



Evaluation of Transportation Projects in Northern Virginia Transportation District

Performance Measure Weights

January 31, 2014

Overall Agenda

- **Overview of Project Evaluation Performance Measures**
 - Highlight changes from the draft project evaluation framework
 - Describe how each performance measure will be calculated, with particular emphasis on transit trips
- **Project Scoring and Rating Process**
 - Discuss changes from the draft project evaluation framework
- **Performance Measure Weighting Process**
 - Description of the Decision Lens process
 - Voting on the relative importance of each performance measure
 - Presentation of results and processing steps
- **Next Steps**

Changes to Performance Measures

Draft Performance Measures

- Travel Time Index 
- Transit Congestion 
- Congestion Duration 
- Person Hours of Delay 
- Person Hours of Congested Travel 
- Person Miles of Congested Travel 
- Accessibility to Jobs 
- Emergency Mobility 

Final Performance Measures

- Transit Crowding
- Congestion Duration
- Person Hours of Delay
- Person Hours of Congested Travel in Automobiles
- Person Hours of Congested Travel in Transit Vehicles
- Accessibility to Jobs
- Emergency Mobility

Travel Time Index (TTI)

- **Removed as a performance measure, due to comments received and not likely to change measurably from project to project**
- **TTI will continue to be used to measure congested severity for other performance measures**

Transit Crowding

- *Reduction in the number of transit route miles experiencing crowded conditions*
- **Crowded conditions are defined using a mode specific load factor:**
 - Local bus > 1.0 riders / seat
 - Express bus > 0.9 riders /seat
 - Metrorail > 100 passengers / car
 - Commuter rail > 0.9 riders / seat
- **Revision:** load factors modified from original concept to include moderate congestion in addition to heavy congestion

Congestion Duration

- *Reduction in the number of hours of the day auto and transit passengers experience heavily congested travel conditions*
- For roadways, this measure will sum the number of 15 minute time periods during the course of the day that a lane-mile of roadway exceeds a travel time ratio of 2.0
- For transit, this measure will sum the number of 15 minute time periods during the course of the day that each transit route mile exceeds the mode specific load factor
 - Local bus > 1.0 riders / seat
 - Express bus > 0.9 riders /seat
 - Metrorail > 100 passengers / car
 - Commuter rail > 0.9 riders / seat
- **Revision:** transit load factors now include moderate and heavy congestion

Person Hours of Delay

- *Reduction in the number of person hours of travel time above free flow travel time.*
- For roadways, this measure will multiply the difference between simulated travel time and free flow travel time on each link in each 15 minute time period by the number of passengers in autos and buses using the link during each 15 minute period
- Person hours of delay for transit will also include the additional waiting time associated with failing to board the intended vehicle due to capacity constraints (vehicle is full) or transfer timing issues (i.e., you missed your transfer because of delays on the first route)

Person Hours of Congested Travel in Automobiles

- *Reduction in the number of person hours of travel in automobiles and trucks on heavily congested facilities*
- This measure will sum the number person hours of travel during each 15 minute time period that the roadway exceeds a travel time ratio of 2.0
- **Revision:** separated person hours of congested travel in automobiles and transit vehicles

Person Hours of Congested Travel in Transit Vehicles

- *Reduction in the number of person hours of travel in buses and trains on heavily congested facilities or in crowded vehicles*
- This measure will sum the number of person hours of travel in buses for each 15 minute time period that the bus travels on a roadway that exceeds a travel time ratio of 2.0 plus the number of person hours of travel on buses or trains with ridership that exceeds the mode specific load factor
 - Local bus > 1.0 riders / seat
 - Express bus > 0.9 riders /seat
 - Metrorail > 100 passengers / car
 - Commuter rail > 0.9 riders / seat
- **Revision:** separated person hours of congested travel in automobiles and transit vehicles

Person Miles of Congested Travel

- **This measure was removed from the analysis because it does not provide significantly different information from the person hours of congested travel measure**

Accessibility to Jobs

- *Increase in the number of jobs that can be reached from each household based on a 45 minute travel time by automobile and a 60 minute travel time by transit*
- **This measure will be calculated based on the simulated travel times on each link during a three hour AM peak period. An upper limit of 45 minutes will be used for highway trips and a 60 minute upper limit for transit in determining the number of jobs that can be accessed by households in the region**

Emergency Mobility

- *Increase in the person hours of travel time resulting from a 10 percent increase in peak hour trip making.*
- This measure will increase the number of trips leaving activity locations within TAZ's during the PM peak hour (5:00-6:00 PM) by 10 percent. This will be accomplished by changing an appropriate number of trip start times of existing travelers that are scheduled to leave their activity locations after 6:00 PM to a random time between 5:00 and 6:00 PM.
- The simulation process will then be re-run using the new trip start times. The increase in the total person hours of travel will be compared to the original total person hours of travel to determine the impact to the system. Projects with the smallest increase in person hours of travel will be given a higher mobility benefit.

