

Item # 5
Regional Bus Subcommittee
June 24, 2014

2014
Congestion Management Process (CMP)
Technical Report

TPB Regional Bus Subcommittee
June 24, 2014

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National Capital Region Transportation Planning Board (TPB)
Metropolitan Washington Council of Governments (COG)

Background of the CMP

- A Congestion Management Process (CMP) is a requirement in metropolitan transportation planning
 - SAFETEA-LU and associated 2007 Federal regulations for metropolitan planning address CMP requirements
 - Retained in MAP-21
 - The official CMP component is wholly integrated into the CLRP to address the federal requirement
 - Separate CMP Technical Report follows a recommendation from the 2006 Federal certification of the TPB process
 - CMP Technical Reports in 2008, 2010, 2012, and now 2014

Outline of the Report

- Executive Summary
 1. Introduction
 2. State of Congestion
 3. Consideration and Implementation of Congestion Management Strategies
 4. Studies of Congestion Management Strategies
 5. How Results of the CMP Are Integrated into the CLRP
 6. Conclusions (key findings and recommendations)

The 2014 CMP Technical Report:

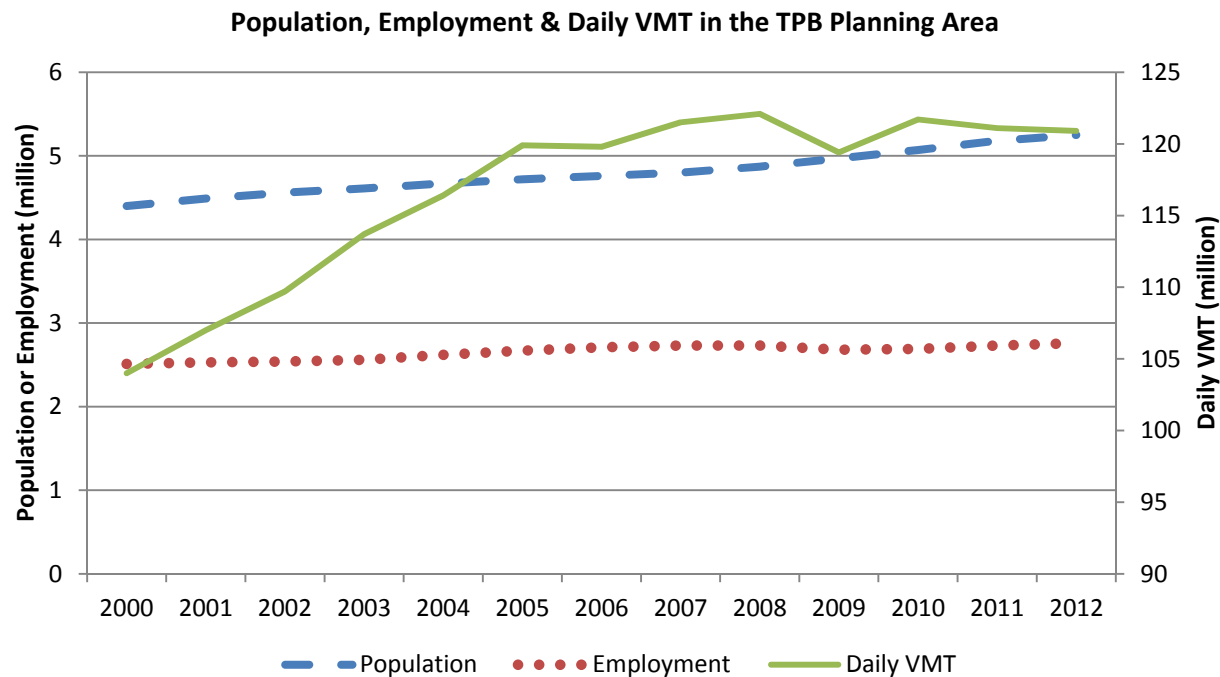
- *Compiles information from a wide range of metropolitan transportation planning activities*
- *Provides some additional CMP specific analyses, particularly I-95 Corridor Coalition Vehicle Probe Project/INRIX data-based analyses*



Part 1: State of Congestion

Population, Employment and Daily VMT

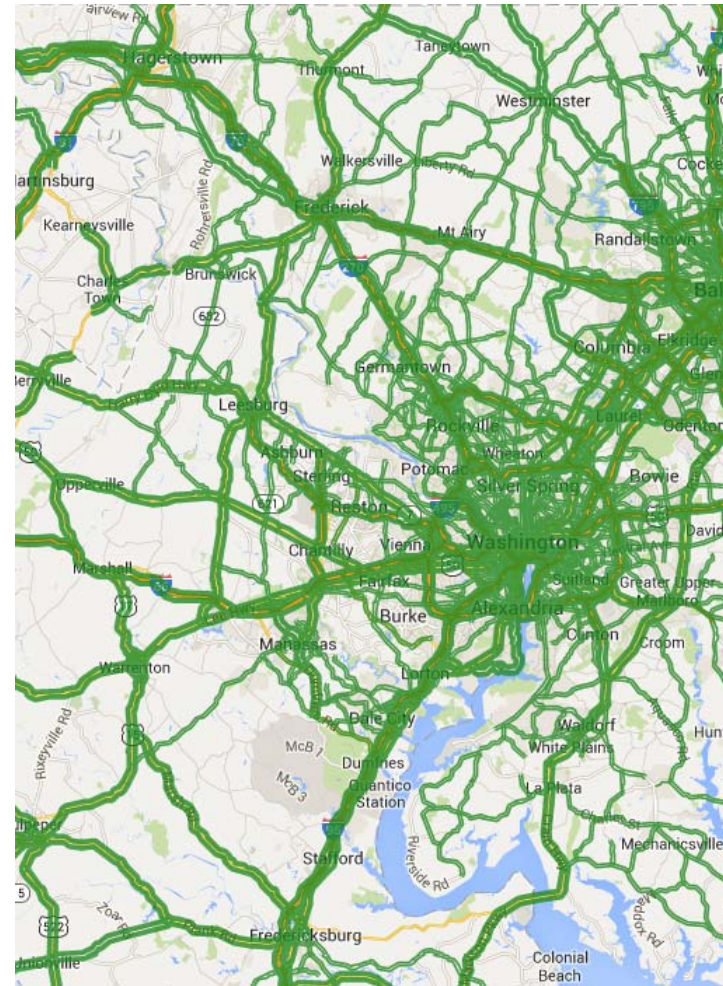
- From 2010 to 2012 in the TPB Planning Area
 - Population, up 3.6%
 - Employment, up 2.6%
 - **Daily VMT, down 0.7%**



