NPMRDS – Probe Data Analytics Tools for Transportation Planning:

Web-based Analysis and Reporting Tools for NYSDOT and NYS MPOs

Project Partners:

University Transportation Research Center (UTRC)

NYSDOT

NYSAMPO

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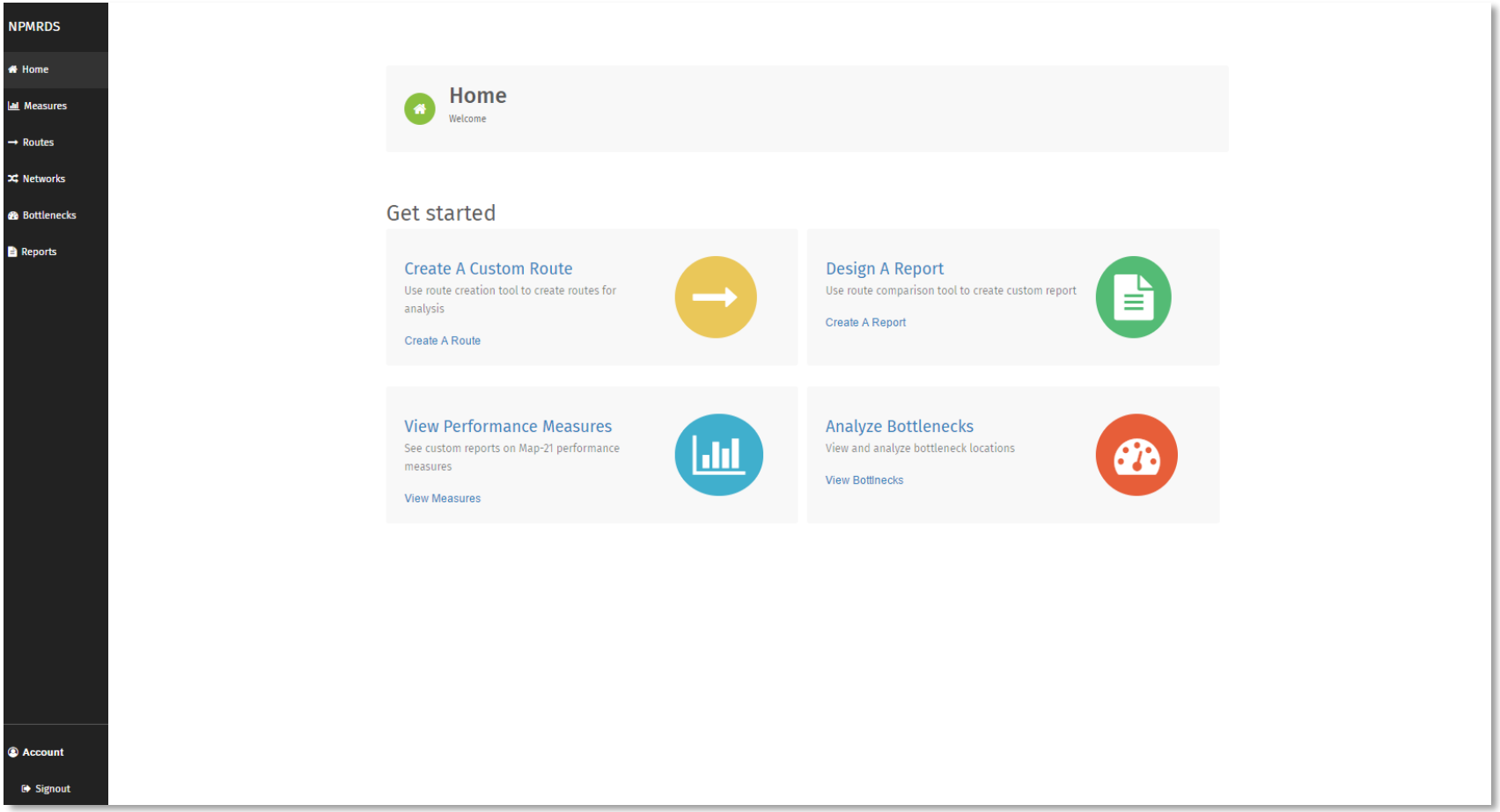
The NPMRDS Dashboard



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NPMRDS = National Performance Measurement Research Dataset

- NPMRDS is an aggregated dataset made by the company HERE until Feb 2017, now aggregated by INRIX.
- Provided by FHWA at no cost to states.
- Based on passenger probe data obtained from a number of sources, including mobile phones, vehicles, and portable navigation devices, gathered in 5 minute intervals
  - NHS Highways are broken into segments, called “TMCs” based on navigational software company (Garmin/TomTom) needs.
- **Big Data: Terrabites in size**

Source of NPMRDS Probe Speed Data

- GPS
- Phone

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Performance Measures
Map-21 (PM3) Reporting

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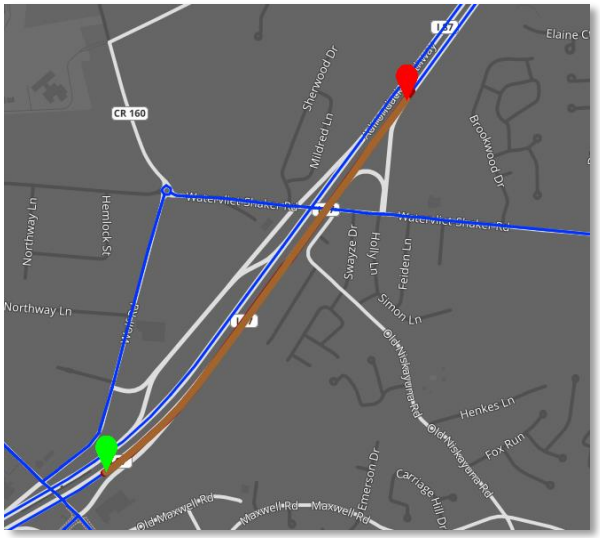
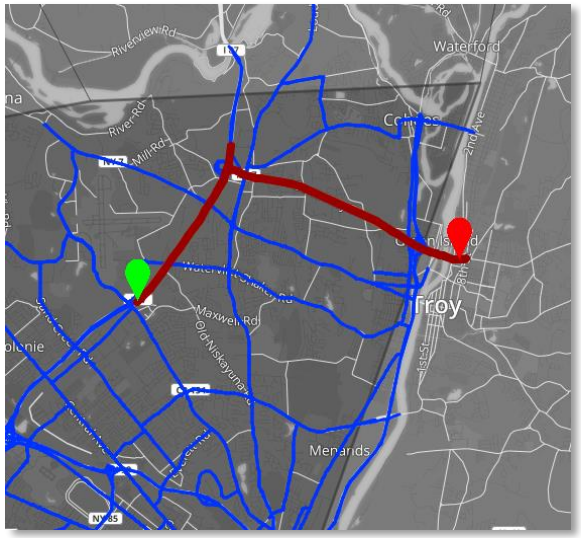
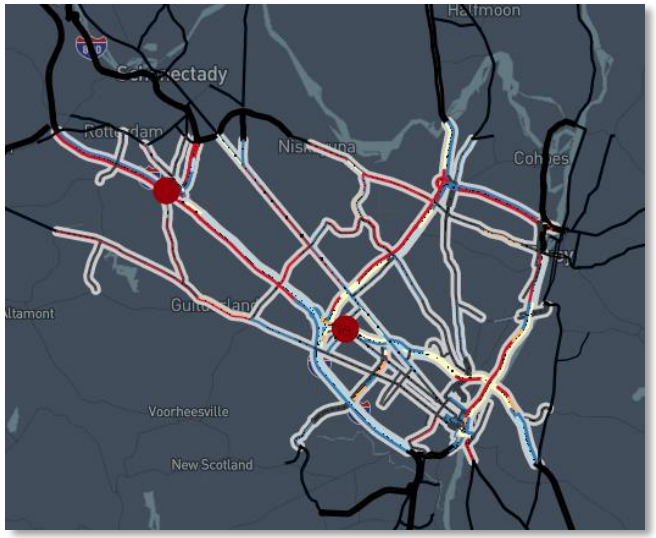
Multi-Geographic Resolution:

Segment || Route || Multi-Route Corridor || Network







Creation and editing tools make your geographies fully customizable

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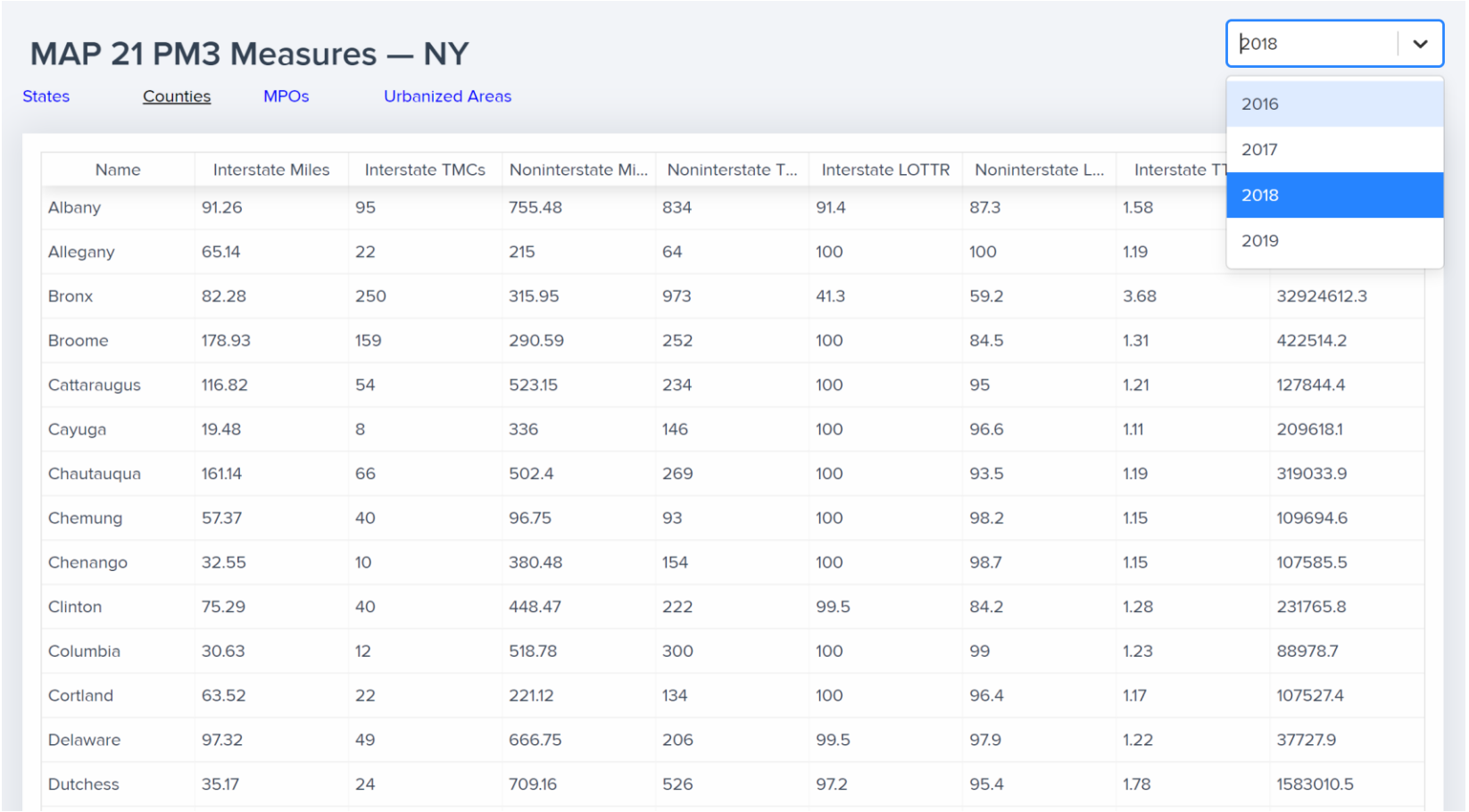
NPMRDS Tools for PM3 Reporting



