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Congestion Management Process (Updated)

ASSOCIATION OF CENTRAL OKLAHOMA GOVERNMENTS

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The contents of this report reflect the views of the Association of Central Oklahoma Governments (ACOG), the Metropolitan Planning Organization for the Oklahoma City Area Regional Transportation Study (OCARTS) Transportation Management Area. ACOG is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect official views or policy of the U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation.

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GLOSSARY

ACOG	Association of Central Oklahoma Governments
CM	Congestion Management
CMWG	Congestion Management Work Group
CMP	Congestion Management Process
CMS	Congestion Management System
FY	Fiscal Year
ISTEA	Intermodal Surface Transportation Equity Act (1991)
MPO	Metropolitan Planning Organization
OCARTS.....	Oklahoma City Area Regional Transportation Study
ODOT	Oklahoma Department of Transportation
OKC	Oklahoma City
SAFETEA-LU.....	Safe, Accountable, Flexible, Efficient Transportation Equity Act: - A Legacy for Users (2005)
TEA-21.....	Transportation Equity Act (1998)
TIP	Transportation Improvement Program
TMA	Transportation Management Area

INTRODUCTION

Demand for highway travel continues to grow as population increases, particularly in metropolitan areas. Construction of new highway capacity to accommodate this growth has not kept pace and congestion has continued to rise. Increasing traffic congestion threatens economic growth, as well as increases pollution. The Texas Transportation Institute (TTI) estimated that in 2003¹ the 85 largest metropolitan areas² within the U.S. experienced 3.7 billion vehicle-hours of delay and 2.3 billion gallons in wasted fuel, resulting in a total loss of \$63 billion. To mitigate congestion, measures such as Intelligent Transportation Systems technology use, travel demand management, and utilization of alternate transportation modes have been emphasized.

The following report documents activities and the underlying process involved in the congestion management and mitigation efforts that are undertaken in the Oklahoma City Area Regional Transportation Study (OCARTS) area. In coordination with the Oklahoma State Department of Transportation (ODOT), the Federal Highway Administration (FHWA) and the local member governments, as well as additional transportation service providers, the Association of Central Oklahoma Governments (ACOG) - the Metropolitan Planning Organization (MPO) for the OCARTS area - has prepared this *Congestion Management Process* report to document the compliance of the regional congestion monitoring and mitigation efforts with the federal regulations governing congestion management.

¹ "The Urban Mobility Report," Texas Transportation Institute, May 2005

² According to the TTI study, the Oklahoma City (OKC) Metropolitan Statistical Area (MSA) was rated as a 'Large' city. Cities that were labeled as large cities had a 2003 population greater than 1 million but less than 3 million.

FEDERAL REGULATIONS GOVERNING CONGESTION MANAGEMENT

According to the latest surface transportation law - Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), enacted in August 2005 - the transportation planning process in areas with a population of 200,000 or more needs to address congestion management through a process that provides for:

“safe and effective integrated management and operation of the multimodal transportation system, based on a cooperatively developed and implemented regional strategy for new and existing transportation facilities through the use of travel demand reduction and operational management strategies”.

Consideration needs to be given to strategies that manage demand, reduce single occupancy vehicle travel, and improve transportation system management and operation. The Congestion Management Process should result in multimodal system performance measures and strategies that can be reflected in the metropolitan transportation plan and the transportation improvement program (TIP).

According to SAFETEA-LU³, this process should encompass:

- Methods to monitor and evaluate the performance of the multimodal transportation system, identify the causes of recurring and non-recurring congestion, identify and evaluate alternative strategies, provide information supporting the implementation of actions, and evaluate the effectiveness of implemented actions.
- Definition of congestion management objectives and appropriate performance measures to assess the extent of congestion and support the evaluation of the effectiveness of congestion reduction and mobility enhancement strategies for the movement of people and goods. Performance measures should be established cooperatively by State, MPO and local officials - in consultation with operators of major modes of transportation.
- Establishment of a coordinated program for data collection and system performance monitoring to define the extent and duration of congestion. This data collection program should be coordinated with existing data sources.
- Identification and evaluation of the anticipated performance and expected benefits.
- Development of implementation schedule, along with information on implementation responsibility and possible funding source for each strategy.
- Implementation of a process for periodic assessment of the effectiveness of implemented strategies. The results of this assessment should be provided to decision makers and the public to provide guidance for future strategy selection.

