

MEMORANDUM

December 4, 2020

TO: Planning, Housing, and Economic Development (PHED) Committee

FROM: Glenn Orlin, Senior Analyst

SUBJECT: Policy area review for master plan evaluation¹

PURPOSE: To review and make recommendations to the Council

This worksession will review and provide feedback to the Planning Board regarding how future master plans should be evaluated for transportation adequacy. Those invited to participate in this worksession are:

- Jason Sartori and Eric Graye, Planning Department
- Alex Rixey, Fehr & Peers DC
- Christopher Conklin, Gary Erenrich and Andrew Bossi, Department of Transportation

Background. In nearly every master and sector plan adopted during the past three decades, the Council checked for transportation adequacy by determining whether a quantifiable balance was achieved between the plan's proposed land use and its proposed transportation network and services. Over these years this balance has been defined as what would be needed to meet the then-current adequate public facilities requirements as described in the Growth Policy/SSP. Achieving balance in a plan was not an academic exercise: if a plan was not balanced, then at some point in the future a proposed master-planned development might be unable to proceed because it would have no means to meet the adequate public facility requirements.

This evaluation applied the Growth Policy/SSP transportation adequacy test then in effect in the subject master plan area, the difference being that while the Growth Policy/SSP compared traffic congestion to the transportation network 6 years in the future, the master plan evaluation compared traffic congestion to the transportation network at buildout, usually 20-25 years in the future. For master plans the evaluation was to check whether the policy area standard would be achieved at buildout; for small area sector plans the evaluation was to check whether the LATR intersection standards would be achieved at buildout. In either case, if a Final Draft plan's proposed land use and transportation elements did not produce a result that met the Growth Policy/SSP standard for that area, then the Council usually revised the plan either by reducing density, increasing capacity in the planned road and transit networks, adjusting the non-auto-driver mode share (NADMS) goals, or some combination of the above. For example, early this year the balance was achieved in the Forest Glen/Montgomery Hills Sector Plan by recognizing that most of the area should be reclassified as a Red Policy Area, thus loosening the LATR standard for the intersections along Georgia Avenue from 80 seconds/vehicle to 120 seconds/vehicle, and by

¹ Key words: #policy area review, transportation

recommending a few minor intersection improvements.² In rare cases the Council adopted a plan that was out of balance. An example is the Potomac Master Plan, which acknowledged that traffic congestion would be worse than the standard but necessary to preserve the “two-lane policy” that has long applied to most roads in that area.

The newly adopted Growth and Infrastructure Policy (GIP), however, calls into question the need for this type of analysis anymore. In Red policy areas—those around Metro stations and future Purple Line stations—the GIP specifies that there is no limit on the amount of allowable congestion, and that developments will not be tested for the traffic they generate. In Orange, Yellow, and Green policy areas, developer-funded road capacity improvements would only be allowed as a last resort, if transportation demand management and operational improvements don’t meet the applicable congestion standard. As for the bicycle and pedestrian networks, their respective functional master plans (the latter scheduled for adoption in 2022) already identify where facilities are to be constructed by the time of a plan’s buildout.

Planning Board recommendations. The Board proposes five metrics, described in the Final Draft County Growth Policy Report as Recommendations 5.11-5.15 in the Final Draft County Growth Policy Report (©1-5) and in a PowerPoint (©6-16). In summary, these metrics would be:

- *5.11: Accessibility*, defined as the number of jobs that can be reached within 45 minutes by auto and by transit, at the time of buildout. Adequacy would be achieved if the proposed plan met or bettered the average accessibility for the county as a whole, which Planning staff has projected to be 1,159,950 jobs within 45 minutes by auto and 134,160 jobs within 45 minutes by transit.
- *5.12: Travel times*, defined as the average time by auto and by transit, considering all trip purposes during all times on a weekday. Adequacy would be achieved if the proposed plan met or bettered the countywide average travel time at the time of buildout, which Planning staff has projected to be 18.8 minutes for autos and 51.7 minutes for transit.
- *5.13: Vehicle miles of travel (VMT) per capita*, defined as the sum of the weekday VMT from trips that both start and end within the county and half the weekday VMT from trips that either start or end within the county, divided by the total number of residents and employees in the county (the “service population”). Adequacy would be achieved if the proposed plan met or bettered the average for the county as a whole at the time of buildout, which Planning staff has projected to be 12.4 VMT/capita.
- *5.14: Non-auto-driver mode share*, defined as the NADMS for all weekday trips regardless of trip purpose. Adequacy would be achieved if the proposed plan met or bettered the average for the county NADMS for the county as a whole at the time of buildout, which Planning staff has projected to be 46%.
- *5.15: Low-stress bicycle accessibility*, defined as the percentage of potential bicycle trips that can be accommodated on a low-stress bikeway network. Adequacy would be achieved if the proposed plan met or bettered the average for the percentage for the county as a whole at the time of buildout, which Planning staff has projected in the Bicycle Master Plan to be 80%.

Note that some improvement in many of the metrics can be achieved without adding more road and transit than is called for in current master plans. For example, if the current plan is housing heavy, replacing some planned housing in favor of more commercial development would result in a closer housing/jobs

² Subsequently the Council has adopted the 2020-2024 SSP that extended the limits of this new policy area to include the entire sector plan area and eliminated the motor vehicle congestion standard entirely.

balance; this in turn would likely result in better accessibility, travel times, and (lower) VMT/capita as some residents would be prone to make shorter trips to work, shopping, etc. The same would be the case for replacing some planned commercial development in job-heavy areas with more planned housing.

DOT recommendations. DOT would revise these metrics as shown in its track-change version of Recommendations 5.11-5.15 (©17-19). While DOT’s revisions appear to be extensive, in reality the disagreement is on only one point: that a finding of adequacy be based on whether the proposed plan improves each metric compared to the existing plan for residents and employees in that master or sector plan’s area, rather than for the county as a whole. In reality, if there is an improvement in one planning area then there will also be an improvement in the county as a whole, all else held equal.