Name	Interstate Miles	Interstate TMCs	Noninterstate Mi...	Noninterstate T...	Interstate LOTTR	Noninterstate L...	Interstate TT	
Albany	91.26	95	755.48	834	91.4	87.3	1.58	
Allegany	65.14	22	215	64	100	100	1.19	
Bronx	82.28	250	315.95	973	41.3	59.2	3.68	32924612.3
Broome	178.93	159	290.59	252	100	84.5	1.31	422514.2
Cattaraugus	116.82	54	523.15	234	100	95	1.21	127844.4
Cayuga	19.48	8	336	146	100	96.6	1.11	209618.1
Chautauqua	161.14	66	502.4	269	100	93.5	1.19	319033.9
Chemung	57.37	40	96.75	93	100	98.2	1.15	109694.6
Chenango	32.55	10	380.48	154	100	98.7	1.15	107585.5
Clinton	75.29	40	448.47	222	99.5	84.2	1.28	231765.8
Columbia	30.63	12	518.78	300	100	99	1.23	88978.7
Cortland	63.52	22	221.12	134	100	96.4	1.17	107527.4
Delaware	97.32	49	666.75	206	99.5	97.9	1.22	37727.9
Dutchess	35.17	24	709.16	526	97.2	95.4	1.78	1583010.5

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Map-21 Performance Measure Scores by Segment
Level of Travel Time Reliability in Syracuse

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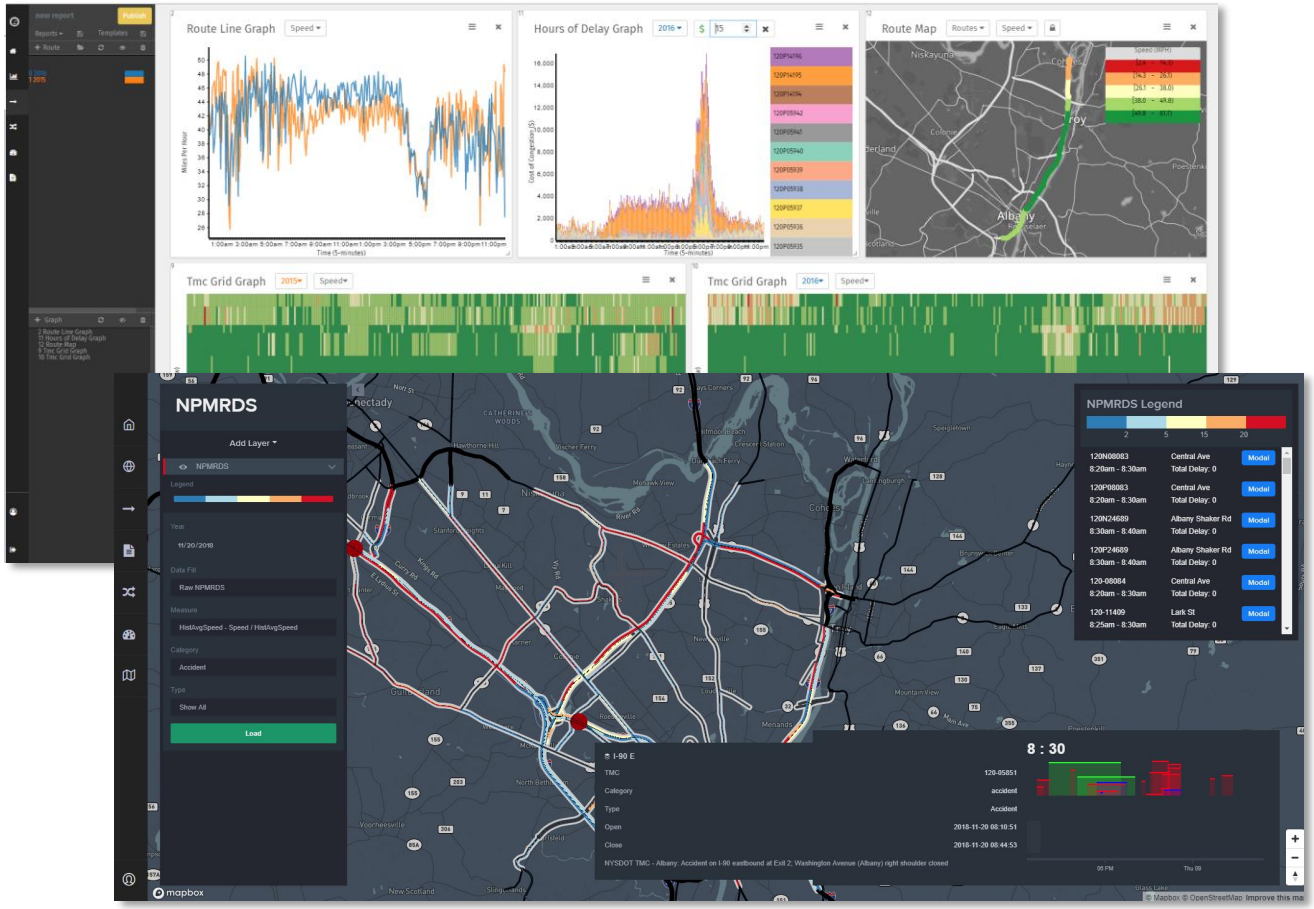
Leveraging NPMRDS for uses beyond PM3

- Congestion Management Planning
- Corridor Analysis
- Network Analysis
- Bottleneck Identification
- Project Prioritization
- Post-Project Analysis
- Incident Post-mortem Analysis



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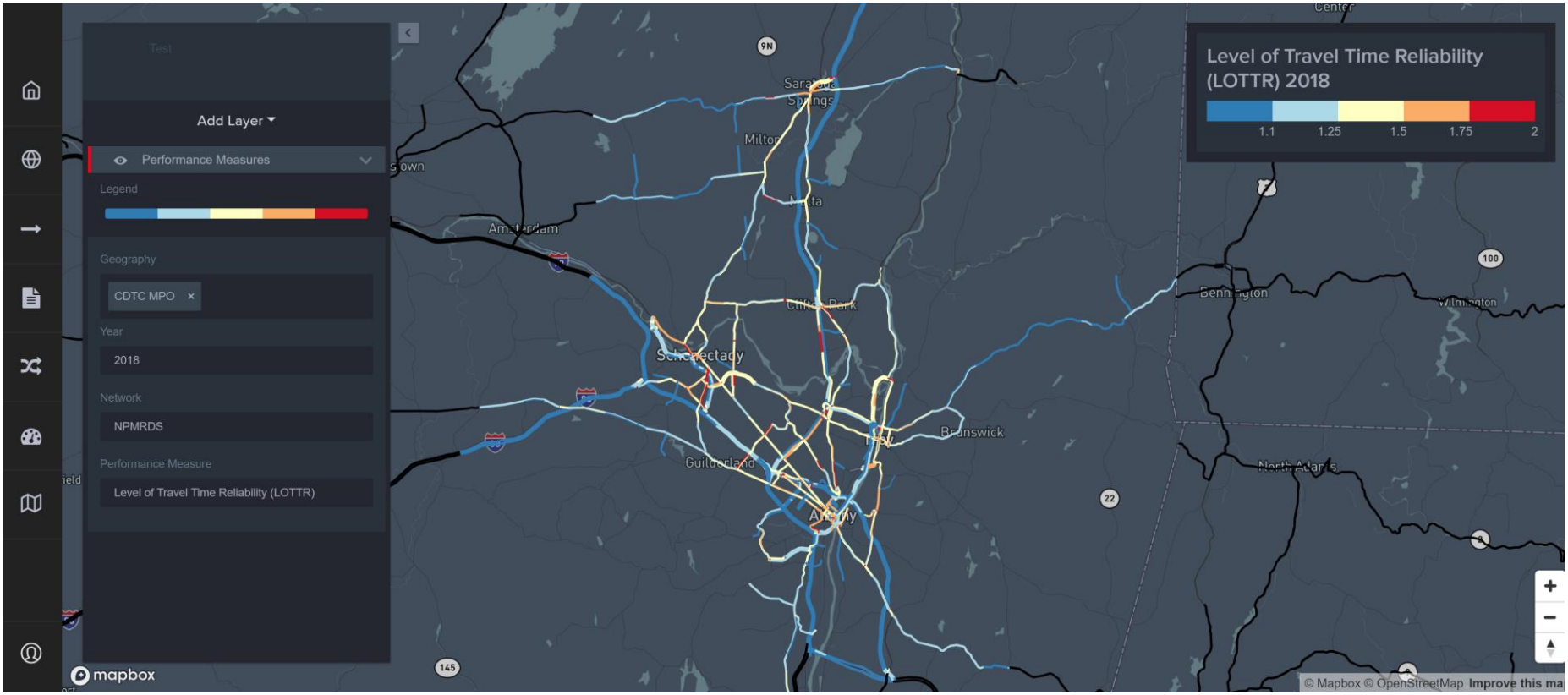
Macro Tools for Congestion Management Planning



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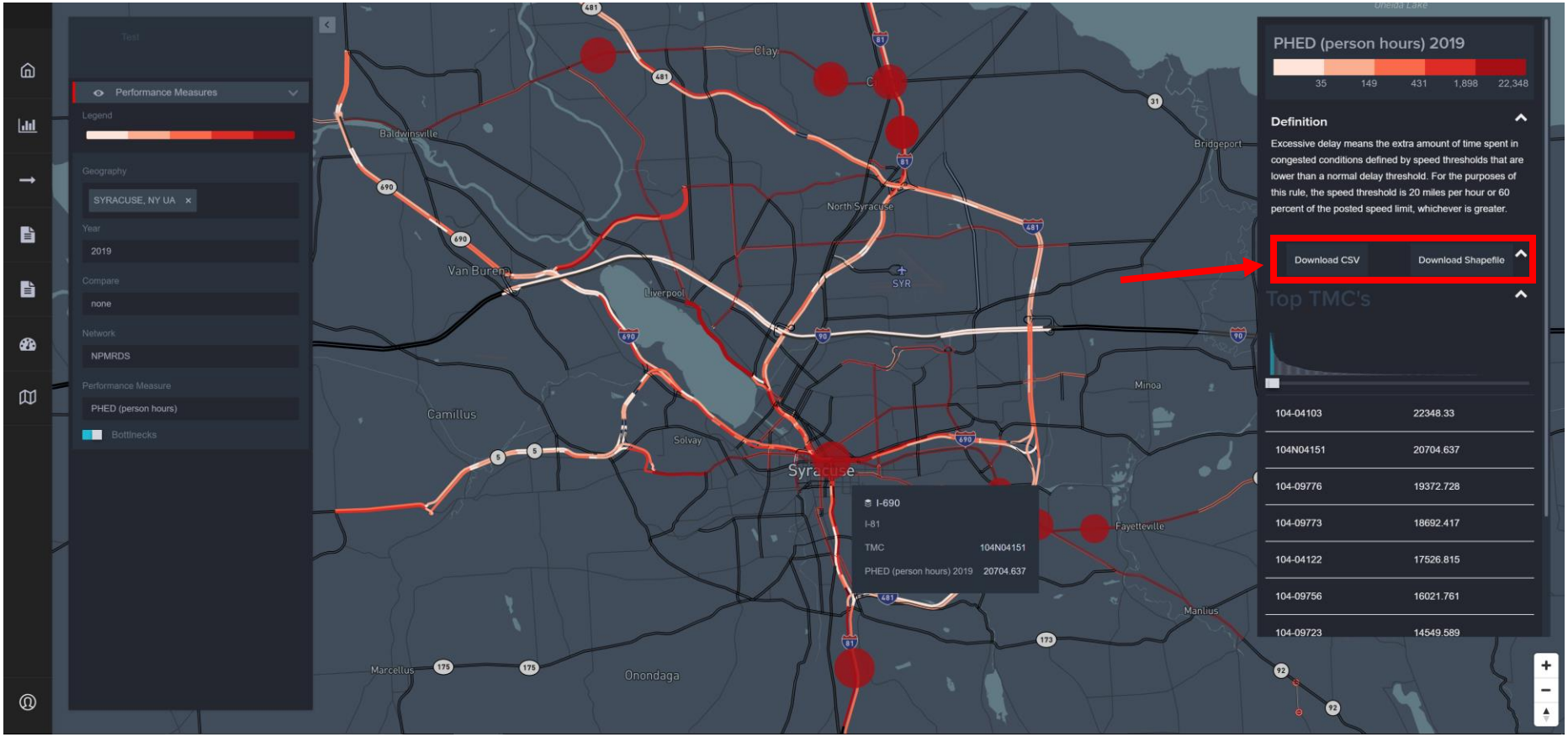
Performance Measure Scores by Segment
CSV and Shapefile Downloads



