RHODE ISLAND CONGESTION MANAGEMENT PROCESS

ANNUAL REPORT: JUNE 2021

Congestion Performance Monitoring Report

Introduction

A CMP is a systematic process for identifying congestion and its causes, developing monitoring processes to measure transportation system performance and reliability, and developing congestion management strategies and moving them into the funding and implementation stages.

All metropolitan areas with populations greater than 200,000 residents, known as Transportation Management Areas, are required by Federal regulations (23 U.S.C. 134(k)(3)) to develop a Congestion Management Process. The original Federal regulations on the Congestion Management Process date back to the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. These regulations were retained and largely unchanged by subsequent Federal legislation, including the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act.

The Rhode Island Congestion Management Process/Plan (CMP) was reviewed by the State Planning Council in the Summer of 2020 and adopted as a component of Transportation 2040 – Rhode Island's Long-Range Transportation Plan (LRTP) in December 2020.

As a part of the CMP, the Congestion Management Task Force (CMTF) recommended that an annual report be generated to monitor the status of ongoing projects related to congestion and to update performance measures with data from the last year.

The 2020 CMP collected travel time performance data from 2018 as a baseline. In this report, performance measure data is being collected from 2019. The reasoning for the delay in data collection is that some data cannot be confidently reported until very late in the following year. Rather than compile an incomplete data set, we have opted to report on the older data on a year to year basis until data collection methods have been improved. Trends, project status, and other elements of this report, however, will be up to date as of Spring 2021.

Congestion Mitigation Project Inventory Update

In the CMP, an inventory of over 130 projects was compiled in an effort to understand which projects from the State Transportation Improvement Program (STIP) and other plans were going to contribute to congestion mitigation. In this section, we provide any updates to the status of those projects that have been made since last year.

It is worth noting that the State is currently working to complete a new STIP for Federal Fiscal Years 2022 – 2031. STIP 2022 – 2031 will have many of the same projects listed as STIP 2018 – 2027, however, projects may be emphasized differently, gained funding or fiscal constraint, or have been completed. In addition, tracking individual projects, other than those included in the STIP, is challenging as most are not being overseen by RIDSP. Nonetheless, the list below outlines any updates from the project statuses included in the original CMP. Please note that the projects below are taken from the 2018-2027 STIP and not the one currently in progress.

<u>Pell Bridge Ramps, Phase 1: STIP ID 1364</u>

- This $15.25 million project in Newport/Middletown is currently under construction.
- Description: Full reconstruction of JT Connell & Coddington Highway, miscellaneous safety and traffic signal improvements in preparation for Phase 2, and the construction of a shared use path.
- Intervention Type: ITS/Operations and Bicycle/Pedestrian

<u>Pawtucket/Central Falls Transit Center: STIP ID 5011</u>

- This $50.91 million project is currently under construction.

- Description: Proposed MBTA commuter rail station adjacent to downtown Pawtucket, and potential TOD, providing convenient access to employment centers in Boston and Providence.
- Intervention Type: Transit operations

Woonsocket Main Street Improvements: STIP ID 5309

- This $5 million project is currently under construction.
- Description: Repaving Sidewalks, elongated bump out for pedestrian crossings, lighting improvements, new crosswalks, ADA ramps, bike parking facilities, shared lane markings, signage, street trees, creation of roundabouts, and bike/ped connections to river.
- Intervention Type: Bicycle/Pedestrian

Statewide Passenger Facilities: STIP ID 7012

- This $21.85 million project is currently under construction.
- Description: This program funds improvements to bus stops, hubs, and intermodal facilities.
- Intervention Type: Transit Operations

Route 4 and I-95 Interchange Connectivity: STIP ID 3350; LRTP# 40

- This estimated $90 million project is in the design phase.
- Description: Connect I-95N to Rt 4 S, Rt 4N to I-95S
- Intervention Type: Roadway

Route 146 at Sayles Hill Road: STIP ID 3250; LRTP #16

- This estimated $150 million project is in the design phase.
- Description: Eliminate the traffic signal using grade separation. RIDOT requested $90 million in INFRA 2020 application.
- Intervention Type: Roadway

