TRANSPORTATION RESEARCH BOARD

How Performance and Data Informs Transportation Decision Making

July 21, 2020

@NASEMTRB #TRBwebinar

PDH Certification Information:

- •1.5 Professional Development Hour (PDH) – see follow-up email for instructions
- You must attend the entire webinar to be eligible to receive PDH credits
- Questions? Contact ReggieGillum at RGillum@nas.edu

The Transportation Research Board has met the standards and requirements of the Registered **Continuing Education Providers** Program. Credit earned on completion of this program will be reported to RCEP. A certificate of completion will be issued to participants that have registered and attended the entire session. As such, it does not include content that may be deemed or construed to be an approval or endorsement by RCEP.



REGISTERED CONTINUING EDUCATION PROGRAM

#TRBwebinar

Learning Objectives

- Identify considerations for project selections based on travel mode
- 2. Discuss data considerations and solutions
- 3. List communications strategies to leverage public involvement in decision making

#TRBwebinar

Performance and Data in Transportation Decision-Making

Today's Roadmap

- 1. Introduction to e-Circular
- 2. Multimodal Planning
- 3. Performance and Data
- 4. Programming and Investment Prioritization
- 5. Communications and Stakeholder Engagement
- 6. Key Takeaways and Opportunities to Advance the Practice
- 7. Q & A session

Introduction to e-Circular

TRB Conference – Atlanta, September 15-18, 2019

TRB [former] Committees (7):

- Statewide Multimodal Planning
- Metropolitan Policy, Planning, and Processes
- Programming and Investment Decision-Making
- Data for Decisions and Performance Measures
- Performance Management
- Transportation Asset Management
- Transit Management and Performance

Co-sponsored by:

- Federal Highway Administration (critical sponsorship for e-circular)
- American Association of State Highway and Transportation Officials
- Association of Metropolitan Planning Organizations

Introduction to e-Circular

Planning Committee

- Bob Hazlett, Maricopa Association of Governments, Co-Chair
- David Wasserman, North Carolina Department of Transportation, Co-Chair
- Claudia Bilotto, WSP
- Jerri Bohard, Oregon Department of Transportation
- Matt Carpenter, Sacramento Area Council of Governments
- Matt Hardy, American Association of State Highway and Transportation Officials
- Trish Hendren, I-95 Corridor Coalition
- Jordan Holt, Washington Metropolitan Area Transit Authority
- Bill Keyrouze, Association of Metropolitan Planning Organizations
- Harlan Miller, Federal Highway Administration
- James Mitchell, Louisiana Department of Transportation and Development
- Jon Schermann, Metropolitan Washington Council of Governments
- Joe Schofer, Northwestern University
- Tracy Selin, Cambridge Systematics
- Hannah Twaddell, ICF
- Amy Van Doren, Marin Transit
- Dwayne Weeks, Federal Transit Administration
- Penelope Weinberger, American Association of State Highway and Transportation Officials
- Jennifer Weeks, Transportation Research Board

Introduction to e-Circular

4 Tracks

- Multimodal Planning Jerri Bohard, Oregon DOT
- 2. Performance and Data Jordan Holt, WMATA
- Programming and Investment Prioritization David Wasserman, NCDOT
- 4. Communications and Stakeholder Engagement Hannah Twaddell, ICF

Key links:

E-circular website - http://onlinepubs.trb.org/onlinepubs/circulars/ec263.pdf

Conference program and powerpoint slides - http://onlinepubs.trb.org/onlinepubs/Conferences/2019/PerformanceDat-a/program.pdf

Performance and Data in Transportation Decision Making

Multimodal Planning

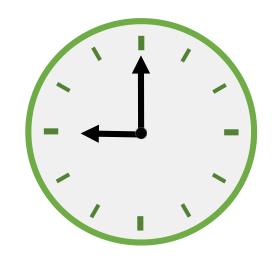
Jerri Bohard
Oregon Department of Transportation

Multimodal Planning Take Aways

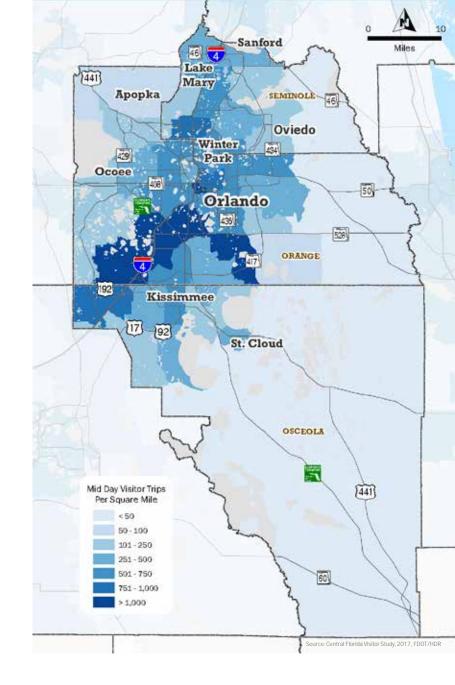
- Data, Data, Data
- From Data to Information
- From Information to Decision Making
- It Depends on Partnerships

^{*}Source and location within the agenda

Visitor Travel Patterns



Mid-Day 9:00 AM – 3:00 PM

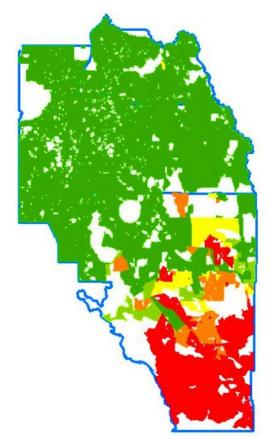


Measuring Accessibility

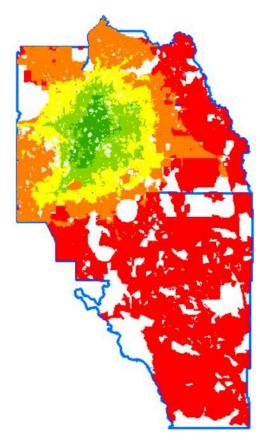
Analysis & Visualization ToolsESRI ArcGIS | Citilabs Sugar Access

Sources of DataStreetlight | Google Maps API |

Citilabs Default Decay Curves

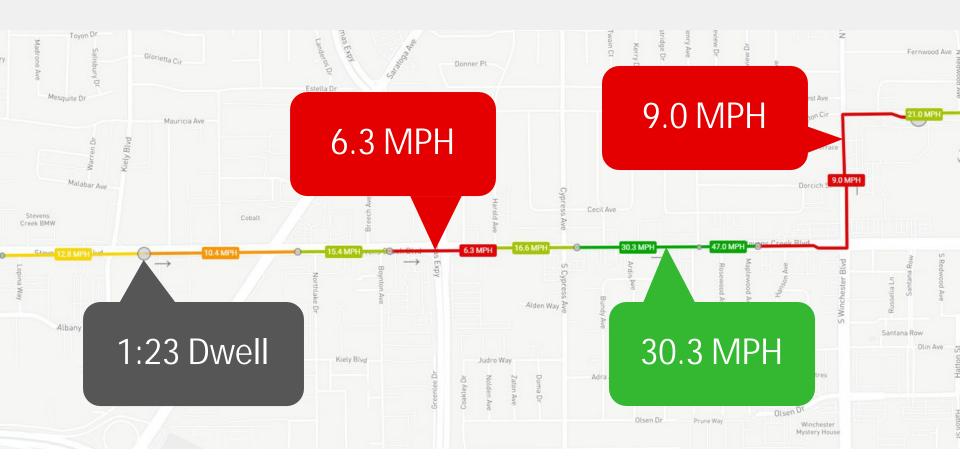


Without Auto Travel Decay Curve

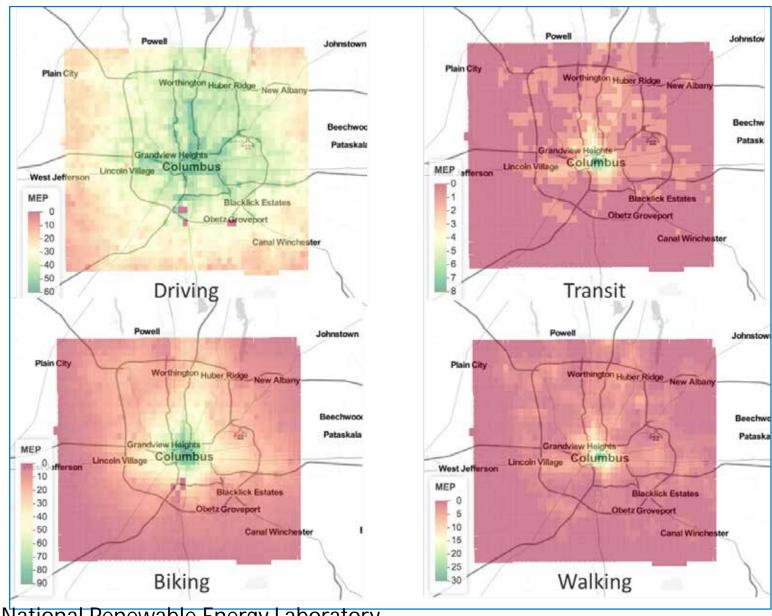


With
Auto Travel Decay Curve*

WE CAN NOW QUANTIFY DELAY



MEP Maps by Mode - Columbus

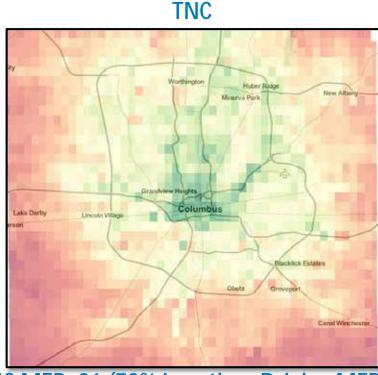


Source = National Renewable Energy Laboratory

TNC Isochrones

Driving Lake Darby Carsal Winchester

Driving MEP: 126



TNC MEP: 36 (73% Less than Driving MEP)

Caveat: The TNC MEP computation does not account for any secondary effects of TNCs such as increased energy (due to deadheading), cost, or congestion effects.