For example, if accessibility were improved by, say, 5% within a planning area under the proposed plan compared to the existing plan, this would likely result in an improvement of only a fraction of a percent in the county as a whole; nevertheless, it would still be an improvement. However, expressing the difference as a change in a master plan area would be more meaningful.

Council staff recommendations.

- There needs to be a recognition that there would no longer be a linkage between the GIP LATR test and the master plan transportation adequacy test, leaving open the possibility that some future master-planned development may not meet the GIP LATR test and not be approved, without a further loosening of GIP LATR standards.
- As recommended by DOT, measure the change from the current to the proposed plan for each of the first three metrics—auto and transit accessibility, auto and transit average travel time, and VMT/capita—within the area of the subject master plan. A finding of adequacy should be made only if each of these metrics are improved.

A follow-up question to be explored: should there be a minimum acceptable improvement from for these metrics from one plan to the next? As an example, should auto accessibility within a planning area be improved by at least 2% and transit accessibility be improved by at least 5%?

- NADMS should be defined as the non-auto-driver mode share for the journey to work, not for all trips. This is the meaning of the measure in current master plans and the GIP, and are the goals used by the County regulating transportation demand management. Furthermore, estimates of future journey-to-work NADMS behavior are more reliable given that they are projected from survey data, while all-purpose or all-day NADMS behavior is guesstimated based on regional factors of the journey-to-work estimates.
- Rather than having improvement in NADMS for a finding of adequacy, instead each plan should either confirm the existing journey-to-work NADMS goal or establish a new one, and that plan should be crafted so it achieves that goal.
- Do not include the Low-Stress Bicycle Accessibility metric, since the Bicycle Master Plan already specifies the bikeway improvements to be made by buildout. This does not mean that adjustments in the planned bikeway network can’t be included in a proposed plan. It merely means that there isn’t the need for a finding of master plan adequacy for bikeways.

To determine whether or not a master plan is in balance, the County Council applies the LATR transportation adequacy test in the context of a long-range planning horizon (typically 20 to 25 years into the future). This test (as described in the Vision Zero integration into LATR discussion provided above) evaluates the traffic generated by master-planned development buildout in combination with a transportation network that assumes certain intersection improvements. This analysis methodology has utility when used to evaluate local transportation adequacy for a subdivision application in a Capital Improvement Program (CIP) planning horizon context (i.e., five to six years into the future). However, the utility of this approach raises some concerns when used to evaluate transportation adequacy for master plans/sector plans in the context of a long-range planning horizon, including:

- **No Consideration of Areawide Effects:** The current HCM-based LATR analysis process is limited to the evaluation of the local signalized intersection roadway network within a master plan study area to assess the adequacy of the master-planned transportation system to accommodate master-plan recommended land use development. However, this process does not help understand the implications of master plan recommendations in a broader areawide context. Conventional intersection-

based analysis also typically emphasizes the additive nature of automobile trips generated by land use development. However, well-planned land use development also has the potential to change trip distribution patterns, to shorten trips, and to shift the mode of travel by providing new destination options in closer proximity.

- **Limited Confidence in Analysis Results:** The application of the HCM intersection delay analysis process is appropriate in the context of a CIP planning horizon (five to six years) when traffic signal-phasing and signal-timing operations parameters used as key analysis inputs can be generally assumed with confidence rather than in a long-term master-planning horizon (20-25 years) when assumptions pertaining to these parameters are far more speculative. As a result, the confidence associated with projecting accurate estimates of intersection delay in the context of a long-term master-planning horizon is limited.

The following recommendations focus on re-introducing a policy area-level transportation adequacy review process for the evaluation of master plans and sector plans to address the concerns cited above associated with using LATR for this purpose.

Policy Area Review

Following are recommendations pertaining to alternative areawide transportation adequacy review approaches to replace the current LATR-based approach used to evaluate the transportation adequacy of master plans. The tests best suited for each master plan may vary, however, the Planning Boards recommends including each of these in the evaluation toolbox.

Thresholds for the proposed metrics are typically set at a value greater or less than the future baseline conditions. Future baseline conditions currently reflect the modeled land use program for the year 2040, including the Metropolitan Washington

Council of Governments' (MWCOC) cooperative forecasts and any adopted master plans, as well as any programmed transportation improvements for the year 2040. These may be revised as plans are updated. In the case of the Low-Stress Bike Accessibility metric, the 2018 Montgomery County Bicycle Master Plan provides the bicycle network baseline, while land use changes would reflect the MWCOC cooperative forecasts and any adopted master plans.

Any changes contemplated in an evaluated master plan will be compared against conditions in the

region in the absence of the changes contemplated in the master plan under evaluation using the information available at the time of evaluation. This comparison to future baseline is used to evaluate whether the master plan under evaluation continues to provide the same level (or an improved level) of public-facility adequacy relative to a previously adopted plan.

A high-level overview of calculation methodologies is described below for purposes of illustrating the meaning of the metrics. Montgomery Planning anticipates retaining the flexibility to adjust the specific calculation approach at the time of master plan evaluation, including sensitivity to the rounding of threshold values.

Finally, application example discussions are provided for each metric. These examples do not reflect complete, calculated results from model runs, they are designed to illustrate how the metrics might play out in practice.

Auto and Transit Accessibility



Recommendation 5.11: *The proposed auto and transit accessibility metric is the average number of jobs that can be reached within a 45-minute travel time by automobile or walk access transit.*

This metric indicates accessibility to destinations and better reflects existing and planned multi-modal travel options and transit-supportive land use densities, and better aligns growth with the provision of adequate public facilities. This metric can also demonstrate accessibility tradeoffs of new destination options, increased density of development, increased congestion and transportation network changes.

As the number of jobs in the region grows, each county resident will have access to more jobs. With increasing traffic congestion, job accessibility in some policy areas will slightly decrease. As long as these policy areas already have above average access to jobs, the net effect of adding more residents to those policy areas is to increase average jobs accessibility – thereby encouraging development in more accessible locations.

