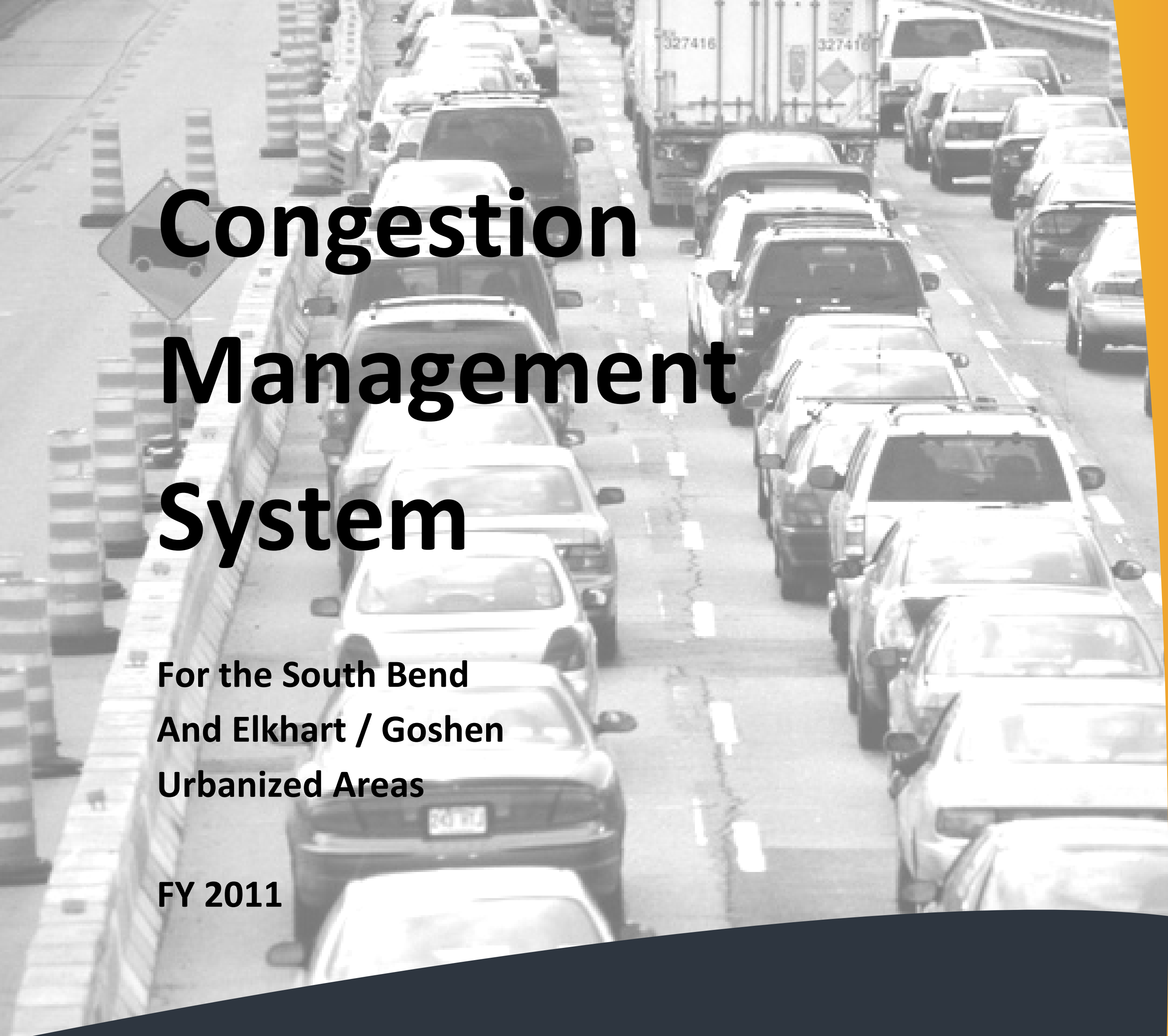

Congestion Management System

For the South Bend
And Elkhart / Goshen
Urbanized Areas

FY 2011

MACOG
Michiana Area Council of Governments

227 W. Jefferson Bldg. - County-City Bldg 1120 - South Bend, IN 46601
P: 574-287-1829 F: 574-287-1840 www.macog.com

EXECUTIVE SUMMARY

The Congestion Management System (CMS) is defined by the Federal Highway Administration (FHWA) as "a systematic process for managing congestion that provides information on a transportation system's performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet state and local needs". The Transportation Equity Act for the 21st Century (TEA-21) required that a congestion management system be developed by Metropolitan Planning Organizations (MPOs) in cooperation with the state. In addition, TEA-21 required that each urbanized area of more than 200,000 in population be designated as a Transportation Management Area (TMA) and that a CMS be developed. The SAFETEA-LU transportation act continues this requirement. The South Bend / Mishawaka urbanized area in St. Joseph County and the Elkhart / Goshen urbanized area in Elkhart County have a total population of 464,490 (266,931 in St. Joseph County and 197,559 in Elkhart County according to 2010 Census data) and have been designated as one TMA. A CMS has been in place since 1996.

The MACOG CMS follows the guidelines in the Indiana Statewide Congestion Management System Work Plan that was developed by INDOT in conjunction with the Purdue University School of Civil Engineering. The CMS consists of the following elements:

- Establishment of Advisory Committees
- Establishment of CMS networks
- Establishment of performance measures
- Establishment of data collection and monitoring systems
- Establishment of common performance objectives and standards
- Analysis on macro level
- Analysis on micro level
- Identification of the network deficiencies
- Evaluation and recommendation of congestion strategies
- Incorporation of CMS into the Transportation Improvement Plan (TIP) and the Transportation Plan (TP)
- Evaluation of effectiveness of implemented projects
- Establishment of a process to periodically update CMS procedures

The CMS provides a structured framework for evaluating travel demand reduction and operational management strategies, lends itself to identifying, prioritizing, and programming transportation improvements, and has been integrated into the Transportation Improvement Plan (TIP) and the Transportation Plan (TP).

The CMS network currently covers all functionally classified network links, totaling 1,379 road miles that range from interstates to collector roads. Following *the Development of Prototype Congestion Management System for the State of Indiana - Purdue University Joint Highway Research Project*, MACOG uses a link-based traffic volume and capacity ratio (V/C) as a major performance measure to identify congestion on roadways.

The analysis on current congestion at the regional level provides a general picture of the congestion in the region. Most of the traffic count data is from the 2003 to 2008 traffic count program. In the 2011 CMS, the total peak hour VMT is 1,416,054 in the region. The congested VMT during the peak hours accounts for 13.2% of the total peak hour VMT. Of the total 1,379 road miles of the network, 86 road miles experience some congestion. This is 6.2% of the network. The total daily VMT in the region is 9,248,166.

SUMMARY TABLE			
DESCRIPTION	2005 BASE YEAR	2035 NOBUILD	2035 BUILD
NETWORK MILES	1379	1402	1410
NETWORK CONGESTION MILES	86	168	134
% CONGESTION MILES	6.2%	12.0%	9.5%
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PK HOUR VMT	1,416,054	1,802,949	1,799,753
PK HOUR VMT CONGESTION	187,616	455,345	387,738
% PK HOUR VMT CONGESTION	13.2%	25.3%	21.5%
	BD-NOBLD	NOBUILD	BUILD
	REDUCE	INCREASE 35-02	INCREASE 35-02
NETWORK MILES	-0.6%	1.7%	2.3%
NETWORK CONGESTION MILES	20.5%	95.6%	55.6%
% CONGESTION MILES	2.5%	5.8%	3.3%
VMT	0.2%	27.3%	27.0%
PK HOUR VMT	0.2%	27.3%	27.1%
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DESCRIPTION	2009 BUILD	2015 BUILD	2020 BUILD	2025 BUILD	2030 BUILD	CURRENT
NETWORK MILES	1378	1402	1405	1406	1407	1376
NETWORK CONGESTION MILES	89	107	102	112	124	89
% CONGESTION MILES	6.5%	7.7%	7.2%	8.0%	8.8%	6.5%
VMT	9,555,829	10,255,115	10,627,621	11,017,874	11,365,140	9,634,537
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% PK HOUR VMT CONGESTION	14.3%	17.9%	17.4%	19.4%	20.5%	13.1%

In St. Joseph County, congestion is mainly on the segments of the following roads: Bremen Highway; SR 23 north of Cleveland Road as well as at the 5-points intersection in the City of South Bend; McKinley Highway (US 20) east of the City of South Bend; Portage Avenue in northwest South Bend near the round-abouts; Ironwood Road from Edison to Pleasant Street; Lincolnway within the City of Mishawaka; and several minor road segments in the region (see congestion maps).

For Elkhart County, congestion is mainly on the segments of the following roads: SR 19 immediately south of the Bypass; US 33 in Dunlap and the City of Goshen, south of downtown; various segments of SR 15, from the City of Goshen to the Town of Bristol and the Indiana Toll Road; US 20 from the Bypass to the County Line; US 6 east of CR 17; and several other roads in the City of Elkhart and the City of Goshen (see congestion maps).

In reviewing the resulting data, it was noticed that Elm Road, south of Lincolnway in Mishawaka, was not congested although it was believed to be a heavily congested area, especially during the peak hours. In reviewing the spreadsheets used to calculate congestion, it was determined that the model was not accurately reducing the per lane capacity of the roadway to reflect the absence of a center median. As this appeared to be a singular anomaly, the capacity was manually corrected for the corridor from Lincolnway to Dragoon Trail.

The 2011 CMS also addresses the needs of the Long Range Plan (LRP). The CMS was used to post-process the data from the travel demand model (TDM) to predict future congestion. The base year of the CMS is 2005 as it is in the model. The table shows that if none of the projects in the TP were constructed, the total percentage of congested miles in the network would increase 5.8% from 2005 to 2035. The peak hour congested VMT would increase by 142.7%, and the congested road miles would increase by 95.6%. The build scenario with the traffic improvement projects implemented would result in the following: the network miles would increase by 2.3%, the total VMT would increase by 27.0%, and the peak hour VMT would increase by 27.1%. The build scenario would have the following improvements over the no build scenarios: the congested network miles would be reduced by 20.5%, and the peak hour congested VMT would be reduced by 14.8%.

All available strategies have been evaluated and summarized in table 9 of section VI. All strategies that have been used and can be used in the MACOG region have been described in detail. These strategies include multi-modal and transit strategies, transit routing, rideshare programs, bike/pedestrian planning, public participation in the clean air program, smart growth and land use programs, signal timing, parking studies, traffic operation management, intelligent transportation systems and other activities.

The analysis at link level also includes the analysis of congestion on level of service (LOS), delay of the travel speed, congestion > spread = effect, and intersection studies. As new time study results are not available, this part of study has not been updated and the analysis from the 1999 CMS is included here. A LOS is assigned to each congested segment. The duration of congestion beyond the peak hours is an important index on the degree of severity of congestion. Further, the directional bound travel speeds during peak hours were calculated using the available travel time study results for some of the congested segments. These studies provided useful information for congestion mitigation strategy selection. The 1999 CMS also includes some intersection studies. A trial study using HCS was attempted, and a short list has been made on selected intersections for further intersection analysis using HCS.

All current congested segments have been carefully examined. Recommendations with priority years have been made to the TP and TIP. A list of network links can be found in the Excel spreadsheet (CMS_2010.xls).

I. INTRODUCTION

The Congestion Management System (CMS) is defined by the Federal Highway Administration (FHWA) as “a systematic process for managing congestion that provides information on a transportation system’s performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet state and local needs”. The Transportation Equity Act for the 21st Century (TEA-21) required that a congestion management system be developed by Metropolitan Planning Organizations (MPOs) in cooperation with the state. In addition, TEA-21 required that each urbanized area of more than 200,000 in population be designated as a Transportation Management Area (TMA) and that a CMS be developed. The SAFETEA-LU transportation act continues this requirement. The South Bend / Mishawaka urbanized area in St. Joseph County and the Elkhart / Goshen urbanized area in Elkhart County have a total population of 464,490 (266,931 in St. Joseph County and 197,559 in Elkhart County according to 2010 Census data) and have been designated as one TMA. A CMS has been in place since 1996.

The Indiana Department of Transportation (INDOT), in conjunction with The Purdue University School of Civil Engineering, published a set of guidelines in the Indiana Statewide Congestion Management System Work Plan and a congestion management report, *the Development of a Prototype Congestion Management System for the State of Indiana*, which provides a suggested procedure to identify congestion on a roadway. The Indiana Statewide Congestion Management System Work Plan consists of the following elements:

- Establishment of Advisory Committees
- Establishment of CMS networks
- Establishment of performance measures
- Establishment of data collection and monitoring systems
- Establishment of common performance objectives and standards
- Analysis on macro level
- Analysis on micro level
- Identification of the network deficiencies
- Evaluation and recommendation of congestion strategies
- Incorporation of CMS into the Transportation Improvement Plans (TIP) and the Transportation Plans (TP)
- Evaluation of effectiveness of implemented projects
- Establishment of a process to periodically update CMS procedures

The MACOG 2011 Congestion Management System is an update of the 2008 CMS, which itself was an update of the 2006 CMS, and is organized and presented around the above listed elements. MACOG continues to use the existing Policy Board Committee and Transportation Technical Advisory Committee as the CMS advisory committee. The CMS is tailored to the unique characteristics of the MACOG region. It provides a structured framework for evaluating travel demand reduction and operational management strategies, lends itself to identifying, prioritizing, and programming transportation improvement projects, and has been integrated into the Transportation Improvement Plan (TIP) and the Transportation Plan (TP) by providing reliable tools for project evaluation, selection and prioritization.