SAFETEA-LU builds upon the requirements laid out in two previous surface transportation laws: the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the Transportation Equity Act of the 21st Century (TEA-21) of 1998. Both laws referred to congestion mitigation efforts as a Congestion Management System (CMS), whereas the latest transportation law places more emphasis on a Congestion Management Process (CMP) that is a well integrated component of the overall metropolitan transportation planning.

³ 23 CFR 450.320

OCARTS AREA CONGESTION MANAGEMENT PROCESS

This chapter describes the steps the OCARTS area has taken to comply with the new Congestion Management Process rules established by SAFETEA-LU. To achieve such compliance, the OCARTS area Congestion Management Work Group (CMWG), consisting of federal, state, and local entities, transportation service providers and MPO staff, met continuously over several months to develop the CMP goal and objectives, strategies and performance measures, selection of corridors and hotspots to be monitored, as well as each agency's involvement in the process, and thus has entirely re-worked the Congestion Management System that existed to date.

CONGESTION MANAGEMENT GOAL AND OBJECTIVES

The following CMP goal and objectives were developed cooperatively by state, and local entities and major transportation service providers.

The CMWG identified the following Congestion Management Process goal for the OCARTS area:

"to maintain the region's high quality of life through the preservation of safe and efficient multimodal transportation and the improvement of mobility for persons and goods."

It was important to the work group to assign equal weight to both efficiency as well as safety of the transportation system. The CMWG identified four objectives for the CMP within the OCARTS area:

- A: Provide safe and efficient mobility for people and goods.*
- B: Reduce travel time and travel time delays.*
- C: Increase the reliability of the multimodal transportation system.*
- D: Reduce Single-Occupancy-Vehicle (SOV) travel.*

IDENTIFICATION OF CONGESTION

The proximate causes of congestion are numerous in large metropolitan areas. They are also invariably linked to other indirect factors such as land-use patterns, employment patterns, income levels, car ownership trends, etc. Generally, however, congestion is identified by two broad categories: recurring and nonrecurring. Recurring congestion refers to usual traffic that occurs at predictable locations. Non-recurring congestion, on the other hand, refers to unexpected or unusual congestion caused by an event such as a traffic accident. Understanding both causes of congestion is critical to the success of the CMP. Without this information, selection of effective mitigation strategies is difficult, if not impossible.

The CMWG has determined that congestion in the OCARTS area is influenced by several factors, including:

- Insufficient roadway capacity
- Traffic incidents
- Delays due to signal timing
- Weather related traffic delays
- Work zone related delays
- Delays due to limiting roadway geometry

DEVELOPMENT OF THE OCARTS AREA CONGESTION MANAGEMENT NETWORK

HISTORICAL CONGESTION MANAGEMENT NETWORK ACTIVITIES

In 1993, based on the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) mandate and the need to alleviate congestion in the OCARTS area, ACOG initiated the development of a Congestion Management System. At the first CMWG meeting in May 1993, eight corridors were identified as having recurring congestion problems, based on available historical data. At a subsequent meeting in September 1993, members of the group recommended the inclusion of two additional corridors as well as splitting two existing corridors. From 1993 to 2000, MPO staff continuously monitored twelve (12) corridors identified as having recurring congestion problems in the OCARTS area. Staff analyzed and evaluated travel and accident data on these corridors in FY 1994, FY 1995, FY 1997, and FY 1999.

In 2001, the MPO staff again reviewed the performance of the existing 12 corridors in the OCARTS area. Based on previous CMS study reports and the latest traffic volume and accident information on the corridors, staff felt the need for some modification to the recurring congestion corridors for the OCARTS area. Mustang Road had been widened since the previous update, and congestion levels had declined. Thus, that corridor was removed. However, staff's analysis revealed moderate to severe congestion on three additional corridors within the region:

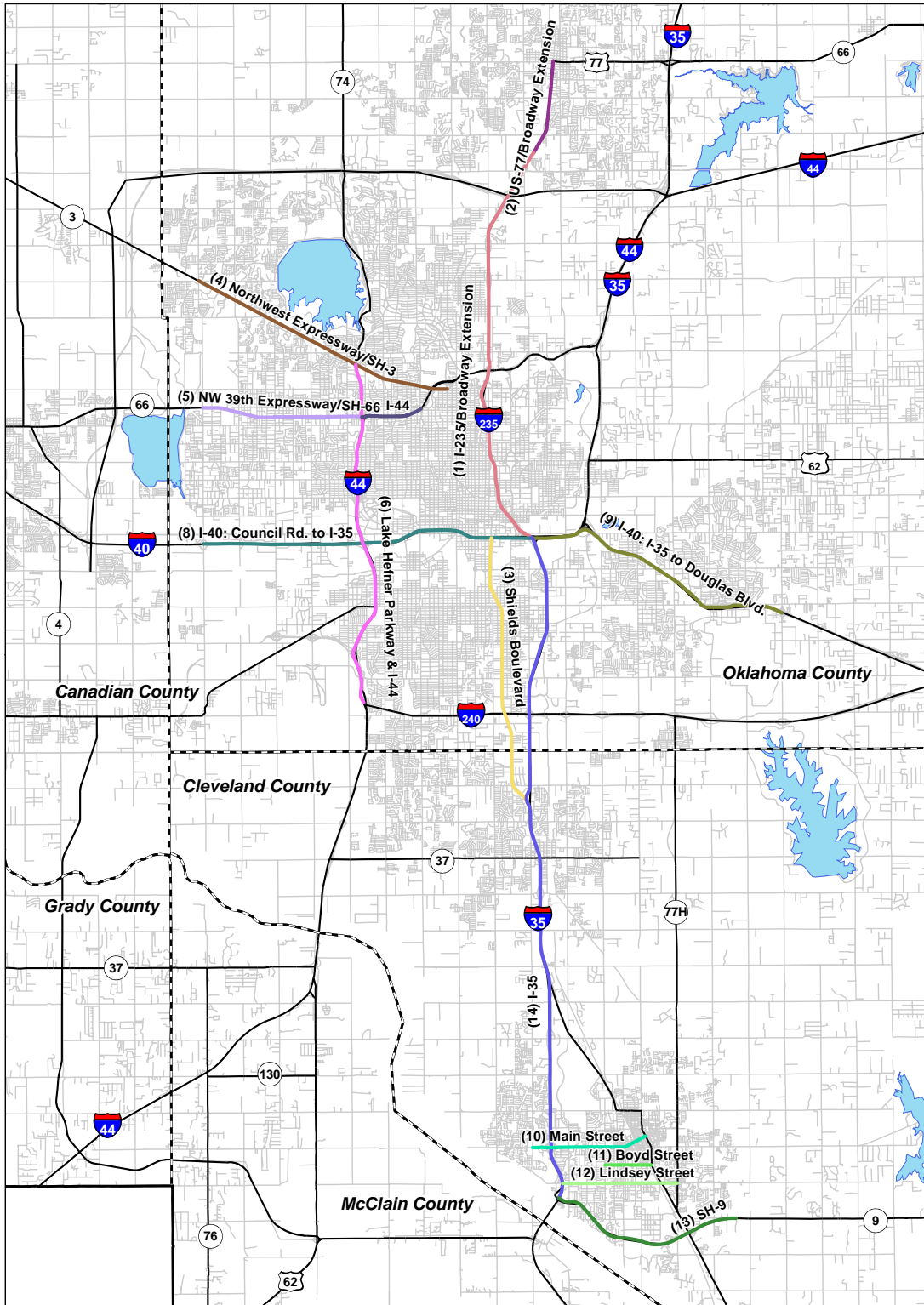
- I-40, between Eastern Ave to Douglas Blvd and an extension of the I-40 western corridor from MacArthur to Council to create two I-40 corridors east (9.2 miles) and west (7.7 miles)
- SH-9, between I-35 and John Saxon Blvd (5.5 miles)
(Johns Saxon Blvd is one-half mile east of 24th Ave SE/Sooner Rd)
- I-44 and Lake Hefner Parkway/SH-74, between I-240 and Northwest Expressway/SH-3 (9.7 miles)

All three corridors were added on June 28, 2001. The list of these 14 recurring congestion corridors, as well as a map illustrating their location is located in Table 1 and Figure 1, respectively.

