Insights from the SHRP 2 Reliability Products in Virginia (P14-6006)

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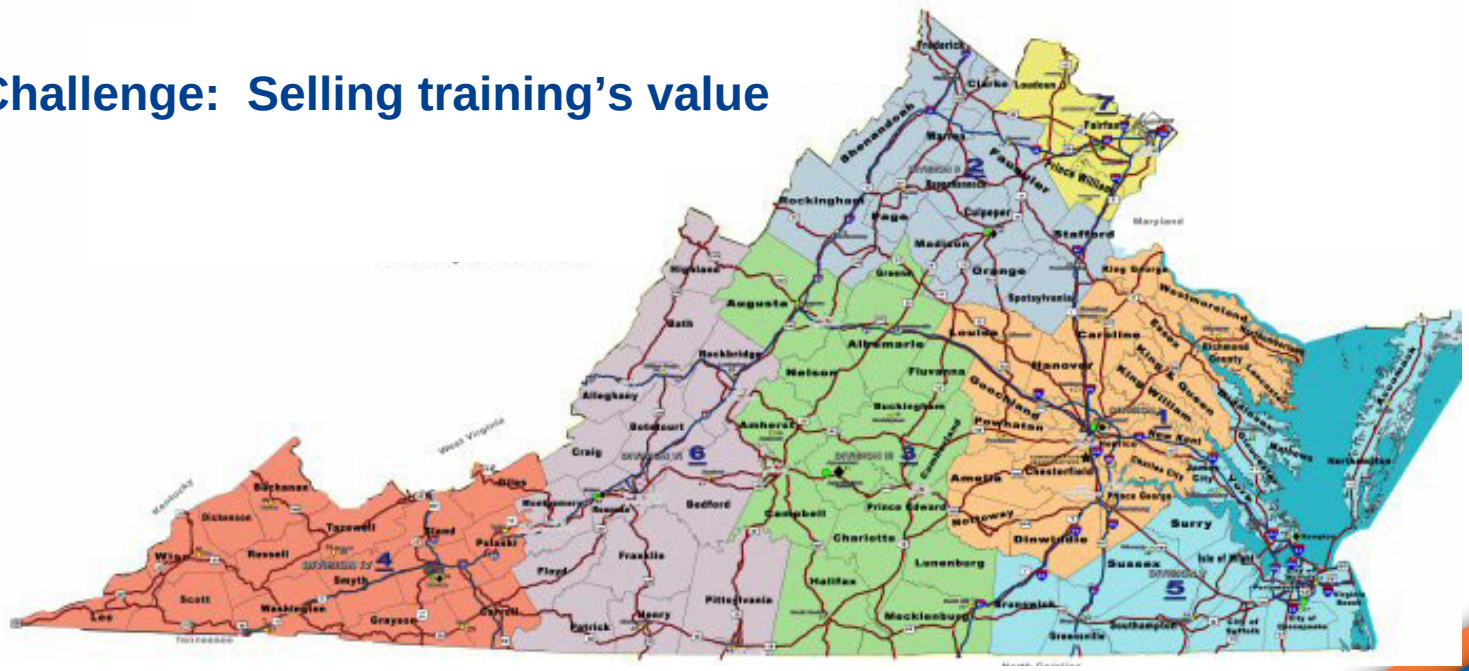
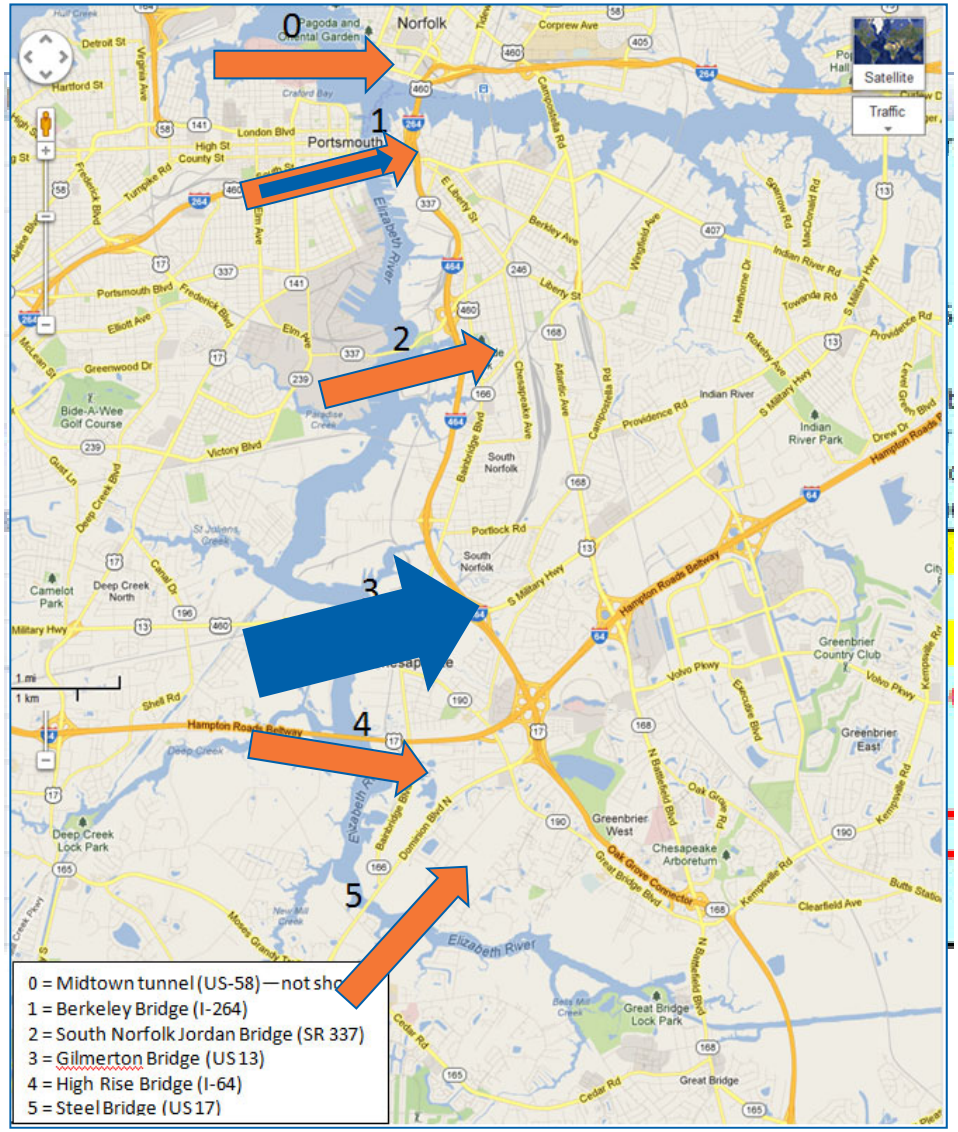
Reliability Tool:
Training for Incident Management (L12/L32A)

