



2018



Annual Regional Congestion Report



EAST-WEST GATEWAY
Council of Governments
Creating Solutions Across Jurisdictional Boundaries

St. Louis Metropolitan Area

2018

Annual Congestion Report

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Introduction

The regional Congestion Management Process (CMP) is a systematic and regionally accepted approach for managing congestion that provides accurate and up-to-date information on transportation system performance. As an MPO for the St. Louis region with a population over 200,000, East-West Gateway is required to maintain a CMP as part of its ongoing transportation planning process.

The CMP is intended to be a systematic way of monitoring, measuring and diagnosing the causes of current and future congestion on a region's multi-modal transportation systems; evaluating and recommending alternative strategies to manage current and future regional congestion; and monitoring and evaluating the performance of strategies implemented to manage congestion.

The purpose of the MPO transportation planning process is to comprehensively consider possible strategies, evaluate projects from diverse viewpoints, and meaningfully involve key stakeholders to support strategic regional choices in congestion management, such as improving roadways, expanding transit capacity, encouraging bicycling, and ensuring safe walking environments. These congestion management strategies provide a connecting tissue between the Long-Range Transportation Plan (LRTP), the Transportation Improvement Plan (TIP), and the regional Intelligent Transportation Systems (ITS). The CMP is strongly connected to the LRTP by providing a set of congestion management objectives, performance measures, and strategies that make the plan comprehensive.

The CMP provides system performance information for evaluating projects nominated for inclusion in the TIP and the CMP objectives are integrated with the application scoring and prioritization process. Transportation systems management and operation for congestion management are implemented through Intelligent Transportation Systems (ITS) such as traffic signal improvements; traveler information projects; electronic fare systems, Automatic Vehicle Identification (AVI), and Automatic Vehicle Location (AVL) technologies. Also, proposed ITS projects are required to be consistent with the regional CMP strategies.

The HERE data set was used to analyze the identified performance measures. HERE is a private vendor that provides mapping data and related services to individuals and companies. MODOT has contracted with HERE for access to their data and the use of the Regional Integrated Transportation Information System (RITIS). RITIS is an automated data sharing, dissemination, and archiving system that includes many performance measures, dashboard, and visual analytics tools housed at the University of Maryland. MODOT's contract provides the same access to Missouri MPOs, which gives EWG the ability to analyze the HERE data set for the entire eight-county region.

Three performance measures were analyzed in this study. These are Speed Index (SI), Planning Time Index (PTI), and Travel Time Index (TTI). These performance measures are defined below:

- Speed Index is the ratio of average speeds to 85th-percentile speeds of a segment. Speed Index was used to identify possible congested freeways. Freeway congestion intensity and duration figures are in Appendix 1.
- Travel Time Index is Travel Time represented as a percentage of the ideal travel time. For example, a TTI value of 1.2 means travel time during peak period is 20% longer than the free-flow travel time between the same origin and destination.

Planning Time Index is the total travel time that should be planned when extra time (buffer time) is included in the trip. For example, a Planning Time Index of 1.60 means that, for a 15-minute trip, the total time that should be planned for the trip is 24 minutes (15 minutes x 1.60 = 24 minutes). In this scenario,

the buffer time alone is 9 minutes (15 minutes x 0.6 percent). The higher the Planning Time Index, the more unreliable travel time is.

The 2018 Regional Congestion Report is comprised of four parts. These are: definition of the congested network, regional congestion analyses (for arterials and freeways), and evaluation of mobility-enhancing strategies, and a conclusion part that notes a broader future outlook for regional congestion.

Definition of Congested CMP Network

For the purposes of this analysis, the morning peak-period is from 6 am to 9 am and the evening peak-period is from 3 pm to 6 pm. The source of data is explained in detail in part 4. All performance measures are calculated and compared based on data from these time periods.

Interstates, other Freeways and Expressways, and other Principal Arterials included in the NHS System that are in the core urban and suburban areas of the St. Louis region.

Congested Location Selection Process:

- Identified locations that met or exceeded thresholds for congestion.
- On arterials eliminated short congested sections where length of congestion was .3 miles or less.

The process of identifying the congested network for this analysis involved a detailed visual inspection of Speed Index congestion on all National Highway System (NHS) roadways in the region depicted on the NHS map. This index is the ratio of average speeds to 85th-percentile speed, which represents free-flow speeds. Four thresholds are applied to the Speed Index to reveal the various categories of congestion from the system for both arterials and freeways.

1 Regional Arterial Congestion Analyses

The arterial congestion analyses comprised of the spatial network scope/extent, selected congested locations (by county), and regional congestion analyses.

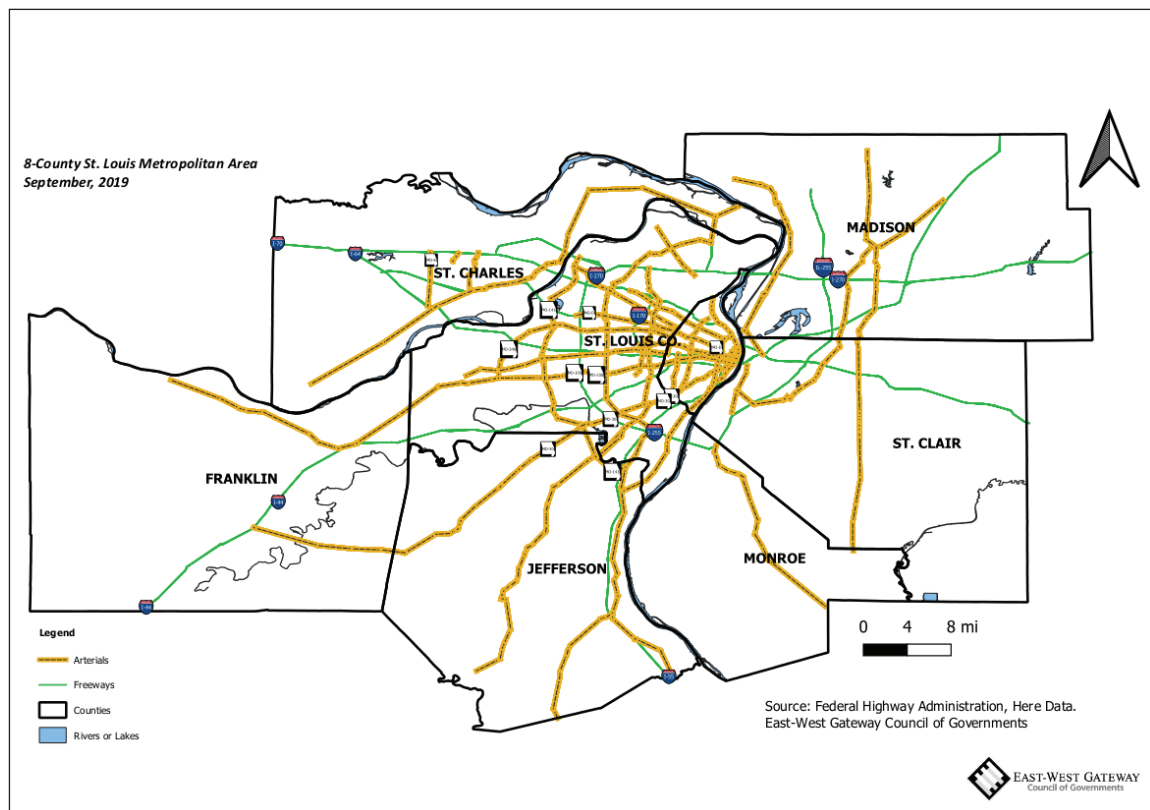
Congested CMP Network

The regional arterial network, as defined above, had a total of 4,772 miles, of which 129 miles (2.7%) was classified as congested. A comparison of total versus congested miles by county is shown in Table 1. While the City of St. Louis had the least number of arterial miles, it ranked as the most congested percentage wise. This is understandable given that it also has the densest arterial system in the region. The spatial distribution of the network is shown in Figure 1.

Table 1: Comparison of Regional and Congested Network Miles

Rank	County	Regional Network		Congested Network		% Congested	Congested Rank
		Miles	Percent	Miles	Percent		
1	St. Louis	2,134.6	44.7%	52.9	43.9%	2.5%	2
2	IL	1,269.8	26.6%	16.9	14.0%	1.3%	4
3	St. Charles	689.7	14.5%	16.7	13.8%	2.4%	3
4	St. Louis City	677.8	14.2%	34.1	28.3%	5.0%	1
TOTAL		4,772	100%	121	100%	2.8%	

Figure 1: Regional Arterial Network



Selected Congested Locations on Arterials

Our arterial analyses resulted in the selection of 121 miles of congested locations: 34 miles in the city of St. Louis, 53 miles in St. Louis county, and 17 miles in both St. Charles and Illinois counties. The tables below show the characteristics of the various congested location for each county. Figures 2 to 9 show the location of selected congested arterials for morning and evening peak periods by direction.

Table 2: City of St. Louis

No	Map No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	1	Forest Park Ave	I-64 to Kingshighway Blvd	MO	WB	PM	2.00	2.65	1.79	2.22	3.57
2	2	Forest Park Ave	Kingshighway Blvd to I-64	MO	EB	PM	1.98	2.06	1.62	1.84	3.21
3	3	Broadway	Sidney St to I-55	MO	SB	PM	1.93	2.10	1.61	1.86	3.11
4	4	Forest Park Ave	DeBaliviere Ave to Big Bend Blvd	MO	WB	PM	1.62	2.98	1.81	2.40	2.94
5	5	Broadway	I-55 S to I-55 N	MO	NB	PM	1.55	2.09	1.72	1.91	2.67
6	6	Tucker Blvd	Cole St to Park Ave	MO	SB	PM	1.51	2.25	1.61	1.93	2.42
7	7	Forest Park Ave	Vandeventer Blvd to Kingshighway Blvd	MO	WB	AM	1.30	2.55	1.76	2.16	2.30
8	8	Jefferson Ave	Washington Blvd to MO-30	MO	SB	PM	1.32	2.32	1.54	1.93	2.04
9	9	Forest Park Ave	Kingshighway Blvd to Vandeventer Blvd	MO	EB	AM	1.30	2.00	1.43	1.72	1.86
10	10	Jefferson Ave	MO-366 (Chippewa) to MO-30	MO	NB	PM	1.33	1.77	1.38	1.58	1.84
11	11	Tucker Blvd	Cole St to MO-100 (Chouteau)	MO	SB	AM	1.19	2.50	1.53	2.02	1.83
12	12	Kingshighway Blvd	I-64 to Delmar Blvd	MO	NB	PM	1.03	1.97	1.46	1.72	1.50
13	13	Kingshighway Blvd	Forest Park Ave to MO-100 (Manchester)	MO	SB	PM	0.79	3.02	1.89	2.46	1.50
14	14	Hampton Ave	Oakland Ave to I-44	MO	SB	PM	0.78	2.99	1.59	2.29	1.24
15	15	Hampton Ave	Eichelberger St to MO-366	MO	NB	PM	0.82	1.73	1.43	1.58	1.18
16	16	Salisbury St	Florissant Ave to I-70	MO	EB	PM	0.42	3.83	2.54	3.19	1.06
17	17	Broadway	I-55 N to MO-366 (Chippewa)	MO	SB	AM	0.75	2.30	1.41	1.86	1.06
18	18	MO-30 (Gravois Rd)	MO-366 to Grand Blvd	MO	EB	PM	0.65	2.08	1.57	1.83	1.01
19	19	Skinker Blvd	Delmar Blvd to Forest Park Pky	MO	SB	PM	0.43	5.00	2.18	3.59	0.93
20	20	Cole St	Broadway to Tucker Blvd	MO	WB	PM	0.45	2.44	1.94	2.19	0.88
21	21	Market St	I-64/Garrison Ln to Jefferson Ave	MO	EB	PM	0.42	2.60	2.00	2.30	0.84
22	22	Cole St	Tucker Blvd to Broadway	MO	EB	PM	0.45	2.33	1.77	2.05	0.80
23	23	Kingshighway Blvd	Florissant Ave to Bircher Blvd	MO	SB	PM	0.56	2.00	1.44	1.72	0.80
24	24	Hampton Ave	Watson Rd to I-44	MO	NB	PM	0.53	2.20	1.51	1.86	0.80
25	25	Broadway	Meremac St to MO-366 (Chippewa)	MO	NB	AM	0.46	2.36	1.72	2.04	0.79
26	26	Market St	I-64/Garrison Ln to Jefferson Ave	MO	EB	AM	0.42	2.60	1.85	2.23	0.78
27	27	Market St	Jefferson Ave to I-64 (Garrison Ln)	MO	WB	PM	0.42	2.55	1.82	2.19	0.77
28	28	Cole St	Broadway to Tucker Blvd	MO	WB	AM	0.45	2.44	1.69	2.07	0.77
29	29	Cole St	Tucker Blvd to Broadway	MO	EB	AM	0.45	2.33	1.66	2.00	0.75
30	30	Salisbury St	Florissant Ave to I-70	MO	EB	AM	0.42	2.56	1.70	2.13	0.71
31	31	Kingshighway Blvd	I-64 to Forest Park Ave	MO	NB	AM	0.50	2.00	1.42	1.71	0.71
32	32	Market St	Jefferson Ave to I-64 (Garrison Ln)	MO	WB	AM	0.42	2.33	1.67	2.00	0.70
33	33	Salisbury St	I-70 to Florissant Ave	MO	WB	PM	0.42	1.92	1.59	1.76	0.67
34	34	Salisbury St	I-70 to Florissant Ave	MO	WB	AM	0.42	2.08	1.51	1.80	0.63
35	35	Mo-115 (Natural Bridge)	Jennings St Rd to Goodfellow Ave	MO	SB	PM	0.44	1.80	1.41	1.61	0.62
36	36	Skinker Blvd	Forest Park Pky to Delmar Blvd	MO	NB	PM	0.43	1.86	1.44	1.65	0.61
37	37	Skinker Blvd	Delmar Blvd to Forest Park Pky	MO	SB	AM	0.43	2.18	1.43	1.81	0.61
38	38	Skinker Blvd	Forest Park Pky to Delmar Blvd	MO	NB	AM	0.43	2.00	1.40	1.70	0.60
39	39	Broadway	I-55/Park Ave to MO-100 (Chouteau)	MO	NB	PM	0.39	1.86	1.39	1.63	0.54
40	40	Market St	18th St to 14th St	MO	EB	PM	0.30	2.22	1.70	1.96	0.51
41	41	Market St	14th St to 18th St	MO	WB	PM	0.30	2.09	1.62	1.86	0.49
42	42	Tucker Blvd	Park Ave to MO-100 (Chouteau)	MO	NB	AM	0.31	2.23	1.56	1.90	0.49
43	43	Kienlen Ave	Page Ave to MO-180 (MLK Dr)	MO	NB	PM	0.35	1.88	1.38	1.63	0.48
44	44	Tucker Blvd	Park Ave to MO-100 (Chouteau)	MO	NB	PM	0.31	2.00	1.54	1.77	0.48
45	45	Kingshighway Blvd	SW Ave to I-44	MO	NB	AM	0.33	3.29	1.42	2.36	0.46
46	46	Jefferson Ave	Washington Blvd to Market St	MO	SB	AM	0.30	2.17	1.51	1.84	0.46
47	47	Market St	18th St to 14th St	MO	WB	AM	0.30	1.92	1.39	1.66	0.42
TOTAL							34.13				

Table 3: St. Louis

No	Map No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	48	MO-D (Page Ave)	I-170 to Schuetz Rd	MO	WB	PM	4.14	2.28	1.53	1.91	6.33
2	49	MO-141	MO-30 to MO-21	MO	SB	PM	3.85	2.56	1.41	1.99	5.43
3	50	US-61 (Lindbergh Blvd)	I-270 to New Halls Ferry Rd	MO	NB	PM	3.49	2.38	1.61	2.00	5.62
4	51	US-61 (Lindbergh Blvd)	Big Bend Rd to MO-100	MO	NB	PM	2.26	1.91	1.49	1.70	3.37
5	52	US-61 (Lindbergh Blvd)	Big Bend Rd to MO-100	MO	NB	AM	2.26	1.95	1.36	1.66	3.08
6	53	MO-21 (Tesson Ferry Rd)	Lindbergh Blvd to Butler Hill Rd	MO	SB	PM	2.07	1.96	1.56	1.76	3.23
7	54	US-61 (Lindbergh Blvd)	Lemay Ferry Rd to MO-21	MO	NB	PM	2.02	1.84	1.45	1.65	2.93
8	55	US-61 (Lindbergh Blvd)	New Halls Ferry Rd to Charbonier Rd	MO	SB	PM	1.79	2.30	1.58	1.94	2.82
9	56	MO-141	Big Bend Rd to I-44	MO	SB	PM	1.73	4.03	1.50	2.77	2.60
10	57	MO-231 (Telegraph Rd)	I-255 to Baumgartner Rd	MO	SB	PM	1.57	2.26	1.44	1.85	2.26
11	58	US-61 (Lindbergh Blvd)	Adams Ave to I-44	MO	SB	PM	1.56	2.24	1.76	2.00	2.74
12	59	MO-180 (St. Charles Rock)	Taussig Ave to McKelvey Rd	MO	SB	PM	1.35	2.03	1.54	1.79	2.08
13	60	MO-21 (Tesson Ferry Rd)	Lindbergh Blvd to I-270	MO	SB	AM	1.11	1.95	1.48	1.72	1.65
14	61	MO-30 (Gravois Rd)	McKenzie Rd to Laclede Station Rd	MO	WB	PM	1.11	1.87	1.40	1.64	1.55
15	62	MO-340 (Olive Blvd)	Chesterfield Pky to Baxter Rd	MO	SB	PM	1.10	4.33	2.00	3.17	2.21
16	63	US-61 (Lindbergh Blvd)	Olive Blvd to Ladue Rd	MO	SB	PM	1.05	3.56	1.52	2.54	1.60
17	64	Laclede Station Rd	S Hanley to Murdoch Ave	MO	SB	PM	1.04	3.19	1.62	2.41	1.69
18	65	MO-141	Hawkins to I-44	MO	NB	AM	1.03	4.43	1.48	2.96	1.52
19	66	MO-141	Ladue Rd to I-64	MO	SB	PM	0.99	2.71	1.55	2.13	1.53
20	67	US-61 (Lemay Ferry Rd)	Mattis Rd to I-255	MO	NB	PM	0.97	2.17	1.50	1.84	1.45
21	68	US-61 (Lemay Ferry Rd)	I-255 to Mattis Rd	MO	SB	PM	0.97	1.94	1.47	1.71	1.42
22	69	MO-21 (Tesson Ferry Rd)	Butler Hill Rd to Kennerly Rd	MO	NB	PM	0.96	2.28	1.57	1.93	1.50
23	70	MO-100 (Manchester Rd)	Big Bend Blvd to McCausland Ave	MO	WB	PM	0.83	2.89	2.32	2.61	1.93
24	71	MO-100 (Manchester Rd)	McCausland Ave to Big Bend Blvd	MO	WB	PM	0.83	2.44	1.85	2.15	1.54
25	72	MO-100 (Manchester Rd)	Big Bend Blvd to McCausland Ave	MO	WB	AM	0.83	2.17	1.50	1.84	1.25
26	73	MO-180 (St. Charles Rock)	Taussig Ave to I-270	MO	SB	AM	0.82	1.86	1.42	1.64	1.16
27	74	MO-115 (Natural Bridge Rd)	Woodson Rd to Brown Rd	MO	SB	PM	0.80	2.07	1.50	1.79	1.21
28	75	MO-340 (Olive Blvd)	Craig Rd to I-270	MO	SB	PM	0.69	2.33	1.50	1.92	1.04
29	76	MO-340 (Olive Blvd)	I-270 to Craig Rd	MO	NB	PM	0.69	1.93	1.37	1.65	0.95
30	77	Clayton Rd	Skinker to Big Bend Blvd	MO	WB	PM	0.69	1.86	1.38	1.62	0.95
31	78	Brentwood Blvd	I-64 to I-170	MO	NB	PM	0.65	1.86	1.39	1.63	0.90
32	79	US-61 (Lindbergh Blvd)	I-55 to Lemay Ferry Rd	MO	SB	PM	0.61	2.38	1.74	2.06	1.06
33	80	Laclede Station Rd	Big Bend Blvd to S Hanley	MO	NB	AM	0.61	4.86	1.76	3.31	1.07
34	81	Clayton Rd	Hanley Rd to Brentwood Blvd	MO	WB	PM	0.54	1.86	1.37	1.62	0.74
35	82	MO-Ac (New Halls Ferry)	Old Halls Ferry Rd to I-270	MO	NB	PM	0.54	2.58	1.76	2.17	0.95
36	83	MO-100 (Manchester Rd)	MO-340 to Old State Rd	MO	WB	PM	0.54	2.22	1.67	1.95	0.90
37	84	Hanley Rd	Clayton Rd to I-64	MO	SB	PM	0.54	5.00	2.01	3.51	1.08
38	85	MO-30 (Gravois Rd)	MO-21 to McKenzie Rd	MO	WB	PM	0.53	2.17	1.48	1.83	0.79
39	86	Laclede Station Rd	Big Bend Blvd to Murdoch Ave	MO	SB	AM	0.43	1.82	1.36	1.59	0.59
40	87	MO-D (Page Ave)	Woodson Rd to I-170	MO	WB	PM	0.36	2.78	1.62	2.20	0.58
41	88	MO-100 (Manchester Rd)	Woods Mill Rd to Henry	MO	WB	PM	0.35	2.55	1.71	2.13	0.60
42	89	MO-100 (Manchester Rd)	Henry Ave to Woods Mill Rd	MO	WB	PM	0.35	2.14	1.53	1.84	0.53
43	90	MO-30 (Gravois Rd)	Sappington Rd to Lindbergh Blvd	MO	WB	PM	0.34	3.10	2.08	2.59	0.71
44	91	MO-30 (Gravois Rd)	Lindbergh Blvd to Sappington Rd	MO	WB	PM	0.34	2.91	2.09	2.50	0.70
45	92	MO-30 (Gravois Rd)	Lindbergh Blvd to Sappington Rd	MO	WB	AM	0.34	2.29	1.53	1.91	0.52
46	93	MO-30 (Gravois Rd)	Sappington Rd to Lindbergh Blvd	MO	WB	AM	0.34	2.07	1.44	1.76	0.48
47	94	MO-180 (St. Charles Rock)	Cypress Rd to Ashby Rd	MO	SB	PM	0.31	1.87	1.36	1.62	0.42
48	95	MO-D (Page Ave)	Concourse Dr to Schuetz Rd	MO	WB	AM	0.31	2.44	1.60	2.02	0.49
49	96	MO-D (Page Ave)	Concourse Dr to Schuetz Rd	MO	WB	PM	0.31	2.17	1.39	1.78	0.43
TOTAL							52.92				

Table 4: St. Charles

No	Map No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	97	MO-94	I-64 to MO-364	MO	NB	PM	3.89	2.14	1.58	1.86	6.15
2	98	MO-K	I-70 to MO-364	MO	SB	PM	3.47	1.84	1.45	1.65	5.03
3	99	MO-94	5th St to I-70	MO	SB	PM	1.71	2.12	1.74	1.93	2.97
4	100	MO-94	5th St to I-70	MO	SB	AM	1.71	1.89	1.38	1.64	2.36
5	101	MO-94	5th St to MO-370	MO	NB	PM	1.48	1.63	1.46	1.55	2.17
6	102	MO-94	5th St to MO-370	MO	NB	AM	1.48	1.63	1.39	1.51	2.06
7	103	MO-79/Salt Lick Rd	I-70 to Mexico Rd	MO	SB	PM	0.95	1.80	1.41	1.61	1.34
8	104	Mid Rivers Mall Dr	Suemandy Rd to Mexico Rd	MO	SB	PM	0.59	2.00	1.40	1.70	0.82
9	105	MO-94	MO-364 to Pralle Ln	MO	NB	PM	0.51	2.38	1.44	1.91	0.74
10	106	MO-94	Zumbehl Rd to Pralle Ln	MO	SB	PM	0.51	2.69	1.64	2.17	0.84
11	107	Mid Rivers Mall Dr	MO-364 to MO-N	MO	NB	PM	0.37	2.91	2.03	2.47	0.75
TOTAL							16.67				

Table 5: Illinois

No	Map No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	108	IL-159 (Glen Carbon)	IL-162 to Governors Pky	IL	NB	PM	3.22	2.31	1.67	1.99	5.37
2	109	IL-159 (Belleville)	IL-15 to I-64	IL	NB	PM	2.80	1.99	1.53	1.76	4.28
3	110	IL-159 (Belleville)	I-64 to IL-15	IL	SB	PM	2.53	2.07	1.54	1.81	3.89
4	111	IL-159 (Glen Carbon)	Governors Pky to I-270	IL	SB	PM	2.12	1.73	1.43	1.58	3.02
5	112	IL-157 (Collinsville)	St Louis Rd to Horseshoe Lake Rd	IL	NB	PM	1.87	1.92	1.51	1.72	2.82
6	113	IL-157 (Collinsville)	Horseshoe Lake Rd to I-55	IL	SB	PM	0.78	2.46	1.77	2.12	1.38
7	114	IL-157 (Collinsville)	Horseshoe Lake Rd to I-55	IL	SB	AM	0.78	1.88	1.40	1.64	1.09
8	115	IL-157 (Edwardsville)	E University Dr to Center Grove Rd	IL	SB	PM	0.53	1.82	1.39	1.61	0.74
9	116	IL-157 (Collinsville)	I-55 to Horseshoe Lake Rd	IL	NB	AM	0.47	1.88	1.38	1.63	0.65
10	117	IL-157 (Edwardsville)	IL-143 to Main St	IL	SB	PM	0.46	2.18	1.72	1.95	0.79
11	118	IL-157 (Edwardsville)	Main St to IL-143	IL	NB	PM	0.46	1.85	1.43	1.64	0.66
12	119	IL-157 (Caseyville)	I-64 to Bunkum Rd	IL	NB	PM	0.43	2.05	1.44	1.75	0.62
13	120	IL-157 (Caseyville)	I-64 to Bunkum Rd	IL	NB	AM	0.43	1.95	1.37	1.66	0.59
TOTAL							16.87				

Figure 2: East Bound Congested Locations (AM Peak)

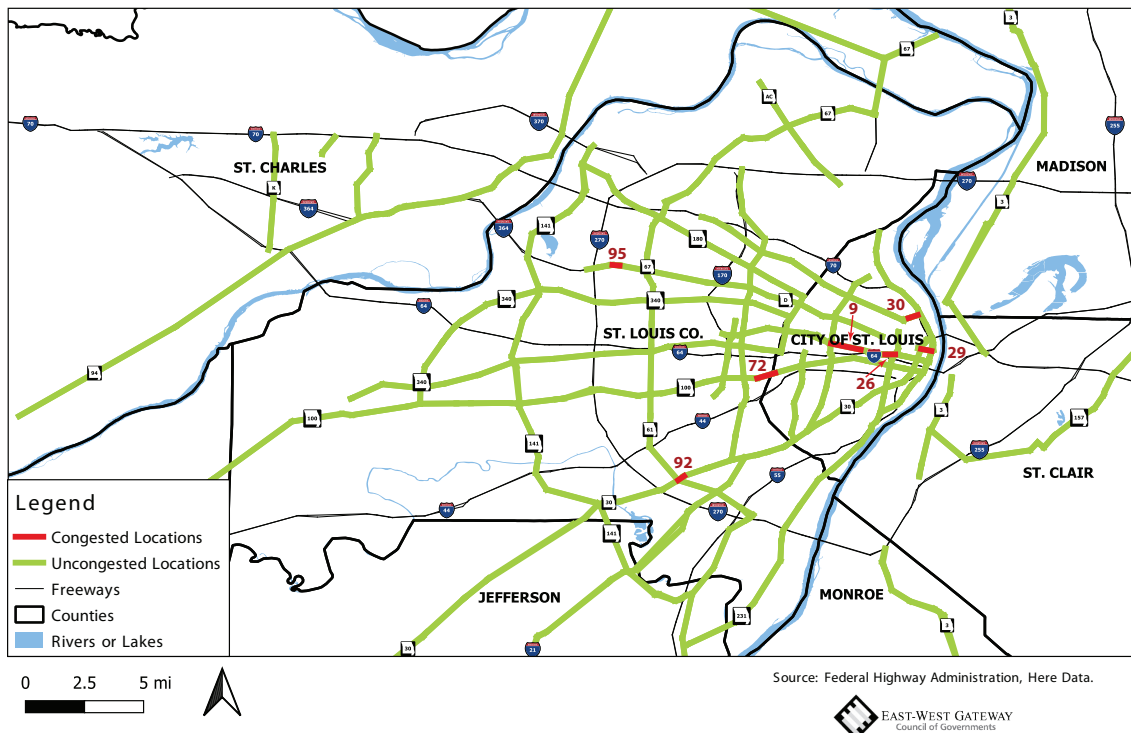


Figure 3: East Bound Congested Locations (PM Peak)

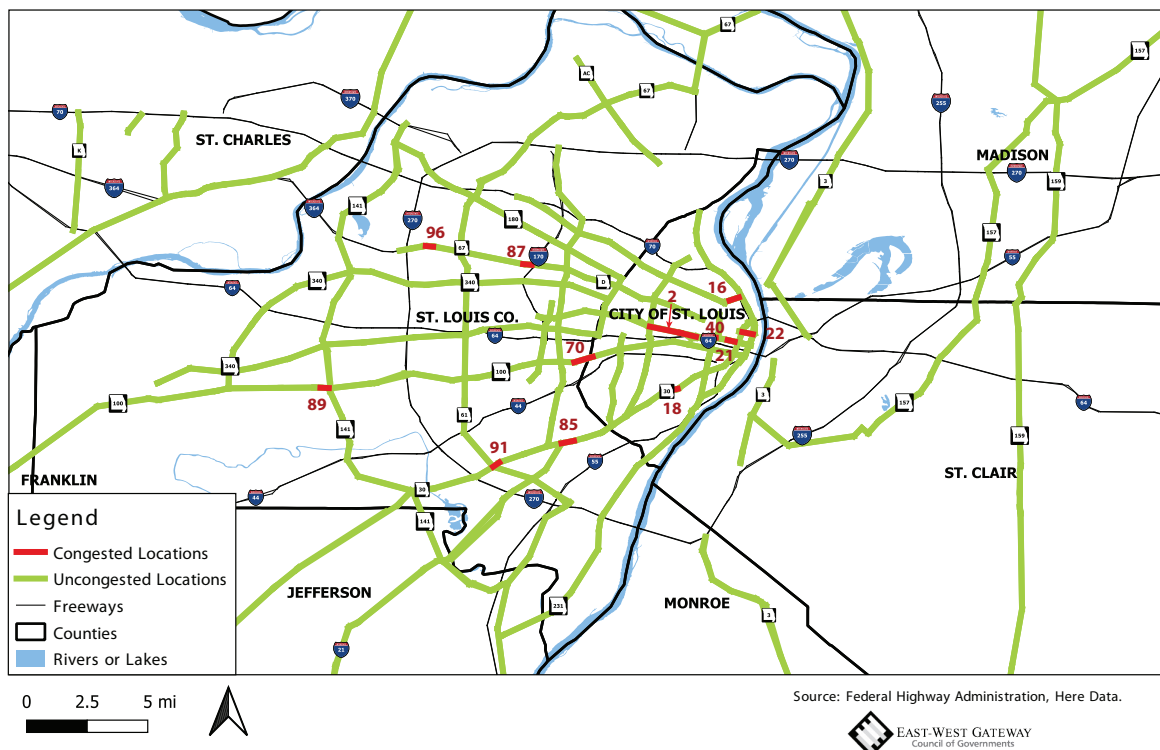


Figure 4: West Bound Congested Locations (AM Peak)

