3%) • Churchill Cluster (113.5%) • Einstein Cluster (116.9%) • Gaithersburg Cluster (107.6%) • Walter Johnson Cluster (113.9%) • Kennedy Cluster (112.5%) • Richard Montgomery Cluster (112.2%) • Northwood Cluster (114.8%) • Paint Branch Cluster (111.0%) • Quince Orchard Cluster (110.4%)

Moratorium	<ul style="list-style-type: none"> • Rosemont ES (-144, 129.9%) in the Gaithersburg Cluster • Strawberry Knoll ES (-191, 141.0%) in the Gaithersburg Cluster • Summit Hall ES (-182, 129.2%) in the Gaithersburg Cluster 		
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Map 1 highlights the results of the hybrid FY2017 Annual School Test for the elementary school level.

Map 1. FY2017 Annual School Hybrid Test Results for Elementary School Level



SCHOOL FACILITY PAYMENTS

School Facility Payments are calculated at 50 percent of a new unit’s school construction cost impact, based on the student generation rates identified previously and current per pupil construction costs.

Table 3 provides the current per pupil school construction costs as provided by the MCPS Department of Facilities Management Division of Construction.

Table 3. Average School Construction Costs for New or Revitalized/Expanded Schools

	Elementary	Middle	High
Capacity/Core	740	1,200	2,400
Building Size (sf)	99,000	165,000	400,000
Project Cost	\$27,522,000	\$47,520,000	\$112,500,000
Cost per Pupil	\$37,192	\$39,600	\$46,875

Source: MCPS Department of Facilities Management – James Song, February 26, 2016.

Figures reflect average cost based on 2016 construction market conditions and will vary pending proposed programs and existing conditions of each project. Figures include all site work and furniture and equipment.

Table 4 below provides all the factors used to calculate the new School Facility Payments.

Table 4. New School Facility Payments and their Calculation Components

	Elementary	Middle	High
Students Generated per Unit			
Single Family Detached	0.205	0.109	0.148
Single Family Attached	0.234	0.107	0.143
Multi-Family Low to Mid Rise	0.203	0.079	0.103
Multi-Family High Rise	0.071	0.029	0.038
School Construction Costs			
Per Pupil	\$37,192	\$39,600	\$46,875
Multiplier			
School Facility Payment	0.5		

	Elementary	Middle	High
School Facility Payment			
Single Family Detached	\$3,812	\$2,158	\$3,469
Single Family Attached	\$4,351	\$2,119	\$3,352
Multi-Family Low to Mid Rise	\$3,775	\$1,564	\$2,414
Multi-Family High Rise	\$1,320	\$574	\$891

PLACEHOLDER PROJECTS

When a placeholder project is included in a CIP, it prevents a moratorium from being imposed in the applicable school/cluster service area, thus allowing new residential development to be approved. A placeholder does not, however, guarantee that new residential development will be approved, but rather that it would be allowed. In fact, five of the eleven placeholders implemented between FY2011 and FY2016 did not lead to any new residential units. The remaining six placeholders allowed at 2,537 new units to be approved without the delay that a moratorium would have caused.

Table 5 summarizes the number of new residential units approved as a result of placeholder projects, by cluster.

Table 5. Residential Units Approved Under Placeholder Projects by Cluster

Cluster	Fiscal Year						Total Units
	FY11	FY12	FY13	FY14	FY15	FY16	
Richard Montgomery	0						0
Northwood		0				0	0
Northwest		455					455
Bethesda-Chevy Chase		440	615	586			1,641
Gaithersburg						0	0
Wheaton						5	5
Einstein						436	436
Walter Johnson						0	0
Total Units	0	895	615	586	0	441	2,537

NOTE: Does not include de minimis approvals of 3 or fewer units.

SCHOOL IMPACT TAX

School taxes are calculated at 100 percent of a new unit's school construction cost impact, based on the student generation rates and per pupil school construction costs identified previously. Although a construction cost impact has been applied on a biennial basis, the last time the construction cost component was reset was in 2007. While overall construction costs have increased, economies of scale resulting from building larger schools have kept per pupil construction costs from increasing at the construction index rate.

Table 6 below shows how the per pupil school construction costs have changed, by school level.

Table 6. Per Pupil School Construction Cost Comparison, 2007 to 2016.