- Led by Virginia State Police in 7 regions
- Benefit: better understanding of VDOT's role in incident response
- "This course has driven home the importance of agencies working together toward a common goal—'Quick Clearance'"
- Challenge: Selling training's value



~~Capacity Tool~~ Reliability Tool: How Highway Congestion and Pricing Affect Travel Demand (C04)



- When work zones cause delay, what traffic will divert?
- Can use the "Traffic Shift Methodology for Corridors"

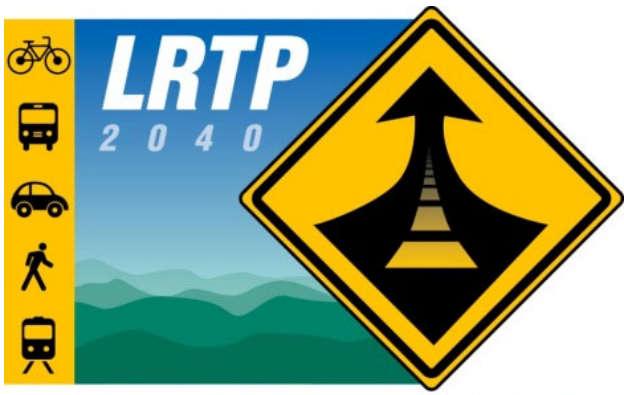
$$P_1^{'z} = \frac{\left[P_1^{mean}\right] e^{\theta t_1 'z}}{\sum_{i=0}^{5} \left[P_i^{mean}\right] e^{\theta t_i 'z}}$$

- Needs a calibration parameter θ
- Parameters from C04 may substitute for local data.