Auto and transit accessibility must meet or exceed future baseline conditions. The threshold proposed for auto and transit accessibility is the average number of jobs accessible within 45 minutes for future baseline conditions. Montgomery County’s regional travel demand model known as “Travel/4,”⁴⁴ provides “skims,” which are tables representing the auto and transit time needed to travel from each transportation analysis zone (TAZ) to every other TAZ in the modeled region. For each TAZ, the number of jobs accessible to that TAZ is equal to the sum of the number of jobs in that TAZ with a skim value less than or equal to 45 minutes. These values are then averaged for all of Montgomery County, weighted by the population of each TAZ to reflect the average number of jobs accessible to a Montgomery County resident. When calculated using the Travel/4 model in February 2020, these values were:

- 1,159,950 jobs on average accessible within 45 minutes by auto
- 134,160 jobs on average accessible within 45 minutes by transit

Hypothetical Application Example – Clarksburg (Yellow Policy Area)

A proposed master plan for Clarksburg contemplates the addition of significantly more housing than included in the future baseline, with all other considerations being equal. Because Clarksburg has lower average values of both jobs accessible by auto within 45 minutes (349,250) and jobs accessible by transit (850) than the Montgomery County average, it is likely that this increase in residents will reduce the Montgomery County average and the master plan will not meet the thresholds. To meet the thresholds, Clarksburg does not need to reach the Montgomery County average; it just needs to maintain or improve the overall Montgomery County average. What are examples of the ways the master plan could be modified to improve the county average and demonstrate adequacy?

⁴⁴ Travel/4 is a Montgomery County-focused adaptation of the regional travel demand model used by the Metropolitan Washington Council of Governments.

- Improve the jobs/housing balance by adding jobs and housing. This will increase auto accessibility to jobs within Clarksburg, but also improve access for all areas within 45 minutes of where the jobs are added, which will likely improve the county’s average auto access to jobs.
- If in the example above the jobs are also added near the limited existing transit service within the Clarksburg policy area, it may also improve the county’s average transit access to jobs.
- Add transit service to connect the new housing (or other existing housing in the master plan area) to jobs. This will improve the county’s average transit access to jobs.

Hypothetical Application Example – Wheaton Central Business District (Red Policy Area)

A proposed master plan for the Wheaton Central Business District (CBD) contemplates the addition of significantly more housing than included in the future baseline, with all other considerations being equal. In a relatively dense and congested location, adding development may slightly reduce

the auto travel shed- the area accessible by auto within a given amount of time – thereby reducing the jobs accessible by auto. However, because the Wheaton CBD has lower average values of both jobs accessible by auto within 45 minutes (1,713,440) and jobs accessible by transit (492,900) than the Montgomery County average, it is likely that this increase in residents will improve the county average and the master plan will meet the thresholds.

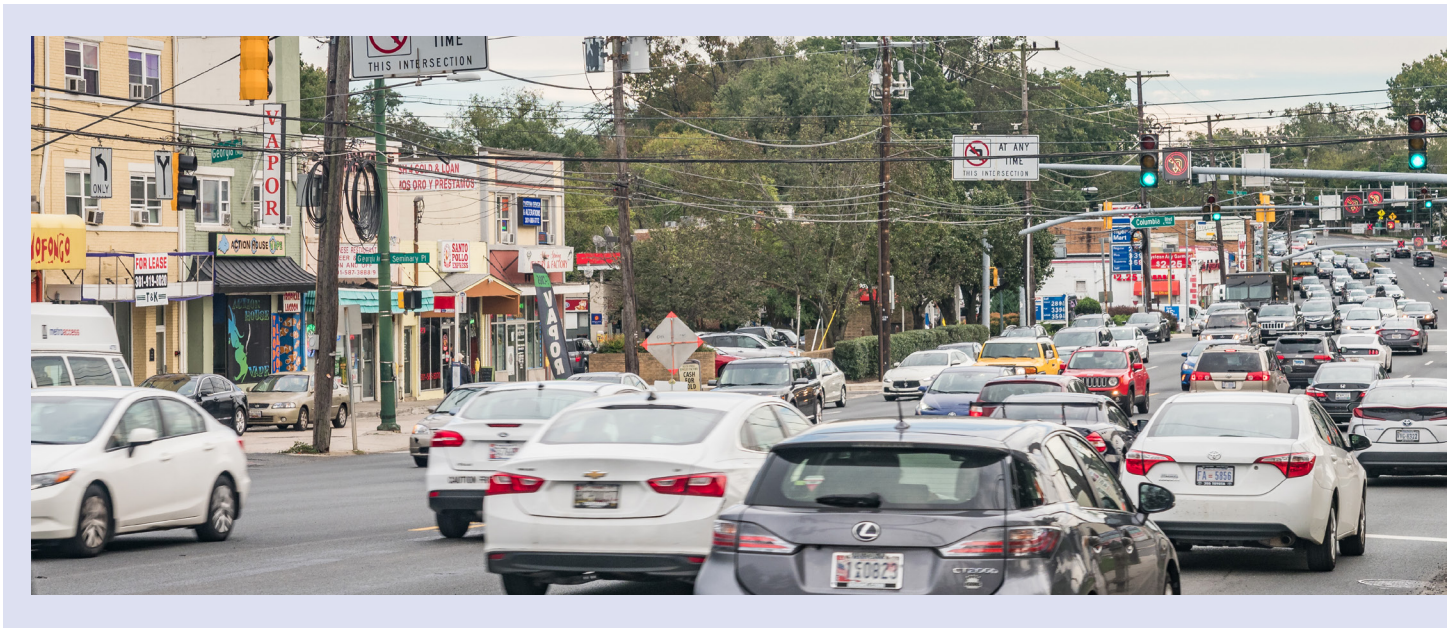
If, however, the increased congestion reduces auto accessibility for residents elsewhere in the county to the extent that it reduces overall county job access by auto, adjustments to the land use program or transportation network may be necessary to maintain or improve auto accessibility.

