



## MEMORANDUM

**TO:** Transportation Planning Board  
**FROM:** Kanti Srikanth, TPB Staff Director  
Michael Grant, ICF  
**SUBJECT:** Status Report on Long-Range Plan Task Force Activities  
**DATE:** October 12, 2017

**DRAFT**  
**For Technical Committee Review**

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This memo provides a summary of activities related to the Long-Range Plan Task Force from the month of September and lays out next steps in the process.

### ANALYSIS UNDERWAY

The task force met on September 20 and was briefed on the assumptions and inputs selected for use in analyzing the ten improvement initiatives the board selected for analysis at its July 19 meeting (Attachment A). The task force reviewed and provided feedback on a proposed set of performance measures, identified by staff, that will be used to present the results of the technical analysis. The performance measures (Attachment B) will enable a comparative assessment of contributions of the ten improvement initiatives towards addressing the challenges the region faces in attaining its transportation goals.

Staff and consultants have been conducting analysis using the assumptions and methods which were shared in September. Staff and consultants worked to finalize the performance measures (measures of effectiveness or “MOEs”) for use in the technical analysis.

### NEXT STEPS

At its next meeting on October 18 the task force will be briefed on the final list of performance measures that will be used to present the results of the technical analysis. The task force will also discuss and finalize “a process by which to select improvement initiatives from amongst the ten analyzed to recommend the TPB endorse for future concerted TPB action.” Staff is assisting in developing a process the task force could consider at its next meeting.

At its November 15 meeting the TPB will be briefed on the Draft Results of the technical analysis of the ten initiatives. The task force will meet after the board’s meeting to have a detailed discussion on the results of the analysis. The schedule for meetings and proposed focus for each meeting, which has recently been updated, is outlined in the table on the next page.

## SCHEDULE FOR REMAINING ACTIVITIES

Meeting Date	Proposed Focus of Meeting
<b>October 18 - TPB</b> 12:00–2:00 P.M.	<ul style="list-style-type: none"> <li>Status report on September task force activities and next steps.</li> </ul>
<b>October 18 – Task Force</b> 2:15–4:00 P.M.	<ul style="list-style-type: none"> <li>Discuss and agree on a process for the selection of a limited set of improvement initiatives from amongst the ten initiatives analyzed, as called for in resolution establishing the task force.</li> </ul>
<b>November 15 - TPB</b> 12:00–2:00 P.M.	<ul style="list-style-type: none"> <li>Status report on October task force activities and next steps.</li> <li>Receive presentation of Draft Results of the analysis of the 10 improvement initiatives.</li> </ul>
<b>November 15 – Task Force</b> 2:15–4:00 P.M.	<ul style="list-style-type: none"> <li>Discuss findings and takeaways from the Draft Results of the analysis.</li> </ul>
<b>November 29 – Task Force (IF NEEDED)</b> 12:00–2:00 P.M.	<ul style="list-style-type: none"> <li>Additional meeting of the task force, <u>if needed</u>, to further discuss the findings and takeaways of the analysis.</li> </ul>
<b>December 6 – Task Force</b> 2:00–4:00 P.M.	<ul style="list-style-type: none"> <li>Select a limited set of improvement initiatives from amongst the ten initiatives analyzed to recommend the TPB endorse, as called for in resolution establishing the task force.</li> </ul>
<b>December 20 – TPB</b> 12:00–2:00 P.M.	<ul style="list-style-type: none"> <li>Receive task force’s recommendation on a subset of improvement initiatives.</li> <li>Discuss and act on proposed resolution endorsing a subset of improvement initiatives for future concerted effort by TPB.</li> </ul>



# ATTACHMENT A

## Memorandum

**To:** Long-Range Plan Task Force  
**From:** ICF Team and TPB Staff  
**Date:** September 14, 2017  
**Re:** Technical Assumptions and Analysis Methods for Long-Range Plan Task Force Study

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Following Transportation Planning Board's (TPB) acceptance of the ten (10) initiatives (projects, policies, and programs) recommended for analysis by the Long-Range Plan Task Force, the TPB staff and ICF Team have been working to define assumptions, analysis methods, and measures of effectiveness to be used to quantify the estimated effects of each initiative toward achieving the goals laid out in TPB and COG's regional policy documents.

The ten initiatives focus on projects, policies, and programs that go above and beyond what is contained in the current 2040 CLRP. An interactive map available at <https://gis.mwcog.org/webmaps/tpb/clrp/2016clrp/> shows both highway and transit projects included in 2040 CLRP up to the 2016 amendment. The ICF team and TPB staff utilized the specific language on the initiatives approved by the TPB, together with analyses from the previous "all build" and aspirations scenarios, and supporting information to develop assumptions for each initiative that expand upon the 2040 CLRP as the baseline for analysis. While the assumptions associated with these ten initiatives build upon previously identified concepts, they are not constrained by local plans and projects. The assumptions are generally aggressive and broad in scope, reflecting the desire to explore concepts that could have a demonstrated regional impact on system performance.

While the initiatives have been defined with some specific parameters for analysis purposes; it is important to note that the analysis is being conducted at a sketch planning level to provide order-of-magnitude and generalized assessments of impacts across various performance criteria. The analysis will not assess the specifics of individual project components and, because of the sketch-level analysis, changes in detailed assumptions will not dramatically alter the regional results. The results will provide information on the potential effects of these regional initiatives and inform selection of initiatives that are worth further study, which would explore more detailed analysis of project, program, and policy details.

This memo provides a summary of the analysis methods and key assumptions that are being used for each of the ten initiatives.

## Analysis Methods

The technical analysis of the ten initiatives is being conducted using a sketch planning approach (simplified analysis techniques) recognizing the short time frame for the analysis and the conceptual nature of several of the initiatives (without details required for more in-depth, comprehensive analysis).

Given the wide array of different types of strategies that are being analyzed for the initiatives, including transportation capacity projects, land use strategies, demand management, and operational strategies, as well as policies related to pricing, no single sketch planning tool can be used to capture all of them. The technical analyses is being done by using a combination of: 1) input assumptions regarding land use, transportation system, and pricing changes; 2) application of components of COG's regional travel model and sketch planning tools; and 3) post-processing of travel-related metrics to estimate other performance outcomes (e.g., emissions, safety), as shown in the figure on the following page.