A Pilot Test to Improve the Use of Performance Measures in TCAPP

Charlottesville-Albemarle MPO

MPO Program Manager, Sarah Rhodes



Project Overview

Charlottesville/Albemarle MPO
Long Range Transportation Plan

What is TCAPP?

Transportation for Communities Advancing Projects through Partnerships

Research Questions

Can we improve the execution of TCAPP?

Do we influence decision making?

Project

Do performance measures change transportation priorities?

Methods

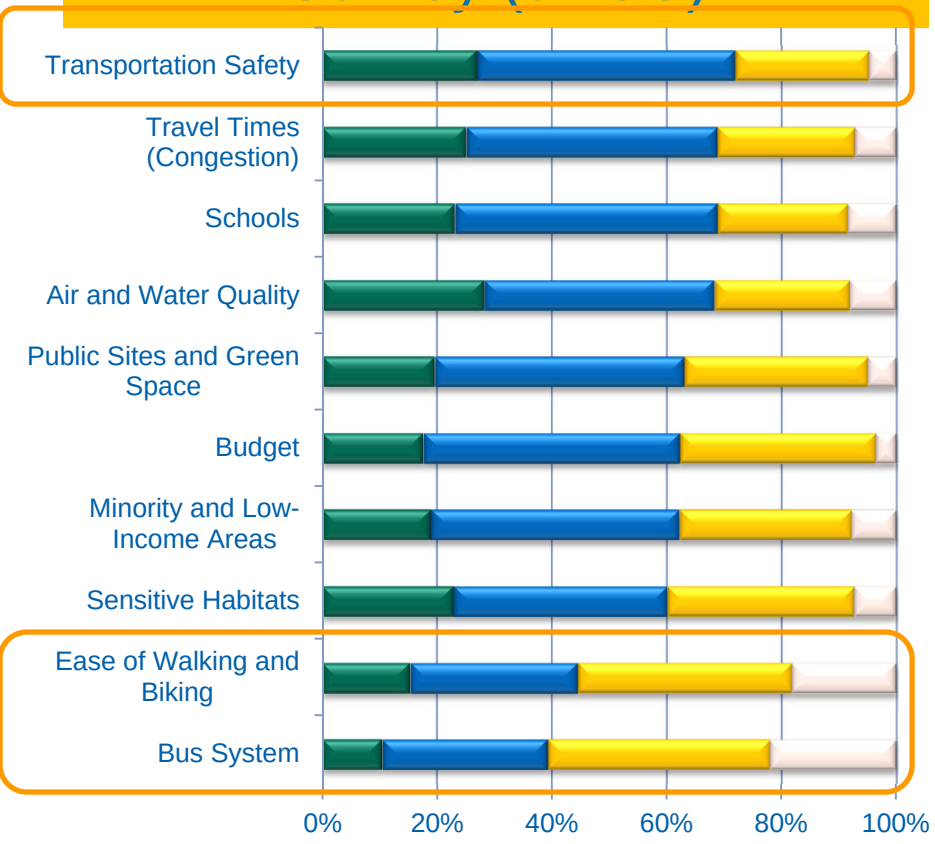
Survey 1: identify the most effective performance measures.

Survey 2: determine whether measures impact decision-making.