The Federal Register Vol. 63, No. 215 includes the following note: "planning area promotes the consideration of efficient system management and operation in transportation planning processes and recognizes that we cannot always build our way out of congestion but need to better manage and operating the existing system". The 2006 CMS put more emphasis on the evaluation and analysis on the operation and management of the existing system, and other alternative strategies to adding capacity strategies.

For the original 2006 CMS, MACOG updated its Long Range Plan to a horizon year of 2030, so the CMS was altered to incorporate the new changes to the TDM and projects. For the 2008 CMS, most of the spreadsheets and code used for the 2006 CMS were modified to reflect a 2005 base year and a 2035 horizon year. The 2011 CMS is simply reusing the updated spreadsheets and code from the 2008 CMS.

II. NETWORK COVERAGE

Consistency and good data are essential in transportation planning. To develop a CMS that lends itself to identifying, prioritizing, and programming transportation improvements for integration into the TIP and the TP, MACOG determined that all federal functionally classified road and street segments included in the TP should also be included in the CMS. As a result, the CMS network covers the functionally classified network links totaling 1,379 road miles ranging from interstates to collectors.

In the MACOG Transportation Management Area (TMA), less than two percent of the total trips use the transit system. Given this characteristic of the TMA, the CMS uses the link based traffic volume and capacity ratio (V/C) as one of the major performance measures. In the CMS, the transit route system and the information of the ridership are included only in the description and analysis of the congestion mitigation strategies but not used in the procedure of congestion identification.

III. PERFORMANCE MEASURES AND STANDARDS

3.1 Performance Measures

In *the Development of Prototype Congestion Management System for the State of Indiana - Purdue University Joint Highway Research Project*, the link based traffic volume and capacity ratio (V/C) is one of the major performance measures to identify congestion on roadways. Traffic volume is the number of vehicles passing through a given point or section of a roadway during a given time period. Capacity is the maximum number of vehicles that can pass through a given point or section of a lane or roadway in one direction during the same given time period under prevailing roadway and traffic conditions. In the research project, a set of capacity values were recommended based on the information of roadways. A set of V/C ratio values were also determined as benchmarks. The actual traffic data would be used to calculate the hourly traffic volumes in the morning peak or evening peak. Finally the ratios of these calculated volumes and capacities would be compared with the benchmark V/C ratios. Congestion would be identified if the former ratios were equal to or greater than the benchmark ratios.

Following guidelines set forth in the CMS prototype, MACOG uses the same V/C ratio performance measure in its CMS. The calculation of the V/C ratio and the method to identify congestion are described in the following paragraphs.

Capacity values are based on the information of the functional classifications of the roads (Table 1) and on the types of land use along those roads.

TABLE 1: FUNCTIONALLY CLASSIFIED ROAD SYSTEM

Code	Description (RURAL)	Code	Description (URBAN)
1	Principal Arterial – Interstate	11	Principal Arterial -- Interstate
2	Principal Arterial – Other	12	Principal Arterial -- Freeway or Bypass
6	Minor Arterial	14	Other Principal Arterial
7	Major Collector	16	Minor Arterial
8	Minor Collector	17	Collector
9	Local	19	Local

A set of capacity values recommended by the CMS prototype guidance developed by the Purdue University Joint Highway Research Project are used in the MACOG CMS (Table 2). Land Use Codes are as follows: Central Business District (CBD); CBD Fringe; Mixed Urban; Suburban / Residential; and Rural areas.

TABLE 2: RECOMMENDED CAPACITY VALUES PER LANE

Land Use Category	Interstate	Major Arterial	Minor Arterial	Collector	Local
CBD	1875	700	600	500	500
CBD Fringe	1875	750	650	580	580
Mixed Urban	1875	820	750	700	700
Suburban/Residential	1875	860	700	600	600
Rural	1875	820	600	540	540

- For major arterials that are non-divided, the capacity values will be lower by approximately 200.
- For major arterials, divided with no access, the capacity values will be approximately 400 lower than the divided with partial access.
- For minor arterials with parking, the capacity values will be approximately 200 lower than for minor arterials without parking.

Annual average daily traffic counts (AADT) are used to calculate the directional peak hour volumes. The directional peak hour volume is the number of cars passing through a given point in one direction in either morning or evening peak hour. The directional peak hour volume is calculated by using the AADT times peak factor (K) and a directional factor (D). This is expressed by an equation in the form of **DPHV= AADT*D*K**. DPHV is the directional peak hour volume, *D* is a factor for one way traffic, and *K* is a factor for converting the daily traffic volumes into the peak hour traffic volumes. The values of K and D are also based on the functional classifications of the roads. The recommended values for K and D for morning peak and evening peak are in Table 3 and the calculation is in Table 4.

TABLE 3: RECOMMENDED VALUES FOR K AND D FACTORS

Facility Type	**AM 'K'**	**AM 'D'**	**PM 'K'**	**PM 'D'**
Urban Interstate	0.070	0.573	0.082	0.597
Urban Arterial	0.074	0.555	0.080	0.581
Rural Interstate	0.075	0.560	0.085	0.572
Rural Arterial	0.075	0.558	0.082	0.594
Rural Collector	0.076	0.578	0.073	0.620

*TABLE 4: CALCULATION OF K * D*

Interstate (1 and 11)	AMK = 0.070	AMD = 0.573
	PMK = 0.082	PMD = 0.597
Other Freeways (2 and 12)		
	AM K*D	0.070 x 0.573 = **0.0401**
	PM K* D	0.082 x 0.597 = **0.0490**
All Other Urban Roads (14, 16, 17, 19)	AMK = 0.074	AMD = 0.555
	PMK = 0.080	PMD = 0.581
	AM K*D	0.074 x 0.555 = **0.0411**
	PM K*D	0.080 x 0.581 = **0.0465**
Rural Arterial (6)	AMK = 0.075	AMD = 0.558
	PMK = 0.082	PMD = 0.594
	AM K*D	0.075 x 0.558 = **0.0419**
	PM K*D	0.082 x 0.594 = **0.0487**
Rural Collector (7, 8 to 9)	AMK = 0.076	AMD = 0.578
	PMK = 0.073	PMD = 0.620
	AM K*D	0.076 x 0.578 = **0.0439**
	PM K*D	0.073 x 0.620 = **0.0453**

In reviewing the final results of the update to the 2010 Congestion Management System, an anomaly was identified on Elm Road in Mishawaka, south of Lincolnway. What should have been a heavily congested roadway, level of service F based on v/c ratios from the travel demand model, was being calculated as a level of service D by the CMS spreadsheet.

Upon further investigation, it was determined that the capacity of the roadway was not being reduced to model the absence of a center median. As the remainder of the region appeared to accurately reflect known congestion, the links along the corridor from Lincolnway to Dragoon Trail were manually corrected to adjust the calculated level of service in the spreadsheet.

3.2 Indiana Standard Congestion Test -- DPHV/C >= Benchmark V/C

The morning and evening peak hour volumes (DPHV) were calculated using AADT and *K**D*. The ratios of the DPHV and capacity (DPHV/C) were compared with the benchmark V/C ratios. These benchmarked V/C ratios were determined by the road's functional classifications, facility types, and types of land use. Congestion will be identified when either the AM or PM DPHV/C is equal to or greater than the benchmark V/C ratio. The recommended Benchmark V/C ratios are in Table 5.

TABLE 5: RECOMMENDED BENCHMARK V/C RATIOS FOR IDENTIFYING CONGESTION

Generator (1)	Major Traffic Urban (2)	Other	Suburban	Rural
Key Intersections	0.90	0.90	0.80	0.70
Freeways	0.80	0.90	0.80	0.70
Principal Arterials	0.90	0.80	0.80	0.70
Minor Arterials	0.90	0.80	0.80	0.70
Collector	0.90	0.80	0.80	0.70

(1) Includes shopping centers, universities, airports, schools, hospitals, etc.
(2) Includes urban areas without special traffic generators

IV. DATA COLLECTION

The information on the roads and traffic counts are the primary sources of data used to determine congestion on the roadways. To use the above methodology and performance measures to run the CMS, data such as functional classifications, the number of directions, the number of lanes, capacity per lane, road segment length, and the type of land use by each road segment are essential variables. Some other variable data has been collected too. Based on the criteria and the benchmarks set out in the Work Plan, the calculations of the directional peak hour volumes and the V/C are calculated.

MACOG collects the traffic count data at over 2,000 separate locations throughout the TMA over a 3-year count cycle. These traffic counts were converted to Annual Average Daily Traffic (AADT). Therefore, in the CMS, one-third of the traffic data was composed from the current year newly collected counts and about two-thirds of the collected counts were from the counts collected in the past two years. Counts for some specific segments were not available so the AADT was derived from adjacent street segments.

V. CONGESTION IDENTIFICATION

5.1 Current Congestion

The currently congested segments were identified using a 2005 base year scenario map in the TDM and the Indiana Standard Congestion Test described in Section III.

5.2 Future Congestion

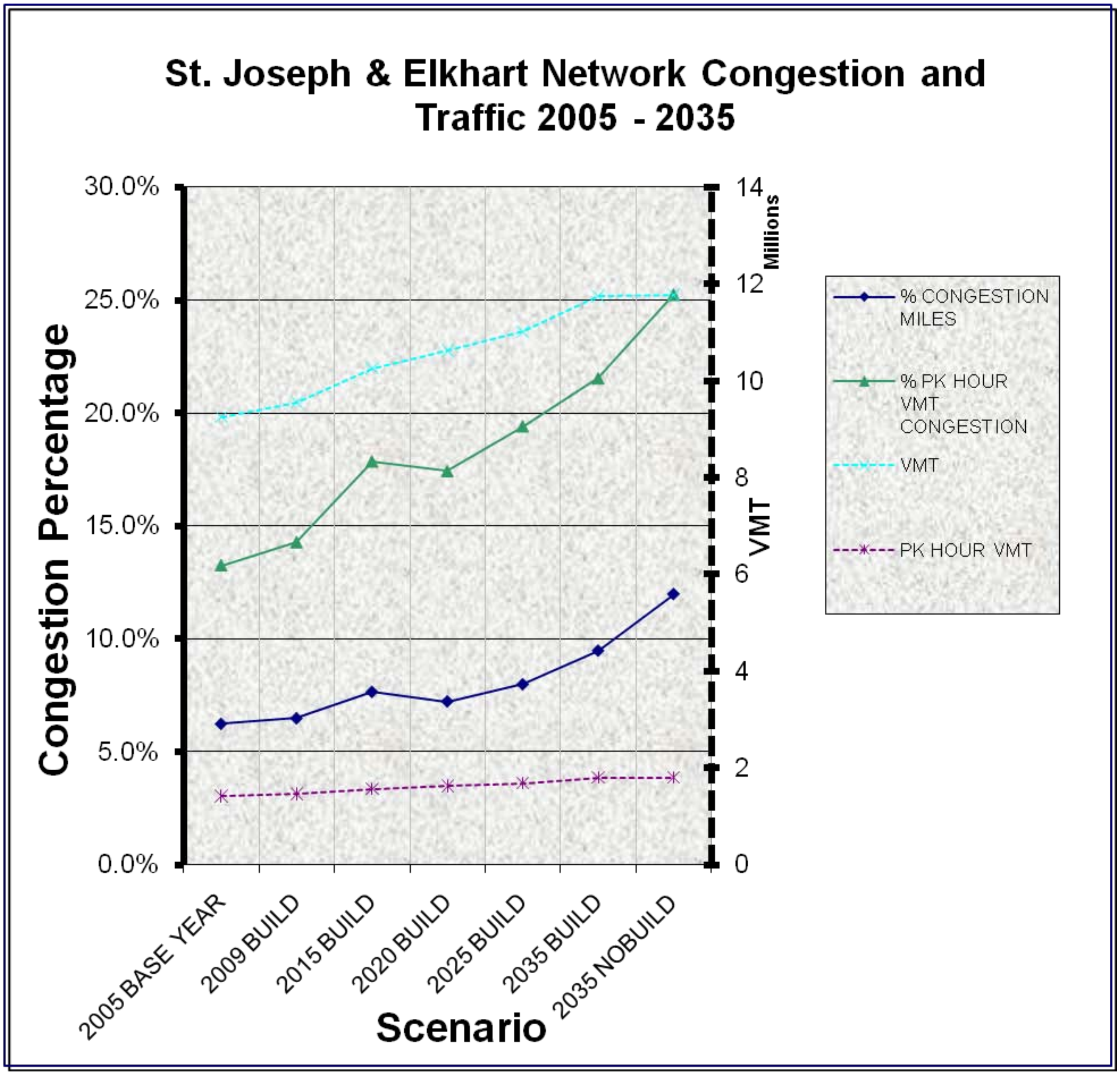
Six horizon years are included in the 2011 CMS, which are the same scenario years in the TDM. The scenario years are 2009, 2015, 2020, 2025, 2030, and 2035. These years are chosen primarily because of the air quality conformity regulations. The forecasted traffic volumes in the TDM are used for congestion calculation.

