National Capital Region Transportation Planning Board
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MEMORANDUM

TO: Transportation Planning Board/TPB Scenario Study Task Force

FROM: Monica Bansal
Department of Transportation Planning

SUBJECT: Development of the CLRP Aspirations and What Would It Take Scenarios

DATE: September 17, 2008

Work on the two new scenarios, "CLRP Aspirations" and "What Would it Take", which are built upon the TPB's previous Regional Mobility and Accessibility Study (RMAS), is moving forward. The CLRP Aspirations scenario will provide a realistic but ambitious alternative growth and transportation strategy for the region that is intended to feed into the 2010 CLRP update. The What Would It Take (WWIT) scenario differs from this model in that it begins with regional climate change mitigation goals and examines how these goals might be met through different combinations of transportation interventions, including some that are not normally reflected in the TPB travel demand modeling process, such as significant changes in individual behavior.

This memo provides a detailed overview of the process of developing the two new scenarios, and is presented in the following sections:

- **Baseline**: Describes the starting point for the scenarios: the Round 7.1 Cooperative Land-Use Forecasts and the 2008 CLRP.
- **Schedule**: Describes the proposed schedule for the scenario development and analysis process, including potential interaction between the two scenarios.
- **Developing the CLRP Aspirations Scenario**: Explains in detail the background of this scenario and describes the process by which the transportation and land use components are being developed.
- **Developing and Analyzing the What Would It Take Scenario:** Explains in detail the background of this scenario and describes how it is being developed and analyzed.
- **Appendix**: Includes background information on the previous RMAS scenarios and their underlying assumptions.

Baseline
Both scenarios are being developed using the Round 7.1 Cooperative Land-Use Forecasts and the 2008 CLRP as the official baseline. Therefore, the various transportation projects planned in the 2008 CLRP are taken as a given for the purposes of this study. Moreover, the land use projections out to 2010 are

also taken as irreversible since many, if not all, development projects up to that date are either already on the ground or in the pipeline. For the purposes of the WWIT scenario, currently employed transportation emissions reduction measures (TERMs), such as the Commuter Connections program, also must be factored into the baseline in order to ensure that double counting of each strategy's emissions reduction potential does not occur.

Schedule

While the initial schedule for the scenario study has been revised, the same completion timeframe remains. The scenarios are expected to be completed by the end of July 2009, which aligns with the beginning of the 2010 four-year CLRP update cycle. This 2010 update will provide many opportunities, such as a longer plan horizon out to 2040, finer grained transportation analysis zones, and the incorporation of new surveys into forecasting models, including new regional household travel and on-board bus surveys.

The CLRP Aspirations and WWIT scenarios will be done concurrently; however, they will follow slightly different schedules. Development of the CLRP Aspirations scenario, including finalization of the land use inputs and completion of transportation network coding, is expected to be completed by January 2009. Completion of scenario analysis and finalization of results is expected to be completed in June 2009, followed by public outreach in June and July 2009. Analysis of the WWIT scenario is expected to be completed prior to the CLRP Aspirations scenario in January 2009 since it will not be relying on the travel demand model for results. At this point, the results of the WWIT scenario can begin informing the analysis of the CLRP Aspirations scenario.

Developing the CLRP Aspirations Scenario

The CLRP Aspirations scenario will specifically draw from the strategies explored in the previously studied RMAS scenarios and the variably priced lanes scenarios. The goal is to create a single scenario reflecting realistic growth and transportation aspirations for the region resulting in a more efficient and equitable transportation system.

The scenario is limited by two primary criteria: (1) proposed densities and growth shifts must be feasible in order to be considered for possible inclusion in the Cooperative Forecasts; (2) proposed transportation projects should be financially within reach by assuming realistic funding sources, such as local and/or regional tax revenues, financial contributions from developers, revenue streams from pricing selected facilities, and possible new federal funding.

The CLRP Aspirations Scenario will intentionally be designed to reflect the current procedures of the CLRP, such as the same representations of travel behavior used in the current TPB travel demand model and the same procedural guidelines required for federal air quality conformity analysis. This preserves the possibility that the CLRP Aspirations Scenario could eventually serve as a de facto 'unconstrained' regional long-range transportation plan, following regional dialogue and outreach about the study findings.