Source: TPB's Regional Transportation Data Clearinghouse; Bureau of Labor Statistics' Quarterly Census of Employment and Wages.

Vehicle Probe Project (VPP)/INRIX Data Coverage

- TPB Planning Area
 - Interstate system, 520 (directional) miles
 - Non-Interstate NHS, 2,160 miles
 - Non-NHS, 2,820 miles
 - All roads, 5,500 miles



(Screenshot was captured on the I-95 Traffic Monitoring website <http://i95.inrix.com/>.)

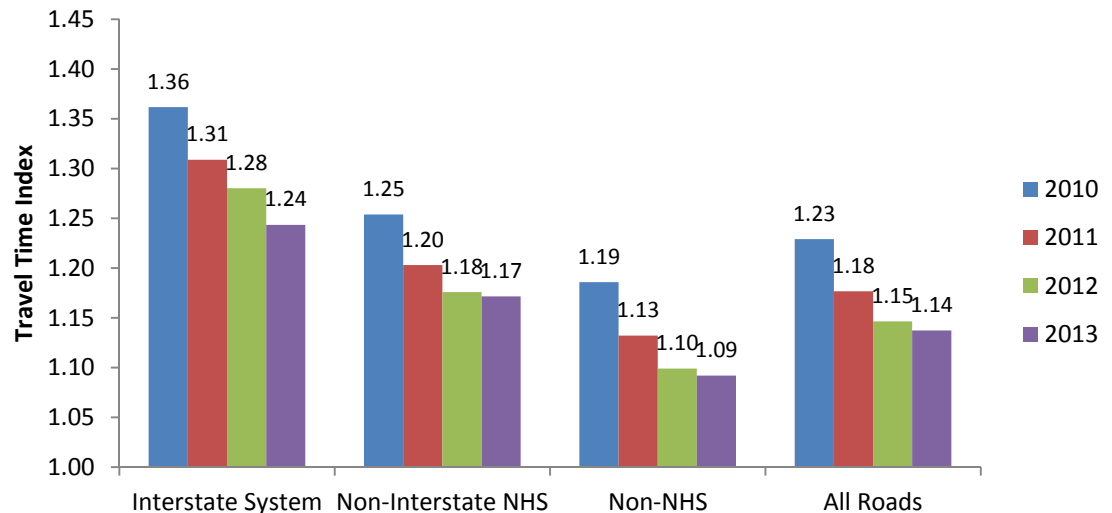
Regional Congestion Trends, 2010-2013 (1/2)

- The Washington region experienced **decreasing** congestion during peak periods from 2010-2013; but the pace of decrease had **slowed down** significantly in 2013:
 - 1) The decrease in *Travel Time Index* from previous year was 4.3%, 2.6% and 0.8% in 2011, 2012 and 2013, respectively; the annual average decrease was 2.6%.

Note:

- Travel Time Index (TTI) is an indicator of the intensity of congestion, calculated as the ratio of actual travel time to free-flow travel time.
- AM Peak: 6:00-10:00 am
- PM Peak: 3:00-7:00 pm

Annual Average Travel Time Index by Highway Category
Total AM and PM Peaks

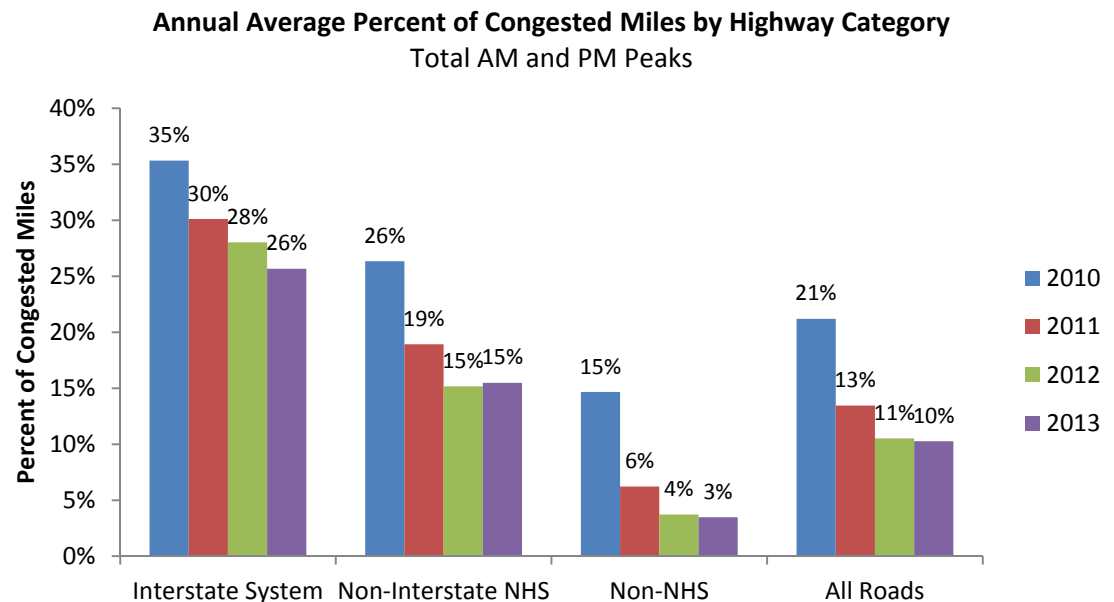


Regional Congestion Trends, 2010-2013 (2/2)

