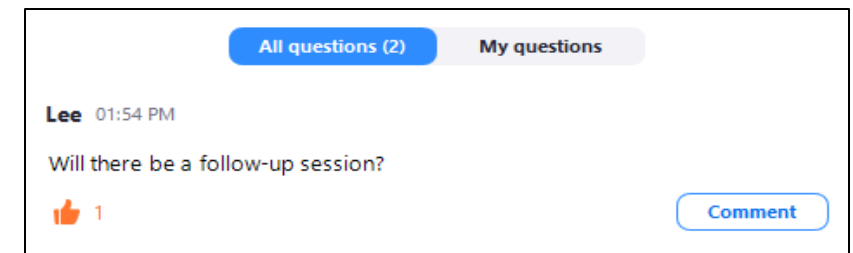# Asking Questions in the Q&A Box

- Click on the Q&A icon at the bottom of your screen

- The questions in the Q&A box will be monitored and answered at the end of each presentation or at the end of the meeting

- You can keep track of your questions in the "My Questions" tab in the Q&A box

Asking Questions Verbally

- Please raise your hand *(click on the hand icon at the bottom of the screen)* and a host will unmute you.

- Please give your name and agency before asking your question

- **Please mute yourself when you are finished speaking**

Coalition Update

Sheryl Bradley
The Eastern Transportation Coalition
TSMO Program Director

Coalition Update – Recent & Upcoming Events

Travel Info

Travel Info Web Summit – 4/4/24
Waze/3rd Party Mapping WG – 6/27/24

RITIS

Enhancement WG - 3/21/24
User Group Mtg – 5/9/2024
Workshops – Semi-Annually

Cross-cutting

Bridge Strike Initiatives
VIE (12/15/2023) & ongoing

TDM

TAC & State POC Mtg – 4/9/2024
New Ancillary Products!
TDM Vendor Forums

HOGs

VRTIM Training Sessions (Fall 2023)
In-person Exchanges – coming soon!

Meeting Participants

Agencies						
Alabama DOT	Campo	City of Detroit, MI	Clackamas County	DVRPC	Illinois DOT	Loudoun County DOT
Amarillo Metropolitan Planning Organization	Cape Cod Commission	City of Franklin, TN	CMAP	ECWRPC	Indiana Toll Road Company	Louisiana DOTD
Anne Arundel County	Capital Region Planning Commission	City of Hartford, CT	Collier County Traffic Operations	EPA	INRIX	Luzerne County MPO
Arizona DOT	Charlotte DOT	City of Knoxville, TN	Colorado DOT	EWGateway COG	International Bridge, Tunnel and Turnpike Association (IBTTA)	Maricopa Association of Governments
Atlanta Regional Commission	Chattanooga TPO	City of Lakeland, FL	Connecticut DOT	Federal Highway Administration	Iowa DOT	Maricopa County DOT
Baltimore Metropolitan Council	Chester County Planning Commission	City of Philadelphia, PA	County of Mercer, NJ	FEMA	Kankakee County Planning Department - KATS	Martin County BOCC
BCDCOG	Chicago Metropolitan Agency for Planning (CMAP)	City of Portland, OR	CPRPO	Florida DOT	Kentucky Transportation Cabinet	Maryland Coordination and Analysis Center
Bi-State Regional Commission	Chittenden County Regional Planning Commission	City of Roswell, NM	DCHC	Florida Turnpike Commission	Knoxville TPO	Maryland DOE
Boston Region MPO	City of Boulder, CO	City of Sevierville, TN	Delaware DOT	Georgia Environmental Protection Division	LA Metro	Maryland DOT
Broward County, FL	City of Charlotte, NC	City of Southlake, TX	District DOT	Hawaii DOT	Land of Sky RPO	Maryland DOT-SHA

Meeting Participants

Agencies						
Maryland Transportation Authority	MWCOG	NOVA	Palm Beach TPA	Rhode Island DOT	SRTA	Vermont AOT
Massachusetts DOT	Nashville DOT	NRPC	PANYNJ	Rutland RPC	ST CHARLES COUNTY, MI	Virginia DOT
MATOC	National Weather Service	Office of Intermodal Planning and Investment	Pennsylvania DOT	SJTPO	Tennessee DOT	Volpe
Michigan DOT	Nebraska DOT	Ohio DOT	Pima Association of Governments	South Carolina DOT	Texas A&M Transportation Institute	Washington DOT
Middlesex County DOT	Nevada DOT	Oklahoma DOT	Pima County DOT	South Dakota DOT	Town of Huntersville, NC	Wisconsin DOT
Modern Mobility Partners	New Jersey DOT	Old Colony Planning Council	PVPC	Southeast Michigan Council of Governments (SEMCOG)	Tri-County Regional Planning Commission	WMATA
MORPC	New York City DOT	Omaha-Council Bluffs Metropolitan Area Planning Agency	Rapides Area Planning Commission	Southeastern Connecticut Council of Governments	TriMet	
MRMPO	New York State DOT	Oregon DOT	RCOC	Southern New Hampshire Planning Commission	Tulare County Association of Governments	
MTA	NJTPA	Ozarks Transportation Organization	Regional Transportation Commission of Southern Nevada	Southwestern Pennsylvania Commission	US DOT	
MVRPC	North Carolina DOT	Palm Beach County	Rhode Island Division of Statewide Planning	Spokane Regional Transportation Council	USDOT Volpe Center	