Auto and Transit Travel Times



Recommendation 5.12: *The proposed metric for auto and transit travel times is average time per trip, considering all trip purposes.*

This metric indicates the total amount of time spent traveling per trip and is a more intuitive measure of travel time burden than intersection delay. Changes in transportation service and facilities in a policy area affect travel times not only for that policy area but also for much of the county. Traffic



congestion may increase, but effects on travel times for individual trips may be offset by changes to trip distribution patterns and shorter trip distances afforded by new destination options in closer proximity.

Auto and transit travel times must not exceed future baseline conditions. The threshold proposed for policy area-level analysis is average travel time per trip (all trips) for the future baseline. The Travel/4 model provides the duration of each trip and the metric is a simple average of all Montgomery County trips. When calculated using the Travel/4 model in February 2020, these values were:

- 18.8 minutes for auto
- 51.7 minutes for transit

Vehicle Miles Traveled (VMT) per Capita



Recommendation 5.13: *The proposed metric for vehicle miles traveled per capita is daily miles traveled per “service population,” where “service population” is the sum of population and total employment for a particular TAZ.*

This metric, indicative of the total amount of driving per person, assesses how well people’s needs can be met without traveling by car and prescribes a more

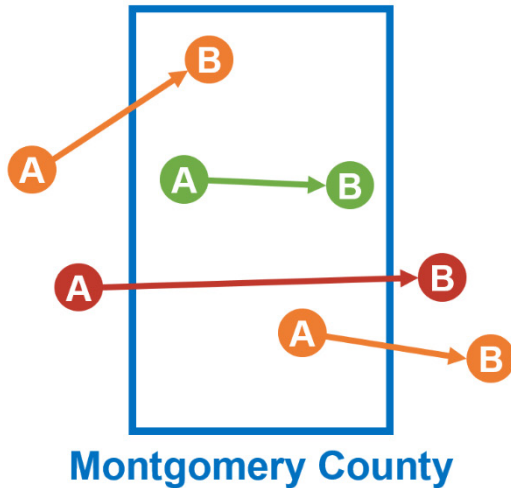
efficient use of space. Changes in transportation service and facilities in a policy area affect VMT not only for that policy area but also for other parts of the county. VMT per capita (demonstrated in Figure 30) will reflect changes in trip distribution patterns, trip lengths, and shifts in mode of travel due to changing destination options.

Vehicle miles traveled per capita must not exceed future baseline conditions. The threshold proposed for policy area-level analysis is daily vehicle miles traveled per “service population” for the future baseline. The Travel/4 model provides matrices of the total number of vehicle trips between TAZs and “skims” of the length (distance) of those trips. Combining the two results in VMT, which is then divided by the “service population” of each TAZ to estimate VMT per capita. The VMT per capita metric includes 100 percent of miles traveled for trips that both start and end in Montgomery County, 50 percent of the mile traveled that either begin or end in Montgomery County, zero percent of the miles traveled for trips that only pass through Montgomery County (See Figure 31). VMT per capita can then be aggregated to the county level using an average weighted by “service population.” When calculated using the Travel/4 model in February 2020, the threshold value was 12.4 VMT per capita.

Figure 30. Calculation of Vehicle Miles Traveled (VMT) per Capita.

$$\begin{array}{c}
 \text{Vehicle Miles Traveled} \\
 \text{(VMT)} \\
 \text{[Car Icon]} \\
 \hline
 \text{[House Icon]} + \text{[Building Icon]} \\
 \text{Population + Employment} \\
 \text{(Service Population)}
 \end{array}
 = \text{VMT per Capita}$$

Figure 31. Montgomery County Vehicle Miles Traveled.



$$\begin{aligned}
 &100\% \text{ of mileage from trips} \\
 &\text{completely within the county} \\
 &+ \\
 &50\% \text{ of mileage from trips that} \\
 &\text{begin OR end in the county} \\
 &+ \\
 &0\% \text{ of mileage from trips that} \\
 &\text{only pass through the county} \\
 &= \\
 &\text{Vehicle Miles Traveled (VMT)}
 \end{aligned}$$



Non-Auto Driver Mode Share (NADMS)



Recommendation 5.14: *The proposed metric for non-auto driver mode share is the percentage of non-auto driver trips (i.e., HOV, transit and nonmotorized trips) for trips of all purposes.*

This metric is indicative of the use of non-auto modal options for all trips and reflective of the degree to which master plan recommended NADMS goals are achieved. Changes in transportation service and facilities in a policy area affect mode choice decisions not only for that policy area but also for other parts of the county.

Non-auto driver mode share must meet or exceed future baseline conditions. The threshold proposed for policy area-level analysis is the percentage of non-auto driver trips for the future baseline. The Travel/4 model provides estimates of the number of trips by each mode, including SOV, HOV2, HOV3+, transit, and nonmotorized (combined pedestrian and bicycle trips). NADMS is estimated as the total share of all person trips by HOV2, HOV3+, transit and nonmotorized modes. When calculated using the Travel/4 model in February 2020, the threshold value was 46 percent NADMS.

Low-Stress Bicycle Accessibility



Recommendation 5.15: *The proposed metric for bicycle accessibility is the Countywide Connectivity metric documented in the 2018 Montgomery County Bicycle Master Plan (page 200).*

This metric estimates the percentage of potential bicycle trips that can be made on a low-stress bicycling network that is “appropriate for most adults” or “appropriate for most children.” This metric is indicative of bike accessibility to destinations in the county and is a proxy for safe segment and crossing connectivity. The threshold proposed for policy area analysis is a Countywide Connectivity percentage greater than or equal to the value calculated for the Bicycle Master Plan buildout (estimated at 80.0 percent in the Bicycle Master Plan, but subject to annual adjustments).