Route 403 Deferred Ramps: STIP ID 3350; LRTP #17

- This estimated $100 - $500 million project is in the design phase.
- Description: Construct additional ramps to remove traffic from Devil's Foot Rd and Post Road
- Intervention Type: Roadway

Alleviate Bottleneck on I-195 WB @ Broadway: STIP ID 3082; LRTP #68

- This estimated $80 million project is in the design phase.
- Description: I-195 WB has a lane drop between Broadway and the Washington bridge, creating a bottleneck and high congestion. Solution would add a lane to increase capacity. Note, current ROW is constrained and would require significant rebuild of retaining wall.
- Intervention Type: Roadway

Implement Bus on Shoulder on Hwy 146 Southbound: STIP ID 3250

- This project is in the design phase.
- Description: Implement bus on shoulder on 146 SB from Mineral Spring to Downtown (2.3 miles). Concerns about the southern limit/terminus at I-95.
- Intervention Type: Bus

BRT: STIP ID 7017

- This project is in the study and development phase.
- Description: Providence-CCRI Warwick via TF Green Airport
- Intervention Type: Transit Operations

Light Rail Transit/BRT: STIP ID 7020

- This project is in the study and development phase.
- Description: Central Falls-CCRI Warwick via Pawtucket and Providence Station
- Intervention Type: Transit Operations

Congestion Management Performance Measures

Congestion data was compiled in the original CMP for baseline year 2018. This year, we are reporting the data from calendar year 2019, as well as a few updates to the 2018 baseline data that have been adjusted as a part of this annual reporting process. This data composition is a joint effort from RIDOT, RIPTA, RIDSP, and our consulting team. Performance measure definitions, data sources, and calculation procedures can be found in Appendix A of the CMP. The color-coding **red** and **green** in the Congestion Management Performance Measure Tracking below indicates if a performance measure **improved** or **worsened** in 2019 from the 2018 baseline.

Congestion Management Performance Measure Tracking				
Objective	**Performance Measure**	**CY 2018 (Baseline)**	**CY 2018 baseline amended**	**CY 2019**
A. Improve Reliability of the Transportation System	A.1 Interstate Reliability	78.6%	-	**80.6%**
	A.2 Non-Interstate Reliability	88.7%	-	**88.4%**
	A.3 CMP Network Reliability	92.0%	-	**92.3%**
	A.4 Reliability During Inclement Weather on CMP Network	91.9%	-	**92.3%**
	A.5 Reliability Through Work Zones on CMP Network	91.1%	-	**87.8%**
	A.6 RIPTA Bus Reliability (ratio of 80th to 50th percentile time)	1.16	-	**1.21**
	A.7 Average Incident Clearance Time (minutes)	29	-	**30**
	A.8 Average Incident Rate (incidents/million VMT)	1.75	-	**1.59**
B. Reduce Recurring Congestion	B.1 Peak-Hour Excessive Delay (PHED) (millions of hours)	14.71	-	**15.45**
	B.2 PHED on CMP Network on CMP Network (millions of hours)	9.34	-	**10.91**
	B.3 PHED During Inclement Weather on CMP Network (millions of hours)	3.72	-	**4.93**
	B.4 PHED Through Work Zones on CMP Network (millions of hours)	0.37	-	**1.09**
	B.5 Number of Bottlenecks	160	-	**148**
	B.6 Total Delay at Bottlenecks (millions of hours)	2,900	-	**2,489**
	B.7 Transit Vehicle Load Factor (% of passenger-hours at load factor >1)	2.9%	-	**4.7%**
	B.8 Passenger-Hours of Delay on RIPTA Buses	9,000**	-	**94,569**
C. Improve Freight and Goods Movement	C.1 Truck Reliability on Interstates	1.79	-	1.79
	C.2 Truck Reliability on Freight Corridors	1.48	-	**1.50**
	C.3 Number of Freight Bottlenecks	27	-	**30**
	C.4 Truck Congestion Costs	$82M	-	**$90M**
D. Increase Modal Choice and Competitiveness	D.1 Bike Path Mileage	241	75	**77**
	D.2 Bike Path Usage [Future Measure]	–	-	–