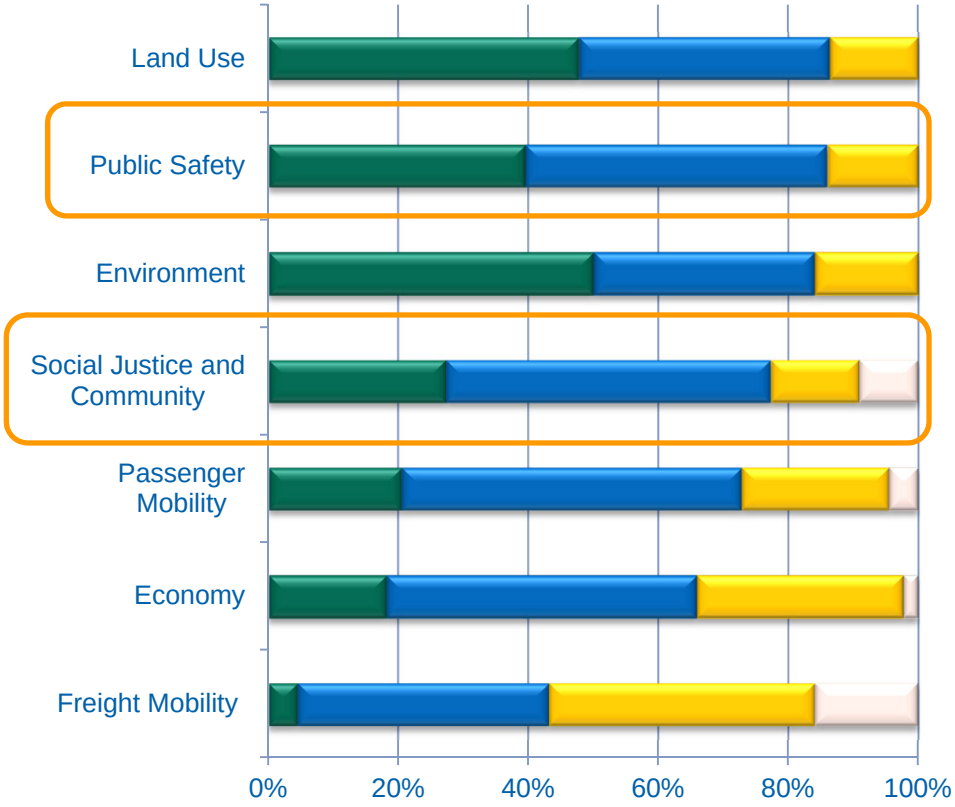
Performance Areas

Charlottesville/Albemarle MPO
Long Range Transportation Plan

Jefferson Area Community Survey (JACS)



