

# Metrics and Supportive Analysis Methodologies for Highly Urbanized, Multimodal Systems



5<sup>th</sup> international Transportation Systems Performance Measurement and Data Conference

Jamie Henson

June 2, 2015

# A Better Title

- The Perils of a Single Performance Measure

# Who Are We?

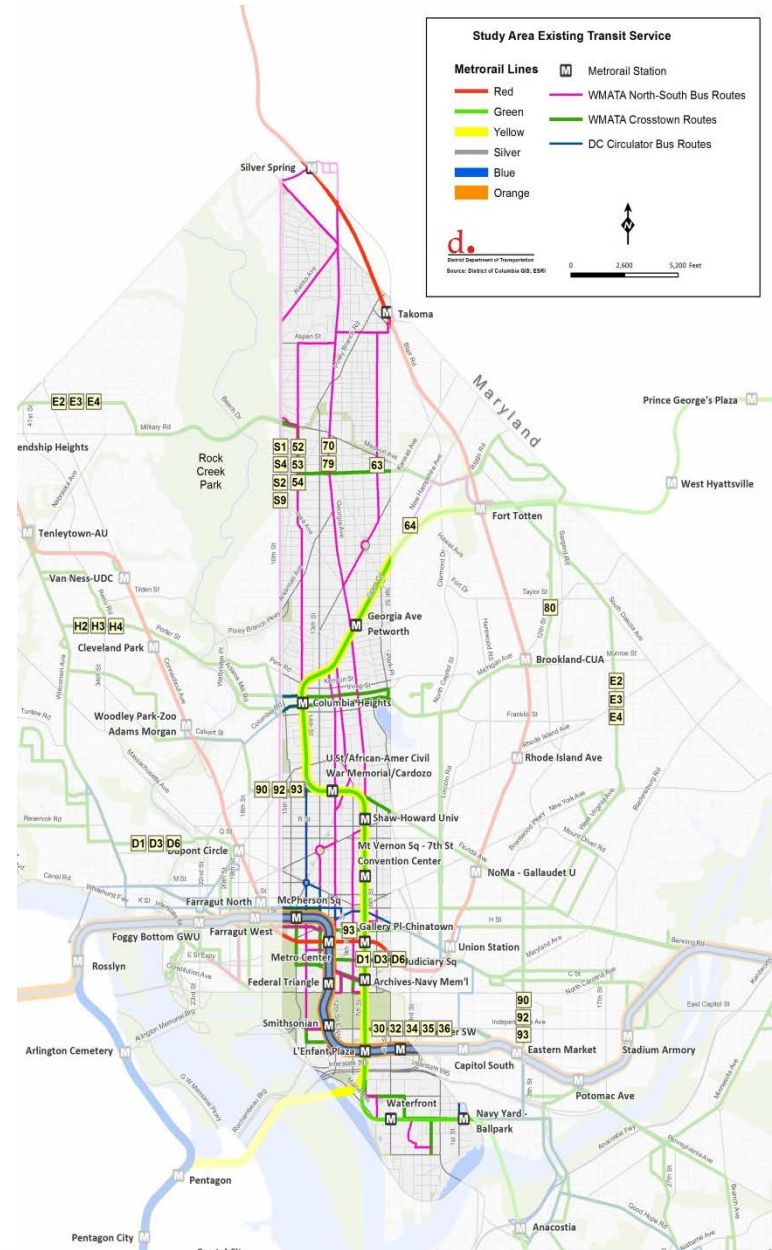
- DDOT is the state DOT for the District of Columbia
- We generally focus on vehicles, bikes, and pedestrians
- Looking to advance transit options
  - Streetcar program
  - Improve efficiency for buses

# Our Vision

- The Comprehensive Plan of the National Capital, District Elements  
.....But traditional LOS measures are not appropriate in a built out city, where widening streets to increase capacity is rarely an option (or a desired outcome). In the District, level of service measurement must integrate vehicular, bicycle, pedestrian and transit travel. The benchmark should be the number of people that can pass along a corridor or through an intersection rather than just the number of cars.

# Context

- Completing a major study focused on streetcar
- Significant bus corridor
- Approximately 75,000 daily bus riders
- Four major bus routes
- Considered exclusive lanes for transit



# Analysis

- LOS
  - Evaluated delay at 118 intersections
  - Considered existing and future; build and no-build
- Transit
  - Extensive operations analysis
  - Utilized APC and AVL data
  - Forecast future ridership
- Diversion
  - Considered results from removing a vehicle travel lane
  - Focused on regional travel model

# Person Thru-put

- Combined results from the analysis and forecasting
- Evaluated person thru-put for various scenarios
- Focus on exclusive transit lanes and results of a diversion analysis
  - How does person thru-put help us decide if exclusive transit lanes are appropriate
  - Do any of the alternatives stand out