Today's Speakers

Mark Franz
UMD CATT Lab
Lead Transportation Analyst
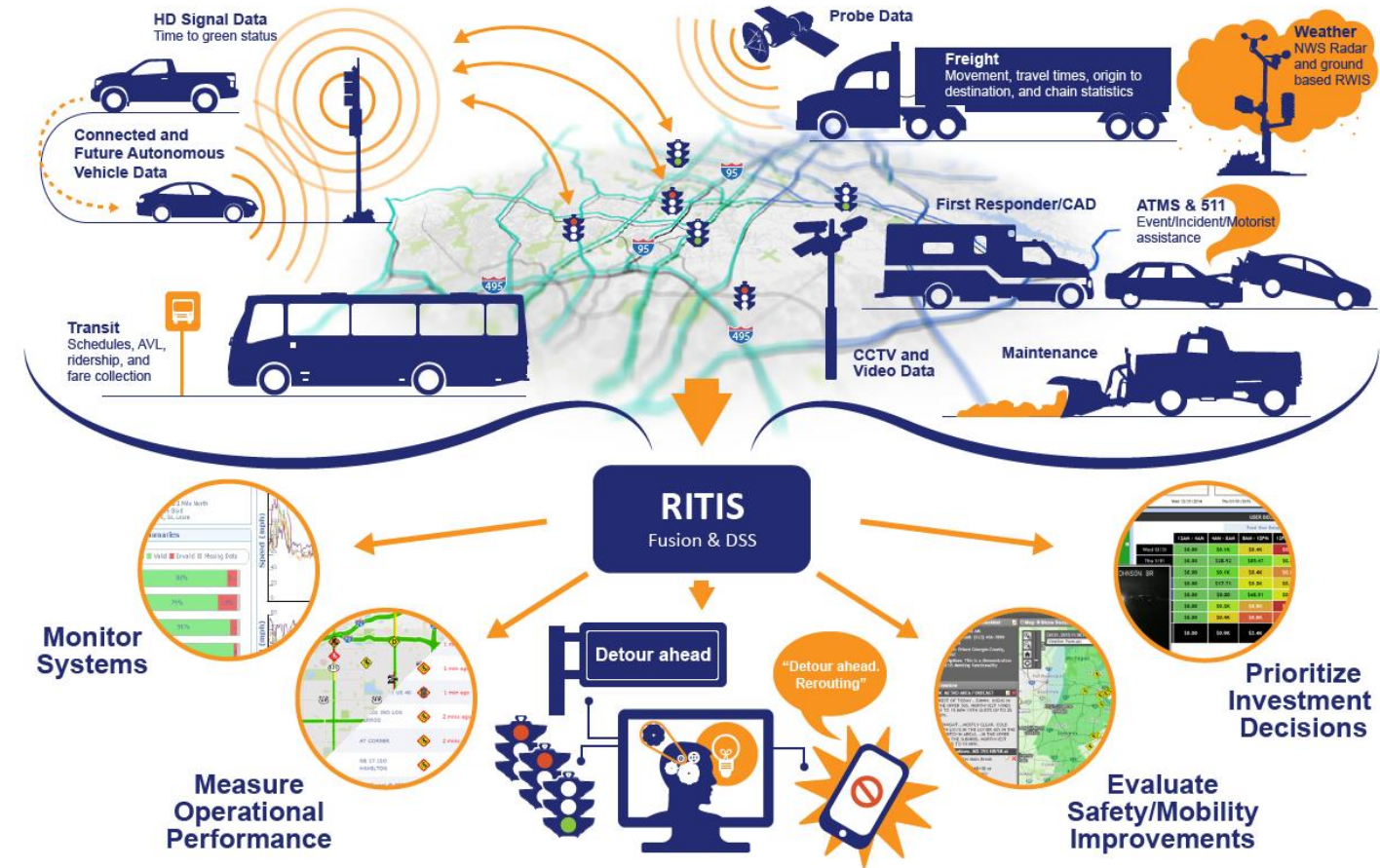
Rick Ayers
UMD CATT Lab
Public Sector Advocate

Agenda

- Review and demonstrations
- Q&A

Today's Slide Deck

Today's Topics

- Background to updated volume limiting methodology

- Overview of car following model (CFM) volume limiting procedure

- Validation of CFM volume limiting algorithm

- Use cases and demonstration of PDA tools that use updated volume estimations to support user delay cost analysis

Which set of tools do you use in your agency to develop performance measures insights?