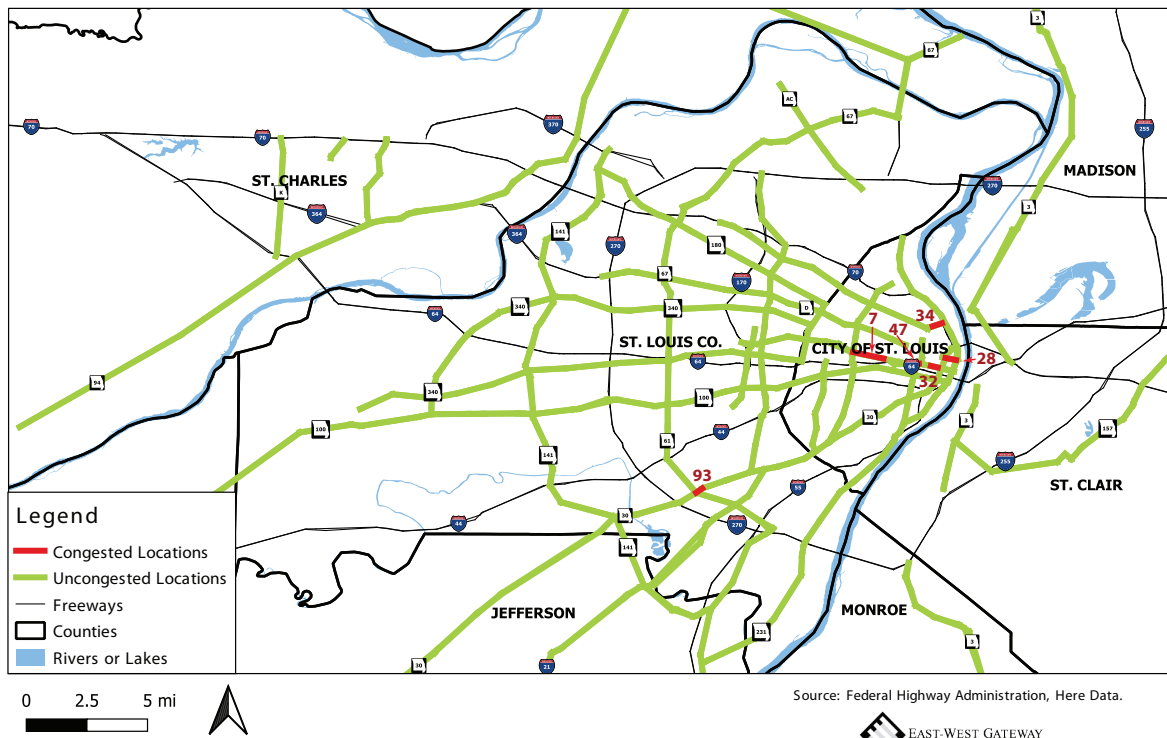


Figure 5: West Bound Congested Locations (PM Peak)

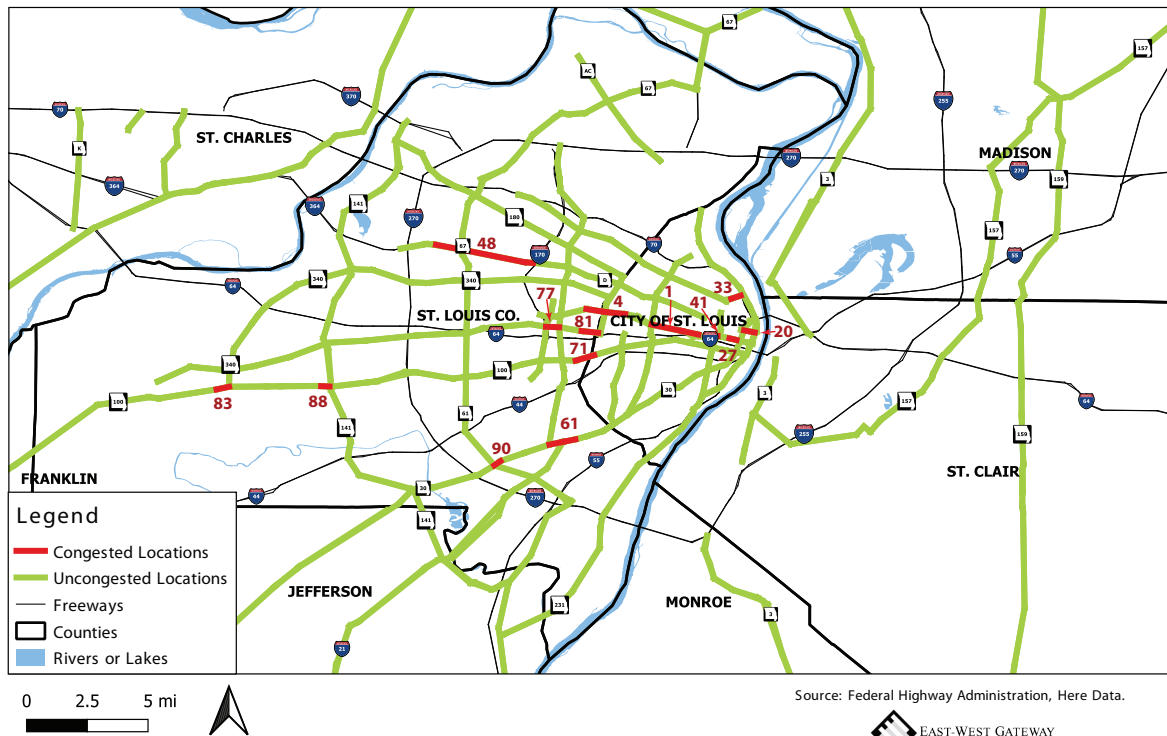


Figure 6: North Bound Congested Locations (AM Peak)

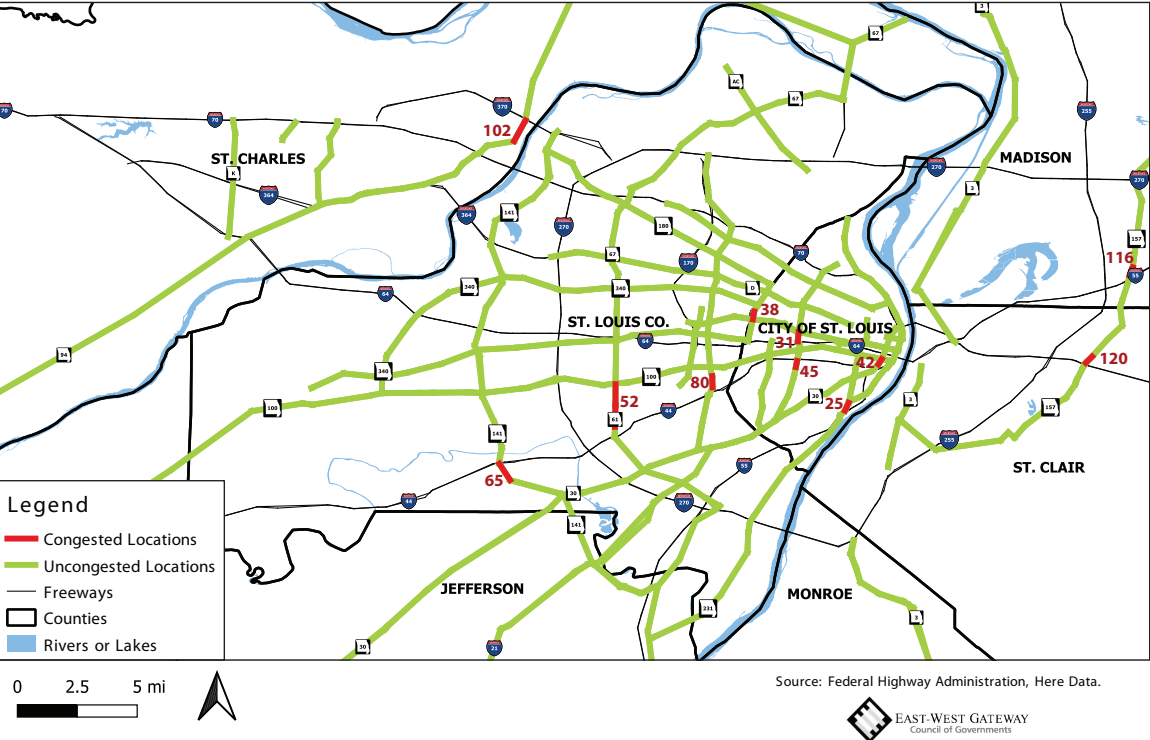


Figure 7: North Bound Congested Locations (PM Peak)

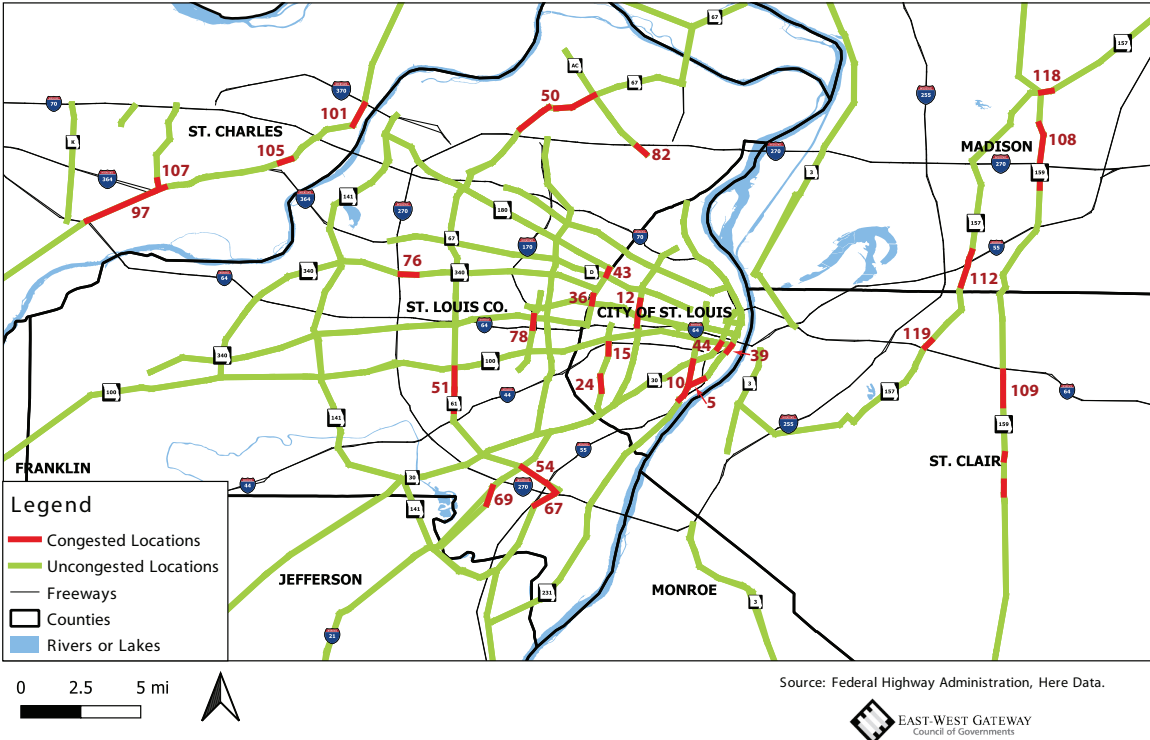


Figure 8: South Bound Congested Locations (AM Peak)

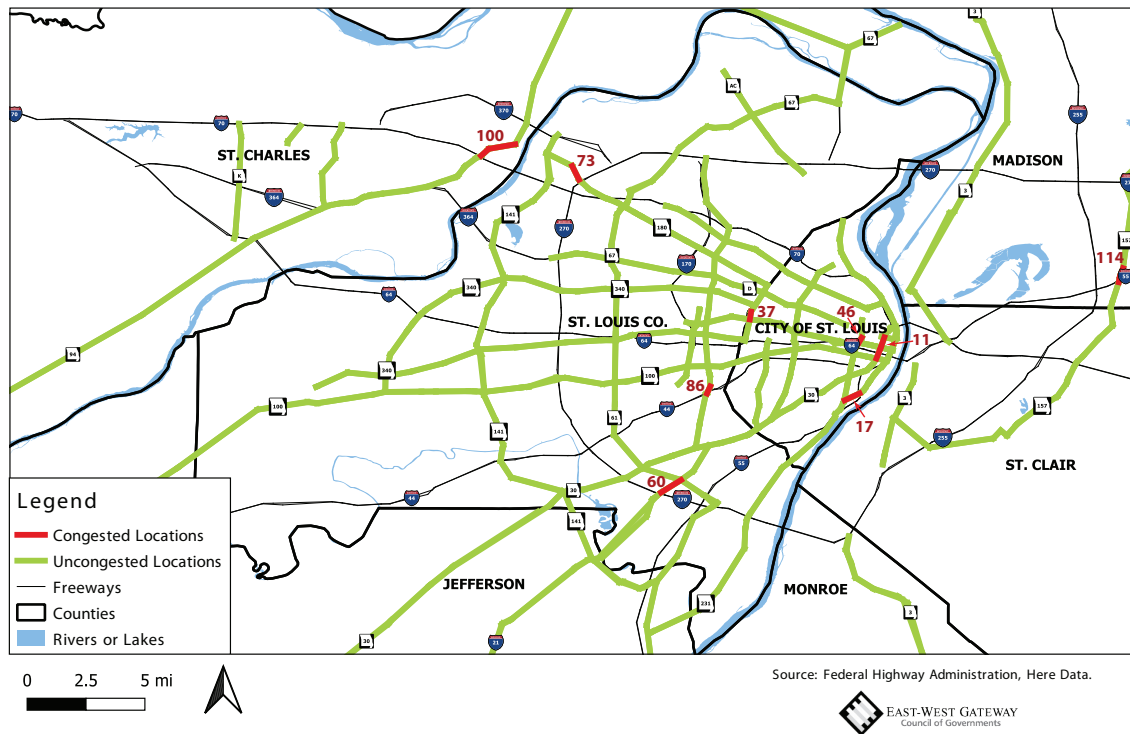
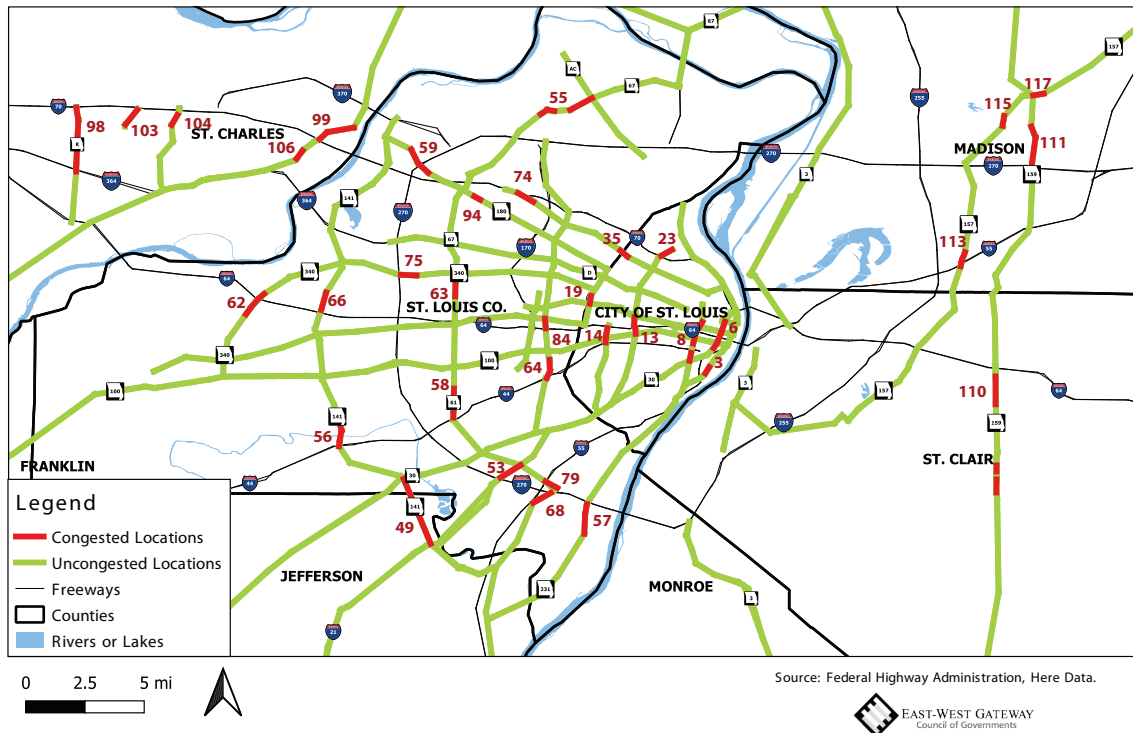


Figure 9: South Bound Congested Locations (PM Peak)



Congestion Performance Analyses

Assessing the performance of regional congestion is one of the fundamental tasks of congestion management. Performance measurement allows system managers to ascertain whether their efforts at curbing congestion are yielding any significant effects on the driving public. In this section, four key analyses were undertaken for AM and PM peak periods. These are:

- Trends in congested miles by peak-period;
- Trends in congested miles by direction of travel;
- Trends in average PTI by peak-period; and
- Trends in average TTI by peak-period.

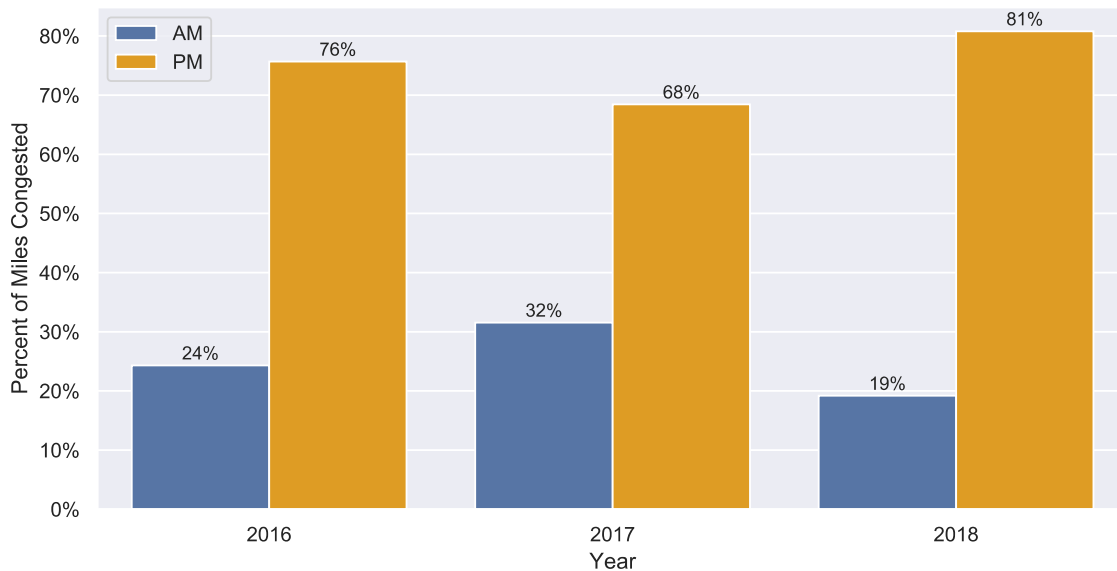
Total Congested Miles Trend

Total congestion looks at all congestion in both Am and PM peak period. Figure 10 compares the percentages of total network miles that are congested in each peak period for each year.

Findings

- Steady increase in the number of miles congested, from 81 (2016) to 92 (2017) and 129 (2018).
- Over time, evening peak-period number of miles of congestion accounted for more than twice the congestion in the morning rush hours.

Figure 10: Trends in Total Congested Miles



Total Congestion Trend by Direction

Total congestion trend compares the percentage of total network miles congested in each direction in each peak period. Table 6 shows the total congestion trend by direction and peak period.

Findings

- Generally, there appears to be significantly more congestion in the North/South than East/West direction.
- In almost all directions, congestion was more pronounced in the evening periods than morning periods.

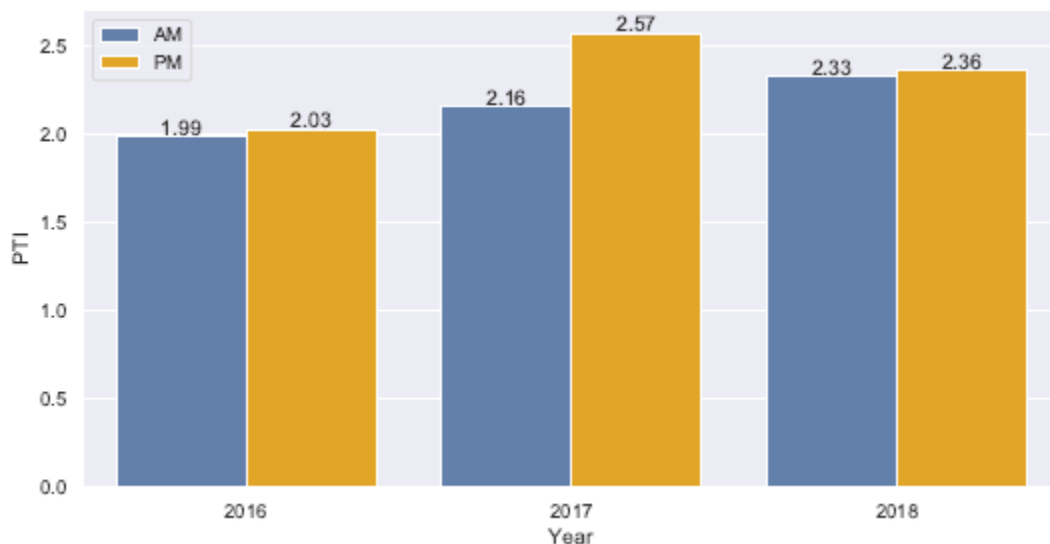
Table 6: Trends in Total Congested Miles

Direction	Peak	2016		2017		2018	
		Queue Length	Percent	Queue Length	Percent	Queue Length	Percent
EB	AM	2.58	3%	5.15	6%	4.07	3%
	PM	4.22	5%	5.48	6%	6.93	6%
WB	AM	3.92	5%	7.63	8%	3.24	3%
	PM	13.16	16%	11.91	13%	13.75	11%
NB	AM	11.52	14%	11.34	12%	8.30	7%
	PM	17.17	21%	20.55	22%	33.36	28%
SB	AM	1.63	2%	4.80	5%	7.53	6%
	PM	26.60	33%	24.79	27%	43.40	36%
TOTAL		81	100%	92	100%	121	100%

Planning Time Index Trend by Peak-Period

PTI trend compares the average PTI in each peak period. Figure 11 shows the PTI trend by peak period. Both AM and PM peak hours showed a slight trend upwards (see figure below).

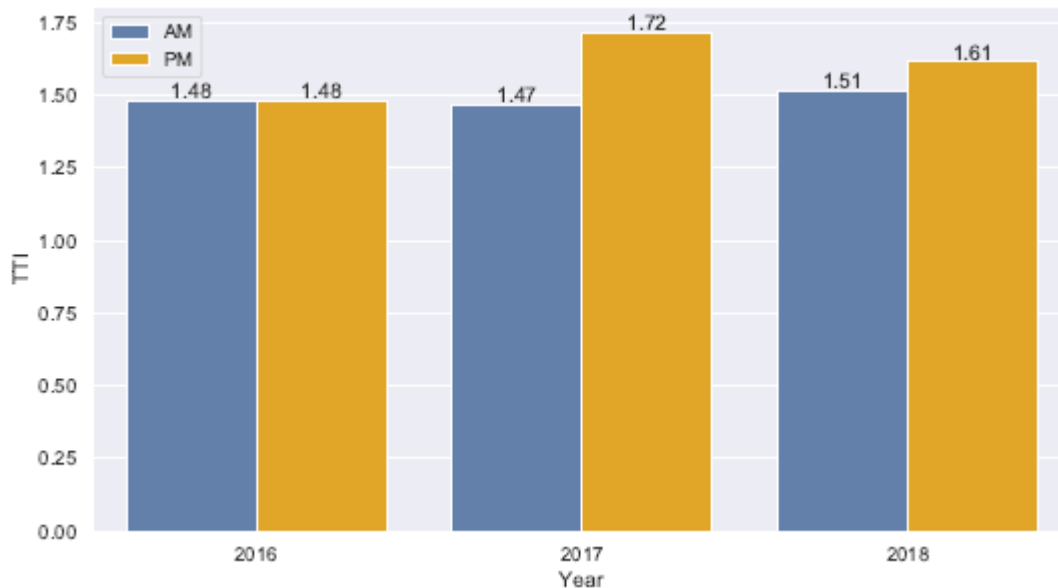
Figure 11: Trends in Planning Time Index (Average)



Travel Time Index Trend by Peak-Period

Figure 14 below compares average TTI for morning and evening peak periods. The results indicated that TTI was relatively stable for the three years in the AM peak hours. However, there was a slight upward movement in the PM peak period.

Figure 14: Trends in Travel Time Index (Average)



Ranked Congested Locations

All congested locations were ranked based on severity and delay impacts. Tables 7 and 8 show the top 10 locations by severity and delay impact, respectively. The complete list of ranked locations are in Appendix 1. Severity and total impact are defined as:

- The Severity number is the average of the TTI and PTI. It takes into account two aspects of congestion; the average delay of a congested location and how reliable that average is from day to day. Higher Severity numbers reflect more severe congestion.
- The Delay Impact number is obtained by multiplying the congested miles of a location by the TTI. Its purpose is to compare delay impact to the motorist, by factoring in the comparative lengths of the queues in each congested location. Higher delay impact numbers reflect longer delays for motorists.

Table 7: Top10 Locations by Severity

No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	Skinker Blvd	Delmar Blvd to Forest Park Pky	MO	St. Louis City	SB	PM	0.43	5.00	2.18	3.59	0.93
2	Hanley Rd	Clayton Rd to I-64	MO	St. Louis	SB	PM	0.54	5.00	2.01	3.51	1.08
3	Laclede Station Rd	Big Bend Blvd to S Hanley	MO	St. Louis	NB	AM	0.61	4.86	1.76	3.31	1.07
4	Salisbury St	Florissant Ave to I-70	MO	St. Louis City	EB	PM	0.42	3.83	2.54	3.19	1.06
5	MO-340 (Olive Blvd)	Chesterfield Pky to Baxter Rd	MO	St. Louis	SB	PM	1.10	4.33	2.00	3.17	2.21
6	MO-141	Hawkins to I-44	MO	St. Louis	NB	AM	1.03	4.43	1.48	2.96	1.52
7	MO-141	Big Bend Rd to I-44	MO	St. Louis	SB	PM	1.73	4.03	1.50	2.77	2.60
8	MO-100 (Manchester Rd)	Big Bend Blvd to McCausland Ave	MO	St. Louis	EB	PM	0.83	2.89	2.32	2.61	1.93
9	MO-30 (Gravois Rd)	Sappington Rd to Lindbergh Blvd	MO	St. Louis	WB	PM	0.34	3.10	2.08	2.59	0.71
10	US-61 (Lindbergh Blvd)	Olive Blvd to Ladue Rd	MO	St. Louis	SB	PM	1.05	3.56	1.52	2.54	1.60

Table 8: Top 10 Locations by Delay Impact

No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	MO-D (Page Ave)	I-170 to Schuetz Rd	MO	St. Louis	WB	PM	4.14	2.28	1.53	1.90	6.33
2	MO-94	I-64 to MO-364	MO	St. Charles	NB	PM	3.89	2.14	1.58	1.86	6.15
3	US-61 (Lindbergh Blvd)	I-270 to New Halls Ferry Rd	MO	St. Louis	NB	PM	3.49	2.38	1.61	2.00	5.62
4	MO-141	MO-30 to MO-21	MO	St. Louis	SB	PM	3.85	2.56	1.41	1.98	5.43
5	IL-159 (Glen Carbon)	IL-162 to Governors Pky	IL	IL	NB	PM	3.22	2.31	1.67	1.99	5.37
6	MO-K	I-70 to MO-364	MO	St. Charles	SB	PM	3.47	1.84	1.45	1.65	5.03
7	IL-159 (Belleville)	IL-15 to I-64	IL	IL	NB	PM	2.80	1.99	1.53	1.76	4.28
8	IL-159 (Belleville)	I-64 to IL-15	IL	IL	SB	PM	2.53	2.07	1.54	1.81	3.89
9	Forest Park Ave	I-64 to Kingshighway Blvd	MO	St. Louis City	WB	PM	2.00	2.65	1.79	2.22	3.57
10	US-61 (Lindbergh Blvd)	Big Bend Rd to MO-100	MO	St. Louis	NB	PM	2.26	1.91	1.49	1.70	3.37

Changes in Overall Severity and Delay Impact

The figures in this section provide a high level comparison of severity and delay impacts from 2016 to 2018 based on the data developed in the Annual Regional Congestion reports.

Figure 13 shows ranking of locations based on their severity scores. Overall, severity of congestion shows an increasing trend from 2016 to 2018.

Figure 13: Ranking of Locations by Severity

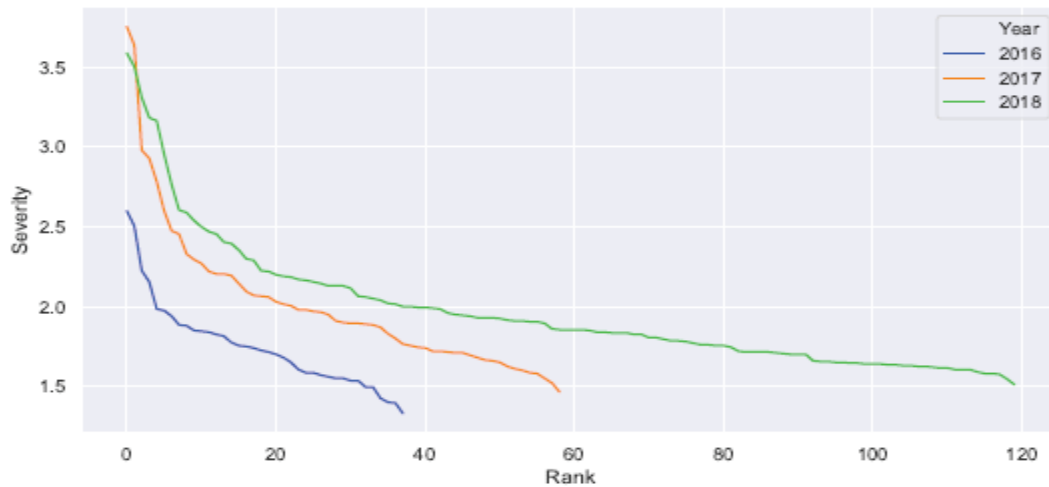
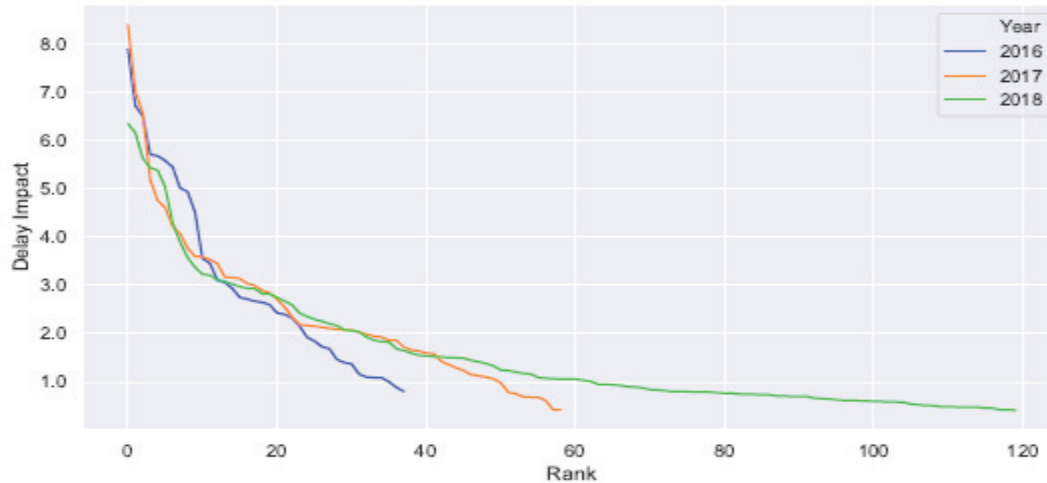


Figure 14 shows changes in delay impact from 2016 to 2018. Overall, the figure below indicates little change in delay impact for the three years.

Figure 14: Ranking of Locations by Delay Impact



Changes in Top 10 Severe and Delay Impact Locations

Tables 9 and 10 specifically examine severity and delay impact figures above for 2017 and 2018. The purpose of this analysis was to track locations that recur in the two years under examination. The red highlighted entries are reoccurring locations with the exact same limits in both years. The green highlighted entries are locations that also reoccur, but their limits vary somewhat from 2017 to 2018. Only four locations in the top 10 most severely congested locations in 2017 were found in 2018 (red and green colors). Thus, while congestion severity has generally increased, the severity does appear to be coming from new locations. For delay impact, five locations in the top 10 most impactful locations in 2017 re-appeared in 2018 (see table 10).