Project Scoring and Rating Process (Revised)

- All measures are based on absolute change from the baseline model results in the Northern Virginia District
- 100 points are awarded to the project that generates the greatest absolute change for each performance measure and analysis year
- The points for all other projects are based on the ratio of the project's absolute change to the absolute change of the project with the greatest congestion impact for a given performance measure
- The MOE scores are multiplied by the attribute weights derived from the stakeholder weighting process
- The sum of the weighted MOE scores will determine the project congestion reduction rating for each analysis year

Weighting Performance Measures

Performance Measure	Near-term Benefits (2020)		Long-term Benefits (2040)	
	Attribute Weights ¹	Weighted MOE Score ²	Attribute Weights ¹	Weighted MOE Score ²
Transit Crowding	A%	A% * S11	A%	A% * S21
Congestion Duration	B%	B% * S12	B%	B% * S22
Person Hours of Delay	C%	C% * S13	C%	C% * S23
Person Hours of Congested Travel in Automobiles	D%	D% * S14	D%	D% * S24
Person Hours of Congested Travel in Transit Vehicles	E%	E% * S15	E%	E% * S25
Accessibility to Jobs	F%	F% * S16	F%	F% * S26
Emergency Mobility	G%	G% * S17	G%	G% * S27
Congestion Reduction Rating	100%	2020 Rating	100%	2040 Rating

1. Attribute weights will be determined through a stakeholder consensus building process

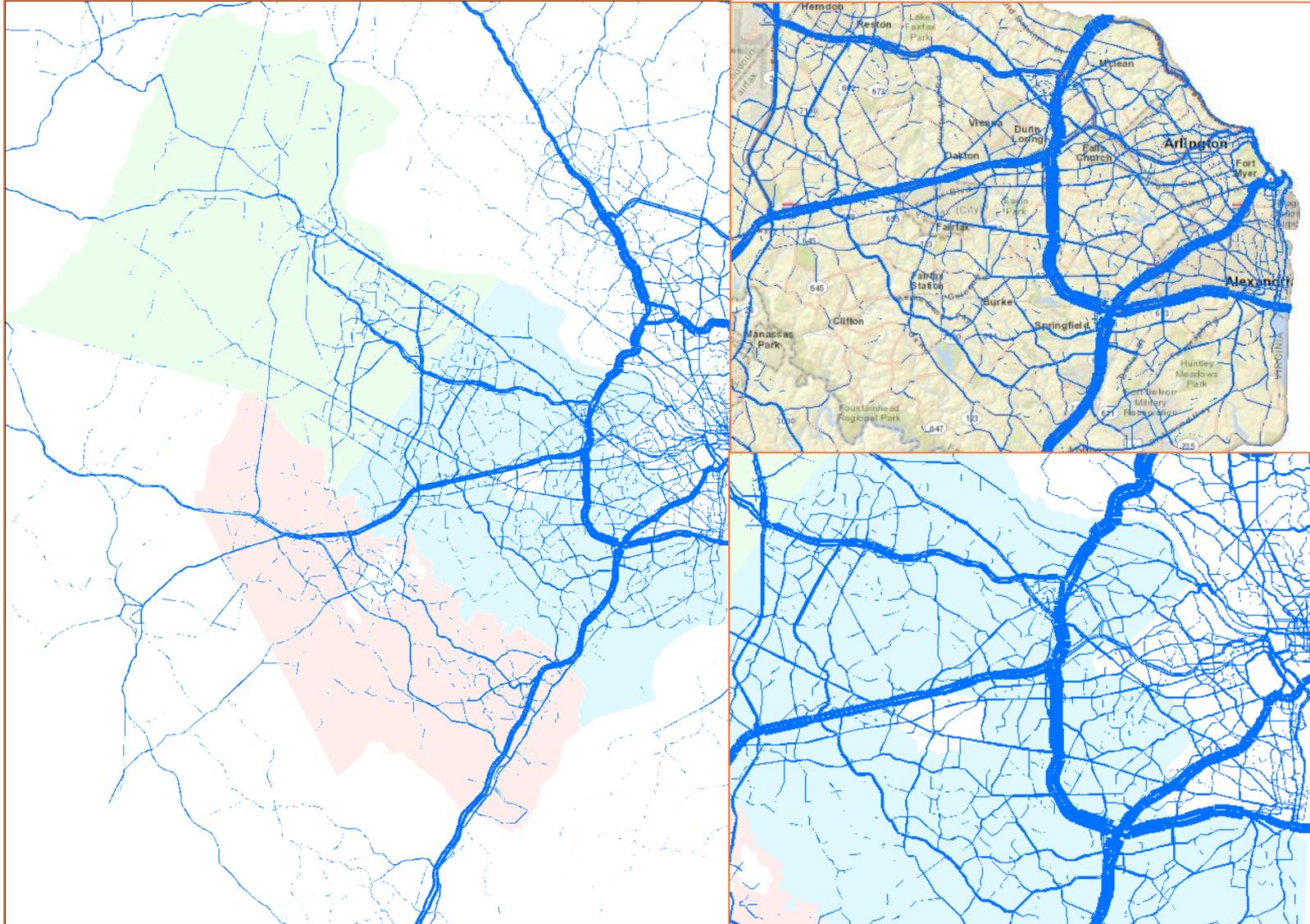
2. S11-S27 represent the project performance score from the modeling process