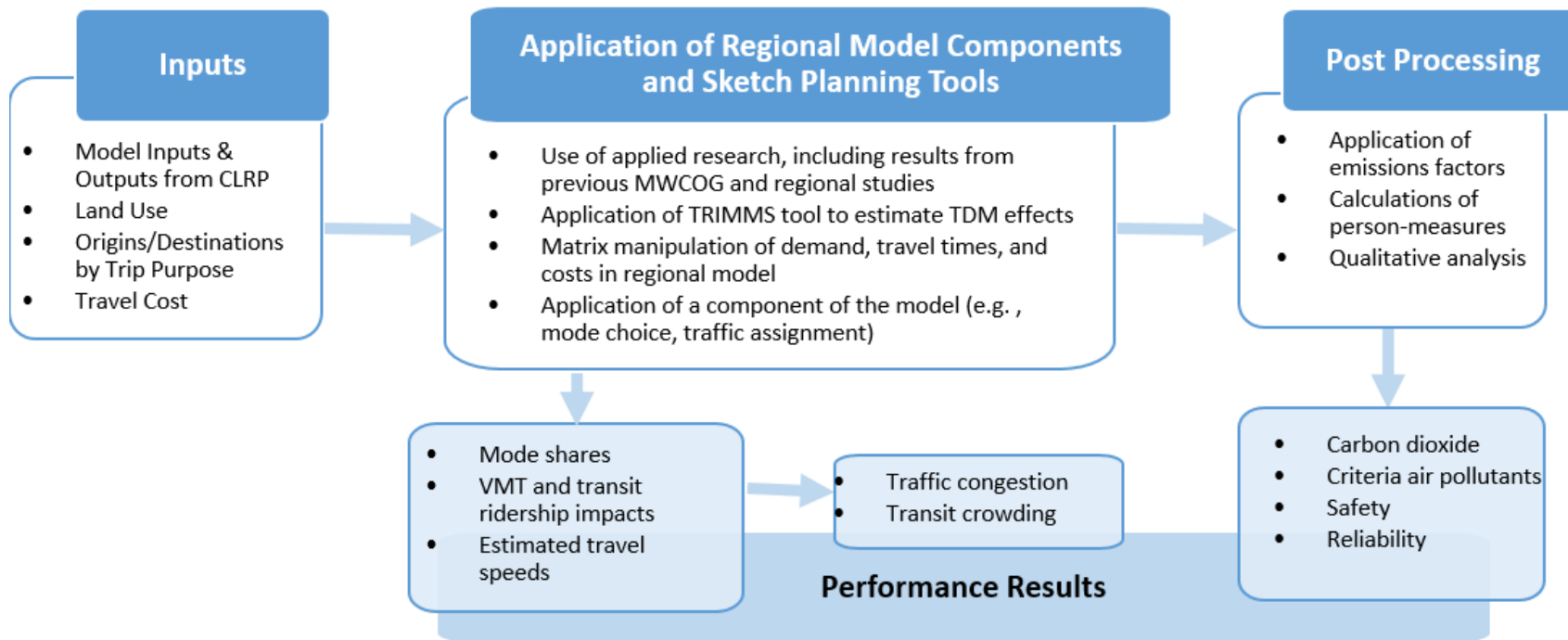


Figure 1: General Analysis Approach

The sketch planning approach include geographic information systems (GIS) analysis, spreadsheet analysis, and use of sketch planning tools, such as the Trip Reduction Impacts of Mobility Management Strategies (TRIMMS) tool to determine mode shifts for travel demand management (TDM) strategies. In addition, analysis using components of MWCOG’s regional model are being conducted in order to capture the regional effects of strategies that make significant changes to land use and transportation infrastructure, particularly to support analysis of assignment of trips to the network in order to estimate impacts on traffic congestion.

## Assumptions

For each of the ten initiatives, we have developed assumptions that are being used in the analysis. The assumptions are guided and constrained by the descriptions that the task force approved and the TPB accepted, which we provide below for your reference. The following pages summarize the related assumptions related to land use, transportation infrastructure and services, and policies all of which build off upon the 2040 CLRP as the foundation.

<i><b>Initiative</b></i>	<i><b>Components</b></i>
<p><b>1. Regional Express Travel Network</b></p>	<ul style="list-style-type: none"> <li>• Express toll lanes network (free to HOV and transit) with added lanes where feasible on existing limited access highways (including remaining portion of the Capital Beltway, I-270, Dulles Toll Road, U.S. 50); includes expanded American Legion Bridge.</li> <li>• New express bus services on network (paid in part through tolls) connecting major Activity Centers.</li> </ul>
<p><b>2. Regional Congestion Hotspot Relief Program</b></p>	<ul style="list-style-type: none"> <li>• Application of technology and enhanced system operations strategies, such as ramp metering, active traffic management, and integrated corridor management (including transit signal priority and enhanced multimodal travel information), plus targeted capacity enhancements where feasible to address top regional congestion hotspots and adjoining connections.</li> <li>• Improved roadway design (such as treatments of turning movements) and reversible lanes on major roadways, as appropriate (to be identified based on strong directional flows).</li> <li>• Expanded regional incident management where appropriate.</li> <li>• Technological integration of demand-responsive services for persons with disabilities and others with limited mobility to create efficiencies of scale and improve mobility of traditionally underserved populations.</li> </ul>
<p><b>3. Additional Northern Bridge Crossing / Corridor</b></p>	<ul style="list-style-type: none"> <li>• New northern bridge crossing of Potomac River, as a multimodal corridor.</li> <li>• New express bus services connecting Activity Centers in this new multimodal corridor.</li> </ul>
<p><b>4. Regionwide Bus Rapid Transit and Transitways</b></p>	<ul style="list-style-type: none"> <li>• Bus rapid transit (BRT)/transitway networks in Montgomery County, Prince George’s County, Northern Virginia (TransAction 2040), DC, and transitway from Branch Ave to Waldorf, specifications according to jurisdiction plans.</li> <li>• Additional DC streetcar line (north-south) as complement to network.</li> <li>• Improved bicycle and pedestrian connections and access improvements to transit stations.</li> </ul>

<b><i>Initiative</i></b>	<b><i>Components</i></b>
<b>5. Regional Commuter Rail Enhancements</b>	<ul style="list-style-type: none"> <li>• VRE System Plan 2040 and MARC Growth and Investment Plan (including run-thru and two-way service on selected lines, increased frequency and hours of service).</li> <li>• Long Bridge corridor improvements including at least 4 tracks and bicycle-pedestrian facilities.</li> <li>• Improved bicycle and pedestrian connections and access improvements to rail stations.</li> </ul>
<b>6. Metrorail Regional Core Capacity Improvements</b>	<ul style="list-style-type: none"> <li>• 100% 8-car trains</li> <li>• Metrorail station improvements at high-volume stations in system core.</li> <li>• Second Rosslyn station to reduce interlining and increase frequency.</li> <li>• New Metrorail core line to add capacity across Potomac River (new Rosslyn tunnel) between Virginia and DC through Georgetown to Union Station toward Waterfront.</li> <li>• Improved bicycle and pedestrian connections and access improvements to rail stations.</li> </ul>
<b>7. Transit Rail Extensions</b>	<ul style="list-style-type: none"> <li>• Metrorail extensions to Centreville/Gainesville, Hybla Valley/Potomac Mills.</li> <li>• Can consider an extension(s) in MD, such as to National Harbor or north of Shady Grove (to be defined later).</li> <li>• Purple line extension to Tysons (west) and Eisenhower Avenue (east).</li> <li>• Improved bicycle and pedestrian connections and access improvements to rail stations.</li> </ul>
<b>8. Optimize Regional Land-Use Balance</b>	<ul style="list-style-type: none"> <li>• Optimize jobs/housing balance regionwide.</li> <li>• Increase jobs and housing around underutilized rail stations and Activity Centers with high-capacity transit.</li> <li>• Build more housing in the region to match employment (about 130,000 more households).</li> </ul>
<b>9. Transit Fare Policy Changes</b>	<ul style="list-style-type: none"> <li>• Reduced price Metrorail fare for off-peak direction during peak period and on underutilized segments.</li> <li>• Free transit for low-income residents.</li> </ul>
<b>10. Amplified Travel Demand Management for Commute Trips</b>	<p>New policies (e.g., employer trip reduction requirements) and programs (e.g., financial incentives) implemented at the local and regional scale to significantly reduce single-occupancy vehicle commute trip making, including:</p> <ul style="list-style-type: none"> <li>• Employer-based parking cash-out</li> <li>• Expanded employer-based transit/vanpool benefits</li> <li>• Expanded telework and flexible schedule adoption</li> <li>• Substantial increase in priced commuter parking in major Activity Centers.</li> </ul>