- 2) The decrease in *Percent of Congested Miles* from previous year was 37%, 22% and 3% in 2011, 2012 and 2013, respectively; the annual average decrease was 21%.

Note:

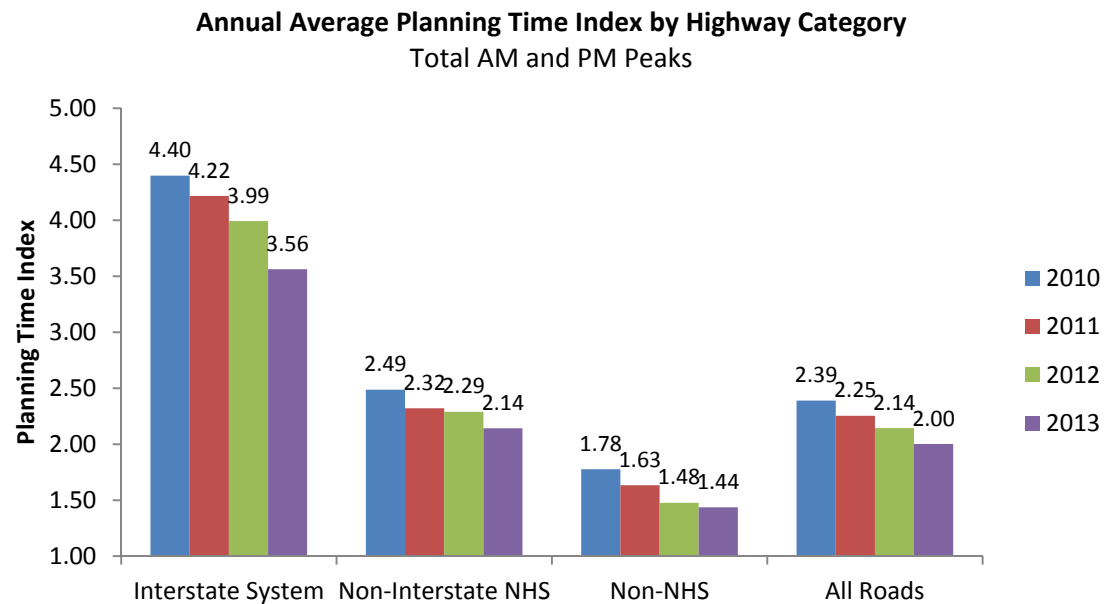
Percent of Congested (Directional) Miles is a system-wide measure that captures the spatial extent of congestion. Congestion is defined if actual travel time is 30% longer than the free-flow travel time, i.e., Travel Time Index > 1.3, according to the National Transportation Operations Coalition.



Regional Highway Travel Time Reliability Trends 2010-2013

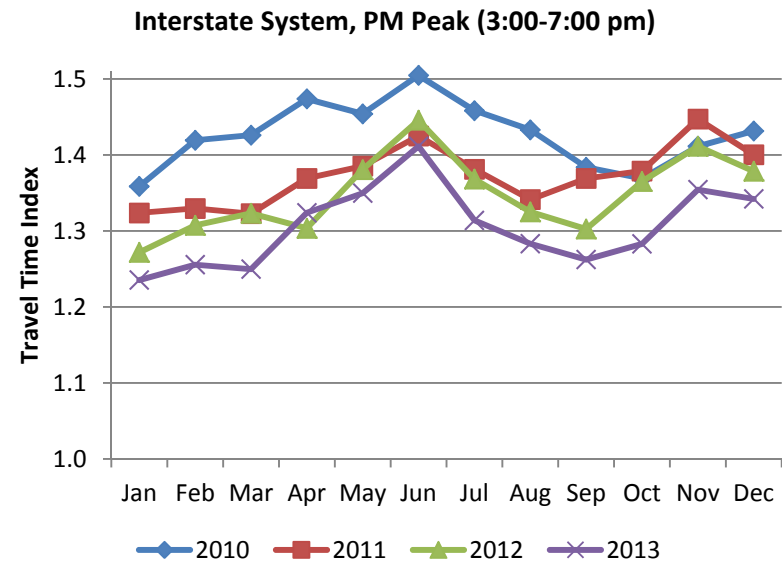
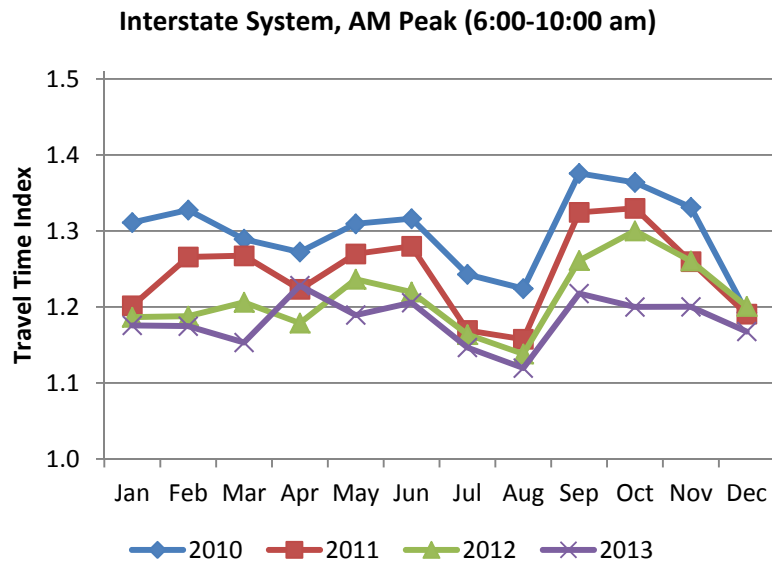
- The Washington region experienced **steady improvement** in travel time reliability during peak periods from 2010-2013:
 - The improvement in travel time reliability, measured by *Planning Time Index*, from previous year was 6%, 5% and 7% in 2011, 2012 and 2013, respectively; the annual average improvement was 6%.