**Table 1:
Recurring Congestion Corridors**

Corridor Number	Corridor	Segment	Length (in Miles)
1	I-235/Broadway Extension - (OKC)	I-40 to 1/2 miles north of Memorial Rd.	11.4
2	US-77/Broadway Extension - (Edmond)	1/2 miles south of S 33rd St. to Edmond Rd.	2.6
3	Shields Boulevard (OKC)	I-40 to I-35	7.6
4	Northwest Expressway/SH-3 (OKC)	Council Rd. to Classen Blvd.	7.6
5	Thirty-Ninth Expressway (Bethany, Warr Acres, OKC)	Council Rd. to Lake Hefner Parkway	4.4
6	I-44 & Lake Hefner Parkway (OKC)	I-240 to Northwest Expressway/SH-3	9.7
7	I-44 (OKC)	Lake Hefner Parkway/SH-74 to Pennsylvania Ave.	1.7
8	I-40 West Segment (OKC)	Council Rd. to I-35	9.2
9	I-40 East Segment (OKC)	I-35 to Douglas Blvd.	7.7
10	Main Street (Norman)	36th Ave. W to Porter Ave.	3.2
11	Boyd Street (Norman)	Berry Rd. to Classen Blvd.	1.3
12	Lindsey Street (Norman)	I-35 to 12th Ave. SE	3.2
13	SH-9 (Norman)	I-35 to John Saxon Blvd.	5.5
14	I-35 (OKC, Moore, Norman)	I-40 to SH-9	18.6
Total			93.7

Figure 1:
Recurring Congestion Corridors



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RECENT CMP NETWORK ACTIVITIES

As part of the congestion management process, the OCARTS area once again evaluated the congestion management network. The CMWG recommended that each entity identify corridors or hotspots in their respective jurisdictions that they believe should be evaluated for inclusion into the congestion management (CM) network.

Once identified by the local entities, the corridors and/or hotspots were evaluated by MPO staff to determine its eligibility. Volume-to-capacity (V/C) ratios and accident rates were calculated for all corridors and hotspots and points assigned according to the following scoring system:

Table 2A: Scoring System for Volume to Capacity Ratios

V/C RATIO	ASSIGNED SCORE
< .65	0
0.66 ~ 0.85	0.5
0.86 ~ 1.00	1.0
> 1.01	1.5

Table 2B: Scoring System for Corridor Accident Rates

ACCIDENT RATE	ASSIGNED SCORE
< 1.0	0
1.01 ~ 2.00	0.5
2.01 ~ 3.00	1.0
> 3.01	1.5

The CMWG agreed to use the following formula to calculate the accident activity:

$$Accident\ Rate = \frac{A \times 10^6}{365 \times (ADT \times Linear\ Miles)}$$

- Where: A = intersection and mid-block related accident frequency⁴
(for a given analysis period (1 year))
ADT = average daily traffic (ADT)

The CMWG thought it important to assign equal importance to efficiency as well as safety during the CM network selection process. Thus the combined score determined how the particular corridor or hotspot compares to other corridors submitted and whether it would be included in the CM network.

The work group suggested to make an accumulative score of 2.0 the cut-off for inclusion of any corridor into the Congestion Management network. This recommendation resulted in the continuation of five of the previously monitored Congestion Management System corridors, the addition of ten new corridors to the CM network, as well as the inclusion of portions of certain submitted corridors that would otherwise not have the number of required points. These recommendations resulted in 19 congestion corridors as shown in Table 3 and Figure 2.

⁴ One-half of the accidents on both the originating and terminating intersection are counted towards the analyzed corridor segment.