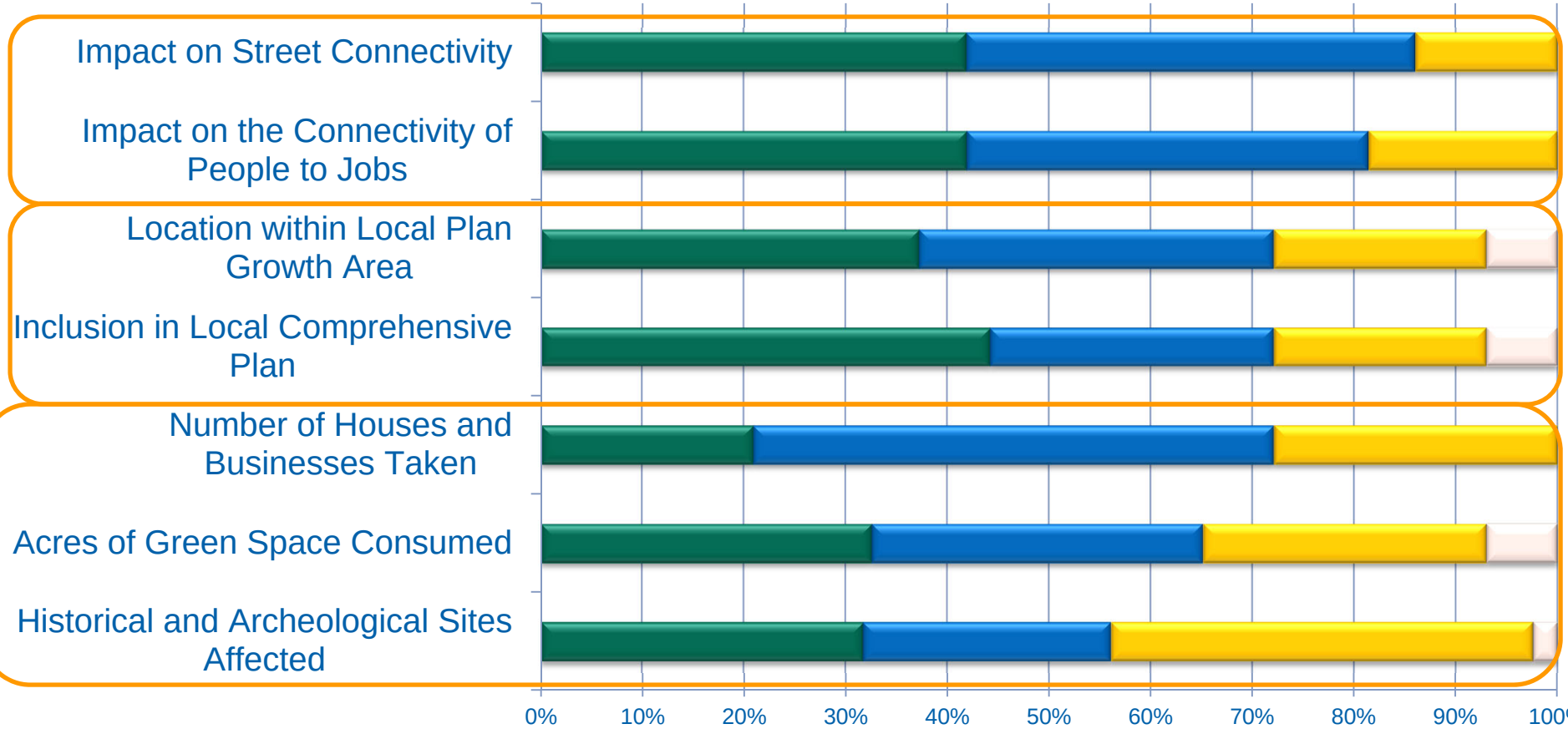
Stakeholder Group Survey



Performance Measures

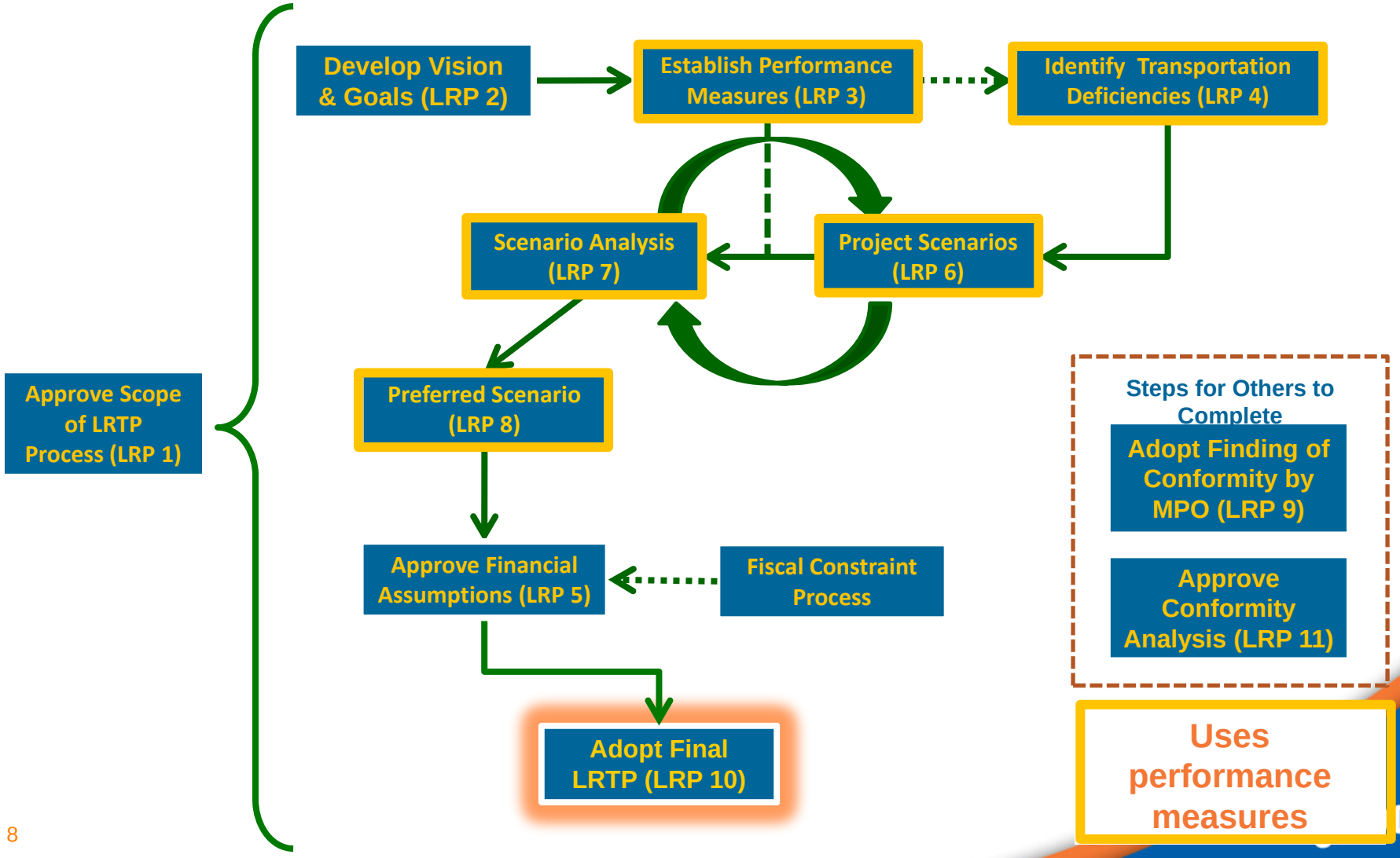
Charlottesville/Albemarle MPO
Long Range Transportation Plan