Note:
 Planning Time Index (PTI) is a travel time reliability measure, defined as the 95th percentile travel time to free-flow travel time.



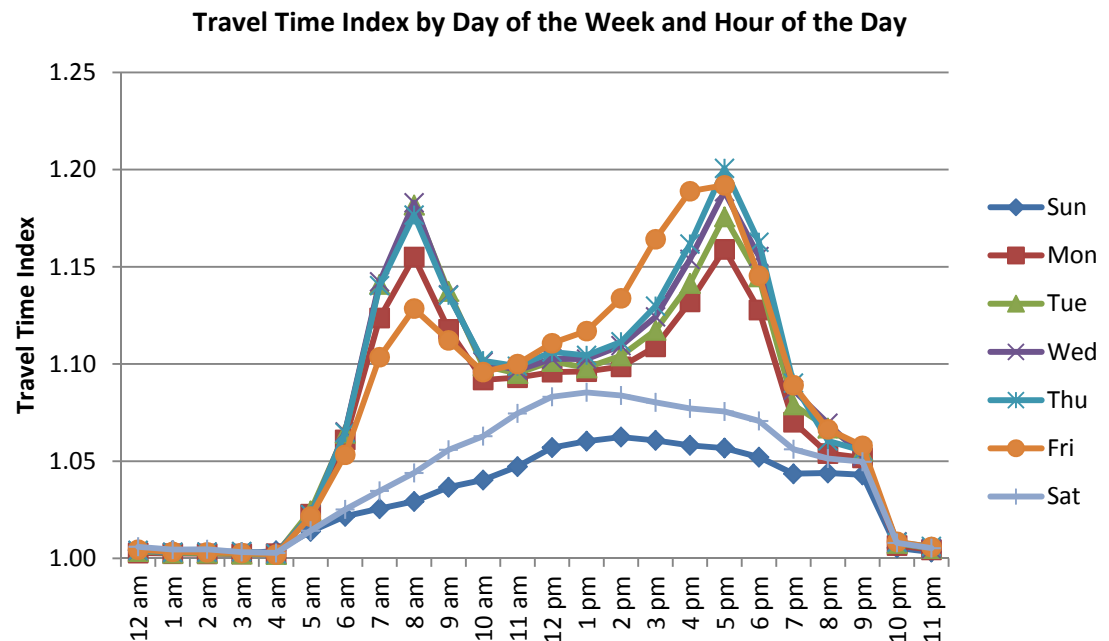
Congestion Seasonal Variations

- Seasonal variation most significant with Interstate system (compared to non-Interstate NHS, non-NHS)
- AM Peak: low – Aug.; High – Sep.
- PM Peak: low – Jan./Sep.; High – Jun.



Congestion Day of Week Variations

- Tue., Wed., & Thu. were the most congested weekdays with similar traffic patterns
- Mon. & Fri. had unique traffic patterns
- Weekend patterns