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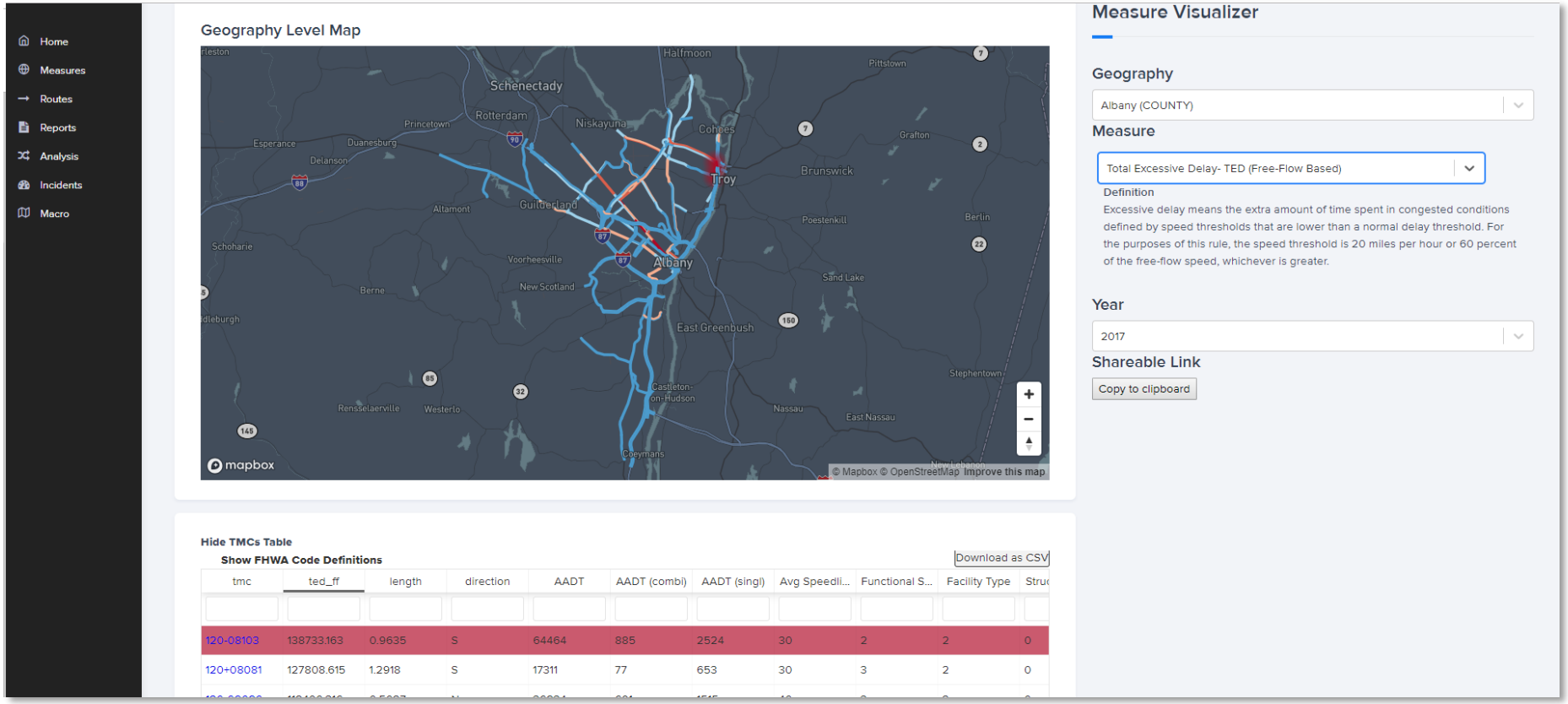
Macro Tools for Congestion Management Planning



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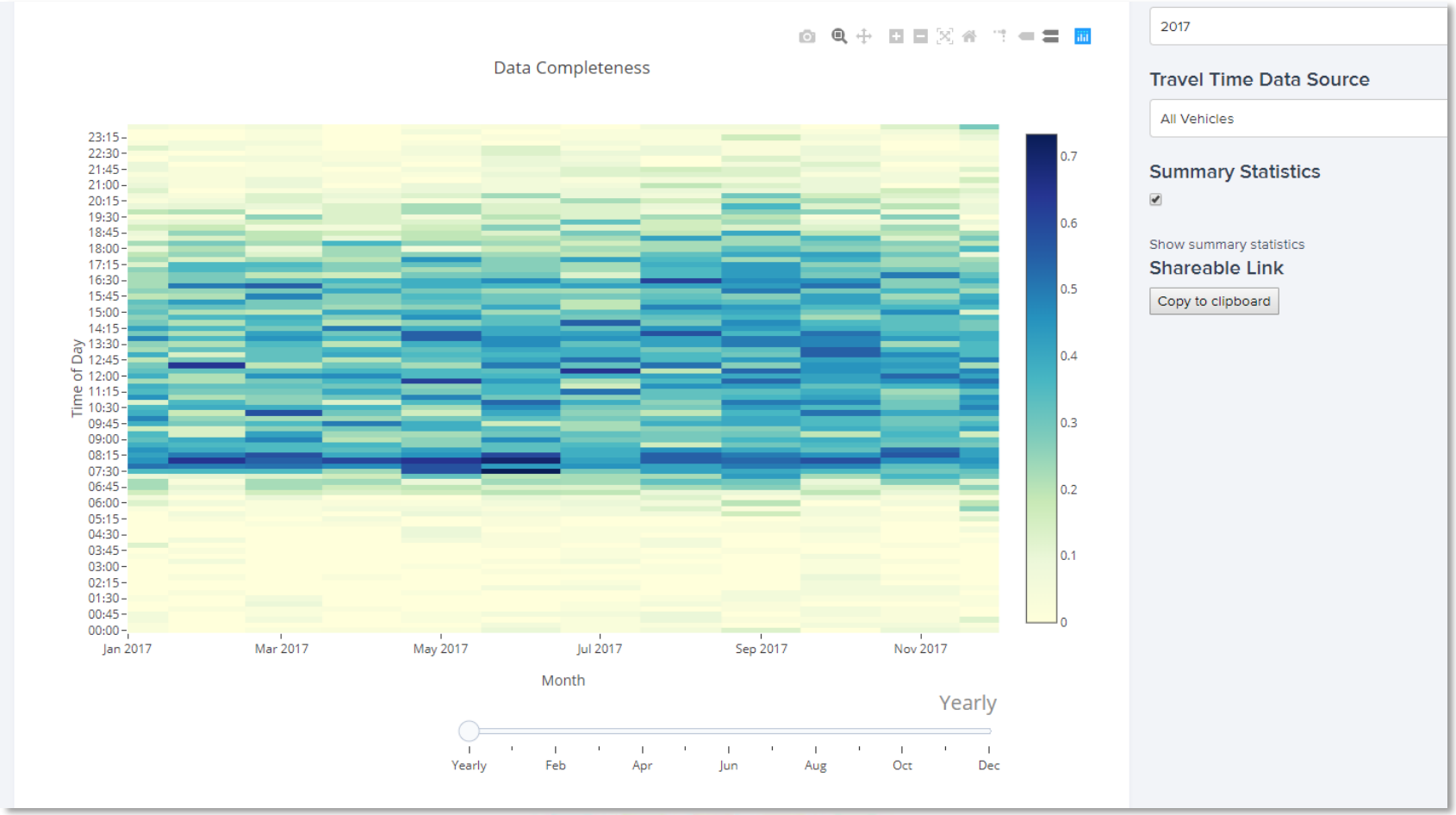
TMC Analysis Tools for Congestion Management Planning



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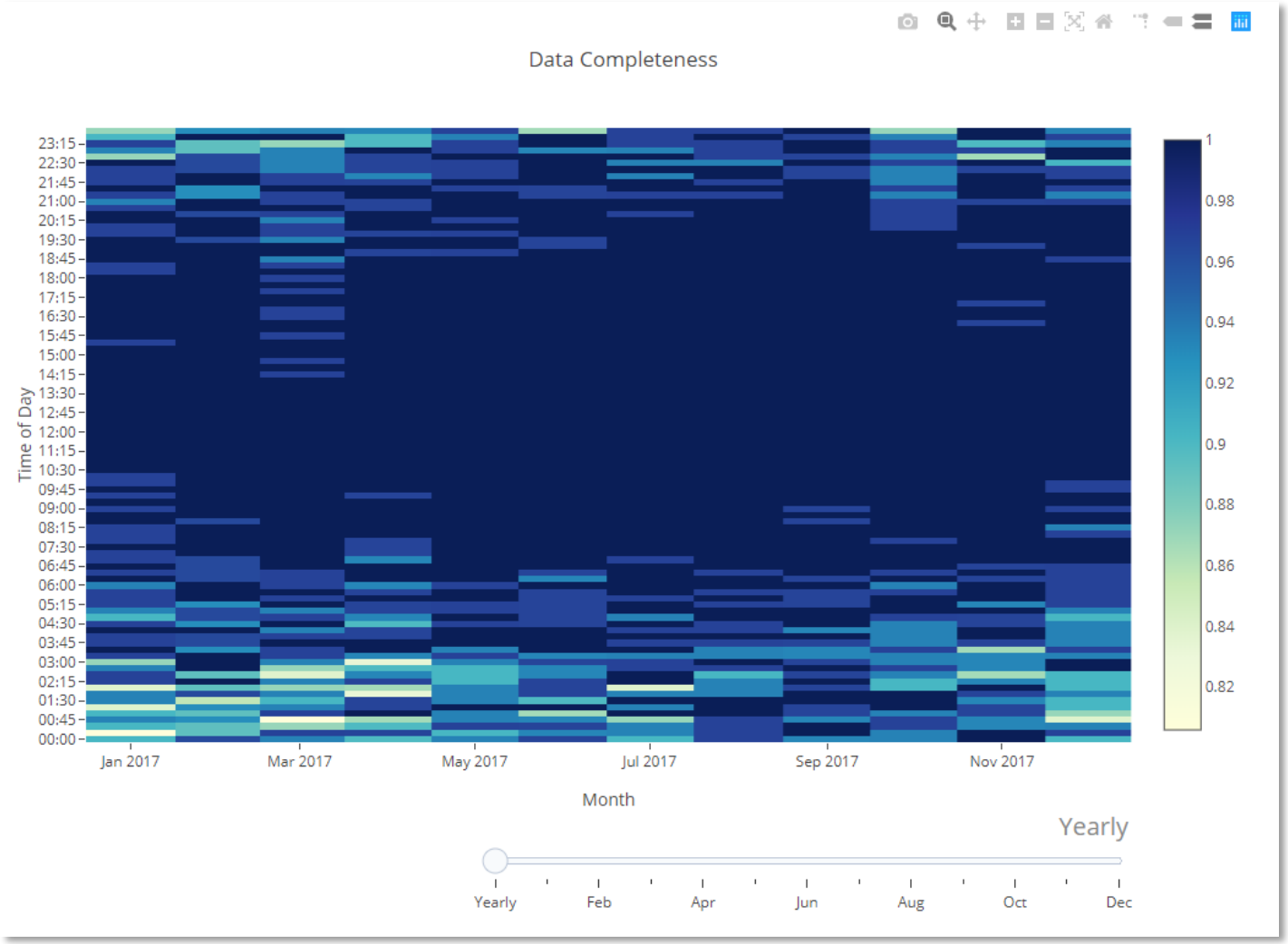