This scenario is comprised of two elements: a transportation component and a land use component, which have been developed concurrently. Both components of the scenario rely heavily on past RMAS goals and assumptions, and thus continue forward with **four major principles** put forward by RMAS: (1) bring people closer to their jobs, thereby reducing their commuting distance; (2) create a balance

between the number of workers and the number of employment opportunities available in the region; (3) land use shifts should push the boundaries of current zoning and comprehensive plan restrictions, while insuring that changes remain feasible; and (4) land use changes should be supported by high quality transportation infrastructure. Within these principles is a strong focus upon concentrating growth in activity centers. For more information on the development of activity centers, please see Appendix 2. Below is a detailed description of the assumptions and methodology for developing these two components.

Transportation Component

The CLRP Aspirations Scenario Transportation Component was developed by collecting previously evaluated transit options throughout the region and comparing them with the network of variably priced highway lanes recently evaluated in a TPB study. It is proposed that transit facilities/corridors with a high degree of overlap with the priced network be implemented as high-quality rapid bus transit operating on priced lanes.

Transit Options in the Regional Mobility and Accessibility Scenario (RMAS) Study

The five RMAS scenarios investigated the addition of a variety of transit projects to the region's transportation network. Many of the scenarios included similar sets of transit projects. The transit projects from all five scenarios were added together to use as a starting point for the transportation component of the CLRP Aspirations Scenario.

The Variably Priced Highway Lanes Network

The TPB study report, "Evaluating Alternative Scenarios for a Network of Variably Priced Highway Lanes in the Metropolitan Washington Region" released in February of 2008, describes the development and analysis of a network of variably priced highway lanes in the Washington region. To begin, the addition of priced lanes to every freeway in the region and major arterial roads outside the Capital Beltway was studied. A second network was evaluated, replacing the new highway capacity in the District of Columbia with pricing of existing freeway lanes and connecting arterials, as well as all DC river crossings. Finally, tolling all existing parkways under the jurisdiction of the National Park Service within the metropolitan Washington region was added to the priced network. These networks were evaluated for demand and toll revenue, and were pared back where demand was not high enough to justify the addition of new freeway lanes.

This pricing study also evaluated the impact of high-quality bus transit on the network of priced lanes. Existing transit routes that operate on portions of the studied priced network were enhanced to increase frequencies and speeds. The evaluation of a robust network of BRT-like bus transit in the region was documented as a topic for further consideration. The CLRP Aspirations Scenario provides an excellent opportunity for the evaluation of such a network.

Previously Evaluated Transit Projects

Other local and regional transportation plans discuss the potential implementation of new transit projects throughout the region. These plans, many of which were completed since the beginning of RMAS, were evaluated for other potential new projects to be included in the CLRP Aspirations scenario. These plans include the following:

1) WMATA 2002 Core Capacity Study
2) WMATA Regional Bus Study, September 2003
3) Washington Metropolitan Regional Bus Study Phase 2 Implementation Plans, December 2004
4) District of Columbia Transit Improvements Alternatives Analysis, October, 2005
5) NVTA TransAction 2030 Plan, April 2006
6) TPB Regional Variably Priced Lanes Study, February 2008
7) WMATA Metrorail Station Access and Capacity Study, April 2008
8) Other regional transit plans and studies:
    a. The City of Alexandria's Transportation Master Plan, March 2008
    b. Montgomery County Master Plan, 1992

Proposed Scenario Transportation Component

TPB staff members, in conjunction with members of the TPB Regional Bus Subcommittee, the TPB Scenario Study Task Force and the TPB Citizens Advisory Committee, have formulated a scenario transportation component. This transportation component is motivated by the following:

- The transportation component should facilitate the land use component of the scenario, which will shift households and jobs into activity centers throughout the region.
- While other highway and transit funding mechanisms may be developed in the future, tolling is currently viewed as the most viable source of transportation funding. This is supported by the three tolling projects currently in the CLRP: The Intercounty Connector, the Beltway HOT Lanes project and the Shirley Highway HOT Lanes project.
- The recent study of alternative scenarios for a network of variably priced highway lanes in the Washington region discussed the need for high-quality alternatives to toll lanes, including transit. The study indicated that it is possible that a toll network could generate sufficient revenue to help finance the operation of high quality bus transit.