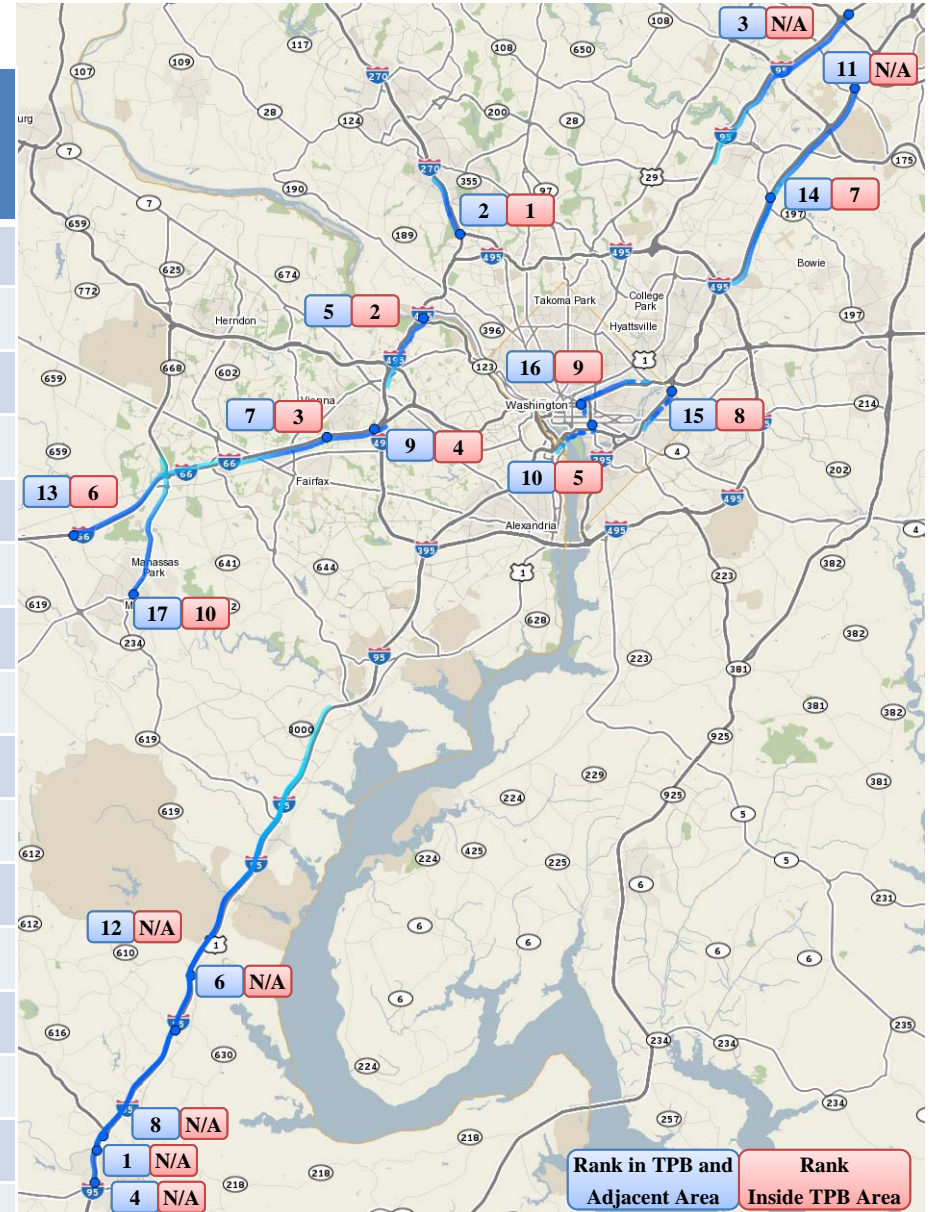


Note:
2013 "All Roads" data are used.

2013 Top Bottlenecks

- by Speed and AADT

Rank in TPB and Adjacent Area	Rank Inside TPB Area	Location	Average Duration	Queue Length (miles)	Occurrences	Impact Factor	2011 AADT*
1	N/A	I-95 SB @ Fred./Sta. Co Line	5 h 6 m	32.0	311	3,055,956	70,500
2	1	I-270 Spur SB @ I-270	1 h 42 m	6.4	884	591,198	133,326
3	N/A	I-95 NB @ MD-100/Exit 43	2 h 51 m	14.5	279	756,736	97,667
4	N/A	I-95 SB @ VA-3/Exit 130	5 h 45 m	32.3	115	1,283,658	56,500
5	2	I-495 CW @ AM Bridge	2 h 47 m	4.7	800	640,474	107,242
6	N/A	I-95 SB @ VA-630/Exit 140	4 h 6 m	20.1	161	795,652	67,000
7	3	I-66 EB @ Vaden Dr/Exit 62	1 h 58 m	6.5	567	490,498	89,000
8	N/A	I-95 SB @ US-17/Exit 133	5 h 8 m	30.2	60	657,455	65,500
9	4	I-66 EB @ I-495/Exit 64	1 h 53 m	4.6	968	513,693	81,000
10	5	I-395 NB @ 2nd St	1 h 43 m	3.8	138	534,048	75,716
11	N/A	MD-295 NB @ MD-175	3 h 48 m	13.8	261	823,541	48,225
12	N/A	I-95 SB @ US-1/Exit 143	3 h 9 m	12.0	175	558,193	70,500
13	6	I-66 WB @ VA-234/Exit 47	2 h 21 m	10.9	339	604,192	63,500
14	7	MD-295 NB @ MD-197/	2 h 47 m	6.7	444	505,186	53,535
15	8	DC-295 NB @ Eastern Ave	2 h 49 m	3.9	428	334,024	56,374
16	9	US-50 WB @ 10th St	4 h 19 m	13.1	145	546,624	12,146
17	10	VA-28 SB @ Sudley Rd	3 h 23 m	8.2	196	330,540	14,464



Travel Times along Major Freeway Commute Routes - AM Peak Travel Times, 2010-2013