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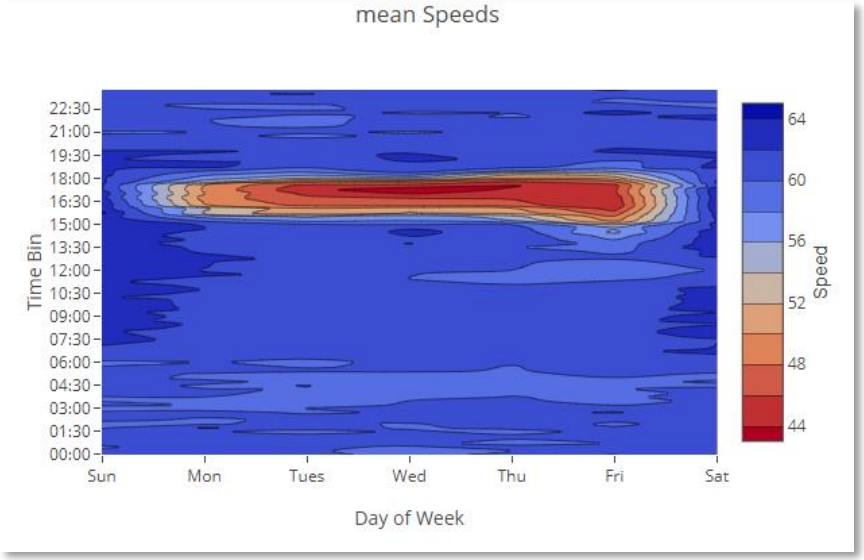
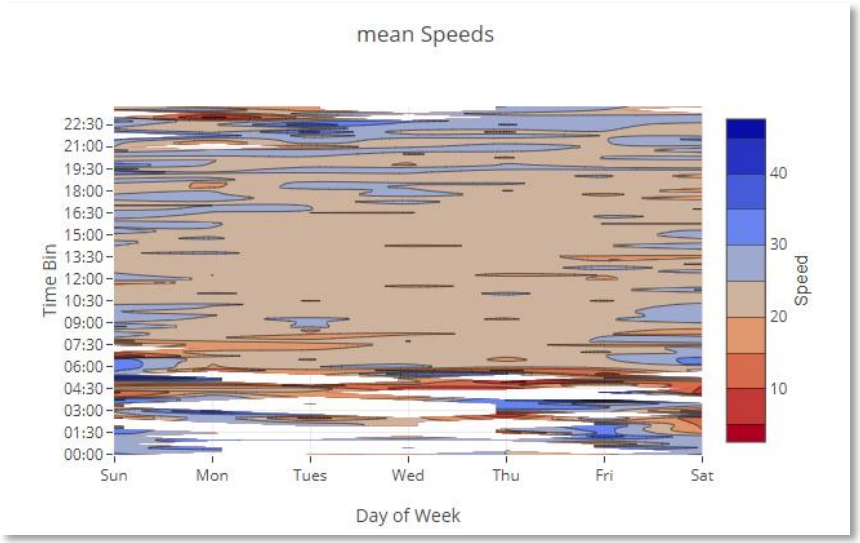
TMC Analysis Tools for Congestion Management Planning
Comparison of Arterial Segment to Interstate Segment



Interstate Segment



Arterial Segment

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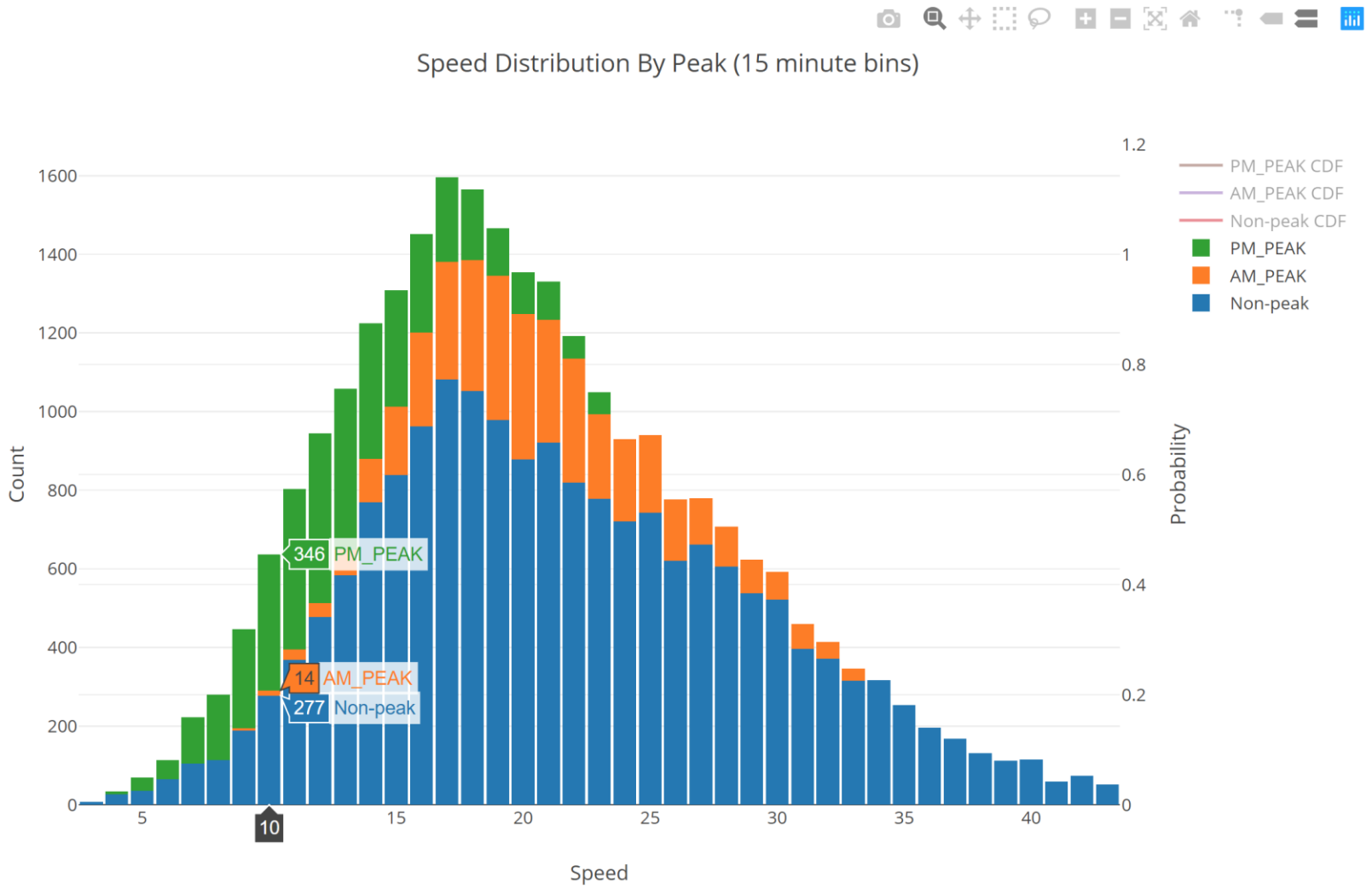
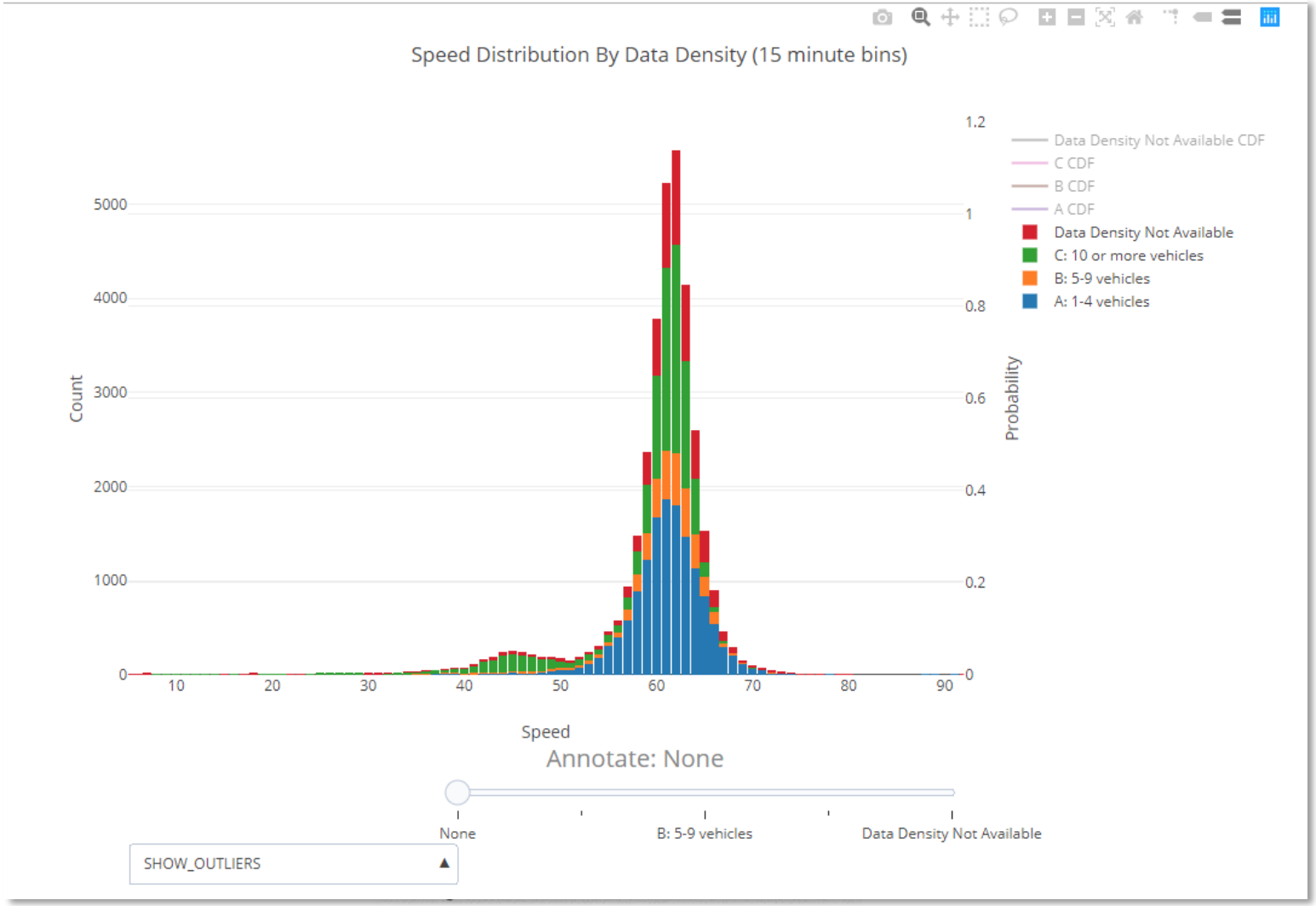
TMC Analysis Tools for Congestion Management Planning