## Initiative 1: Regional Express Travel Network

**Express Toll Lanes** - Regional network of express toll lanes on limited access highways; dynamic tolling is assumed on the express toll lanes with no toll for HOV-3.

### Express Lane Facilities in the Network

Facility	#HOT lanes*	Notes
I-95 (VA)	2-3 <sup>^</sup>	Existing/in 2040 CLRP
I-395 (VA) to DC line	3 <sup>^</sup>	Existing/in 2040 CLRP
I-66 outside Beltway (VA)	2	In 2040 CLRP
I-66 inside Beltway (VA)	2-3	In CLRP; converts existing HOV to HOT
MD-200 ICC	3	Toll road functions as HOT (free HOV-3)
I-495 Beltway (VA)	2	Largely existing/in CLRP; adds capacity from I-95 to Woodrow Wilson Bridge
American Legion Bridge	2	New capacity
I-495 Beltway, American Legion Bridge to I-270 (MD)	2	New capacity
I-495 Beltway, I-270 to Woodrow Wilson Bridge	1	New capacity
I-270, north of ICC (MD)	1	HOV converted to HOT lane
I-270, south of ICC (MD)	2	New capacity with 1 HOV lane converted to 2 HOT Lanes
I-95 (MD)	2	New capacity
US-50 (MD)	1	New lane from South Dakota Ave. to MD-410, conversion of HOV to HOT lane beyond
MD-4	1	New capacity
MD-5	1	New capacity
I-395 (DC)	1	New capacity
I-295 (DC)	1	New capacity
I-695 (DC)	1	New capacity
VA-267 Dulles Toll Road	1	New capacity east of VA-28
VA-28	2	New capacity with 1 HOV lane converted to 2 HOT Lanes

Each direction, unless otherwise noted.

<sup>^</sup>Reversible lanes

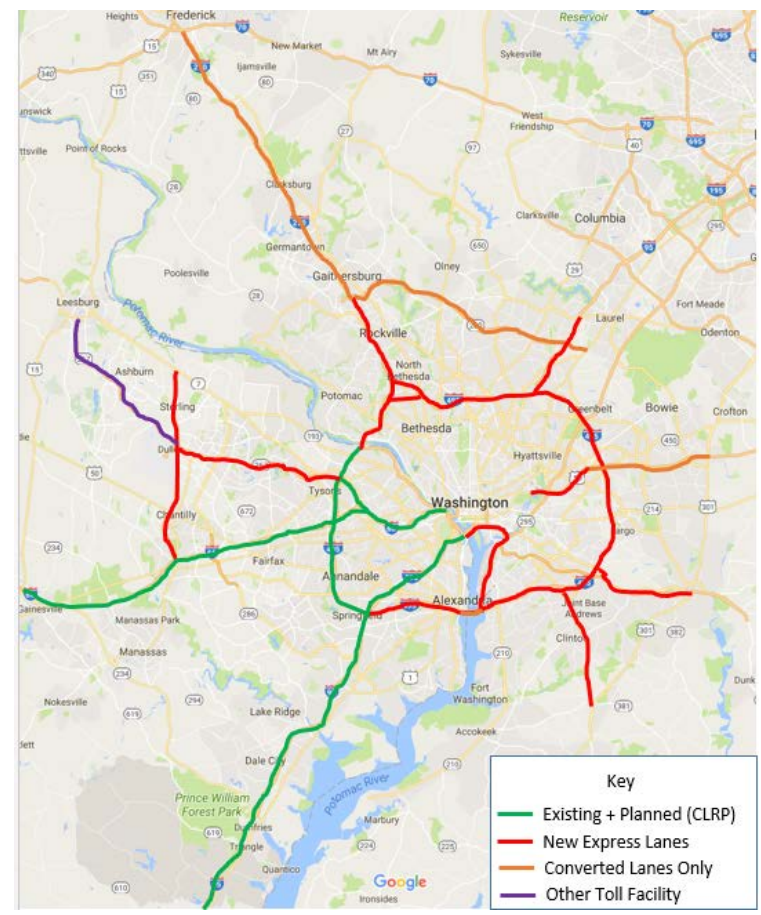


Figure 2. Express Lane Network



**Express Bus Network** - New express bus services on network (paid in part through tolls) will connect major Activity Centers. The express bus services will rely primarily on the express lanes. Analysis assumes headways of 10 minutes peak periods and 20 minutes off-peak periods.

No.	HOV/HOT Facilities	Origin, Destination, and Transfer Points
1	I-495 Beltway	I-270 (N. Bethesda), Georgia Ave., I-95, Greenbelt, US-50, Largo, MD-4, MD-5, National Harbor, Eisenhower Ave, I-395, I-66, Tysons, VA-267*
2	I-270	N. Frederick, Shady Grove/King Farm, I-495, DC core via Canal Rd.
3	ICC	King Farm, Shady Grove, Calverton/I-95, Muirkirk
4	I-95, I-495	West Laurel, Calverton/ICC, I-495/College Park, Silver Spring, DC Core via Georgia Ave.
5	US-50, New York Ave.	US301 (Bowie), I-495, DC Core via US-50/New York Ave.
6	MD-4, I-495	Wayson's Corner, I-495, MD 5, Anacostia (via Suitland Pkwy.), DC Core
7	MD-5	Waldorf, I-495, Anacostia (via Suitland Pkwy.), DC core.
8	I-295	National Harbor, Anacostia, DC Core.
9	I-95 S, I-395	Dale Blvd, Lorton, Springfield, I-495, DC Core.
10	I-66	Gainesville, VA-28, I-495, West Falls Church, Rosslyn, DC Core.
11	I-66, VA-28	Gainesville, VA-28, VA-267, Sterling, Leesburg.
12	Dulles Tollway	Dulles Airport, VA-28, Spring Hill, I-495, West Falls Church, Rosslyn, DC Core via I-66.

\*For sketch analysis purposes, showing service around the entire Beltway, but individual bus routes might cover portions (e.g., Greenbelt-N. Bethesda; Largo-Eisenhower Ave.) Also, some "Beltway" routes might include connections to spurs (e.g., Dale Blvd. /I-95 toward Tysons via I-495).