# Transit Forecast

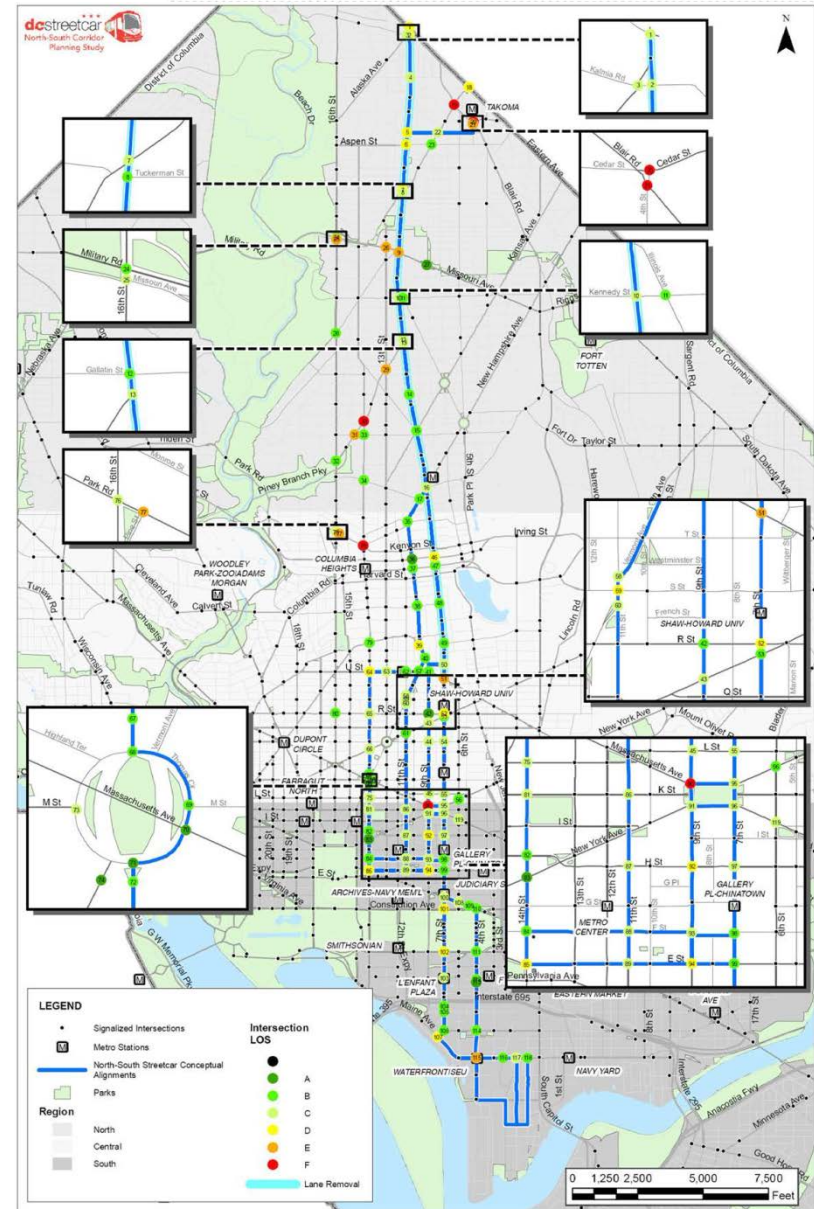
Alternative	Daily Ridership	Travel Times (NB/SB)
1	10,450	41 (NB)/41(SB)
2	15,900	47 (NB)/43(SB)
3	14,400	41(NB)/41(SB)
4	10,850	41(NB)/41(SB)

Alternative	Cumulative Route Miles	Daily Ridership	Travel Times (NB/SB)	Sensitivity Test	Ridership Increase
1a	18	13,000	41/41	Provide 5 minute headway north of U Street NW	26%
1b	18	11,000	41/41	Move North-South streetcar stop within 0.1 miles of an East-West streetcar stop Station	5%
1c	18	11,500	41/41	Remove Route 79 and modify Route S9	10%
1d	18	11,925	39/39	Assumes exclusive right of way for streetcar north of U Street NW in the year 2020 with an average operating speed of 14 MPH	14%
1e	18	14,300	34/34	Assumes exclusive right of way for streetcar for the entire alignment, including within Downtown in 2020. The operating speeds were 20 percent higher than what was assumed in Alternative 1.	37%



# Diversion Results

- PM 2040 LOS showed minimal impacts
- No LOS impacts on the dedicated facility
- Few LOS impacts on parallel facilities

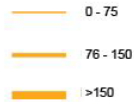


# Diversion Results

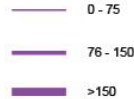
- Major traffic shift from dedicated facility
- Minor to moderate additional traffic on parallel facilities