TMC Analysis Tools for Congestion Management Planning



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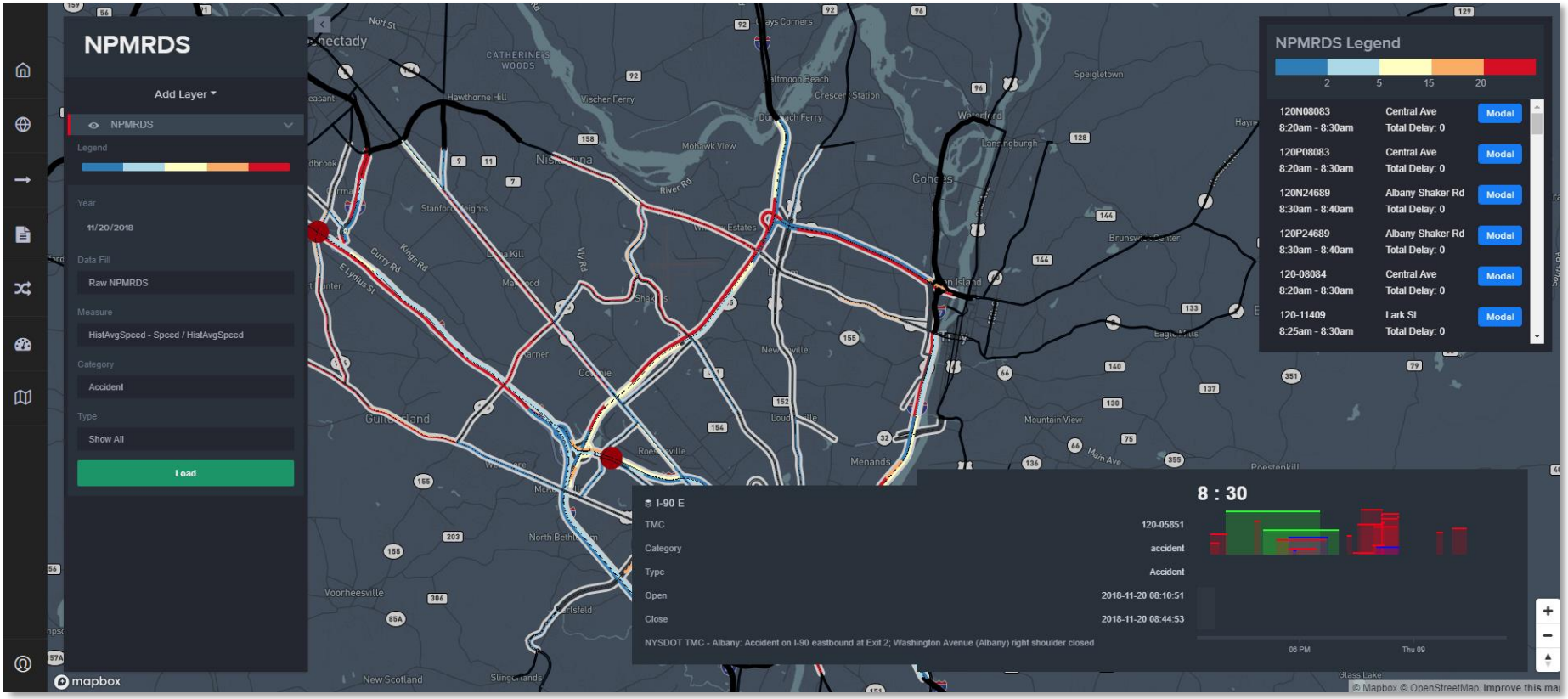
Network Analysis Tools for Incident Detection and Analysis



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Data Integration

AVAIL has begun to integrate many other geo-spatial transportation datasets through conflation of the NPMRDS shapefile to the LRS and HPMS shapefiles

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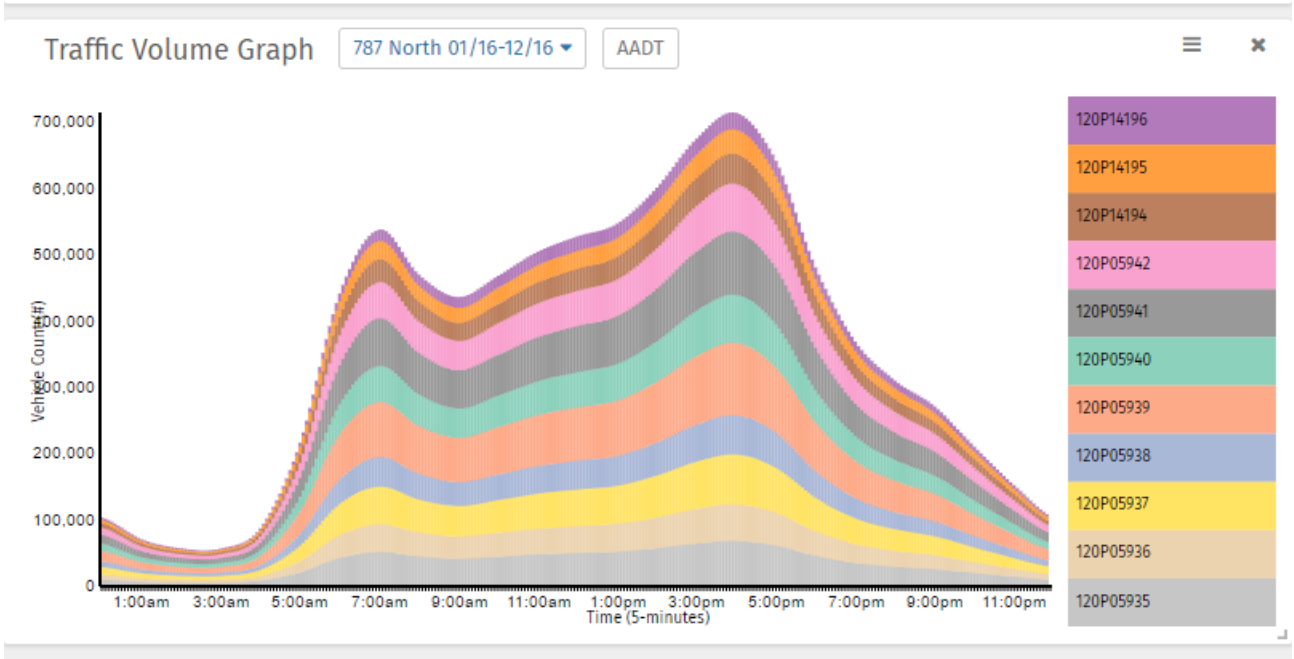
Data Integration



AADT and Short Counts

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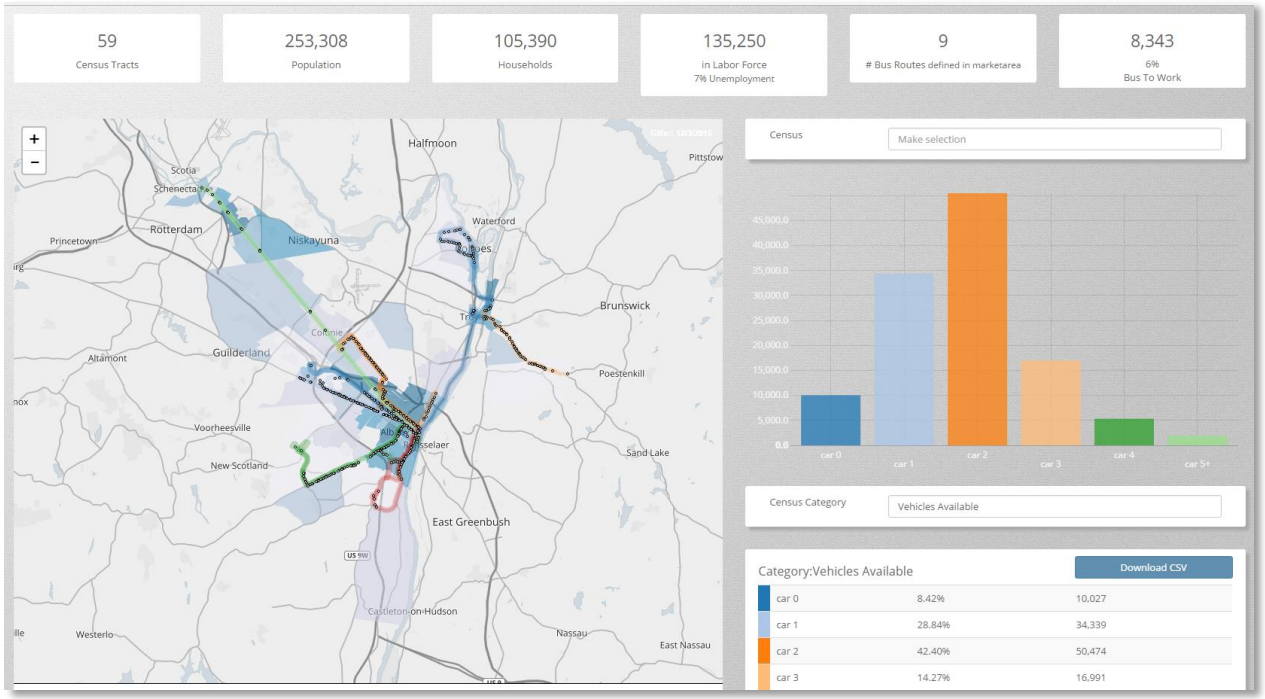
Forward Looking

- Transearch
- Socio-economic-demographic effects of transportation network,
  - Census/Infogroup etc.
- Site-Specific Volume Delay Functions
- Merging real-time probe data with historic analytics for forecasting
  - Statistical Probability Distributions based on time of day and current counts/speeds,



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Expanded Data

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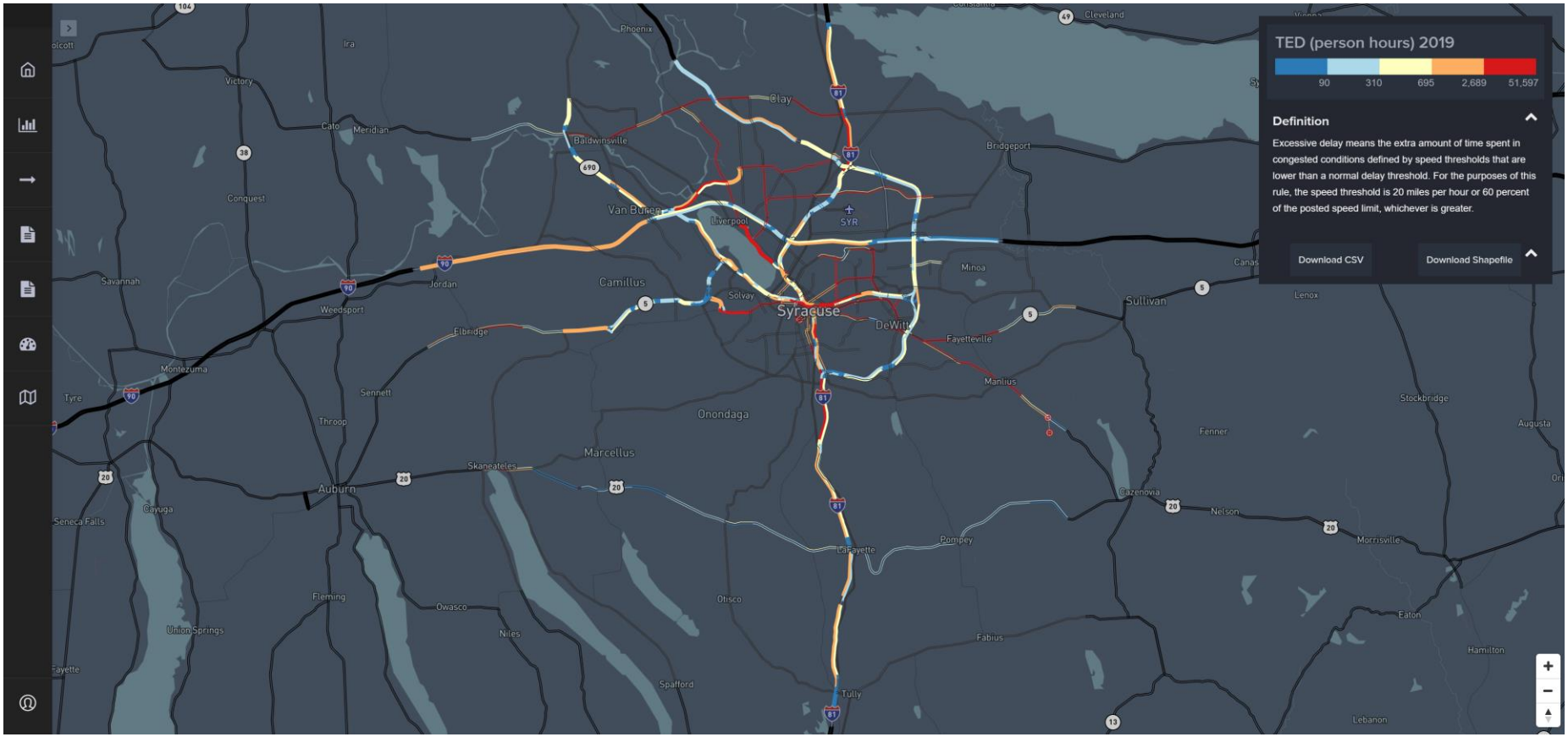
Onondaga County Without Expanded Network