Example Output: Supply Chain Performance by Stage

Sector: Home Improvement

Multimodal

Avg. Adjusted Path Miles

Avg. 2017.4 Total Cost per Unit

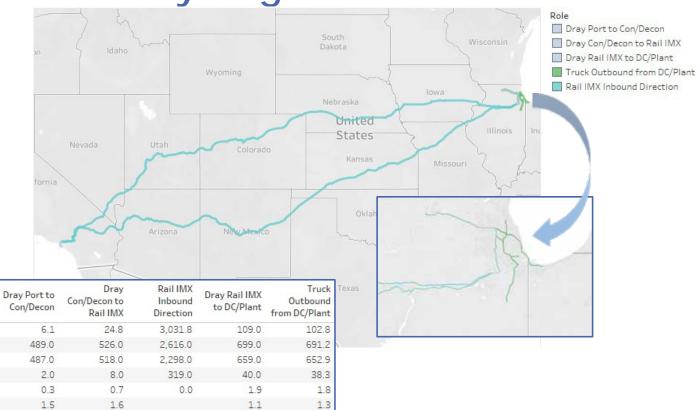
Avg. 2017.4 Fuel Cost per Unit

Avg. 2017.4 Linehaul Cost per Unit

Avg. 2017.4 Mean or 50% Travel Time (hrs)

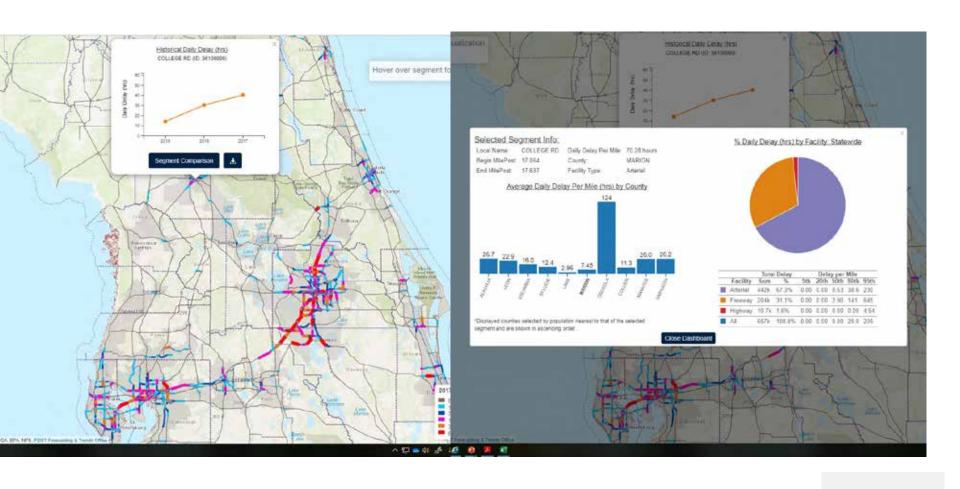
Avg. 2017.4 Cross Modal Reliability Ratio

- 5 stages from port to retail outlet
- Alternate rail routes
- Substantial drayage expense

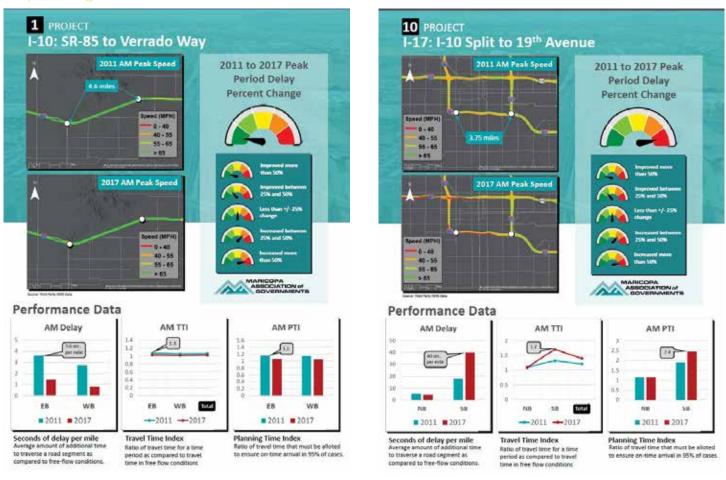


www.i95coalition.org

Digital Source Book



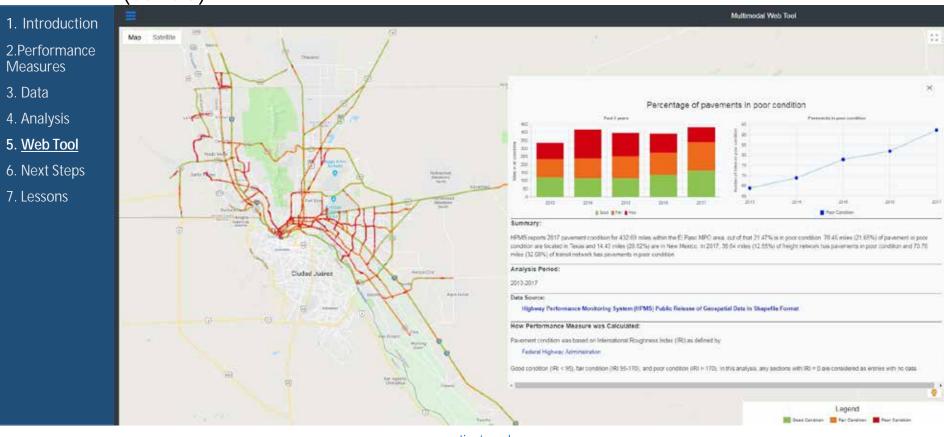
Reporting



Source = Maricopa Association of Governments 1A

5. Web Tool

(cont'd)

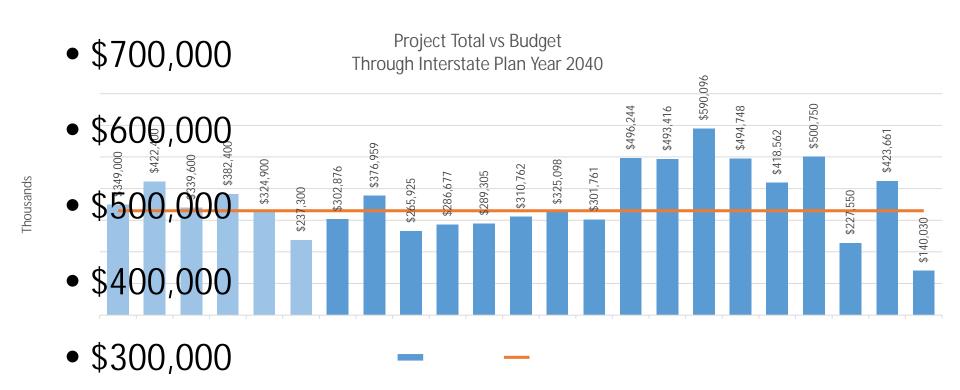


www.ctis.utep.edu

STATEWIDE TARGETS

Priority		Target			
	Safety	fatalities and serious injuries			
# 'H	Infrastructure	60% of interstate pavement in good condition 40% of non-interstate NHS pavement in good condition 50% of NHS bridges in good condition			
	Mobility	75% travel time reliability on Interstates 50% travel time reliability on other NHS roadways			

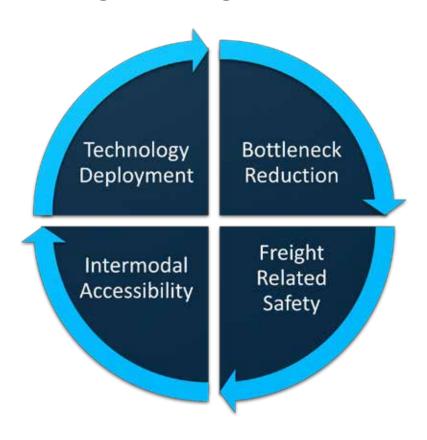
Current Status



• \$200,000

Source = Iowa DOT 1A

Freight Program Goals









A \$19.5 Million Interstate 57 reconstruction project was passed over for:

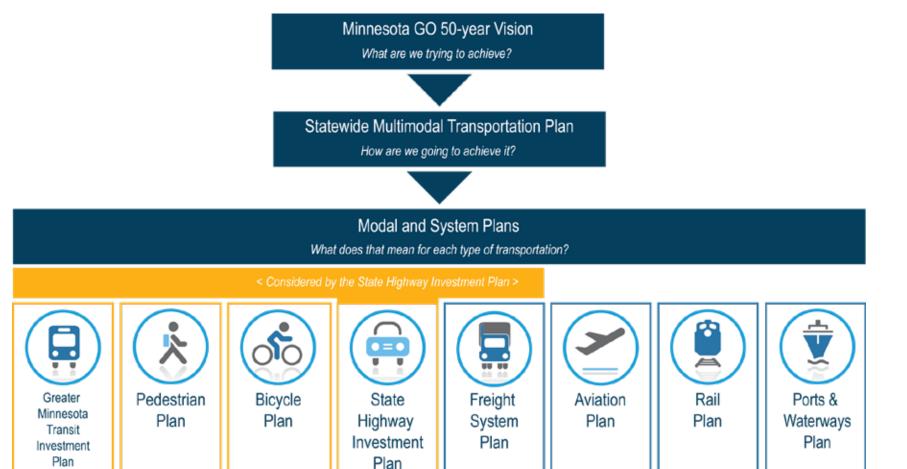
- 2 interchange phase I studies
- Truck parking expansions at two IDOT rest areas (24 spaces)
- Reconstruct Cargill Elevator Road in Cahokia
- Install .6 miles of new RR track avoids 4 at-grade crossings of State Route
- Reconstruct Front Street in Pekin access to Marine Port
- New access road and dock at America's Central Port
- \$1m for truck parking information system (Statewide)

\$24m vs \$19.5m (+23%) plus over \$3m from locals.

6 happy partners

	July 31, 2019
PENNSYLVANIA 2021 TRANSPORTATION PROGRAM FINANCIAL GUIDANCE	
INTRODUCTION	
1021 TRANSPORTATION PROGRAM UPDATE	
FUNDING Highway and Bridge Funding Distribution	- 2
Public Transit Funding Distribution	
•	
APPENDICIES	
Appendix 1: Available Funds – Highway and Bridge Appendix 2: Highway and Bridge Base Funding Allocations for Each Region.	10
Appendix 2: Enginesy and Dridge Date Funding Associations for Each Region. Appendix 3: Rapid Bridge Replacement Program.	26
Appendix 4: Asset Management Factor	28
Appendix 5: 2021 Financial Guidance Formula Summary	30
Amendix 6: State Transit Funding	31
Appendix 7: Federal Transit Funding	36
Appendix 8: Federal and State Transit Funding by Region.	41

- Formulas unchanged for first and second year (FFY 2021 & 2022)
- New Formulas for remaining 10 years



< Considered by the Freight System Plan >

MnDOT's Family of Plans

Project Selection Committee Decision Making

Projects	Criteria 1	Criteria 2	Criteria 3
 Pretty bad project 	Unacceptable	N/A	Acceptable
üPretty good project	Excellent	Good	Acceptable
 Average project 	N/A	Acceptable	Good
üGreat project	Excellent	Excellent	N/A
 Awful project 	Unacceptable	Acceptable	Unacceptable
 Average project 	Acceptable	Good	N/A
Average project	N/A	Acceptable	Acceptable

Lessons

- The process may be fair
- The process may be accurate
- The process may be true to the data

 It doesn't matter if the process doesn't produce the outcomes stakeholders expect

3 easy steps

- 1. Ask who is willing to go on the journey with us
- 2. Establish the ground rules for traveling together
- 3. Go on the journey







Performance and Data in Transportation Decision Making

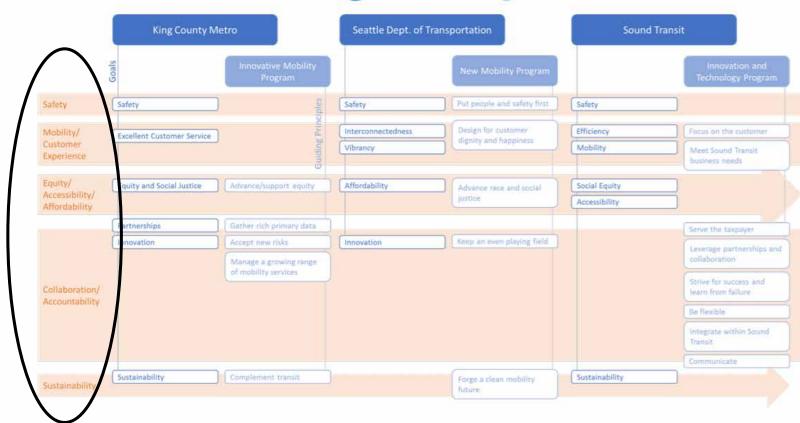
Performance and Data

Jordan Holt Washington Metropolitan Area Transit Authority

Track B

- Shared performance measures to drive common outcomes: 2 examples
- Business Intelligence to inform decision-making: 3 approaches
- Data governance: Chief Data Officers share different models
- Transportation (data) as a Service?

Goals and Guiding Principles continued...



Pilot Evaluation Scorecard

Updated May 2019
Date of review: Name of reviewer:

Goals and (



What are you working towards?	What are you measuring?	What does success look tike?		
Goal area	Performance metric	Intended directionality	Target for this pilot	lo
Safety	Number of serious incidents (deaths or serious injuries) Total and per 1000 service miles	Zero		inue
	Number of minor incidents Total and per 1000 service miles	Low		
	Conflicts between vehicles and other road users Observed rate per 100 loads/unloads	Low		
	Perceived safety/security Average user rating out of 5	High		Innovation and Technology Program
Mobility	Total users Number of unique users served by the pilot	High		
	Total trips Number of trips completed in the pilot	High		
	Reliability of service Percentage of trips completed within 5 minutes of time estimate	High		eet Sound Transit
	Trip request fulfillment time [Minutes]	Low		
	Average travel time [Minutes]	Low		
s and	First/last-mile connectivity Percentage of trips provided to/from transit stations	High		rve the taxpayer
Custamer Experience	Average distance to pick-up/drop-off point [Feet]	Moderately low		werage partnerships and
Custamer Experience	Customer satisfaction Average user rating out of 5	High		rive for success and
	Ride completion rate % of trips completed	High		arn from failure
	Marketing Total number of service sign-ups or app downloads	High		flexible
	Active users Percent of all users who have used the service at least once in the last three months	High		ansit immunicate
Accessibility	Physical accessibility Percentage of vehicles/infrastructure that are wheelchair-accessible	High		
	Average request fulfilment time For users requiring wheelchair-accessible vehicle	Low		
	Digital accessibility Service availability for users without smartphones and/ or data plans	High/Yes		
	Financial accessibility Service availability for users without credit/debit cards	High/Yes		T
	Language accessibility Service and information offered in languages spoken by user population	High/Yes		

PERFORMANCE-BASED FUNDING ALLOCATION Performance Lane Miles Funding Allocation Formula

KPI: PAVEMENT PRESERVATION INDEX

What is the effort toward pavement preservation?

PPI = Actual PM % / Recommended PM %

Jurisdiction	Network PCI	\$PM/ Lane Mile	Actual PM%	Recom'd PM%	Pavement Preservation Index
Regional Benchmark	68	\$1,336	17%	16%	1.06
ALAMEDA	66	\$1,271	13%	15%	0.88
ALAMEDA COUNTY	71	\$ 671	18%	28%	0.67
ALBANY	58	\$1,247	10%	13%	0.78
BERKELEY	58	\$ 263	2%	11%	0.20
DUBLIN	87	\$3,124	50%	79%	0.62
EMERYVILLE	75	\$ 48	100%	35%	2.87
FREMONT	63	\$5,140	43%	16%	2.76
	Regional Benchmark ALAMEDA ALAMEDA COUNTY ALBANY BERKELEY DUBLIN EMERYVILLE	Regional Benchmark 68 ALAMEDA 66 ALAMEDA COUNTY 71 ALBANY 58 BERKELEY 58 DUBLIN 87 EMERYVILLE 75	Regional Benchmark 68 \$1,336 ALAMEDA 66 \$1,271 ALAMEDA COUNTY 71 \$ 671 ALBANY 58 \$1,247 BERKELEY 58 \$ 263 DUBLIN 87 \$3,124 EMERYVILLE 75 \$ 48	Regional Benchmark 68 \$1,336 17% ALAMEDA 66 \$1,271 13% ALAMEDA COUNTY 71 \$ 671 18% ALBANY 58 \$1,247 10% BERKELEY 58 \$ 263 2% DUBLIN 87 \$3,124 50% EMERYVILLE 75 \$ 48 100%	Regional Benchmark 68 \$1,336 17% 16% ALAMEDA 66 \$1,271 13% 15% ALAMEDA COUNTY 71 \$671 18% 28% ALBANY 58 \$1,247 10% 13% BERKELEY 58 \$263 2% 11% DUBLIN 87 \$3,124 50% 79% EMERYVILLE 75 \$48 100% 35%

KPI: ASSET SUSTAINABILITY INDEX

Is the pavement asset sustainable?