	D.3 HOV/Dedicated Bus-Lane Route Miles	0.8	-	0.8
	D.4 Percent of Non-SOV Travel	18.2%	-	**20.4%**
	D.5 Commuter Rail Ridership (million trips)	1.14	1.21	**1.28**
	D.6 RIPTA Bus Ridership (million trips)	16.3	-	**16.4**
	D.7 Providence/Newport Ferry Ridership	46,400	42,778	**46,405**
E. Improve Intermodal Connectivity	E.1 Percent of Population with Transit Access	18.1%	-	18.1%
	E.2 Percent of Jobs with Transit Access	21.8%	-	21.8%
	E.3 Bike System Connectivity	0.3	-	0.3
F. Promote and Invest in Innovative Congestion Management Technologies	F.1 Number of Intersections with Advanced Traffic Control*	720/1182	-	**728/1190**
	F.2 Number of Intersections with Remote Monitoring*	4/1182	-	**15/1190**
	F.3 Number of Real-time Travel Time Signs Per Route Mile	0	-	0
	F.4 Number of RIPTA Bus Routes with Transit Priority Treatment	1	-	1
G. Promote Land Development and Infill Development/ Redevelopment in Transportation-Efficient Locations	G.1 Percent of Permits in Transit Propensity Areas [Future Measure]	-	-	-
	G.2 Transportation Funds Invested in Transit Propensity Areas	TBD	-	TBD
H. Reduce Emissions and Improve Air Quality	H.1 Total Vehicle-Miles of Travel Per Capita	7,577	-	**7,159**
	H.2 Emission Reductions by CMAQ Projects [Future Measure]	-	-	-
	H.3 Counties in Air Quality Attainment	5 of 5	-	
	H.4 GHG Emissions (MMTCO2e) [Future Measure]	-	-	-
*Intersection metrics currently include those under the jurisdiction of the State and of the City of Providence. **B.8 Baseline under review				

Some measures were amended due to computational corrections from the baseline year. These include amending RIDOT mapping/roadway coding for bike path mileage and ensuring that calendar year was used instead of fiscal year since some of these measures overlap with federal reporting. For RIPTA data measures A.6, B.7, and B.8, data was exported from mid-January 2019 to mid-January 2020 for performance reporting, as that is the time frame in which data is counted upon export from their data warehouse. Performance section E is likely to shift after new data is integrated from the 2020 Census as well.

Regarding B.5 and B.6, a comparison list has been compiled to demonstrate how bottlenecks have shifted between 2018 and 2019. The list shows where the 2019 bottlenecks were ranked in 2018 or if they were not on the top 30 list (NR). The second chart shows the 2018 bottlenecks that were not ranked in the top 30 in 2019 but were in the top 30 in 2018. You can see where those bottlenecks fell in the list, or if that bottleneck head is no longer considered a bottleneck by CMP definition (NR).