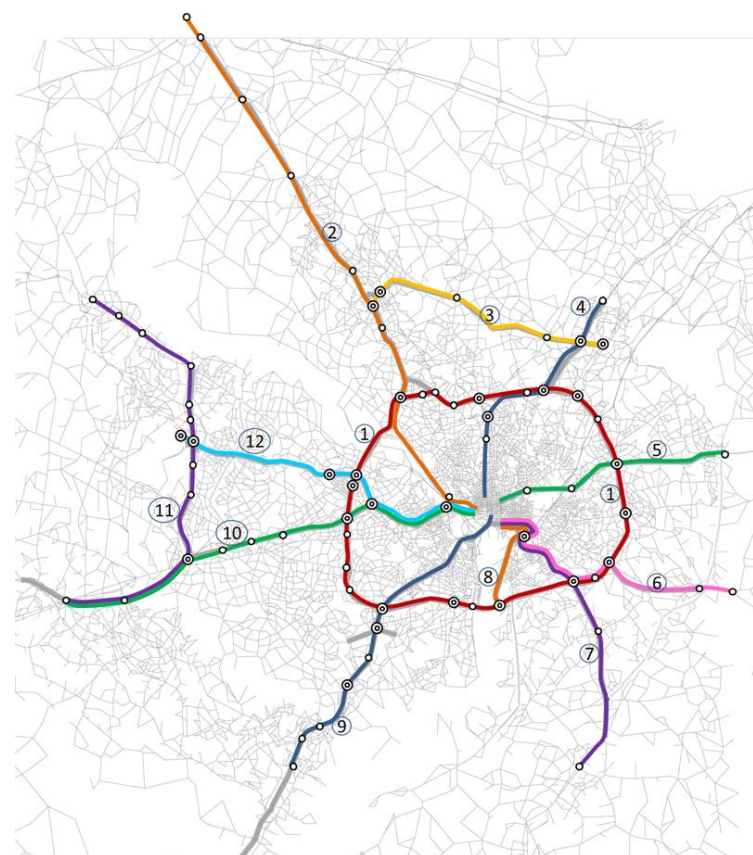


Figure 3. Express Bus Network

**Land Use** – 2040 CLRP Round 9.0 Cooperative land Use Forecasts are being used without any change

**Analysis Approach** – The express lanes and express buses is being coded in the 2040 CLRP network to assess mode choice and traffic assignment effects (using the 2040 CLRP person trip tables as inputs). Tolls are assumed on the newly coded facilities with no toll for HOV-3.

## Initiative 2: Regional Roadway Congestion Hotspot Relief

**Hotspot Relief** – Maximize available capacity using technological and operations management strategies at locations with top congestion hotspots in the region, and supplemental lane capacity in limited locations where potentially warranted. The hotspots selected were based upon the Congestion Management Process list of top bottlenecks plus selected spots from the 2040 CLRP where the forecast volume to capacity ratio was greater than 1.

	Location	Addressed In 2040 CLRP?
From Congestion Management Process Report	I-495 IL between VA-267 and I-270 Spur	X
	I-495 OL between I-95 and MD-193	
	I-66 EB at VA-267	X
	I-270 SPUR SB	
	I-95 SB at VA-123	X
	VA-28 SB between US-50 and I-66	X
	US-15 NB between VA-7 and N. King St.	
	I-495 OL between I-270 and MD-190	
	I-495 IL between MD-355 and MD-185	
	I-66 WB at Vaden Dr./Exit 62	X
	I-495 IL between I-95 and US-1	
	I-495 OL at Telegraph Rd.	X
	I-495 OL at MD-202/Landover Rd.	
	Constitution Ave WB between 12th St. and 17th St.	X
	New York Ave. WB between N. Capitol St. and I-395	X
	DC-295 NB at Pennsylvania Ave	X
	DC-295 SB at Benning Rd.	X
	I-395 NB between US-1 and GW Pkwy	X
VA-123 between GW Pkwy and Canal Rd		
Canal Rd NW between M St and Foxhall Rd		
US 301 between Berry Rd and McKendree Rd		
I 695 between Anacostia Fwy and M St		

Note: Locations addressed in the CLRP will not be analyzed as a part of this effort.

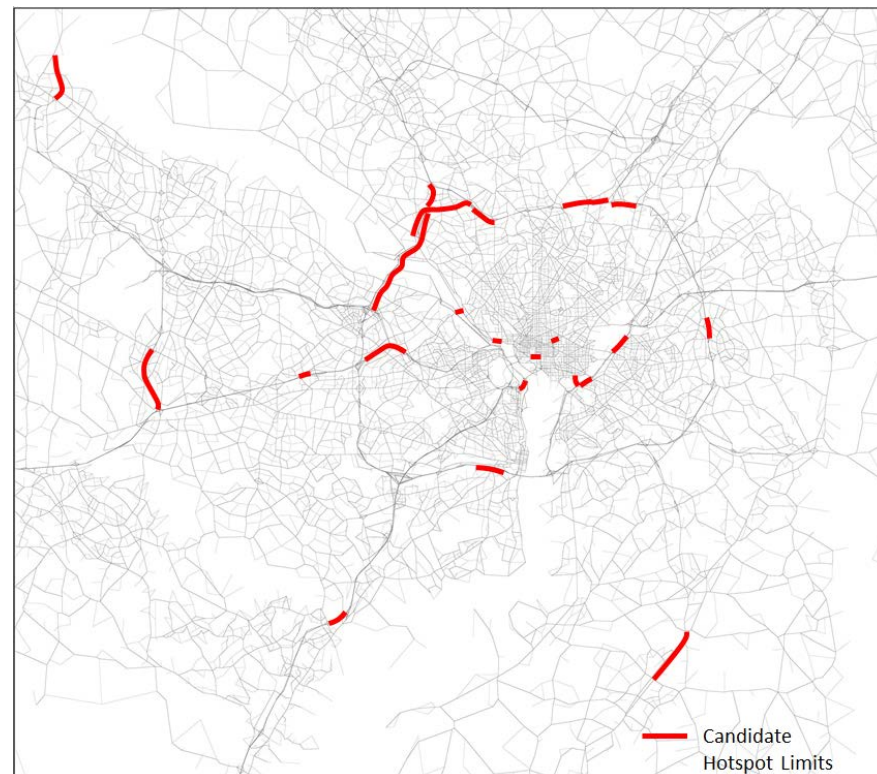


Figure 4. Targeted Hotspot Relief Locations (Source: Sabra Wang and Associates)

**Reversible Lanes** – Non-expressway segments with 3+ lanes and with high volume/capacity ratios in the peak direction and relatively low volume/capacity ratios in the off peak direction in the 2040 CLRP forecast were selected.