ASI = Actual M&R / Annualized 10-Year Needs

County	Jurisdiction	Network PCI	Actual M&R /Lane Mile	Needs /Lane Mile	Asset Sustainability Index
	Regional Benchmark	68	\$10,400	\$27,000	39%
	ALAMEDA	66	\$9,800	\$26,900	36%
	ALAMEDA COUNTY	71	\$3,600	\$16,200	22%
	ALBANY	58	\$12,700	\$29,800	43%
	BERKELEY	58	\$11,600	\$32,400	36%
	DUBLIN	87	\$6,300	\$5,600	113%
	EMERYVILLE	75	\$0	\$16,100	0%
	EREMONT	63	\$11 900	\$29 100	/11%

KPI: BACKLOG OVER ASSET VALUE

How much effort is needed to reach the state of good repair?

Backlog over Asset Value =

Current Backlog

Network Asset Value

County	Jurisdiction	Network PCI	Current Backlog (millions)	Network Asset Value (millions)	Backlog/ Asset Value
	Regional Benchmark	68	\$5,645	\$38,814	15%
Alameda	ALAMEDA	66	\$32	\$229	14%
	ALAMEDA COUNTY	71	\$55	\$647	8%
	ALBANY	58	\$9	\$41	22%
	BERKELEY	58	\$77	\$298	26%
	DUBLIN	87	\$4	\$180	2%
	EMERYVILLE	75	\$3	\$37	7%
	FREMONT	63	\$131	\$805	16%

DEFINING BUSINESS INTELLIGENCE?

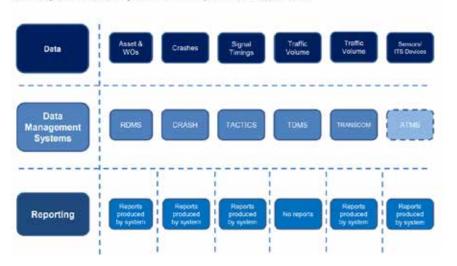
Technologies, applications, and practices for the collection, integration, analysis, and presentation of business information and data



Gen 1

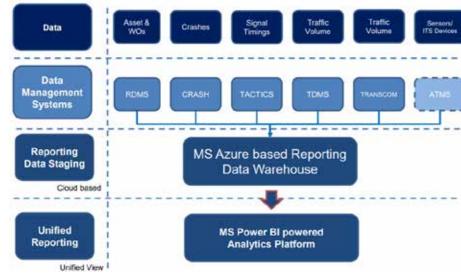
PA Traffic Reporting - Current

Currently, each functional system/data source produces its report in silo.



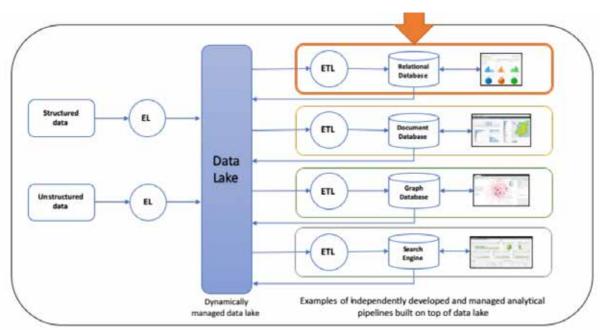
Gen 2 PA Traffic - Future

Our goal is to move to a centralized data warehouse and visualization window into the data.



Gen 3

Modern



BI Practices "In a Nutshell"

Good Practices

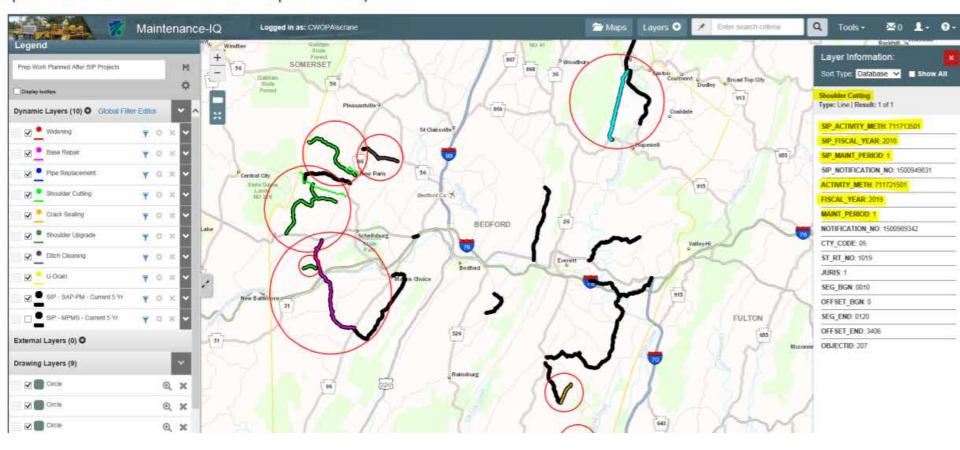
- √ Identify the business need
- ✓ Obtain executive support
- √ Identify data sources
- √ Utilize proper training
- Make use of data visualizations
- ✓ Encourage experimentation
- ✓ Invest in research
- Measure success through multiple perspectives

Practices to Avoid

- X Choose BI tools before knowing needs
- × Promise everything on day 1
- Immediately provide overbroad access to all BI tools
- Make it perfect and done
- x Measure too many metrics
- Put security considerations on the back burner

Out of Sequence Work

The below GIS system map allows managers to visualize the prep work activities planned after surface improvement projects (paving). It is a proactive map that helps to eliminate out-of-sequence rework (i.e., prep-type activities performed soon after a surface improvement).



NDOT Cable Median Barrier (CMB) Sensitivity Analysis

This app provides interactive sensitivity analysis of the benefit/cost ratio of installing cable median barrier on the Nebraska sections of I-80 with open medians. Two models are available to predict the frequency of future crossover median crashes (CMC): the 'NDOT Zero Inflated Negative Binomial model' which is fit from NDOT's observed CMC history on I-80 based on VMT and median width, and the 'Sicking' model from Dean Sicking's 2009 pooled fund research.



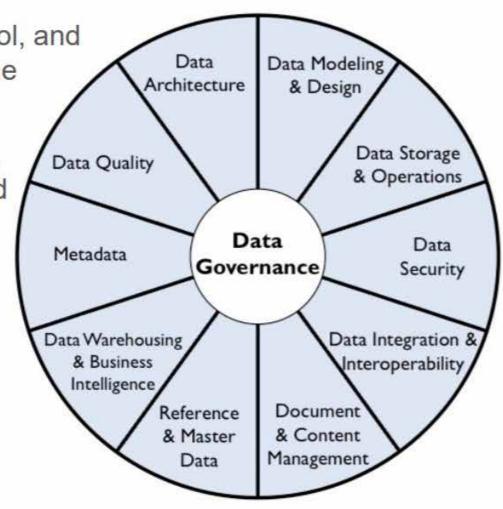
I-80 Benefit / Cost Ratio of CMB Installation Rapid City* B/C Ratio + CMCs (2013 - 2018) Sioux Falls* IOWA NEBRASKA Det Moines» ramie* Cheyenne* UNITED STATES DENVER-OF AMERICA OLORADO KANSAS Leaflet | OpenStreetMap O CartoDB Benefit / Cost Ratio by Traffic Volume, Median Width Per One-mile Section of I-80

What is Data Governance

 The exercise of authority, control, and shared decision making over the management of data assets.

 Ensures data meets standards, business rules, regulations, and organizational needs.

 It is a process, not a project, rooted in people, processes, and technology.



Copyright[©] 2017 DAMA International

Takeaways

- Look for incremental, high value, and quick wins
- Don't boil the ocean (prioritize effort)
- Use existing requirements to set urgency
- Provide constant support

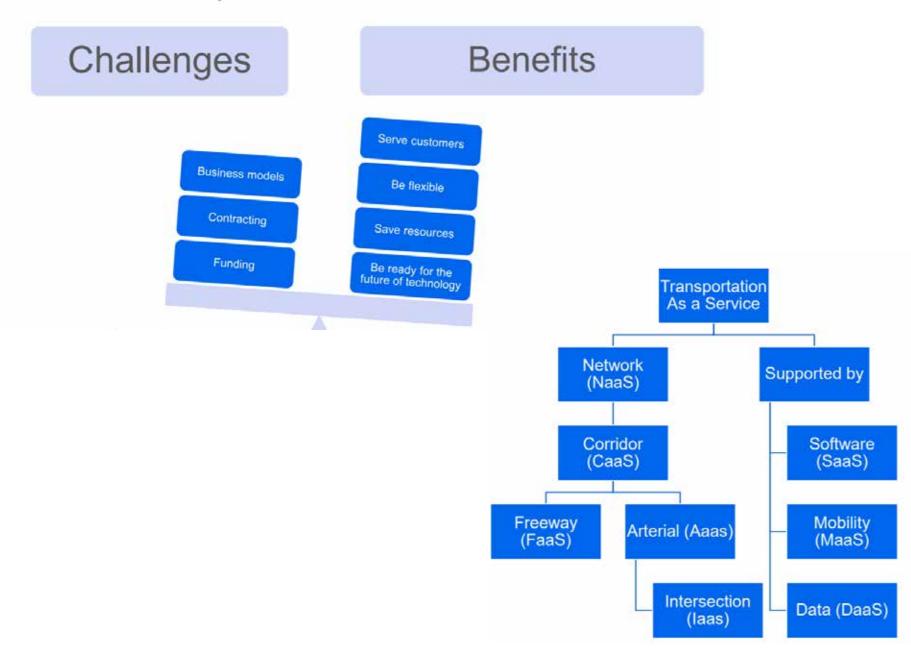
Takeaways

- Executive support
- Constant communication
- Dedicated resources
- Keep it simple
- Don't let perfection get in the way of the good