Table 9: Top 10 Most Severe Locations from 2017 and 2018

2017					2018			
No.	Route	Limits	Direction	Peak	Route	Limits	Direction	Peak
1	MO-100	Vandeventer to Kingshighway	WB	PM	Skinker Blvd	Delmar Blvd to Forest Park Pky	SB	PM
2	Skinker Blvd	Delmar to Forest Park Pky	SB	PM	Hanley Rd	Clayton Rd to I-64	SB	PM
3	SALISBURY ST	N FLORISSANT AVE to I-70	EB	PM	Laclede Station Rd	Big Bend Blvd to S Hanley	NB	AM
4	MO-100	Big Bend to McCausland	EB	PM	Salisbury St	Florissant Ave to I-70	EB	PM
5	HAMPTON AVE	I-64/US-40 to I-44	SB	PM	MO-340 (Olive Blvd)	Chesterfield Pky to Baxter Rd	SB	PM
6	Hanley Rd	Shaw Park Dr to I-64/US-40/Eager Rd	SB	PM	MO-141	Hawkins to I-44	NB	AM
7	LACLEDE ST RD	Union Pacific to Murdoch	SB	PM	MO-141	Big Bend Rd to I-44	SB	PM
8	MO-141	Big Bend to I-44	SB	PM	MO-100 (Manchester Rd)	Big Bend Blvd to McCausland Ave	EB	PM
9	KINGSHIGHWAY	Laclede Ave to Manchester	SB	PM	MO-30 (Gravois Rd)	Sappington Rd to Lindbergh Blvd	WB	PM
10	JEFFERSON	Washington Blvd to Park Ave	SB	PM	US-61 (Lindbergh Blvd)	Olive Blvd to Ladue Rd	SB	PM

Table 10: Top 10 Locations with Most Delay Impacts from 2017 and 2018

2017					2018			
No.	Route	Limits	Direction	Peak	Route	Limits	Direction	Peak
1	US-67 (Lindbergh)	I-270 to Old Halls Ferry Rd	NB	PM	MO-D (Page Ave)	I-170 to Schuetz Rd	WB	PM
2	MO-94	I-64/US-40/US-61 to Mid Rivers Mall Dr	NB	PM	MO-94	I-64 to MO-364	NB	PM
3	MO-D (Page Ave)	I-170 to Schuetz Rd	WB	PM	US-67	I-270 to New Halls Ferry Rd	NB	PM
4	MO-K	I-70 to MO-364	SB	PM	MO-141	MO-30 to MO-21	SB	PM
5	MO-94	N 5th Street to I-70	SB	PM	IL-159 (Glen Carbon)	IL-162 to Governors Pky	NB	PM
6	IL-111	Forest Blvd to I-55/I-70/US-40	NB	PM	MO-K	I-70 to MO-364	SB	PM
7	IL-111	Forest Blvd to I-55/I-70/US-40	NB	AM	IL-159 (Belleville)	IL-15 to I-64	NB	PM
8	Forest Park Ave	I-64 to Kingshighway	WB	PM	IL-159 (Belleville)	I-64 to IL-15	SB	PM
9	KINGSHIGHWAY	Shaw to Delmar	NB	AM	Forest Park Ave	I-64 to Kingshighway Blvd	WB	PM
10	KINGSHIGHWAY	I-44 to Delmar	NB	PM	US-61 (Lindbergh Blvd)	Big Bend Rd to MO-100	NB	PM

2 Regional Freeway Congestion Analyses

The analyses of freeway congestion data covered the spatial network of freeways considered for analysis, selected congested locations, and congestion performance analyses.

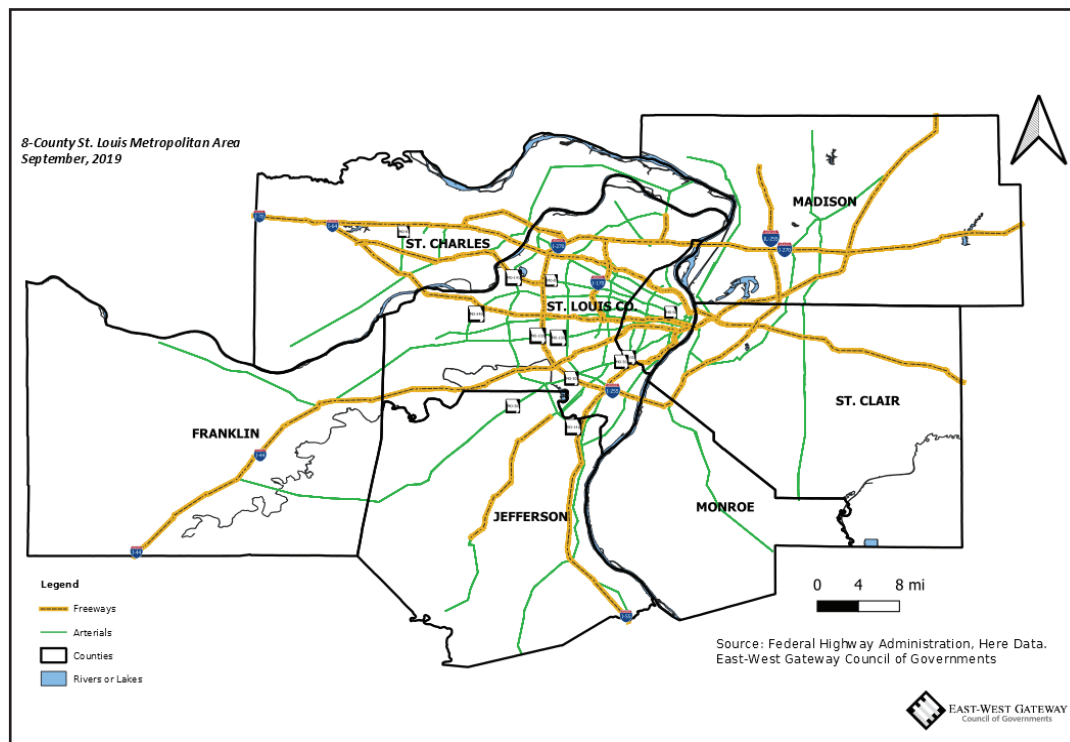
Congested CMP Network

A total of 3,460 miles of freeways was considered for the regional analysis (see figure 15), of which about 8% are considered congested during morning and evening peak hours. A breakdown of the total monitored and congested miles shows the following distribution (see Table 11):

Table 11: Comparison of Regional and Congested Network Miles

No.	County	Monitored		Congested		% Congested Rank	Congested Rank
		Miles	Percent	Miles	Percent		
1	St. Louis	1315.2	38	148.0	55.3	11.3	2
2	IL	1258.1	36.4	23.8	8.9	1.9	4
3	St. Charles	600.8	17.4	39.9	14.9	6.6	3
4	St. Louis City	286	8.3	56.0	20.9	19.6	1
TOTAL		3460	100	268	100	8%	

Figure 15: Regional Freeway Network



Selected Congested Locations on Freeway

Our freeway analyses resulted in the selection of 267 miles of congested locations: 56 miles in the city of St. Louis, 148 miles in St. Louis county, 40 miles in St. Charles county, and 24 miles in Illinois. The table below shows the characteristics of the various congested locations. Figures 16 to 23 show the location of selected congested freeways.

Table 12: Congested Freeway Locations

Map No.	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	I-270	I-70 to Tesson Ferry Rd/MO-21	MO	St. Louis	SB	PM	18.70	3.12	1.55	2.34	28.99
2	I-70	I-170 to Cave Springs	MO	St. Louis	WB	PM	14.66	2.09	1.26	1.67	18.47
3	I-70	Tr Hughes/Belleau Crk to Pearce Blvd	MO	St. Charles	WB	PM	12.16	2.03	1.24	1.63	15.08
4	I-70	I-270 to Jennings Sta Rd	MO	St. Louis	EB	PM	11.14	2.40	1.29	1.85	14.37
5	I-270	McDonnell Blvd to MO-367	MO	St. Louis	EB	PM	11.10	2.82	1.56	2.19	17.32
6	I-64	Mason Rd to McCausland Ave	MO	St. Louis	EB	PM	10.20	2.59	1.37	1.98	13.97
7	I-64	MO-K to I-70	MO	St. Charles	WB	PM	10.10	2.74	1.42	2.08	14.34
8	I-270	I-55/I-255 to Manchester	MO	St. Louis	NB	AM	10.08	3.34	1.62	2.48	16.33
9	I-64	Ballas Rd to McCausland	MO	St. Louis	EB	AM	7.80	2.60	1.36	1.98	10.61
10	I-270	I-70 to Ladue	MO	St. Louis	SB	AM	6.94	2.02	1.17	1.60	8.12
11	I-44	I-55 to Shrewsbury Ave	MO	St. Louis City	WB	PM	6.85	4.61	2.10	3.36	14.39
12	I-70/I-44/I-55	Gasconade St to Grand Ave	MO	St. Louis City	SB	PM	6.63	2.37	1.29	1.83	8.55
13	I-270	IL-203 to Riverview	MO/IL	St. Louis	WB	AM	6.52	1.25	1.18	1.21	7.69
14	I-64	Jefferson Ave to Boland Pl	MO	St. Louis City	WB	PM	6.24	3.97	2.12	3.05	13.23
15	I-55	Loughborough to Park Ave	MO	St. Louis City	NB	AM	6.21	1.87	1.15	1.51	7.14
16	I-64	I-170/Brentwood Blvd to MO-JJ/Ballas Rd	MO	St. Louis	WB	PM	5.72	2.31	1.30	1.81	7.44
17	I-70	Fifth St to St. Charles Rock Rd	MO	St. Charles	EB	AM	5.68	2.30	1.21	1.76	6.87
18	I-170	MO-180/St Charles Rock to Hanley Rd	MO	St. Louis	NB	PM	5.54	2.39	1.38	1.89	7.58
19	I-70	Bryan to Tr Hughes	MO	St. Charles	EB	AM	5.01	2.05	1.14	1.59	5.71
20	I-270	IL-3 to Riverview Dr	IL/MO	IL	WB	PM	4.91	1.16	1.21	1.19	5.94
21	I-64	25th St. IL to PSB MO	IL	IL	WB	AM	4.85	4.67	2.30	3.49	11.15
22	I-255	IL-157 to Mousette Ln	IL	IL	NB	PM	4.69	1.46	1.27	1.37	5.96
23	I-64	I-70 to Mo-N	MO	St. Charles	EB	AM	4.41	1.88	1.20	1.54	5.29
24	I-64	Chesterfield Pky to Boones Crossing	MO	St. Louis	WB	PM	4.35	2.30	1.33	1.82	5.79
25	I-270	Bellefontaine Rd to Florissant Ave	MO	St. Louis	WB	AM	4.31	2.82	1.40	2.11	6.03
26	I-64	Boones Crossing to Chesterfield Pkwy	MO	St. Louis	EB	AM	4.25	2.47	1.20	1.84	5.10
27	I-170	Olive Blvd to I-64	MO	St. Louis	SB	AM	4.18	2.15	1.23	1.69	5.14
28	I-170	MO-340/Olive Blvd to I-64	MO	St. Louis	SB	PM	4.18	3.95	1.86	2.91	7.77
29	I-64	Haupton Rd to Hanley Rd	MO	St. Louis City	WB	AM	3.71	3.38	1.61	2.50	5.97
30	I-270	Page to I-70	MO	St. Louis	NB	PM	3.50	2.07	1.13	1.60	3.95
31	I-55	Loughborough to Reavis Barracks Rd	MO	St. Louis City	SB	PM	3.44	2.05	1.20	1.63	4.13
32	I-70 NB-WB	I-55/I-64 IL to Cass Ave MO	IL	IL	WB	AM	3.25	2.57	1.24	1.90	4.03
33	I-70 EB-SB	Cass Ave MO to I-55/64 IL	IL	IL	EB	PM	3.21	2.04	1.32	1.68	4.23
34	I-44	Elm to Shrewsbury	MO	St. Louis	EB	AM	3.09	2.24	1.21	1.73	3.74
35	I-44	Bowles Ave to Highway Dr	MO	St. Louis	EB	AM	3.00	1.98	1.13	1.56	3.39
36	I-70	I-70 Exp/Bircher Blvd to Lucas And Hunt Rd	MO	St. Louis City	WB	PM	3.00	2.34	1.33	1.84	3.99
37	I-255	State St to IL-15	IL	IL	SB	AM	2.94	1.21	1.23	1.22	3.62
38	I-55/I-64	Broadway MO to I-70 Split IL	MO/IL	IL	EB	PM	2.94	1.75	1.29	1.52	3.79
39	I-44	Highway Dr to I-270	MO	St. Louis	EB	PM	2.84	2.26	1.26	1.76	3.58
40	I-64	Grand Ave to PSB	MO	St. Louis City	EB	PM	2.71	6.19	2.56	4.38	6.94
41	I-64	Olive to Timberlake Manor Pkwy	MO	St. Louis	EB	PM	2.22	1.89	1.15	1.52	2.55
42	I-44	I-55/I-64/S-40 to Tenth St	MO	St. Louis City	WB	PM	2.02	2.60	1.34	1.97	2.71
43	I-44	I-55/I-64/S-40 to Tenth St	MO	St. Louis City	WB	AM	2.02	2.02	1.17	1.60	2.36
44	I-44	Haupton to Kingshighway	MO	St. Louis City	EB	AM	1.98	1.77	1.14	1.46	2.26
45	I-44	Jefferson Ave to Shrewsbury Ave	MO	St. Louis City	WB	AM	1.65	1.34	1.13	1.23	1.86
46	I-70	Salisbury St to St Louis Ave	MO	St. Louis City	EB	PM	1.61	2.17	1.19	1.68	1.92
47	I-70	Union Blvd to Jennings St. Rd	MO	St. Louis City	WB	AM	1.58	2.44	1.19	1.82	1.88
48	I-44	Bowles Ave to MO-141	MO	St. Louis	WB	PM	1.55	1.62	1.12	1.37	1.74
49	I-44	Jefferson Ave to Grand Blvd	MO	St. Louis City	WB	AM	1.48	1.78	1.12	1.45	1.66
50	MO-364	Central School Rd to Kisker Rd	MO	St. Charles	SB	PM	1.30	2.34	1.13	1.73	1.47
51	I-170	Ladue Rd to Delmar Blvd	MO	St. Louis	NB	PM	1.14	1.53	1.13	1.33	1.29
52	I-170	I-270 to Hanley	MO	St. Louis	SB	AM	1.03	1.77	1.12	1.45	1.15
53	I-64	Ninth St to I-55/I-70/S-40	MO	St. Louis City	EB	AM	0.78	1.71	1.23	1.47	0.96
54	I-44	Haupton to Jefferson Ave	MO	St. Louis City	EB	PM	0.73	1.81	1.16	1.48	0.85
55	I-44/I-55	Lafayette Ave. to Park Ave.	MO	St. Louis City	NB	PM	0.44	1.90	1.17	1.54	0.51
TOTAL							267				

Figure 16: East Bound Congested Locations (AM Peak)

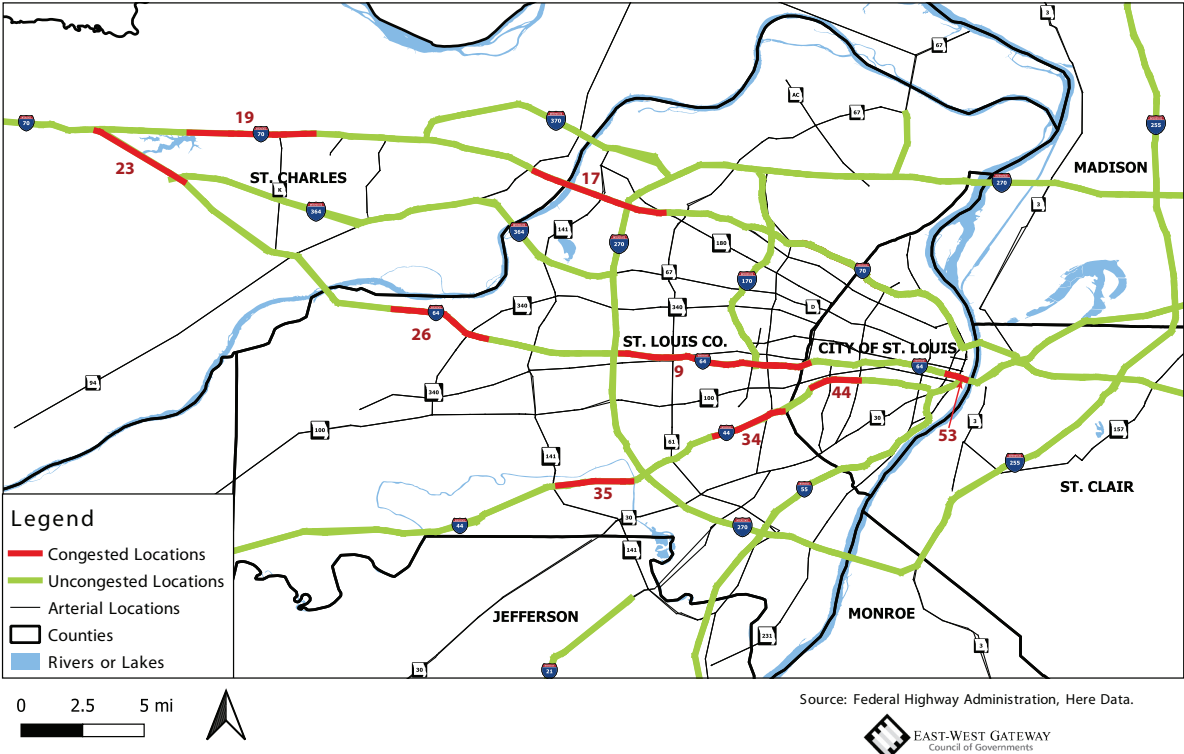


Figure 17: East Bound Congested Locations (PM Peak)

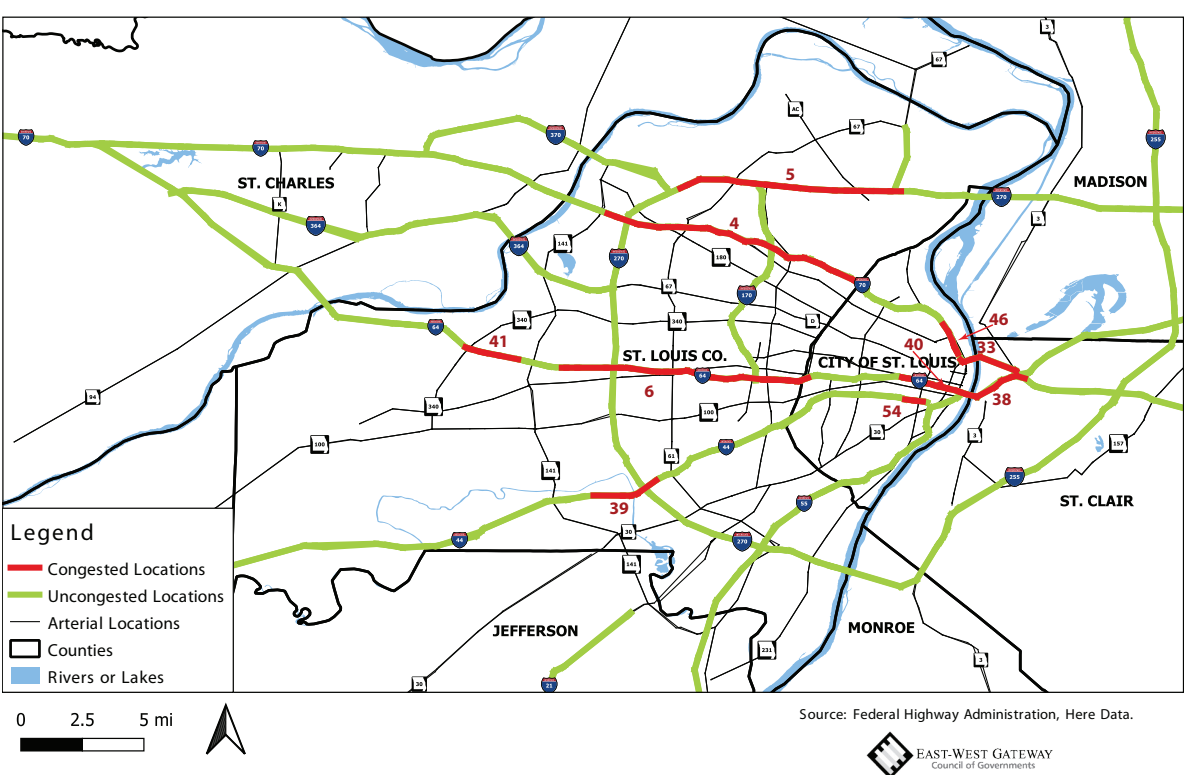


Figure 18: West Bound Congested Locations (AM Peak)

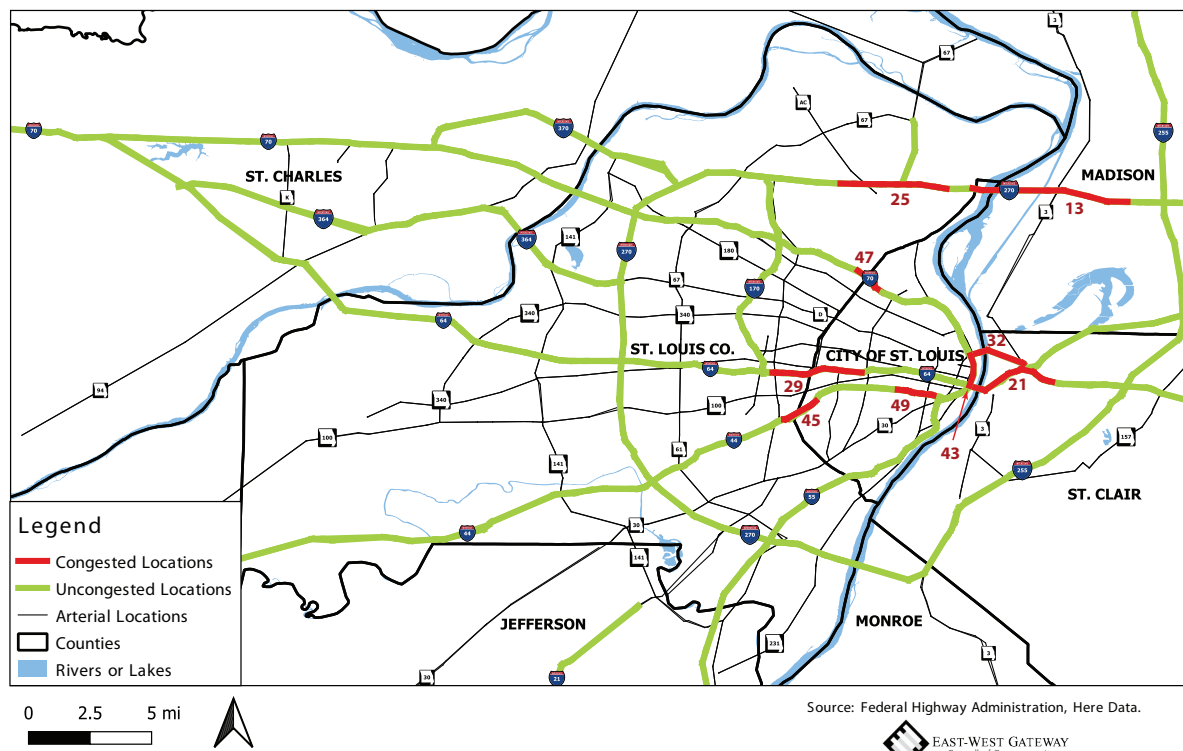


Figure 19: West Bound Congested Locations (PM Peak)

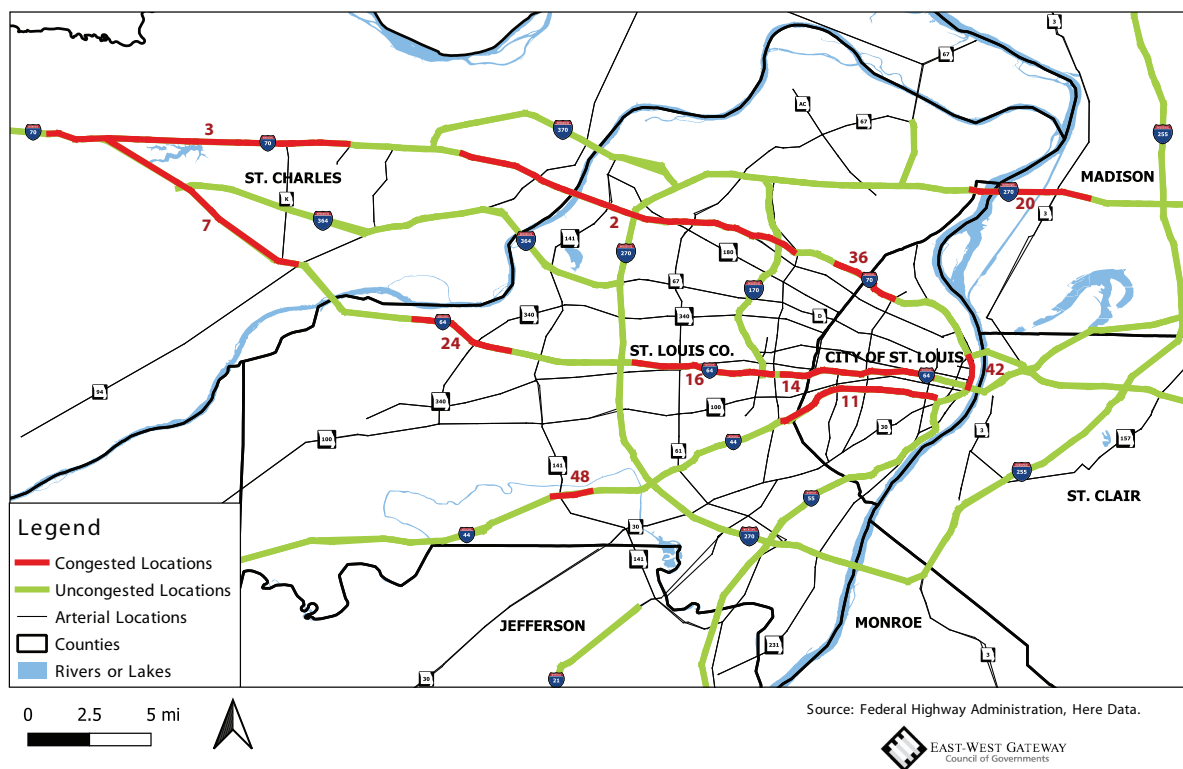


Figure 20: North Bound Congested Locations (AM Peak)

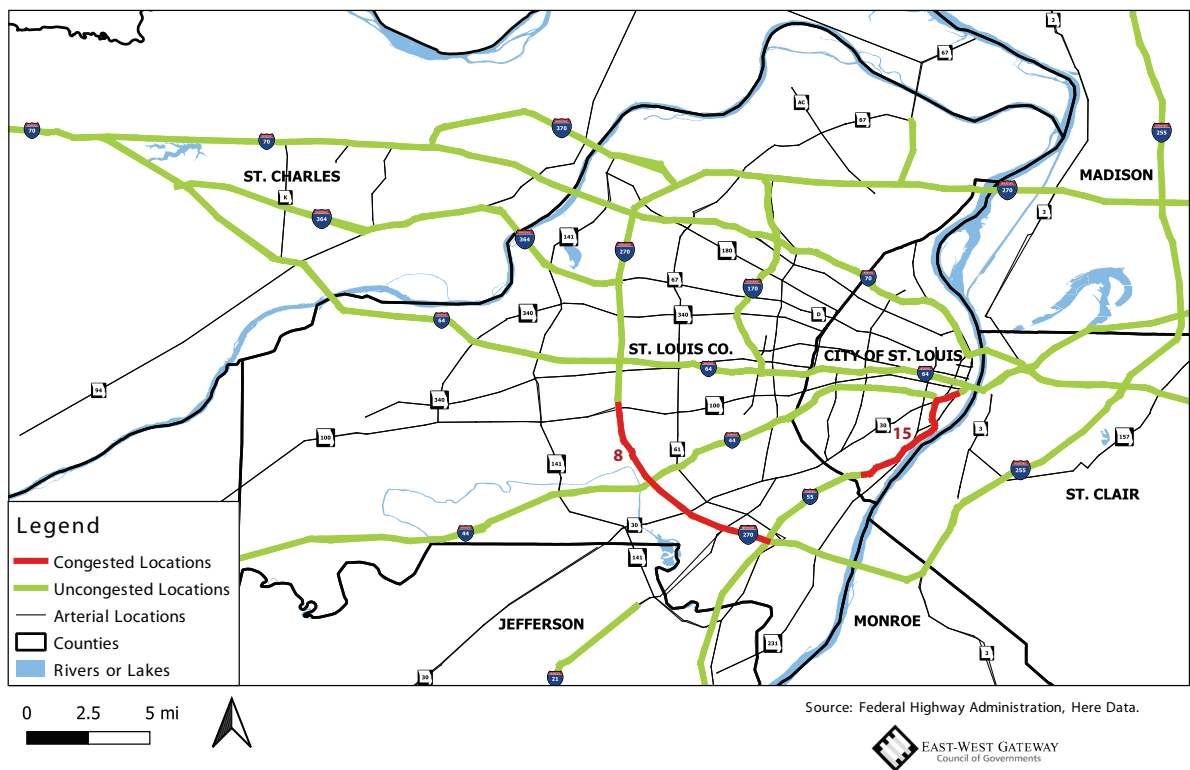


Figure 21: North Bound Congested Locations (PM Peak)

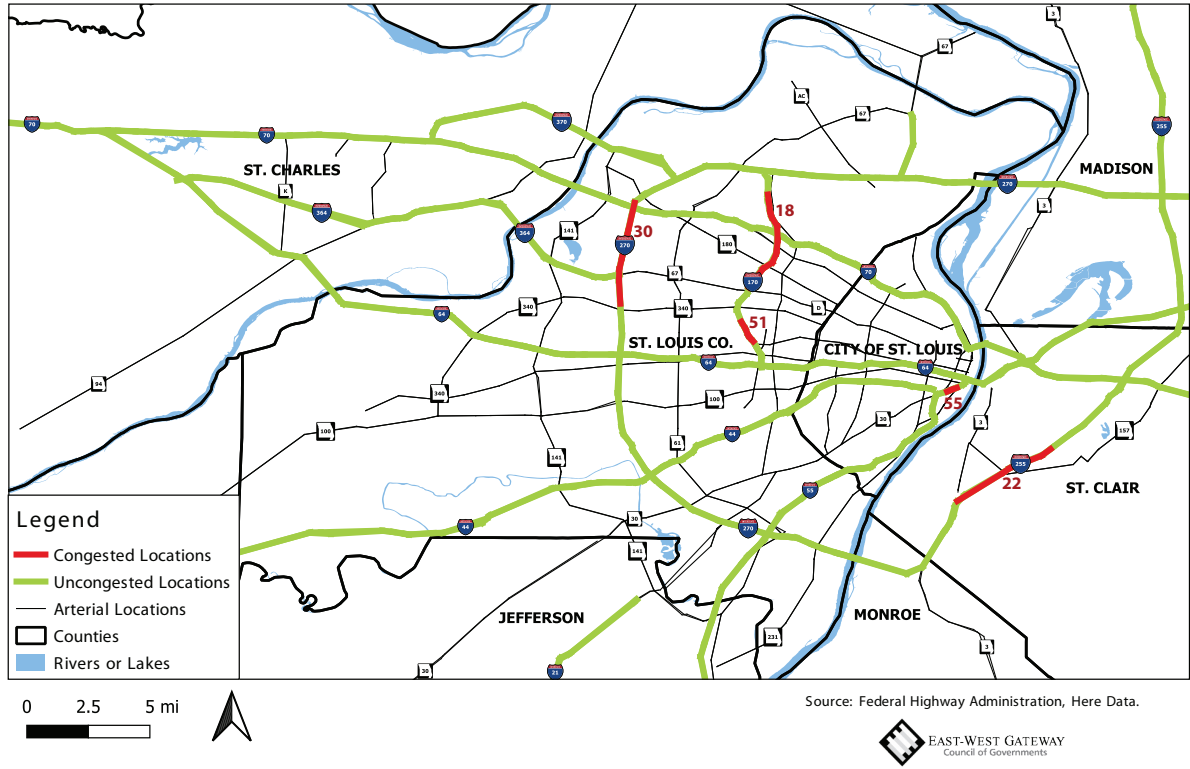


Figure 22: South Bound Congested Locations (AM Peak)