Detailed congested links can be found in the CMS_2011.xls Excel file, and thematic maps are included at the end of this document. The 2009 CMS Technical Report provides more information on this topic and is available from MACOG upon request.

VI. CONGESTION ANALYSIS AND MANAGEMENT STRATEGIES

6.1 Analysis on Congestion at a Macro Level

The analysis on current congestion at the regional level provides a general picture of the congestion in the region. Most of the traffic count data is from the 2003 to 2008 traffic count program. In the 2011 CMS, the total peak hour VMT is 1,416,054 in the region. The congested VMT during the peak hours accounts for 13.2% of the total peak hour VMT. Of the total 1,379 road miles of the network, 86 road miles experience some congestion. This is 6.2% of the network (see chart below). The total daily VMT in the region is 9,248,166.



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The build scenario, with the road improvement projects implemented, would affect the network in the following aspects: the network miles would increase by 2.3%, total VMT would increase by 27.0%, and peak hour VMT would increase by 27.1%. The build scenario would have the following improvements over the no build scenario: the congested network miles would be reduced by 2.5%, and the peak hour congested VMT would be reduced by 14.8%.

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6.2 General Evaluation on Available Strategies

In general, high cost strategies, like new construction or adding travel lanes, are more effective in reducing congestion. Low cost strategies tend to have smaller impacts on congestion. Low cost strategies are worth considering since the benefits of these strategies are usually considered large relative to the small costs. All available mitigation strategies can be defined in the categories of demand side, supply side, or both supply and demand side management and land use management. They can be ranked in terms of cost effectiveness. These strategies and associated characteristics are listed in table 7.

Given the characteristics and conditions of the MACOG TMA, all mitigation strategies with a * mark in Table 7 are considered possible and adoptable in the present and near future within the region. The strategies listed in the table without a * mark are not suitable in the area at this time. Given the configuration of the transportation network in the MACOG region, the strategies of Integrated Freeway and Arterial Lanes, HOV Lanes, and Incident Management are not adaptable at this time.

TABLE 7: AVAILABLE CONGESTION STRATEGIES

STRATEGY	MANAGEMENT TYPE	CHARACTERISTICS	B/C
Ridesharing*	Demand side	Eliminate vehicle trips	med-high
Alternative Work Arrangement	Demand side	Reduce congestion in peak hours	high
Pedestrian/Bike Improvements*	Demand /supply sides	Eliminate/shift vehicle trips	low
Transit Routing/Marketing*	Supply /Demand	Shift vehicle trips to transit	medium
Rail	Supply /Demand	Shift vehicle trips to rail	high
Congestion Pricing (Toll or Bus)	Supply /Demand	Shift vehicle trips and routes	high
Traffic Operational Improvements*	Supply/system side	Improving flows and efficiency	high
Traffic Signal Improvements*	Supply/system side	Reduce intersection congestion	high
Growth and Land Use Management*	Demand side/land use	Long term impact on traffic pattern	medium
Incident Management	System side	Reduce temporal and spot congestion	med-high
Integrated Freeway/Arterial Lanes	Supply side	Improve flows and efficiency	medium
Traffic Management*	Demand side	Shape the traffic pattern-long term	very high
HOV Lane	Supply /system side	Improve highway operation / capacity	medium
Transit/Transportation Development*	Demand/supply	New programs or activities	medium
Add Travel Lanes *	Supply / capital invest	Increase capacity and flows	high
Intelligent Transportation System*	Information/Supply side	Move the flows efficiently	medium
New Construction *	Supply/capital invest	Increase capacity and flows	high
Parking Pricing or Regulations*	Supply / system side	Encourage bike and pedestrian in CBD	high

The transportation system and operational management is an important part of the CMS. One goal of the CMS is to make the existing transportation system operate more efficiently by reducing congestion and meeting the increased demand for better movement of people and goods. Travel demand management, land use analysis, bike and pedestrian trail plans, and transit improvements along with operational traffic management are strategies that should be emphasized for both the present and future for area wide traffic reduction.

6.3 Strategies Implemented and Proposed to Reduce General Congestion

This section details the efforts being made to reduce congestion area wide. The efforts include the Clean Air Program, Transportation Enhancement Activities (TE), Congestion Mitigation Air Quality (CMAQ) projects, transit improvements, and various other strategies.

A. Multi-Modal and Transit Strategies

The South Bend Public Transportation Corporation, also known as TRANSPO, completed a Multi-Modal Terminal, named South Street Station, in downtown South Bend in 1998. This terminal includes a transfer facility for the TRANSPO fixed route bus system and connects a trolley circulator system that serves the downtown South Bend area. A proposal to dedicate space in the terminal for AMTRAK passenger train service was withdrawn in 2005 because the rail owners did not support this plan. South Street Station is designed to accommodate inter-city bus service as well as local taxi services. The terminal includes commercial space, rest rooms and waiting areas for all of the offered services.

During 1997 to 2004, TRANSPO supplied free rides on Ozone Action Days to reduce SOV (single occupant vehicle) use. The Interurban Trolley, a fixed route transit system that operates in Elkhart and Goshen, also offers free rides on Ozone Action Days. Ozone Action Days are declared when ozone is at its highest levels during the ozone season (April – October). The free ride program was designed to encourage people to use public transit as a way to decrease vehicle emissions, reduce congestion, and encourage increased bus ridership. The free-ride program was funded with CMAQ funds, managed by MACOG, although the program could only be funded for up to three years with those funds. Afterwards, the transit system MACOG manages in Elkhart County chose to continue offering free rides on Ozone Action Days.

The City of Elkhart is served by the Heart City Rider (HCR) service, while the Goshen Transit Service (GTS) serves the City of Goshen. Both services are subsidized, demand response transit programs provided under contract with local taxicab companies.

TABLE 8: ELKHART / GOSHEN TRANSIT RIDERSHIP

TRANSIT SYSTEM	2007	2008	2009
Elkhart / Goshen Route	100,491	117,256	106,354
Concord Township Route	42,841	45,371	38,198
North Pointe Route	26,373	27,848	27,194
Heart City Rider	111,255	118,617	103,711
Goshen Transit Service	24,794	32,337	20,486

In 2008 the fixed route system totaled 1,305,912 annual passenger miles, an average of 8.0 miles per passenger trip. The demand response service garnered 389,540 annual passenger miles, an average of 2.58 miles per passenger trip. Combined, the fixed route and demand response systems saved 1.7 million potential vehicle miles traveled by single occupant vehicles.

The Federal Transit Authority (FTA) requires all transit systems complete a National Transit Data (NTD) report each year to measure the effectiveness of the transit services. Additionally, MACOG administers an annual rider survey for both HCR and GTS.

B. Transit Routing Strategy

The Elkhart / Goshen fixed route system was renamed from *The Bus* to the *Interurban Trolley* in December 2005 with the introduction of trolley buses to the transit system. The fixed routes include a main Elkhart / Goshen route operating along US 33 from the City of Elkhart to the City of Goshen, including the Goshen CBD and the industrial area southeast of the CBD. This route was introduced in 1999. A second route serving the North Pointe area of Elkhart via SR 19 was added in 2004. In the fall of 2009, MACOG created a new route in the City of Elkhart that will connect with TRANSPO in Mishawaka, to provide service to both a developing commercial area in Elkhart County as well as providing an inter-county route to connect the South Bend / Mishawaka urbanized area with the Elkhart / Goshen urbanized area.

US 33 from Elkhart to Goshen and in the Goshen CBD is congested as well as SR 15 in the Goshen CBD. A fixed bus route operating along the corridor helps to reduce the congestion. A study carried out previously by the MACOG in 1998 showed that there is a need for the fixed bus route service.

The Interurban Trolley routes operate from 5:00 am to 7:55 pm on weekdays and from 5:40 am to 6:50 pm Saturdays. Four trolley buses operate the main Elkhart/Goshen route on the US 33 corridor to maintain 30-minute headways throughout the day. The North Pointe route is operated with one trolley bus and maintains 1-hour headways. It operates from 5:00 am to 6:50 pm on weekdays and from 6:00 am to 6:50 pm on Saturdays.

The Interurban Trolley system supplements the current Concord Township Bus route, as well as the demand-responsive Heart City Rider and Goshen Transit Service programs. The Interurban Trolley system also coordinates with the Concord Township bus service for setting up the transfer points between the transit routes. Transfers between the routes are available by request for no additional cost.

The major goals of The Interurban Trolley system are three-fold. First, the system should help to reduce congestion along US 33 from Elkhart to Goshen; it should help to reduce the single occupancy vehicle traffic between Elkhart and Goshen. Second, it provides access to transportation for people on welfare to help them get to work. Finally, it makes service agencies such as the Social Security Office, hospitals, and various shopping centers more accessible for the elderly and physically-challenged residents of Elkhart County. MACOG is constantly pursuing service expansions as additional funding sources become available as well as adjusting existing routes to better serve its ridership.

TRANSPO provides 16 fixed bus routes in South Bend and Mishawaka, between the hours of 5:00 am to 9:55 pm on weekdays and between 7:00 am to 6:00 pm on Saturdays. The service covers the urbanized areas within the artificial boundary created by the US 20 Bypass. A fixed shuttle route service is also operated in downtown South Bend during peak hours on weekdays. In 2008, TRANSPO routes generated 1,715,035 vehicle revenue miles using 57 buses during peak hours. Ridership amassed 12,622,687 annual passenger miles, an average of 3.2 miles per passenger trip. Thus, over 12 million potential vehicle miles traveled were saved by the ridership of TRANSPO in 2008.

TABLE 9: TRANSPO RIDERSHIP (South Bend/Mishawaka)

Transit System	2005	2006	2007
TRANSPO	3,106,808	3,428,736	3,515,050

C. Ride Share Program

The MACOG has operated a ride-sharing program since 1994, designed to reduce overall congestion in the region. The program is a computerized program that matches potential riders considering car-pooling to work.

D. Bike/Pedestrian Plan

The Bike and Pedestrian work element is based on the bike and pedestrian element of the 2035 Transportation Plan. This plan has specific recommendations for bike and pedestrian facilities along many of the existing roads in the region. For the details of this plan, refer to the document titled The Bicycle/Pedestrian Element of the MACOG 2035 Transportation Plan. The existing and programmed bike routes and pedestrian facilities will have mild but direct impacts of shifting the vehicle trips to other modes of travel.

In conjunction with the bike and pedestrian element of the TP, MACOG and the local engineers and park departments have aggressively pursued TE projects and CMAQ projects. As more CMAQ and TE projects are completed, the impact on congestion can be further analyzed in corridors throughout the entire region. A complete list of Transportation Enhancement Activities (TE) and CMAQ projects can be found in the Transportation Improvement Program (TIP).

E. Public Participation

Public participation and involvement transportation planning is also an important strategy. MACOG publishes a quarterly newsletter called the MACOGazette to inform the Transportation Policy Board, Transportation Technical Advisory Committee (TTAC) and the general public about the efforts to reduce congestion, to improve air quality, and about the strategies to be used in the TP and CMS activities. In addition, the MACOG website (www.macog.com) and e-mail address (macogdir@macog.com) are available to the public.

F. Clean Air Program

One of the primary components of the Clean Air Program is to reduce the number of single occupancy vehicles on ozone action days. MACOG has had an active public education and awareness program in place since 1994. This program includes a complete advertising campaign that includes radio and television commercials, outdoor advertising, video presentations, posters, and consumer brochures. These efforts have all been effective in educating local citizens about air quality problems, as well as advising them of what they can do to make the air cleaner.

In addition to the programs listed above, the Partners for Clean Air program was started in 1996. This program targets the business community in conjunction with local chambers of commerce. This program helps employers to encourage employees to participate in clean air activities, like ride sharing, and informs the employers and employees about levels of polluting emissions and what they can do to help reduce air pollution.

G. Smart Growth and Land Use Programs

Trip making patterns, volumes, and modal distributions are largely a function of land-use development patterns. It is important to implement land-use and growth management policies that tie land-use densities and designs to transportation system demand capability.