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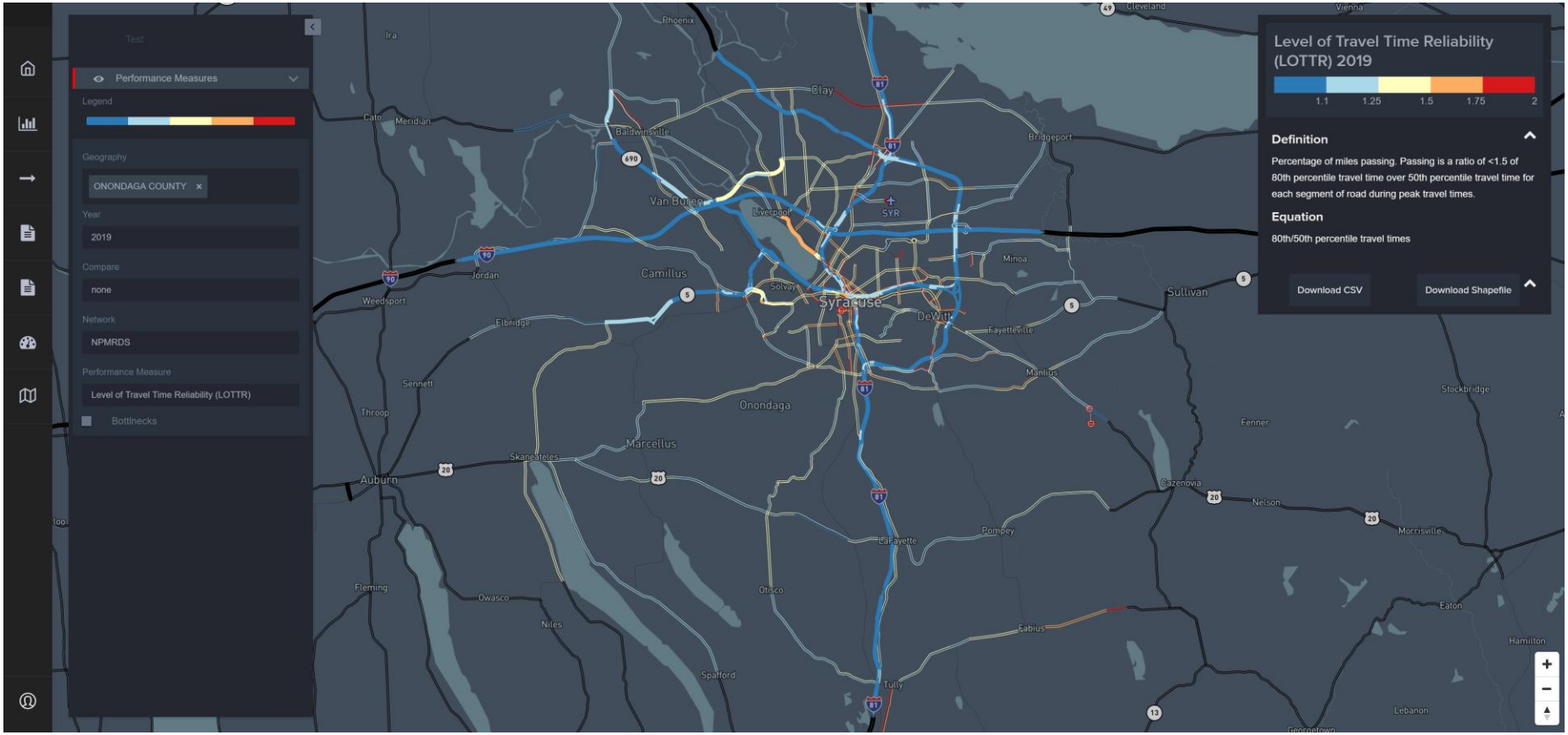
Onondaga County With Expanded Network



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Onondaga County Expanded Network

Before/After

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Examples of NPMRDS Based Analysis

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Corridor Analysis Tools
Penn Station Amtrak Track Work

Comparing traffic on the LIE entering Manhattan from June and July of 2017 to June and July of 2018

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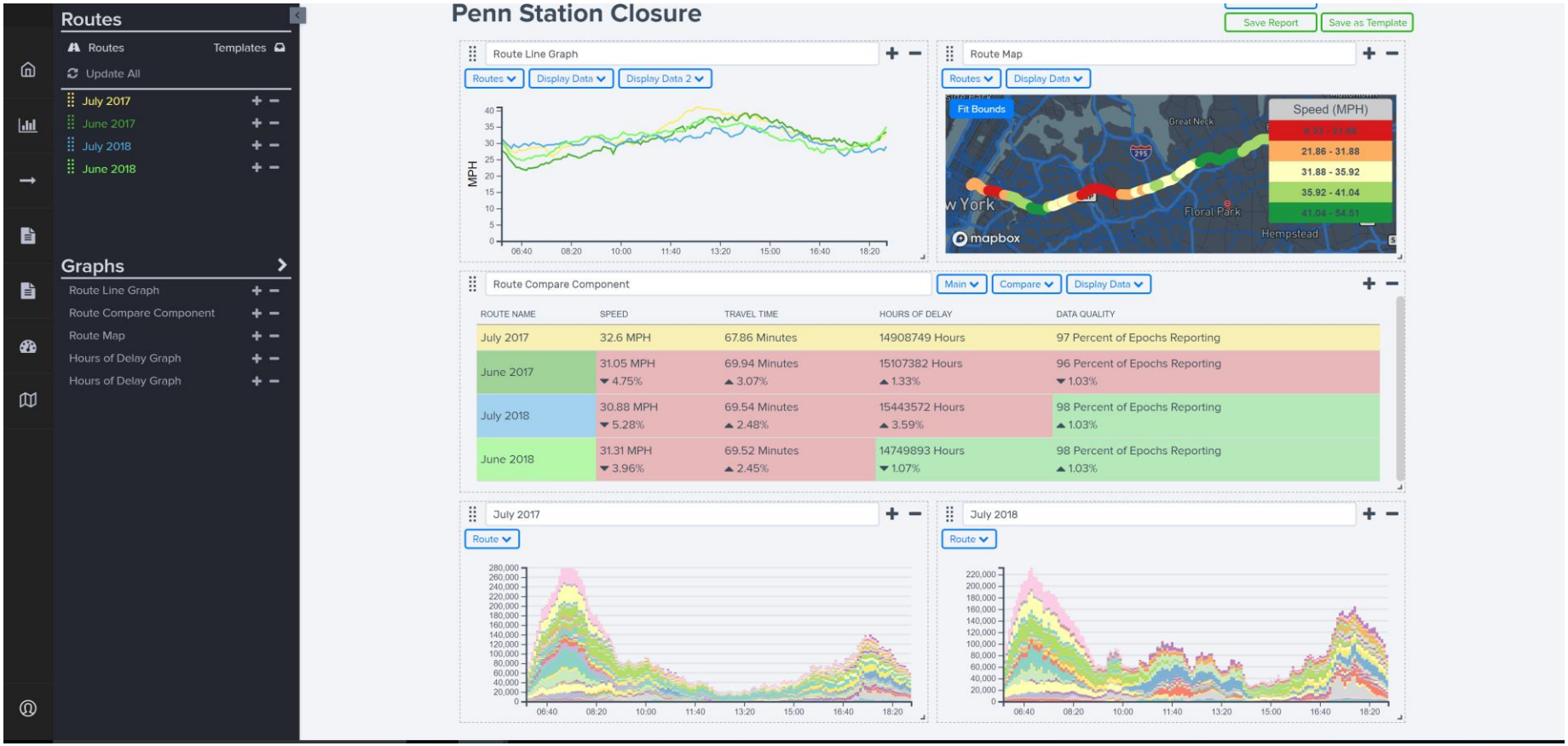
Penn Station Amtrak Track Work



Speeds and Travel Times were stable even though a significant number of public transportation commuters were forced to find other means of travel.

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Corridor Analysis Tools
Penn Station Amtrak Track Work

Route Compare Component | Main | Compare | Display Data

ROUTE NAME	SPEED	TRAVEL TIME	HOURS OF DELAY	DATA QUALITY
July 2017	32.6 MPH	67.86 Minutes	14908749 Hours	97 Percent of Epochs Reporting
June 2017	31.05 MPH ▼ 4.75%	69.94 Minutes ▲ 3.07%	15107382 Hours ▲ 1.33%	96 Percent of Epochs Reporting ▼ 1.03%
July 2018	30.88 MPH ▼ 5.28%	69.54 Minutes ▲ 2.48%	15443572 Hours ▲ 3.59%	98 Percent of Epochs Reporting ▲ 1.03%
June 2018	31.31 MPH ▼ 3.96%	69.52 Minutes ▲ 2.45%	14749893 Hours ▼ 1.07%	98 Percent of Epochs Reporting ▲ 1.03%

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Rexford Bridge Pre/Post Construction

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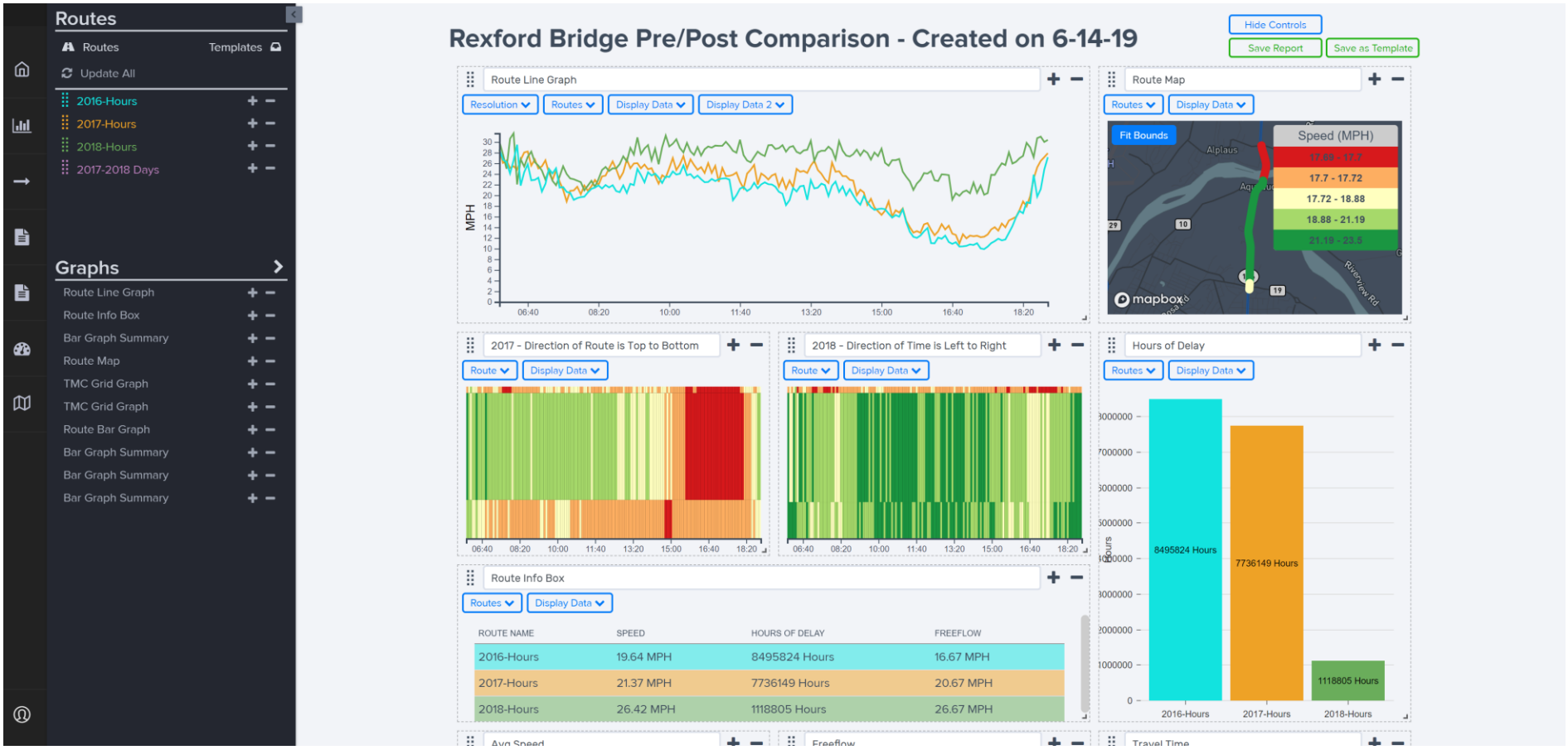
Corridor Analysis Tools
Rexford Bridge Open July 2017