Route	Length (miles)	Average Travel Time in Peak Period (min)				Reliable (95th) Travel Time* in Peak Period (min)				2013 Change in Average Travel Time in Peak Period (min)			2013 Change in 95th Travel Time in Peak Period (min)		
		2010	2011	2012	2013	2010	2011	2012	2013	vs. 2010	vs. 2011	vs. 2012	vs. 2010	vs. 2011	vs. 2012
C1: I-270 SB from I-70 to I-370	24	33	29	29	29	81	65	60	58	-4	0	0	-23	-7	-2
C2: I-270 SB from I-370 to I-495	10	16	14	13	14	35	34	29	29	-2	-1	0	-7	-5	0
C3: VA-267 EB from VA-28 to VA-123	14	18	18	15	15	43	39	29	29	-3	-2	0	-14	-10	0
C4: I-66 EB from VA-28 to I-495	12	19	20	17	17	48	41	35	32	-3	-3	0	-16	-9	-2
C5: I-66 EB from I-495 to TR Bridge	13	20	19	16	17	43	42	34	34	-3	-3	0	-9	-8	-1
C6: I-95 NB from VA-234 to Exit 169	20	25	24	24	24	61	61	59	56	-1	0	-1	-5	-5	-3
C7: I-95 NB HOV from VA-234 to Exit 169	18	18	17	17	17	28	27	24	23	-1	-1	0	-5	-4	-1
C8: I-395 NB from I-95 to H St.	13	24	24	23	23	66	68	65	62	-1	-2	-1	-3	-6	-2
C9: I-395 NB HOV from I-495 to US-1	11	14	14	13	13	31	30	29	27	-1	-1	0	-5	-3	-2
C10: US-50 WB from US-301 to MD-295	14	17	16	16	16	32	31	28	28	-1	0	0	-4	-3	0
C11: MD-295 SB from MD-198 to US-50	16	21	20	19	19	50	47	42	40	-2	-1	0	-10	-6	-2
C12: I-95 SB from MD-198 to I-495	8	11	10	9	9	28	28	20	19	-2	-1	0	-9	-9	-1
C13: I-495 IL from I-270 to I-95	10	12	11	11	11	18	18	18	16	-1	0	0	-3	-2	-2
C14: I-495 IL from I-95 to US-50	9	10	10	9	9	12	12	12	12	0	0	0	0	-1	0
C15: I-495 IL from US-50 to I-95	28	28	28	27	29	41	38	41	46	1	1	2	5	8	5
C16: I-495 IL from I-95 to I-66	10	17	17	14	11	39	36	34	16	-7	-6	-3	-22	-20	-18
C17: I-495 IL from I-66 to I-270	14	16	16	15	15	25	24	25	26	-1	-1	0	1	2	1
C13: I-495 OL from I-95 to I-270	10	20	19	17	18	43	44	38	38	-2	-1	1	-5	-6	0
C14: I-495 OL from US-50 to I-95	10	12	12	11	11	24	25	22	20	-1	0	0	-4	-5	-2
C15: I-495 OL from I-95 to US-50	29	31	30	29	28	46	46	43	39	-3	-2	-1	-7	-7	-5
C16: I-495 OL from I-66 to I-95	11	10	10	10	10	12	12	11	10	-1	-1	0	-2	-1	0
C17: I-495 OL from I-270 to I-66	14	15	15	15	14	23	23	20	18	-1	-2	-1	-5	-5	-2
C18: I-295 NB from I-495 to 11th St. Brdg.	6	10	9	10	9	28	25	30	25	0	0	0	-3	-1	-5

* The majority (95%) of trips spent equal to or less than the reliable (95th) travel time on the specified route. On average, a traveler could successfully complete the travel on the specified route within the reliable travel time during 19 out of 20 trips (only 1 trip could exceed the reliable travel time).

Arterials

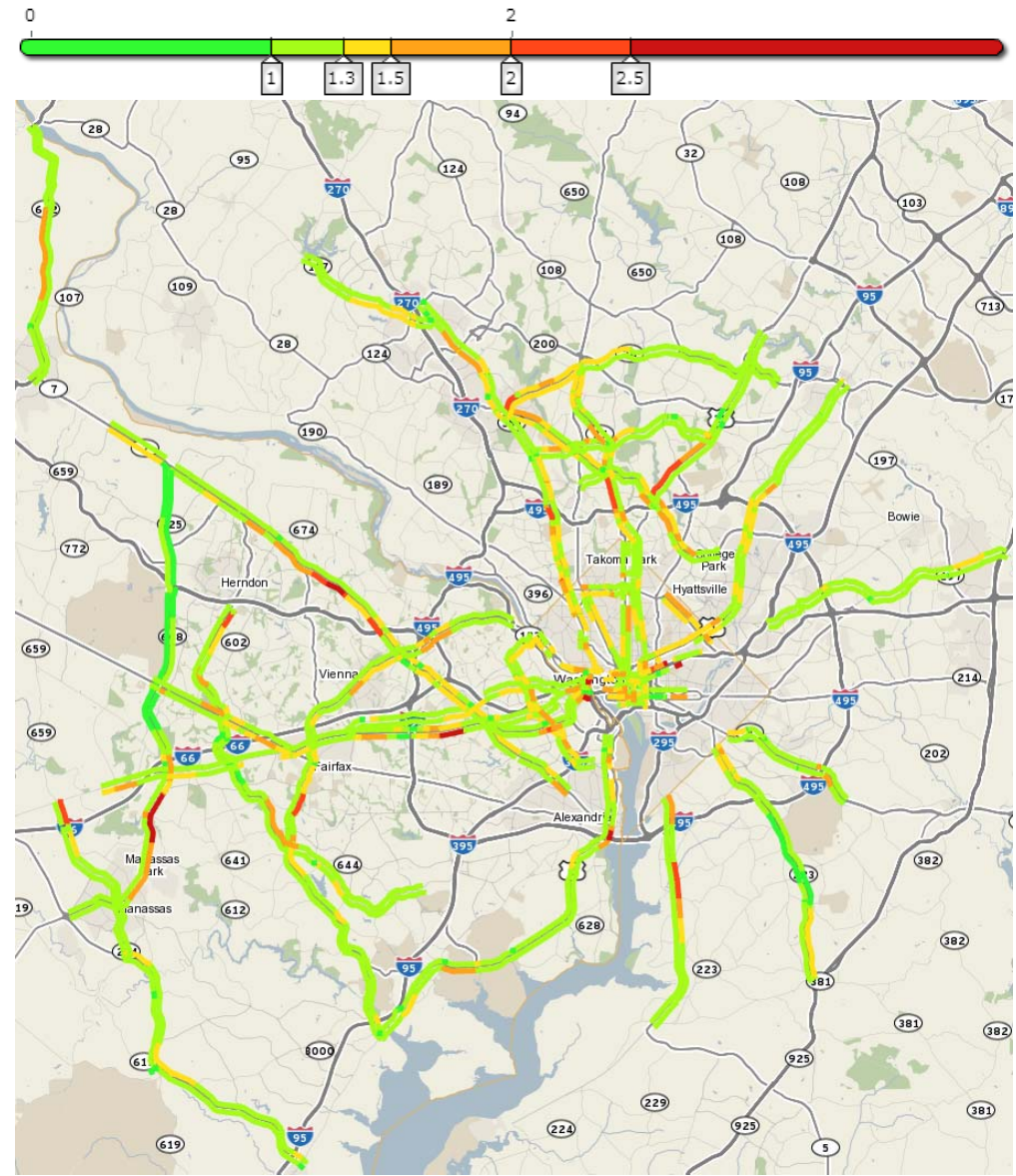
AM Peak Hour

Congestion Level:

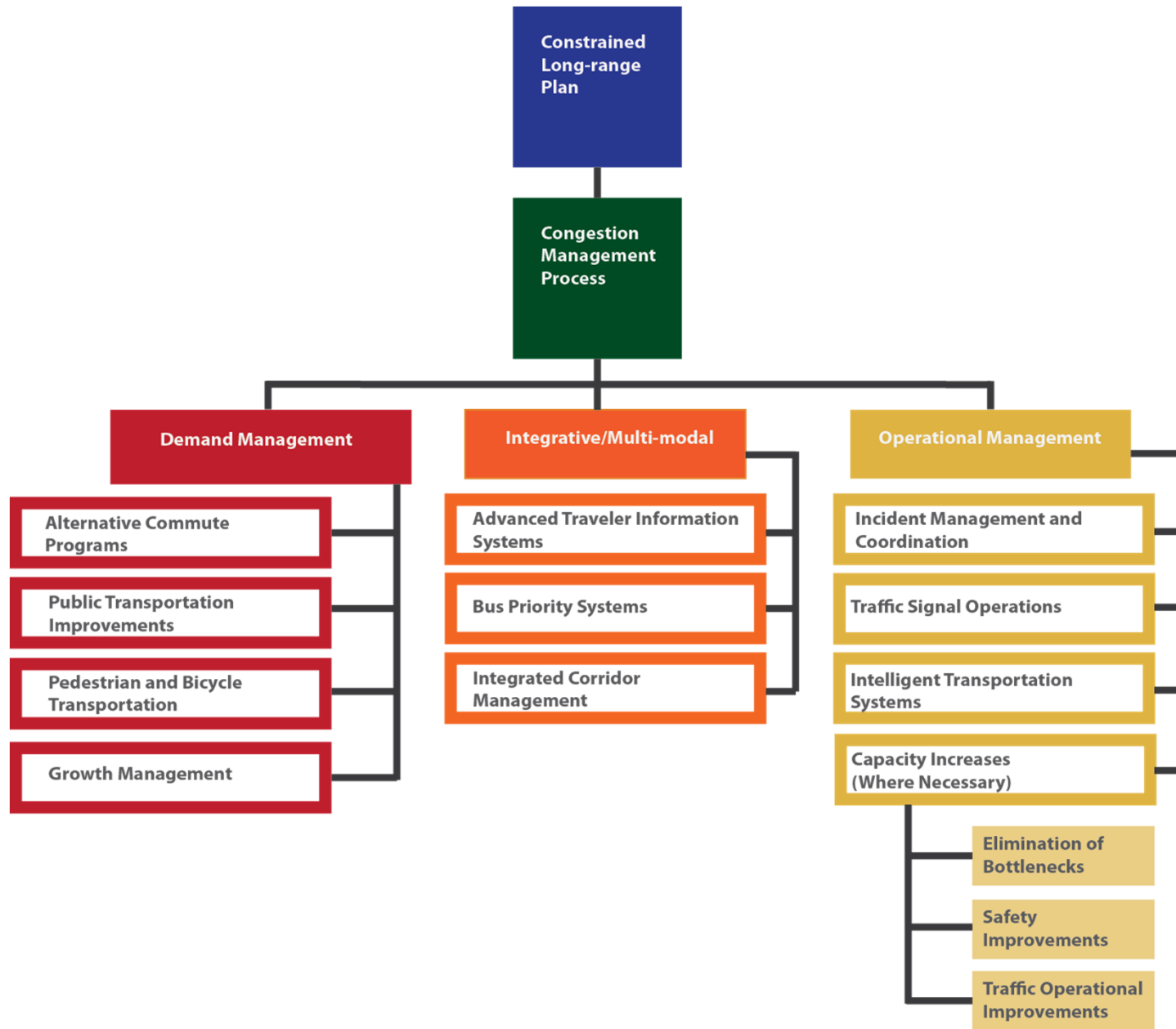
- TTI = 1.0: Free flow
- $1.0 < \text{TTI} \leq 1.3$: Minimal
- $1.3 < \text{TTI} \leq 1.5$: Minor
- $1.5 < \text{TTI} \leq 2.0$: Moderate
- $2.0 < \text{TTI} \leq 2.5$: Heavy
- $2.5 < \text{TTI}$: Severe

Travel Time Index and Planning Time Index on all National Highway System are shown in Appendices A and B.