Land Use Performance Measures



TCAPP Process

Charlottesville/Albemarle MPO
Long Range Transportation Plan



Next Steps

Charlottesville/Albemarle MPO
Long Range Transportation Plan

Final Survey Implementation

Survey 2: determine whether measures impact decision-making.

Scenario Questions

Assess the scenario structure for how it could have been made more accessible.

Measures' Influence on Decisions

Assess the degree to which the most important measures would have to change to affect a decision.

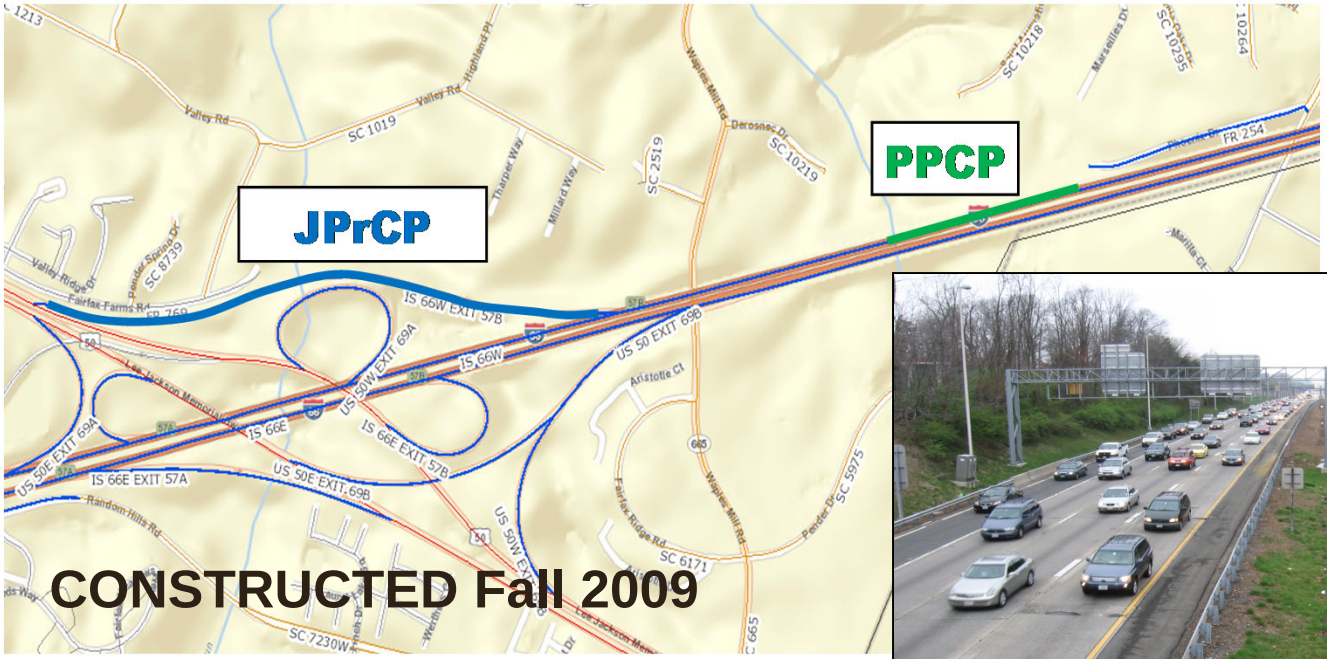
Final Steps

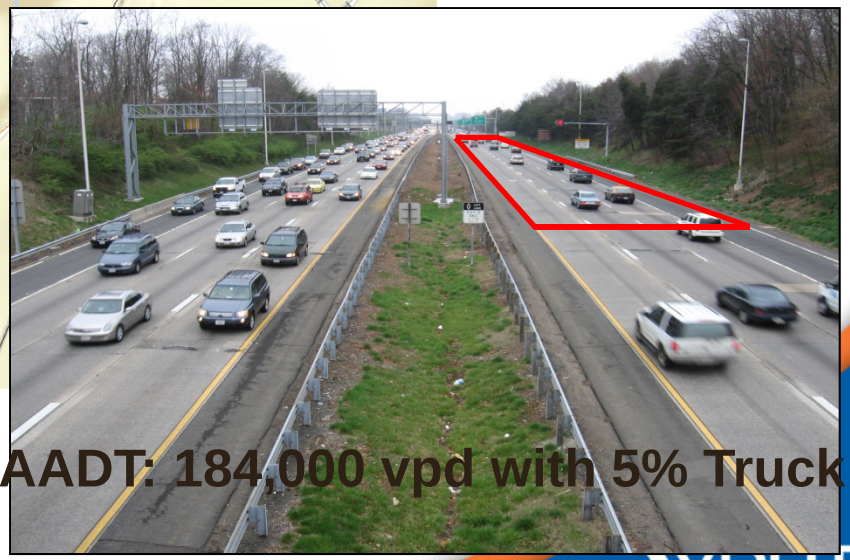
Draft report due in March will include:

1. The most important measures.
2. The influence of these measures.

Precast Pavements in Virginia

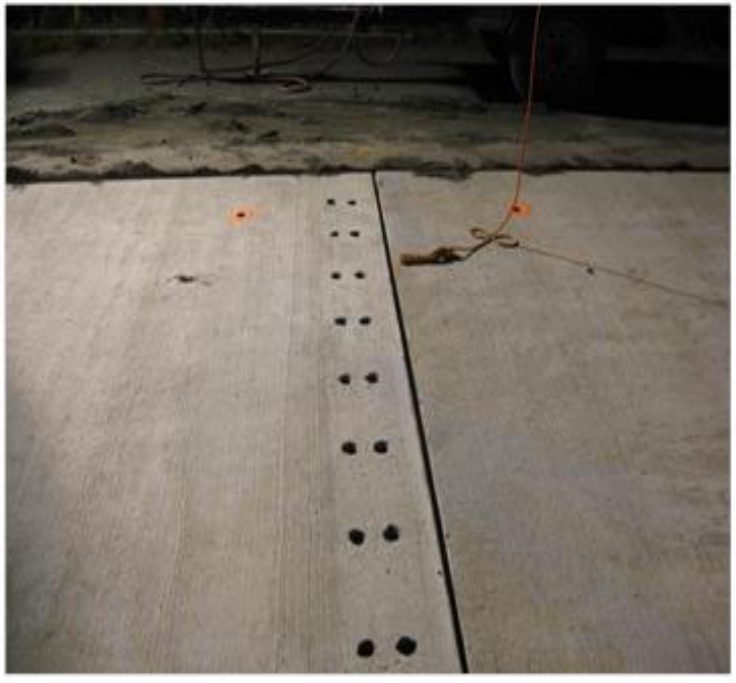
VDOT successfully implemented precast technology on I-66 near Washington DC





Jointed Precast Concrete Pavement

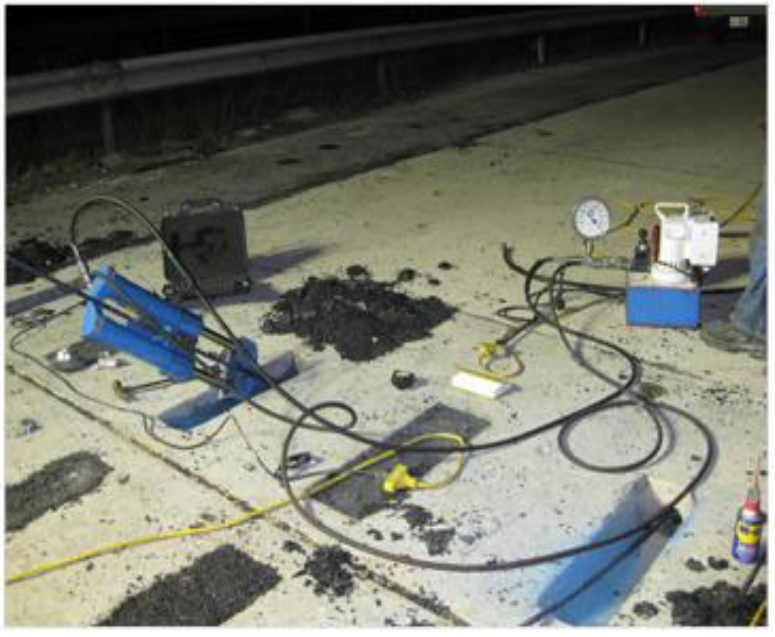
- Exit 57B ramp, I-66W to US50W (Right lane 3550 ft)
- Similar to JRCP – doweled 10-16 ft panels