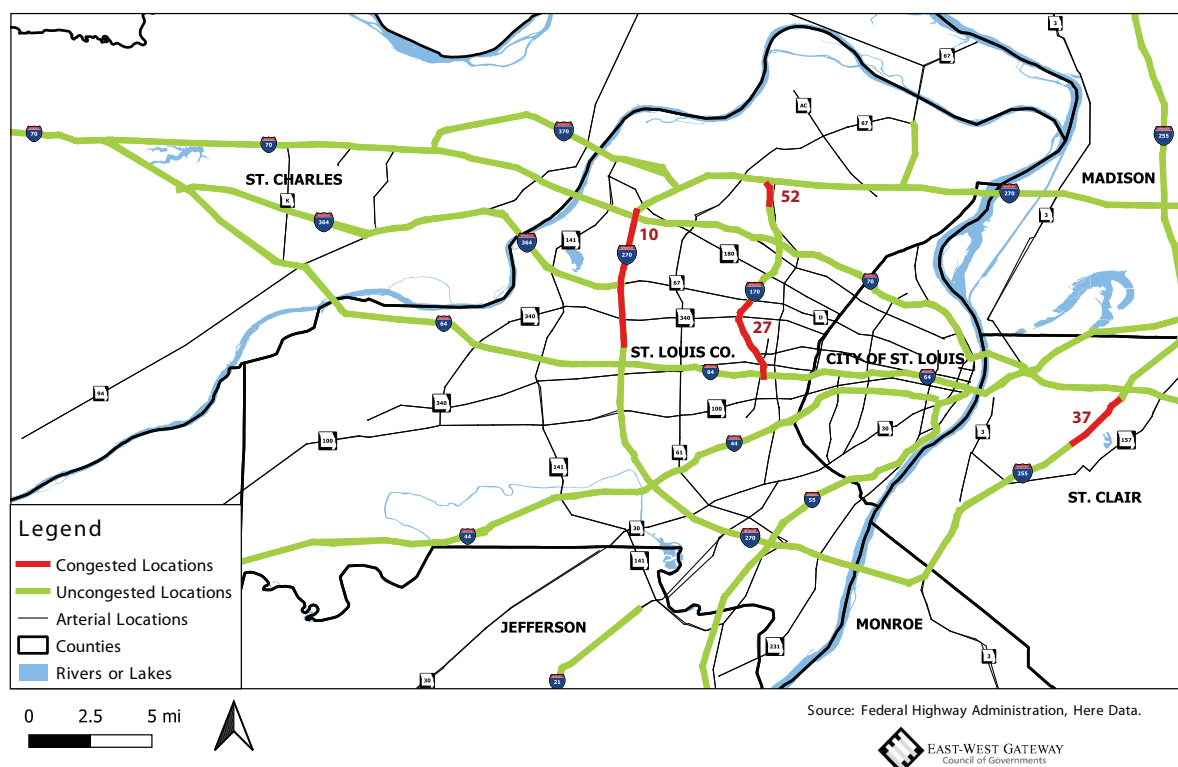
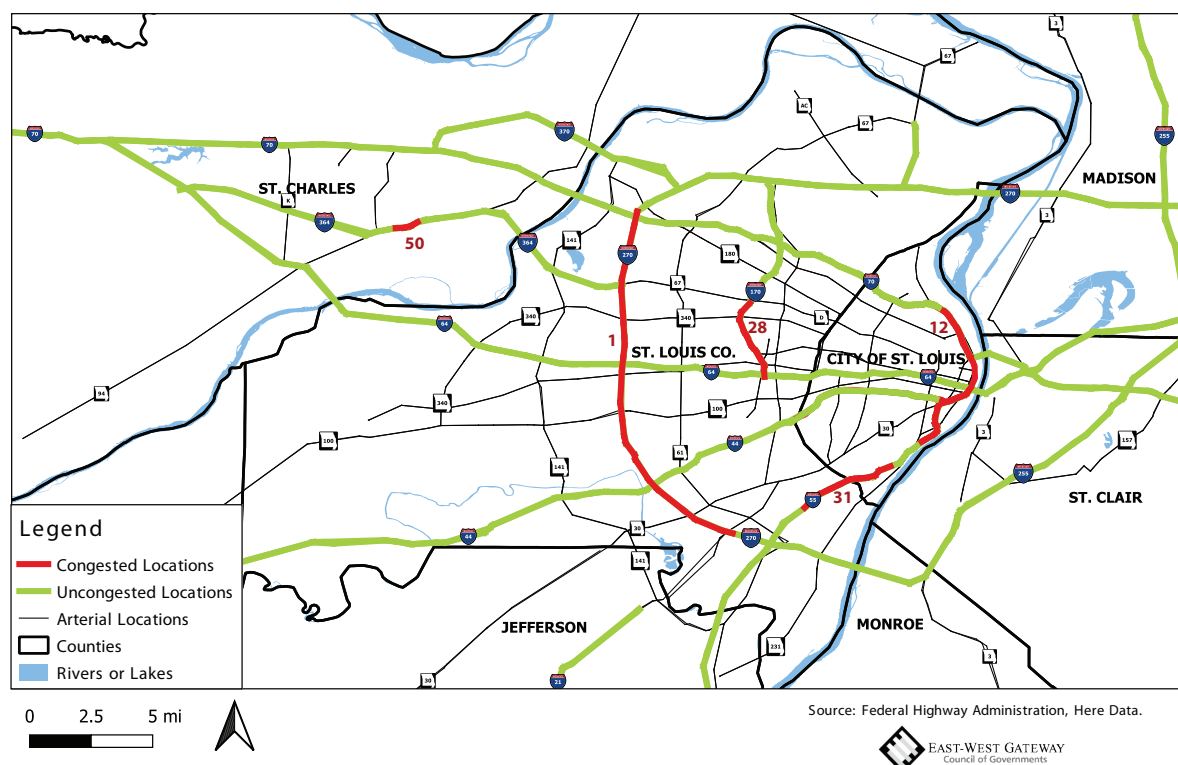


Figure 23: South Bound Congested Locations (PM Peak)



Freeway Congestion Intensity and Duration

A congestion scan is a graphic representation of how congestion on a corridor varies by location and time of day. Time of day is shown on the horizontal axis by hour for the entire day. Location along the corridor is shown in miles on the vertical axis and is referenced to intersecting roadways. Congestion is represented using color coding. Green is uncongested, yellow is moderate congestion, red is heavy congestion and dark red is severe congestion. The resulting visual shows where congestion occurs along the corridor, the intensity of the congestion and the time of day it occurs. The solid yellow and red bands represent continuous congestion along a corridor with the width of a band showing the length of time that the congestion occurs and the length of a band showing the distance in miles of the congestion. Figures 24 to 30 show the space-time representation of freeway congestion.

Figure 24: I-44 (MO-100 to I-55)

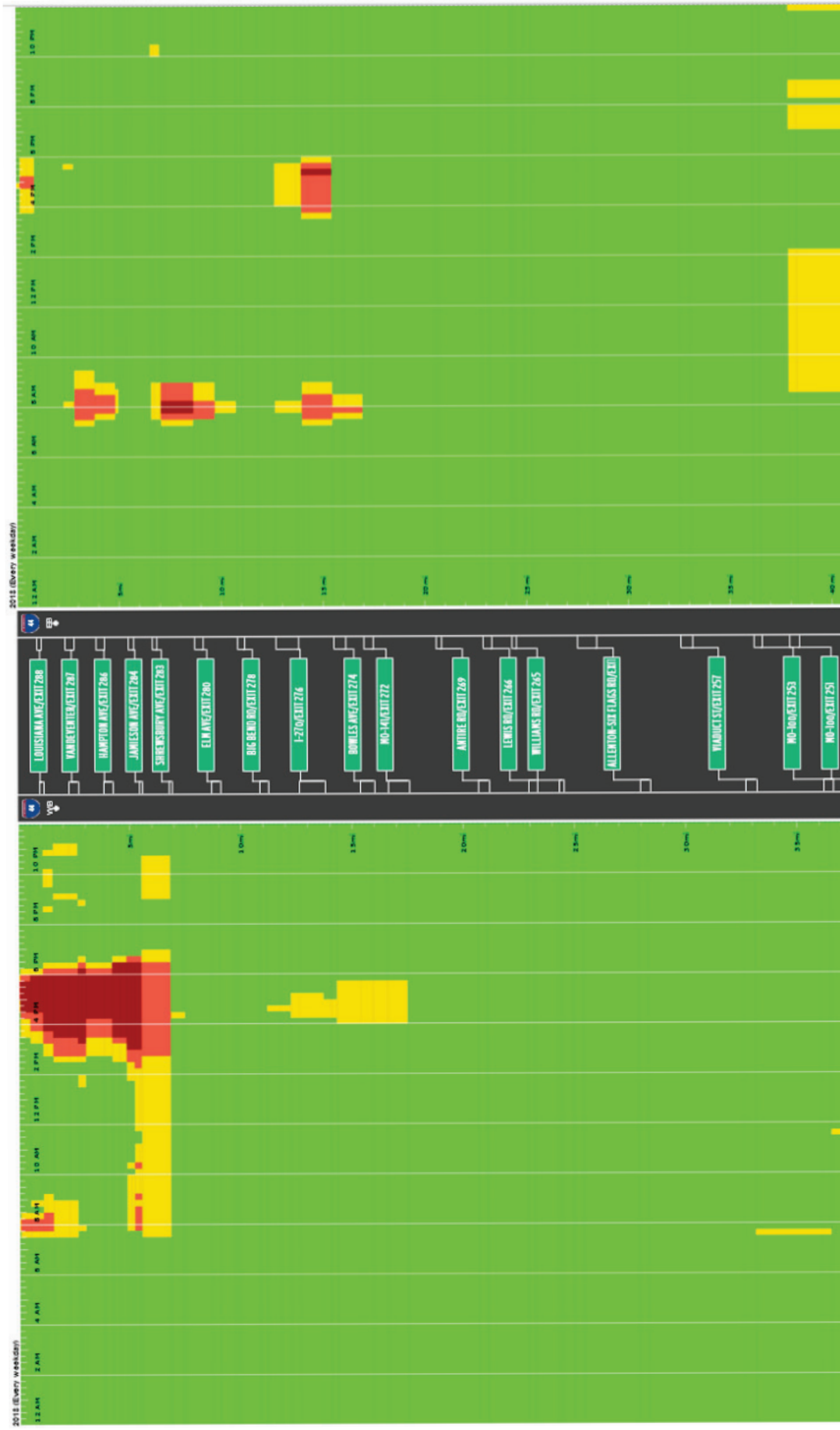


Figure 25: I-55 (I-44 to I-255)

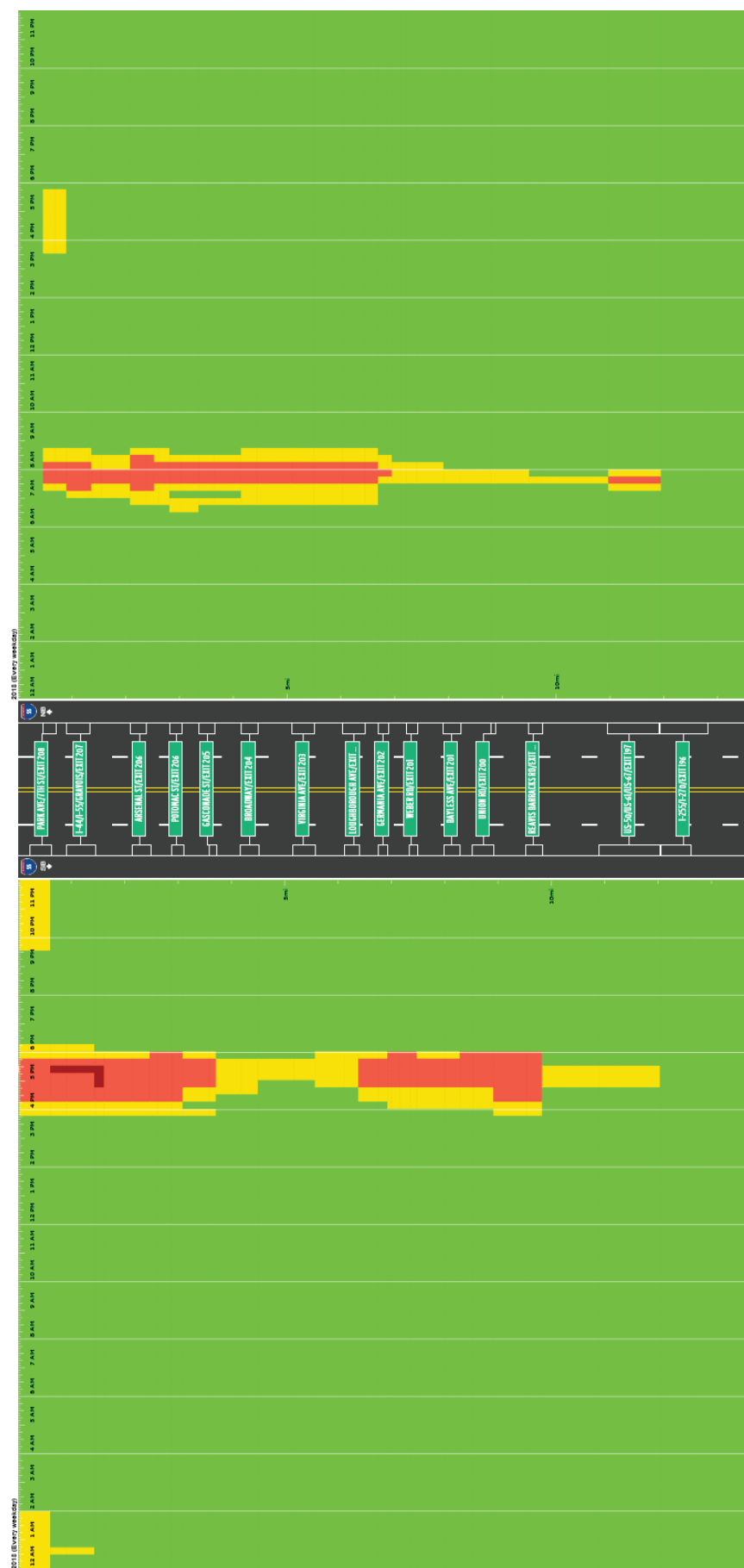


Figure 26: I-170 (Hanley to I-64)

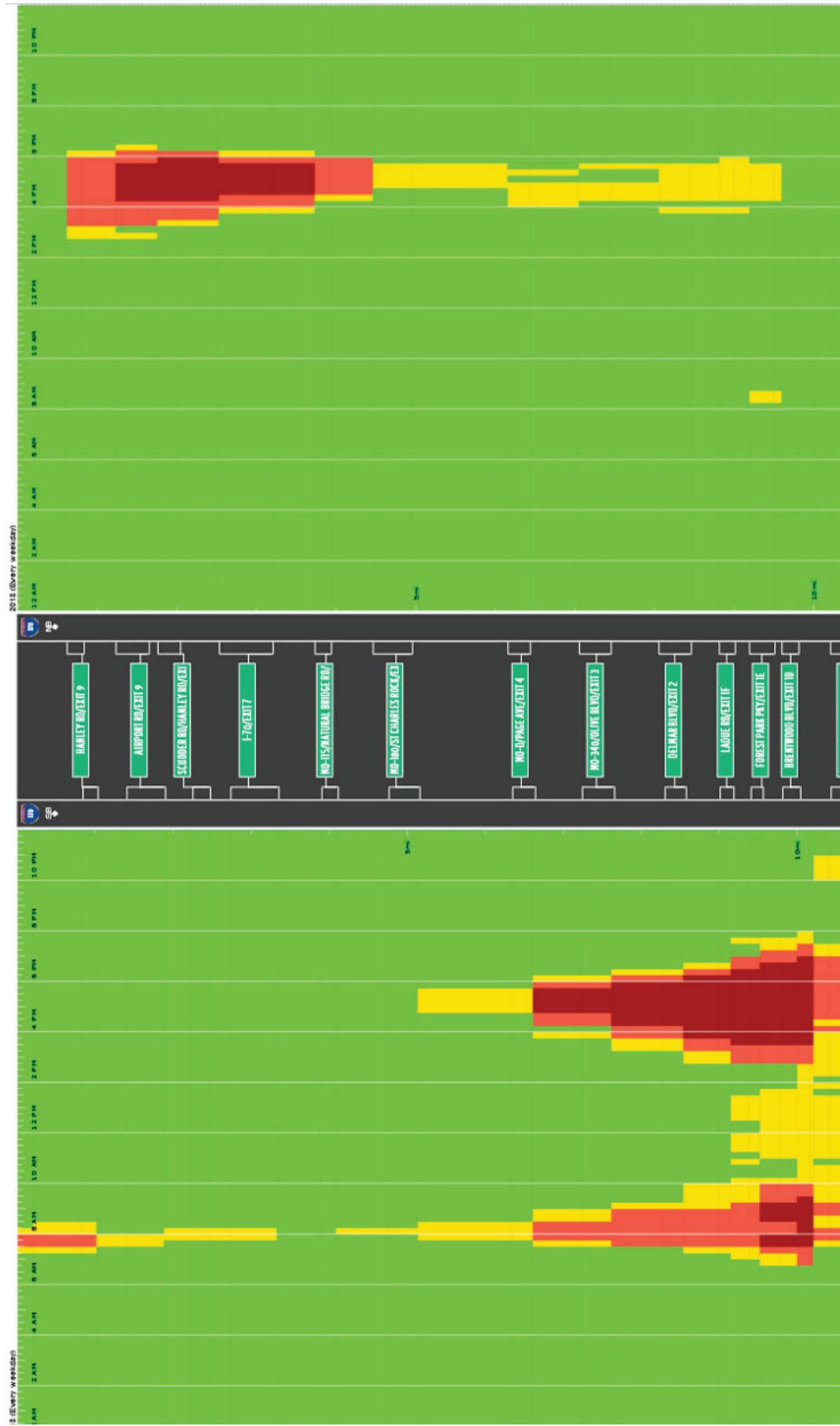


Figure 27: I-270 (Lilac to MO-180, EB & WB)

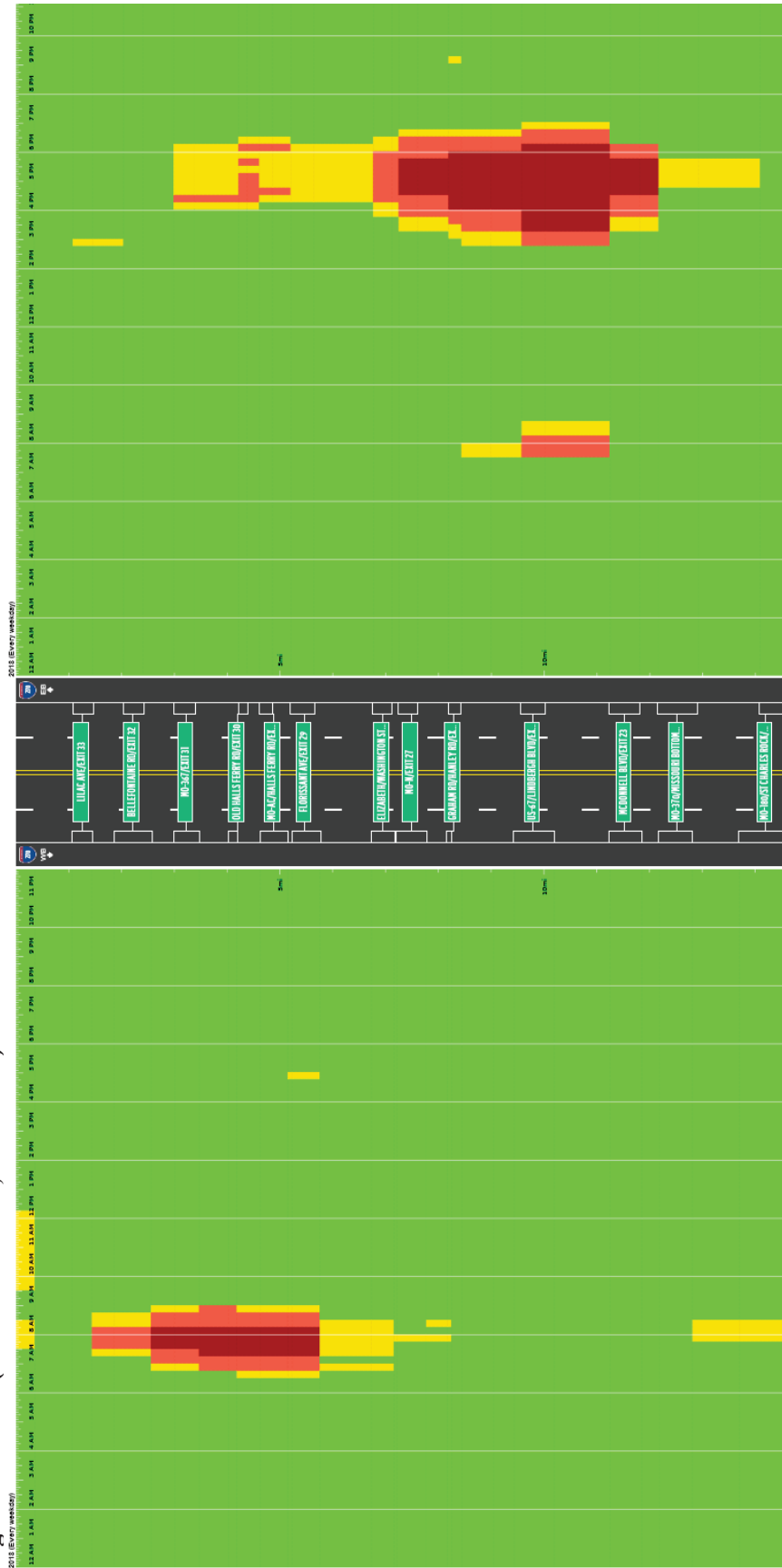


Figure 28: I-270 (Dorset to I-55, NB & SB)

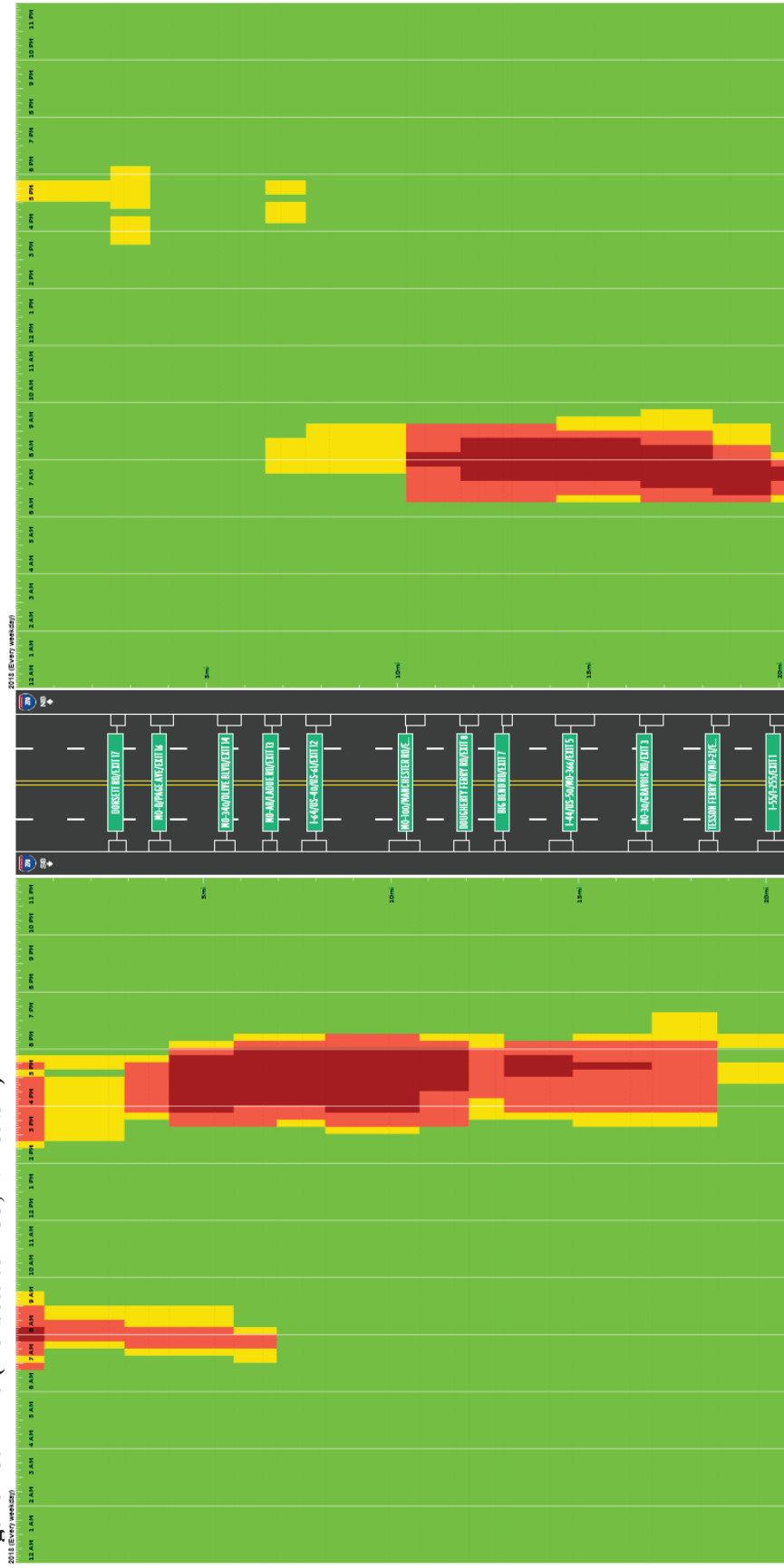
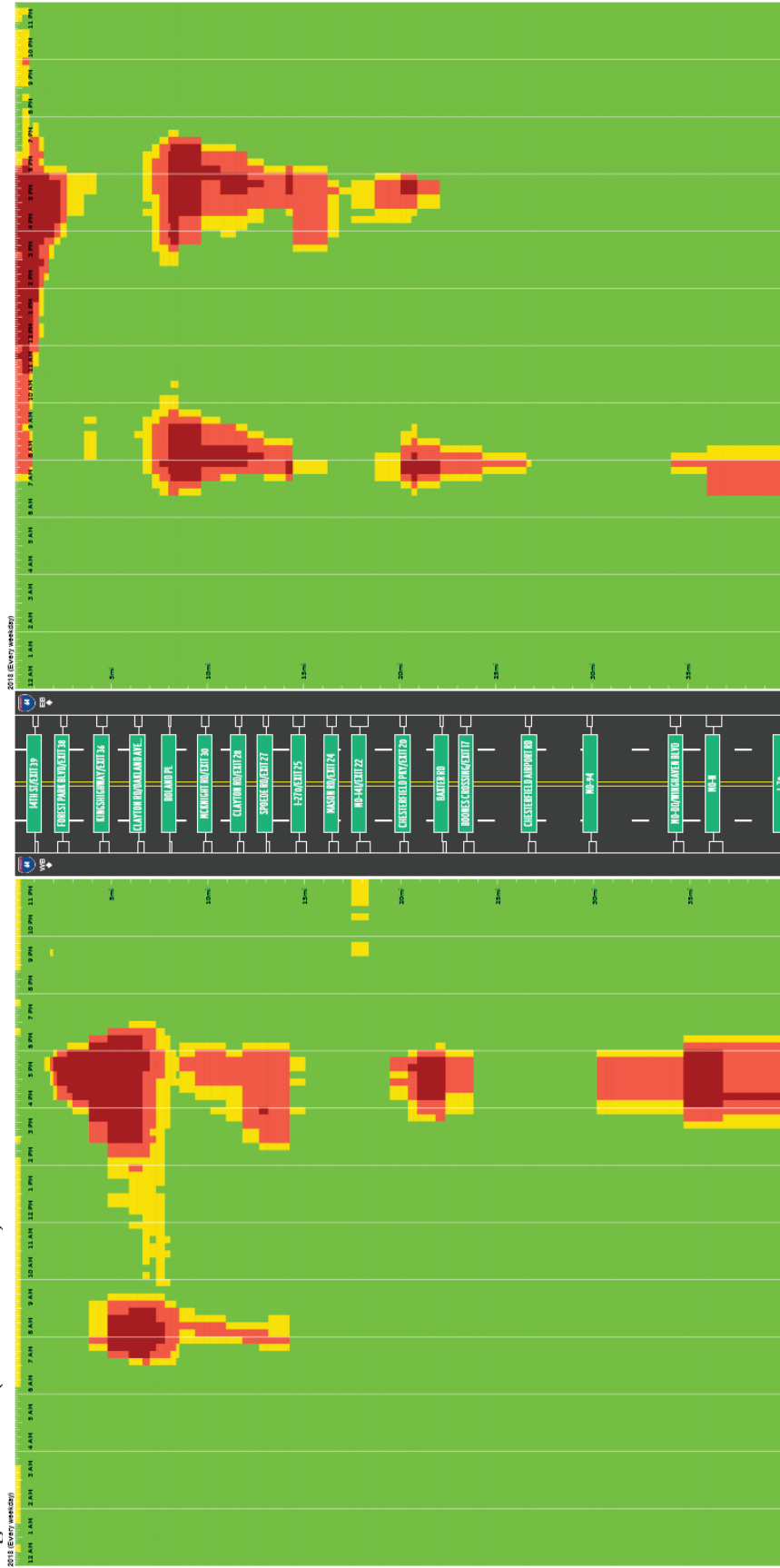


Figure 29: I-64 (I-70 to 14th St)



30



Congestion Performance Analyses

Performance measures are key components of the CMP process as they:

- characterize existing and anticipated conditions on the regional transportation system;
- track progress toward meeting regional objectives;
- identify specific locations with congestion to address; and
- assess congestion mitigation strategies, programs, and projects.

In this section, six key analyses were undertaken for AM and PM peak periods. These are:

- Trends in congested miles by peak-period;
- Trends in congested miles by direction of travel;
- Trends in average PTI by peak-period;
- Trends in average TTI by peak-period;
- Regional congestion transition by peak-period; and
- Impact of work zone activities on congestion.

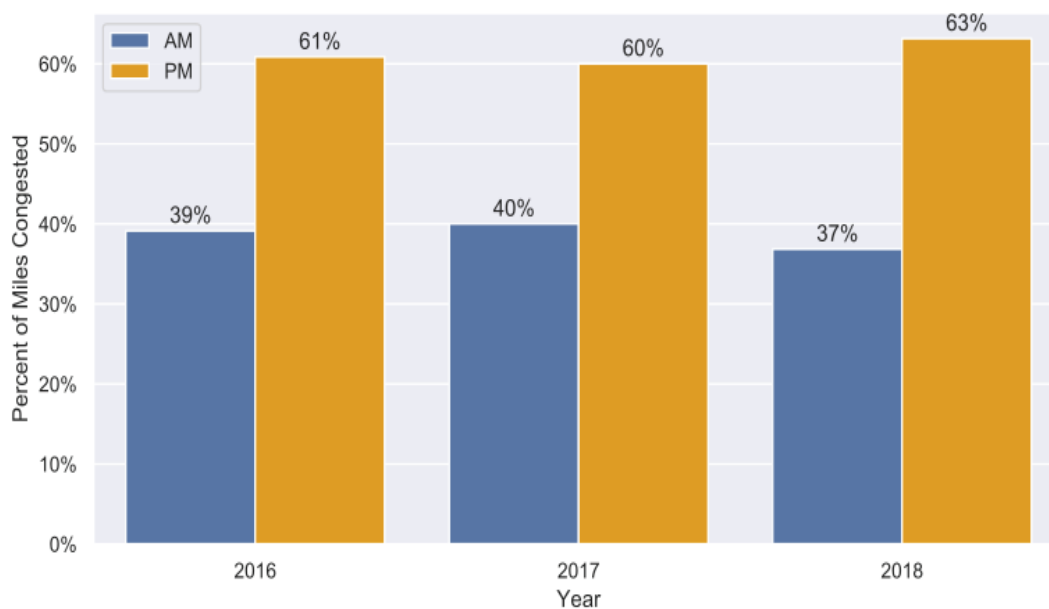
Total Congestion Trend

Total Congestion Trend analysis focuses on overall changes in total congestion changes over time by peak period (see Figure 31 below).