- RITIS Probe Data Analytics Suite

- NPMRDS Analytics

- Both

Why a New Methodology is Being Used

An Opportunity for Improvement

- Early adopters of User Delay Cost tool saw abnormalities associated with highly congested roadway segments.

- While building the Causes of Congestion Graphs (CCG) web app, we:
  - Encouraged agencies to send updated AADTs/volumes
  - Seized the opportunity to validate our UDC algorithm
    - especially the volume limiting equations

National, State and County App
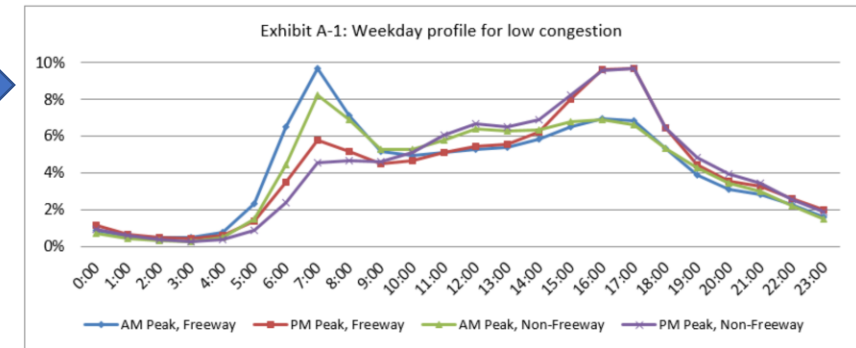https://go.umd.edu/congestion

Why is Volume Limiting Important?

- Volume **profiling** are estimates derived from AADT

  - Profiling can produce reasonable volume estimates under **normal** conditions

    - Profiling however does **not** capture impact of abnormal congestion on traffic flow

- Volume **limiting** tries to resolve this issue

- Example:

Hourly Volume Distribution Charts

Exhibit A-1: Weekday profile for low congestion

Legend: AM Peak, Freeway — PM Peak, Freeway — AM Peak, Non-Freeway — PM Peak, Non-Freeway
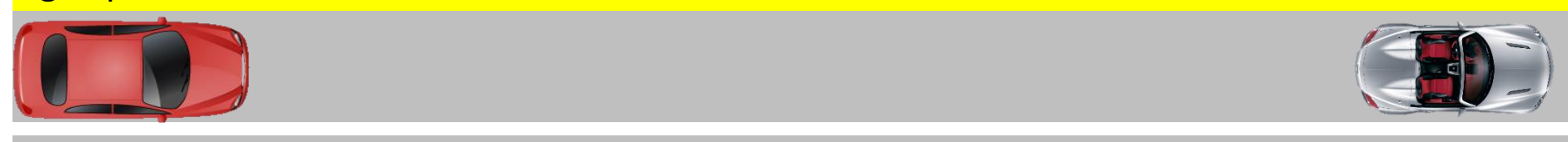
Normal Traffic Flow

Abnormal Traffic Flow

Profiling does not work under **abnormal** congestion
Need to limit the volumes

Background to the Car Following Model (CFM) Volume Limiting Procedure

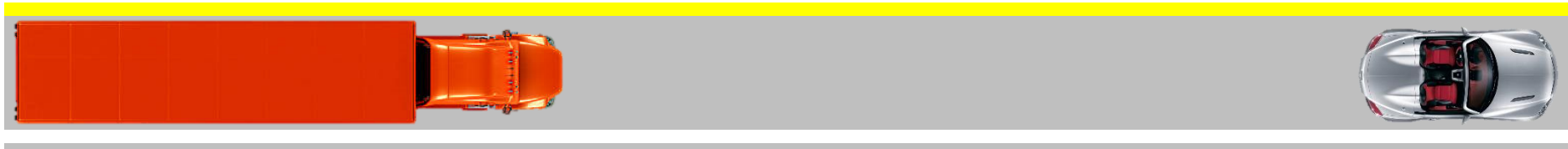# Assumption: As congestion increases, speeds drop, and vehicles follow closer

High Speed

Moderate Speed

Low Speed

Assumption: For a given speed, cars can follow closer than trucks

Procedure:

Step 1: Estimate spacing of passenger and commercial vehicles

Step 2: Calculate total lane length consumed by each vehicle (vehicle length and spacing)
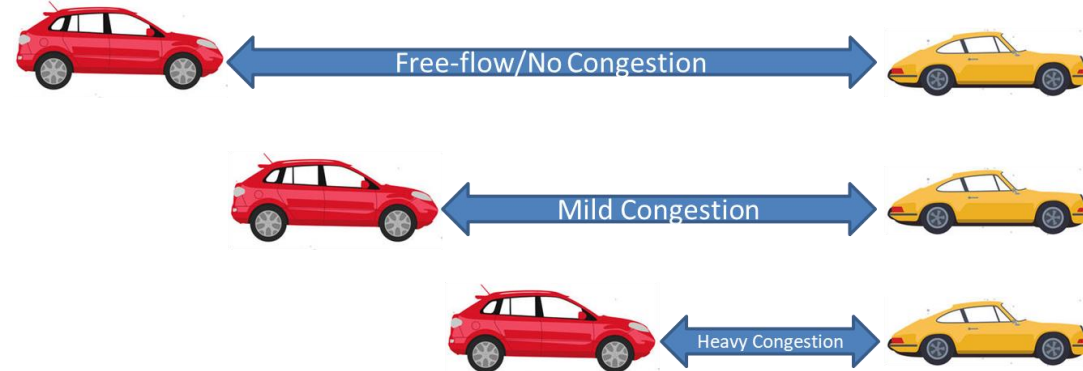
Step 3: Compute # of passenger and commercial vehicles on each segment

Step 4: Compute # of passenger and commercial vehicles traversing the segment

Step 5: Compare the car-following model with the historical volume profiling to pick the minimum estimated volume

Car following model sets the max number of vehicles that can be placed on a given segment at a given speed.

Validation of CFM Volume Limiting Algorithm

Validation Framework

- Ground Truth: 16 ATR stations in MD
- Analysis Period: Wed May 22, 2019
- Compare:
  1. UDC using ATR volumes
  2. UDC using old PDA volume limiting equations
  3. UDC using CFM volume limiting equations

Number	Tmc	FirstName	Miles	FRC	AADT
1	110-04625	MD-193/University Blvd/Exit 29	1.19	1	107,518
2	110+04626	MD-650/New Hampshire Ave/Exit 28	1.14	1	107,518
3	110-12783	US-1/Belair Rd/Belair Byp	1.92	4	10,509
4	110+12784	MD-24/Vietnam Vets Memorial Hwy	1.92	4	10,509
5	110+05213	Warren Rd	1.36	4	13,347
6	110-05212	Padonia Rd	1.36	4	13,347
7	110-07392	US-50/Ocean Gtwy	3.06	3	4,700
8	110-06335	US-113/Berlin Dover Rd	1.80	3	7,403
9	110-09618	Renner Rd	1.73	3	15,662
10	110+09619	MD-5-BR/St Charles Pky	1.74	3	15,662
11	110+06360	MD-404/Queen Anne Hwy	9.55	2	16,935
12	110-06359	MD-322/Easton Byp/Easton Pky	9.63	2	16,944
13	110+06958	Keep Tryst Rd/Valley Rd	0.52	2	12,267
14	110-10632	Maryland/Virginia State Line	0.52	2	12,267
15	110+04534	MD-567/Cromwell BR Rd/Exit 29	0.25	1	78,180
16	110-04533	Providence Rd/Exit 28	0.54	1	78,136

Results of UDC Validation

Functional Class 1 | Functional Class 3

Total Delay Cost

Measure Names
- Ground Truth
- Car Following Model
- PDA Volume profile

Functional Class 1:
- Ground Truth: $19.01K
- Car Following volume limiting: $18.23K
- PDA volume limiting: $6.22K

Functional Class 3:
- Ground Truth: $3.68K
- Car Following volume limiting: $2.70K
- PDA volume limiting: $2.70K

Data from Wednesday May 22, 2019

Use Cases for Generating User Delay Costs and The PDA Tools that Generate the $$$ Metrics