Through the Livable Communities Initiative, MACOG is promoting Smart Growth ideas in the counties of St. Joseph, Elkhart, Marshall, and Kosciusko. The annual Livable Communities Workshop, along with a Smart Growth Initiatives Handbook produced by MACOG, encourages local jurisdictions to plan for land-use development while also considering the increased demand placed on the transportation system by new development. Through these programs, MACOG is identifying ways in which the links between transit, land-use and urban design can be enhanced to provide better solutions and strategies for land-use development and transportation planning problems.

H. Signal Timing

Congestion on certain roadways may be reduced by improving traffic flows without an expensive investment. One way of improving traffic flows is to monitor and change traffic signal timing so that the signals in a particular corridor will function properly to allow for smoother traffic flows.

I. Parking Studies

No work in this field has been done in the recent past. Several parking studies have been done in the South Bend CBD, including one completed by MACOG several years ago. The City of Elkhart completed a Comprehensive Plan that includes parking studies for the downtown area in 1998. Before any conclusion or recommendation to new parking spaces can be made, more data is needed to identify existing parking locations, spaces, and pricing as well as traffic volumes in downtown areas.

J. Traffic Operation Management, Intelligent Transportation Systems and Other Activities

Traffic operational management and Intelligent Transportation Systems (ITS) play very important roles in the planning process. The surveillance, monitoring, and feedback on the mobility of persons and goods, including traveler information systems across modes, will make the existing transportation system work more efficiently. In the MACOG region, some work has been done on transit management, highway / railway crossing safety studies, and traffic signal control and traveler information, including transit-based and highway-based systems. MACOG conducted a regional survey of fiber, long-haul, and wireless networking and developed a comprehensive ITS plan based on the results.

Programs like alternative work schedules such as staggered work and end times are most cost effective to reduce local and peak hour congestion. MACOG has already had the Partners for Clean Air Program in place for a few years to educate and promote transportation alternatives to the public and business communities. It would be feasible to promote an Alternative Work Schedule program along with the Clean Air Program and other public participation programs.

To implement an effective Travel Demand Management Measure is important in transportation planning. Trip making patterns, volumes, and modal distributions are largely a function of development patterns. An important consideration for the development of a Travel Demand Management Measure (TDMM) program is the relationship between the TDMM alternatives under consideration and the proposed transportation improvements and land use plans for the area. It is essential to develop long-term strategies as well as short-term strategies. The short-term strategies are aimed at the more immediate issue of too many cars in one place at one time. Long-term congestion avoidance strategies focus on the root of the congestion problem. These strategies try to preserve the capability of the transportation system to handle future travel demand.

Finally, with the fluctuations in gas a price over the past several years, the public has begun using and requesting more alternative forms of transportation. This has resulted in an increase in transit ridership, more individuals riding bicycles to work, and the local jurisdictions receiving more requests for bike and pedestrian friendly routes along existing transportation corridors.

6.4 Analysis on Congestion at a Micro Level

A. Level of Service

The concept of the level of service (LOS) along a corridor uses qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers. The descriptions of individual levels of service characterize these conditions in terms of such factors as speed, travel time, density, traffic interruptions, comfort, convenience, and the freedom to maneuver. Six levels of service are defined for each type of facility for which analysis procedures are available. General descriptions of operating conditions for each of the levels of service are as follows:

- LOS A describes completely free-flow operations. The operation of vehicles is virtually unaffected by the presence of other vehicles.

- LOS B also represents reasonably free-flowing operations, although the presence of other vehicles begins to be noticeable. The speeds at the free-flow speed are generally maintained.
- LOS C represents a range in which the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is now clearly affected by the presence of other vehicles.
- LOS D represents a range in which the ability to maneuver is severely restricted because of traffic congestion. Travel speed begins to be reduced by increasing traffic volumes.
- LOS E represents operations at or near capacity and is quite unstable. The densities at this level vary depending upon the free-flow speed and vehicles are operating with the minimum spacing at which uniform flow can be maintained.
- LOS F represents forced or breakdown flow. Operations are at the stop-go condition.

The LOS is another important performance measure for congestion. The LOS measures the degree of congestion and is equivalent to the volume and capacity ratio (V/C). In this document, a V/C ratio greater than 0.6 and less than 0.8 is equivalent to LOS D, a V/C ratio greater than 0.8 and less than 1.0 is equivalent to LOS E, and a V/C ratio greater than 1.0 is equivalent to LOS F and represents traffic at a stand-still.

B. Duration of Congestion

The duration of congestion beyond the peak hours is an important index to the degree of the severity of the congestion. The 2011 CMS has not updated the study on this subject. In 1998, congested links with a V/C ratio greater than 1.0, which were not listed in the TIP or the 2015 TP, were selected for further study to look for a congestion spread effect over time. Using these criteria, 27 segments in the 1998 CMS were selected for spread effect study, of which, 11 segments were from St. Joseph County and 16 were from Elkhart County. Hourly traffic counts on these segments, from 7:00am to 9:00am and from 3:00pm to 6:00pm were examined.

The results of the study show that the following segments experience severe congestion that can last for more than an hour beyond peak time: In St. Joseph County, Bremen Highway (SR331) from Jackson Road to Ireland Road experiences congestion from 3:30pm to 6:00pm, LaSalle Street from west of Michigan to St. Louis Blvd. experiences congestion from 2:30pm to 5:00pm, and Lincolnway from Capital Avenue to Power Drive are congested from 3:00pm to 6:00pm.

In Elkhart County, Main Street (SR 15) from Plymouth Street to Madison Street, SR 120 at SR 15 and SR 15 from Prospect Avenue to Hackett Drive experience congestion for more than one hour in the afternoon. The congestion on the remaining segments of the 27 selected segments do not extend more than one hour during the peak times.

C. Delay of the Travel Speed

The 2011 CMS has not updated the study on this subject either. The 2011 CMS simply includes the 1998 work in this document. During 1997, MACOG completed a travel time study that included driving selected corridors during the morning peak, afternoon peak, and off peak hours in both directions of travel. The Travel Time Study has been completed on a three year rotating cycle based on selected corridors of each functional class. Data collected three times a day will allow for comparisons of temporal variation in travel speed and will also provide information for selecting mitigation projects to improve congestion at peak times.

The time study results compiled by MACOG in 1998 are in Table 10. They show the off peak average travel speed for the roads of different facility types in Elkhart and St. Joseph County. The information from the time study conducted by MACOG will also be used to help to monitor changes in the flow of traffic along certain corridors of the network.

TABLE 10: TIME STUDY RESULTS IN 1998

Functional Class	Elkhart County Average MPH	St. Joseph County Average MPH
6 Rural Minor Arterial	45.368	51.914
7 Rural Major Collector	47.317	53.026
8 Rural Minor Collector	42.584	41.137
2 Rural Principal Arterial	48.485	48.485
1 Rural Interstate	70.0	70.0
11 Urban Interstate	62.4	62.4
12 Urban Freeway	63.7	63.7
14 Urban Principal Arterial	36.192	37.087
16 Urban Minor Arterial	35.545	33.387
17 Urban collector	30.37	35.99

The travel speeds for the identified congested segments were calculated using the available time study results. The time delays on these congested segments were examined. Note that not all congested segments nor all the corridors in the time study were examined, but only those identified congested segments that were also in time studies.

6.5 Specific Strategies Planned and Recommended for the Congested Segments

A strategy with a specific priority year for most congested segments (current and future) has been programmed either in the TIP or the 2035 TP. A closer evaluation was made of the congested segments that were not in the TIP or the 2035 TP, and strategies were recommended for the 2035 TP. As a result, some of these recommendations have been included in the 2035 TP. It is well recognized that light congestion is necessary for an urbanized area as well as for other transportation modes to be competitive. Therefore the no-build strategy is also an option to leave some congestion under certain levels.

6.6 Intersection Studies

Intersection operations and designs are a common cause for congestion in a corridor. *The Development of Prototype Congestion Management System for the State of Indiana* also suggested that major intersections in the network be included in the CMS report. This section summarizes the studies and improvements that were completed, the improvements on intersections that have been programmed and planned, and the intersections selected for further study as of the 2006 CMS.

A. Intersection Studies

A database for major intersections in the TMA and the selected intersection studies are important elements of the CMS because they are essential for study and selection of congestion reduction strategies other than road capacity expansion. So intersection studies should start with building a database of major intersections in the region. The data was composed from the accident inventory database based on the criteria of number of accidents, the total traffic volumes at the intersection, and the total number of deaths and injuries at the intersection. The data was then expanded by including the information about intersection geometry and signals that was obtained with great help from county and city engineering departments.

Several intersection studies have been done in the MACOG region and are summarized in the following. INDOT's Engineer's Report on U.S. 33 Added Travel Lanes includes several intersection studies long US 33 from south of CR 40 to north of Monroe Street (G400) and from Monroe Street to the south junction of SR 15 (G300) in Goshen. The results are shown in Table 11**.**

TABLE 11: US 33 INTERSECTION CAPACITY ANALYSES

US 33	**2001**	**pm peak**	**2021**	**pm peak**
CR 38 Intersection	LOS B	delay 6.5	LOS D	delay 29.0
Wal-Mart Supercenter Intersection	LOS B	delay 7.0	LOS F	delay *

B. Intersection Improvements Programmed, Planned, and Further Studies

In addition to the above studies and the planned improvements by INDOT, a few intersections were selected for analysis based on the information of the total volume and the frequency of accidents. These intersections were included in the 2006 CMS for further study. The intersections below were also recommended for analysis using Highway Capacity Software (HCS) by the McTrans Transportation Research Center at the University of Florida.

In St. Joseph County

1. Western @ Olive
2. Western @ Lombard
3. Grape @ Edison
4. Grape @ Mckinley
5. Miami @ Ewing
6. LaSalle @ Hill

In Elkhart County

1. Hively @ Benham
2. CR 9 @ CR 26
3. CR 13 @ CR 26
4. Chicago Tr. @ Lincoln

VII. INTEGRATION WITH TIP, TP, AND UPDATE OF CMS PROCEDURES AND MONITORING SYSTEM

8.1 Integration with TIP and TP

The CMS is a major consideration for the TIP and TP. As required by FHWA and the EPA, any street or road that is programmed for added travel lanes in the TP must be a part of the CMS. This must be made a part of the TP and must be discussed during the public participation portion of the update.

The 2006 CMS was used as a useful tool in the process of project evaluation and selection for the 2035 Plan. The recommended strategies for the congested links were considered by the 2035 plan and some of the strategies have been included in the 2035 TP. The CMS continues to be a part of TIP process. The CMS build scenarios also provide useful information on the transportation system and its performance. A CMS build scenario simulates the programmed implementations and tells the would-be impacts of the programmed implementations; it identifies future congestion and deficiency of the network assuming the implementations are completed. This would help to evaluate the project selection process for the TIP in a timely manner.

8.2 Update of CMS Procedures and Monitoring System

A complete and accurate database for the transportation system and a good monitoring system are important for the CMS, especially important for strategy selection as well as for the identification of the deficiencies of the transportation system. The CMS is an ongoing process and so is the data collection for the CMS.

The monitoring system is a very important aspect of the CMS. It is essential to update the information to include not only the new counts but also any significant road projects into the CMS in a timely manner. This would trace any changes in the system as well as in traffic demand, so that the identification of road congestion would be more reliable. The last part of the 2011 CMS addresses issues such as the update of the CMS procedures and the monitoring systems.

MACOG is continuing to update and improve the data collection procedures and monitoring systems. MACOG has made the travel time study a part of the UPWP and the time studies will be done on a three-year cycle to track changes for both the CMS and the TP updates. The results of this study will also provide information that will help local engineers to improve traffic signal timing for the closed loop and interconnect systems. All time study results should be utilized for study on the delay of speed. The V/C ratio method detects congestion that is caused by low capacity, but there are also other causes such as pavement conditions, incidents, and bad weather impacts. Using more time study data will help to identify the delays caused other than by low capacities.

A database for major intersections is important for the CMS and needs to be developed and expanded. Since traffic information at the intersection is the most complicated, dynamic, and useful for strategies that are relatively inexpensive and quick for reducing congestion, monitoring and updating intersection data is essential for a comprehensive CMS.

A land use database is important in identifying traffic generators and controlling these traffic generators and access. MACOG has developed land use and zoning map in a digital format for St. Joseph and Elkhart County. A study on freight generators, freight movement routes, as well as regional economic patterns and development has already been completed. These will help to identify the areas with heavy traffic and to further control these traffic generators. One way to control traffic generators is to provide local entities with the most recent access management techniques that affect the capacity of that road. Controlling the number of driveways (access) can greatly improve traffic flow and therefore mitigate the need for more lanes.

As in the past, MACOG will continue to work with TRANSPO to make the transit system as efficient and attractive as possible. MACOG will also continue to work to develop transit monitoring systems and activities that will show the impact of transit on congestion mitigation.

8.3 Non-SOV Analysis Methodology

Given that there is no local survey data available for bicyclist, pedestrian, and bus rider behavior, national survey results are used for determining an individual's choice on modes of transportation. Bicycle and pedestrian usage is calculated using the same methodology.