**Table 3:
List of OCARTS area CMP Corridors⁵**

No.	Entity	Corridor	Segment	Length
1*	Edmond	Broadway Extension	Edmond Rd. to S City Limits	2.50
2	Edmond	Edmond Rd.	Santa Fe to Bryant	3.00
3 [`]	Edmond/Oklahoma City	Broadway Extension	N 150 th to Memorial**	1.17
4	Midwest City	Air Depot	Reno to S 29th	2.00
5	Moore	S 19th	Telephone Rd. to Broadway	0.60
6*	Norman	Lindsey	Ed Noble Parkway to Classen	2.98
7*	Norman	Main	36 th Ave W to Porter	3.10
8	Norman	Robinson	Brookhaven to 12 th Ave E	4.20
9	Norman	SH-77H/12 th Ave E	Rock Creek to Lindsey	3.00
10*	Oklahoma City	39 th Expressway	Meridian to SH-74	1.40
11 [`]	Oklahoma City	Broadway Extension	N 78 th to N 36th	3.00
12	Oklahoma City	I-240	I-44 to I-35	4.60
13 [`]	Oklahoma City	I-35	S 25 th to S 89 th	4.05
14 [`]	Oklahoma City	I-44	Pennsylvania to I-235	2.31
15	Oklahoma City	May	Britton to NW Expressway	2.80
16	Oklahoma City	Pennsylvania	N 150 th to N 122 nd	2.00
17	Oklahoma City	Portland	N 164 th to Kilpatrick Turnpike	2.10
18	Oklahoma City	Rockwell	N 122 nd to NW Expressway	2.50
19*	Oklahoma City/Warr Acres	NW Expressway	Council to Classen	7.60
Total				54.91

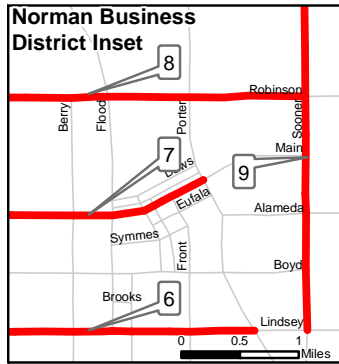
* previously monitored under CMS program

[`] selected portion of stakeholder submitted corridor

**overlap with Corridor 1

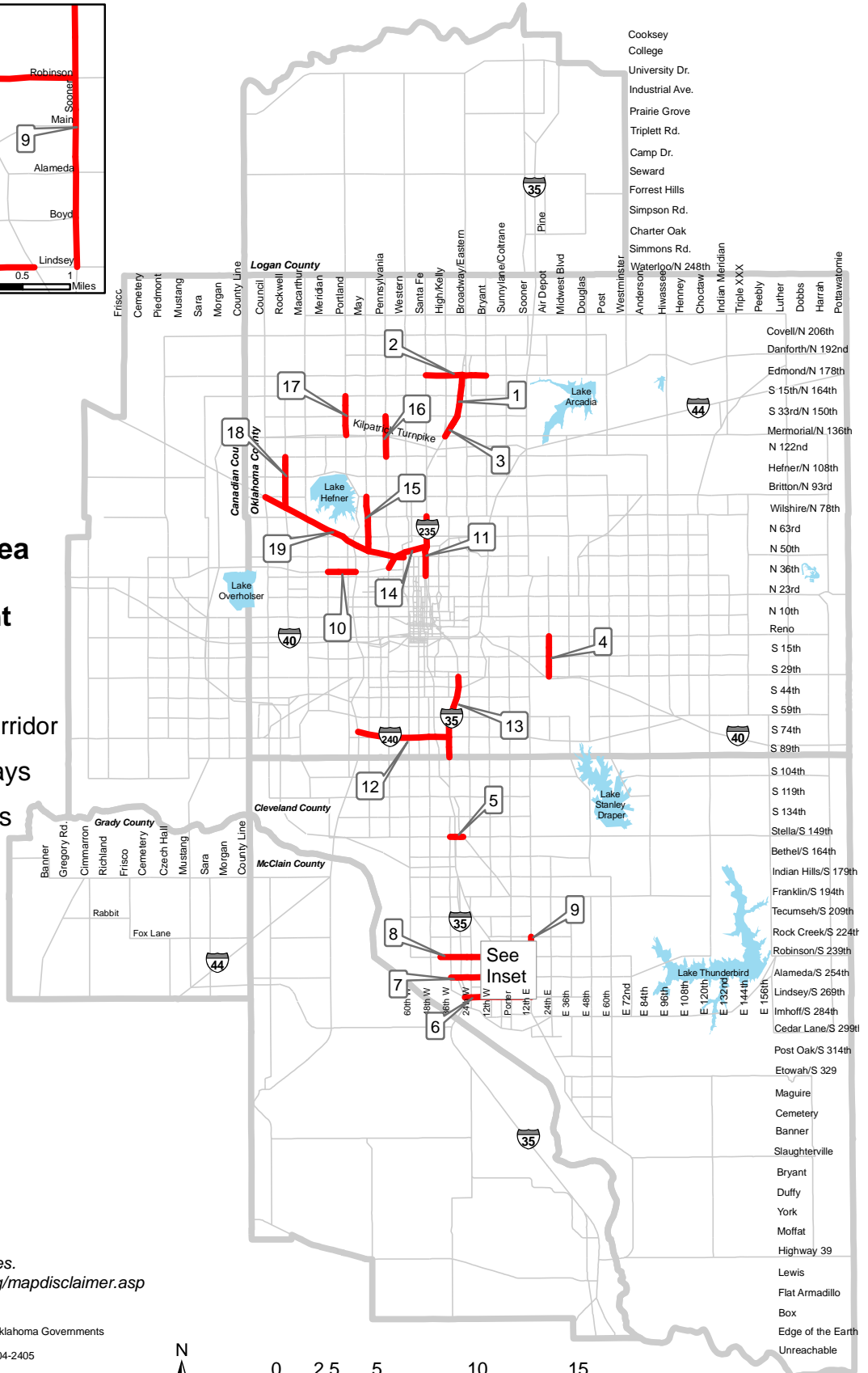
⁵ The final list of corridors was approved by the Intermodal Transportation Policy Committee on October 25, 2007