Policy Area Review - Auto & Transit Accessibility

R5.11

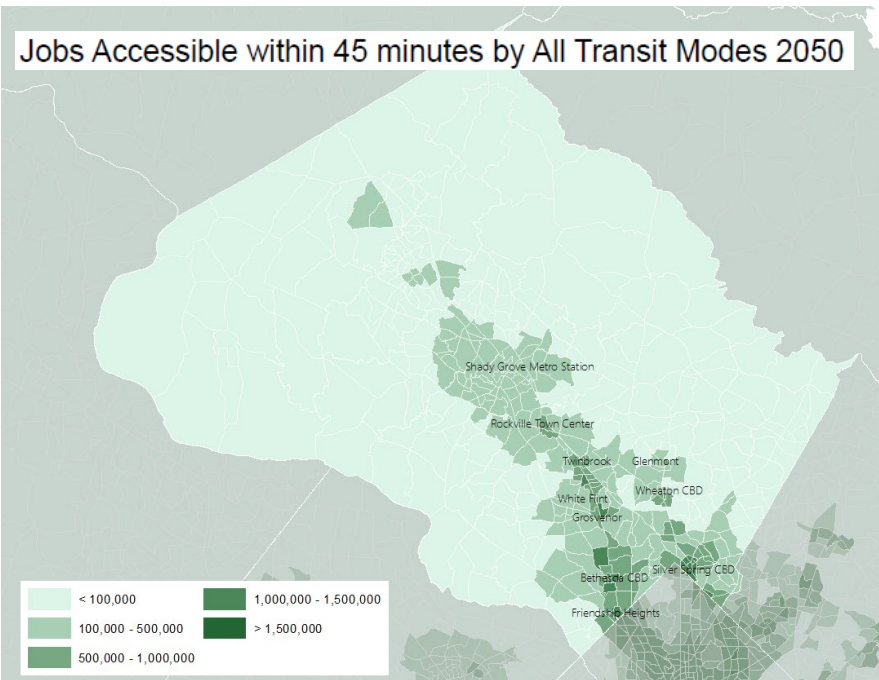
The proposed auto and transit accessibility metric is the average number of jobs that can be reached within a 45-minute travel time by automobile or walk access transit.

What? Number of jobs accessible within 45 minutes greater than future baseline conditions
Auto: 1,159,950 jobs on average
Transit: 134,160 jobs on average

How? Travel/4 Model

Where? TAZ level; population-weighted average to County

Why? Indicates accessibility to destinations
Can demonstrate accessibility tradeoff of new destination options, increased density of development, increased congestion, and transportation network changes



Policy Area Review – Transit Accessibility

R5.11 Hypothetical Example

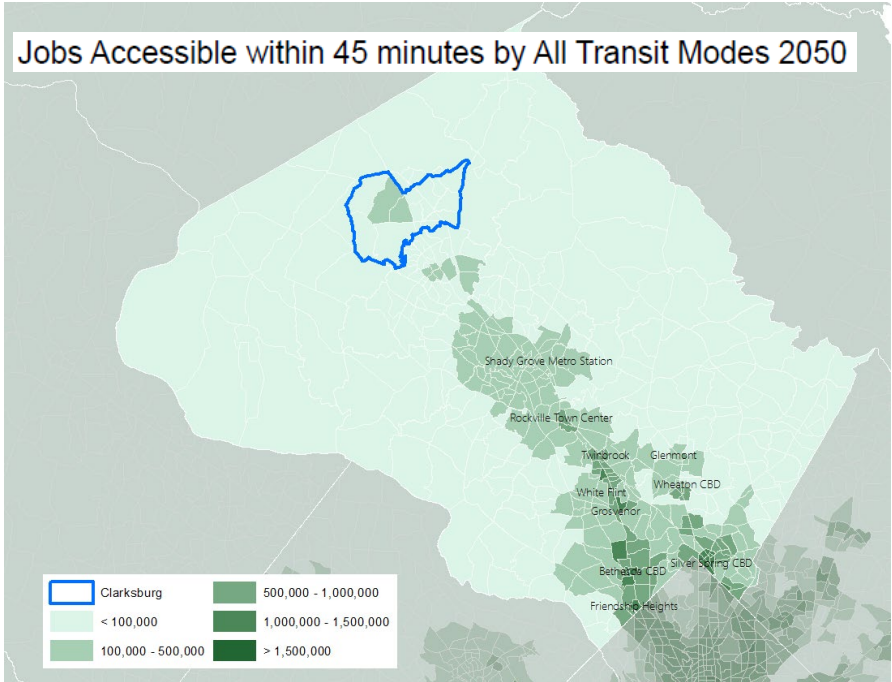
Jobs Accessible within 45 Minutes by Transit	
Montgomery County Future Baseline:	134,160
Clarksburg Existing:	850
Clarksburg Future Baseline:	26,700

Scenario: Suppose a proposed master plan adds more residents to Clarksburg than planned in the Future Baseline (with no other changes)

Result: Reduced Montgomery County average job accessibility by transit

Potential Policy Responses:

- Improve jobs/housing balance by adding transit-accessible jobs within Clarksburg
- Add transit service to connect the new or existing housing to jobs



Policy Area Review – Auto & Transit Travel Times

R5.12

The proposed metric for auto and transit travel times is average time per trip, considering all trip purposes.

What? Average travel time per trip (all trips) less than future baseline

- 19 minutes for Auto (vs. 16 minutes existing)
- 52 minutes for Transit (vs. 50 minutes existing)

How? Travel/4 Model + custom script

Where? TAZ level; County average for all trips

Why? Indicates total amount of time spent traveling per trip
Travel time more intuitive measure of burden than intersection delay

Changes in a Policy Area affect travel times not only for that policy area but for much of the County.

Congestion may increase, but effects on travel times for individual trips may be offset by changes to trip distribution patterns and shorter trip distances afforded by new destination options in closer proximity.



Policy Area Review – Transit Travel Times

R5.12 Clarification

What is included in transit travel times?

Total end-to-end travel time, including:

- In-Vehicle Time
- Initial Wait Time
- Transfer Wait Time
- Access Time (walk or drive)

Policy Area Review – Transit Travel Times

R5.12 Clarification

Why might transit travel times increase between existing and future baseline conditions, even with additional transit infrastructure and service?