The methodology is documented in the *Guidebook on Methods to Estimate Non-Motorized Travel: Supporting Documentation* as a sketch plan method (1999). The method is simplified to fit into the transportation planning analysis needs of MACOG. According to a 1991 Harris Poll cited in an article of Public Roads Online, 2.5 times the number of people that currently walk or bike would do so if there were better facilities available. The Census breaks down the number of people that use different modes of transportation to get to work by mode. The number of people who biked or walked to work was multiplied by 2.5 to get the number who would use each mode if facilities improved. Since it is only the increase in walkers and bikers that would draw cars off the road, the actual number was subtracted from the predicted number to get a difference. This difference was divided by the total number of people to get a percentage. This is the percentage used in the formula to calculate the possible decrease in traffic volume on a segment. Elkhart and St. Joseph County have different rates of usage for both biking and walking so they were calculated separately.

For project analysis, the improved bike and pedestrian facilities are assumed to serve people living within a certain distance of the facility. As in the guidebook, the common practice is 0.5 miles. Therefore, the service area (travel shed) is the buffer of 0.5 miles along each side of the improved facilities.

TABLE 12: CALCULATION OF THE PERCENTAGE OF NEW BIKE/PED USERS

	Elkhart	St. Joseph
Number of people who bike or walk to work	2,496	5,252
Estimated number if facilities improved (x2.5)	6,240	13,130
Difference (improved – current)	3,744	7,878
Population	182,791	265,559
Percentage that would bike or walk but don't already	2.046%	2.967%

In addition to improved bike and pedestrian facilities, the effect of adding a transit route through a corridor is estimated. This was done using a different method from the previous two, and although the same methodology was used for the two counties, they were calculated separately. In St. Joseph County, the numbers are from Transpo. In Elkhart County, calculations were done based on numbers for the Bus and the Concord Bus, which were operated in 2000.

In both cases the number of people who use transit for transportation was estimated by taking the annual ridership numbers and dividing them by the number of operating days for the transit provider divided by two trips per day (coming and going). This number was then divided by the population of bus routes' typical service area to produce a percentage. This percentage was then applied to the traffic volumes to get the traffic volume decrease due to transit. This method assumes that those people in the surrounding census tracts are statistically normal and that people along new transit routes would use the system at a similar rate as those that currently have access. The typical service area of a transit route is 0.25 miles on each side of the route according to the Highway Capacity Manual 2000. Population is calculated by adding up the intercepted blocks with the buffer using 2000 Census data.

TABLE 13: CALCULATION OF PERCENTAGE OF NEW TRANSIT RIDERS

	Elkhart	St. Joseph
Population of bus routes' typical service area	50,098	180,875
Ridership	80,457	2,505,989
Number of service days per year	307	307
Trips per day	2	2
Bus route passengers	131	4,081
Percent of bus service area population that are bus riders	0.262%	2.256%

To calculate the traffic reduction due to the improvement of bike and pedestrian facilities or transit routes, the population living in the service area should be determined using GIS analysis. This number is then multiplied by the rate above to provide the number of people diverted from using single occupant vehicles.

According to a 2002 National Household Travel Survey, Americans take four trips a day on average. Therefore, the trips diverted from SOV should equal the number of people times four. To convert this to vehicle trips, the number is divided by 1.51, which is the average daily auto-occupancy rate.

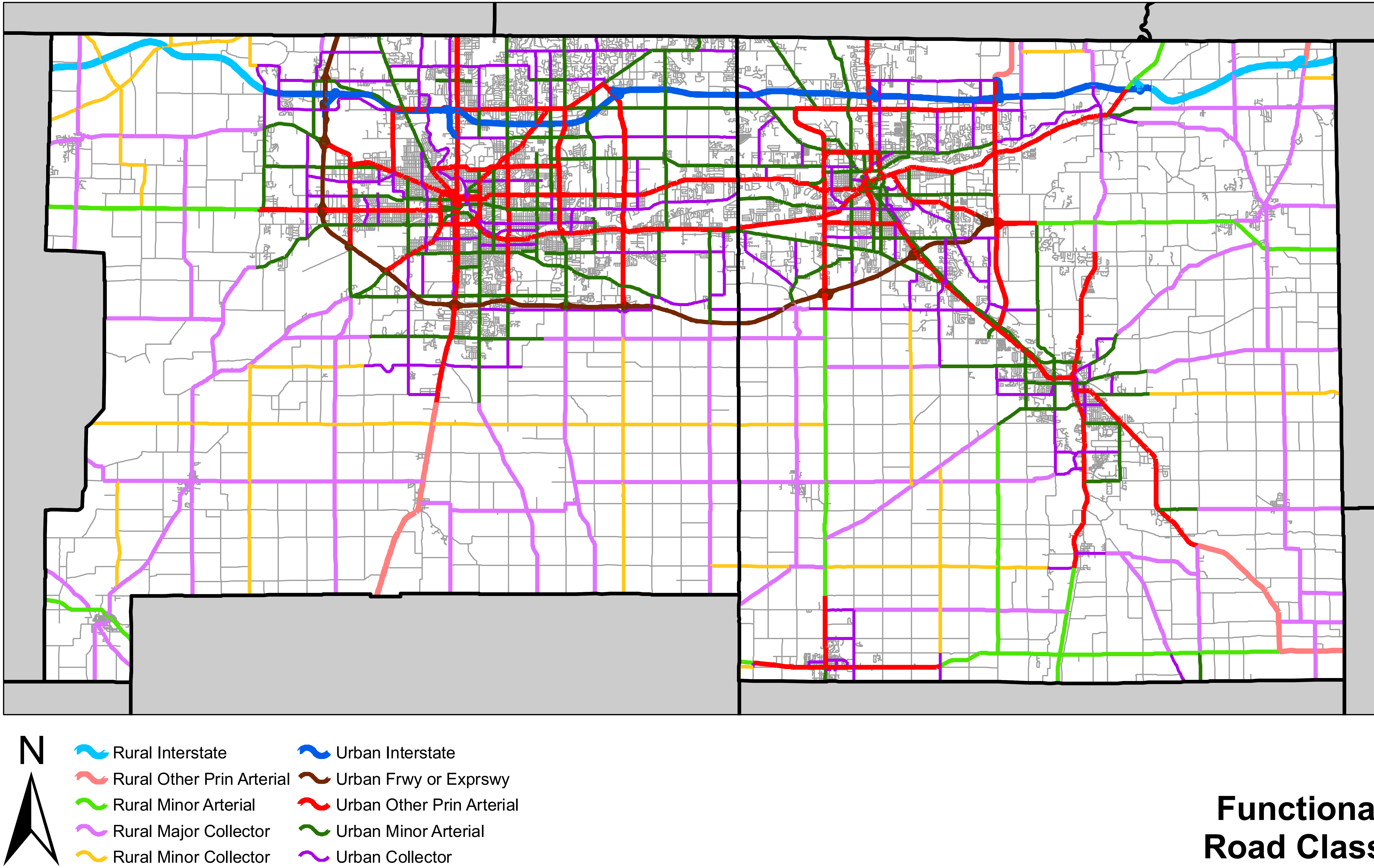
8.4 Process of Non-SOV Analysis for LRP Projects

The non-SOV analysis is established to identify all traffic congestion mitigation methods other than adding travel lanes to release the congestion, as stated in Federal Regulations 23 CFR 500.109c. First, if a project is already in the current TIP, has been through an environmental assessment process, is not regionally significant (not adding travel lanes), or is not using federal funds, that project will pass the CMS analysis. Projects that are listed in the illustrative section are not analyzed.

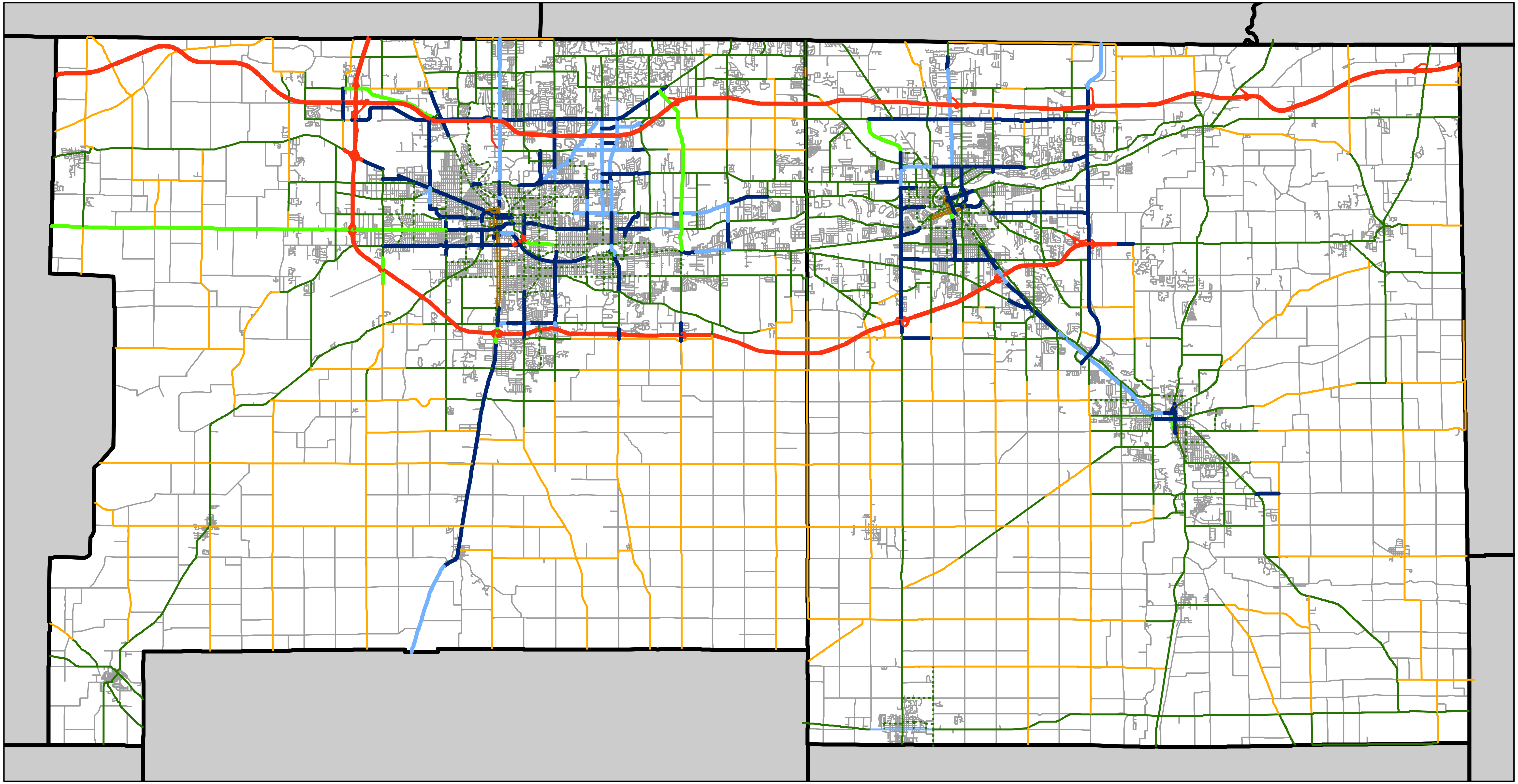
Then, projects that need further CMS analysis are checked with their congestion status in the no-build 2035 scenario in the TDM. If the road segments of the projects are not congested, they are subject to further analysis. Otherwise, transit, bike, and pedestrian analysis needs to be completed for the projects. The analysis assumes a certain percentage of the population within the service buffer will switch to using transit, biking, or walking instead of driving cars if a transit route, bike, or pedestrian facility is implemented. If the congestion is released, then detailed analysis of non-SOV mitigation is needed. New roads are subject to further analysis. If the road segments of the projects were still found to be congested, then the projects pass the CMS analysis by finding that the non-SOV mitigation will not release the congestion.

If the projects are no longer congested after applying non-SOV mitigation, they are then checked for existing transit services and bike / pedestrian routes. If any of them is already available, that mitigation method is taken out of the non-SOV analysis and the analysis is repeated. The availability of a route is defined as being within the buffer area as stated in the previous section.

Also, a project might not show any congestion, but has a significantly high accident rate. Therefore, a center left-turn lane is need for safety purposes. Some roads are built as connectors to major developments or are part of a major traffic-moving corridor. All these reasons might lead to the conclusion that adding travel lane is necessary, even though the road is not congested.