Use Cases for User Delay Cost $$$ Analysis

- **Work zone performance reporting**

- Corridor performance reporting

- Regular traffic/congestion reporting

- Before and after-action assessments

  - Project changes/improvements

  - Collision assessments

  - Severe weather impacts
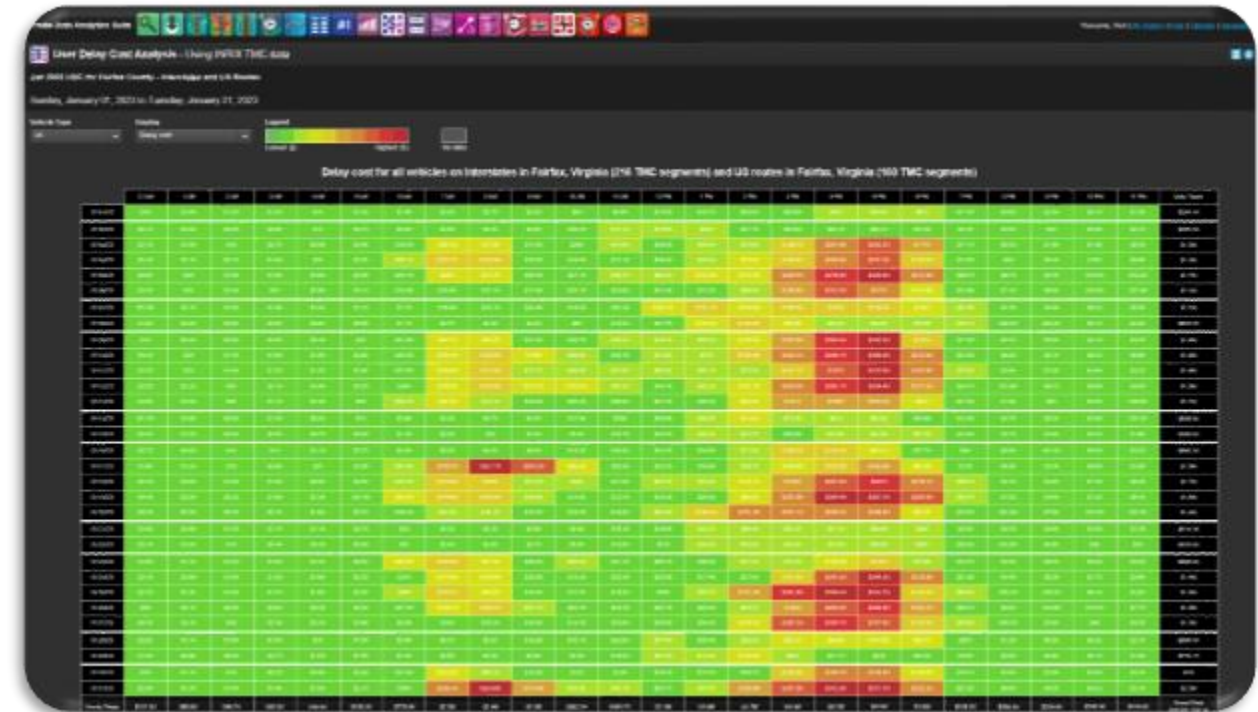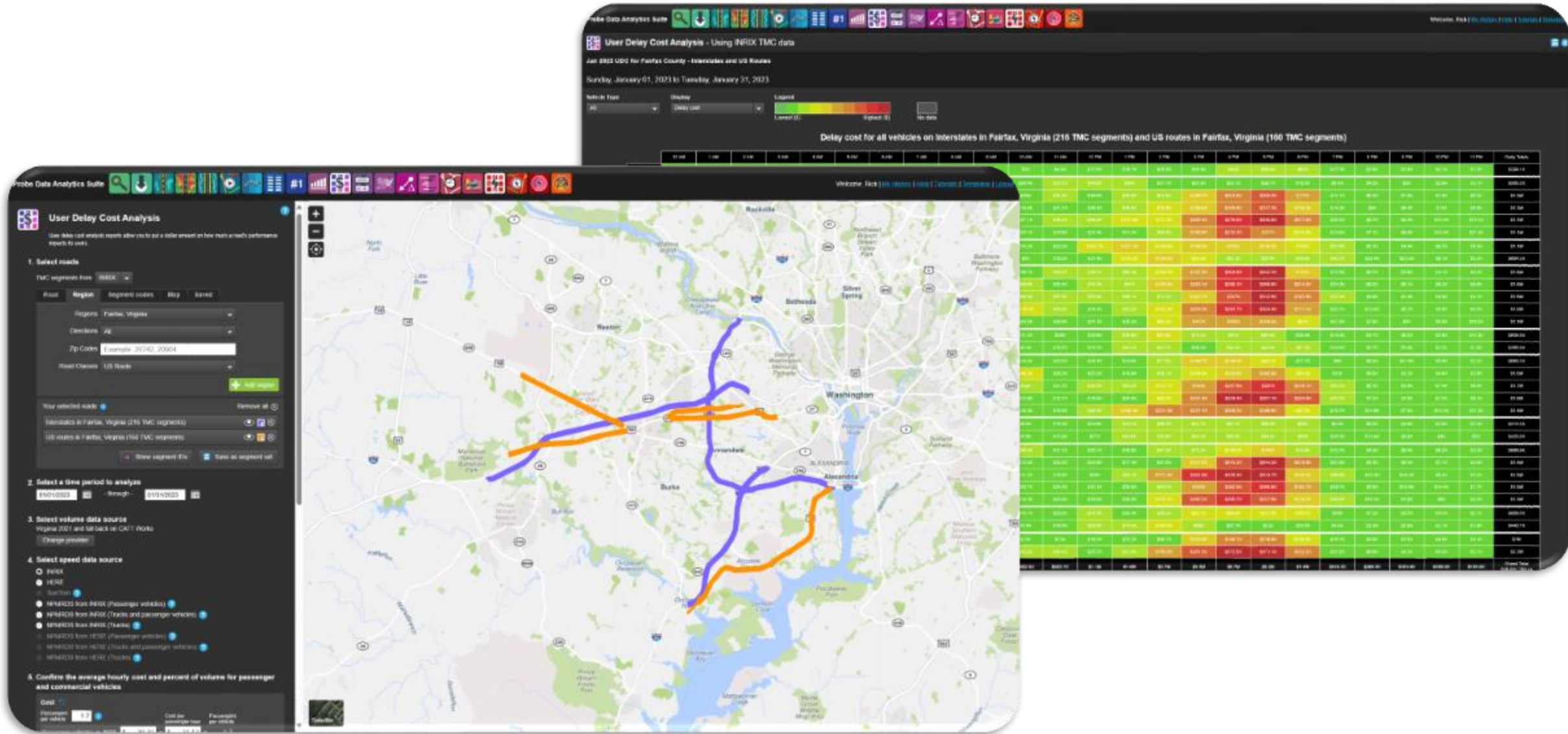
Have you ever used the PDA User Delay Cost analysis tool?