New Connections – New transit options that are faster than current options but longer than the average transit travel time (e.g. 355 BRT from Clarksburg to Rockville, plus potential transfers)

Congestion – Local buses in mixed traffic are subject to general traffic congestion, which increases between existing and future baseline conditions

Travel Demand Patterns – Travel demand patterns shift between existing and future baseline conditions, reflecting land use changes (e.g., significant job growth in White Oak, which has longer-than-average transit travel times)

Policy Area Review – Transit Travel Times

R5.12 Clarification

How could future transit travel times be reduced?

Potential Policy Responses

- Further improve transit performance (e.g., dedicated facilities, queue jumps, increased frequencies, etc.) to reduce wait times and increase average transit travel speeds
- Increase opportunities to shorten travel distances
 - Balanced land uses
 - Additional local transit routes to connect more destinations
- Locate future land use growth in areas with high transit accessibility and short transit travel times

Policy Area Review – Vehicle Miles Traveled per Capita

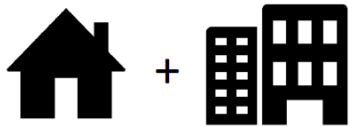
R5.13

The proposed metric for vehicle miles traveled per capita is daily miles traveled per “service population”, where “service population” is the sum of population and total employment for a particular TAZ.

Vehicle Miles Traveled
(VMT)



= VMT per Capita



Population + Employment
(Service Population)

What? Daily vehicle miles traveled per “service population”
“service population = population + total employment
less than future baseline

12.4 VMT per capita (vs. 13.0 existing)

How? Travel/4 Model + custom script
50% of origin VMT + 50% of destination VMT

Policy Area Review – Vehicle Miles Traveled per Capita

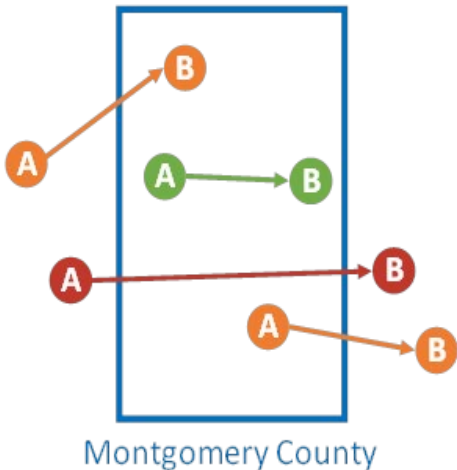
R5.13

The proposed metric for vehicle miles traveled per capita is daily miles traveled per “service population”, where “service population” is the sum of population and total employment for a particular TAZ.

Where? Service Population-weighted County average

Why? VMT per capita will reflect changes in trip distribution patterns, trip lengths, and shifts in mode of travel due to changing destination options.

Changes in a Policy Area affect vehicle miles traveled not only for that policy area but for other parts of the County as well.



100% of mileage from trips completely within the county

+

50% of mileage from trips that begin OR end in the county

+

0% of mileage from trips that only pass through the county

=

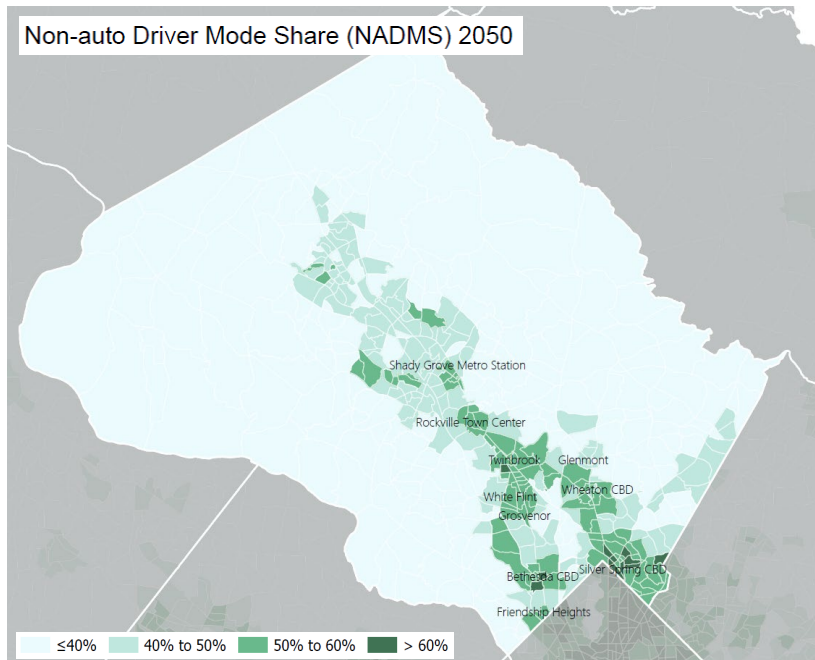
Vehicle Miles Traveled (VMT)



Policy Area Review – Non-Auto Driver Mode Share

R5.14

The proposed metric for non-auto driver mode share is the percentage of non-auto driver trips (i.e., HOV, transit and nonmotorized trips) for trips of all purposes.



- What?** % of non-auto driver trips greater than future baseline 46% NADMS for all trip purposes
- How?** Travel/4 Model + custom script
Includes origin and destination trip ends
- Where?** TAZ level; summarized for all County trips
- Why?** Indicates use of non-auto modal options
Changes in a policy area affect mode choice decisions| not only for that policy area but for other parts of the County as well.

Policy Area Review – Bicycle Accessibility

R5.15

The proposed metric for bicycle accessibility is the Countywide Connectivity metric documented in the 2018 Montgomery County Bicycle Master Plan (page 200).