Prestressed Precast Concrete Pavement

I-66W between exists 57 & 60; 4 lanes 1020 ft

Similar to CRCP – 160 ft with expansion joints



Precast Pavements in Virginia

Needs special attention to details:

- Base preparation
- Placement and matching of slabs
- Grouting operation
- Alignment of post-tensioning ducts
- Ways to avoid corner cracks and edge spalling during installation
- Tying together adjacent lanes
- Securing post-tensioning strands
- Precast fabrication QC/QA
- Expansion joint details

Precast Pavements in Virginia

- Cast off site to ensure quality & durability
- Accelerated construction
  - Possible with night only lane closures
  - Minimizes congestion
- Satisfactory constructability
- Off-site trial was helpful to resolve challenges
- After 4 years of traffic performing satisfactorily
  - Some deterioration of expansion joint
  - Minor cracks near lifting hook, grout holes and post-tensioning block outs.

Future Plan

- **Precast panels are an allowed option for repair and construction in VDOT.**
- **Contractor indicated willingness to use these systems again.**
- **Future projects with these systems are expected.**

SHRP 2 R-07:Performance Specifications for Rapid Renewal

- VCTIR was a subcontractor to TDC Partners, LTD and Trauner Consulting Services.
- Our focus – performance specifications for bridges.
- Deliverables/activities:
  - Literature review & annotated bibliography
  - Draft specification for concrete bridges.
  - Demonstration project testing the developed specification in a bridge deck.

VDOT and Performance Specifications

For decades the VDOT has explored development and application of performance specifications for concrete and asphalt.

End Result Specification for concrete bridges and pavements has been used in pilot projects.

Item	Current Method	End Result Specification (ERS)
Mix Design	Prescriptive	Performance measures
Testing	VDOT	Contractor and VDOT
Basis of Pay	Minimum	PWL (percent within limits)

VDOT End Results Specifications

Hardened concrete parameters

- Compressive strength
- Permeability

Includes

- Prequalification, QC Plan by the Contractor (preconstruction and during construction)
- Mix design approval
- Acceptance

SHRP 2-07/VDOT

Includes additional parameters for bridge decks

- Cracking (pass/fail)
- Cover Depth
- Deck Thickness
- Air Content
- Compressive Strength
- Permeability

Lake Anna Bridge on Route 208

SHRP2 R07/VDOT demonstration project

Overview

13 spans

2 lanes, Eastbound & Westbound

930’ in length

Westbound lane replaced 1st

Conventionally Reinforced Concrete

Pay Factors

- **VDOT Pay Factor = 82 + 0.2 (PWL)**
- **SHRP 2 Pay Factor**

Percent Within Limits (PWL)	Pay Factor
91-100	[0.006 * (PWL - 90)]
85-90	0.0
55-84	-0.9 + 0.01 * PWL

Lake Anna Bridge Summary

- Results for the most part are very good
- Variability of the product determined and pay factors applied.

Parameter	Pay Factor	
Cover Depth	98.08 (89.85)	
Deck Thickness	87.30 (50.00)	
	Before Pumping	After Pumping
Compressive Strength	102.00 (106.00)	102.00 (106.00)
Permeability	102.00 (106.00)	102.00 (106.00)
Air Content	100.30 (101.32)	95.02 (80.07)
Average PF	99.94 (90.63)	96.88 (86.38)

VDOT (SHRP 2) Pay Factors

FUTURE

- VDOT plans to include ERS in future projects.
- The mix design portion (responsibility lies with the contractor) has been included in the VDOT Road and Bridge Specifications as an option.
- SHRP 2 parameters will be considered for future projects.

For More Information

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