Hours of Delay have decreased dramatically since the opening of the new Rexford Bridge

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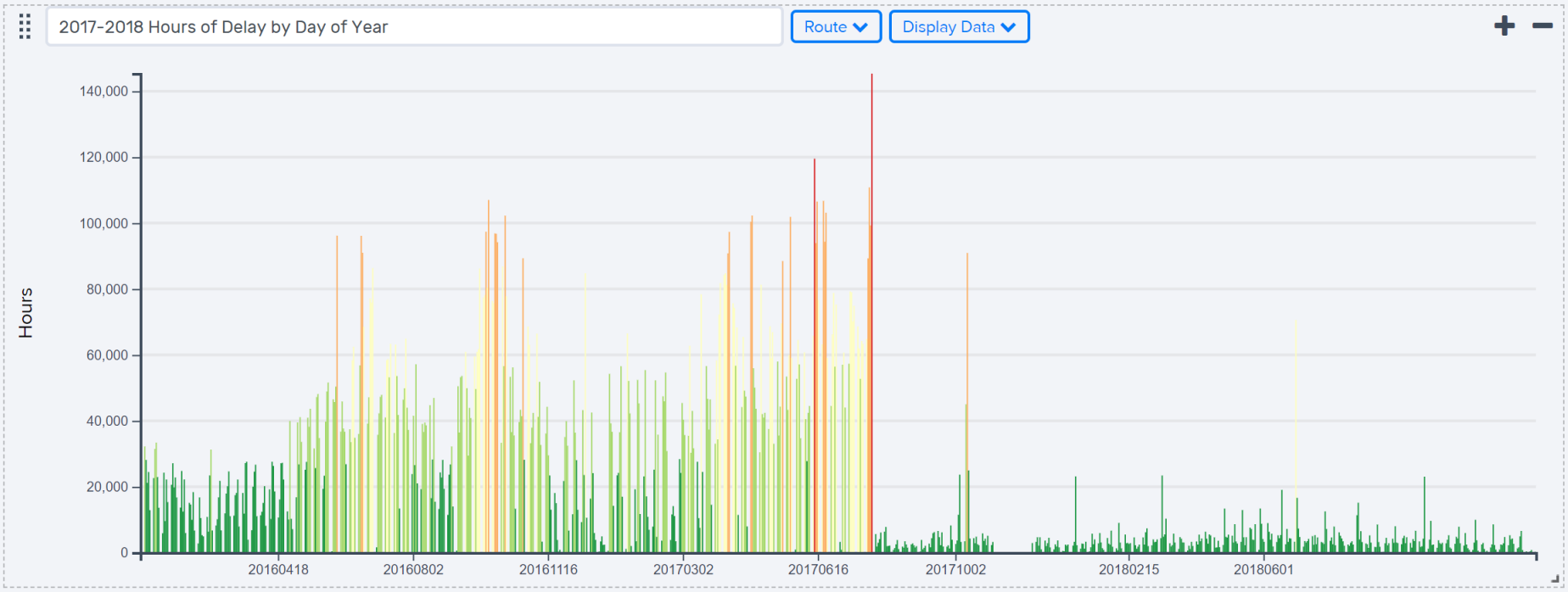
Corridor Analysis Tools
Rexford Bridge Open July 2017



The corridor analysis tools provide a variety of data resolution tools. Here we see hours of delay for every day since January 1, 2016 on the X-Axis. Hours of delay decreased significantly after the new bridge was opened.

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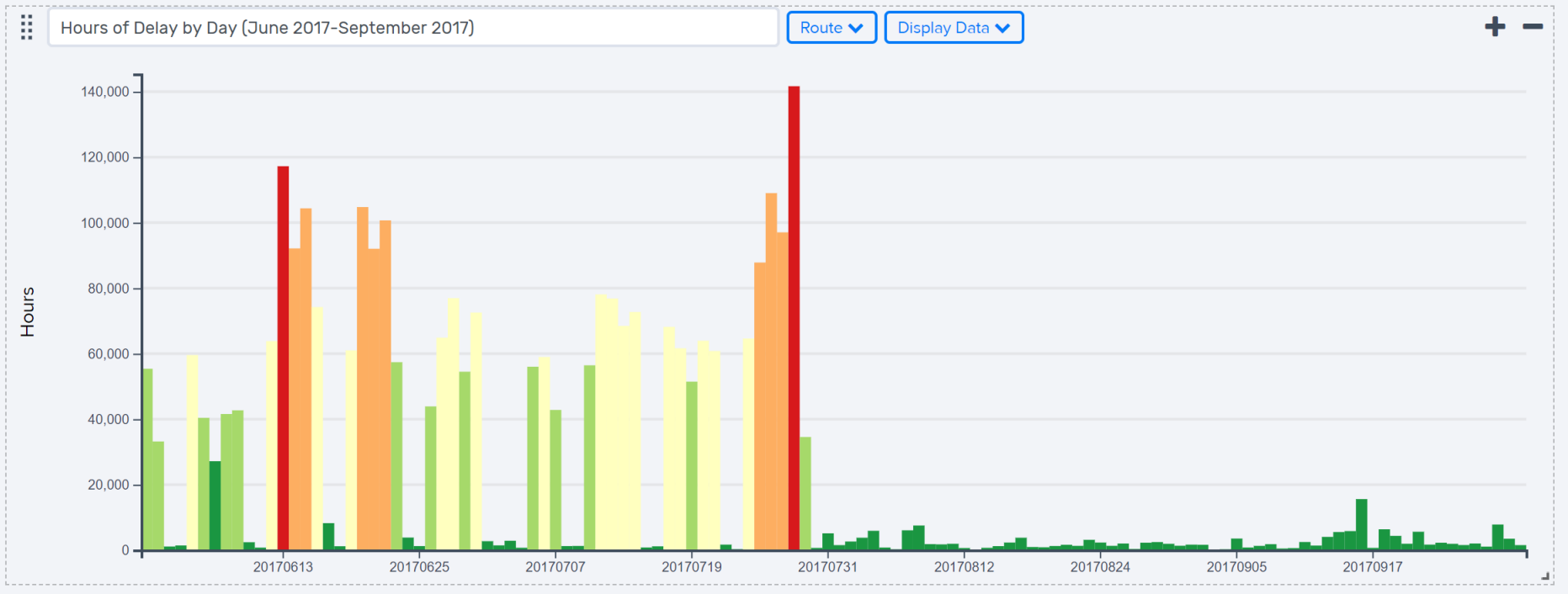
Corridor Analysis Tools
Rexford Bridge Open July 2017



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Post Project Analysis Case Study:
The Tappan Zee (Mario Cuomo) Bridge Opening

Here we see Speeds before and after the opening of the final span of the Mario Cuomo Bridge

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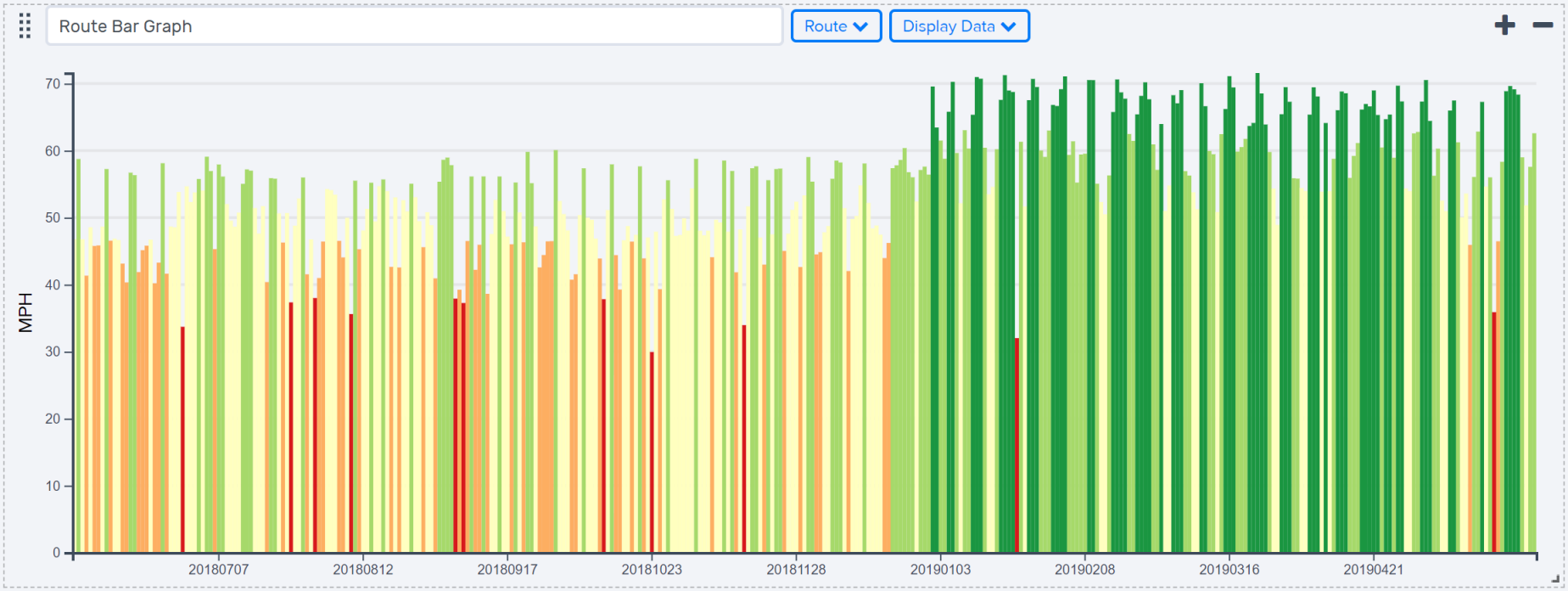
Post Project Analysis Case Study: The Tappan Zee (Mario Cuomo) Bridge Opening



Route Compare Component | Main | Compare | Display Data

ROUTE NAME	SPEED	TRAVEL TIME	HOURS OF DELAY
Pre - Tappan Zee South 4	49.84 MPH	4.67 Minutes	4491739 Hours
Post - Tappan Zee South 4	61.77 MPH ▲ 23.94%	4.19 Minutes ▼ 10.28%	2407623 Hours ▼ 46.40%

Here we see Speeds before and after the opening of the final span of the Mario Cuomo Bridge

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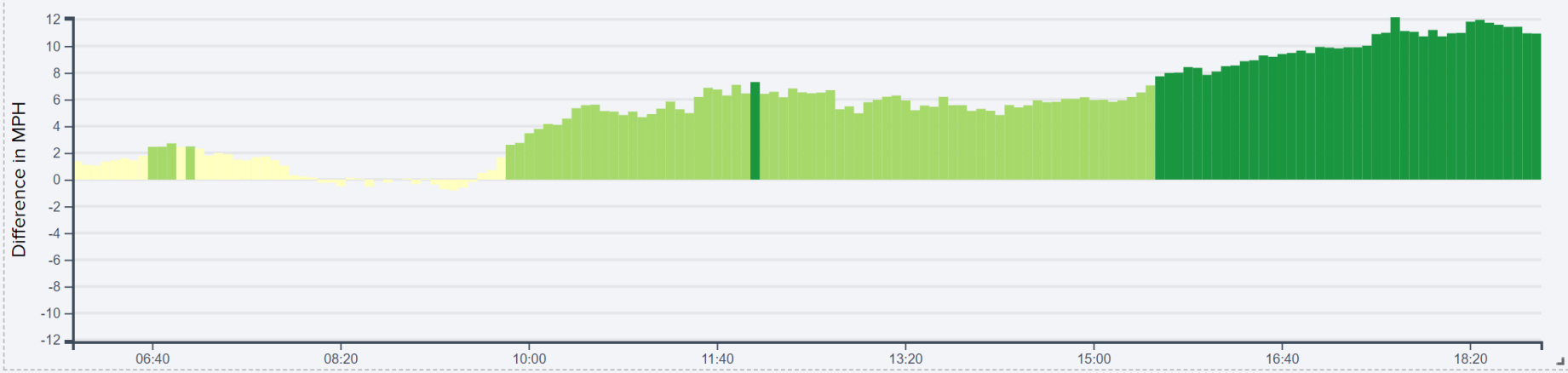
Post Project Analysis Case Study: The Tappan Zee (Mario Cuomo) Bridge Opening