Findings

- The 2016-18 average number of miles congested for evening peak-period was about 62%.
- Congestion was predominantly in the evening and it continued to grow.

Figure 31: Trends in Total Congested



Total Congestion Trend by Peak-Period

This section examine changes in total congestion changes over time by peak period by direction (see table below).

Findings

- Overall, EB/WB congestion levels were significantly higher than NB/SB directions.
- EB/NB locations appeared to have more heavy morning rush hour congestion than evening periods.
- On the contrary, West/South directions had considerably higher congestion in the evenings.

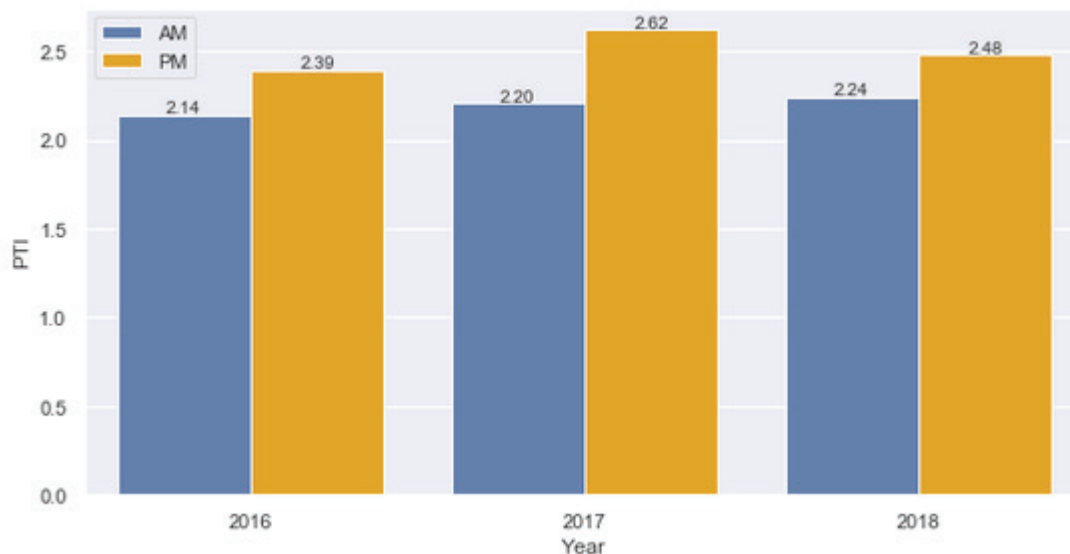
Table 13: Trends in Total Congestion by Direction

Direction	Peak	2016		2017		2018	
		Queue Length	Percent	Queue Length	Percent	Queue Length	Percent
EB	AM	59.63	20.90%	32.08	17.09%	36.00	13.44%
	PM	54.49	19.10%	34.85	18.56%	48.70	18.18%
WB	AM	22.43	7.86%	21.49	11.45%	29.37	10.97%
	PM	74.70	26.18%	48.28	25.72%	71.56	26.72%
NB	AM	18.91	6.63%	12.89	6.87%	16.29	6.08%
	PM	8.98	3.15%	4.33	2.31%	15.31	5.72%
SB	AM	10.67	3.74%	8.62	4.59%	16.31	6.09%
	PM	35.48	12.44%	25.18	13.41%	34.25	12.79%
TOTAL		285	100%	188	100%	268	100%

Planning Time Index Trend by Peak-Period

This section looks at changes in average PTI over time for each peak period (see figure below). Overall, both AM and PM peak periods showed a slight upward trend.

Figure 32: Trends in Planning Time Index (Average)



Travel Time Index Trend by Peak-Period

This analysis tracks changes in average TTI over time for each peak period (see figure below). Overall, both AM and PM peaks showed a slight upward trend.

Figure 33: Trends in Travel Time Index (Average)



Ranked Congested Locations

We ranked all congested locations identified in Table 12. The top 10 locations by severity and total impact are shown in Tables 14 and 15, respectively. The complete list of ranked locations are in Appendix 2. Severity and total delay impact are defined as:

- The Severity number is the average of the TTI and PTI. It takes into account two aspects of congestion; the average delay of a congested location and how reliable the average travel time is from day to day. Higher Severity numbers reflect more severe congestion.
- The Delay Impact number is obtained by multiplying the congested miles of a location by the TTI. Its purpose is to compare the impact of delay to motorists, by factoring in the comparative lengths of the queues in each congested location.

Table 14: Top 10 Locations by Severity

No.	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	I-64	Grand Ave to PSB	MO	St. Louis City	EB	PM	2.71	6.19	2.56	4.38	6.94
2	I-64	25th St. IL to PSB MO	IL	IL	WB	AM	4.85	4.67	2.30	3.49	11.15
3	I-44	I-55 to Shrewsbury Ave	MO	St. Louis City	WB	PM	6.85	4.61	2.10	3.36	14.39
4	I-64	Jefferson Ave to Boland Pl	MO	St. Louis City	WB	PM	6.24	3.97	2.12	3.05	13.23
5	I-170	MO-340/Olive Blvd to I-64/	MO	St. Louis	SB	PM	4.18	3.95	1.86	2.91	7.77
6	I-64	Hampton Rd to Hanley Rd	MO	St. Louis City	WB	AM	3.71	3.38	1.61	2.50	5.97
7	I-270	I-55/I-255 to Manchester	MO	St. Louis	NB	AM	10.08	3.34	1.62	2.48	16.33
8	I-270	I-70 to Tesson Ferry Rd/MO-21	MO	St. Louis	SB	PM	18.70	3.12	1.55	2.34	28.99
9	I-270	McDonnell Blvd to MO-367	MO	St. Louis	EB	PM	11.10	2.82	1.56	2.19	17.32
10	I-270	Bellefontaine Rd to Florissant Ave	MO	St. Louis	WB	AM	4.31	2.82	1.40	2.11	6.03

Table 15: Top 10 Locations by Delay Impact

No.	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	I-270	I-70 to Tesson Ferry Rd/MO-21	MO	St. Louis	SB	PM	18.70	3.12	1.55	2.34	28.99
2	I-70	I-170 to Cave Springs	MO	St. Louis	WB	PM	14.66	2.09	1.26	1.67	18.47
3	I-270	McDonnell Blvd to MO-367	MO	St. Louis	EB	PM	11.10	2.82	1.56	2.19	17.32
4	I-270	I-55/I-255 to Manchester	MO	St. Louis	NB	AM	10.08	3.34	1.62	2.48	16.33
5	I-70	Tr Hughes/Belleau Crk to Pearce Blvd	MO	St. Charles	WB	PM	12.16	2.03	1.24	1.63	15.08
6	I-44	I-55 to Shrewsbury Ave	MO	St. Louis City	WB	PM	6.85	4.61	2.10	3.36	14.39
7	I-70	I-270 to Jennings Sta Rd	MO	St. Louis	EB	PM	11.14	2.40	1.29	1.85	14.37
8	I-64	MO-K to I-70	MO	St. Charles	WB	PM	10.10	2.74	1.42	2.08	14.34
9	I-64	Mason Rd to Mccausland Ave	MO	St. Louis	EB	PM	10.20	2.59	1.37	1.98	13.97
10	I-64	Jefferson Ave to Boland Pl	MO	St. Louis City	WB	PM	6.24	3.97	2.12	3.05	13.23

Changes in Overall Severity and Delay Impact

The figures in this section provide a high level comparison of severity and delay impacts from 2016 to 2018 based on the data developed in the Annual Regional Congestion reports. Figure 34 shows ranking of locations based on their severity scores. Overall, severity of congestion increased over time.

Figure 34: Ranking of Locations by Severity

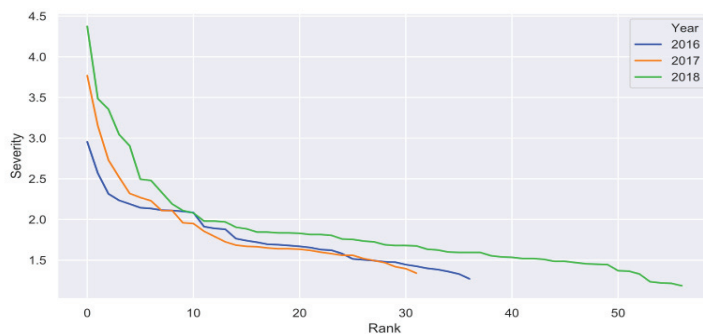
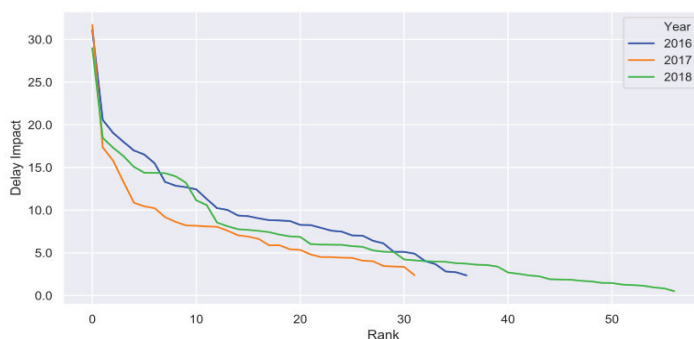


Figure 35 below shows that the highest levels of delay impact stayed the same in all three years. Below these levels, 2016 was highest, followed by 2018, with 2017 being the lowest.

Figure 35: Ranking of Locations by Delay Impact



Tables 16 and 17 specifically examine the top 10 locations from the severity and delay impact figures above for 2017 and 2018. The purpose of this analysis was to track locations that recur in the two years under examination. The red highlighted entries are reoccurring locations with the exact same limits in both years. The green highlighted entries are locations that also reoccur, but their limits vary somewhat from 2017 to 2018.

Eight of the top 10 most severely congested locations in 2017 recurred in 2018 (red and green colors). Congestion severity has generally increased, and there appears to be a strong correlation between the most severely congested locations in 2017 and 2018. For Delay Impact, six locations in the top 10 highest delay locations in 2017 recurred in 2018.

Table 16 Top 10 Most Severe Locations from 2017 and 201

2017					2018			
No.	Route	Limits	Direction	Peak	Route	Limits	Direction	Peak
1	I-64	Kingshighway/Exit 36 to I-55/I-70/US-40	EB	PM	I-64	Grand Ave to PSB	EB	PM
2	I-44/I-55	Grand Ave/Exit 247 to I-44/I-55/Gravois/Exit 207	EB	PM	I-64	25th St. IL to PSB MO	WB	AM
3	I-170	I-64 to MO-D	SB	PM	I-44	I-55 to Shrewsbury Ave	WB	PM
4	I-44	Hampton/Exit 286 to Shrewsbury/Exit 283	WB	PM	I-64	Jefferson Ave to Boland Pl	WB	PM
5	I-270	I-55/I-255/Exit 1 to MO-100/Manchester Rd/Exit 9	NB	AM	I-170	MO-340/Olive Blvd to I-64/	SB	PM
6	I-64, I-55/I-64	Baugh Ave. to Poplar St Brg.	WB	AM	I-64	Hampton Rd to Hanley Rd	WB	AM
7	I-270	McDonnell Blvd/Exit 23 to Elizabeth-Washington St/Exit 28	EB	PM	I-270	I-55/I-255 to Manchester	NB	AM
8	I-270	I-70 to I-55/I-255/Exit 1	SB	PM	I-270	I-70 to Tesson Ferry Rd/MO-21	SB	PM
9	I-64	Kingshighway/Exit 36 to I-170/Brentwood Blvd/Exit 31	WB	AM	I-270	McDonnell Blvd to MO-367	EB	PM
10	I-64	MO-K to I-70	WB	PM	I-270	Bellefontaine Rd to Florissant Ave	WB	AM

Table 17: Top 10 Locations with Most Delay Impacts from 2017 and 2018

2017					2018			
No.	Route	Limits	Direction	Peak	Route	Limits	Direction	Peak
1	I-270	I-70 to I-55/I-255/Exit 1	SB	PM	I-270	I-70 to Tesson Ferry Rd/MO-21	SB	PM
2	I-64	Chesterfield Pky/Exit 20 to McCausland Ave/Exit 33	EB	PM	I-70	I-170 to Cave Springs	WB	PM
3	I-270	I-55/I-255/Exit 1 to MO-100/Manchester Rd/Exit 9	NB	AM	I-270	McDonnell Blvd to MO-367	EB	PM
4	I-64	MO-K to I-70	WB	PM	I-270	I-55/I-255 to Manchester	NB	AM
5	I-64	Kingshighway/Exit 36 to I-55/I-70/US-40	EB	PM	I-70	Tr Hughes/Belleau Crk to Pearce Blvd	WB	PM
6	I-64	I-270/Exit 25 to McCausland to Ave/Exit 33	EB	AM	I-44	I-55 to Shrewsbury Ave	WB	PM
7	I-70	Zumbuhl/Exit 227 to Natural Bridge Rd/Exit 237/Exit 238	EB	AM	I-70	I-270 to Jennings Sta Rd	EB	PM
8	I-70	Lake St Louis Blvd/Exit 214 to MO-79/Exit 220	EB	AM	I-64	MO-K to I-70	WB	PM
9	I-270	McDonnell Blvd/Exit 23 to Elizabeth-Washington St/Exit 28	EB	PM	I-64	Mason Rd to McCausland Ave	EB	PM
10	I-70	I-270/Exit 231 to Cave Springs/Exit 225	WB	PM	I-64	Jefferson Ave to Boland Pl	WB	PM

Changes in Freeway Congestion

Table 18 shows the percent change in the miles of congestion identified - on selected routes in the congested freeway network. The selected freeways considered in this analysis were I-64, I-70, I-270, I-44/I-55, and I-170. These routes accounted for 94% of congested freeways in 2016, 100% in 2017, and 92% in 2018. Although their contribution fell to 92%, the total congested queue length on these routes increased by 38% between 2017 and 2018.

Table 18: Queue Length Changes for Selected Routes

No	Selected Freeways	2016	2017	2018	% Change
1	I-64	61.54	54.84	67.34	9%
2	I-70	64.90	42.88	61.30	43%
3	I-170	20.16	13.00	16.07	24%
4	I-270	59.03	47.29	66.06	40%
5	I-44	35.17	15.41	27.21	77%
6	I-55	24.16	2.89	9.65	234%
7	I-55/I-64	-	4.12	2.94	-29%
8	I-44/I-55	3.11	7.29	7.07	-3%
TOTAL		268	188	258	

Regional Congestion Transition

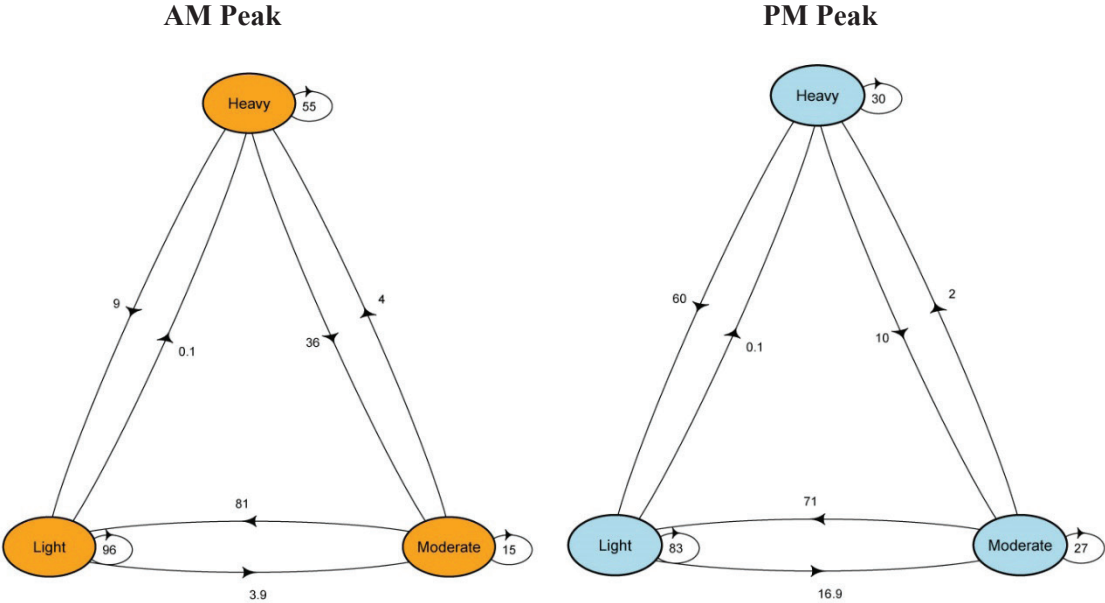
The degree at which regional traffic congestion changes from one state to the other is of key importance to policy planners in forecasting future state of congestion. This analysis was carried out for freeway traffic congestion and the purpose was to understand the likelihood of reaching Light congestion (free-flow) from moderate and heavy congestion levels. The data covers 2012 and 2018 monthly congestion categorized as being either Light, Moderate or Heavy. This analysis was undertaken with R's markovchain package and assumes congestion starts initially in a given category and then takes a move to another category, continuing to do so until reaching Light (free-flow). The model further assumes that at each move (transition), congestion is independent of the past level.

The results of the model are shown in Figure 36 below for each peak period. During morning peak-period, heavy congestion levels are followed by another heavily congested levels 55% of the time, a moderate congestion 36% of the time, and a light congestion the other 9% of the time. During the same period, moderate congestion levels are followed by another moderate congestion levels 15% of the time, a light congestion 81% of the time, and a heavy congestion the other 4% of the time. The congestion transition pattern appears to be Heavy congestion moving to Light, through Moderate.

At the evening peak-period, heavy congestion levels are followed by another heavily congested levels 30% of the time, a moderate congestion 10% of the time, and a light congestion the other 60% of the time, affirming a movement from both heavy and moderate to light, almost at the same time. If congestion for a particular month is moderate, there is a 71% probability that the following month's congestion will be light and a 2% probability that it will be followed by heavy congestion. Also, if congestion is moderate, there is therefore a 27% chance that the next month's congestion will be another moderate.

Juxtaposing this finding with the results of the distribution of congestion during peak-periods, we can strongly conclude that, although evening peak period congestion accounted for 70% of total congestion was in the period, the rate of return to free-flow condition was faster in the evening than in the morning peak periods.

Figure 36: Congestion Transition Analysis



Impact of Work Zones on Traffic Congestion

Maintenance and upgrading of needed road infrastructure cannot be undertaken without proper demarcation of work zone. However, constrained driving environments resulting from these construction activities present significant reduction in mobility. FHWA reports that work zones account for an estimated 10% of overall congestion and 24% of nonrecurring freeway delays. These staggering findings make it imperative to assess the impact of work zone construction on traffic congestion in the St. Louis region. Table 19 below shows the summary of evaluation results of work zone impacts on Travel Time Index using CausalImpact R package for Bayesian structural time-series model. Table 19 shows the summary of impact evaluation of work zone activities on TTI. In addition Figures 37 to 46 graphically depict PTI and TTI trends before and after each work zone activity. The shaded region is the period within which the work zone activity occurred.

There work zones with severe possible impacts on traffic congestion were analyzed. These are:

- I-44 (I-55 to Shrewsbury), March to December.
- I-64 (Poplar Street Br.), January to December.
- I-270 (Bridge over Fee Fee Cr. and railroad), June to September.

Table 19: Summarized Impact of Work Zones

No.	Road	Limits	Direction	Peak	Evaluation	TTI	Impact
1	I-64	PSB	EB	PM	With Project	1.80	Significant
	I-64	PSB	EB	PM	Without Project	1.64	
2	I-270	Br. over Fee-Fee Cr. & RR	SB	AM	With Project	1.30	Significant
	I-270	Br. over Fee-Fee Cr. & RR	SB	AM	Without Project	1.10	
3	I-270	Br. over Fee-Fee Cr. & RR	SB	PM	With Project	1.30	Significant
	I-270	Br. over Fee-Fee Cr. & RR	SB	PM	Without Project	1.10	
4	I-44	I-55-Shrewsbury	WB	AM	With Project	1.09	Significant
	I-44	I-55-Shrewsbury	WB	AM	Without Project	1.05	
5	I-44	I-55-Shrewsbury	WB	PM	With Project	2.29	Significant
	I-44	I-55-Shrewsbury	WB	PM	Without Project	2.03	
6	I-270	Br. over Fee-Fee Cr. & RR	NB	AM	With Project	1.00	Not Significant
	I-270	Br. over Fee-Fee Cr. & RR	NB	AM	Without Project	1.00	
7	I-270	Br. over Fee-Fee Cr. & RR	NB	PM	With Project	1.10	Not Significant
	I-270	Br. over Fee-Fee Cr. & RR	NB	PM	Without Project	1.10	
8	I-64	PSB	WB	AM	With Project	1.42	Not Significant
	I-64	PSB	WB	AM	Without Project	1.42	
9	I-44	I-55-Shrewsbury	EB	AM	With Project	1.03	Not Significant
	I-44	I-55-Shrewsbury	EB	AM	Without Project	1.02	
10	I-44	I-55-Shrewsbury	EB	PM	With Project	1.05	Not Significant
	I-44	I-55-Shrewsbury	EB	PM	Without Project	1.05	

Work Zone TTI Trends

1. I-270

Figure 37: 270 NB AM

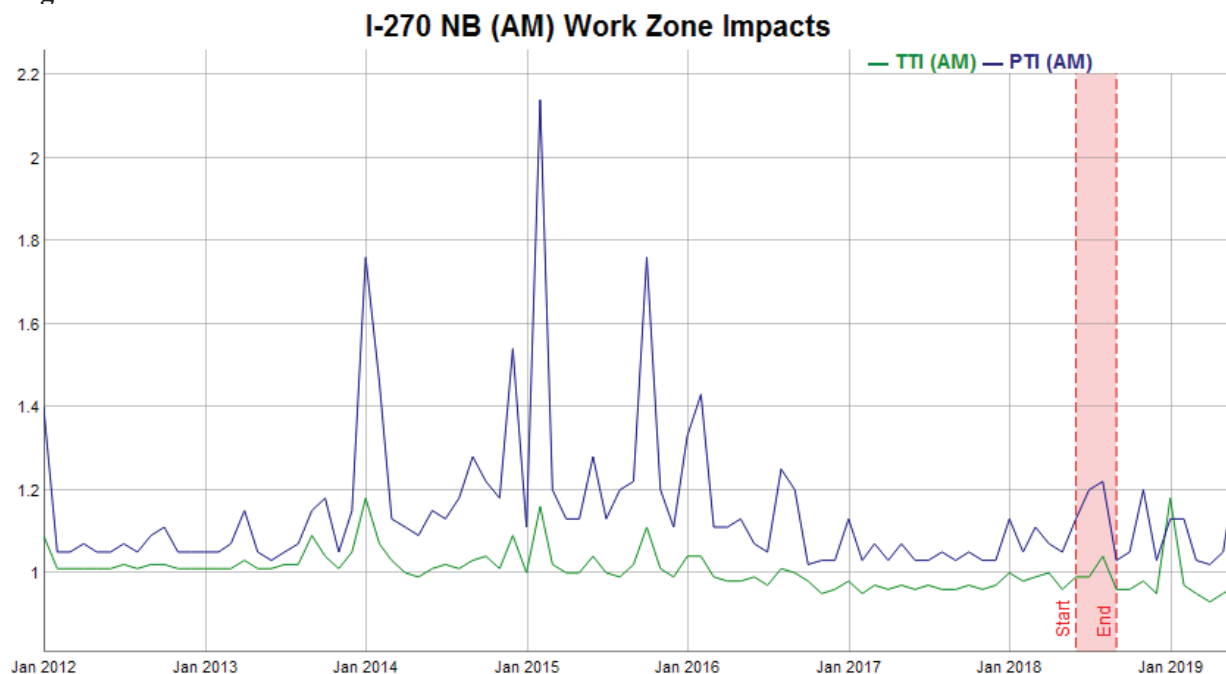


Figure 38: 270 NB PM

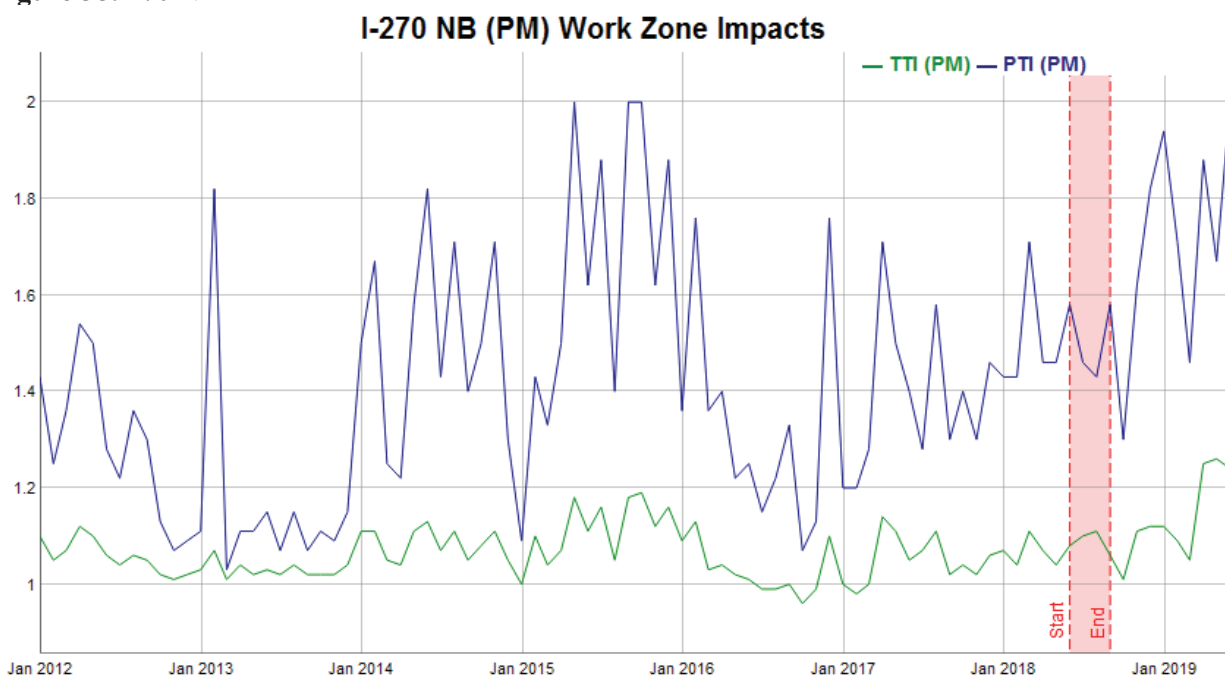


Figure 39: 270 SB AM

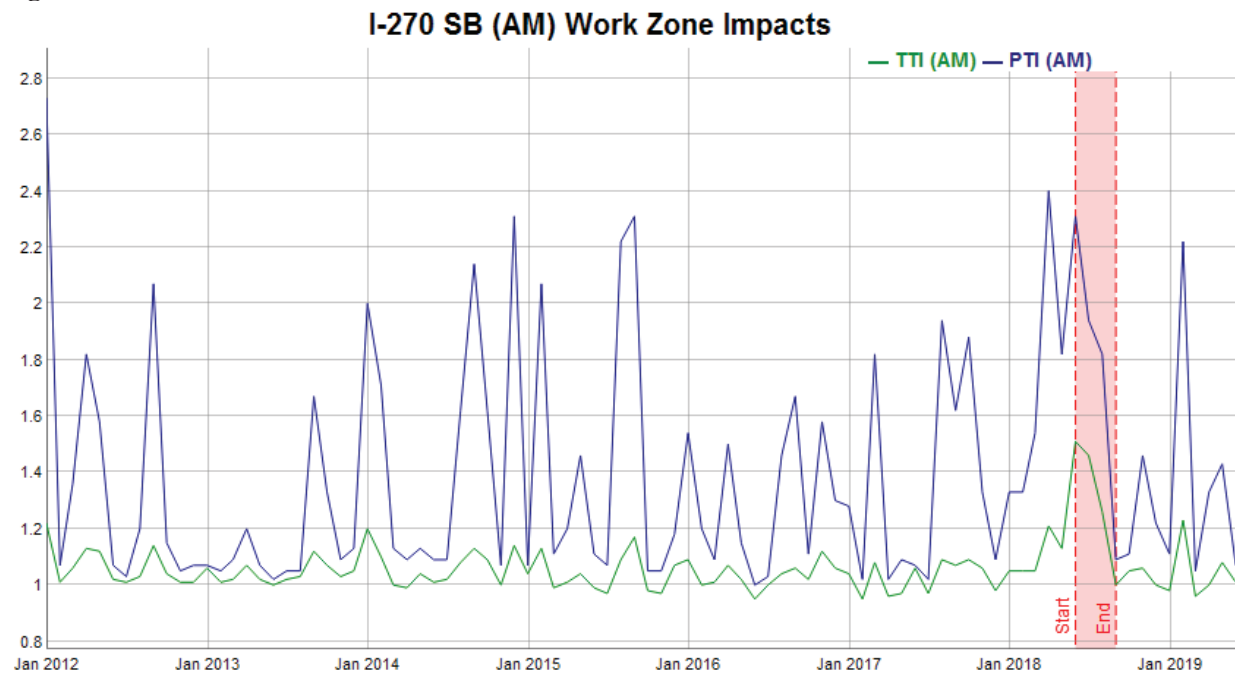
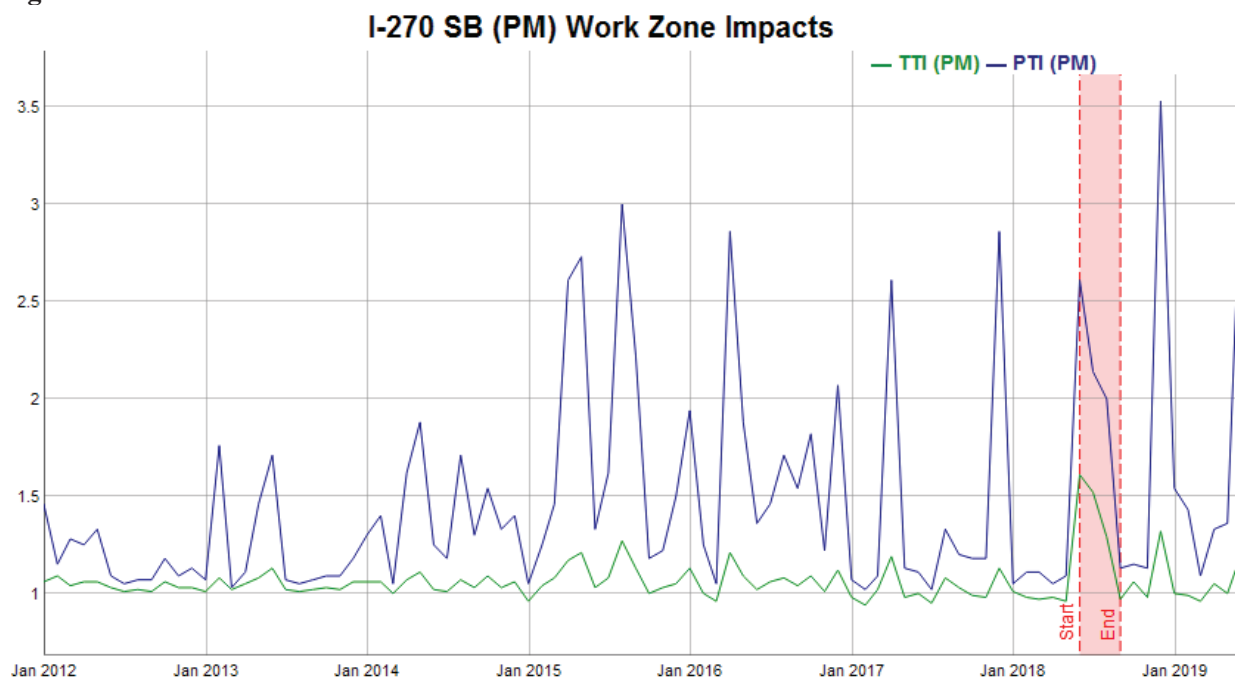