The CLRP Aspirations Scenario provides the opportunity to analyze a network of high quality bus routes that would operate on a network of freely flowing, variably priced and managed lanes being evaluated as part of the scenario. Bus transit on toll lanes will replace previously evaluated transit projects along corridors with a large degree of overlap.

More specifically, the transportation scenario was developed through the following methodology:

1. Transit projects from the CLRP, RMAS and other local/regional studies were mapped together to provide a picture of all transit under consideration in the region.
2. This transit project map was overlaid with a map of the variably priced highway lanes network, and areas of overlap were noted.
    a. Dedicated on- and off-ramps to the priced network outside of activity centers were converted to slip ramps to reduce cost and provide greater accessibility to the activity centers without encouraging sprawl.
3. Bus transit stations were located across the region:
    a. Existing park-and-ride lots on the priced network were converted to bus stations.
    b. Activity centers along the priced network yet outside of Metrorail corridors were each given one bus station.
    c. Bus stations were placed at the junctions of the priced network and the Metrorail system to provide seamless connections between bus and rail.

d. Bus stations were added at key interchanges of the priced network as well as major employment centers outside of the TPB region

Feedback received to date on this proposed transportation network includes the following:

- Transit network should extend to and through the City of Frederick.
- New activity centers should be established, including Wheaton, Fort Belvoir and Westphalia.
- Transit connections should be made to and through downtown Washington.
- Activity centers will require circulator bus transit systems to bring passengers from the bus transit stations to work locations and households.

TPB staff is currently implementing these comments and further refining the transportation scenario. Future refinements will include:

- Transforming the network of priced lanes into individual transit lines.
- Determining priority bus transit routes through downtown Washington, evaluating the H-I Street NE/NW corridor, the Georgia Avenue corridor, Constitution Avenue and 14th/16th Streets NW.
- Developing circulator transit service for major activity centers.
- Considering the extension of the priced network north of the City of Frederick, providing service to Fort Detrick and a North Frederick transit station.

Land Use Component

The scenario attempts to shift projected household and employment growth from 2010-2030 from the Round 7.1 Cooperative Forecast in order to achieve the four RMAS principles. It begins by mechanically combining the past RMAS scenarios in an effort to create one scenario more aggressive than the five scenarios individually. Therefore, the first step in developing the land use aspect of the scenario was to evaluate the land use shifts (and underlying assumptions) that occurred in the past five land use/transportation scenarios.

RMAS Assumptions

RMAS consisted of five alternative land use and transportation scenarios, created to address regional challenges of people living further away from their jobs, more and more people working in the region but residing outside of the region, people on the eastern side of the region forced to commute long distances to jobs in the west; and underutilized land around public transit:

- "More Households" (higher household growth in region)
  - 216,000 households were added to the core and inner suburban jurisdictions
- "Households In" (more households in inner areas)
  - 84,000 households were shifted from outer suburban jurisdictions to inner jurisdictions with higher jobs-to-households ratios
- "Jobs Out" (more jobs in outer areas)
  - 82,000 jobs were shifted from core jurisdictions to outer suburban jurisdictions
- "Region Undivided"
  - 114,000 jobs and 57,000 households were shifted from the western to eastern portions of the region
- "Transit-Oriented Development"

- 150,000 jobs and 125,000 households were shifted to areas within ½ mile of current or planned transit stations or centers

The shifts that occurred in these five scenarios were largely guided by the TPB Vision strategy of concentrating residential and commercial development within activity centers and close to existing or planned infrastructure. Therefore, TAZs were split into two categories: "receiving" and "donor" zones. Receiving zones were either proximate to transit or located within an activity cluster and are where post-2010 growth would primarily be directed. All other zones were designated as "donor" zones from which projected growth could be shifted to a "receiving" zone.