- Yes

- No

PDA User Delay Cost Tool – Calculate $$$ Impact of Congestion

Has your agency submitted network volume data to the CATT Lab?

- Yes

- No

- I'm not certain

PDA User Delay Cost – States with/without Volumes

States with Authoritative Volumes Submitted to CATT Lab

Others - Restricted to NHS via NPMRDS

DEMONSTRATION

RITIS

INTRODUCTION   TOOL CATALOG   USE CASES   GET ACCESS   TUTORIALS   **TEMPLATES**

LOG IN

Templates

Corridor Performance Report

Monthly Congestion Report

Project Assessment Report

Top 10 Bottlenecks Report

After Action Review

Holiday Travel Forecast

Work Zone Performance Report

Overview

Tools Used In This Report

Design Recommendations

How To Create The Report

Work Zone Performance Report

Use this template package along with RITIS tool results and your agency's content to create a work zone performance report, including a front cover, project description page, a performance report pages (key metrics, operational impact assessment, etc). There are layouts and formats for daily and weekly reports and some agency use case examples to give you maximum flexibility in choosing the report style that best suits your needs. We've also included a Design Resources package that contains various elements – such as icons, custom graphics & tables and instructions on making the report interactive – so that you can more clearly and effectively communicate the results to your audience.

Overview

ROAD WORK AHEAD

Daily Work Zone Performance Assessment

Diverging Diamond Interchange Project
(I-75/SR 93 & SR 884/Colonial Blvd. Interchanges • Fort Myers • Lee County)

Wednesday, April 12, 2023

1. **Click to download the PowerPoint template** to create a report that presents a Performance Report for Work Zones along a roadway. Additional design resources are also available to make building a report faster and easier.

   You must **log in** to download this template.

2. **Download Agency Use Case examples** below to see how other agencies have used these templates or have created similar reports using content from RITIS:

   - **FDOT** Diverging Diamond Interchange (using this template) ↗
   - **FDOT** Diverging Diamond Interchange (Weekly & Daily WZ performance report options) ↗
   - **MDTA** Rehabilitating the Baltimore Harbor Tunnel (portrait/full report) ↗
   - **MDTA** Rehabilitating the Baltimore Harbor Tunnel (weather forecast style, 2-pg) ↗
   - **ODOT** Oregon 217 WZ Monitoring and Performance Measurements (RITIS training example report) ↗

3. **Scroll down to learn how to create this report** or click on the 'How To Create Report' in the navigational menu.

Tools Used In This Report (click on the links for a brief video tutorial on using a tool)

Performance Summaries

Create reports on performance metrics grouped by day of week, weekdays and weekends across a stretch of road.

Event Query Tool (optional)

Find events during a specific time range and geography, along with several visualizations and tabular summaries. Also use EQT to quickly access RITIS Incident Timeline, Operator's Notes and Responder timetables.

CONTACT INFORMATION

Communications
Brian Bollas
(813) 262-8549

Construction PM
David Jones
 (863) 519-2345

For more project information, click <u>here</u>

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FDOT DISTRICT 1

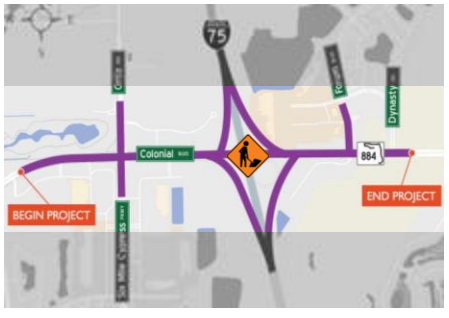| Construction PM	Communications
David Jones	Brian Bollas
(863) 519-2345	(813) 262-8549

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Weekly Work Zone Performance Report
Week of April 9th to April 15th, 2023 • 8 AM to 5 PM

I-75/SR 93 & SR 884/Colonial Blvd. Interchange
Project No. 413065-1

Work Zone Details

Limits — Approx. 1.6 mi from just west of Colonial Gardens Cir to just east of Dynasty Dr I-75/SR 884 interchange.

Lane Status — No lane closures during daytime operations.

Counter Measures — Barrels, arrow boards.

Operation — All lanes are open, 3 thru lanes in each direction.

Hours of Operation — Typical are 8am to 5pm, night work between 9pm and 6am.

Police Enforcement — During lane closures - are present before lane is closed and shortly after it is open.