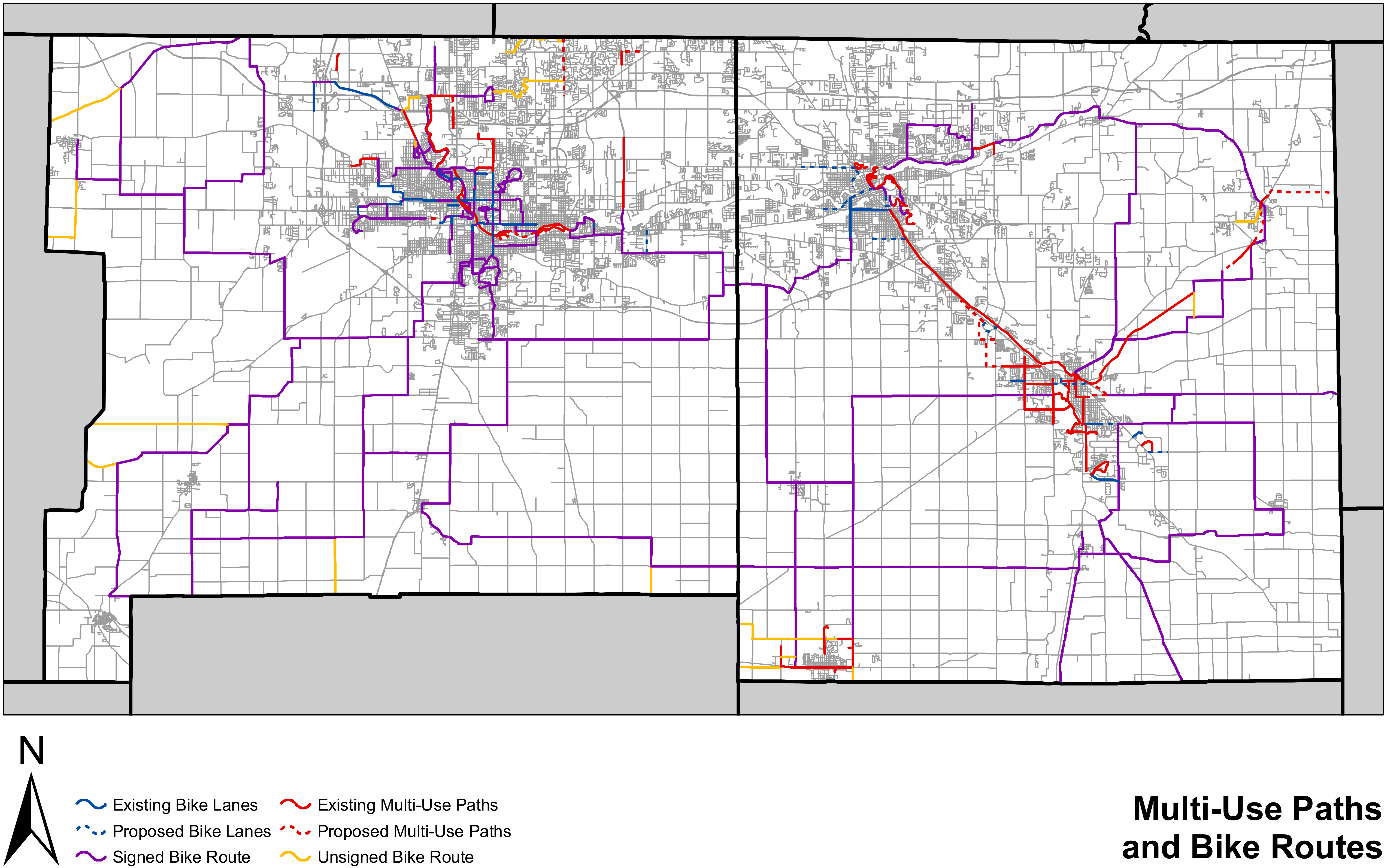


Functional Road Class

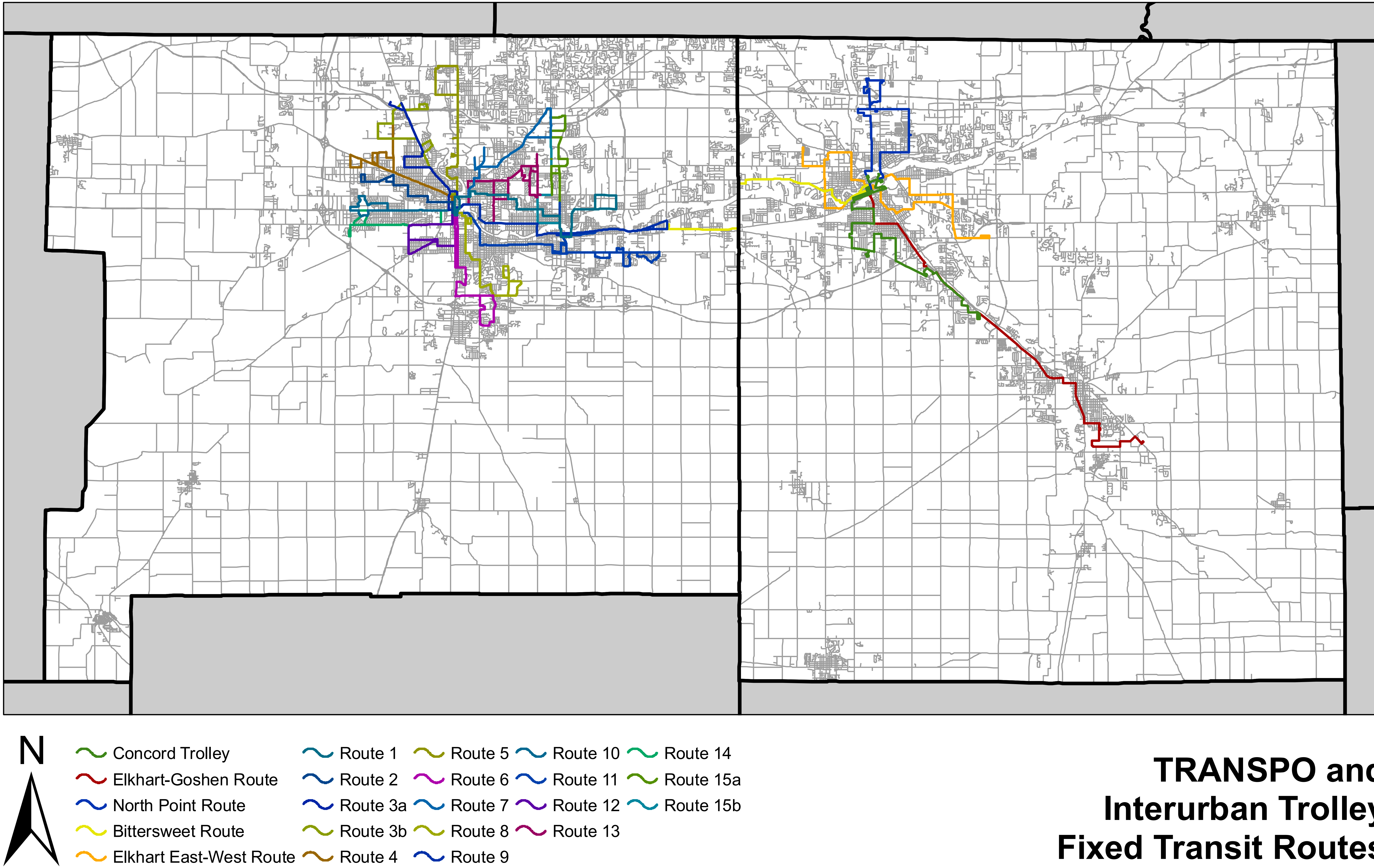


- Full Access Control, Divided with Four or more Lanes
- Four or more Lanes with Center Turn Lane
- No Access Control but Divided with Four or more Lanes
- No Access Control, non-Divided with Four or more Lanes
- Two Lanes with Center Turn Lane
- One-way Arterial
- Two Lanes with Parking
- Two Lanes without Parking
- Rural County Road
- Ramp