## PEAK HOUR TRAFFIC (VEHICLES PER HOUR)

### Decreased Traffic



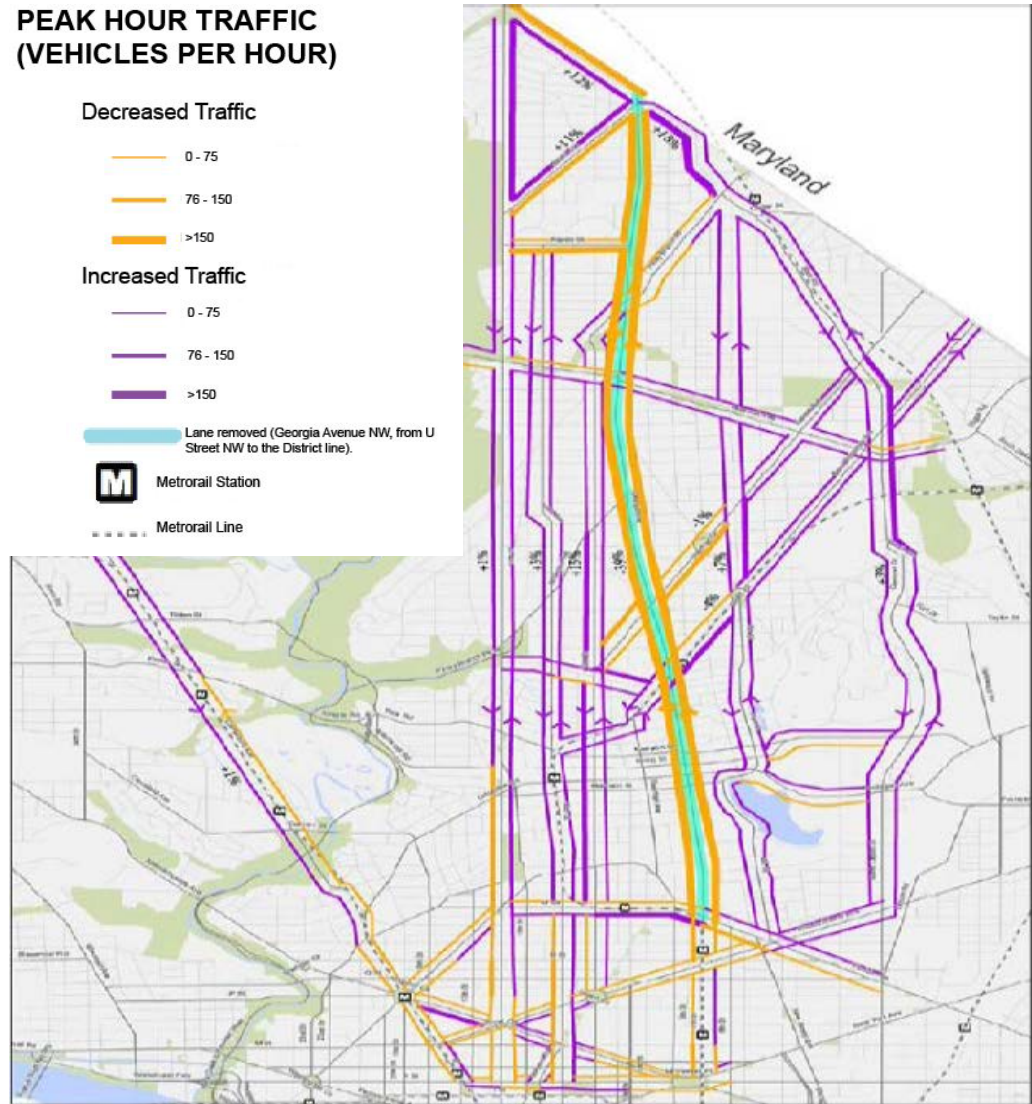
### Increased Traffic



Lane removed (Georgia Avenue NW, from U Street NW to the District line).