Figure 2:
OCARTS Area CMP Corridor Map



**OCARTS Area
Congestion
Management
Process
Corridors**

- CMP Corridor
- Roadways
- Counties



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IDENTIFICATION OF STRATEGIES AND ASSESSMENT OF EFFECTIVENESS

The CMWG discussion of possible mitigation activities can be found in Attachment 1.

The work group chose the most appropriate strategies to achieve the congestion management goal and objectives and grouped them by category into the Strategies Tool-Kit, as shown in Table 4.

**Table 4:
OCARTS Area CMP Strategies Tool-Kit**

OCARTS CMP STRATEGIES - TOOL KIT - CATEGORY	STRATEGY	RELATIVE TO OBJECTIVE
Arterial and hotspot strategies	Clear sight distance Provide advanced warning signs Change traffic control Optimize traffic signal timing Coordinate traffic signal timing along corridor Enforce traffic rules and posted speeds Implement access management Change channelization Improve intersection geometry Add capacity	A A A, B, C A, B, C A, B, C A, B, C B A, B, C A, B, C A, B, C
Highway strategies	Utilize smart workzone Intelligent Transportation Systems (ITS) Deploy ITS for incident management and traveler information Implement regional incident management recommendations Utilize road weather information system ITS Implement regionwide 511 traveler information system Adopt Strategic Highway Safety Plan upon completion	A, B, C A, B A, B, C A, B A, B A
Regionwide travel demand management and demand reduction strategies	Promote use of alternate modes of transportation Increase transit services and coverage area Promote transit services Promote car-pooling and park-and-ride Encourage area employers to offer telecommuting and flex-time	A, D D D D B, D

Source: Meeting minutes of the Congestion Management Work Group meeting on August 29, 2007

The assessment of the effectiveness of each strategy will be accomplished by monitoring the system performance before, during, and after the implementation of the chosen strategy.

MONITORING AND EVALUATION OF SYSTEM PERFORMANCE

The CMWG extensively discussed performance measures that would capture throughput, average congestion conditions, as well as reliability of the transportation system. The complete set of performance measures discussed for the OCARTS area is shown in the Attachment 2.