- **LiDAR data** Ver large, difficult to analyze
- (classification), difficult to render, legal
- **Crowdsourced data** very large and fast changing, difficult to analyze (text, image, video), legal issues, quality and veracity
- **Internet of Things data** Very large and fast changing, quality and veracity, legal issues
- **CAV data** very large and fast changing, proprietary, lack of control and transparency, legal issues

XaaS for Transportation



Performance and Data in Transportation Decision Making

Programming and Investment Prioritization

David Wasserman

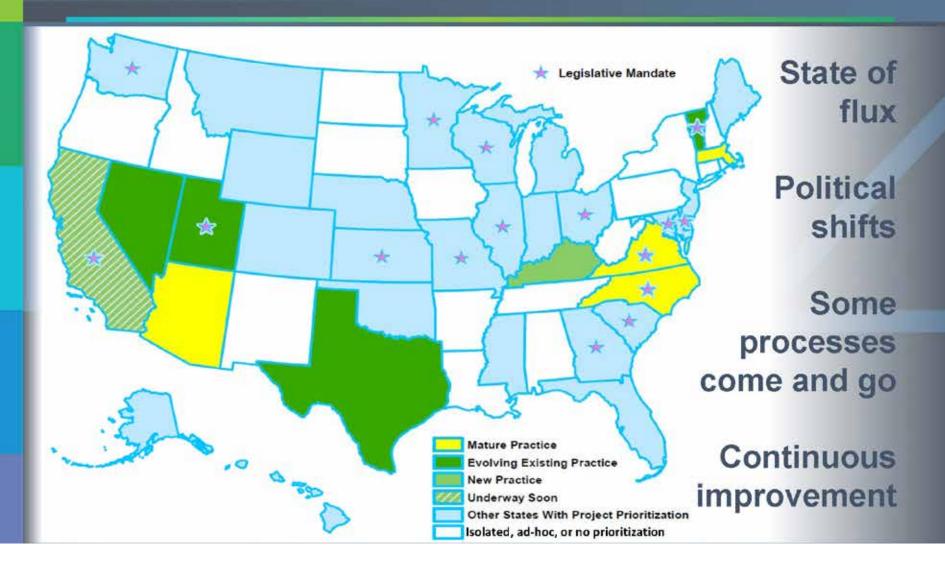
North Carolina Department of Transportation

Track C

- Peer Exchange
- Many different agencies speakers
- Organizations have a variety of experience

State of the Nation / Balancing Data-Driven Decision-Making with Political Reality

State of the Nation



How STI Works

40% of Funds

30% of Funds

30% of Funds

Estimated \$25B in Funds for SFY 2020-2029

Statewide Mobility

Focus → Address
Significant Congestion
and Bottlenecks

- Selection based on 100% Data
- Projects Programmed prior to Local Input Ranking

Regional Impact

Focus → Improve Connectivity within Regions

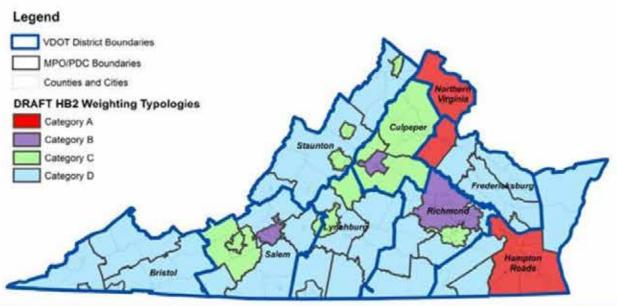
- Selection based on 70% Data & 30% Local Input
- Funding based on population within Region (7)

Division Needs

Focus → Address Local Needs

- Selection based on 50%
 Data & 50% Local Input
- Funding based on equal share for each Division (14)

Area Type Weighting



Factor	Congestion Mitigation	Economic Development	Accessibility	Safety	Environmental Quality	Land Use
Category A	45%	5%	15%	5%	10%	20%
Category B	15%	20%	25%	20%	10%	10%
Category C	15%	25%	25%	25%	10%	
Category D	10%	35%	15%	30%	10%	

P2P Overview

Pavement Preservation

Funding: \$260M / year

Scoring: Technical = 35%

District = 30%

Safety = 25%

Policy = 10%

Bridge Preservation

Funding: \$60M / year

Scoring: Technical & Safety = 60%

District = 30%

Policy = 10%

Modernization

Funding: \$91M / year

Scoring: Technical = 35%

District = 30%

Safety = 25%

Policy = 10%

Expansion

Funding: \$0M / year

Scoring: Technical = 50%

District = 25%

Safety = 15%

Policy = 10%

Data-driven Project Selection Across the States

SHIFT 2020 Benefits

Data-Driven

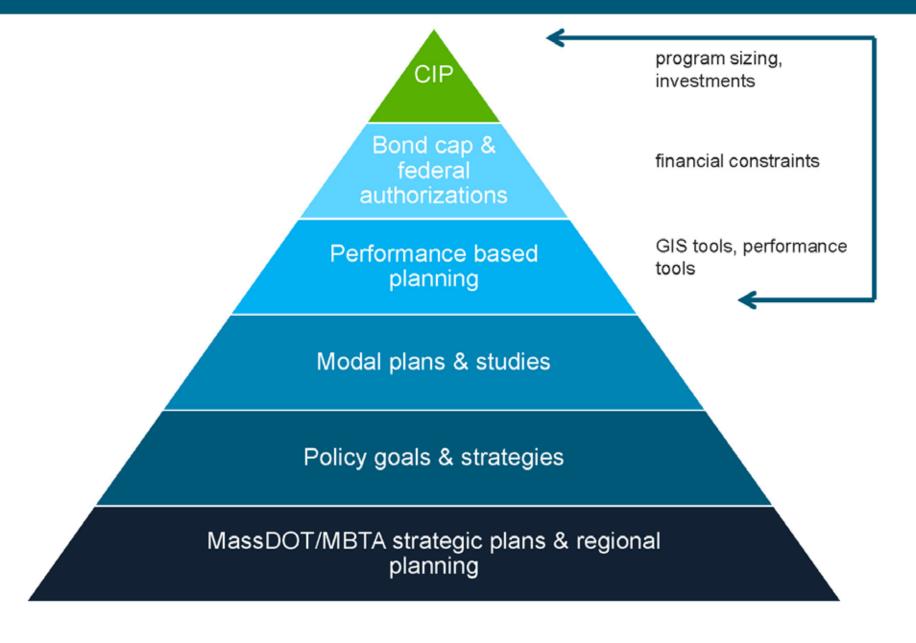
Objective

Transparent

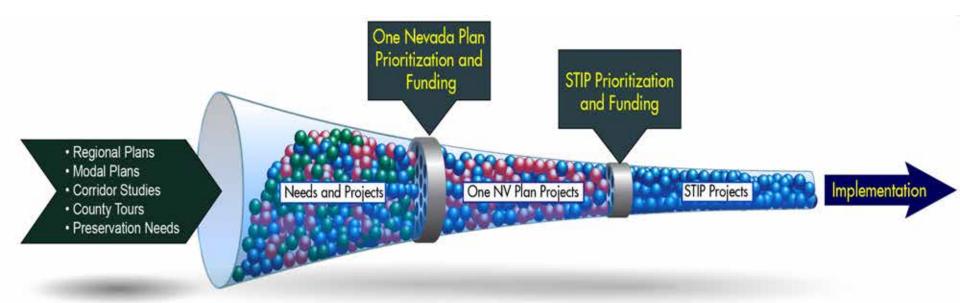
Collaborative

Dependable

The *massDOT* planning pyramid



The OneNV Plan Process



From prioritization by allocation to allocation by performance based prioritization

Process Automation for Corridor Prioritization

TxDOT Data



Raw Input

Criteria	Performance Measure	Raw Value
	Pavement	
-1	Pavement Condition Score	89.8
2	% Pavement with Pavement Condition Score < 60	5.7%
	Bridge	
3	Bridge Sufficiency Score	92.8
4	% Deck Area on Bridges with Suff Rating < 60	0.0%
	Safety	
5	K&A crash rate for entire corridor	3.5
6	Total crash rate for entire corridor	55.3
	Congestion	
7	% Count Stations with Existing V/C > 0.80	0.0%
8	% Count Stations with Future V/C > 0.80	18.5%
9	Texas Transp Institute hot spot list for all	0.0%
10	Texas Transp Institute hot spot list for trucks	0.0%
	Economic Development	
11	Daily Freight Volumes	9,300
12	Commodity Flow	142M
13	Existing employment	157
14	Existing population	349
15	Projected annual traffic growth rate	3.8%
16	% of Privately held land	99.2%
	Connectivity	
17	Provides access to existing multi-modal facilities or major traffic generators	0.44
18	Part of hurricane evacuation route	100%
19	Part of National Freight Network or TxDOT Primary Freight Network	100%