Figure 40: 270 SB PM



2. PSB

Figure 41: PSB EB PM

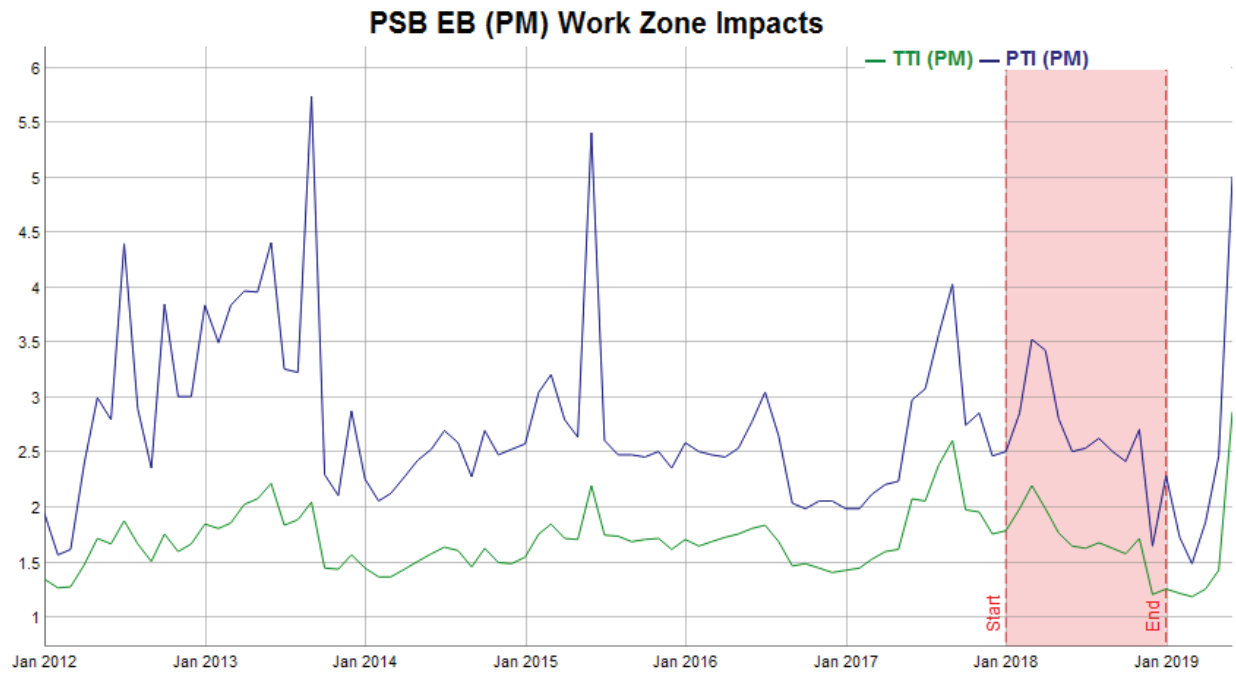
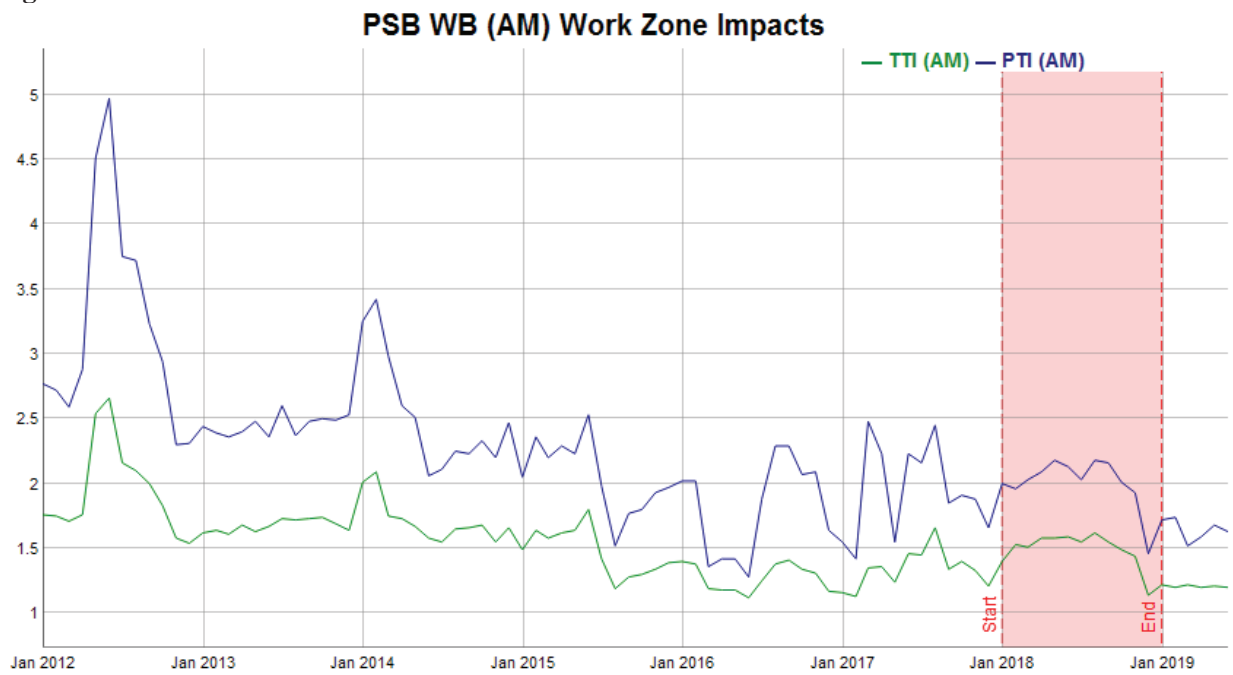


Figure 42: PSB WB AM



3. I-44 (I-55 to Shrewsbury)

Figure 43: EB AM

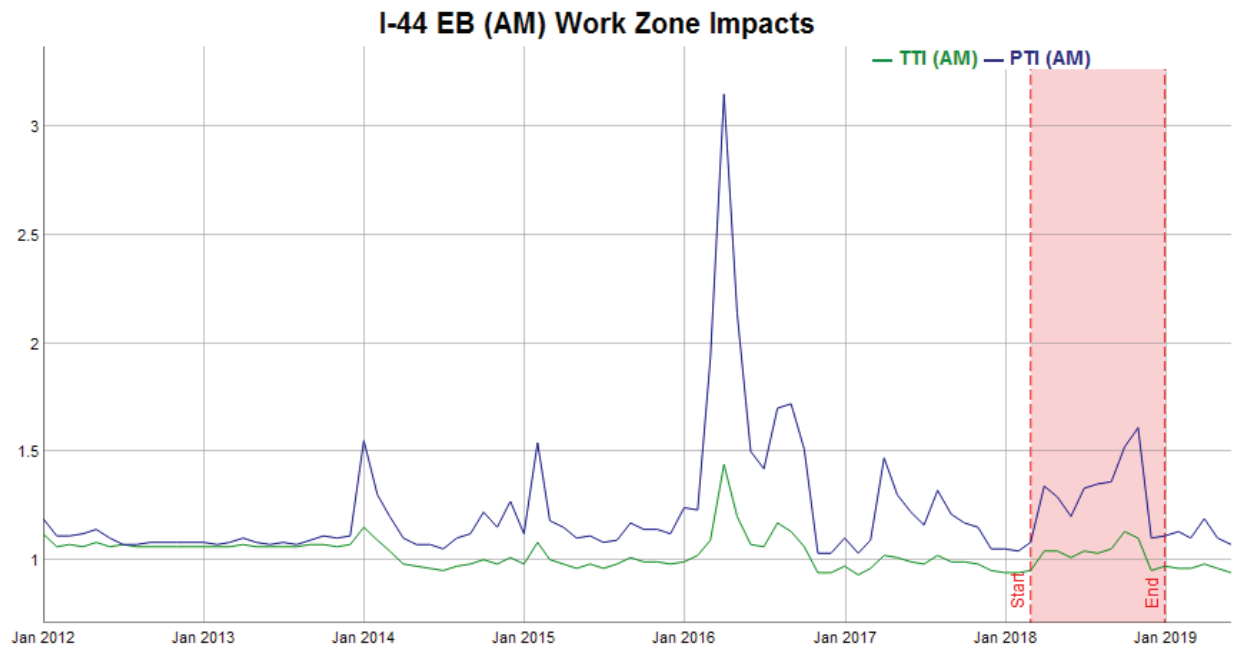


Figure 44: EB PM

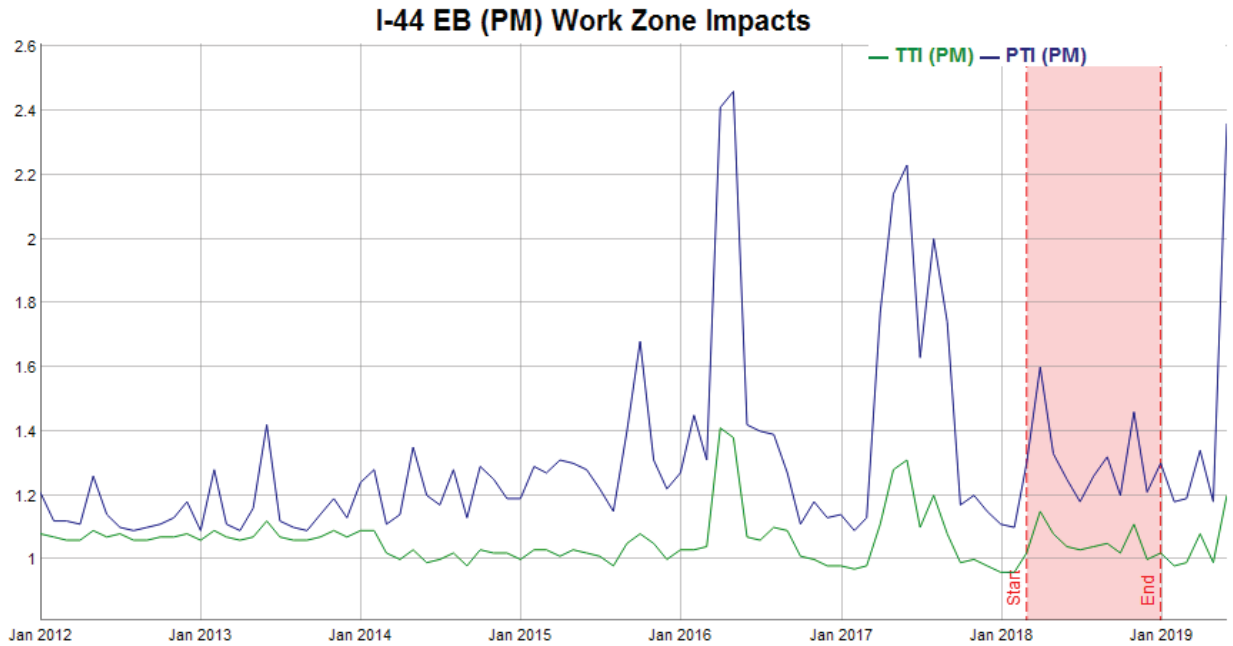


Figure 45: WB AM

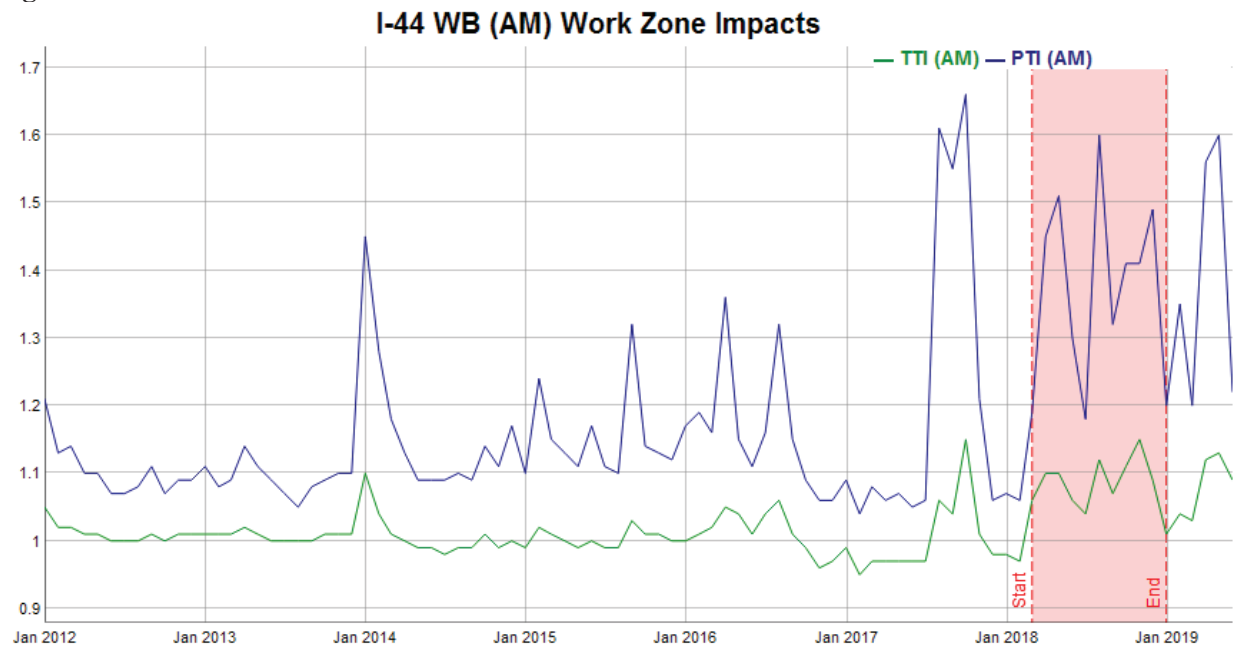
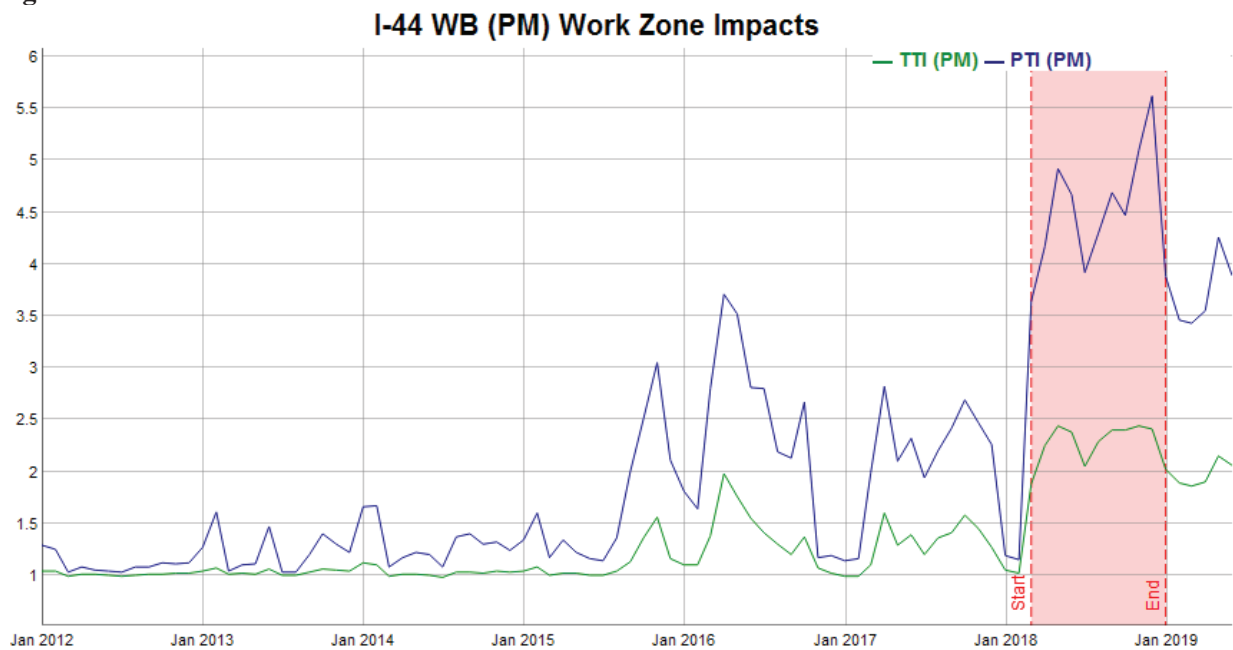


Figure 46: WB PM



Mobility-Enhancing Strategies

Following the implementation of mobility-enhancing projects, partners are often required to evaluate strategies to ensure that implemented strategies are effective at addressing congestion as intended. Strategies that significantly improve congestion are encouraged in future project sponsorship. The following sub-section reports mobility project evaluations from the Missouri Department of Transportation (MO-DOT), Illinois Department of Transportation (IDOT), and St. Charles.

Missouri Department of Transportation (MODOT)

Project: Missouri Route 30 (Gravois Road) Signal Optimization. There are a total of twenty-nine (29) distinct intersections with signals associated with the Route 30 corridor that were studied as part of this project.

Table 20: Missouri Route 30 (Gravois Road) Congestion Benefits

	Travel Time	# of Stops	Avg Speed	Total Delay	Fuel (gals)	HC (grams)	CO (grams)	NOx (grams)
AM EB								
Before	877.7	6.7	25.9	218	0.2911	25.8192	226.8808	12.4793
After	804.3	3	28.3	163	0.2665	20.8961	196.9844	7.9812
Difference	-73.4	-3.7	2.4	-55	-0.025	-4.9231	-29.8964	-4.4981
Improvement	-8%	-55%	9%	-25%	-8%	-19%	-13%	-36%

	Travel Time	# of Stops	Avg Speed	Total Delay	Fuel (gals)	HC (grams)	CO (grams)	NOx (grams)
AM WB								
Before	846.3	4	26.6	188.7	0.2794	24.299	220.8029	11.1918
After	833	4	27.1	184.7	0.2789	22.5289	210.3785	9.3244
Difference	-13.3	0	0.5	-4	-5E-04	-1.7701	-10.4244	-1.8674
Improvement	-2%	0%	2%	-2%	0%	-7%	-5%	-17%

	Travel Time	# of Stops	Avg Speed	Total Delay	Fuel (gals)	HC (grams)	CO (grams)	NOx (grams)
PM EB								
Before	929	8.3	24.5	273.3	0.307	28.9307	248.7264	15.3081
After	857.5	4.3	26.6	224.3	0.2813	23.994	220.7496	10.6276
Difference	-71.5	-4	2.1	-49	-0.026	-4.9367	-27.9768	-4.6805
Improvement	-8%	-48%	9%	-18%	-8%	-17%	-11%	-31%

	Travel Time	# of Stops	Avg Speed	Total Delay	Fuel (gals)	HC (grams)	CO (grams)	NOx (grams)
PM WB								
Before	916.7	10.7	24.6	262.3	0.3086	29.1382	248.3792	15.7615
After	913.7	4.7	24.7	266	0.2905	24.8021	227.2246	10.6264
Difference	-3	-6	0.1	3.7	-0.018	-4.3361	-21.1546	-5.1351
Improvement	0%	-56%	0%	1%	-6%	-15%	-9%	-33%

The results of these measurements show substantial improvements in nearly all metrics during all of the time periods. A few of the metrics saw little to no change. The total delay for westbound in the PM and the oxides of nitrogen for westbound on Saturday show a slight increase.

From an annualized perspective the implemented signal timing is estimated to reduce fuel consumption by 38,670 gallons resulting in a reduction in operating costs of \$103,249 (see table below). In addition, the slight fuel decrease due to the implemented signal timing yields a reduction in emissions of 278,798 pounds annually.

Table 21: Energy Savings from I-44 Ramp Signal Coordination

Emission Measure	Pre-Study	Post-Study	Difference
Est. Annual Fuel Consumption (gal/yr)	1,573,300	1,534,630	-38,670
Est. Annual Operating Costs (\$/yr)	4,200,711	4,097,462	-103,249
Est. Annual VOC Emissions (kg/yr)	229,216	193,211	-36,005
Est. Annual CO Emissions (kg/yr)	2,004,901	1,797,527	-207,374
Est. Annual NO Emissions (kg/yr)	115,401	79,981	-35,420
TOTAL VOC/CO/NO Emissions (kg/yr)	2,349,518	2,070,719	-278,799

City of St. Louis

Signal optimization studies were undertaken on five corridors:

- 14th Street (NB & SB: Chouteau/MO 100 to Cass Avenue);
- 4th Street (NB: Park Avenue to Cass Avenue);
- 7th Street (NB: Park Avenue to Washington Avenue);
- 8th Street (SB: Washington Avenue to Park Avenue); and
- Broadway (SB: Park Avenue to Cass Avenue).

The overall congestion effect was positive; speeds increased by up to 72%, travel times reduction ranged between 23 and 42%, delay reductions reached 63%, and number of stops reduced by up to 67%. The table below shows the congestion effects of the signal optimization.

Table 22: Congestion Effects of City of St. Louis Signal Coordination

Corridor	Peak	Congestion Factor	Pre-Study	Post-Study	% Change
4th Street (NB: Park Avenue to Cass Avenue)	AM Peak	Average Travel Time (sec)	536.8	439.2	-18.2%
		Average Delay	295.6	201.8	-31.7%
		Average # of Stops	5.6	5.6	0.0%
		Average Travel Speed (mph)	13.6	16.6	22.1%
	PM Peak	Average Travel Time (sec)	542.4	346.2	-36.2%
		Average Delay	303.8	107.0	-64.8%
		Average # of Stops	7.8	2.6	-66.7%
		Average Travel Speed (mph)	13.4	21.0	56.7%
Broadway (SB: Park Avenue to Cass Avenue)	AM Peak	Average Travel Time (sec)	365.6	465.8	27.4%
		Average Delay	129.6	231.6	78.7%
		Average # of Stops	3.8	4.6	21.1%
		Average Travel Speed (mph)	19.7	15.5	-21.3%
	PM Peak	Average Travel Time (sec)	707.8	412.4	-41.7%
		Average Delay	472.8	174.6	-63.1%
		Average # of Stops	12.0	4.6	-61.7%
		Average Travel Speed (mph)	10.2	17.5	71.6%
7th Street (NB: Park Avenue to Washington Avenue)	AM Peak	Average Travel Time (sec)	411.2	317.6	-22.8%
		Average Delay	273.2	178.0	-34.8%
		Average # of Stops	7.0	5.6	-20.0%
		Average Travel Speed (mph)	11.8	15.3	29.7%
	PM Peak	Average Travel Time (sec)	420.8	376.0	-10.6%
		Average Delay	284.2	235.8	-17.0%
		Average # of Stops	7.2	6.4	-11.1%
		Average Travel Speed (mph)	11.6	12.9	11.2%
8th Street (SB: Washington Avenue to Park Avenue)	AM Peak	Average Travel Time (sec)	375.2	336.6	-10.3%
		Average Delay	239.8	202.8	-15.4%
		Average # of Stops	6.0	5.4	-10.0%
		Average Travel Speed (mph)	12.3	13.7	11.4%
	PM Peak	Average Travel Time (sec)	357.6	388.2	8.6%
		Average Delay	224.2	254.2	13.4%
		Average # of Stops	6.0	5.8	-3.3%
		Average Travel Speed (mph)	12.9	11.9	-7.8%
14th Street (NB: Chouteau/MO 100 to Cass Avenue)	AM Peak	Average Travel Time (sec)	346.6	352.8	1.8%
		Average Delay	179.4	183.2	2.1%
		Average # of Stops	4.0	3.8	-5.0%
		Average Travel Speed (mph)	16.7	16.5	-1.2%
	PM Peak	Average Travel Time (sec)	457.0	345.0	-24.5%
		Average Delay	289.2	176.0	-39.1%
		Average # of Stops	7.0	3.0	-57.1%
		Average Travel Speed (mph)	12.7	16.8	32.3%
14th Street (SB: Chouteau/MO 100 to Cass Avenue)	AM Peak	Average Travel Time (sec)	358.6	362.2	1.0%
		Average Delay	191.6	192.2	0.3%
		Average # of Stops	5.4	4.0	-25.9%
		Average Travel Speed (mph)	16.2	16.0	-1.2%
	PM Peak	Average Travel Time (sec)	388.6	413.8	6.5%
		Average Delay	222.0	243.2	9.5%
		Average # of Stops	6.2	5.4	-12.9%
		Average Travel Speed (mph)	14.9	14.0	-6.0%

Illinois Department of Transportation (IDOT)

Project: Illinois Route 159 in Collinsville, Illinois

The study corridor contained six specified intersections located along Illinois Route 159 at Beltline Road/Pine Lake Road, East Park Avenue/Spring Street, East Wickliffe Avenue, East Clay Street, East Main Street, and East Church Street. All intersections are currently controlled by Econolite ASC/2 and ASC/3 controllers and are coordinated via time base control.

Congestion Effects

The travel time delay studies indicated that the flow of end to-end traffic through the corridor improved significantly throughout the day. The benefits to traffic due to improved coordination along Illinois Route 159 are detailed as follows:

- **AM Peak Hour** - The new morning coordination plan allowed for a reduced travel time northbound and southbound along Illinois Route 159, which led to increased travel speeds of 5.1-3.5 mph over the pre-study. The improved travel times along Illinois Route 159 resulted in lower delays (reduced by 47.5% and 31.4%) in the northbound and southbound directions, respectively. Average stops along Illinois Route 159 improved from 1.8 to 0.4 and 2.8 to 1.6 in the northbound and southbound directions, respectively.
- **Midday Peak Hour** – The new midday coordination plan provided reduced travel time northbound and southbound along Illinois Route 159, which led to increased travel speeds of 6.2-2.0 mph over the pre-study. The improved travel times along Illinois Route 159 resulted in lower delays (reduced by 54.5% and 20.7%) in the northbound and southbound directions, respectively. Average stops along Illinois Route 159 improved from 2.6 to 0.6 and 2.0 to 1.2 in the northbound and southbound directions, respectively.
- **PM Peak Hour** – The new afternoon coordination plan provided for reduced travel time northbound and southbound along Illinois Route 159, which led to increased travel speeds of 8.5-9.8 mph over the pre-study. The improved travel times along Illinois Route 159 resulted in lower delays (reduced by 63.7% and 71.7%) in the northbound and southbound directions, respectively. Average stops along Illinois Route 159 improved from 2.8 to 0.8 and 3.0 to 0.0 in the northbound and southbound directions, respectively.

Emission Benefits

In conclusion, it is reasonable to state that the improved coordination of the Illinois Route 159 corridor in Collinsville, Illinois will result in significantly improved operating conditions throughout the day. Noticeable annualized benefits should also be realized in terms of reduced travel time, fuel consumption and pollution.

As a final step in this analysis, net savings in annual operating costs and pollutant emissions were estimated using FHWA guidelines (“A Method for Estimating Fuel Consumption and Vehicle Emissions on Urban Arterials and Networks,” Report Number FHWA-TS-81-210; April 1981). These computations were based upon average travel times, speed measurements and daily traffic volumes. The results are summarized in the table below. Calculations of the existing conditions indicated that approximately 1,081,630 gallons of fuel were consumed annually and that over 385,961 pounds of pollutants were emitted each year within the corridor. Measurements of the net increase in travel speeds were used to determine that 80,155 gallons of fuel could be saved each year by the improved coordination. This improved fuel consumption would result in an annual operating cost savings of approximately \$225,236 (assuming an average fuel price of \$2.81 per gallon). In addition, pollutant emissions would be decreased by 54,753 pounds per year.

Table 23: Energy Savings from IL-Route 159 Signal Optimization

Emission Measure	Pre-Study	Post-Study	Difference
Est. Annual Fuel Consumption (gal/yr)	1,081,630	1,001,475	-80,155
Est. Annual Operating Costs (\$/yr)	3,039,380	2,814,145	-225,235
Est. Annual VOC Emissions (kg/yr)	36,562	32,198	-4,364
Est. Annual CO Emissions (kg/yr)	286,216	236,069	-50,147
Est. Annual NO Emissions (kg/yr)	63,184	62,941	-243
TOTAL VOC/CO/NO Emissions (kg/yr)	385,962	331,208	-54,754

St. Charles County

Optimization results for two corridors were assessed. The first corridor is Mid Rivers Mall Drive, from Connection E south of the I-70 Interchange to St. Peters Howell Road. The second corridor is Muegge Road from Mexico Road south of the I-70 Interchange to Old Highway 94 north of the Highway 94/1st Capitol Drive interchange. In total there are 22 signals to be optimized, all of which are being monitored by TransCore's TransSuite software.

Optimized signal timing plans were implemented in December 2018, and post-implementation travel time runs conducted in January 2019. The optimization resulted in delays being reduced by as much as 58%, travel times reduced by as much as 21%, and average speeds increased by as much as 26%. The travel time runs for certain time periods had varying degrees of improvement, with most intersections seeing improvements during all periods, and progression throughout the corridor improved. Using HERE.com data for a more wide-ranging data view of travel times, the average corridor decreases in travel time ranged from 3% to 18%.

The improvements to Mid Rivers Mall are estimated to reduce fuel consumption by 60,835 gallons, emissions by 398,246 pounds, and save \$150,262 annually. The improvements to Muegge Road are estimated to reduce fuel consumption by 41,280 gallons, emissions by 206,412 pounds, and save \$101,962 annually.

Conclusions

Traffic congestion in the St. Louis region continues to be a concern for the public and policy-makers alike. Traffic congestion in the region is disproportionately on freeways. Of the 397 congested miles of the CMP network in the AM and PM peak periods, freeways represented 268 miles while arterials had 129 miles. Most of the congestion in the region occurs during evening peak hours. Out of the 129 miles of arterial congestion, 25 miles occur in the morning peak while approximately 104 miles occur during evening peak hours. For freeways, morning peak period congestion accounted for 98 miles while 170 miles of congestion was in the evening rush hours.

Inter-jurisdictional coordination is vital for analyzing and mitigating regional traffic congestion. Since trips produced in one jurisdiction end up being attracted to others, the attendant congestion resulting from this flow of traffic does not respect artificial jurisdictional boundaries. Effective solutions to traffic congestion requires continued deliberations on transferring lessons from implemented strategies. The active participation of regional partners in sharing ideas on workable strategies and challenges in implementation at the Congestion Management and Operations Committee (CMOC) meetings is encouraging. Overall, evaluation results of the impact of signal timing projects on congestion in the region is positive. The foregoing analysis has enhanced our understanding of congestion in the region and where we should consider directing congestion mitigation effects. We encourage stakeholders to continuously refer to the list of congested locations in implementing mobility-enhancing strategies that have the potential to reduce regional congestion significantly.