Posted Work Zone Speed — 35mph

Work Zone Performance Metrics

Avg. Daily Vehicle Speed
EB 30.5mph
(6.89min Travel Time)

WB 27.3mph
(7.70min Travel Time)

Significant Queue
2hr **47**min
CONGESTED LENGTH 5.33 mi
(occurred EB @ Ortiz Ave on Apr 11, 2023, from 3:22pm to 6:09pm)

Avg. Daily Veh.-hr. of Delay
445h
AVG. DAILY DELAY COST
$13,500

Day-by-Day Performance Metrics

METRIC	DIR	Sun (4/9)	Mon (4/10)	Tue (4/11)	Wed (4/12)	Thu (4/13)	Fri (4/14)	Sat (4/15)
Avg. Speed (mph)	EB	36.1	30.5	30.2	**26.9**	30.4	28.0	33.1
	WB	35.1	29.0	**23.5**	25.7	27.4	24.0	29.7
Avg. TT (min)	EB	5.79	6.89	6.97	**7.81**	6.93	7.5	6.36
	WB	5.99	7.25	**8.95**	8.17	7.68	8.75	8.16
Total Cost (dollars)	EB	$0	**$19.3K**	$5.9K	$11.6K	$6.1K	$12.5K	$0
	WB	$0	$0	**$16.1K**	$6.0K	$4.0K	$12.1K	$0
Veh.-hr. of Delay (hours)	EB	0	**637**	194	384	233	414	0
	WB	0	0	**534**	198	132	400	0

BOLD = WORST PERFORMANCE

For the Week - Total Cost | **$93.6K** • Total Veh.-hr. of Delay | **3,126h**

Notable Events

Traffic Congestion
WEEKDAYS
EB 3:00pm to 5:00pm
WB 5:30am to 9:00am
(from I-75 to Winkler Ave.)

Traffic Incident
WED, April 12, 2023
EB 3:47pm to 4:45pm
Collision blocked 2 lanes
(just beyond I-75)

Weather
WED, April 12, 2023
Heavy rain and gusty winds caused hazardous driving conditions
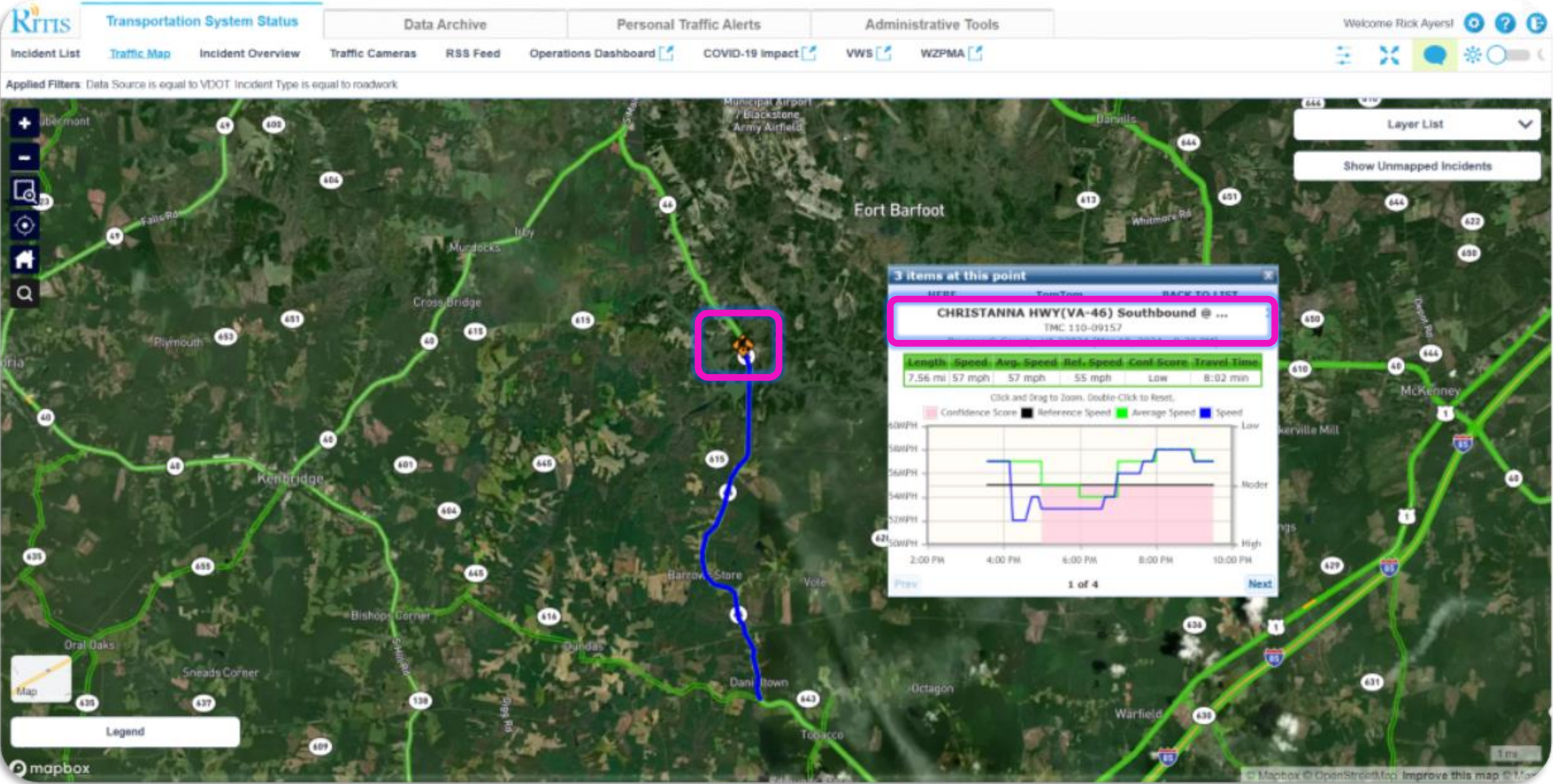(11:00am to 1:00pm)