Data Extraction Tool

Score

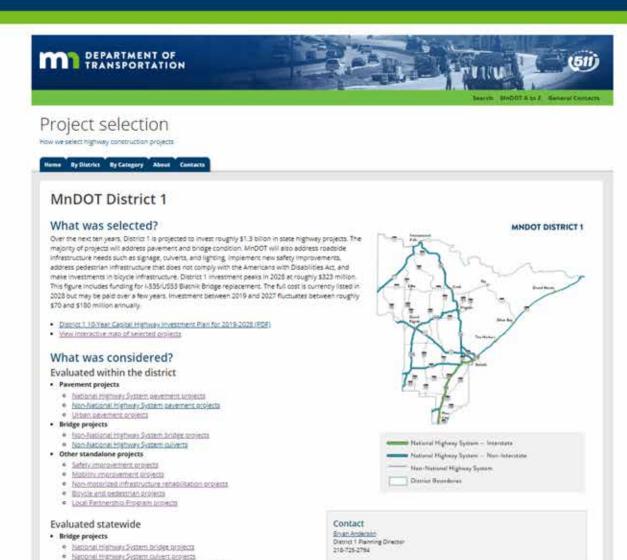
Criteria	Performance Measure	Score
	Pavement	
1	Pavement Condition Score	5.1
2	% Pavement with Pavement Condition Score < 60	5.7
	Bridge	
3	Bridge Sufficiency Score	1.0
4	% Deck Area on Bridges with Suff Rating < 60	0.0
	Safety	
5	K&A crash rate for entire corridor	3.9
6	Total crash rate for entire corridor	1.3
	Congestion	
7	% Count Stations with Existing V/C > 0.80	0.0
8	% Count Stations with Future V/C > 0.80	2.3
9	Texas Transp Institute hot spot list for all	0.0
10	Texas Transp Institute hot spot list for trucks	0.0
	Economic Development	
11	Daily Freight Volumes	4.8
12	Commodity Flow	4.3
13	Existing employment	5.2
14	Existing population	5.6
15	Projected annual traffic growth rate	6.3
16	% of Privately held land	9.2
	Connectivity	
17	Provides access to existing multi-modal facilities or major traffic generators	2.5
18	Part of hurricane evacuation route	10.0
19	Part of National Freight Network or TxDOT Primary Freight Network	10.0
20	Part of Energy Sector Route	9.6

Corridor Prioritization Tool (CPT)

Website

Multiple ways to navigate to a project list

- By type of project
- By district



Bridge projects over state highways carrying railroads

Mode-Neutral Project Evaluation

Project Evaluation Across Modes

Benefits	Challenges	Requires
 Provides decision-makers the information to better optimize project selection and funding. 	 Different modes have different purposes and benefits – apples to oranges comparison Stakeholder engagement to understand the process can be time consuming and costly 	 Engaged leadership Common goals Diversity of thought at the table Communication across all levels within agency Improved communication tools Common and meaningful language
Allows decision-makers to evaluate the transportation network as a system, instead of by individual modes.	Political realities and funding availability and requirements may not align with results	 Keep performance evaluation funding agnostic Manage expectations around needed projects Focus on outcomes Agile funding strategies
 Provides a data-driven mechanism to determine the greatest needs, irrespective of mode 	 Limited mode-neutral measures Limited common data exists between and across modes Lack of robust data management/governance processes 	 Creative evaluation processes Elevating data management as a part of the process Better predictive tools

"Community to Region" Performance Framework



INVESTMENT NEEDS THAT SUPPORT

- Local, multimodal connections and access to community resources
- Advance livability and quality of life principles

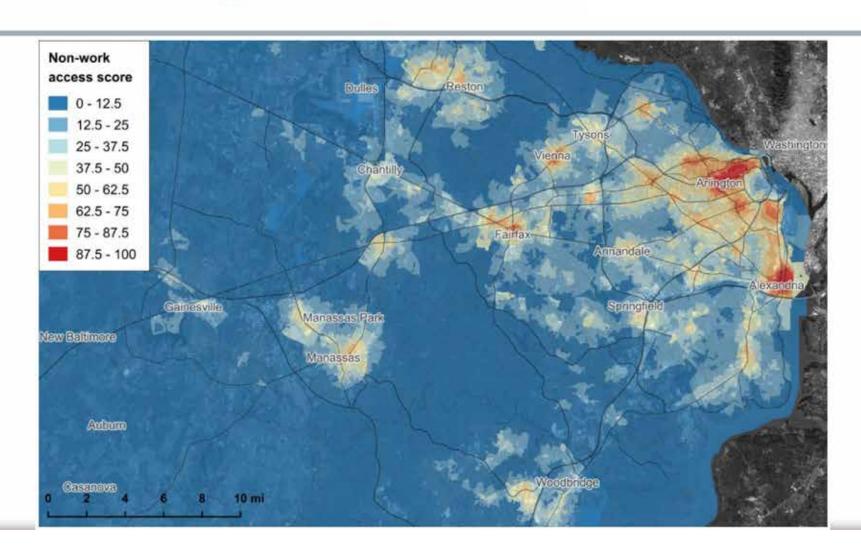
INVESTMENT NEEDS THAT SUPPORT

 Strategic, multimodal connections between communities and regional activity/ economic centers to support economic development

- Mobility and intermodal improvements to ensure region is well connected within the state and the nation
- Support economic competitiveness and advance overall economic development potential

Selin, T., and Taylor, M.D. Chattanooga 2040 RTP Performance-Framework: Balancing Regional and Community Needs, TRB, June 2014

Land Use – Non-Work Accessibility Northern Virginia



Mode Neutrality

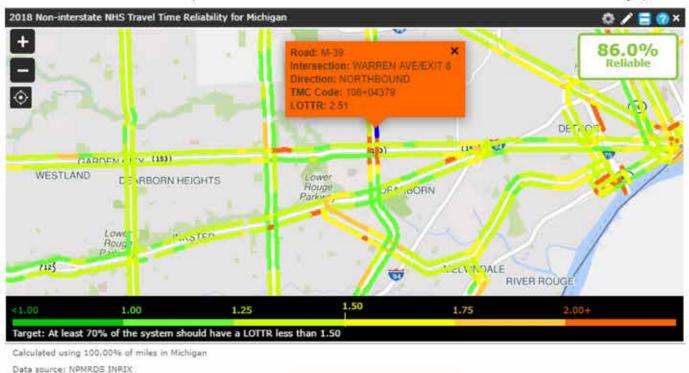
- 5 Modes: Highways, Walkways/Paths/Trails (WPT), Rail, Aviation, & Transit
- 8 Evaluation Criteria: Safety Mobility / Connectivity

Asset Condition Resiliency

Community Environment

Economic Access Health Access

LOTTR (Level of Travel Time Reliability)



EXAMPLE OF RECURRING CONGESTION

IH 635 (E), Royal/Miller Rd) to SH 78 Direction: EB

Speeds, mph, by time of day (15-minute interval) and day of April 2016

				TIME OF THE DAY		
U		Early Morning Off-Peak	Morning Peak	Midday Off-Peak	Afternoon Peak	Night Off-Peak
Hour	0	0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	66.00 66.00 77.00 77.00 77.00 77.00 80 80.00 80.00 80.00 80.00 80 80 80 80 80 80 80 80 80 80 80 80 8	8.66 0.00	8 4 8 5 8 4 8 5 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	99 99 99 99 99 99 99 99 99 99 99 99 99
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April 5, 201		64 61 50 61 61 62 61 63 69 60 63 59 36 61 64 60 61 50 64 64 66 65 10 6	50 54 64 69 60 50 50 67 85 50 67 64 56 50 85 50	8 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	58 51 49 34 27 27 25 21 17 24 15 29 37 53 34	25 29 51 51 46 57 85 60 40 15 8 11 42 50 83 83 82 83 81
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April 7, 201	5 Thu	88 85 87 84 83 88 83 83 83 83 83 83 83 83 83 83 83	85 83 87 82 70 89 84 89 88 88 89 82 84 81 84	8 8 8 80 80 80 80 84 85 85 81 85 88 81 85 84 83 83 84 83 80 80 82 40	35 34 33 26 18 21 13 13 12 27 28 28 42 56 55	# 57 53 53 54 61 55 50 50 54 61 61 61 53 50 65 63 63 67
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April 13, 201	5 Wed	57 E2 27 56 54 58 22 53 58 6 61 59 53 50 64 63 66 54 63 55 61 57 64 6	63 62 67 62 68 69 70 72 61 61 63 69 64 61 61	So 56 56 50 50 64 61 62 62 61 64 61 67 61 61 62 64 58 62 59 62 62 51	30 35 33 32 33 28 31 31 33 42 47 54 61 62 63	52 40 56 58 63 63 63 59 53 63 61 63 59 51 55 60 66 53 64 66
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IH 635 (E), Royal/Miller Rd to SH 78