APPENDIX

Appendix 1: Ranked Arterial Locations

City of St. Louis

• Ranked by Severity

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	Skinker Blvd	Delmar Blvd to Forest Park Pky	MO	SB	PM	0.43	5.00	2.18	3.59	0.93
2	Salisbury St	Florissant Ave to I-70	MO	EB	PM	0.42	3.83	2.54	3.19	1.06
3	Kingshighway Blvd	Forest Park Ave to MO-100 (Manchester)	MO	SB	PM	0.79	3.02	1.89	2.46	1.50
4	Forest Park Ave	DeBaliviere Ave to Big Bend Blvd	MO	WB	PM	1.62	2.98	1.81	2.40	2.94
5	Kingshighway Blvd	SW Ave to I-44	MO	NB	AM	0.33	3.29	1.42	2.36	0.46
6	Market St	I-64/Garrison Ln to Jefferson Ave	MO	EB	PM	0.42	2.60	2.00	2.30	0.84
7	Hampton Ave	Oakland Ave to I-44	MO	SB	PM	0.78	2.99	1.59	2.29	1.24
8	Market St	I-64/Garrison Ln to Jefferson Ave	MO	EB	AM	0.42	2.60	1.85	2.23	0.78
9	Forest Park Ave	I-64 to Kingshighway Blvd	MO	WB	PM	2.00	2.65	1.79	2.22	3.57
10	Broadway	Angelica St to St Louis Ave	MO	SB	PM	1.05	2.70	1.71	2.21	1.80
11	Cole St	Broadway to Tucker Blvd	MO	WB	PM	0.45	2.44	1.94	2.19	0.88
12	Market St	Jefferson Ave to I-64 (Garrison Ln)	MO	WB	PM	0.42	2.55	1.82	2.19	0.77
13	Forest Park Ave	Vandeventer Blvd to Kingshighway Blvd	MO	WB	AM	1.30	2.55	1.76	2.16	2.30
14	Salisbury St	Florissant Ave to I-70	MO	EB	AM	0.42	2.56	1.70	2.13	0.71
15	Cole St	Broadway to Tucker Blvd	MO	WB	AM	0.45	2.44	1.69	2.07	0.77
16	Cole St	Tucker Blvd to Broadway	MO	EB	PM	0.45	2.33	1.77	2.05	0.80
17	Broadway	Meremac St to MO-366 (Chippewa)	MO	NB	AM	0.46	2.36	1.72	2.04	0.79
18	Tucker Blvd	Cole St to MO-100 (Chouteau)	MO	SB	AM	1.19	2.50	1.53	2.02	1.83
19	Market St	Jefferson Ave to I-64 (Garrison Ln)	MO	WB	AM	0.42	2.33	1.67	2.00	0.70
20	Cole St	Tucker Blvd to Broadway	MO	EB	AM	0.45	2.33	1.66	2.00	0.75
21	Market St	18th St to 14th St	MO	EB	PM	0.30	2.22	1.70	1.96	0.51
22	Tucker Blvd	Cole St to Park Ave	MO	SB	PM	1.51	2.25	1.61	1.93	2.42
23	Jefferson Ave	Washington Blvd to MO-30	MO	SB	PM	1.32	2.32	1.54	1.93	2.04
24	Broadway	I-55 S to I-55 N	MO	NB	PM	1.55	2.09	1.72	1.91	2.67
25	Tucker Blvd	Park Ave to MO-100 (Chouteau)	MO	NB	AM	0.31	2.23	1.56	1.90	0.49
26	Broadway	Angelica St to St Louis Ave	MO	SB	AM	1.05	2.07	1.66	1.87	1.75
27	Broadway	Sidney St to I-55	MO	SB	PM	1.93	2.10	1.61	1.86	3.11
28	Broadway	I-55 N to MO-366 (Chippewa)	MO	SB	AM	0.75	2.30	1.41	1.86	1.06
29	Hampton Ave	Watson Rd to I-44	MO	NB	PM	0.53	2.20	1.51	1.86	0.80
30	Market St	14th St to 18th St	MO	WB	PM	0.30	2.09	1.62	1.86	0.49
31	Forest Park Ave	Kingshighway Blvd to I-64	MO	EB	PM	1.98	2.06	1.62	1.84	3.21
32	Jefferson Ave	Washington Blvd to Market St	MO	SB	AM	0.30	2.17	1.51	1.84	0.46
33	MO-30 (Gravois Rd)	MO-366 to Grand Blvd	MO	EB	PM	0.65	2.08	1.57	1.83	1.01
34	Broadway	Adelaide Ave to E Grand	MO	SB	AM	0.59	2.20	1.42	1.81	0.84
35	Skinker Blvd	Delmar Blvd to Forest Park Pky	MO	SB	AM	0.43	2.18	1.43	1.81	0.61
36	Salisbury St	I-70 to Florissant Ave	MO	WB	AM	0.42	2.08	1.51	1.80	0.63
37	Tucker Blvd	Park Ave to MO-100 (Chouteau)	MO	NB	PM	0.31	2.00	1.54	1.77	0.48
38	Salisbury St	I-70 to Florissant Ave	MO	WB	PM	0.42	1.92	1.59	1.76	0.67
39	Broadway	Adelaide Ave to E Carrie Ave	MO	NB	AM	0.49	2.00	1.49	1.75	0.73
40	Kingshighway Blvd	Florissant Ave to Bircher Blvd	MO	SB	PM	0.56	2.00	1.44	1.72	0.80
41	Broadway	S Calvary Ave to Riverview Blvd	MO	NB	PM	1.98	1.94	1.49	1.72	2.95
42	Forest Park Ave	Kingshighway Blvd to Vandeventer Blvd	MO	EB	AM	1.30	2.00	1.43	1.72	1.86
43	Kingshighway Blvd	I-64 to Delmar Blvd	MO	NB	PM	1.03	1.97	1.46	1.72	1.50
44	Kingshighway Blvd	I-64 to Forest Park Ave	MO	NB	AM	0.50	2.00	1.42	1.71	0.71
45	Skinker Blvd	Forest Park Pky to Delmar Blvd	MO	NB	AM	0.43	2.00	1.40	1.70	0.60
46	Broadway	Angelica St to E. Carrie Ave	MO	NB	PM	1.58	1.90	1.48	1.69	2.34
47	Market St	18th St to 14th St	MO	WB	AM	0.30	1.92	1.39	1.66	0.42
48	Skinker Blvd	Forest Park Pky to Delmar Blvd	MO	NB	PM	0.43	1.86	1.44	1.65	0.61
49	Kienlen Ave	Page Ave to MO-180 (MLK Dr)	MO	NB	PM	0.35	1.88	1.38	1.63	0.48
50	Broadway	I-55/Park Ave to MO-100 (Chouteau)	MO	NB	PM	0.39	1.86	1.39	1.63	0.54
51	Mo-115 (Natural Bridge)	Jennings St Rd to Goodfellow Ave	MO	SB	PM	0.44	1.80	1.41	1.61	0.62
52	Broadway	Riverview Blvd to N Calvary Ave	MO	SB	PM	1.60	1.77	1.43	1.60	2.29
53	Hampton Ave	Eichelberger St to MO-366	MO	NB	PM	0.82	1.73	1.43	1.58	1.18
54	Jefferson Ave	MO-366 (Chippewa) to MO-30	MO	NB	PM	1.33	1.77	1.38	1.58	1.84

• **Ranked by Total Impact**

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	Forest Park Ave	I-64 to Kingshighway Blvd	MO	WB	PM	2.00	2.65	1.79	2.22	3.57
2	Forest Park Ave	Kingshighway Blvd to I-64	MO	EB	PM	1.98	2.06	1.62	1.84	3.21
3	Broadway	Sidney St to I-55	MO	SB	PM	1.93	2.10	1.61	1.86	3.11
4	Broadway	S Calvary Ave to Riverview Blvd	MO	NB	PM	1.98	1.94	1.49	1.72	2.95
5	Forest Park Ave	DeBaliviere Ave to Big Bend Blvd	MO	WB	PM	1.62	2.98	1.81	2.40	2.94
6	Broadway	I-55 S to I-55 N	MO	NB	PM	1.55	2.09	1.72	1.91	2.67
7	Tucker Blvd	Cole St to Park Ave	MO	SB	PM	1.51	2.25	1.61	1.93	2.42
8	Broadway	Angelica St to E. Carrie Ave	MO	NB	PM	1.58	1.90	1.48	1.69	2.34
9	Forest Park Ave	Vandeventer Blvd to Kingshighway Blvd	MO	WB	AM	1.30	2.55	1.76	2.16	2.30
10	Broadway	Riverview Blvd to N Calvary Ave	MO	SB	PM	1.60	1.77	1.43	1.60	2.29
11	Jefferson Ave	Washington Blvd to MO-30	MO	SB	PM	1.32	2.32	1.54	1.93	2.04
12	Forest Park Ave	Kingshighway Blvd to Vandeventer Blvd	MO	EB	AM	1.30	2.00	1.43	1.72	1.86
13	Jefferson Ave	MO-366 (Chippewa) to MO-30	MO	NB	PM	1.33	1.77	1.38	1.58	1.84
14	Tucker Blvd	Cole St to MO-100 (Chouteau)	MO	SB	AM	1.19	2.50	1.53	2.02	1.83
15	Broadway	Angelica St to St Louis Ave	MO	SB	PM	1.05	2.70	1.71	2.21	1.80
16	Broadway	Angelica St to St Louis Ave	MO	SB	AM	1.05	2.07	1.66	1.87	1.75
17	Kingshighway Blvd	I-64 to Delmar Blvd	MO	NB	PM	1.03	1.97	1.46	1.72	1.50
18	Kingshighway Blvd	Forest Park Ave to MO-100 (Manchester)	MO	SB	PM	0.79	3.02	1.89	2.46	1.50
19	Hampton Ave	Oakland Ave to I-44	MO	SB	PM	0.78	2.99	1.59	2.29	1.24
20	Hampton Ave	Eichelberger St to MO-366	MO	NB	PM	0.82	1.73	1.43	1.58	1.18
21	Salisbury St	Florissant Ave to I-70	MO	EB	PM	0.42	3.83	2.54	3.19	1.06
22	Broadway	I-55 N to MO-366 (Chippewa)	MO	SB	AM	0.75	2.30	1.41	1.86	1.06
23	MO-30 (Gravois Rd)	MO-366 to Grand Blvd	MO	EB	PM	0.65	2.08	1.57	1.83	1.01
24	Skinker Blvd	Delmar Blvd to Forest Park Pky	MO	SB	PM	0.43	5.00	2.18	3.59	0.93
25	Cole St	Broadway to Tucker Blvd	MO	WB	PM	0.45	2.44	1.94	2.19	0.88
26	Market St	I-64/Garrison Ln to Jefferson Ave	MO	EB	PM	0.42	2.60	2.00	2.30	0.84
27	Broadway	Adelaide Ave to E Grand	MO	SB	AM	0.59	2.20	1.42	1.81	0.84
28	Cole St	Tucker Blvd to Broadway	MO	EB	PM	0.45	2.33	1.77	2.05	0.80
29	Kingshighway Blvd	Florissant Ave to Bircher Blvd	MO	SB	PM	0.56	2.00	1.44	1.72	0.80
30	Hampton Ave	Watson Rd to I-44	MO	NB	PM	0.53	2.20	1.51	1.86	0.80
31	Broadway	Meremac St to MO-366 (Chippewa)	MO	NB	AM	0.46	2.36	1.72	2.04	0.79
32	Market St	I-64/Garrison Ln to Jefferson Ave	MO	EB	AM	0.42	2.60	1.85	2.23	0.78
33	Market St	Jefferson Ave to I-64 (Garrison Ln)	MO	WB	PM	0.42	2.55	1.82	2.19	0.77
34	Cole St	Broadway to Tucker Blvd	MO	WB	AM	0.45	2.44	1.69	2.07	0.77
35	Cole St	Tucker Blvd to Broadway	MO	EB	AM	0.45	2.33	1.66	2.00	0.75
36	Broadway	Adelaide Ave to E Carrie Ave	MO	NB	AM	0.49	2.00	1.49	1.75	0.73
37	Salisbury St	Florissant Ave to I-70	MO	EB	AM	0.42	2.56	1.70	2.13	0.71
38	Kingshighway Blvd	I-64 to Forest Park Ave	MO	NB	AM	0.50	2.00	1.42	1.71	0.71
39	Market St	Jefferson Ave to I-64 (Garrison Ln)	MO	WB	AM	0.42	2.33	1.67	2.00	0.70
40	Salisbury St	I-70 to Florissant Ave	MO	WB	PM	0.42	1.92	1.59	1.76	0.67
41	Salisbury St	I-70 to Florissant Ave	MO	WB	AM	0.42	2.08	1.51	1.80	0.63
42	Mo-115 (Natural Bridge)	Jennings St Rd to Goodfellow Ave	MO	SB	PM	0.44	1.80	1.41	1.61	0.62
43	Skinker Blvd	Forest Park Pky to Delmar Blvd	MO	NB	PM	0.43	1.86	1.44	1.65	0.61
44	Skinker Blvd	Delmar Blvd to Forest Park Pky	MO	SB	AM	0.43	2.18	1.43	1.81	0.61
45	Skinker Blvd	Forest Park Pky to Delmar Blvd	MO	NB	AM	0.43	2.00	1.40	1.70	0.60
46	Broadway	I-55/Park Ave to MO-100 (Chouteau)	MO	NB	PM	0.39	1.86	1.39	1.63	0.54
47	Market St	18th St to 14th St	MO	EB	PM	0.30	2.22	1.70	1.96	0.51
48	Market St	14th St to 18th St	MO	WB	PM	0.30	2.09	1.62	1.86	0.49
49	Tucker Blvd	Park Ave to MO-100 (Chouteau)	MO	NB	AM	0.31	2.23	1.56	1.90	0.49
50	Kienlen Ave	Page Ave to MO-180 (MLK Dr)	MO	NB	PM	0.35	1.88	1.38	1.63	0.48
51	Tucker Blvd	Park Ave to MO-100 (Chouteau)	MO	NB	PM	0.31	2.00	1.54	1.77	0.48
52	Kingshighway Blvd	SW Ave to I-44	MO	NB	AM	0.33	3.29	1.42	2.36	0.46
53	Jefferson Ave	Washington Blvd to Market St	MO	SB	AM	0.30	2.17	1.51	1.84	0.46
54	Market St	18th St to 14th St	MO	WB	AM	0.30	1.92	1.39	1.66	0.42

St. Louis County

• Ranked by Severity

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	Hanley Rd	Clayton Rd to I-64	MO	SB	PM	0.54	5.00	2.01	3.51	1.08
2	Laclede Station Rd	Big Bend Blvd to S Hanley	MO	NB	AM	0.61	4.86	1.76	3.31	1.07
3	MO-340 (Olive Blvd)	Chesterfield Pky to Baxter Rd	MO	SB	PM	1.10	4.33	2.00	3.17	2.21
4	MO-141	Hawkins to I-44	MO	NB	AM	1.03	4.43	1.48	2.96	1.52
5	MO-141	Big Bend Rd to I-44	MO	SB	PM	1.73	4.03	1.50	2.77	2.60
6	MO-100 (Manchester Rd)	Big Bend Blvd to McCausland Ave	MO	EB	PM	0.83	2.89	2.32	2.61	1.93
7	MO-30 (Gravois Rd)	Sappington Rd to Lindbergh Blvd	MO	WB	PM	0.34	3.10	2.08	2.59	0.71
8	US-61 (Lindbergh Blvd)	Olive Blvd to Ladue Rd	MO	SB	PM	1.05	3.56	1.52	2.54	1.60
9	MO-30 (Gravois Rd)	Lindbergh Blvd to Sappington Rd	MO	EB	PM	0.34	2.91	2.09	2.50	0.70
10	Laclede Station Rd	S Hanley to Murdoch Ave	MO	SB	PM	1.04	3.19	1.62	2.41	1.69
11	MO-D (Page Ave)	Woodson Rd to I-170	MO	EB	PM	0.36	2.78	1.62	2.20	0.58
12	MO-Ac (New Halls Ferry Rd)	Old Halls Ferry Rd to I-270	MO	NB	PM	0.54	2.58	1.76	2.17	0.95
13	MO-100 (Manchester Rd)	McCausland Ave to Big Bend Blvd	MO	WB	PM	0.83	2.44	1.85	2.15	1.54
14	MO-141	Ladue Rd to I-64	MO	SB	PM	0.99	2.71	1.55	2.13	1.53
15	MO-100 (Manchester Rd)	Woods Mill Rd to Henry	MO	WB	PM	0.35	2.55	1.71	2.13	0.60
16	US-61 (Lindbergh Blvd)	I-55 to Lemay Ferry Rd	MO	SB	PM	0.61	2.38	1.74	2.06	1.06
17	MO-D (Page Ave)	Concourse Dr to Schuetz Rd	MO	EB	AM	0.31	2.44	1.60	2.02	0.49
18	US-61 (Lindbergh Blvd)	Adams Ave to I-44	MO	SB	PM	1.56	2.24	1.76	2.00	2.74
19	US-61 (Lindbergh Blvd)	I-270 to New Halls Ferry Rd	MO	NB	PM	3.49	2.38	1.61	2.00	5.62
20	MO-141	MO-30 to MO-21	MO	SB	PM	3.85	2.56	1.41	1.99	5.43
21	MO-100 (Manchester Rd)	MO-340 to Old State Rd	MO	WB	PM	0.54	2.22	1.67	1.95	0.90
22	US-61 (Lindbergh Blvd)	New Halls Ferry Rd to Charbonier Rd	MO	SB	PM	1.79	2.30	1.58	1.94	2.82
23	MO-21 (Tesson Ferry Rd)	Butler Hill Rd to Kennerly Rd	MO	NB	PM	0.96	2.28	1.57	1.93	1.50
24	MO-340 (Olive Blvd)	Craig Rd to I-270	MO	SB	PM	0.69	2.33	1.50	1.92	1.04
25	MO-30 (Gravois Rd)	Lindbergh Blvd to Sappington Rd	MO	EB	AM	0.34	2.29	1.53	1.91	0.52
26	MO-D (Page Ave)	I-170 to Schuetz Rd	MO	WB	PM	4.14	2.28	1.53	1.91	6.33
27	MO-231 (Telegraph Rd)	I-255 to Baumgartner Rd	MO	SB	PM	1.57	2.26	1.44	1.85	2.26
28	US-61 (Lemay Ferry Rd)	Mattis Rd to I-255	MO	NB	PM	0.97	2.17	1.50	1.84	1.45
29	MO-100 (Manchester Rd)	Big Bend Blvd to McCausland Ave	MO	EB	AM	0.83	2.17	1.50	1.84	1.25
30	MO-100 (Manchester Rd)	Henry Ave to Woods Mill Rd	MO	EB	PM	0.35	2.14	1.53	1.84	0.53
31	MO-30 (Gravois Rd)	MO-21 to McKenzie Rd	MO	EB	PM	0.53	2.17	1.48	1.83	0.79
32	MO-180 (St. Charles Rock Rd)	Taussig Ave to McKelvey Rd	MO	SB	PM	1.35	2.03	1.54	1.79	2.08
33	MO-115 (Natural Bridge Rd)	Woodson Rd to Brown Rd	MO	SB	PM	0.80	2.07	1.50	1.79	1.21
34	MO-D (Page Ave)	Concourse Dr to Schuetz Rd	MO	EB	PM	0.31	2.17	1.39	1.78	0.43
35	MO-21 (Tesson Ferry Rd)	Lindbergh Blvd to Butler Hill Rd	MO	SB	PM	2.07	1.96	1.56	1.76	3.23
36	MO-30 (Gravois Rd)	Sappington Rd to Lindbergh Blvd	MO	WB	AM	0.34	2.07	1.44	1.76	0.48
37	MO-21 (Tesson Ferry Rd)	Lindbergh Blvd to I-270	MO	SB	AM	1.11	1.95	1.48	1.72	1.65
38	US-61 (Lemay Ferry Rd)	I-255 to Mattis Rd	MO	SB	PM	0.97	1.94	1.47	1.71	1.42
39	US-61 (Lindbergh Blvd)	Big Bend Rd to MO-100	MO	NB	PM	2.26	1.91	1.49	1.70	3.37
40	US-61 (Lindbergh Blvd)	Big Bend Rd to MO-100	MO	NB	AM	2.26	1.95	1.36	1.66	3.08
41	MO-340 (Olive Blvd)	I-270 to Craig Rd	MO	NB	PM	0.69	1.93	1.37	1.65	0.95
42	US-61 (Lindbergh Blvd)	Lemay Ferry Rd to MO-21	MO	NB	PM	2.02	1.84	1.45	1.65	2.93
43	MO-180 (St. Charles Rock Rd)	Taussig Ave to I-270	MO	SB	AM	0.82	1.86	1.42	1.64	1.16
44	MO-30 (Gravois Rd)	McKenzie Rd to Laclede Station Rd	MO	WB	PM	1.11	1.87	1.40	1.64	1.55
45	Brentwood Blvd	I-64 to I-170	MO	NB	PM	0.65	1.86	1.39	1.63	0.90
46	Clayton Rd	Skinker to Big Bend Blvd	MO	WB	PM	0.69	1.86	1.38	1.62	0.95
47	Clayton Rd	Hanley Rd to Brentwood Blvd	MO	WB	PM	0.54	1.86	1.37	1.62	0.74
48	MO-180 (St. Charles Rock Rd)	Cypress Rd to Ashby Rd	MO	SB	PM	0.31	1.87	1.36	1.62	0.42
49	Laclede Station Rd	Big Bend Blvd to Murdoch Ave	MO	SB	AM	0.43	1.82	1.36	1.59	0.59

• **Ranked by Total Impact**

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	MO-D (Page Ave)	I-170 to Schuetz Rd	MO	WB	PM	4.14	2.28	1.53	1.91	6.33
2	US-61 (Lindbergh Blvd)	I-270 to New Halls Ferry Rd	MO	NB	PM	3.49	2.38	1.61	2.00	5.62
3	MO-141	MO-30 to MO-21	MO	SB	PM	3.85	2.56	1.41	1.99	5.43
4	US-61 (Lindbergh Blvd)	Big Bend Rd to MO-100	MO	NB	PM	2.26	1.91	1.49	1.70	3.37
5	MO-21 (Tesson Ferry Rd)	Lindbergh Blvd to Butler Hill Rd	MO	SB	PM	2.07	1.96	1.56	1.76	3.23
6	US-61 (Lindbergh Blvd)	Big Bend Rd to MO-100	MO	NB	AM	2.26	1.95	1.36	1.66	3.08
7	US-61 (Lindbergh Blvd)	Lemay Ferry Rd to MO-21	MO	NB	PM	2.02	1.84	1.45	1.65	2.93
8	US-61 (Lindbergh Blvd)	New Halls Ferry Rd to Charbonier Rd	MO	SB	PM	1.79	2.30	1.58	1.94	2.82
9	US-61 (Lindbergh Blvd)	Adams Ave to I-44	MO	SB	PM	1.56	2.24	1.76	2.00	2.74
10	MO-141	Big Bend Rd to I-44	MO	SB	PM	1.73	4.03	1.50	2.77	2.60
11	MO-231 (Telegraph Rd)	I-255 to Baumgartner Rd	MO	SB	PM	1.57	2.26	1.44	1.85	2.26
12	MO-340 (Olive Blvd)	Chesterfield Pky to Baxter Rd	MO	SB	PM	1.10	4.33	2.00	3.17	2.21
13	MO-180 (St. Charles Rock Rd)	Taussig Ave to McKelvey Rd	MO	SB	PM	1.35	2.03	1.54	1.79	2.08
14	MO-100 (Manchester Rd)	Big Bend Blvd to McCausland Ave	MO	EB	PM	0.83	2.89	2.32	2.61	1.93
15	Laclede Station Rd	S Hanley to Murdoch Ave	MO	SB	PM	1.04	3.19	1.62	2.41	1.69
16	MO-21 (Tesson Ferry Rd)	Lindbergh Blvd to I-270	MO	SB	AM	1.11	1.95	1.48	1.72	1.65
17	US-61 (Lindbergh Blvd)	Olive Blvd to Ladue Rd	MO	SB	PM	1.05	3.56	1.52	2.54	1.60
18	MO-30 (Gravois Rd)	McKenzie Rd to Laclede Station Rd	MO	WB	PM	1.11	1.87	1.40	1.64	1.55
19	MO-100 (Manchester Rd)	McCausland Ave to Big Bend Blvd	MO	WB	PM	0.83	2.44	1.85	2.15	1.54
20	MO-141	Ladue Rd to I-64	MO	SB	PM	0.99	2.71	1.55	2.13	1.53
21	MO-141	Hawkins to I-44	MO	NB	AM	1.03	4.43	1.48	2.96	1.52
22	MO-21 (Tesson Ferry Rd)	Butler Hill Rd to Kennerly Rd	MO	NB	PM	0.96	2.28	1.57	1.93	1.50
23	US-61 (Lemay Ferry Rd)	Mattis Rd to I-255	MO	NB	PM	0.97	2.17	1.50	1.84	1.45
24	US-61 (Lemay Ferry Rd)	I-255 to Mattis Rd	MO	SB	PM	0.97	1.94	1.47	1.71	1.42
25	MO-100 (Manchester Rd)	Big Bend Blvd to McCausland Ave	MO	EB	AM	0.83	2.17	1.50	1.84	1.25
26	MO-115 (Natural Bridge Rd)	Woodson Rd to Brown Rd	MO	SB	PM	0.80	2.07	1.50	1.79	1.21
27	MO-180 (St. Charles Rock Rd)	Taussig Ave to I-270	MO	SB	AM	0.82	1.86	1.42	1.64	1.16
28	Hanley Rd	Clayton Rd to I-64	MO	SB	PM	0.54	5.00	2.01	3.51	1.08
29	Laclede Station Rd	Big Bend Blvd to S Hanley	MO	NB	AM	0.61	4.86	1.76	3.31	1.07
30	US-61 (Lindbergh Blvd)	I-55 to Lemay Ferry Rd	MO	SB	PM	0.61	2.38	1.74	2.06	1.06
31	MO-340 (Olive Blvd)	Craig Rd to I-270	MO	SB	PM	0.69	2.33	1.50	1.92	1.04
32	MO-Ac (New Halls Ferry Rd)	Old Halls Ferry Rd to I-270	MO	NB	PM	0.54	2.58	1.76	2.17	0.95
33	MO-340 (Olive Blvd)	I-270 to Craig Rd	MO	NB	PM	0.69	1.93	1.37	1.65	0.95
34	Clayton Rd	Skinker to Big Bend Blvd	MO	WB	PM	0.69	1.86	1.38	1.62	0.95
35	MO-100 (Manchester Rd)	MO-340 to Old State Rd	MO	WB	PM	0.54	2.22	1.67	1.95	0.90
36	Brentwood Blvd	I-64 to I-170	MO	NB	PM	0.65	1.86	1.39	1.63	0.90
37	MO-30 (Gravois Rd)	MO-21 to McKenzie Rd	MO	EB	PM	0.53	2.17	1.48	1.83	0.79
38	Clayton Rd	Hanley Rd to Brentwood Blvd	MO	WB	PM	0.54	1.86	1.37	1.62	0.74
39	MO-30 (Gravois Rd)	Sappington Rd to Lindbergh Blvd	MO	WB	PM	0.34	3.10	2.08	2.59	0.71
40	MO-30 (Gravois Rd)	Lindbergh Blvd to Sappington Rd	MO	EB	PM	0.34	2.91	2.09	2.50	0.70
41	MO-100 (Manchester Rd)	Woods Mill Rd to Henry	MO	WB	PM	0.35	2.55	1.71	2.13	0.60
42	Laclede Station Rd	Big Bend Blvd to Murdoch Ave	MO	SB	AM	0.43	1.82	1.36	1.59	0.59
43	MO-D (Page Ave)	Woodson Rd to I-170	MO	EB	PM	0.36	2.78	1.62	2.20	0.58
44	MO-100 (Manchester Rd)	Henry Ave to Woods Mill Rd	MO	EB	PM	0.35	2.14	1.53	1.84	0.53
45	MO-30 (Gravois Rd)	Lindbergh Blvd to Sappington Rd	MO	EB	AM	0.34	2.29	1.53	1.91	0.52
46	MO-D (Page Ave)	Concourse Dr to Schuetz Rd	MO	EB	AM	0.31	2.44	1.60	2.02	0.49
47	MO-30 (Gravois Rd)	Sappington Rd to Lindbergh Blvd	MO	WB	AM	0.34	2.07	1.44	1.76	0.48
48	MO-D (Page Ave)	Concourse Dr to Schuetz Rd	MO	EB	PM	0.31	2.17	1.39	1.78	0.43
49	MO-180 (St. Charles Rock Rd)	Cypress Rd to Ashby Rd	MO	SB	PM	0.31	1.87	1.36	1.62	0.42

St. Charles County

• Ranked by Severity

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	Mid Rivers Mall Dr	MO-364 to MO-N	MO	NB	PM	0.37	2.91	2.03	2.47	0.75
2	MO-94	Zumbehl Rd to Pralle Ln	MO	SB	PM	0.51	2.69	1.64	2.17	0.84
3	MO-94	5th St to I-70	MO	SB	PM	1.71	2.12	1.74	1.93	2.97
4	MO-94	MO-364 to Pralle Ln	MO	NB	PM	0.51	2.38	1.44	1.91	0.74
5	MO-94	I-64 to MO-364	MO	NB	PM	3.89	2.14	1.58	1.86	6.15
6	Mid Rivers Mall Dr	Suemandy Rd to Mexico Rd	MO	SB	PM	0.59	2.00	1.40	1.70	0.82
7	MO-K	I-70 to MO-364	MO	SB	PM	3.47	1.84	1.45	1.65	5.03
8	MO-94	5th St to I-70	MO	SB	AM	1.71	1.89	1.38	1.64	2.36
9	MO-79/Salt Lick Rd	I-70 to Mexico Rd	MO	SB	PM	0.95	1.80	1.41	1.61	1.34
10	MO-94	5th St to MO-370	MO	NB	PM	1.48	1.63	1.46	1.55	2.17
11	MO-94	5th St to MO-370	MO	NB	AM	1.48	1.63	1.39	1.51	2.06

• Ranked by Total Impact

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	MO-94	I-64 to MO-364	MO	NB	PM	3.89	2.14	1.58	1.86	6.15
2	MO-K	I-70 to MO-364	MO	SB	PM	3.47	1.84	1.45	1.65	5.03
3	MO-94	5th St to I-70	MO	SB	PM	1.71	2.12	1.74	1.93	2.97
4	MO-94	5th St to I-70	MO	SB	AM	1.71	1.89	1.38	1.64	2.36
5	MO-94	5th St to MO-370	MO	NB	PM	1.48	1.63	1.46	1.55	2.17
6	MO-94	5th St to MO-370	MO	NB	AM	1.48	1.63	1.39	1.51	2.06
7	MO-79/Salt Lick Rd	I-70 to Mexico Rd	MO	SB	PM	0.95	1.80	1.41	1.61	1.34
8	MO-94	Zumbehl Rd to Pralle Ln	MO	SB	PM	0.51	2.69	1.64	2.17	0.84
9	Mid Rivers Mall Dr	Suemandy Rd to Mexico Rd	MO	SB	PM	0.59	2.00	1.40	1.70	0.82
10	Mid Rivers Mall Dr	MO-364 to MO-N	MO	NB	PM	0.37	2.91	2.03	2.47	0.75
11	MO-94	MO-364 to Pralle Ln	MO	NB	PM	0.51	2.38	1.44	1.91	0.74

Illinois

• Ranked by Severity

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	IL-157 (Collinsville)	Horseshoe Lake Rd to I-55	IL	SB	PM	0.78	2.46	1.77	2.12	1.38
2	IL-159 (Glen Carbon)	IL-162 to Governors Pky	IL	NB	PM	3.22	2.31	1.67	1.99	5.37
3	IL-157 (Edwardsville)	IL-143 to Main St	IL	SB	PM	0.46	2.18	1.72	1.95	0.79
4	IL-159 (Belleville)	I-64 to IL-15	IL	SB	PM	2.53	2.07	1.54	1.81	3.89
5	IL-159 (Belleville)	IL-15 to I-64	IL	NB	PM	2.80	1.99	1.53	1.76	4.28
6	IL-157 (Caseyville)	I-64 to Bunkum Rd	IL	NB	PM	0.43	2.05	1.44	1.75	0.62
7	IL-157 (Collinsville)	St Louis Rd to Horseshoe Lake Rd	IL	NB	PM	1.87	1.92	1.51	1.72	2.82
8	IL-157 (Caseyville)	I-64 to Bunkum Rd	IL	NB	AM	0.43	1.95	1.37	1.66	0.59
9	IL-157 (Edwardsville)	Main St to IL-143	IL	NB	PM	0.46	1.85	1.43	1.64	0.66
10	IL-157 (Collinsville)	Horseshoe Lake Rd to I-55	IL	SB	AM	0.78	1.88	1.40	1.64	1.09
11	IL-157 (Collinsville)	I-55 to Horseshoe Lake Rd	IL	NB	AM	0.47	1.88	1.38	1.63	0.65
12	IL-157 (Edwardsville)	E University Dr to Center Grove Rd	IL	SB	PM	0.53	1.82	1.39	1.61	0.74
13	IL-159 (Glen Carbon)	Governors Pky to I-270	IL	SB	PM	2.12	1.73	1.43	1.58	3.02

• Ranked by Total Impact

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	IL-159 (Glen Carbon)	IL-162 to Governors Pky	IL	NB	PM	3.22	2.31	1.67	1.99	5.37
2	IL-159 (Belleville)	IL-15 to I-64	IL	NB	PM	2.80	1.99	1.53	1.76	4.28
3	IL-159 (Belleville)	I-64 to IL-15	IL	SB	PM	2.53	2.07	1.54	1.81	3.89
4	IL-159 (Glen Carbon)	Governors Pky to I-270	IL	SB	PM	2.12	1.73	1.43	1.58	3.02
5	IL-157 (Collinsville)	St Louis Rd to Horseshoe Lake Rd	IL	NB	PM	1.87	1.92	1.51	1.72	2.82
6	IL-157 (Collinsville)	Horseshoe Lake Rd to I-55	IL	SB	PM	0.78	2.46	1.77	2.12	1.38
7	IL-157 (Collinsville)	Horseshoe Lake Rd to I-55	IL	SB	AM	0.78	1.88	1.40	1.64	1.09
8	IL-157 (Edwardsville)	IL-143 to Main St	IL	SB	PM	0.46	2.18	1.72	1.95	0.79
9	IL-157 (Edwardsville)	E University Dr to Center Grove Rd	IL	SB	PM	0.53	1.82	1.39	1.61	0.74
10	IL-157 (Edwardsville)	Main St to IL-143	IL	NB	PM	0.46	1.85	1.43	1.64	0.66
11	IL-157 (Collinsville)	I-55 to Horseshoe Lake Rd	IL	NB	AM	0.47	1.88	1.38	1.63	0.65
12	IL-157 (Caseyville)	I-64 to Bunkum Rd	IL	NB	PM	0.43	2.05	1.44	1.75	0.62
13	IL-157 (Caseyville)	I-64 to Bunkum Rd	IL	NB	AM	0.43	1.95	1.37	1.66	0.59