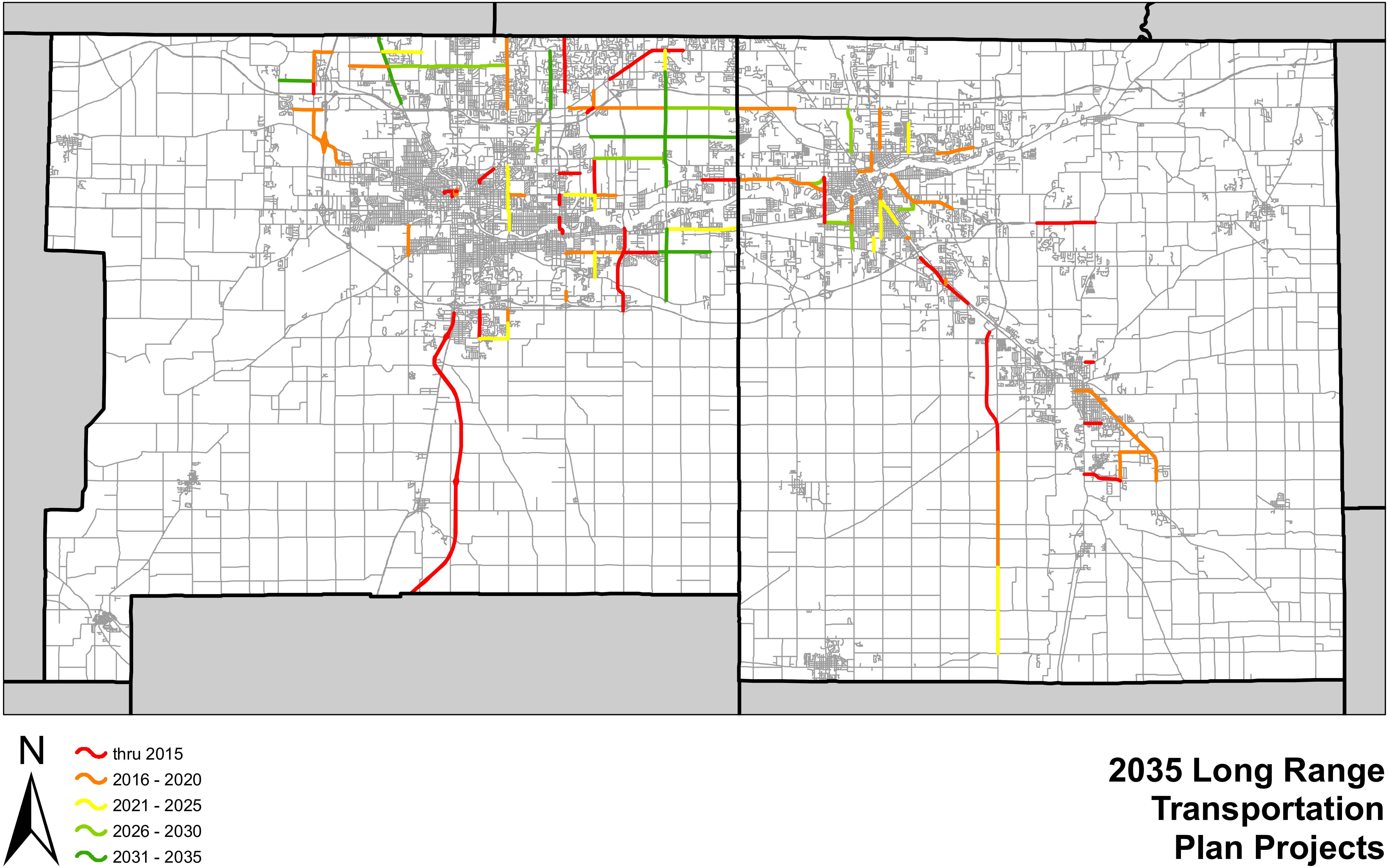
Existing Facility Types



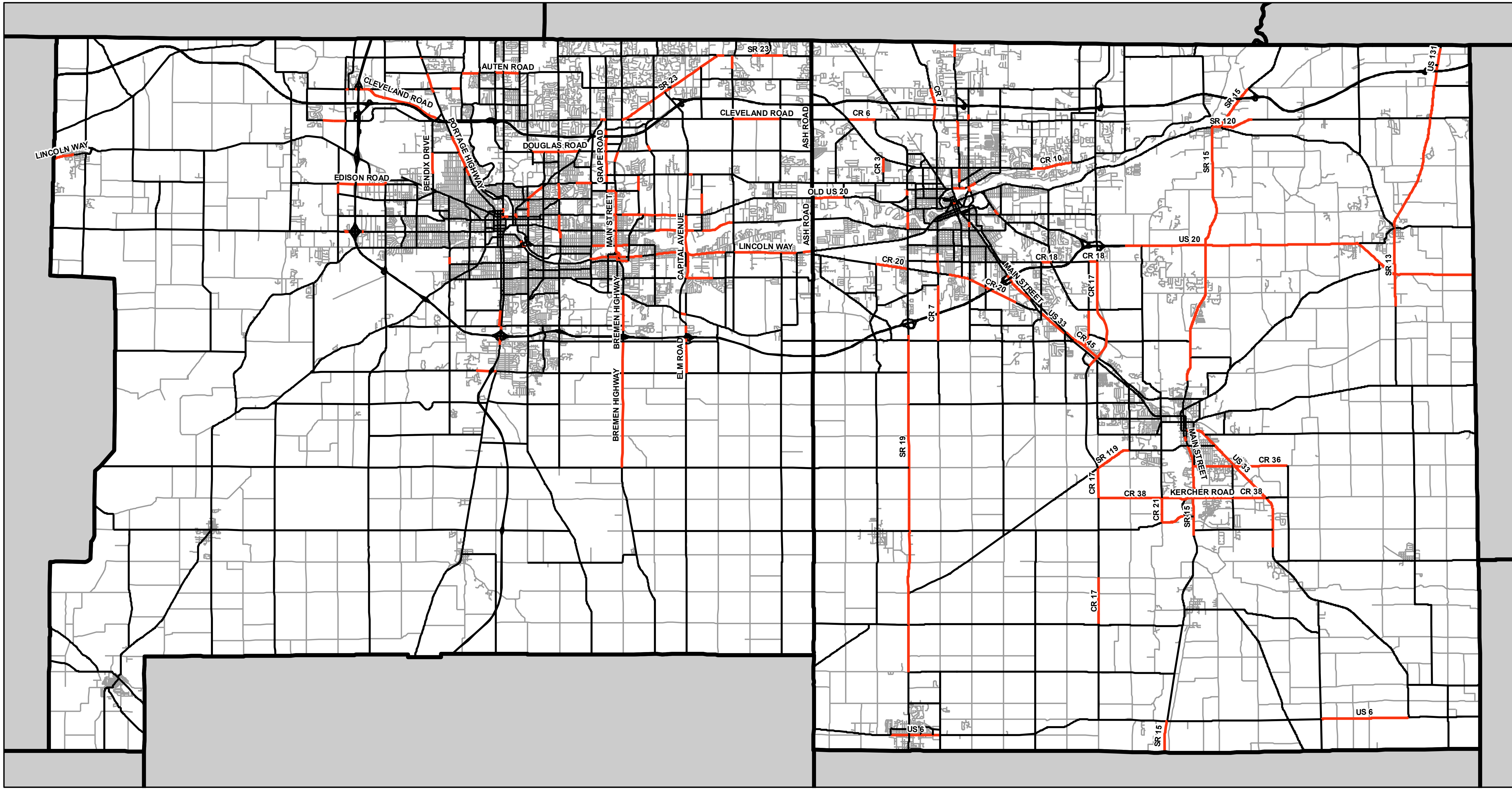
Multi-Use Paths and Bike Routes



TRANSPO and Interurban Trolley Fixed Transit Routes

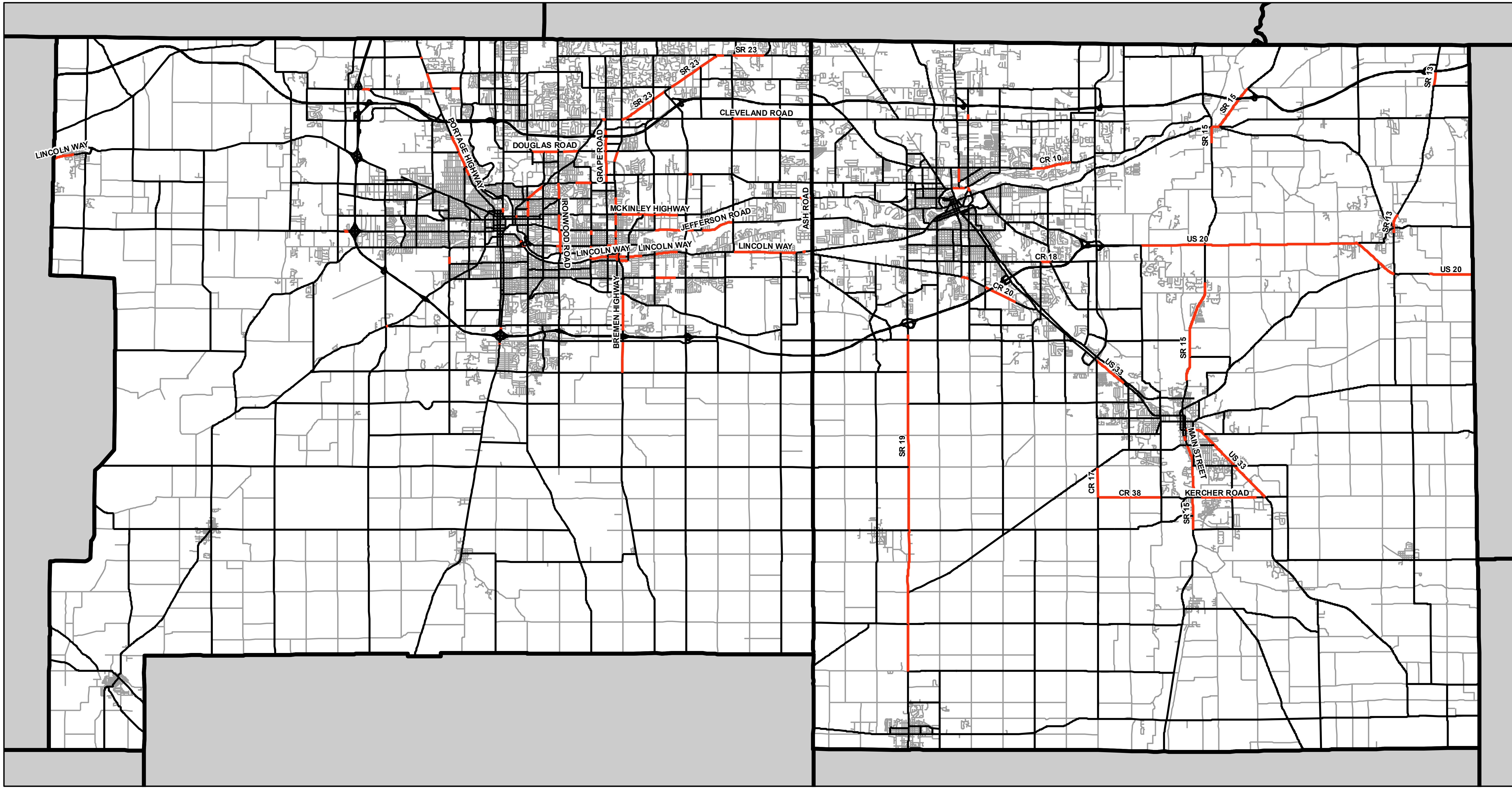


2035 Long Range Transportation Plan Projects



No Build Congested Segments

2005 Congested Segments



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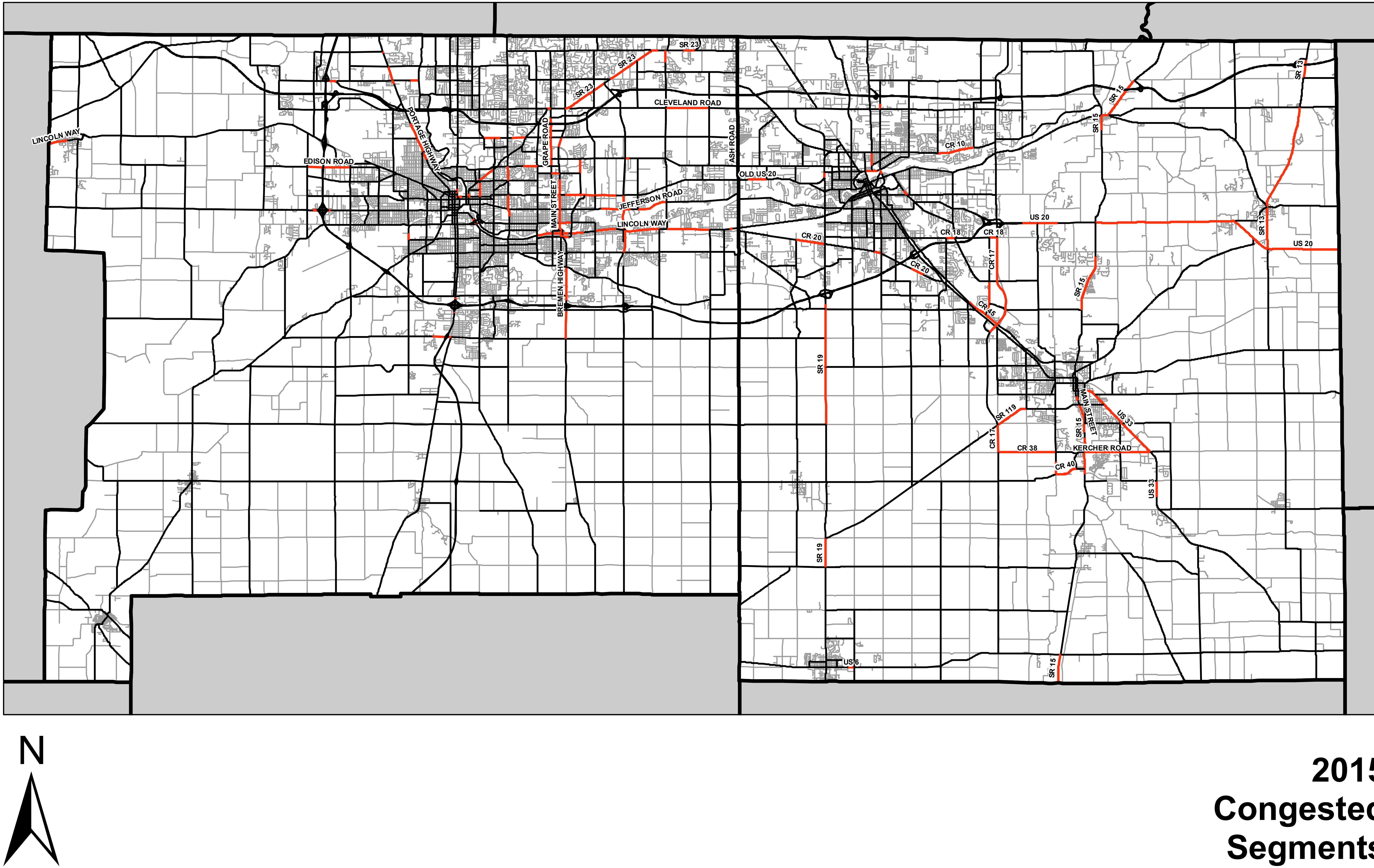
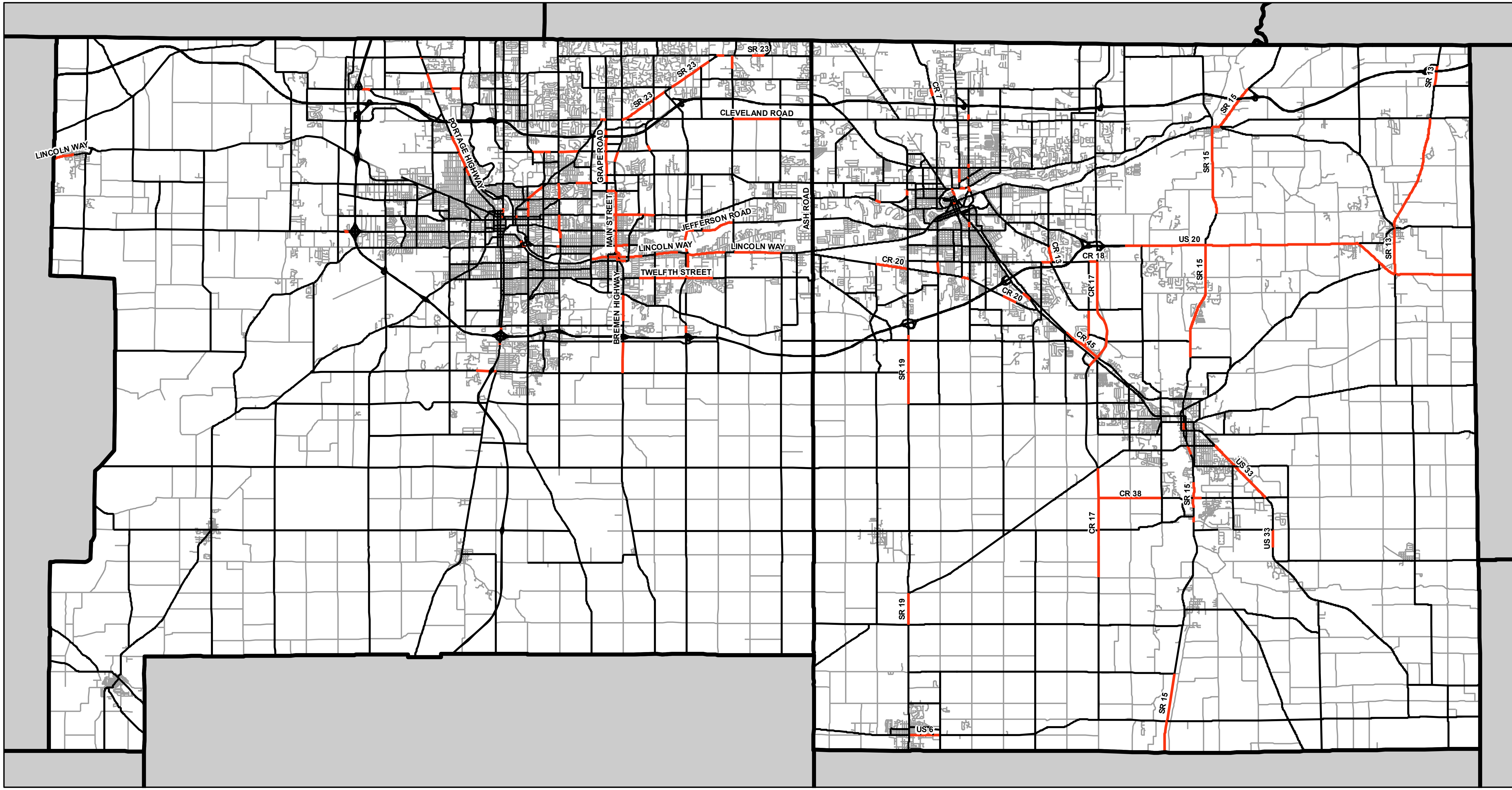
2009 Congested Segments