Speeds 2016 vs 2018 | Main | Compare | Display Data



Route Compare Component | Main | Compare | Display Data

ROUTE NAME	SPEED	TRAVEL TIME	HOURS OF DELAY
2016 - Tappan Zee South5	43.87 MPH	13.33 Minutes	66982658 Hours
2017 - Tappan Zee South5	47.15 MPH ▲ 7.48%	12.3 Minutes ▼ 7.73%	41531215 Hours ▼ 38.00%
2018 - Tappan Zee South5	49.24 MPH ▲ 12.24%	11.92 Minutes ▼ 10.58%	47570840 Hours ▼ 28.98%

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Incident Analysis
Beer Truck Rollover on the BQE

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Incident Case Study:
Beer Truck Rollover on the BQE

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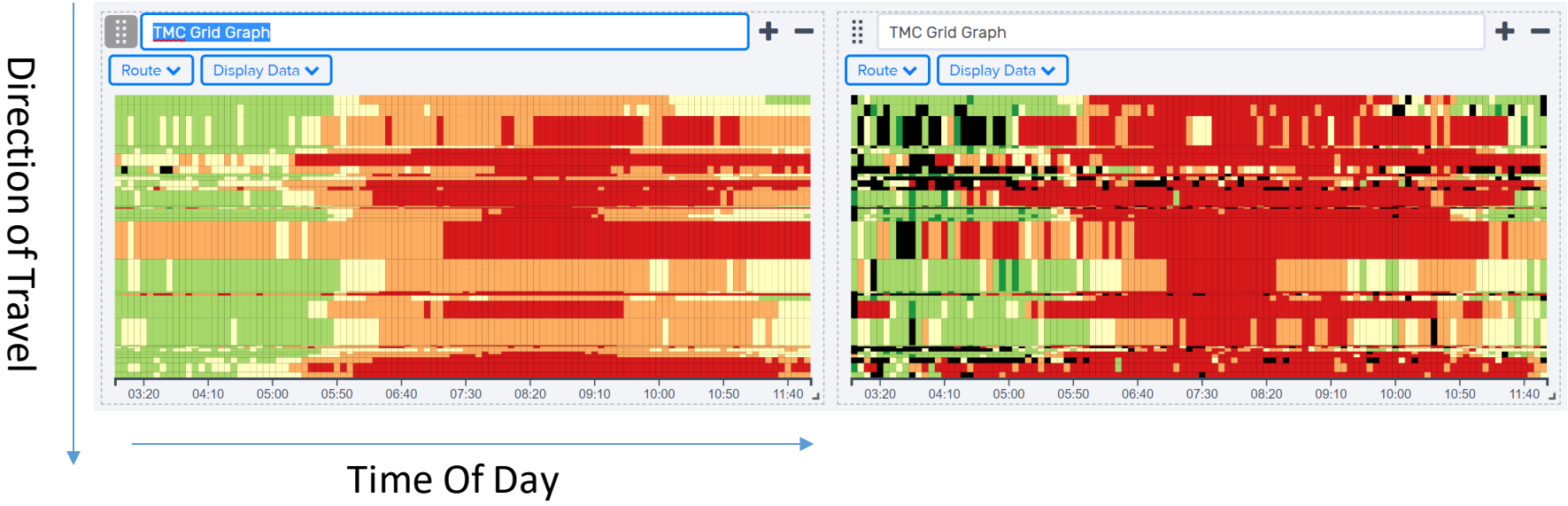
Incident Case Study:
Beer Truck Rollover on the BQE

Avg Day

Incident



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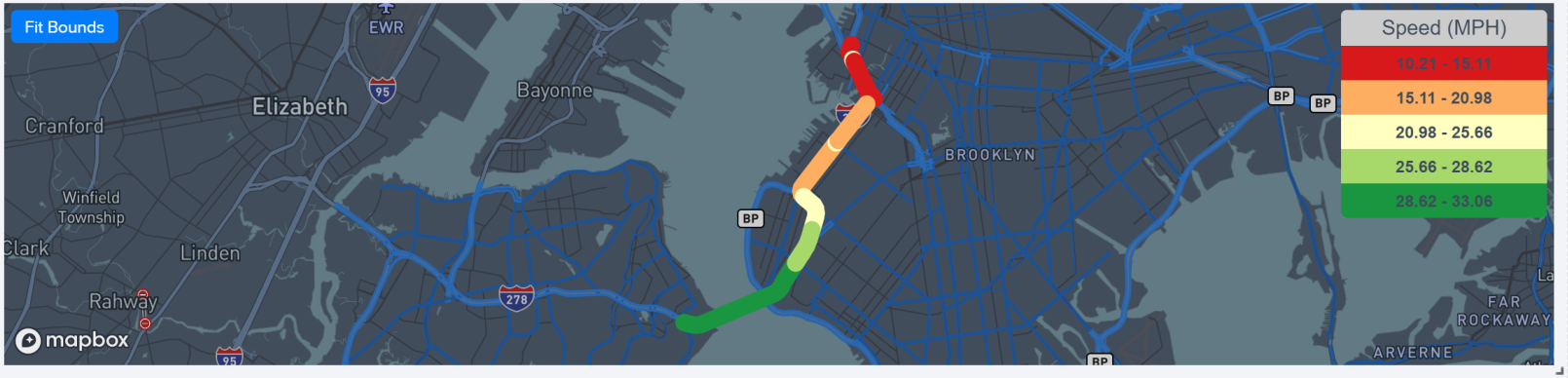
Incident Case Study:
Beer Truck Rollover on the BQE

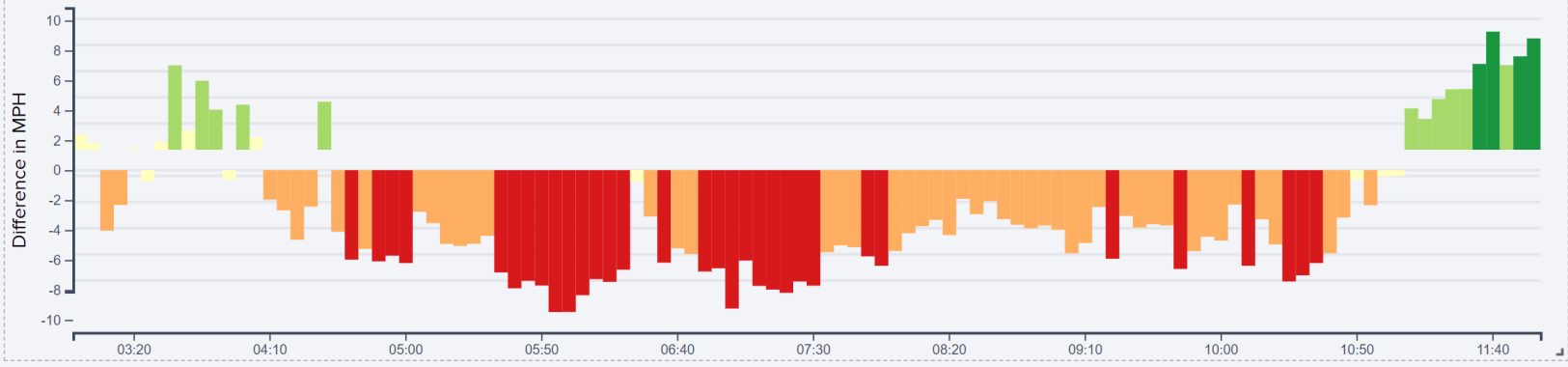
Route Map | Routes | Display Data



Route Compare Component | Main | Compare | Display Data

ROUTE NAME	SPEED	TRAVEL TIME	HOURS OF DELAY
Normal Day	27.65 MPH	46.64 Minutes	73926282 Hours
Beer Truck Rollover	22.44 MPH ▼ 18.84%	80.05 Minutes ▲ 71.63%	4864025 Hours ▼ 93.42%

Route Difference Graph | Main | Compare | Display Data



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Corridor Analysis
I-87 Northbound to the Twin Bridges

Incident at the Twin Bridges

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Incident Analysis

This case study shows an incident on I-87 Northbound at the Twin Bridges from November 21, 2016

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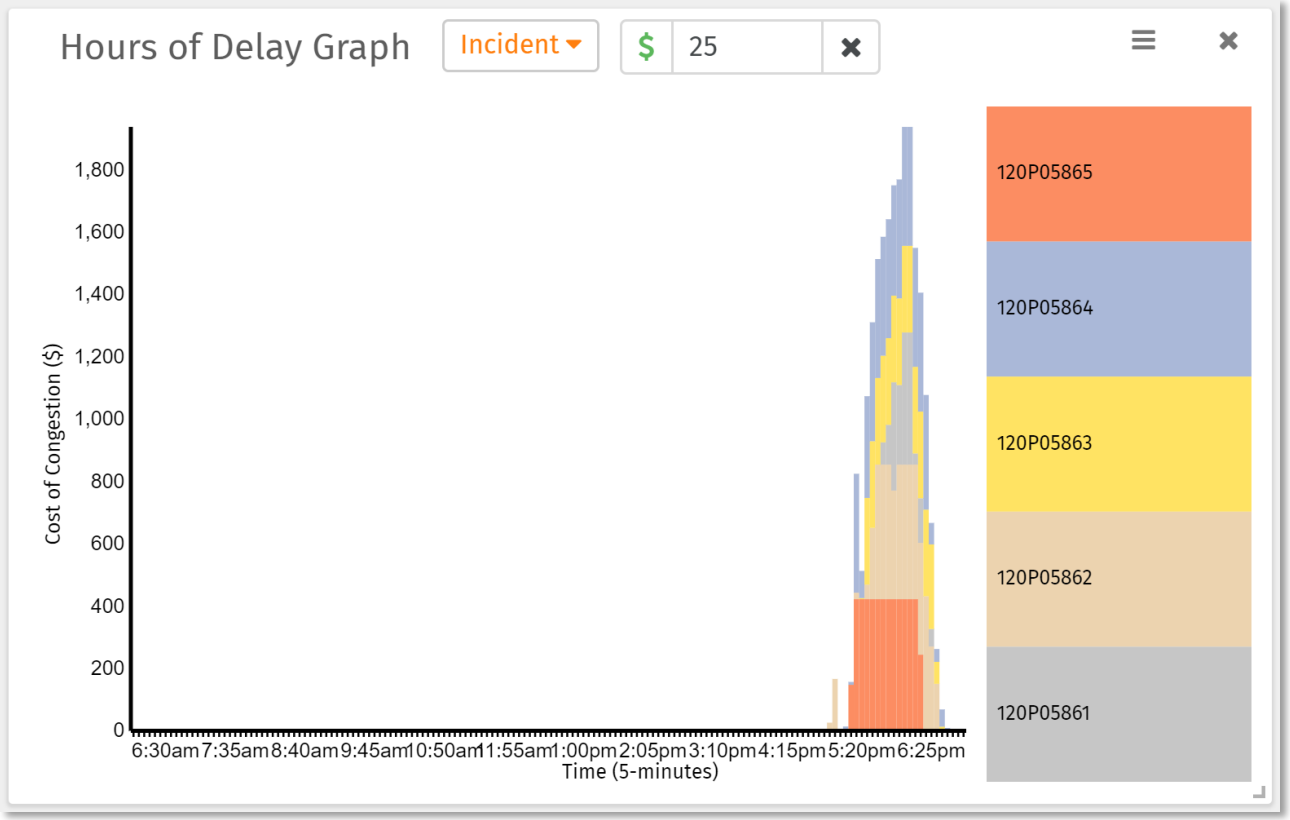
Incident Analysis



Hours of Delay and Cost of Delay associated with the selected incident

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Lewis Mumford Center
University at Albany, SUNY