For a detailed summary of the RMAS assumptions and growth shifts in each of the five scenarios, please see Appendix 1.

Combining the Scenarios

In order to create one scenario based on the past five RMAS scenarios, an initial version of the land use component was developed by combining the 2010-2030 growth shifts that occurred in each of the five past scenarios, adjusting the numbers to reflect the changes that have occurred between the cooperative forecast used for RMAS (Round 6.4) and today's cooperative forecast (Round 7.1), and then normalizing to attain a regional jobs-housing balance.

The scenarios were combined by taking the maximum addition of jobs and households to receiving zones or the maximum subtraction of jobs and households from donor zones across any of the five scenarios. For instance, if a particular zone received household and/or employment shifts in multiple scenarios, the maximum positive shift was used as the upper limit of additional growth that the zone could absorb as approved by the COG Planning Directors Technical Advisory Committee (PDTAC) for RMAS.

Household shifts were specifically determined for each TAZ by comparing the gain or loss of housing growth across the scenarios where households were shifted: the Households In, More Households, TOD, and Region Undivided scenarios. As an example, if TAZ X is a receiving zone and received 100 households in the Households In, More Households, and TOD scenarios, but was in an eastern jurisdiction inside an activity center and therefore received 200 households in the Region Undivided scenario, it was assumed in the CLRP Aspirations scenario that TAZ X would receive 200 households, since that was the maximum that the zone was feasibly approved to receive.

Job shifts were specifically determined for each TAZ by comparing the gain or loss of employment growth across the scenarios where jobs were shifted: the TOD, Region Undivided, and Jobs Out scenarios. As an example, if TAZ Y is a receiving zone and received 100 jobs in the TOD scenario, 200 jobs in the Region Undivided scenario, but was in a core jurisdiction and therefore lost 200 new jobs in the Jobs Out scenario, it was assumed in the CLRP Aspirations scenario that TAZ Y would still receive 200 jobs, since that was the maximum *positive* shift that the zone was feasibly approved to receive. However, if zones did not receive jobs in the TOD or Region Undivided scenarios, they were assumed to be donor zones and could lose new jobs. Therefore core zones not specifically designated as receiving zones could lose new jobs under the Jobs Out scenario.

Determining this shift could not be a uniform process because of the differences between the Round 6.4 forecast used for the five previous scenarios and the current Round 7.1 forecast. Therefore, there are three possible outcomes in this analysis:

1. In zones where the Round 7.1 forecast is higher than the Round 6.4 forecast, but below the maximum scenario total, the new scenario shift would be equal to the difference between the scenario total and the Round 7.1 forecast total

Example 1

Round 6.4 HHS	Scenario HHS	Round 7.1 HHS	New Shift	Aspirations Total
400	1000	500	500	1000

2. In zones where the Round 7.1 forecast is lower than the Round 6.4 forecast, the maximum addition of households and/or employment from the previous scenario will be applied to the Round 7.1 forecast

Example 2

Round 6.4 HHS	Scenario HHS	Round 7.1 HHS	New Shift	Aspirations Total
400	1000	300	600	900

3. In zones where the Round 7.1 total is higher than the maximum scenario total, no additional growth was assigned.

Example 3

Round 6.4 HHS	Scenario HHS	Round 7.1 HHS	New Shift	Aspirations Total
400	1000	1100	0	1100

Based on this assessment of the potential for each designated receiving zone to absorb new growth, the projected growth forecasts for 2010-2030 from Round 7.1 have been assigned to the receiving zones.

Status of Land Use Component

The land use component is currently under review by the PDTAC to determine if any of the proposed shifts in housing and employment growth, either positive or negative, are too aggressive or not aggressive enough. Comments thus far have touched on the issue that many of the assumptions built into RMAS are now outdated. Therefore, the PDTAC will be reviewing the scenario to determine if there any projected developments that will be part of the upcoming Round 7.2 forecast that could be at odds with the projected shifts and should therefore be factored into this scenario. They are also reviewing the scenario to determine where new activity centers designated after RMAS was completed have not been factored in, particularly TAZs that are currently designated as a donor or receiving zone that should be the opposite, and also where new activity centers should be considered. Comments have also included potential issues with combining all five scenarios, particularly with negative effects of including the Jobs Out scenario, which takes job growth out of the core and places it in outer jurisdictions.