Direction: WB

Speeds, mph, by time of day (15 minute interval) and day of April 2016

		TIME OF THE DAY							
				TIME OF THE DAY					
В		Early Morning Off-Peak	Morning Peak	Midday Off-Peak	Afternoon Peak	Night Off-Peak			
Hour	o w	000 000 000 000 000 000 000 000 000 00	00000000000000000000000000000000000000	9.86 10.00 10.00 10.00 10.00 11.10 11.10 12.00 12.00 12.00 13.00 14.00 14.00 14.00 16.00 1	15.00 10.00	18 18 18 18 18 18 18 18 18 18 18 18 18 1			
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Legend for Freeways



Example Metrics

Roadway Expansion Mobility & Congestion Criterion

	Measure	Metric	Nature of Metric	Sponsor Provided	Percent of Criterion Score
1)	Change in Congestion Intensity	Absolute change in the link-level travel time index (TTI) in the build vs no build scenario for the worst traffic time period	Numerical; derived from ARC's modeling	No	50%
2)	Change in Congestion Extent	Absolute change in regional vehicle hours of delay (VHD) in the build vs no build scenario for the worst traffic time period	Numerical; derived from ARC's modeling	No	50%

Metric for Evaluating the Roadway Expansion Reliability Criterion

Measure	Metric	Nature of Metric	Sponsor Provided
Worst Travel Time Reliability	Aggregated 80% travel time / 50% travel time for all weekdays	Numerical; derived from real- world data	No

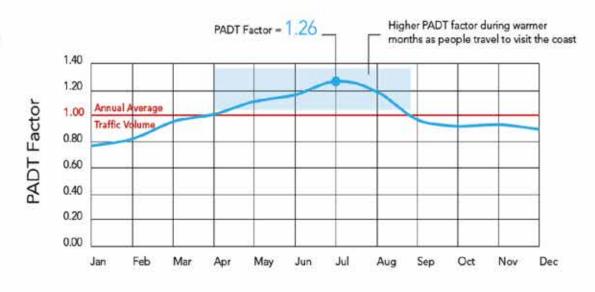
Peak Average Daily Traffic

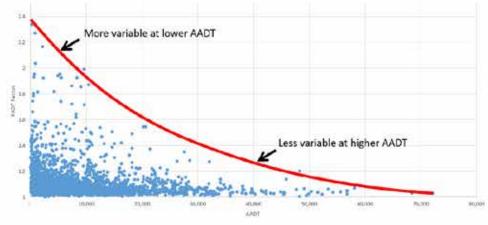
PADT = ADT occurring in peak month (includes weekday & weekend)

Factor AADT to the peak month:

PADT = AADT x PADT Factor

An example for I-40 near Wilmington:





Multi-Criteria Prioritization Model

Performance Measure Category	Project-Level Performance Measures	Expansion	Enhancement	SGR
		42	27	15
	Existing, Projected Population Density	6	4	3
	Existing Population - Communities of Interest	8	6	6
Market	Existing Employment Density	5	3	2
	Existing Low Wage Employment Density	7	5	4
	Land Use Mix - Existing, Planned (+/- Community Impacts)	8	4	0
	(Re) Development Potential	8	5	0
		30	50	70
	Transit Trips	10	10	15
Performance	Transit Reliability	15	20	25
	Increased Useful Life	0	10	25
	Elements to Improve Safety/Security/Environment	5	10	5
		28	23	15
	Financial Plan	15	10	10
Deliverability	Documented Project Support	4	4	0
	Project Readiness - Schedule, Environmental Impacts	4	4	0
	Regional Integration / Connectivity	5	5	5
Cost-Effectiveness	Cost per Point	NA	NA	NA

Transit Prioritization Metrics

- quantitative measur



Mobility



Accessibility



Economy



Safety



Sustainability & Quality of Life

- > ridership (#)
- > person throughput (#)
- > travel time reliability
- service frequency
- Population served by frequent transit (#)
- > transit dependent households served (#)
- Improved system connectivity
- > access to parks and open space (#)
- > TOD potential (#)
- Access to jobs (#)
- > \$ invested in disadvantaged communities (#)
- > Fatal/severe injury collision area addressed (#)
- Transit system safety addressed
- GHG emissions (#)
- > Heat island effect & storm water runoff potential
- Habitat & open space preservation
- Clean option in environmentally sensitive community

	Ped Segment	Ped Intersection	Bike Segment	Shared Use
Stakeholder Input				
Requests & Comments	Proportionate	Proportionate	Proportionate	Proportionate
Included in Adopted Plan	Proportionate	Proportionate	Proportionate	Proportionate
Constraints				
Available Right of Way	Proportionate	Proportionate	Proportionate	Proportionate
Major Utility Relocation	Inv. Proportionate	Inv. Proportionate	Inv. Proportionate	Inv. Proportionate
Existing Conditions				
Total Vehicle Lanes	Proportionate	x	x	Proportionate
Posted Speed Limit	Proportionate	Proportionate	x	Proportionate
Average Daily Traffic (ADT)	Proportionate	Proportionate	x	Proportionate
Traffic Stress	x	×	Proportionate	x
Type of Traffic Control	x	Inv. Proportionate	x	x
Presence of Raised Median for Refuge	x	Proportionate	x	x
Distance from Nearest Traffic Signal	x	Inv. Quantile 10	x	X
ADA Compliance	x	Proportionate	x	x
Longest Crossing Distance	x	Quantile 4	x	x
Connectivity				
Connects to Existing Sidewalk/Path	x	Proportionate	x	x
Connects to Proposed Sidewalk/Path	x	x	x	x
Connectivity	Proportionate	x	Proportionate	Proportionate
Safe Routes to School	Proportionate	Proportionate	Proportionate	Proportionate
Located on Transit Route	Proportionate	x	x	Proportionate
Equity				
Equity Score	Proportionate	Proportionate	Proportionate	Proportionate
Population Density	Quantile 10	Quantile 10	Quantile 10	Quantile 10
Activity/Employment Density	Quantile 10	Quantile 10	Quantile 10	Quantile 10

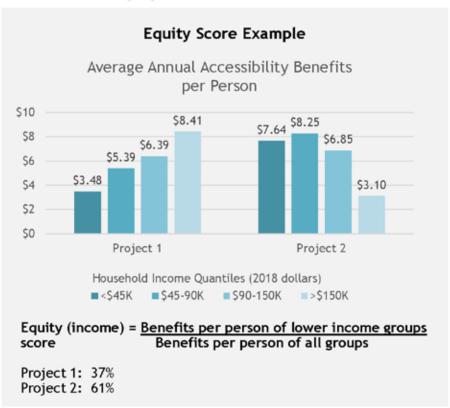
City of Harrisonburg Bicycle and Pedestrian Plan, https://www.harrisonburgva.gov/bicycle-pedestrian-plan

SmartTRAC project selection (HDOT)

Mode	Metric		sibility ints
Transit	Access to jobs by transit (percent of jobs accessible by auto)		00
D:l-i	Access to jobs by biking (percent of jobs accessible by auto)		100
Biking	Bike accessibility index		100
Walking Access to non-work destinations by walking		100	

ID	Project Title	File Folder	Department	Section or Office	Cost	Total Score	Total Score / Cost (\$m)
H11	Waianuenue Avenue Pavement Maintenance, Kaiulani Street to Rainbow Drive (South Hilo, Routes 1950 and 2720)	Hawaii	Hawaii County	Public Works	\$ 1,331,000	14.36	10.79
H15	Mamalahoa Highway Pavement Maintenance, Phase 2 of 3, Keopuka Heights Road to Hokukano Road (North Kona, Route 11)	Hawaii	Hawaii County	Public Works	\$ 1,351,000	14.36	10.63
H10	Kilauea Avenue Pavement Maintenance: Wailoa Bridge to Puainako Street, MP 0.7 to MP 2.2 (South Hilo, Route 1920)	Hawaii	Hawaii County	Public Works	\$ 1,506,000	14.36	9.54
H12	Mamalahoa Highway Pavement Maintenance, Phase 1 of 3, Kiloa Road to Keopuka Heights Road (North Kona, Route 11)	Hawaii	Hawaii County	Public Works	\$ 1,506,000	14.36	9.54
H01	Mamalahoa Highway Safety Improvements from MP 98.7 – 105.3, Mamalahoa Highway, 1.0 Mile North of Haleili Road to the vicinity of Bruner Road	HWY-TS	HDOT	HWY-TD	\$ 1,100,000	10.36	9.42
H02	Mamalahoa Highway Safety Improvements from MP 17.9 – 20.8 and MP 21.3 – 26.2	HWY-TS	HDOT	HWY-TD	\$ 1,100,000	10.36	9.42

Equity Assessment - New Approach (for 3 Futures)



Three Score Categories

Impedes Equity <40%

of Benefits 40%-60%

Advances Equity >60%

Speed Data[ing] (Data & Tools used in project evaluation that feeds the TIP/STIP

- Kentucky's SHIFT Tool
- North Carolina's SPOT On!ine
- New York City Strategic Plan Scoring System
- Georgia's Mark1 and Numetric Platform
- North Carolina's Signal System Retiming Program
- Texas Corridor Prioritization Tool

Prioritization Results

Evaluated ~3100 projects (P3.0)

~530 funded (17%)

Increased Transparency

All data used in scoring available for review

Maria Soncillo		Statements McLette Tourns		South by Explore Section 12 Comment			PORPU Seet.3	Project in division has burished in the buriered into the operant. Project not all funded in the factor do intended all grows and the recommendation of project in the proj				Project in grade with an Earlief to Pa- flogued Impact seagon. If grade with high facility of the Project is and society are angitients receive load should pench pre- ass project.			
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For more information on how to read a accordant, click here.