Facility	Limits		Divided	Undivided	2040 CLRP Total # Lanes
	A	B			
MD-355	MD-124	Montrose Pkwy			
Connecticut Ave	Georgia Ave	Knowles Ave	X		6
Connecticut Ave	I-495	Calvert St	in MD	in DC	6
Georgia Ave	Randolph Road	I-495	X		6
Georgia Ave	Colesville Road	Arkansas Ave		X	6
New Hampshire Ave	Eastern Ave NE	Metzerott Road	X		6
Rhode Island Ave	Eastern Ave NE	Logan Circle	X		6
New York Ave	South Dakota Ave	H Street	X		6
Bladensburg Road	South Dakota Ave	Benning Road	X		6
Benning Road	Bladensburg Road	Minnesota Ave	X		8
Pennsylvania Ave	Minnesota Ave	Independence Ave	X		8
Martin Luther King Jr Hw	Eastern Ave NE	Glen Dale Road	X		6
Central Ave	Harry Truman Drive	Hill Road	X		6
Crian Hwy	Smallwood Drive	Accokeek Road	X		6
US 1	Curtis Drive	Backlick Road	X		6
Minnieville Rd	Dale Blvd	Caton Hill Road	X		6
US-50	Watson Road	Sully Road	X		6

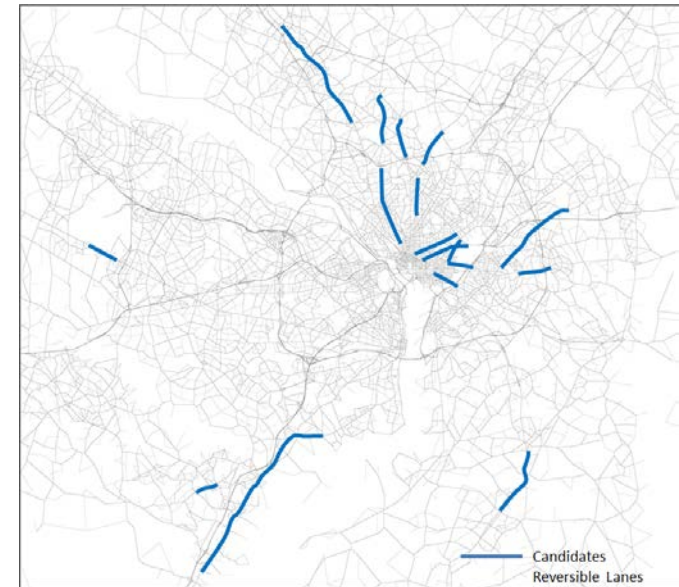


Figure 5. Candidate Facilities for Reversible Lanes (Source: Sabra Wang and Associates)

**Demand-Responsive Services** – for persons with limited mobility and general population.

**Land Use** – 2040 CLRP Round 9.0 Cooperative Land Use Forecasts are being used without any change.

**Analysis Approach** – Estimated benefits by application of the strategies described above are being coded in the regional model by increasing the effective capacities of the segments on the selected corridors. The increased capacity will reflect the cumulative operational improvements expected to accrue from the strategies applied, based on available literature/studies. A post mode choice assignment will then be carried out using the 2040 CLRP vehicle trip tables as inputs. Improvements to Demand Responsive Services for persons with disabilities are being explored and its potential impacts to targeted markets will be done with a separate off model data and analysis

**Enhanced Incident Management, Active Traffic Management (ATM) & Integrated Corridor Management (ICM) –**

Increased effective capacity on selected major arterials, expressways, and parkways, including:

- I 495
- I 270
- ICC
- Baltimore Washington Parkway
- George Washington Parkway
- US 50, VA 7, MD-355, MD-210 and VA 28.

## Initiative 3: Additional Northern Bridge Crossing /Corridor

**New Northern Bridge Crossing** – New toll road (about 14 miles long) between VA28/VA 7 junction and I 270/I-370 junction (MD-200/Intercounty Connector) across Potomac River, 3-lanes each direction (to connect with existing 3-lane per direction facilities). Parkway-style facility (similar to Intercounty Connector) with no interchanges between the above terminal points. The per-mile toll rates from MD-200 is assumed on the new toll road connection.

**New Express Bus Service** – New express bus services connecting activity centers along the corridor (Rockville-King Farm-Research Center-Shady Grove to/from Dulles Town Center, Route 28 Central/South, Innovation Center at 20 minute peak, 30 minute off-peak headways. Existing fare pricing is assumed for the new express bus service.

**Land Use** – 2040 CLRP Round 9.0 Cooperative land Use Forecasts were altered by assuming modest increase in households and jobs in areas with existing development areas within Montgomery and Loudoun Counties impacted by the new facility. About 8,900 households and 16,200 jobs (about 0.4% and 0.3% of TPB Planning Region totals, respectively) will be added to these areas with reduction in other parts of the planning area proportionate to anticipated growth in the CLRP Round 9.0 Cooperative Land Use Forecasts. The new households and jobs in the corridor will be added based on accessibility across the bridge using an initial model run, as below:

- 5% increase in households and employment in Traffic Analysis Zones (TAZs) with a 55-minute or less travel time between Loudoun and Montgomery County
- 3.5% increase in households and employment in TAZs with a 56- to 60-minute travel time between Loudoun and Montgomery County
- Proportional reductions in all other TAZs (approximately 0.3%) to maintain normalized regional totals

Approximately 60% of the job shift and 30% of the household shift are to activity centers in the corridor.

**Analysis Approach** – Add new 6-lane toll corridor and express bus service, along with modified land use, to the regional model; run the model analysis.

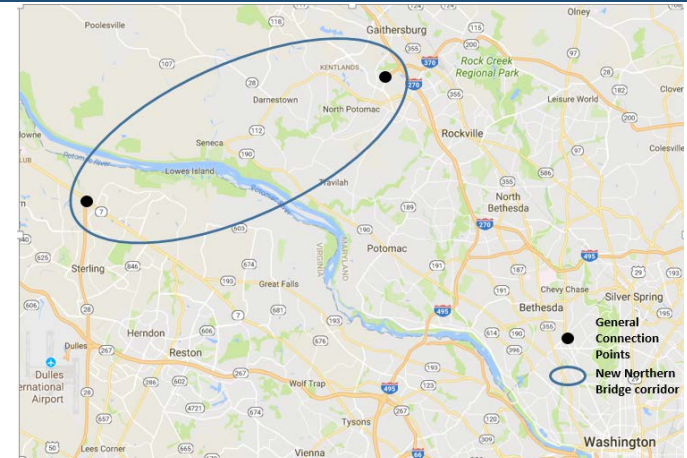


Figure 6. General Connection Points for New Corridor

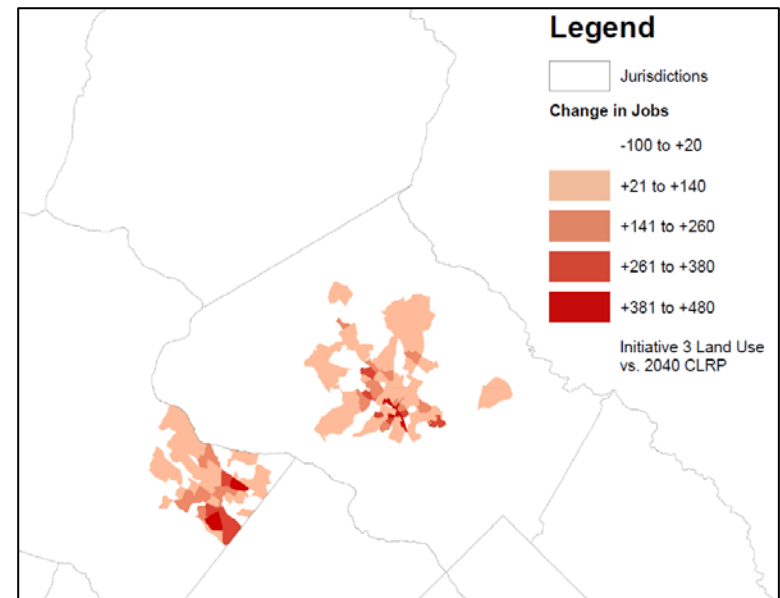


Figure 7. Location of Assumed Increase in Jobs in the Corridor (Source: Fehr & Peers)