2015 Congested Segments



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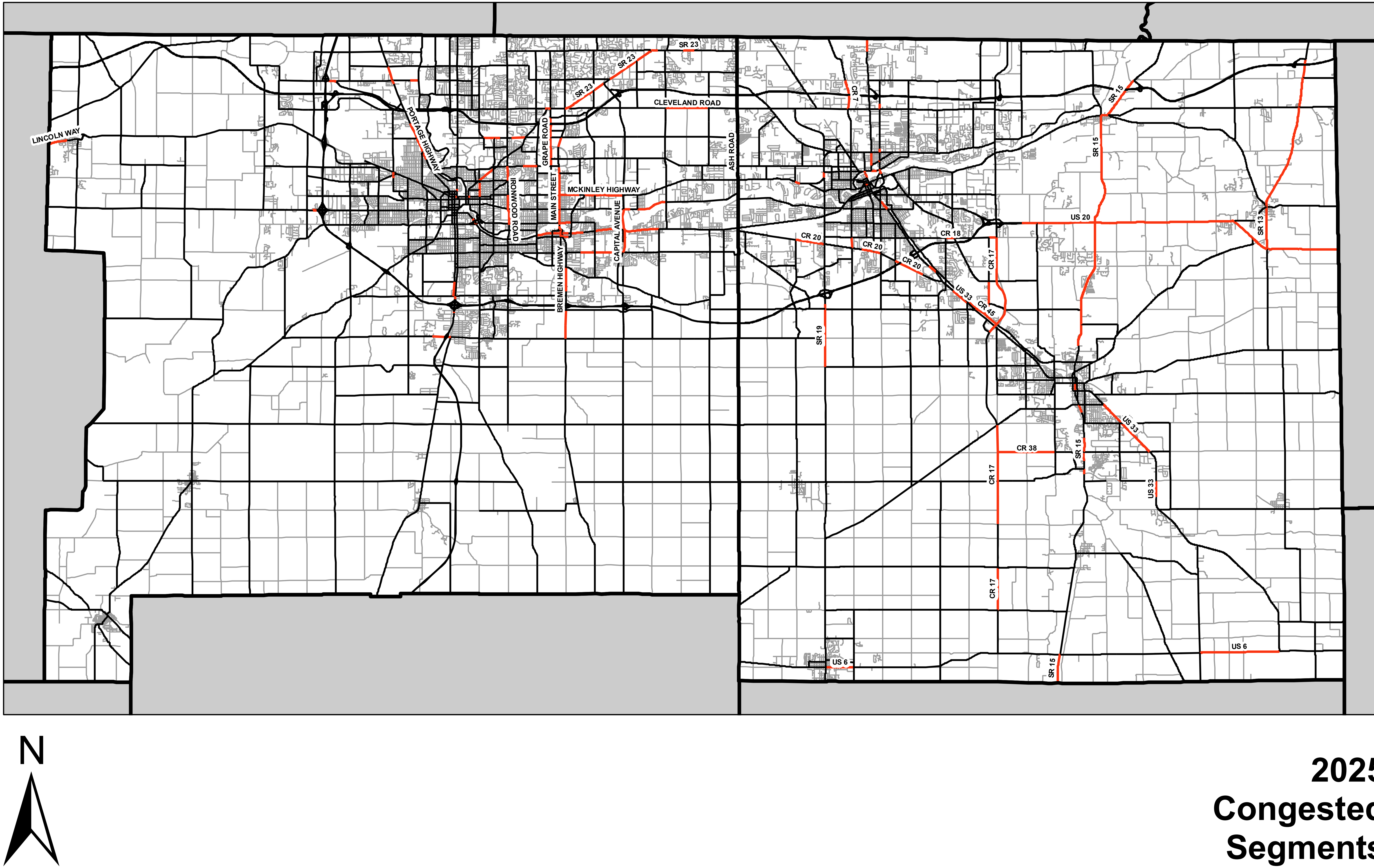
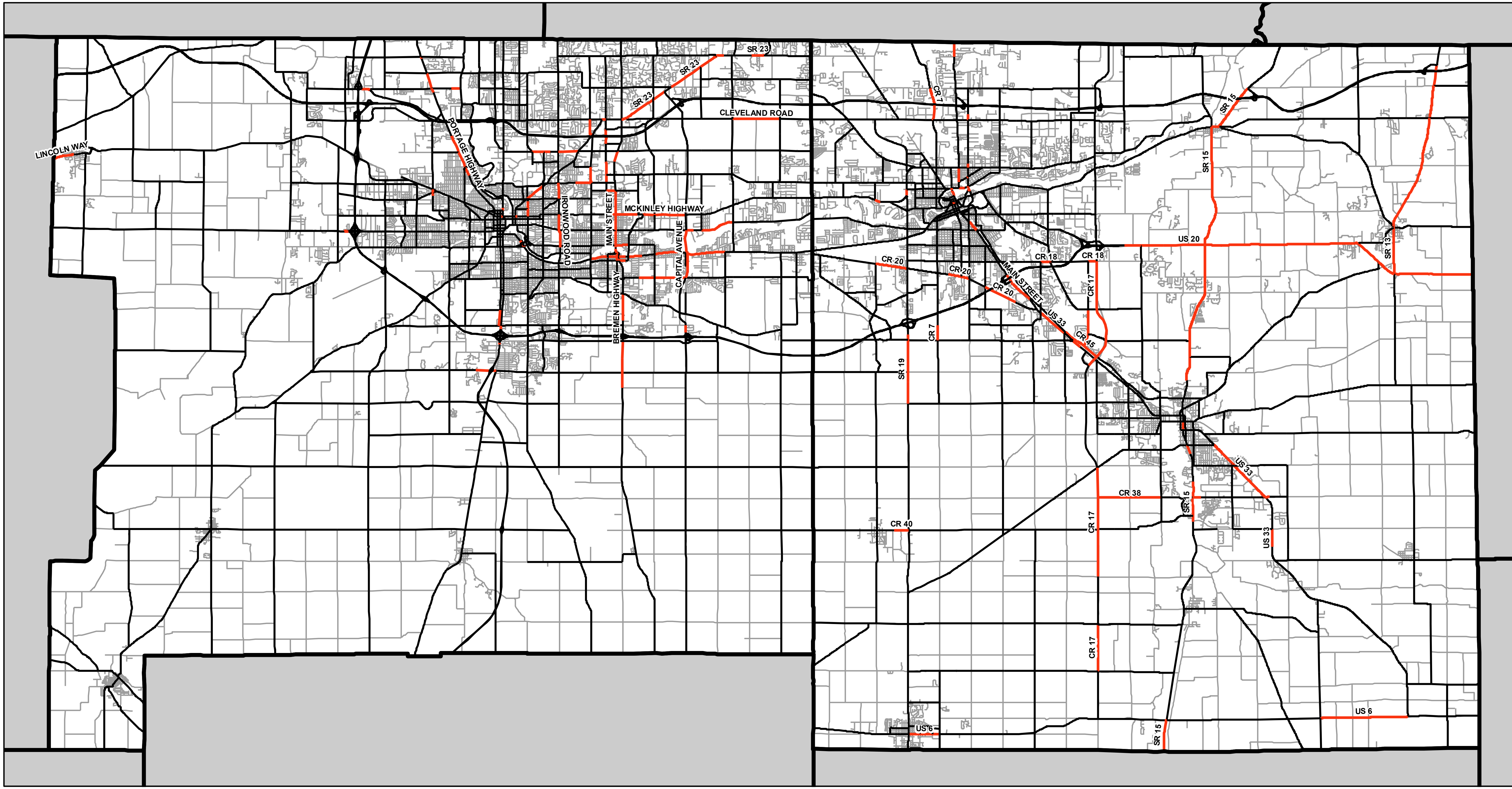
2020 Congested Segments



2025 Congested Segments



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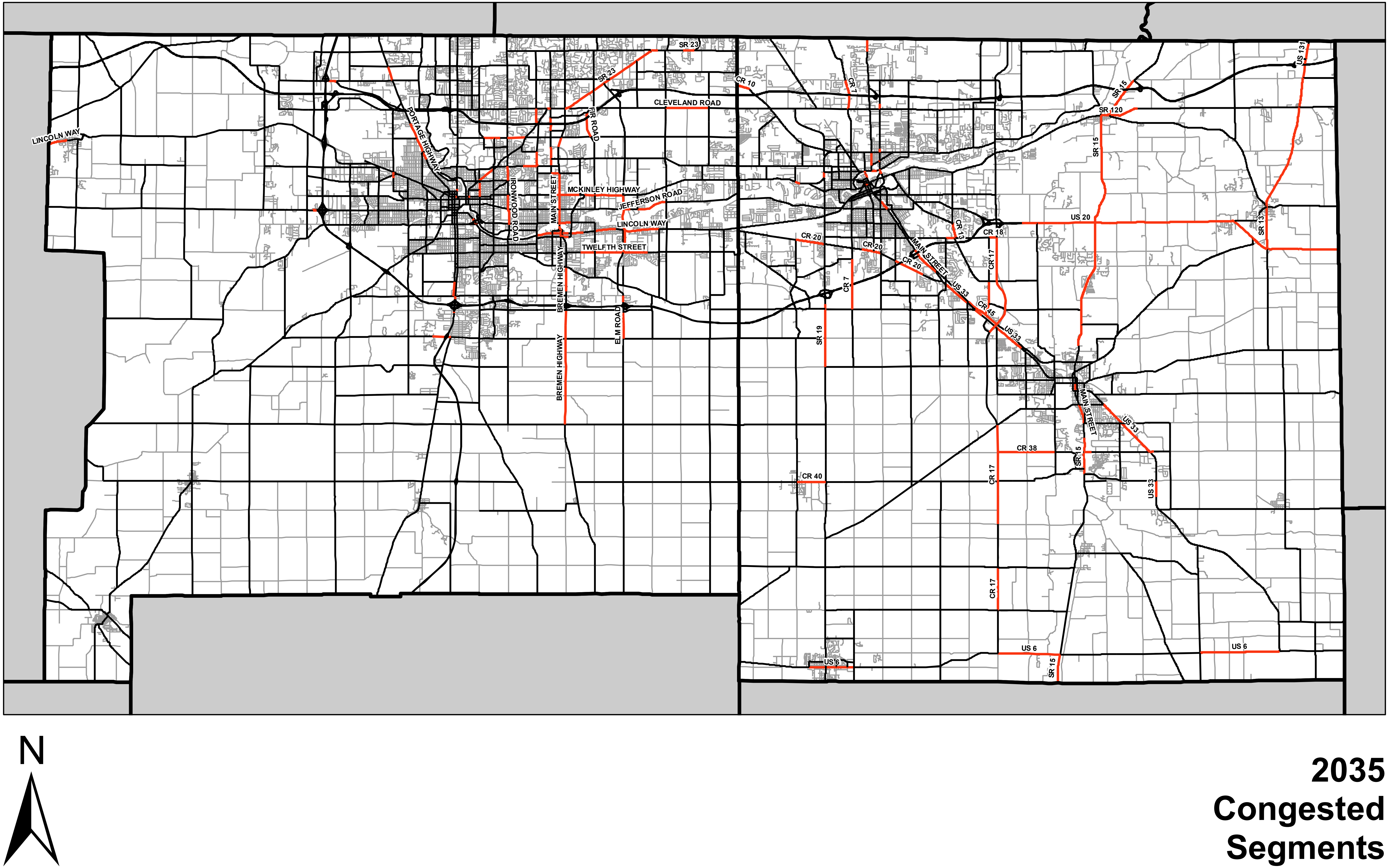
2030 Congested Segments



2035 Congested Segments