Developing and Analyzing the What Would It Take Scenario

The WWIT scenario differs significantly from the CLRP Aspirations scenario and provides the flexibility to assess strategies and assumptions beyond those used to date. Rather than building a new scenario and then testing its performance against the 2030 baseline, the WWIT Scenario begins with climate change mitigation goals adopted by the COG Climate Change Steering Committee (CCSC) and determines the different scales and combinations of interventions that would be necessary to achieve

those objectives. The scenario will be designed to facilitate regional dialogue with the public and among decision-makers about the steps necessary to implement a very aggressive approach to greenhouse gas reduction, in a way that moves beyond the typical constraints of the TPB analysis process.

Goals

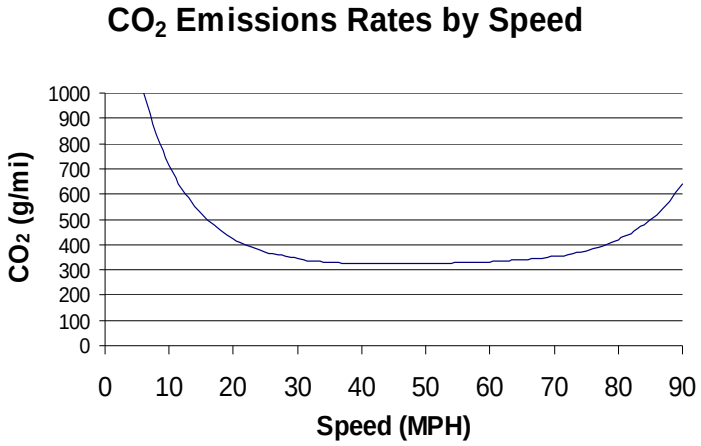
The scenario begins with CCSC proposed regional goal of reducing annual regional CO_2 emissions to 2005 levels by 2012, 20% below 2005 levels by 2020, and 80% below 2005 levels by 2050. Mobile-source emissions are roughly 30% of overall regional CO_2 emissions, making the transportation sector an integral factor in the region's ability to meet such goals.

Status of WWIT Scenario

The WWIT Scenario is currently being developed with a focus on analyzing transportation emissions reductions strategies within three possible areas: (1) *fuel efficiency*, through the imposition of stricter CAFE standards and/or incentives to purchase highly fuel-efficient vehicles; (2) *reducing the carbon intensity of fuels*, through increased use of alternative-fuel vehicles, such as biofuel, electric, hybrid, plug-in hybrid, and hydrogen-powered vehicles; and (3) *improvements in travel efficiency*, through reductions in vehicle travel (which are being addressed through land use patterns, fuel prices, other driving costs, the availability of non-SOV alternatives, such as transit, walking and bicycling) and operational improvements.

All strategies that fall within these three categories are being analyzed along three lines: (1) effectiveness at reducing greenhouse gas (GHG) emissions, (2) cost-effectiveness per ton of CO_2 abated, and (3) the timeframe, either short, medium, or long, on which the measure can be implemented. The primary measures being analyzed are the current and potential TERMs, the transportation strategies listed in the COG Climate Change Report released for public comment in July 2008, and broader strategies, such as fuel efficiency and alternative fuel use.

Each strategy is being analyzed for general effectiveness to determine the total emissions reduction that can be achieved by that strategy. For instance, new research points to congestion management and mitigation as a potentially highly effective means of reducing current CO_2 emissions because CO_2 emissions vary greatly across vehicle speeds. Research out of the University of California at Riverside shows a U-curve (shown below) indicating that for a typical vehicle fleet very slow vehicle speeds (less than 15 mph) can have up to twice the CO_2 emissions of higher speeds (around 20-70 mph).