Appendix 3: Ranked Freeway Locations

• Ranked by Severity

No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	I-64	Grand Ave to PSB	MO	St. Louis City	EB	PM	2.71	6.19	2.56	4.38	6.94
2	I-64	25th St. IL to PSB MO	IL	IL	WB	AM	4.85	4.67	2.30	3.49	11.15
3	I-44	I-55 to Shrewsbury Ave	MO	St. Louis City	WB	PM	6.85	4.61	2.10	3.36	14.39
4	I-64	Jefferson Ave to Boland Pl	MO	St. Louis City	WB	PM	6.24	3.97	2.12	3.05	13.23
5	I-170	MO-340/Olive Blvd to I-64/	MO	St. Louis	SB	PM	4.18	3.95	1.86	2.91	7.77
6	I-64	Hampton Rd to Hanley Rd	MO	St. Louis City	WB	AM	3.71	3.38	1.61	2.50	5.97
7	I-270	I-55/I-255 to Manchester	MO	St. Louis	NB	AM	10.08	3.34	1.62	2.48	16.33
8	I-270	I-70 to Tesson Ferry Rd/MO-21	MO	St. Louis	SB	PM	18.70	3.12	1.55	2.34	28.99
9	I-270	McDonnell Blvd to MO-367	MO	St. Louis	EB	PM	11.10	2.82	1.56	2.19	17.32
10	I-270	Bellefontaine Rd to Florissant Ave	MO	St. Louis	WB	AM	4.31	2.82	1.40	2.11	6.03
11	I-64	MO-K to I-70	MO	St. Charles	WB	PM	10.10	2.74	1.42	2.08	14.34
12	I-64	Ballas Rd to Mccausland	MO	St. Louis	EB	AM	7.80	2.60	1.36	1.98	10.61
13	I-64	Mason Rd to Mccausland Ave	MO	St. Louis	EB	PM	10.20	2.59	1.37	1.98	13.97
14	I-44	I-55/I-64/US-40 to Tenth St	MO	St. Louis City	WB	PM	2.02	2.60	1.34	1.97	2.71
15	I-70 (NB-WB)	I-55/I-64 IL to Cass Ave MO	IL	IL	WB	AM	3.25	2.57	1.24	1.91	4.03
16	I-170	MO-180/St Charles Rock to Hanley Rd	MO	St. Louis	NB	PM	5.54	2.39	1.38	1.89	7.58
17	US-61	Pitman Ave to I-70	MO	St. Charles	SB	AM	1.22	2.47	1.22	1.85	1.49
18	I-70	I-270 to Jennings Sta Rd	MO	St. Louis	EB	PM	11.14	2.40	1.29	1.85	14.37
19	I-64	Boones Crossing to Chesterfield Pkwy	MO	St. Louis	EB	AM	4.25	2.47	1.20	1.84	5.10
20	I-70	I-70 Exp/Bircher Blvd to Lucas And Hunt Rd	MO	St. Louis City	WB	PM	3.00	2.34	1.33	1.84	3.99
21	I-70/I-44/I-55	Gasconade St to Grand Ave	MO	St. Louis City	SB	PM	6.63	2.37	1.29	1.83	8.55
22	I-64	Chesterfield Pky to Boones Crossing	MO	St. Louis	WB	PM	4.35	2.30	1.33	1.82	5.79
23	I-70	Union Blvd to Jennings St. Rd	MO	St. Louis City	WB	AM	1.58	2.44	1.19	1.82	1.88
24	I-64	I-170/Brentwood Blvd to MO-JJ/Ballas Rd	MO	St. Louis	WB	PM	5.72	2.31	1.30	1.81	7.44
25	I-44	Highway Dr to I-270	MO	St. Louis	EB	PM	2.84	2.26	1.26	1.76	3.58
26	I-70	Fifth St to St. Charles Rock Rd	MO	St. Charles	EB	AM	5.68	2.30	1.21	1.76	6.87
27	MO-364	Central School Rd to Kisker Rd	MO	St. Charles	SB	PM	1.30	2.34	1.13	1.74	1.47
28	I-44	Elm to Shrewsbury	MO	St. Louis	EB	AM	3.09	2.24	1.21	1.73	3.74
29	I-170	Olive Blvd to I-64	MO	St. Louis	SB	AM	4.18	2.15	1.23	1.69	5.14
30	I-70 (EB-SB)	Cass Ave MO to I-55/64 IL	IL	IL	EB	PM	3.21	2.04	1.32	1.68	4.23
31	I-70	Salisbury St to St Louis Ave	MO	St. Louis City	EB	PM	1.61	2.17	1.19	1.68	1.92
32	I-70	I-170 to Cave Springs	MO	St. Louis	WB	PM	14.66	2.09	1.26	1.68	18.47
33	I-70	Tr Hughes/Belleau Crk to Pearce Blvd	MO	St. Charles	WB	PM	12.16	2.03	1.24	1.64	15.08
34	I-55	Loughborough to Reavis Barracks Rd	MO	St. Louis City	SB	PM	3.44	2.05	1.20	1.63	4.13
35	I-270	Page to I-70	MO	St. Louis	NB	PM	3.50	2.07	1.13	1.60	3.96
36	I-270	I-70 to Ladue	MO	St. Louis	SB	AM	6.94	2.02	1.17	1.60	8.12
37	I-44	I-55/I-64/US-40 to Tenth St	MO	St. Louis City	WB	AM	2.02	2.02	1.17	1.60	2.36
38	I-70	Bryan to Tr Hughes	MO	St. Charles	EB	AM	5.01	2.05	1.14	1.60	5.71
39	I-44	Bowles Ave to Highway Dr	MO	St. Louis	EB	AM	3.00	1.98	1.13	1.56	3.39
40	I-64	I-70 to Mo-N	MO	St. Charles	EB	AM	4.41	1.88	1.20	1.54	5.29
41	I-44/I-55	Lafayette Ave. to Park Ave.	MO	St. Louis City	NB	PM	0.44	1.90	1.17	1.54	0.51
42	I-55/I-64	Broadway MO to I-70 Split IL	MO/IL	IL	EB	PM	2.94	1.75	1.29	1.52	3.79
43	I-64	Olive to Timberlake Manor Pkwy	MO	St. Louis	EB	PM	2.22	1.89	1.15	1.52	2.55
44	I-55	Loughborough to Park Ave	MO	St. Louis City	NB	AM	6.21	1.87	1.15	1.51	7.14
45	I-44	Compton to Jefferson Ave	MO	St. Louis City	EB	PM	0.73	1.81	1.16	1.49	0.85
46	I-64	Ninth St to I-55/I-70/US-40	MO	St. Louis City	EB	AM	0.78	1.71	1.23	1.47	0.96
47	I-44	Hampton to Kingshighway	MO	St. Louis City	EB	AM	1.98	1.77	1.14	1.46	2.26
48	I-44	Jefferson Ave to Grand Blvd	MO	St. Louis City	WB	AM	1.48	1.78	1.12	1.45	1.66
49	I-170	I-270 to Hanley	MO	St. Louis	SB	AM	1.03	1.77	1.12	1.45	1.15
50	I-44	Bowles Ave to MO-141	MO	St. Louis	WB	PM	1.55	1.62	1.12	1.37	1.74
51	I-255	Il-157 to Mousette Ln	IL	IL	NB	PM	4.69	1.46	1.27	1.37	5.96
52	I-170	Ladue Rd to Delmar Blvd	MO	St. Louis	NB	PM	1.14	1.53	1.13	1.33	1.29
53	I-44	Jamieson Ave to Shrewsbury Ave	MO	St. Louis City	WB	AM	1.65	1.34	1.13	1.24	1.86
54	I-255	State St to Il-15	IL	IL	SB	AM	2.94	1.21	1.23	1.22	3.62
55	I-270	IL-203 to Riverview	MO/IL	St. Louis	WB	AM	6.52	1.25	1.18	1.22	7.69
56	I-270	IL-3 to Riverview Dr	IL/MO	IL	WB	PM	4.91	1.16	1.21	1.19	5.94

• **Ranked by Total Impact**

No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	I-270	I-70 to Tesson Ferry Rd/MO-21	MO	St. Louis	SB	PM	18.70	3.12	1.55	2.34	28.99
2	I-70	I-170 to Cave Springs	MO	St. Louis	WB	PM	14.66	2.09	1.26	1.68	18.47
3	I-270	McDonnell Blvd to MO-367	MO	St. Louis	EB	PM	11.10	2.82	1.56	2.19	17.32
4	I-270	I-55/I-255 to Manchester	MO	St. Louis	NB	AM	10.08	3.34	1.62	2.48	16.33
5	I-70	Tr Hughes/Belleau Crk to Pearce Blvd	MO	St. Charles	WB	PM	12.16	2.03	1.24	1.64	15.08
6	I-44	I-55 to Shrewsbury Ave	MO	St. Louis City	WB	PM	6.85	4.61	2.10	3.36	14.39
7	I-70	I-270 to Jennings Sta Rd	MO	St. Louis	EB	PM	11.14	2.40	1.29	1.85	14.37
8	I-64	MO-K to I-70	MO	St. Charles	WB	PM	10.10	2.74	1.42	2.08	14.34
9	I-64	Mason Rd to Mccausland Ave	MO	St. Louis	EB	PM	10.20	2.59	1.37	1.98	13.97
10	I-64	Jefferson Ave to Boland Pl	MO	St. Louis City	WB	PM	6.24	3.97	2.12	3.05	13.23
11	I-64	25th St. IL to PSB MO	IL	IL	WB	AM	4.85	4.67	2.30	3.49	11.15
12	I-64	Ballas Rd to Mccausland	MO	St. Louis	EB	AM	7.80	2.60	1.36	1.98	10.61
13	I-70/I-44/I-55	Gasconade St to Grand Ave	MO	St. Louis City	SB	PM	6.63	2.37	1.29	1.83	8.55
14	I-270	I-70 to Ladue	MO	St. Louis	SB	AM	6.94	2.02	1.17	1.60	8.12
15	I-170	MO-340/Olive Blvd to I-64/	MO	St. Louis	SB	PM	4.18	3.95	1.86	2.91	7.77
16	I-270	IL-203 to Riverview	MO/IL	St. Louis	WB	AM	6.52	1.25	1.18	1.22	7.69
17	I-170	MO-180/St Charles Rock to Hanley Rd	MO	St. Louis	NB	PM	5.54	2.39	1.38	1.89	7.58
18	I-64	I-170/Brentwood Blvd to MO-JJ/Ballas Rd	MO	St. Louis	WB	PM	5.72	2.31	1.30	1.81	7.44
19	I-55	Loughborough to Park Ave	MO	St. Louis City	NB	AM	6.21	1.87	1.15	1.51	7.14
20	I-64	Grand Ave to PSB	MO	St. Louis City	EB	PM	2.71	6.19	2.56	4.38	6.94
21	I-70	Fifth St to St. Charles Rock Rd	MO	St. Charles	EB	AM	5.68	2.30	1.21	1.76	6.87
22	I-270	Bellefontaine Rd to Florissant Ave	MO	St. Louis	WB	AM	4.31	2.82	1.40	2.11	6.03
23	I-64	Hampton Rd to Hanley Rd	MO	St. Louis City	WB	AM	3.71	3.38	1.61	2.50	5.97
24	I-255	IL-157 to Mousette Ln	IL	IL	NB	PM	4.69	1.46	1.27	1.37	5.96
25	I-270	IL-3 to Riverview Dr	IL/MO	IL	WB	PM	4.91	1.16	1.21	1.19	5.94
26	I-64	Chesterfield Pky to Boones Crossing	MO	St. Louis	WB	PM	4.35	2.30	1.33	1.82	5.79
27	I-70	Bryan to Tr Hughes	MO	St. Charles	EB	AM	5.01	2.05	1.14	1.60	5.71
28	I-64	I-70 to Mo-N	MO	St. Charles	EB	AM	4.41	1.88	1.20	1.54	5.29
29	I-170	Olive Blvd to I-64	MO	St. Louis	SB	AM	4.18	2.15	1.23	1.69	5.14
30	I-64	Boones Crossing to Chesterfield Pkwy	MO	St. Louis	EB	AM	4.25	2.47	1.20	1.84	5.10
31	I-70 (EB-SB)	Cass Ave MO to I-55/64 IL	IL	IL	EB	PM	3.21	2.04	1.32	1.68	4.23
32	I-55	Loughborough to Reavis Barracks Rd	MO	St. Louis City	SB	PM	3.44	2.05	1.20	1.63	4.13
33	I-70 (NB-WB)	I-55/I-64 IL to Cass Ave MO	IL	IL	WB	AM	3.25	2.57	1.24	1.91	4.03
34	I-70	I-70 Exp/Bircher Blvd to Lucas And Hunt Rd	MO	St. Louis City	WB	PM	3.00	2.34	1.33	1.84	3.99
35	I-270	Page to I-70	MO	St. Louis	NB	PM	3.50	2.07	1.13	1.60	3.96
36	I-55/I-64	Broadway MO to I-70 Split IL	MO/IL	IL	EB	PM	2.94	1.75	1.29	1.52	3.79
37	I-44	Elm to Shrewsbury	MO	St. Louis	EB	AM	3.09	2.24	1.21	1.73	3.74
38	I-255	State St to IL-15	IL	IL	SB	AM	2.94	1.21	1.23	1.22	3.62
39	I-44	Highway Dr to I-270	MO	St. Louis	EB	PM	2.84	2.26	1.26	1.76	3.58
40	I-44	Bowles Ave to Highway Dr	MO	St. Louis	EB	AM	3.00	1.98	1.13	1.56	3.39
41	I-44	I-55/I-64/US-40 to Tenth St	MO	St. Louis City	WB	PM	2.02	2.60	1.34	1.97	2.71
42	I-64	Olive to Timberlake Manor Pkwy	MO	St. Louis	EB	PM	2.22	1.89	1.15	1.52	2.55
43	I-44	I-55/I-64/US-40 to Tenth St	MO	St. Louis City	WB	AM	2.02	2.02	1.17	1.60	2.36
44	I-44	Hampton to Kingshighway	MO	St. Louis City	EB	AM	1.98	1.77	1.14	1.46	2.26
45	I-70	Salisbury St to St Louis Ave	MO	St. Louis City	EB	PM	1.61	2.17	1.19	1.68	1.92
46	I-70	Union Blvd to Jennings St. Rd	MO	St. Louis City	WB	AM	1.58	2.44	1.19	1.82	1.88
47	I-44	Jamieson Ave to Shrewsbury Ave	MO	St. Louis City	WB	AM	1.65	1.34	1.13	1.24	1.86
48	I-44	Bowles Ave to MO-141	MO	St. Louis	WB	PM	1.55	1.62	1.12	1.37	1.74
49	I-44	Jefferson Ave to Grand Blvd	MO	St. Louis City	WB	AM	1.48	1.78	1.12	1.45	1.66
50	US-61	Pitman Ave to I-70	MO	St. Charles	SB	AM	1.22	2.47	1.22	1.85	1.49
51	MO-364	Central School Rd to Kisker Rd	MO	St. Charles	SB	PM	1.30	2.34	1.13	1.74	1.47
52	I-170	Ladue Rd to Delmar Blvd	MO	St. Louis	NB	PM	1.14	1.53	1.13	1.33	1.29
53	I-170	I-270 to Hanley	MO	St. Louis	SB	AM	1.03	1.77	1.12	1.45	1.15
54	I-64	Ninth St to I-55/I-70/US-40	MO	St. Louis City	EB	AM	0.78	1.71	1.23	1.47	0.96
55	I-44	Compton to Jefferson Ave	MO	St. Louis City	EB	PM	0.73	1.81	1.16	1.49	0.85
56	I-44/I-55	Lafayette Ave. to Park Ave.	MO	St. Louis City	NB	PM	0.44	1.90	1.17	1.54	0.51

Appendix 4: Work Zones (MODOT)

County	Job Number	Route	Direction	Mile Markers (start to finish)	Log Miles (start to finish)	Description	Total Project Estimate	Timing of Traffic Impacts (ie. Summer, April-October, etc)	Type of Traffic Impact (day/night/24, # of lanes open)	Anticipated Work Zone Delay (minutes)	Anticipated Work Zone Queue (miles)	Zipper Merge (Yes or No)
		severe impacts= red		Moderate impacts=yellow			Minimal to no impacts=green					
St. Louis City	6I3150	IS 44	EB/WB	286.6-288.4	EB 286.4 to 288.2; WB 4.9 to 6.6	Bridge improvements from Kingshighway Boulevard to 39th Street. Project involves bridges A2386, A2163, A2164, A2165, A2600 and A2255. \$1,149,000 Open Container funds.	\$30,366	April - Dec	3 of 4 lanes 24/7; various ramp closures; narrow and shifted lanes	67 minutes EB 84 minutes WB	5.7 miles EB 7 miles WB	no
St. Louis City	J6I3034D	IS 44	EB/WB	282-283	EB 282.3 to 283.3; WB 9.7 to 10.8	Bridge improvements over BNSF	\$16,600	Mar - Dec	3 of 4 EB; 2 of 4 WB; Shrewsbury on-ramp closed; 24/7; narrow and shifted lanes	67 minutes EB 200 minutes WB	5.7 miles EB 15 miles WB	no
St. Louis City	6I3111	IS 64	EB/WB	37.0 - 39.0	EB 37.0 to 39.1; WB 1.7 to 3.8	Asphalt Mill and fill on I-64 from Vandeventer to 21st St.	\$2,650	April - November	off peak, nights, wkends	0 minutes of delay anticipated	0 miles of delay anticipated	
St. Louis City	J6I2377C	IS 64	EB/WB	209	40.3 to 40.8	Poplar Street Bridge	\$50,000	Jan - Dec	NB I-55 to EB PSB ramp closed through Feb; 3 lanes WB PSB; 2 lanes EB PSB; various full weekend closures EB	36 minutes	6 miles	no
St. Louis City	6I3205	RP IS70W TO BROADWAY	WB	242.2 - 246.6	3.5 to 3.9	Interchange improvements at I-70 westbound exit ramp to Broadway and along Broadway. Project involves bridge A6205. Project fully funded by \$1,264,000 CMAQ and \$327,000 Land Clearance for Redevelopment Authority.	\$1,591	Jan - May	off peak, nights, wkends single lane closure	No delays anticipated	No delays anticipated	no
St. Louis	J6I3113/J6I3157	I-270				Asphalt mill and fill on I-270 between Rte. 100 and I-55.	\$16,716					
St. Louis	J6I2423	I-44/141				Interchange bridge and pavement work.	\$22,000	Jan - May	off peak, nights, weekends single lane closures			
St. Louis	J6I2423	141	NB			Ramp tie in at I-44.		April	2 weeks of 24hr single lane closure	Heavy delays expected in AM rush	Heavy delays expected in AM rush	
St. Louis	J6P3180/J6P3200	141				Bridge joint replacement and epoxy overlay on Rte. 141 at multiple locations between Rte. 30 and I-64. Asphalt mill and fill between Centurion and Vance and between Milldale and South Outer Forty.						

St. Louis	6I3029	IS 44			Bridge replacement from I-270 to west of Meramec River. Project involves bridges L0623 and A2643. \$2,000,000 FY 2012 Interstate Maintenance Discretionary grant for preliminary engineering.	\$71,622	August, details still being discussed			
St. Louis	6I3169	IS 44			Pavement improvements from east of Murdoch Avenue to Rte. 141. \$2,815,000 District Operating funds.	\$18,086	mostly night work. GR and pavement repairs during day.	beginning soon (March 2018)		
St. Louis	6I3156	IS 70	EB & WB	241.4 - 242.2	Interchange improvements at Rte. U (Lucas and Hunt Road). Project involves bridge A6233. \$1,013,000 Open Container funds.	\$3,619	April - November	Night - 1 or 2 of 3; 24/7 narrowed & shifted lanes		
St. Louis	6I3165	IS 70	EB & WB	239.4 - 244.2	Pavement improvements from Springdale Avenue in Berkeley to Union Boulevard in St. Louis city. \$157,461 Open Container funds.	\$8,120	Summer/Fall - Option to push work to CY 2019	Night - 1 or 2 of 3		
St. Louis	6I3166	RP IS70W TO IS270E			Rehabbing concrete pavement ramps at I-270 and I-70 interchange, and also at I-270 and Rte. 180 (St. Charles Rock Road) interchange in Bridgeton.	\$1,412	Summer/Fall	Night/Weekend - Ramps Closed		
St. Louis	6I3146/J 6S3261	I-270	NB & SB	17.6 - 20.0	Rehabilitate Bridge A1242 (I-270 over Fee Fee Creek and railroad) / Paint Bridge A3787 (McKelvey Rd. over I-270)	\$4,222	Summer	24/7, 3 of 5 lanes open		
St. Charles	6I2418	IS 70			Restripe lanes, improve interchanges, construct outer roads and sidewalks from Woodlawn Ave. to TR Hughes Blvd. including Main St. Project involves bridges L0710 and A6157. \$3,878,533 Cost Share, \$3,500,000 CMAQ, and \$6,132,000 City of O'Fallon.	\$15,506				
St. Charles	6I3109	IS 70			Pavement improvements from Fifth Street in St. Charles County to Fee Fee Road in St. Louis County. \$302,950 from SAFETEA-LU Demo ID # MO152. \$647,156 from TEA-21 Demo ID # MO024.	\$5,006				
St. Charles	6P3071	US 61			New interchange at Rte. P / Peine Road, safety improvements at median crossovers north of Peine Road to north of Rte. A. Project involves bridge H0149. \$4,331,337 Cost Share, \$2,795,119 Wentzville, \$3,501,000 St. Charles County, \$3,031,188 Demo ID MO160.	\$14,412				

Jefferson	J6I3110/ J6I3131	I-55	NB & SB	170-173		Rehab bridges over Rte. 67, UPRR, & Platin Creek	\$14,653	Spring/Summer	24/7 1 of 2 lanes open			Yes
Jefferson	J6I3159	I-55	NB & SB			Crack Sealing and Guardrail from RT M- RT Z	\$1,392	Spring/Summer	Day 2 of 3 open. Night 1 of 3 open			No
Jefferson	J6P3144/ J6P3145	US 67	NB & SB			Intersection safety improvements at Montauk and Victoria roads	\$1,438	Summer	Day/Night 1 of 2 lanes open			No
Jefferson	J6P2345	Mo 21				Intersection improvements @ Mo 110	\$851	Spring/Summer	Day/Night 1 lane flagging operation			No
Jefferson	J6S3160	Mo 30	EB/WB			Microsurfacing from St. Louis County line to just west of Route PP	\$2,500	Spring/Summer	Day/Night 1 of 2 lanes open			No
Franklin	J6I3116/J 6S3163	I-44	EB/WB			Bridge replacement EB I-44 over US 50 and St. Mary Rd. over I-44	\$4,911	Spring/Summer	Day/Night 1 of 2 lanes open			No
Franklin	J6I3189	I-44	EB/WB			Pavement improvements from Rte. 30 to Crawford County line.	\$35,988	Summer 18 - Winter 19	Day/Night 1 of 2 lanes open			No
Franklin	J6S3161 and J6P3194	Mo 47	NB/SB			Microsurfacing from Commercial St. in St. Clair to Norwood Trailer Ct. in Washington. HFST as part of Safety D/B project.	\$2,571	Spring/Summer	Day/Night 1 lane flagging operation			No
Franklin	J6P3194	Mo-100	EB/WB		60-68	HFST from Yeates Rd. to Bluff Rd.	\$1,164	Spring	Day/Night 1 lane flagging operation			No
St. Charles	J6P3194	I-70	EB/WB		207.5-208.3	HFST and pavement marking	\$281	Spring/Summer	Night, off peak 1 lane open			No
Franklin	J6P3194	I-44	WB		45.75 - 46.39	HFST and inlaid pavement markers	\$241	Spring Summer	Night, off peak 1 lane open			No
St. Charles	J6P3194	Mo 364	WB		7.1 - 8.1	Diamond grinding and pavement marking	\$310	Spring/Summer	Night, off peak 1/2 lanes open			No
St. Charles	J6P3194	Mo 364/94	EB		13.2-14.1	Diamond grinding and pavement marking	\$369	Spring/Summer	Night, off peak 1/2 lanes open			No
St. Charles	J6P3195	Mo-61	NB/SB		256.6-263.9	Guard cable and inlaid pavement markers from I-70 to Big Creek	\$1,340	Spring/Summer	Day/Night, 1 lane open			No

St. Louis County Projects

The majority of our paving is done at night, but work on curbs, sidewalk, curb ramps, approaches, and base repairs typically occur during the day.

Major impacts:

- **Chesterfield Parkway West** (I-64 to Olive Blvd.)
 - Resurfacing, ADA improvements, dual left turn at Swingley Ridge Rd.
 - Tentative NTP: 2/26/2018
 - Working Days: 120
 - Night paving 7pm-6am
- **Dorsett Road** (East of Calamaide Dr. to I-270)
 - Resurfacing and pedestrian facility upgrades
 - Letting: 10/4/2017
 - Anticipated Completion: 8/2018
- **Missouri Bottom Road** (I-270 to Fee Fee Rd.)
 - Resurfacing and pedestrian facility upgrades
 - NTP: 12/18/2017
 - Working Days: 95
 - Anticipated Completion: 9/2018
 - Night paving
- **Lilac Avenue** (Chambers to I-270)
 - Resurfacing and pedestrian facility upgrades
 - NTP: 7/24/2017
 - Working Days Remaining: 26
- **Old Halls Ferry Bridge #107** (just South of I-270, near Ashton Drive)
 - Bridge replacement
 - Letting: 11/15/2017
 - Anticipated Completion: 9/2018
 - Full closure-detour to New Halls Ferry
- **Vance Road** (141 to just west of Hanna Rd)
 - Road resurfacing and bridge replacement.
 - Will likely affect traffic movements at MO-141/Vance-Forest intersection during closure.
 - 90-day full closure likely starting in April 2018.
- **Gravois/Musick:**
 - Intersection improvements and vertical alignment improvements to Musick.
 - Involves a lengthy full closure on Musick just south of Gravois.
 - NTP anticipated in April 2018.

Minimal impact:

- **North Hanley Road** (Madison Ave. to 1'100' South of Frost Ave. AND 60' North of Morningaire Dr. to I-270)
 - Resurfacing and pedestrian facility upgrades
 - NTP: 8/21/2017
 - Working Days Remaining: 22
- **North Hanley Road** (St. Charles Rock Rd. to Page Ave.)
 - Resurfacing and pedestrian facility upgrades
 - Letting Date: 1/31/2018
 - Anticipated Completion: 12/2018
- **Baxter Road** (Clarkson Rd. to 0.1 mi North of Country Field Dr.)
 - Resurfacing and pedestrian facility upgrades
 - Letting: 11/29/2017
 - Anticipated Completion: 12/2018
- **Conway Bridge #204** (just West of White Road)
 - Bridge Replacement
 - Letting: 11/15/2017
 - Anticipated Completion: 10/2018
 - Full Closure-detour to Olive
- **Creve Coeur Mill Bridge #215** (between Page and Olive)
 - Bridge Replacement
 - Letting: 5/31/2017
 - Full Closure beginning in June and lasting 90 days
- **Eva Road** (Frost Ave. to McDonnell Blvd.)
 - Complete roadway replacement
 - Tentative Letting: 3/1/2018
- **Lucas-Hunt Road** (Woodrow Ave. to St. Charles Rock Rd.)
 - Resurfacing, pedestrian facility upgrades, and ITS work
 - Letting Date: 2/21/2018
 - Anticipated Completion: 1/2019
- **Big Bend Blvd/Manchester Intersection Project:**
 - Construction of a northbound right-turn lane on Big Bend, intersection signal and ADA upgrades.
 - NTP anticipated in March 2018
- **Telegraph Road** (Kingston to Lemay Ferry):
 - Road resurfacing and pedestrian facility upgrades.
 - Project currently underway
 - NTP was 9/5/2017
 - 40 working days remain.

- **Union Road** (Lindbergh Blvd to Reavis Barracks):
 - Road resurfacing project currently underway.
 - NTP was 6/12/2017
 - 70 working days remain.
- **Clayton Road** (St. Louis City Limits to Louwen Drive):
 - Resurfacing and pedestrian facility upgrades
 - Tentative letting date 3/28/2018
- **Hawkins-Fuchs** (Meramec Bottom Road to Lemay Ferry Road); **Old Lemay Ferry** (Lemay Ferry to Hawks-Fuchs)
 - Resurfacing project
 - NTP forthcoming in Spring 2018
- **Sappington Barracks** (Telegraph to Barracksview Road)
 - Resurfacing and pedestrian facility upgrades
 - Tentative letting date 5/9/2018
- **Buckley Road** (Sappington Barracks Rd to Lemay Ferry Rd)
 - Resurfacing and pedestrian facility upgrades
 - Tentative letting date 5/9/2018
- **Mehl Ave/Patterson Rd** (Lemay Ferry Road to Yaeger Road)
 - Resurfacing and pedestrian facility upgrades
 - Tentative letting date 3/14/2018
- **Summit Road** (Gravois Road to Bowles Avenue)
 - Resurfacing and pedestrian facility upgrades
 - Tentative letting date 5/23/2018

IDOT

- MLK Bridge Ramps (Approach structure & retaining wall replacement)
 - June 2018 Letting (Est. Aug. 2018 start work)
 - Completion date = end of Aug. 2019

This project has been revised to completely close the MLK Bridge and all associated ramps/approaches.

- Poplar Street Collector-Distributor Ramps
 - August 2018 Letting (Est. late Sept. 2018 start work)
 - Completion date = To Be Determined, due to the significant change in scope
 - Description of work
 - WB I-55/64 CD Ramp = Joint replacement, superstructure and substructure repairs – will require lane closures and some short term/periodic closures (weekends), but I do not know the details of which just yet. They will try to coordinate with the 4 weekend closures of I-55/64 that are going to be contained in the below mentioned MLK Bridge Ramp project. Some of the joint replacement work may even be pushed back until after the MLK re-opens in late August 2019.
 - EB I-55/64 CD Ramp = bridge deck patching – will require some intermittent lane closures

St. Charles County

The project we have going to construction this year that will have some impact on traffic patterns are the following:

- I-70 Outer Roads Phase 1: Currently scheduled to go out to bid in March 2018 with anticipated construction start in June.
- Wabash Ave Reconstruction (Between Sonderen Street to Wabash Spur): A portion of the road will be closed for a period to replace a box culvert and then for the remainder of the project the roadway within the construction limits will be one-way westbound. Bids have been opened and we are waiting on award concurrence from MoDOT. Anticipate on construction beginning early March.
- Intersection of Sommers and DD: Anticipate on bidding this project in March/April and construction beginning in June. Will require some intermittent lane closures which will occur after school is out since there are three schools in the vicinity that pass through that intersection.
- Mexico Road from Barrington Drive to Hwy K: Resurfacing and reconstruction of sidewalk along the south side of Mexico Road. Anticipate on bidding the project in June with an August construction start.
- Hepperman Road – Already started. Running through most of 2018.
- South Point Prairie at Jackson – Already started. Should finish around June/July 2018.
- David Hoekel, Phase 1 – There is a very outside chance that this could bid at the end of 2018.
- David Hoekel, Phase 2 – It is possible this could bid at the end of 2018.
- David Hoekel, Phase 4 – This could bid as soon as fall 2018 if ROW goes quickly. Likely more of a late year bid, then utility work and most roadwork in 2019.
- Nahm Road Bridge Replacement – Bid by spring 2018. 60 day construction project.
- South River Road – Could be out to bid and underway by late 2018.
- Westwood Drive – Bidding first quarter of 2018. Will run the entire year, possibly into 2019
- Woodstream Box Culvert Replacement – Bid by spring 2018. 60 day construction project.

I don't know that many of these dramatically affect MoDOT's system. None of these touch MoDOT routes directly except DHP#4. That one would be the most important to them, since it includes curve smoothing on Route N at Duello/Hopewell. Unfortunately it has a lot of parcels needing acquisition, and we do not yet have approved ROW Plans from MoDOT. There's a chance it won't make a 2018 bidding, but we will be pushing for it since it has federal funds.



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