Travel Time Index during 8:00-9:00 am on Middle Weekdays in 2013



Part 2:
Congestion Management Strategies,
CMP-CLRP Integration, and
Recommendations



New Strategies in 2014 CMP Report

- Demand Management Strategies

- Transit

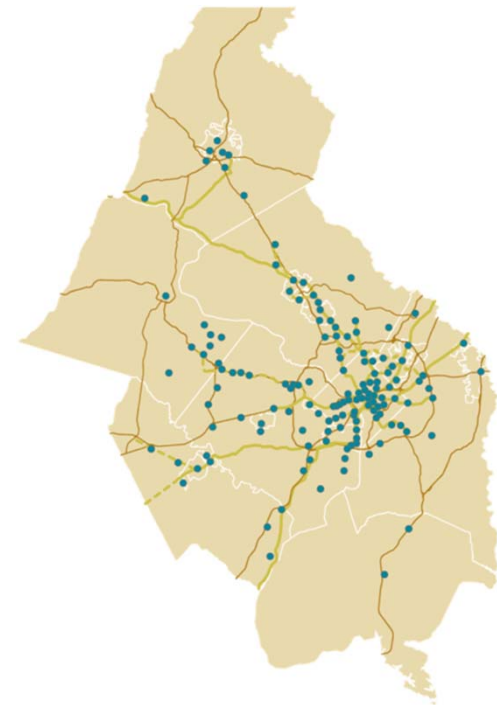
- Weekend service on MARC Penn Line
 - Crystal City-Potomac Yard Transitway
 - DC Streetcar
 - Metrorail Silver Line

- Bicycle/Pedestrian Programs

- Transportation Alternatives Program

- Land Use Strategies

- New Regional Activity Center map and *Place + Opportunity*



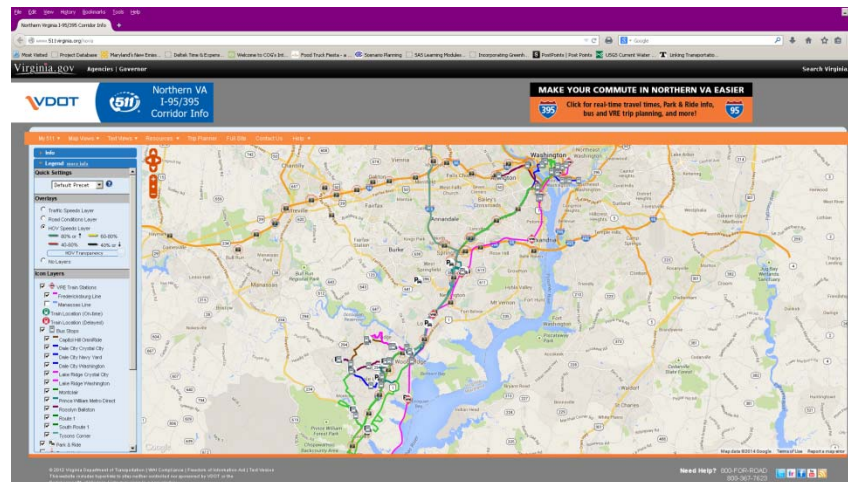
New Strategies in 2014 CMP Report

- Operational Management Strategies
 - 495 Express Lanes
 - DDOT Traffic Signal Timing Project
 - Enhancements to MATOC Program
 - VDOT's I-66 Active Traffic Management Project



New Strategies in 2014 CMP Report

- Integrative/Multi-modal Strategies
 - Implementation of VDOT ICM project in I-95 and US-1 Corridors



- Advanced Traveler Information Systems
- Mobile Devices and Social Media

CMP Strategies Highlighted in the RTPP

- Alleviate roadway bottlenecks
- Increase roadway efficiency
- Promote commute alternatives
- Increase bicycle and pedestrian infrastructure
- Apply priority bus treatments
- More capacity on the existing transit system
- Bus rapid transit (BRT) and other cost-effective transit alternatives
- Express toll lanes

2014 CMP Technical Report Recommendations (1/2)

1. Refine CMP to meet MAP-21 requirements
2. Continue Commuter Connections
3. Enhance MATOC
4. Invest in existing transportation system
5. Congestion management during construction
6. Consider variable pricing
7. Encourage transit
8. Encourage non-auto travel modes

2014 CMP Technical Report Recommendations (2/2)

9. Integrated operations management/demand management strategies
10. Multimodal traveler information
11. Safely interface with social media
12. Regional Activity Centers connectivity
13. Regional congestion monitoring program with multiple data sources
14. Continue to monitor recent trends in congestion
15. Monitor freight movement

Suggestions and Discussions for the Future

- Examine “transit bus-significant” sub-network
 - Comment received from TPB Board Meeting
 - How to define “transit bus-significant” sub-network
- Examine “freight-significant” sub-network
 - Comment received from Freight Subcommittee
 - How to define “freight-significant” sub-network
- Monitoring results of the above sub-networks can be summarized in future:
 - Quarterly NCR Congestion Report
 - Periodical updates to Freight Subcommittee and Regional Bus Subcommittee
 - CMP Tech Report

Considerations for a Probe Data Transit Bus-Significant Sub-Network

- Roadway coverage
 - Some smaller roads may not be available
 - Data on smaller roads are less precise than on heavily-trafficked roads
 - Sample size limitations of the current analysis tools (there may be future improvements)
- Nature of the data
 - Not traffic engineering-level of detail (e.g., no detail for bus-only lanes, HOV/HOT lanes, traffic signal timing, sub-block roadway segments)
 - Low data availability at low traffic times (e.g. middle of the night)
- Utility of this analysis
 - Understanding how the congestion trends differ on bus-significant roadways versus the overall network
 - Other thoughts from the committee?
- Staff can draft a bus-significant network for review
 - Considerations of regional network analysis versus corridor-specific analyses
 - PCN as baseline
 - Bus AVL data would help us

Proposed Probe Data Working Group (PDWG)

- Objective: improve regional coordination in using private sector probe-based traffic data for transportation systems performance monitoring and reporting
 - Consistency in technical details
 - Thorough and transparent documentation
- Aimed at assisting TPB member agencies
- Structure
 - As one of the subcommittees/groups of MOITS
 - Meet quarterly

QUESTIONS?

Comments could be sent to COG/TPB Staff
Erin Morrow: emorrow@mwkog.org