Metrorail Station

Metrorail Line



# Diversions Results

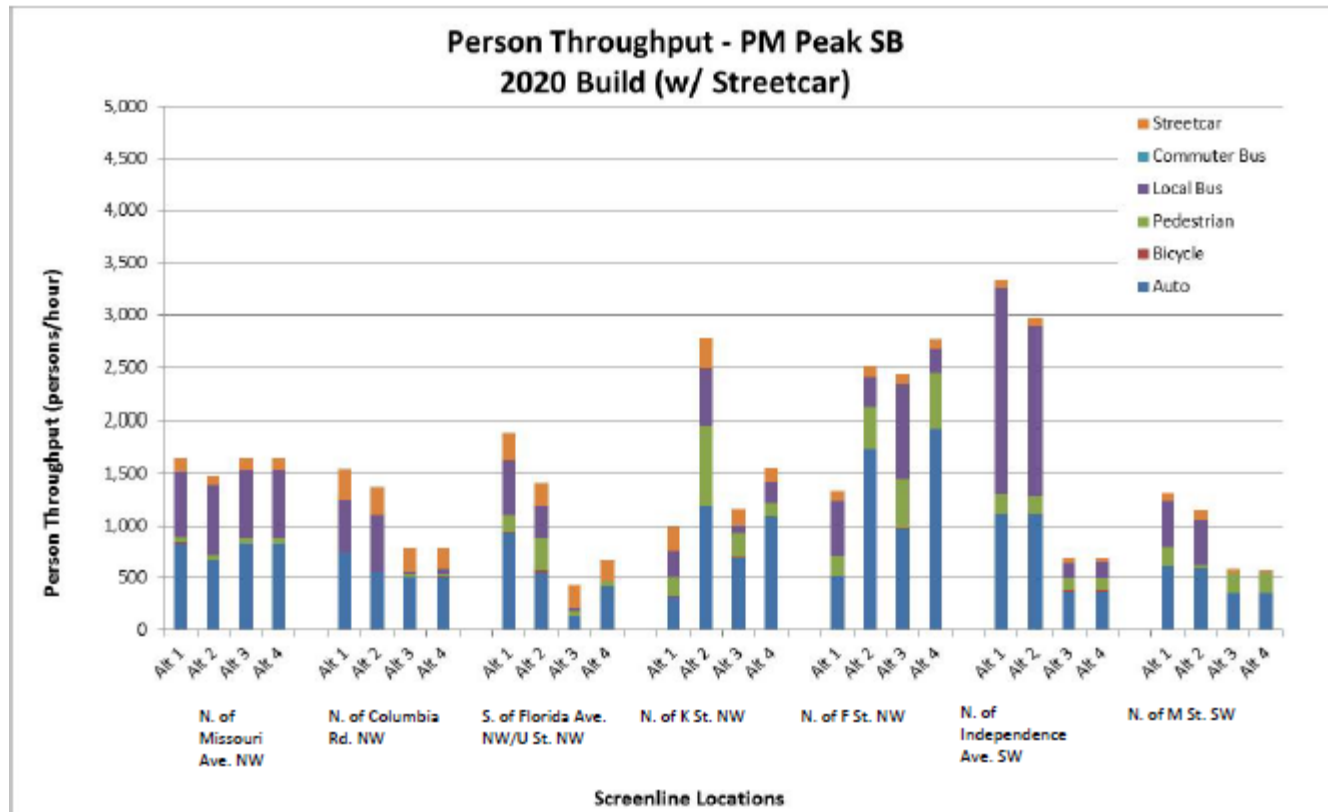
Table 4-81: Diverted Traffic for Year 2040 due to Dedicated Transit Lane

Street	Segment	Traffic Volumes Changes		Traffic Percent Change	
		AM Peak Hour (vph): Southbound	PM Peak Hour (vph): Northbound	AM Peak Hour (%): Southbound	PM Peak Hour (%): Northbound
Alaska Ave. NW	S. of Eastern Ave.	+110	+120	+11%	+13%
Blair Road	E. of Georgia Ave.	+200	+180	+18%	15%
16 <sup>th</sup> St. NW	S. of Missouri Ave. NW	+25	+35	+1%	+2%
14 <sup>th</sup> St. NW	S. of Missouri Ave. NW	+35	+45	+3%	+3%
13 <sup>th</sup> St. NW	S. of Missouri Ave. NW	+80	+55	+15%	+11%
Georgia Ave. NW	S. of Missouri Ave. NW	-885	-850	-48%	-49%
Kansas Ave. NW	W. of 5 <sup>th</sup> St. NW	-10	-20	-1%	-2%
New Hamp. Ave. NW	W. of 5 <sup>th</sup> St. NW	-40	-85	-4%	-9%
5 <sup>th</sup> St. NW	S. of Kansas Ave. NW	+40	+35	+7%	+7%
N. Capitol St.	S. of Missouri Ave. NW	+75	+135	+3%	+5%

# What Is Person Thru-put

- Facility focused?
- Corridor focused?
- How is the corridor defined?
- Is it location focused?

# Person Thru-put Result



# What We Did

- Reduced the focus on person thru-put
- Provided a broader set of measures
  - Transit travel time
  - Dwell time
  - Travel time reliability
  - Headway adherence
  - Vehicle LOS
  - Volume changes
- Synthesize results to better define problems
- Start a research project

# Points to Ponder

- Don't despair
- Measures are useless unless you can create them
- Link the measures with data and analysis tools
- Probably a bad idea to focus on 'a' metric
- Work toward using the metrics to tell a story
- Think about what decision makers need to 'sell' the project
- LOS doesn't look so bad after all