## Initiative 4: Regionwide Bus Rapid Transit and Transitways

**Bus Rapid Transit/Transitway Networks** – Additional bus rapid transit (BRT)/transitway networks in Montgomery County, Prince George’s County, Northern Virginia (TransAction 2040), DC, and a transitway from Branch Ave to Waldorf. *These lines are in addition to those already in the CLRP, which include: DC streetcar (Union Station-Georgetown), Corridor Cities Transitway, Crystal City Transitway Northern Extension, US-1 BRT (Huntington Metro to Woodbridge), West End Transitway (Van Dorn Metro to Pentagon Metro), and Tiger Grant Bus Priority Improvements.*

**DC:**

- Georgia Ave/9th St (Takoma Park-Buzzard Pt)
- Waterfront- Capitol South Metro
- 16th St (Silver Spring-McPherson Sq)
- Minnesota Ave/11 St (E. Capitol St-Eastern Mkt),
- Nebraska/Military Rd/Missouri Ave/S. Dakota (Tenleytown-Michigan Park)
- U Street/ Florida Ave/ 8th Street (Woodley Park-Navy Yard)
- Wisconsin Ave (Tenleytown-Georgetown)
- N. Capitol (McMillan-Union Station)
- Veirs Mill Rd (Rockville-Wheaton)
- US-1 (Arundel Mills-College Park)
- US-1 (Greenbelt-Konterra)
- MD-5 / US-301 (White Plains-Branch Ave)
- US-50 (Bowie-New Carrollton)
- University Blvd/Riggs Rd/MD-410/MD-201/MD-450 (Bladensburg-Takoma-Langley)

**Maryland:**

- Georgia Avenue North / Georgia Avenue South
- MD-355 North / MD-355 South
- Randolph Road (US-29 to White Flint)
- New Hampshire Avenue
- North Bethesda Transitway (White Flint Metro - Montgomery Mall)
- University Blvd (Wheaton – Takoma/ Langley Transit Center)
- US-29 (Columbia-Silver Spring)

**Virginia:**

- VA-28 (Manassas to Dulles Town Center)
- US-29 (Fair Oaks Mall to Rosslyn)
- US-50 (Dunn Loring Metro to Rosslyn)
- VA-236/US-50 (King Street Metro to Fair Oaks Mall)
- VA-7 (Spring Hill Metro to West End Transitway)
- Gallows Rd/Annandale Rd (Tysons - Annandale)
- Columbia Pike (Pentagon City - Annandale)

**Multi-State:**

- MD-4/Penn Ave (Upper Marlboro-Eastern Market),
- MD-210/S. Capitol SW (Byan’s Rd-Navy Yard),
- MD-5/Nat’l Harbor/King Street Metro

Existing local bus/streetcar fare pricing is assumed for the new BRT/ Transitways. Initiative also includes improved bicycle and pedestrian access.

**Land Use** – 2040 CLRP Round 9.0 Cooperative Land Use Forecasts were adjusted to have modest increase in employment and household densities in zones with new services, relocating employment and housing from outside activity centers within jurisdictions. Increase densities in TAZs with new BRT to 5 households/acre and 30 jobs/acre while maintaining the regional control totals

**Analysis Approach** – The new BRT/ Transitways with the stops are being coded in the MWCOG Model. The bicycle/pedestrian boarding mode shares to the BRT were altered in the MWCOG model to represent increased bike/ped accessibility to the BRT. A post distribution mode choice and assignment will be carried out using the person trip tables from the 2040 CLRP model.

## Initiative 5: Regional Commuter Rail Enhancements

**Improvements to MARC and VRE Commuter Rail Systems** – Expand upon commuter rail enhancements already in 2040 CLRP (which includes an increase in MARC and VRE capacity, frequency, and additional reverse peak service, as well as 3 new stations on an extended Haymarket branch of the Manassas VRE line (Although this extension is not planned to be included in the updated CLRP, it is part of the 2040 CLRP that is forming the base for this analysis).

**Additional Improvements on top of CLRP:**

Improvement	Notes
Upgrading all 60-min, peak-time headways in the CLRP to 30-min headways.	Applies to both MARC and VRE systems.
Upgrading all 30-min headways in the CLRP to 20-min headways.	Applies to both MARC and VRE systems.
Establishing off-peak service on all MARC and VRE lines, if not already in CLRP.	All off-peak service will run every 60 minutes.
Run-through services of the MARC Camden and Penn lines with VRE to extend to Alexandria.	These two lines have the most potential for run-through service
Improved bicycle and pedestrian connections and access improvements to rail stations	N/A

Note: Existing fare structures and pricing are assumed

**Land Use** – 2040 CLRP Round 9.0 Cooperative Land Use Forecasts are being without any change.

**Approach** – The increased services and run-through service into network is being coded to estimate potential ridership increase and mode shifts. A post distribution mode choice and assignment will be carried out using the person trips from the 2040 CLRP model. Utilize estimating ridership increased forecast figures from MARC and VRE to validate/adjust the results. The additional trips due to interlining will be incorporated into the VRE and MARC totals.