2019 Bottleneck Comparison

2019 Rank	2018 Rank	Head Location	Average max length (mi)(1)	Average daily duration (2)	Base Impact (3)	Speed differential (4)	Congestion (5)	TOTAL DELAY (6)
1	2	I-95 N @ RI-1A/THURBERS AVE/EXIT 18	2.11	3 h 17 m	158,738	5,486,679	247,173	317,305,085
2	5	RI-146 S @ I-95	0.84	5 h 46 m	165,043	6,445,976	354,763	251,747,572
3	24	EDDY ST S @ I-95/THURBERS AVE	0.88	2 h 57 m	55,575	593,202	74,319	178,827,015
4	7	US-6 E @ I-95	0.52	4 h 56 m	62,388	1,853,427	114,959	112,109,347
5	19	RI-4 N @ I-95	1.83	56 m	43,036	1,679,669	85,273	69,787,329
6	NR	I-295 S @ RI-14/PLAINFIELD PIKE/EXIT 4	3.32	52 m	63,081	2,166,613	91,924	56,577,741
7	NR	EDDY ST N @ I-95/THURBERS AVE	0.89	1 h 33 m	30,339	317,103	34,734	56,528,638
8	12	RI-146 N @ SAYLES HILL RD	0.3	6 h 42 m	67,580	2,098,390	133,069	45,713,860
9	NR	US-1 FRONTAGE N @ I-95	0.4	2 h 14 m	18,749	237,715	25,955	43,702,756
10	18	RI-15 W @ RI-7/DOUGLAS AVE	1.64	2 h 3 m	71,363	890,749	91,149	40,866,765
11	NR	UNION AVE E @ RI-10/HUNTINGTON AVE	0.26	2 h 30 m	11,070	90,360	14,340	34,400,957
12	20	RI-15 E @ RI-126/SMITHFIELD AVE	1.34	2 h 18 m	64,717	708,787	77,330	34,330,850
13	NR	CRANSTON ST S @ RI-10/HUNTINGTON AVE	0.4	7 h 39 m	57,318	561,243	74,929	33,715,844
14	17	US-1 N @ RI-117/CENTERVILLE RD/GREENWICH AVE	1.04	1 h 47 m	41,705	744,296	61,999	32,787,220
15	NR	US-44 W @ OAKLAND AVE	0.76	2 h 20 m	38,768	403,741	49,472	32,286,593
16	29	RI-146 S @ SAYLES HILL RD	0.96	1 h 47 m	38,630	1,135,591	65,861	30,862,980
17	NR	RI-2 N @ RI-3/COWESETT RD	0.5	9 h 21 m	66,345	1,241,929	89,286	27,601,816
18	NR	HARTFORD AVE E @ SERVICE RD 1	0.38	2 h 4 m	13,414	137,045	17,332	27,189,351
19	NR	US-6 W @ HOPKINS AVE	0.47	4 h 6 m	42,631	977,094	74,745	26,402,387
20	14	RI-114 N @ RI-103/CHILD ST/BAKER ST	0.61	4 h 34 m	59,882	743,070	77,836	25,805,547
21	15	RI-4 S @ W ALLENTON RD	1.87	55 m	38,999	1,264,327	58,745	23,177,899
22	30	I-295 N @ RI-37/EXIT 3	1.08	1 h 2 m	23,482	936,761	43,247	23,030,259
23	NR	RI-2 N @ RI-113/EAST AVE	0.46	4 h 3 m	26,977	413,727	35,701	21,193,460
24	11	RI-103 E @ RI-114/MAIN ST	1.12	2 h 15 m	49,916	611,565	60,769	20,724,369
25	NR	US-6A W @ RI-128/KILLINGLY ST	0.57	1 h 34 m	18,131	202,223	23,300	20,672,159
26	NR	UNION AVE W @ TERRACE AVE	0.65	47 m	10,720	96,347	13,745	20,087,972
27	NR	RI-2 S @ RI-12/PARK AVE	0.52	3 h 17 m	35,785	349,097	43,400	19,682,150
28	NR	US-44 E @ RI-15/MINERAL SPRING AVE	0.69	2 h 15 m	35,426	588,031	55,675	18,379,885
29	25	RI-15 E @ RI-146/LOUISQUISSET PIKE	0.46	4 h 59 m	34,725	433,180	43,042	17,877,315
30	NR	RI-5 N @ US-6A/HARTFORD AVE	0.32	7 h 57 m	33,929	405,961	44,564	17,320,154