In addition to assessing how effective transportation measures are at achieving the goals of this scenario, measures will be assessed for their cost-effectiveness as well. Some possible interventions can serve as "low-hanging fruit" and provide relatively cheap benefits, such as telecommuting programs, as opposed to more complex and expensive measures, such as major changes to current land use patterns. Recent studies have pointed to a cost-effectiveness threshold that serves as the point at which the nation's emissions reduction goals can be met. Measures whose cost falls far above the threshold could be considered unnecessarily expensive. For instance, a 2007 McKinsey & Company study identified a price threshold of $50 per ton of carbon dioxide abated. A similar threshold can be used to measure and prioritize regional strategies. This analysis will be used in conjunction with other considerations, such as multiple benefits that may be offered and a high level of general effectiveness at reducing CO_2 emissions.
An example of this type of cost-effectiveness work is below.

	(TIP Projects)	
Number	Category Description	CO2 Cost Effectiveness Range *
1	Access Improvements to Transit/ HOV	$100 to $400
2	Bicycle / Pedestrian projects	$50 to $100
3	Transit Service improvements	$100 to $800
4	Rideshare Assistance Programs	$30 to $300
5	Park & Ride Lots (Transit and HOV)	$100 to $500
6	Telecommute Programs	$10 to $40
7	Signal Optimization	$30 to $50
8	Bus Replacement Programs	$525 to $775
	* Several locations / applications studied	

The third layer of analysis is examining the timeframe for implementation for strategies. Experts have asserted that GHG emissions remain in the atmosphere for many decades, making them unlike criteria pollutants, such as PM and NO_x, where only annual emissions are examined. Therefore, GHG emissions cannot be looked at on an annual basis, but rather should be considered cumulatively across several decades. If emissions are examined in a cumulative manner, early emissions reductions will have a compounding effect upon future emissions levels, demonstrating that early GHG emissions reductions will be increasingly necessary to effectively stabilize GHG emissions and avoid the most severe impacts of climate change. Therefore, this scenario will examine strategies for timeframe on which they can deliver emissions reductions and what the total impact of their implementation will be for the region. For instance, actions that can have an effective and immediate response, such as increased fuel prices, can be looked at as an early strategy, while those that require a long planning horizon, such as a new facility, should be planned early in order to realize benefits in target years.

This analysis of the strategies will inform the development of a series of alternatives for meeting the goals of the scenario. Each alternative will examine different scales and combinations of the strategies necessary to meet the goals, beginning with a simple examination of what it would take to meet the goals with just one of the three categories of strategies alone.

APPENDIX 1: ***Summary and Assumptions Underlying Five RMAS Scenarios***

1. More Households
    a. Goal: to achieve a greater balance between jobs and housing in the region by attracting more people who work in the region but do not live in the region.
    b. 216,000 households were added to the core and inner suburban jurisdictions, which is a 38% increase over projected 2010-2030 growth (231,000 households would have been necessary to create a balanced jobs-to-households ratio of 1.6 for the region, where it is assumed that each household in the region would have an average of 1.5 workers and 10% of these workers would be employed at more than one job. However, the District, Arlington and Fairfax County were not able to accommodate the extra growth).
    c. PDTAC agreed that these additional households were to be allocated to regional activity clusters, transit centers, and other areas where the respective Planning Director believed that this higher household growth increment could be logically accommodated in a concentrated fashion. It was recognized that this allocation of additional household growth would not necessarily be constrained by existing planning and zoning.
    d. Outer jurisdictions already had a much lower jobs-to-households ratio than the core and inner suburbs and thus did not receive any household growth.
2. Households In
    a. Goal: to reduce average commuting distances by re-allocating forecast household growth to bring all jurisdictions in the region closer to a 1.6 jobs-to-households ratio.
    b. Assumed that more of the region's 2010 to 2030 household growth could be placed closer to employment centers in core and inner suburban jurisdictions in order for more workers to live closer to their jobs.
    c. This scenario assumed a shift of 84,000 households (27% of total 2010-2030 growth) from Prince William, Frederick, Charles, Calvert, and Stafford counties to jurisdictions projected to have a larger jobs-to-households ratio than the region as a whole (District of Columbia, Arlington County, City of Alexandria, and Fairfax County).
    d. This scenario also assumed that this shift in household growth would be from areas outside of regional activity clusters to regional activity clusters and other areas of concentrated employment growth in the core and inner suburbs.
3. Jobs Out
    a. Goal: to reduce average commuting distances by re-allocating forecast job growth from the core area to outer suburban jurisdictions in order to bring the jobs-to-households ratio closer to 1.6 in each jurisdiction.
    b. Assumed a shift of 82,000 jobs (12% of 2010-2030 growth) from core area jurisdictions (the District, Arlington, and Alexandria) to outer suburban jurisdictions (Prince William, Frederick, Charles, Calvert, and Stafford counties)
    c. It was also assumed in this scenario that this shift in job growth to the outer suburbs would be concentrated in regional activity clusters within these outer suburban jurisdictions.
4. Region Undivided
    a. Goal: to balance development on the east and west portions of the region to reduce directional congestion and commuting times for residents traveling from the east to jobs in the west.
    b. Forecast 2010-2030 job growth outside of regional activity clusters in the western portion of the region was reallocated to regional activity clusters, transit centers, and other areas in the eastern portion of the region where it was believed that this additional job growth increment could be accommodated.