Decision Lens Voting

Next Steps

- **February 7 – distribute 2020 congestion maps to help stakeholders define projects**
 - Daily volume, peak hour TTI, congestion duration, and person hours of delay
- **February 20 – NVTA meeting to approve projects/project packages for submission**
- **Apply the project selection model to projects proposed by NVTA and CTB**
- **Present the recommended set of projects for evaluation to NVTA on March 13th and CTB on March 19th**
- **Run each project through the TPB modeling process by June 1st**
- **Run each project through the TRANSIMS process by October**
- **Final rating report in December**

Prototype 2020 Congestion Map



Project Nomination Form (pages 1 and 2)

Evaluation and Rating of Significant Transportation Projects In Northern Virginia Project Nomination Form

Draft: Jan. 30, 2014



Submitting Entity

- Northern Virginia Transportation Authority Commonwealth Transportation Board

As a point of reference, the Commonwealth Transportation Board (CTB) adopted the following six priorities for the Project Selection Model (PSM) process in October, 2013. **Which CTB priorities does your project address?** (check all that apply)

- | | |
|--|--|
| <input type="checkbox"/> Preserve and Enhance Statewide Mobility Through the Region | <input type="checkbox"/> Reduce the Costs of Congestion to Virginia's Residents and Businesses |
| <input type="checkbox"/> Increase Coordinated Safety and Security Planning | <input type="checkbox"/> Increase System Performance by Making Operational Improvements |
| <input type="checkbox"/> Improve the Interconnectivity of Regions and Activity Centers | <input type="checkbox"/> Increase Travel Choices to Improve Quality of Life for Virginians |

Please keep these priorities in mind as you answer the following questions about your project.

Project Title _____

1. Project Type (check all that apply)

- | | |
|----------------------------------|--|
| <input type="checkbox"/> Highway | <input type="checkbox"/> Large scale TDM |
| <input type="checkbox"/> Rail | <input type="checkbox"/> Bike/Ped |
| <input type="checkbox"/> Bus | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> ITS | |

2. Project Corridor (Refer to maps at the link below and check all that apply.)

- | | |
|--|--|
| <input type="checkbox"/> Transaction 2040 Corridor | <input type="checkbox"/> Corridor of Statewide Significance ¹ |
| <input type="checkbox"/> Statewide Mobility System | <input type="checkbox"/> SuperNova Corridor |

¹ http://www.virginiadot.org/projects/northernvirginia/evaluating_significant_projects.asp

3. Project Description/Components (termini, number of lanes, operating policies for transit & HOV improvements like HOV requirements, transit headways, etc.) No more than 2 paragraphs²

- For highway projects include project limits, changes to number or use of lanes, any changes to traffic control system, complimentary bike/ped way improvements.
- For transit projects include service route, frequency, stops/station location, station access information.
- For TDM projects include program details with anticipated nature and magnitude of change in travel.
- For ITS projects include details about the systems operations (including those at traffic signals) and information communications that would impact mode and/or route choice.

4. What congestion problem is this project designed to address?

² Please provide a schematic/map of the project's location with your submission

Project Nomination Form (pages 3 and 4)

5. **Project Impact Area** (What other highway facilities OR transit routes are likely to be impacted and how by this specific project?)

6. **Total Cost to Complete Project** (including all components for a project package, not including operating costs)

7. **Project Implementation Year**
 Before 2025 After 2025

8. **Project is In Transaction 2040**
 Yes No

9. **Project is In current CLRP** (specify implementation year) _____
 Yes No

10. **Does the Project connect regional activity centers? Which ones?**
 (Refer to map included in the solicitation document)
 Yes No

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11. **Does the Project connect major facilities? Which ones?** (Interstate highways, principal arterials or transit stations, park and ride lots and DCA or IAD airports)
 Yes No

12. **Does this project increase person moving capacity? On which modes and which facility/corridor?**
 Yes No

13. **Project's impact on mobility**

- The project improves mobility between jurisdictions or activity centers
- The project improves roadway or bus capacity on radial roads
- The project improves reversible capabilities on the radial roadways
- The project expands/extends rail transit systems

Please indicate below a staff member(s) who can respond to detailed questions on the project such as project limits, number of lanes, transit stops, etc.

Thank you for taking the time to complete this form on behalf of your agency. Please return the form as a high resolution pdf. and email Valerie.Pardo@VDOT.Virginia.gov, or you may print and fax it to (703) 815-3219, no later than Friday, Month 00, 2014. If you are faxing, please call Valerie Pardo at (703) 259-1736, to notify her to expect a facsimile.

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Questions / Comments

THANKS!

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