Work Zone Details

Limits
I-75/MM 348, South of SR-200 in Ocala, FL

Lane Status
No lane closures during daytime operations.

Counter Measures
Barrels, arrow boards.

Operation
All lanes are open, 3 thru lanes in each direction.

Hours of Operation
Typical are 8am to 5pm, night work between 9pm and 6am.

Police Enforcement
During lane closures - are present before lane is closed and shortly after it is open.

Posted Work Zone Speed
35mph

Work Zone Performance Metrics

Avg. Daily Vehicle Speed
EB **30.5**mph
(6.89min Travel Time)
WB **27.3**mph
(7.70min Travel Time)

Significant Queue
2hr **47**min
CONGESTED LENGTH 5.33 mi
(occurred EB @ Ortiz Ave on Apr 11, 2023, from 3:22pm to 6:09pm)

Avg. Daily Veh.-hr. of Delay
7.6hrs
AVG. DAILY DELAY COST
$325

Day-by-Day Performance Metrics

METRIC	DIR	Sun (4/9)	Mon (4/10)	Tue (4/11)	Wed (4/12)	Thu (4/13)	Fri (4/14)	Sat (4/15)
Avg. Speed (mph)	EB	36.1	30.5	30.2	**26.9**	30.4	28.0	33.1
	WB	35.1	29.0	**23.5**	25.7	27.4	24.0	29.7
Avg. TT (min)	EB	5.79	6.89	6.97	**7.81**	6.93	7.5	6.36
	WB	5.99	7.25	**8.95**	8.17	7.68	8.75	8.16
Total Cost (dollars)	EB	$0	**$19.3K**	$5.9K	$11.6K	$6.1K	$12.5K	$0
	WB	$0	$0	**$16.1K**	$6.0K	$4.0K	$12.1K	$0
Veh.-hr. of Delay (hours)	EB	0	**637**	194	384	233	414	0
	WB	0	0	**534**	198	132	400	0

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Heavy rain and gusty winds caused hazardous driving conditions
(11:00am to 1:00pm)

Take-aways and Resources

- **Your agency volumes support the most accurate calculations**

- Former algorithm implemented in PDA underestimated UDC, especially in Functional Class #1.

- The output of the car following model is a more accurate estimate of the number of passenger and commercial vehicles experiencing delay on each segment than previous volume equations.

- Improvements in estimating user delay costs in PDA tools

  - User Delay Cost

  - Causes of Congestion

- Learn more about UDC here, https://pda.ritis.org/suite/help/#udc-analysis

- Click this link for a summary of the methodology used in the Car Following Model

Do you have an interest in better understanding how PDA tools can be used to support your Congestion Management Process (CMP)?

- Yes
- No, my work does not directly involve a Congestion Management Process.

Thank you

Questions or Comments?

Michael L. Pack
PackML@umd.edu

Rick Ayers
RAyers@umd.edu

Mark Franz
MFranz1@umd.edu

Please give the CATT Lab a score of 1 to 3 for the value of providing this workshop as resource for your agency

1 - Neutral

2 - Moderately valuable

3 - Extremely valuable

Upcoming RITIS Events (hosted by TETC)

- Enhancement Working Group (invite only) – March 21, 2024 –
  - For more information on Working Group activities, please contact Sheryl Bradley, TETC (sbradley@tetcoalition.org) or Bob Frey, MassDOT & Working Group Chair (Bob.Frey@dot.state.ma.us)

- Next RITIS User Group Meeting – May 9, 2024 (1:00pm-2:30pm, ET) – Look for an invitation soon!
  - For more information on User Group activities, please contact Sheryl Bradley, TETC (sbradley@tetcoalition.org) or Michael Pack (PackML@umd.edu)

Questions?

Sheryl Bradley (TETC)	sbradley@tetcoalition.org
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