Route 301 University Drive/Market Ctr Double RCUT

Project in: 3488

Reconfigure elementations of University Drive at US 301 and Market Center at US 301 respectively to Restricted Crossing U-Turn intersections & install marked pedestrian chossedor.

Submitting Entity: King George County

Prelminary Engineering: Not Started Not Started Right of Way: Not Started Construction: Eligible Fund Program: District Grant

VTRANS Need: Urban Development Area





10.5 SMART SCALE SCORE

Scorecards
ODF Version

#32 OF 433 STATEWINE

#1 OF 32 DISTRICTWIDE

King George

\$3,500,000 SMART SCALE Requested Funds. \$3,500,000 Total Project Cest. 3.7 Project Benefit. 10.5 Project Benefit / Total Cost...

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Revised 01/15/2019 03-18

Always Be Ready...



□ Politics



Know Political Projects

□ Transparency



Show Your Data

■ Explain Data



Graphs & Simplicity

□ Show Tradeoffs



Scenario Planning

Programming and Investment Prioritization Key Take Aways

- Know your political climate
- Have champions (internal and external)
- Build process incrementally
- Involve stakeholders
- Data and tools are your friends but test first
- Communication is key

Performance and Data in Transportation Decision Making

Communications and Stakeholder Engagement

Hannah Twaddell

ICF

Communication-Related Presentations	Circular Page
Plenary: What Performance-based Decision-making Looks Like	1-6
Plenary: Structuring Your Agency to Disseminate Information	103-105
Session 5C: Integrating Equity and Resilience	153-155
Session 7C: Communicating Project Results	160-167
 Chapter 9: Communications and Stakeholder Engagement Session 1D: Engaging the Public and Local Officials in Data Driven Decision Making Session 2D: Fostering Local Accountability for Regional and Statewide System Performance Session 3D: Fostering Employee Accountability for Agency Performance Session 4D: Statewide Frameworks for Collaborative Performance Management Session 5D: Dashboard Demo 	171-198
Plenary: Bringing It All Together	222-223
Appendix C: Mobile App Surveying Technique	240-241

Data Driven Communication Can Improve Our Ability To

Engage the public and stakeholders

Inform elected and appointed officials

Improve agency business performance

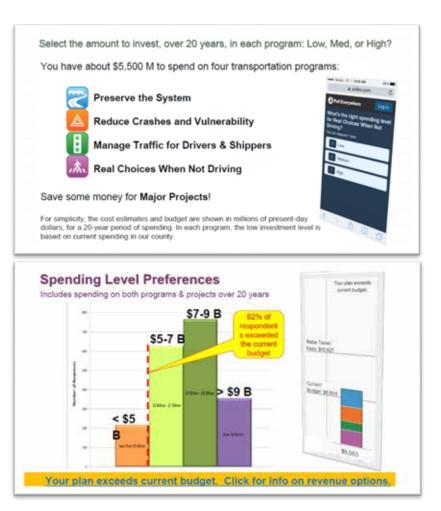
Engaging People

- Eliciting useful input
- Building trust

Everyone sees the scoring results at the same time

- Decision makers are presented the results and the staff recommended funding scenario the same day the results are released to the public
- This is an important policy to maintain the integrity and transparency of the process

Session 7C: Virginia Office of Intermodal Planning and Investment

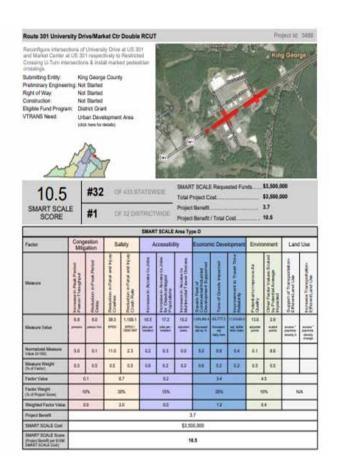


Session 1D: #FloridaMan Makes Rational Choices

Informing Decision Makers

- Providing useful information
- Supporting defensible decisions





Session 7C: Virginia Office of Intermodal Planning and Investment

Shaping Compelling Stories

Who is the audience?

- How much time to they have to absorb the information?
- Are they really interested in the topic?

What are you trying to convey?

- What is the process for identifying and deciding upon projects?
- What are the decision-making criteria?

Why is your message important?

- What are the interests and concerns of the politicians or decision-makers?
- How can you keep them focused on the topic at hand?

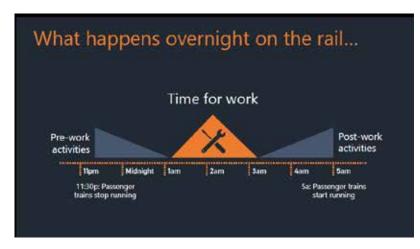
How are you communicating complex information to your audience?

- What was discussed and decided before?
- Where are we at this moment?
- What decisions move the audience forward?

Session 1D Project Prioritization Made Simple

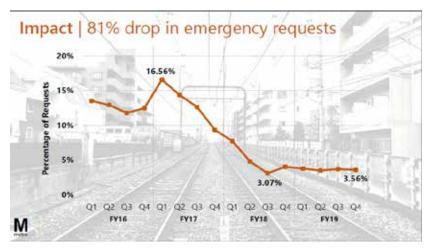
Improving Agency Performance

- Building a culture of accountability
- Resolving hidden hindrances



Session 3D: I Need Track Rights!





Communication Key Takeaways

Pinpoint the right questions Structure useful analyses

Shape compelling stories

Performance and Data in Transportation Decision Making

Key Takeaways and Opportunities to Advance the Practice

Hannah Twaddell

ICF

Invest in Good Data

- Defining
- Sourcing
- Collecting
- Cleaning
- Maintaining
- Updating
- Applying





Appendix C: Mobile App Survey (Lessons Learned by Conference Participants) Top: After Day 1. Bottom: After Day 2

Invest in Useful Tools

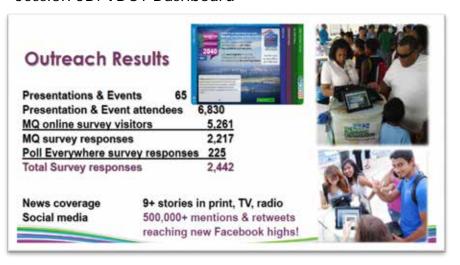
- Defining
- Developing
- Training
- Applying



Session 5D: MNDOT Dashboard



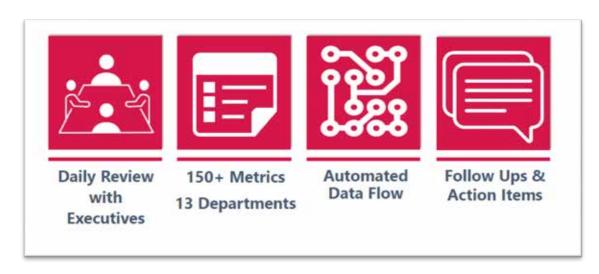
Session 5D: VDOT Dashboard



Session 1D: #Florida Man Makes Rational Decisions

Build Skills Across the Board

- Leaders
- Managers
- Analysts
- Communicators
- Facilitators
- Implementers

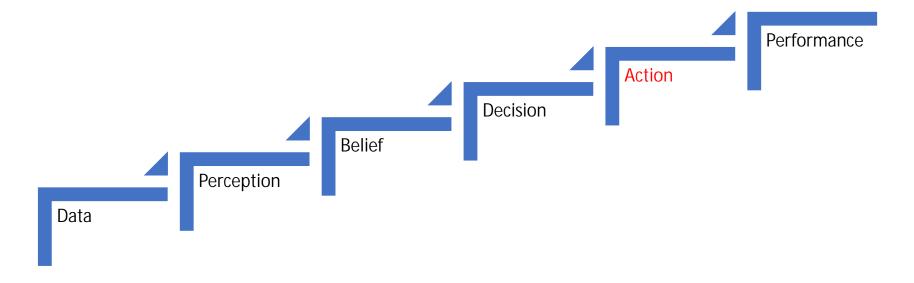


Session 5D: CTA Performance Management Daily Flash Reports

And Remember

Data Doesn't Change Performance ...

People Change Performance



Today's Panelists

- David Wasserman, North Carolina Department of Transportation, <u>dswasserman@ncdot.gov</u>
- Jerri Bohard, Oregon Department of Transportation, Jerri.L.bohard@odot.state.or.us
- Jordan Holt, Washington Metropolitan Transit Authority, JHHolt@wmata.com
- Hannah Twaddell, ICF, hannah.twaddell@icf.com

#TRBWebinar

Download the E-circular

Conference on Performance and Data in Transportation Decision Making (E-C263)

http://onlinepubs.trb.org/onlinepubs/circulars/ec263.pdf

Upcoming TRB Webinars

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Enter the Portal-The Transportation
 Performance Management (TPM) Portal August 12

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