Bottlenecks Outside Top 30 from 2018

2018 Rank	2019 Rank	Head Location	Average max length (mi)(1)	Average daily duration (2)	Base Impact (3)	Speed differential (4)	Congestion (5)	TOTAL DELAY (6)
1	NR	I-95 S @ RI-7/RI-146/CHARLES ST/EXIT 23	2.29	3 h 43 m	175,690	5,670,083	274,885	344,087,155
3	NR	I-95 N @ US-6/RI-10/EXIT 22	1.69	2 h 20 m	79,293	2,466,408	127,527	200,107,335
4	NR	I-195 W @ I-95	2.52	46 m	45,086	1,666,027	112,662	149,979,906
6	NR	I-95 N @ RI-7/RI-146/CHARLES ST/EXIT 23	1.89	1 h 5 m	46,901	1,538,399	81,108	133,239,245
8	NR	I-95 N @ RI-10/EXIT 16	2.34	1 h 1 m	48,383	1,662,464	77,759	110,460,918
9	NR	I-195 W @ BROADWAY/EXIT 6	1.24	1 h 5 m	26,561	975,421	53,313	61,549,539
10	31	US-1 S @ AIRPORT RD	0.64	5 h 55 m	80,799	1,591,739	108,456	44,926,206
13	NR	I-195 W @ US-44/4TH ST/TAUNTON AVE/EXIT 4	0.92	1 h 22 m	11,373	416,399	26,129	31,643,898
16	70	RI-2 S @ RI-117/CENTERVILLE RD	0.92	2 h 43 m	44,581	664,777	56,784	29,612,639
21	NR	US-6 W @ HARTFORD PIKE	0.79	4 h 28 m	60,977	1,179,687	84,394	24,003,125
22	33	RI-15 E @ RI-7/DOUGLAS AVE	0.6	3 h 17 m	39,799	513,106	51,844	21,323,677
23	NR	US-1 S @ RI-4	0.27	5 h 21 m	19,664	301,038	29,007	19,535,578
26	51	RI-2 N @ RI-115/TOLL GATE RD	0.41	3 h 30 m	23,145	363,429	32,082	18,476,282
27	32	US-44 W @ RI-5/SANDERSON RD/CEDAR SWAMP RD	0.71	2 h 18 m	34,503	544,078	43,546	17,692,564
28	56	US-44 W @ I-195	0.76	1 h 27 m	23,686	375,498	43,757	17,363,185

(1) - Average of the maximum queues formed during each occurrence of the bottleneck.

(2) - Average of the duration of each occurrence of the bottleneck.

(3) - Base Impact is the sum of the queue lengths over the duration of the bottleneck

(4) - Speed differential is base impact weighted by the difference between free-flow speed and observed speed.

(5) - Congestion is base impact weighted by the measured speed as a percentage of free-flow speed.

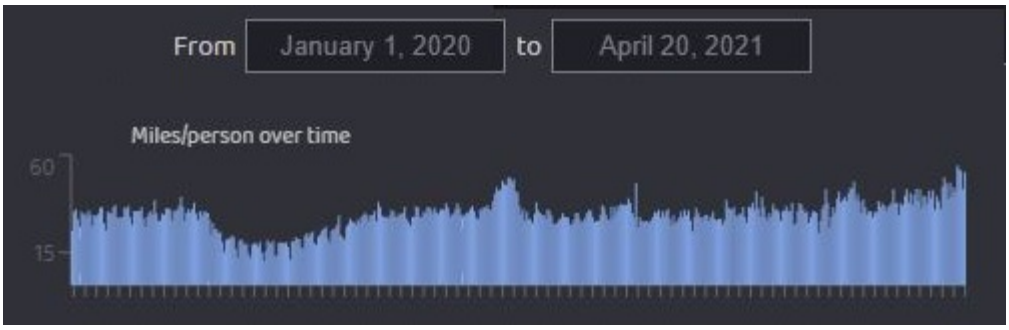
(6) - Total Delay is Base impact weighted by the difference between free-flow travel time and observed travel time multiplied by the average daily volume (ADT).

Congestion Management Trends and Strategies

As you can see above, the performance tracking from 2019 is similar to 2018. Freight congestion is up a tick from the baseline year. While recurring congestion appears to have decreased a bit, congestion related to both weather and work zones has increased. This is likely due to an uptick in road projects in higher traveled areas as the State is working to improve State of Good Repair for highway safety over the last few years.