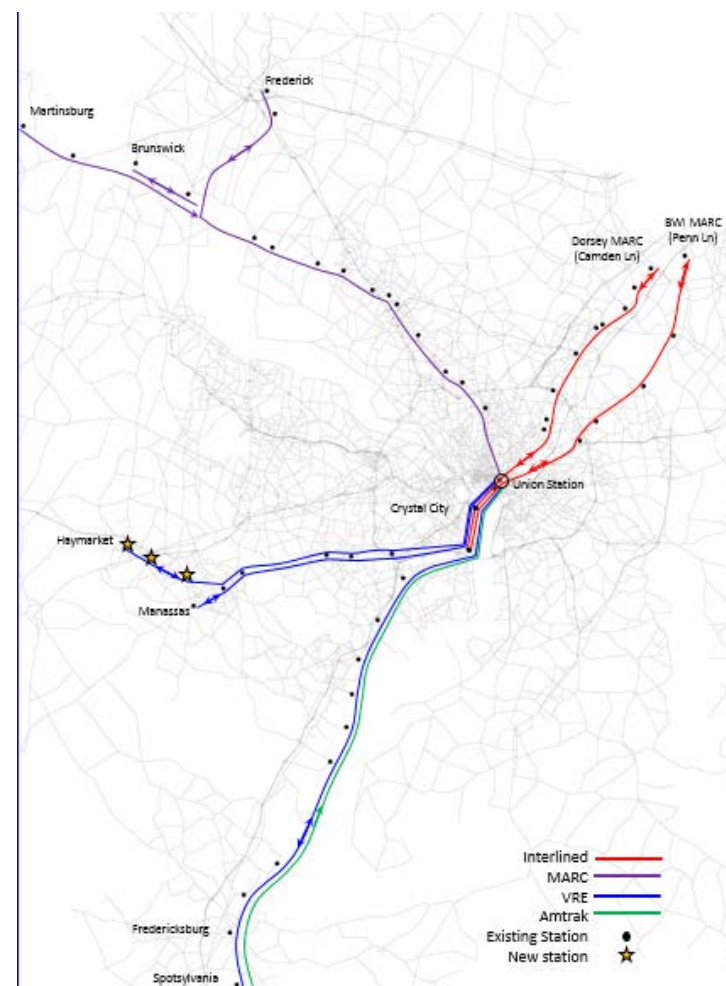


Figure 8. Commuter Rail System being Analyzed

## Initiative 6: Metrorail Regional Core Capacity Improvements

**Core Capacity Improvements** – 100% 8-car trains, and additional stations and station improvements to increase core system capacity

### Improvements to the Existing System

- 100% 8-car trains
- Metrorail station improvements at high-volume stations in system core
- Improved bicycle and pedestrian connections and access improvements to rail stations.

**Additional Stations and Routes-** In addition to the general core system improvements listed above, this initiative also expands the Metrorail system:

- Second Rosslyn station to reduce interlining and increase frequency
- New Metrorail core line to add capacity across Potomac River (New Rosslyn tunnel between Virginia and DC through Georgetown to Union Station toward Waterfront as loop, based on WMATA Momentum 2040).

**Land Use** – 2040 CLRP Round 9.0 Cooperative Land Use Forecasts will be used without any change.

**Fares** – Existing fare structures and pricing are assumed.

**Analysis Approach** – The new stations and new lines are being added to the MWCOCG model network with a simplified approach. Core capacity constraint in the model were removed. Further, walking and automotive access are assumed at stations. A post distribution mode choice and assignment will be carried out using the person trips from the 2040 CLRP model.



Figure 9. Metrorail Core Capacity Improvements

## Initiative 7: Transit Rail Extensions

**Metrorail Extensions** – Extensions to all existing Metro lines (except Silver), plus Purple Line Light Rail extensions. Improved bicycle and pedestrian connections and access improvements to rail stations.

Metrorail / Light Rail Line	Proposed Extension
Orange Line	Extend West-bound rails beyond Vienna-Fairfax to Centreville
Blue Line	Extend South-bound rails beyond Franconia-Springfield to Potomac Mills
Yellow Line	Extend South-bound rails beyond Huntington to Hybla Valley
Red Line	Extend Northwest-bound rails beyond Shady Grove to Germantown
Green Line	Extend North-bound rails beyond Greenbelt to South Laurel
	Add new South-bound light rail from Branch Ave to Waldorf
Purple Line Light Rail	Extend West-bound rails beyond Bethesda to Tysons (running north toward Montgomery Mall then along Beltway)
	Extend East-bound rails beyond New Carrollton to Eisenhower Avenue (with stops at Branch Avenue and National Harbor)

Note: Existing fare pricing for transit rail will be used for the extended lines with a cap on the maximum fare

### Land Use Assumptions

Assume some shift of land use to Activity Centers in these corridors.

- Increase densities in TAZs with new LRT to 7 households/acre and 45 jobs/acre
- Increase densities in TAZs with new Metrorail to 15 households/acre and 90 jobs/acre
- Maintain regional control totals, shift within jurisdictions

**Analysis Approach** – The new extended lines and new stations are being added to the transit network of the MWCOG model. Auto access and walk access were added to the new stations. A post distribution mode choice and assignment will be carried out using the person trips from the 2040 CLRP model.

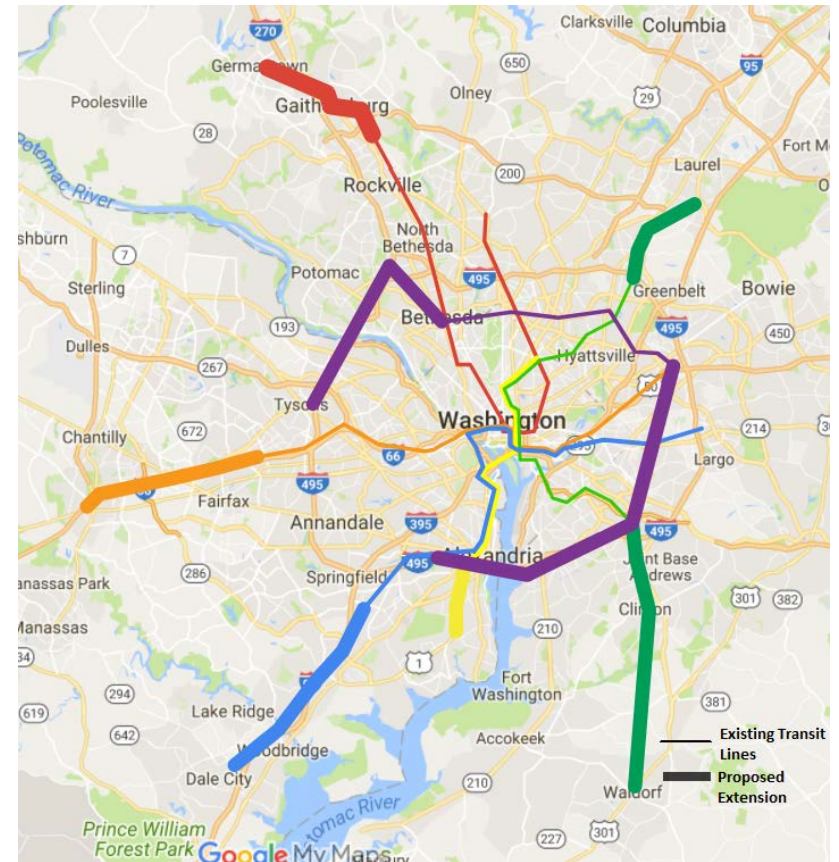
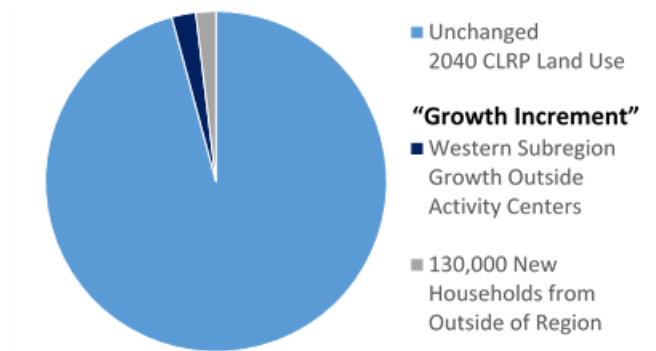


Figure 8. Existing Metrorail and Proposed Rail Extensions



## Initiative 8: Optimize Regional Land-Use Balance

**Land Use Assumptions** – The focus of this initiative is to achieve better jobs-housing balance in the region. This initiative encourages development near and around underutilized premium transit stations. A better jobs/housing ratio is achieved in the region by increasing the increment of future employment growth in the eastern portion of the region and reducing this increment of future growth in the western portion of region. (Note that the eastern subregion includes the eastern portions of the City of Alexandria, Arlington County, Fairfax County, Prince William County, the District of Columbia, and Montgomery County, in addition to Charles County and most of Prince George’s County). Additionally, more housing is added to the region (130,000 households) to reduce the need for daily long-distance “in-commuters” living beyond the region’s outer boundaries. Jobs and housing in this optimization process are reallocated to underutilized rail stations and Activity Centers with high capacity transit. Only the increment of growth between 2025 and 2040 outside of Activity Centers (“Growth Increment”; 2.3% of 2040 CLRP total) is reallocated in this Initiative.