c. Assumed a shift of 114,000 jobs (18% of total 2010-2030 growth) from the western to eastern portions of the region in the 2010 to 2030 time period
d. For each eastern jurisdiction, the amount of job growth reallocated was proportional to the total number of jobs forecast for the eastern portion of the region in 2030
e. Assumed a household growth shift of 57,000 households (13% of total 2010-2030 growth) from the western to the eastern portion of the region
f. The assumed job and household growth shifts from the west to east were designed to achieve equivalent jobs-to-households ratios in both western and eastern jurisdictions.

5. Transit-Oriented Development
   a. Goal: to better utilize current infrastructure and promote greater transit usage by concentrating growth around current and planned transit stations
   b. Assumed a shift, to the maximum extent possible, of forecast 2010-2030 job and household growth to areas within ½ mile of current or planned Metrorail stations, commuter rail stations or other current or potential transit centers.
   c. The growth shifted into these transit areas came from non-transit areas outside of regional activity clusters.
   d. Assumed shifts of 150,000 jobs (24% of total 2010-2030 employment growth) and 125,000 households (33% of total 2010-2030 household growth)
   e. Most of these assumed job and household shifts occurred within each jurisdiction, but some growth was shifted between jurisdictions in cases where some jurisdictions could not accommodate all of their 2010 to 2030 growth within their transit areas, and other jurisdictions had the capacity to accommodate more than their forecast 2010 to 2030 growth in their current and planned transit areas.

A full RMAS technical report detailing the results and assumptions is available on the web: http://www.mwcog.org/uploads/committee-documents/oVhcXF420061018110814.pdf

APPENDIX 2: ***Background on Activity Centers***

Based on employment densities forecast for 2030, the PDTAC initially identified more than 180 "regional" and "local" activity centers that together contained nearly 80 percent of the region's employment and approximately 20 percent of the region's households.

Those 180 centers were pared down to identify only those centers that are regionally significant and also fit into specific typologies:

- DC Core
- Mixed Use Centers (up to 2 sq miles): >15,000 jobs and >25 jobs/acre in 2025; >10 units/acre
- Employment Centers (up to 3.5 sq miles): >20,000 jobs and >30 jobs/ acre in 2025
- Suburban Employment Centers (up to 6 sq miles): >15,000 jobs and >10 jobs/ acre in 2025
- Emerging Employment Centers (up to 6 sq miles): >15,000 jobs and >50% job growth between 2000 and 2025 or <50% commercial buildout in 2025

There are now 58 Regional Activity Centers that contain slightly more than half of the region's current and future employment, but only about 10 percent of the region's households.

The full report on activity centers is available on the web: http://www.mwcog.org/uploads/pub-documents/Blta20031126183601.pdf