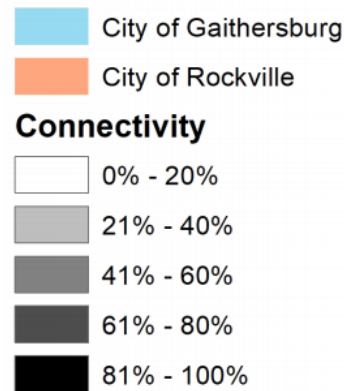
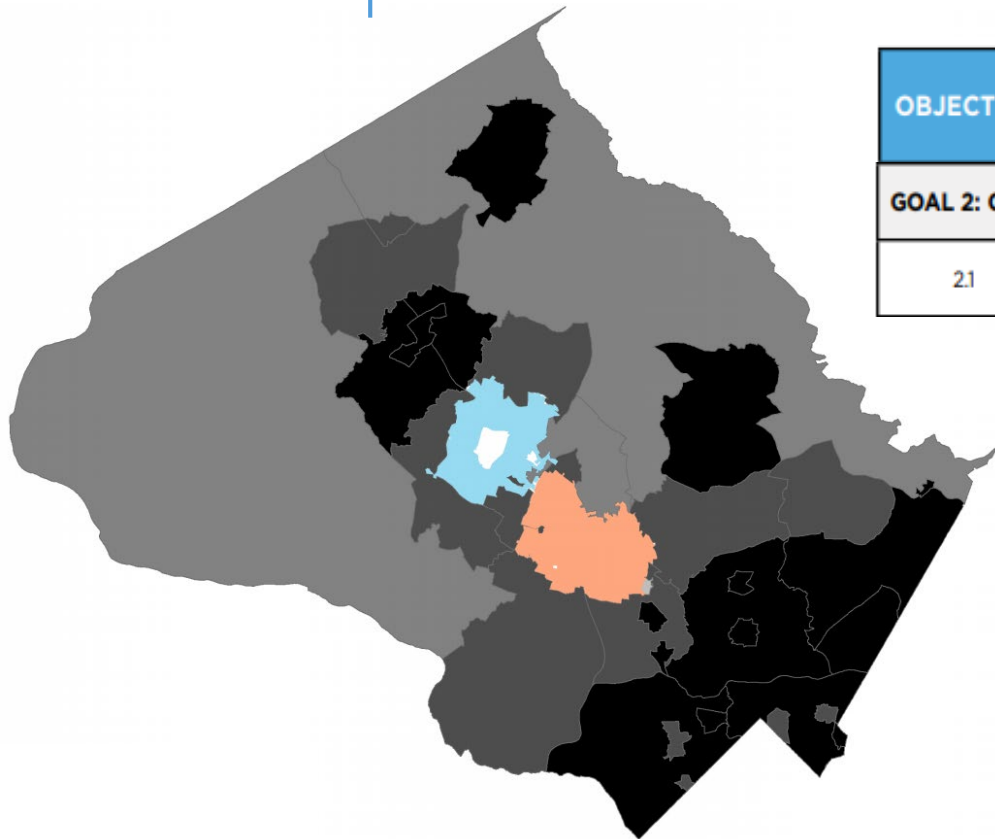
- What?** Percentage of potential bicycle trips able to be made on a low-stress bicycling network.
("appropriate for most adults" or "appropriate for most children")
Consistent with approach for Objective 2.1 of Bicycle Master Plan – "Countywide Connectivity"
- How?** ArcMap GIS script network analysis
Bicycle Master Plan Bike Stress Map (County Only)
Bicycle trip length decay function
- Where?** Census Block Group level
Countywide % of potential bicycle trips
- Why?** Indicates bike accessibility to destinations in Montgomery County
Proxy for safe segment and crossing connectivity

Policy Area Review - Bicycle Accessibility

R5.15

The proposed metric for bicycle accessibility is the Countywide Connectivity metric documented in the 2018 Montgomery County Bicycle Master Plan (page 200).

OBJECTIVE	METRIC	EXIST-ING (2018)	FUND-ED	HIGH PRIORITY	TIER 1	TIER 2	TIER 3	TIER 4	BUILD OUT
GOAL 2: CREATE A HIGHLY-CONNECTED, CONVENIENT AND LOW-STRESS BICYCLING NETWORK									
21	Countywide Connectivity	16%	N/A	20%	30%	40%	50%	50%	80%



DOT's Recommended Revisions (in track changes)

Auto and Transit Accessibility Recommendation 5.11: The proposed auto and transit accessibility metric is the average number of jobs that can be reached within a 45-minute travel time by automobile or walk access transit.

This metric indicates accessibility to destinations and better reflects existing and planned multimodal travel options and transit-supportive land use densities, and better aligns growth with the provision of adequate public facilities. This metric can also demonstrate accessibility tradeoffs of new destination options, increased density of development, increased congestion and transportation network changes. The threshold proposed for auto and transit accessibility is the average number of jobs accessible within 45 minutes for future baseline conditions and compared to the existing master plan.

~~As the number of jobs in the region grows, each county resident will have access to more jobs. With increasing traffic congestion, job accessibility in some policy areas will slightly decrease. As long as these policy areas already have above average access to jobs, the net effect of adding more residents to those policy areas is to increase average jobs accessibility—thereby encouraging development in more accessible locations. Auto and transit accessibility must meet or exceed future baseline conditions. The threshold proposed for auto and transit accessibility is the average number of jobs accessible within 45 minutes for future baseline conditions.~~ Montgomery County's regional travel demand model known as "Travel/4,"⁴⁴ provides "skims," which are tables representing the auto and transit time needed to travel from each transportation analysis zone (TAZ) to every other TAZ in the modeled region. For each TAZ, the number of jobs accessible to that TAZ is equal to the sum of the number of jobs in that TAZ with a skim value less than or equal to 45 minutes. The policy area adequacy test is to have the future master plan increase the number of jobs accessible from the master plan area via both auto and transit. If the access to jobs via either auto or transit is less than either the baseline or the existing master plan, then the proposed master plan fails and land use and transportation programs and plans should be reexamined until the master plan passes this test. ~~These values are then averaged for all of Montgomery County, weighted by the population of each TAZ to reflect the average number of jobs accessible to a Montgomery County resident. When calculated using the Travel/4 model in February 2020, these values were: • 1,159,950 jobs on average accessible within 45 minutes by auto • 134,160 jobs on average accessible within 45 minutes by transit~~