	Elementary	Middle	High
2007 per Pupil Construction Costs	\$32,525	\$42,352	\$47,502
2016 per Pupil Construction Costs	\$37,192	\$39,600	\$46,875
Change from 2007 to 2016	+\$4,667	-\$2,752	-\$672

Source: MCPS Department of Facilities Management.

Table 7 provides all the factors used to calculate the new School Impact Taxes.

Table 7. New School Impact Taxes and their Calculation Components

	Elementary	Middle	High
Students Generated per Unit			
Single Family Detached	0.205	0.109	0.148
Single Family Attached	0.234	0.107	0.143
Multi-Family Low to Mid Rise	0.203	0.079	0.103
Multi-Family High Rise	0.071	0.029	0.038
School Construction Costs			
Per Pupil	\$37,192	\$39,600	\$46,875
	Combined All Levels		
School Impact Taxes			
Single Family Detached	\$18,878		
Single Family Attached	\$19,643		
Multi-Family Low to Mid Rise	\$15,507		
Multi-Family High Rise	\$5,570		

The Planning Board Draft of the Subdivision Staging Policy also recommends that a portion of the School Impact Tax equivalent to 10 percent of the cost of a student seat be dedicated to land acquisition for new schools. Table 8 demonstrates the amount of funding such a policy would have generated for the acquisition of land in each of the last five fiscal years.

Table 8. Funding that Would Have Been Dedicated to Land Acquisition for Schools Under Proposed Policy, FY2011-FY2015

Fiscal Year	Land Acquisition Fund Potential
2011	\$1,608,983
2012	\$1,829,155
2013	\$3,100,195
2014	\$5,093,030
2015	\$3,630,753
Total	\$15,262,116

ENTERPRISE ZONE EXEMPTIONS

The Planning Board Draft of the Subdivision Staging Policy recommends phasing out the School Impact Tax and School Facility Payment exemption for new development within former Enterprise Zones. The Silver Spring Central Business District (CBD) is currently Montgomery County’s only former Enterprise Zone.

Table 9 summarizes the number of residential units built within the Silver Spring CBD since its Enterprise Zone designation expired in June 2006 (all units come from multi-family high rise structures, and the allocation to a fiscal year is based on the date construction of each building was completed).

Table 9. Units Built in the Former Silver Spring CBD Enterprise Zone

Fiscal Year	Units Completed
FY2006	220
FY2007	145
FY2008	143
FY2009	704
FY2010	0
FY2011	325
FY2012	247
FY2013	540
FY2014	921
FY2015	437
FY2016	102

SCHOOL RECOMMENDATION SUMMARY

STUDENT GENERATION RATES

- Calculate School Facility Payments and the School Impact Tax using student generation rates associated with all residential structures built any year.

ANNUAL SCHOOL TEST

- Implement a hybrid annual school test that combines cluster utilization tests with individual school capacity deficit tests.

SCHOOL FACILITY PAYMENTS

- Update the calculation of the School Facility Payments on a biennial basis (concurrent with the annual school test or with the update to the Subdivision Staging Policy) using the latest generation rates and school construction cost data, limiting any change (increase or decrease) to no more than five percent.
- Modify the calculation of the School Facility Payments to apply a 0.5 multiplier instead of the current 0.6 multiplier.

PLACEHOLDER PROJECTS

- Placeholder capacity for a particular cluster level or school can only be counted as capacity in the annual school test for two years.

SCHOOL IMPACT TAX

- Update the School Impact Tax amounts on a biennial basis (concurrent with the annual school test or with the update to the Subdivision Staging Policy) using the latest student generation rates and school construction cost data, limiting any change (increase or decrease) to no more than five percent.
- Remove the 0.9 multiplier in the School Impact Tax, so as to capture the full cost of school construction associated with a new residential unit.
- Require a portion of the School Impact Tax equivalent to 10 percent of the cost of a student seat be dedicated to land acquisition for new schools.
- Allow a credit against the School Impact Tax for land dedicated for a school site, as long as the density calculated for the dedication area is excluded from the density calculation for the site, and MCPS agrees to the site dedication.

ENTERPRISE ZONE EXEMPTIONS

- Reintroduce the School Impact Tax and School Facility Payments in former Enterprise Zones through a phased approach.
- Conduct further research to develop the criteria and process by which an area of the County can be exempted from the School Impact Tax and School Facility Payments.