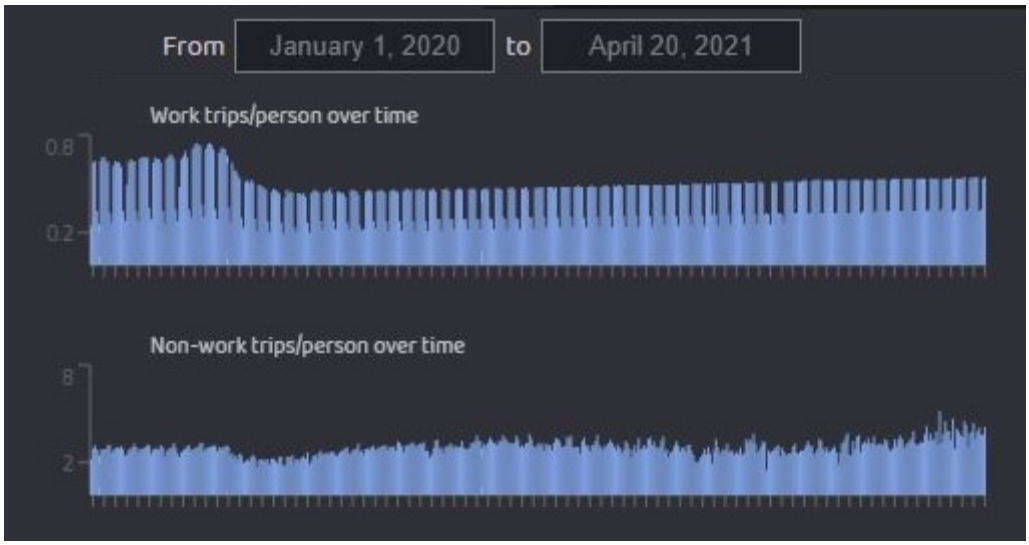
Despite the 2019 data being the latest we can analyze for performance, the biggest trend over the 16 months has been the impact of the COVID-19 pandemic on congestion. Through Regional Integrated Transportation Information Systems (RITIS) hosted by the University of Maryland CATT Lab, we can analyze this data on a broad level.

Prior to the pandemic, the percentage of people staying home on weekdays was around 17%. This number spiked to around 35% in April 2020, which resulted in a substantial shift in cars on the road. Similarly, trips per person decreased from 3.5 trips per day to around 2.5 trips per day in April 2020. That number moved back to a normal range by July of 2020, however, and as of April 2021, has increased to over 4.0 trips per day. A similar trend can be seen in miles/person per day in Rhode Island, as dictated in the graphic below. These trends cause more irregular congestion on roadways, and while peak hour traffic still exists in 2021, it has become less predictable throughout off-peak hours.



Miles per person from 1/1/2020 to 4/20/2021

Another telling statistic is work trips per day. Rhode Island was seeing a peak of 0.75 work trips per day in February 2020. That number dropped with the onset of the pandemic but has not returned to the prior peak as of April 2021. That number dipped to 0.43 trips per day in April 2020, but a year later in April 2021, remains around 0.53 trips per day. A combination of people losing their jobs, those remaining out of work, and working from home is likely responsible for this shift, which can be seen in the graphic below. This also contributes to irregular congestion, as peak work traffic has shifted to other trips throughout the day. People are still on the roadways, but are traveling for different purposes, causing daily traffic that can be less predictable than pre-pandemic congestion.



Work and non-work trips per person from 1/1/2020 to 4/20/2021

When performance data has been compiled for 2020 and 2021, these trends will likely demonstrate a substantial change in the numbers that were previously observed. We will know better then where these trends are most prevalent and if there can be any mitigation efforts in particular corridors to help ease more irregular congestion, or if these trends shift back to any semblance of pre-pandemic numbers. COVID-19 has given the state of congestion in Rhode Island an interesting challenge moving forward, as we will have to continue to adapt to transportation trends and attempt to prevent these trends from contributing to any future issues that may not have been foreseen in the original CMP.

As more data is compiled for congestion management in the future and trends are more clearly observed, setting realistic, performance based targets for both short (5 year) and longer (10+ year) term trends will help the State to track, adapt, and mitigate these congestion factors in the future. The assistance of integrating CMP factors into the new E-STIP grading system for potential roadway projects will help this effort.

Conclusion

The current condition of the congestion landscape in Rhode Island is in the midst of a shift. While the completed data sets of the 2018 and 2019 data show no drastic swings, the COVID-19 pandemic has caused the State to reconsider these trends in an effort to understand the true status of congestion, and what can be done preventatively to help mitigate potential issues. 2020 data is currently in the works and another status report will be coming soon to fully analyze the changes observed from a year in which transportation has seen one of the most drastic tilts in years. The Congestion Management Task Force, along with RIDSP, RIDOT, and RIPTA will continue to work together to help analyze these trends in an effort to improve reliability within the transportation system in Rhode Island.