~~Hypothetical Application Example—Clarksburg (Yellow Policy Area)~~

~~A proposed master plan for Clarksburg contemplates the addition of significantly more housing than included in the future baseline, with all other considerations being equal. Because Clarksburg has lower average values of both jobs accessible by auto within 45 minutes (349,250) and jobs accessible by transit (850) than the Montgomery County average, it is likely that this increase in residents will reduce the Montgomery County average and the master plan will not meet the thresholds. To meet the thresholds, Clarksburg does not need to reach the Montgomery County average; it just needs to maintain or improve the overall Montgomery County average. What are examples of the ways the master plan could be modified to improve the county average and demonstrate adequacy?~~

- ~~• Improve the jobs/housing balance by adding jobs and housing. This will increase auto accessibility to jobs within Clarksburg, but also improve access for all areas within 45 minutes of where the jobs are added, which will likely improve the county's average auto access to jobs.~~

- ~~If in the example above the jobs are also added near the limited existing transit service within the Clarksburg policy area, it may also improve the county's average transit access to jobs.~~
- ~~Add transit service to connect the new housing (or other existing housing in the master plan area) to jobs. This will improve the county's average transit access to jobs.~~

~~Hypothetical Application Example — Wheaton Central Business District (Red Policy Area)~~

~~A proposed master plan for the Wheaton Central Business District (CBD) contemplates the addition of significantly more housing than included in the future baseline, with all other considerations being equal. In a relatively dense and congested location, adding development may slightly reduce the auto travel shed—the area accessible by auto within a given amount of time—thereby reducing the jobs accessible by auto. However, because the Wheaton CBD has lower average values of both jobs accessible by auto within 45 minutes (1,713,440) and jobs accessible by transit (492,900) than the Montgomery County average, it is likely that this increase in residents will improve the county average and the master plan will meet the thresholds.~~

~~If, however, the increased congestion reduces auto accessibility for residents elsewhere in the county to the extent that it reduces overall county job access by auto, adjustments to the land use program or transportation network may be necessary to maintain or improve auto accessibility.~~

Auto and Transit Travel Times Recommendation 5.12: The proposed metric for auto and transit travel times is average time per trip, considering all trip purposes.

This metric indicates the total amount of time spent traveling per trip and is a more intuitive measure of travel time burden than intersection delay. Changes in transportation service and facilities in a policy area affect travel times not only for that policy area but also for much of the county. Traffic congestion may increase, but effects on travel times for individual trips may be offset by changes to trip distribution patterns and shorter trip distances afforded by new destination options in closer proximity.

Auto and transit travel times must not exceed future baseline conditions. The threshold proposed for policy area-level analysis is average travel time per trip (all trips) in the master plan area for the future baseline. The Travel/4 model provides the duration of each trip and the metric is a simple average of all Montgomery County trips. ~~When calculated using the Travel/4 model in February 2020, these values were:~~

- ~~• 18.8 minutes for auto~~
- ~~• 51.7 minutes for transit~~

Vehicle Miles Traveled (VMT) per Capita Recommendation 5.13: The proposed metric for vehicle miles traveled per capita is daily miles traveled per “service population,” where “service population” is the sum of population and total employment for a particular TAZ.

This metric, indicative of the total amount of driving per person, assesses how well people’s needs can be met without traveling by car and prescribes a more efficient use of space. ~~Figure 30. Calculation of Vehicle Miles Traveled (VMT) per Capita.~~ Changes in transportation service and facilities in a policy area affect VMT not only for that policy area but also for other parts of the county. VMT per capita (demonstrated in Figure 30) will reflect changes in trip distribution patterns, trip lengths, and shifts in mode of travel due to changing destination options.

Vehicle miles traveled per capita must not exceed future baseline conditions. The threshold proposed for policy area-level analysis is daily vehicle miles traveled per “service population” for the future baseline. The Travel/4 model provides matrices of the total number of vehicle trips between TAZs and “skims” of the length (distance) of those trips. Combining the two results in VMT, which is then divided by the “service population” of each TAZ to estimate VMT per capita. The VMT per capita metric includes 100 percent of miles traveled for trips that both start and end in Montgomery County, 50 percent of the mile traveled that either begin or end in Montgomery County, zero percent of the miles traveled for trips that only pass through Montgomery County (See Figure 31). VMT per capita can then be aggregated to the master plan area, county level using an average weighted by “service population.” ~~When calculated using the Travel/4 model in February 2020, the threshold value was 12.4 VMT per capita.~~

Non-Auto Driver Mode Share (NADMS) Recommendation 5.14: The proposed metric for non-auto driver mode share is the percentage of non-auto driver trips (i.e., HOV, transit and nonmotorized trips) for trips of all purposes.

This metric is indicative of the use of non-auto modal options for all trips and reflective of the degree to which master plan recommended NADMS goals are achieved. Changes in transportation service and facilities in a policy area affect mode choice decisions not only for that policy area but also for other parts of the county.

Non-auto driver mode share must meet or exceed future baseline conditions. The threshold proposed for policy area-level analysis is the percentage of non-auto driver trips for the future baseline. The Travel/4 model provides estimates of the number of trips by each mode, including SOV, HOV2, HOV3+, transit, and nonmotorized (combined pedestrian and bicycle trips). NADMS is estimated as the total share of all person trips by HOV2, HOV3+, transit and nonmotorized modes. Master plans that do not meet the required NADMS should reexamine the land use as well as the transit network to achieve the established goal. ~~When calculated using the Travel/4 model in February 2020, the threshold value was 46 percent NADMS.~~

Low-Stress Bicycle Accessibility Recommendation 5.15: The proposed metric for bicycle accessibility is the Countywide Connectivity metric documented in the 2018 Montgomery County Bicycle Master Plan (page 200).

This metric estimates the percentage of potential bicycle trips that can be made on a low-stress bicycling network that is “appropriate for most adults” or “appropriate for most children.” This metric is indicative of bike accessibility to destinations in the county and is a proxy for safe segment and crossing connectivity. The threshold proposed for policy area analysis is a Countywide Connectivity percentage greater than or equal to the value calculated for the Bicycle Master Plan buildout (estimated at 80.0 percent in the Bicycle Master Plan, but subject to annual adjustments).