The increment of land use growth between 2025 and 2040 (“growth increment”) in the Round 9.0 Cooperative Forecast is adjusted in the following way:

1. Including the 130,000 additional households from outside the region, the regional job/household ratio in 2040 is 1.54 (including corresponding adjustments in external travel in the region).
2. The job and household growth increment is allocated between the eastern and western subregions such that both subregions reach a job/household ratio of 1.54.
3. Within each subregion, the job and household growth increment is allocated to individual jurisdictions in an iterative process with the goal of each jurisdiction approaching the regional job/household ratio of 1.54. The allocated growth increment for each jurisdiction is assigned to Transportation Analysis Zones (TAZs) to favor Activity Centers with high-capacity transit (underutilized rail stations).

Jurisdiction	2040 CLRP			Initiative 8 Land Use		
	Households	Jobs	Ratio	Households	Jobs	Ratio
Alexandria	92,898	142,735	1.54	92,898	142,735	1.54
Arlington	131,149	267,641	2.04	165,427	266,422	1.61
Charles	83,426	58,762	0.70	83,426	71,019	0.85
District of Columbia	396,233	1,011,806	2.55	485,486	1,007,702	2.08
Fairfax	530,118	908,430	1.71	578,515	903,797	1.56
Fauquier	10,806	25,296	2.34	13,140	20,961	1.60
Frederick	126,539	133,934	1.06	113,522	127,507	1.12
Loudoun	167,588	273,910	1.63	162,387	249,798	1.54
Montgomery	450,922	653,917	1.45	438,110	644,989	1.47
Prince George's	370,023	393,336	1.06	370,011	453,943	1.23
Prince William	209,020	280,546	1.34	195,800	261,440	1.34
<b>Eastern Subregion</b>	<b>1,054,764</b>	<b>1,604,039</b>	<b>1.52</b>	<b>1,107,094</b>	<b>1,702,578</b>	<b>1.54</b>
<b>Western Subregion</b>	<b>1,513,958</b>	<b>2,546,274</b>	<b>1.68</b>	<b>1,591,628</b>	<b>2,447,735</b>	<b>1.54</b>
<b>TPB Planning Region Total</b>	<b>2,568,722</b>	<b>4,150,313</b>	<b>1.62</b>	<b>2,698,722</b>	<b>4,150,313</b>	<b>1.54</b>

**Analysis Approach** – Run model analysis with modified land use and unmodified 2040 CLRP transportation network. Adjust external travel to reflect reduced regional in-flow associated with 130,000 households moved from outside the region.

## Initiative 9: Transit Fare Policy Changes

**Reduced Off-Peak Fares** – Metrorail fares were reduced for off-peak direction during peak period and on underutilized segments. Fares were set to the non-peak rates for the off-peak direction, even during peak travel times.

**Reduced Fares for Low-Income Residents** – Metrorail fares for low-income residents were reduced to zero. The low-income group is assumed to be the lowest income quartile from the MWCOG model.

*2040 CLRP network will be assumed for this Initiative.*

**Land Use** – 2040 CLRP Round 9.0 Cooperative Forecasts were used without any change.

**Analysis Approach** – Low-income trips fares were reduced to zero in the model, and non-peak fares will be used for peak trips in the off-peak direction. A post distribution mode choice and assignment will be carried out using the person trips from the 2040 CLRP model. An alternative comparison is to use transit price elasticities to estimate change in off-peak ridership and literature to estimate change low-income ridership, and incorporate into network assignment.

## Initiative 10: Amplified Employer-based Travel Demand Management

**Expansion of Existing and Planned TDM Programs** – This initiative assumes significant expansion beyond current TDM programs in the region, and includes new policies to expand them further at a regional scale. Policies that were included in this initiative are listed below:

- Expanded employer-based transit/vanpool benefits
  - Transit/vanpool subsidies averaging \$50 per month are provided by 80% of employers
- Increase in priced parking in major activity centers.
  - 90% of parking for work-trips in activity centers is priced, with parking costs assumed to range from \$4/day minimum (could reflect employer-provided parking cash out).
- Substantial increase in telework and flexible schedule adoption
  - 20% telework share (from current 10% share; this equates to an average of about 2 days per week [40% telework] for “office” employees, given overall share of office workers). Teleworkers come proportionately from other modes (drive alone, carpool, transit, etc.)

*2040 CLRP network is assumed for this Initiative.*

**Land Use** – 2040 CLRP Round 9.0 Cooperative Land Use Forecasts is used without any change.

**Analysis Approach** – Use sketch planning analysis (TRIMMS, spreadsheet tools) to estimate mode shifts; apply to network assignment.

# ATTACHMENT B

## Measures of Effectiveness

As discussed during the task force's September meeting, a combination of quantitative and qualitative assessments will be provided to compare the 10 initiatives based on their performance on the following measures of effectiveness (MOEs).

Qualitative MOEs	Quantitative MOEs
1. Road Congestion	1. Travel Time (SOV): average travel time per trip
2. Transit Crowding	2. Travel Time (non-SOV): average travel time per trip
3. Inadequate Bus Service	3. Traditional Congestion: vehicle hours of delay
4. Unsafe Walking & Biking	4. Jobs Accessibility by Transit: # of jobs accessible within 45-minute transit commute
5. Development around Metrorail	5. Jobs Accessibility by Auto: # of jobs accessible within 45-minute car commute
6. Housing & Job Location	6. Mode Share: SOV
7. Metrorail Repair Needs	7. Mode Share: non-SOV
8. Roadway Repair Needs	8. Reliable Trips: share of trips on reliable modes
9. Incidents and Safety	9. VMT
10. Pedestrian & Bicyclist Safety	10. VMT per capita
11. Environmental Quality	11. Transit Options for Households: share of HH in zones with high-capacity transit
12. Open Space Development	12. Transit Options for Employment:
13. Bottlenecks	13. Share of jobs in zones with high-capacity transit
14. Travel Time Reliability	14. VOC Emissions
	15. NOx Emissions
	16. CO2 Emissions

The report will also discuss other considerations, such as whether the initiative requires additional right-of-way and whether users' costs may increase.