The work group identified the following performance measures for use in the OCARTS area CMP:

- Accident Rate, based on the number of accidents along each particular corridor
- Level of Service, based on traffic counts and Volume-to-Capacity Ratios
- Average Travel Time, based on Global Positioning System (GPS) guided travel runs
- Delay at Signalized Intersections, captured through arterial travel time studies and GPS travel runs
- Occurrence of Flexible Work Schedules and Telecommuting, as well as Use of Alternate Modes of Transportation, as captured by transportation "customer surveys", transit ridership and transit bus-bicycle rack use
- Travel Time Reliability, expressed as the variability of the traffic.com⁶ data

Table 5 lists all of these performance measures, along with the desired outcome, target objective, and associated data needs:

**Table 5:
OCARTS Area CMP Performance Measures**

PERFORMANCE MEASURES	DESIRED OUTCOME	TARGET OBJECTIVE	RESPONSIBLE AGENCIES	CURRENT STATUS	ASSOCIATED DATA
Accident rate	Reduction	A	ODOT, ACOG	Ongoing	Accident data
Level of Service	Steady/ Improvement	A	ACOG, Member Jurisdictions	Ongoing	Volume/Capacity (V/C) Ratio
Average travel time	Reduction	A, B	ACOG, Member Jurisdictions	Ongoing	GPS travel run
Delay at (signalized) intersections	Reduction	B	ACOG, Member Jurisdictions	Limited Effort	Turning Movements, Controller Settings, Run Info, HCM Analysis
Delay at (signalized) intersections (2)	Reduction	B	Member Jurisdictions	Limited Effort	Arterial Travel Time studies
Occurrence of flexible work schedules/ telecommuting	Increased occurrence	B, C, D		New	Transportation "customer" survey
Travel time reliability (limited to certain Interstate Corridors)	Increase	C	ACOG	New	Traffic.com data (potentially add ODOT RTMS data)
Use of alternate modes of transportation	Increased use	D	COTPA, CART	Ongoing	Transit Ridership
Use of alternate modes of transportation (2)	Increased use	D	COTPA, CART	New	Bicycle Rack use
Use of alternate modes of transportation	Increased use	D	ACOG	New	Transportation "customer" survey

Source: Meeting minutes of the Congestion Management Work Group meeting on September 19, 2007

⁶ traffic.com provides the MPO with average speed and vehicle volume data along certain major interstates within the OCARTS area. The proprietary data is provided to ACOG by Mobility Technologies, Inc.

As stated previously, these performance measures will be used for the evaluation of the system prior to, during, and after the implementation of the chosen congestion mitigation strategies.

COORDINATED DATA COLLECTION AND SYSTEM PERFORMANCE MONITORING PROGRAM

The MPO has maintained a cooperative, comprehensive data collection program for many years. The regional traffic count database is updated on a monthly basis with information supplied by the cities of Oklahoma City, Edmond, Midwest City and Norman. Additional counts are obtained from the ODOT Planning Division to accommodate areas of the region where traffic counts are not frequently taken (i.e. Logan County, rural Oklahoma County).

Staff maintains a Microsoft Access database of all regional traffic counts with multiple tables linked by a common ID field. Benefits of the database design include the ability to easily generate reports and statistics, prevent data redundancy and inaccuracy, and allow online access for the general public. The traffic counts and locations are dynamically linked to the new computerized street/highway network map designed for easy retrieval and maintenance. A traffic count map depicting the most recent counts within the OCARTS area is created from the database using ArcView GIS software

The MPO also collects travel time information to support regional congestion management activities. Global Positioning System (GPS) technology is utilized to perform four travel time runs (2 at a.m. peak, 2 at p.m. peak) on each of the congestion corridors in the OCARTS area. The use of this technology allows the MPO to monitor and analyze congestion with greater spatial accuracy.

The Oklahoma City (OKC) Traffic Management Division conducts a travel time/delay study to identify key congestion locations throughout the Oklahoma City arterial network. The results are compared with historical study area data.

Another important component of data collection effort is accident data. The MPO receives up-to-date accident data from ODOT so that it can analyze the physical characteristics of the accidents, causes and patterns of accidents, and cost effectiveness of implemented safety improvements.

OKC Traffic Management staff annually ranks the high accident intersections in the Oklahoma City area based on analysis of the number of accidents and accident rates. The rates developed by this study are used to assist in prioritizing intersection improvement and congestion management projects. OKC staff summarizes the OKC area study results in an annual report.

As there are certain new performance measures which were approved to be included in the CMP, the MPO will coordinate efforts to incorporate these in the data collection and performance monitoring program.

ANTICIPATED PERFORMANCE AND EXPECTED BENEFITS

The CMWG discussed the anticipated CM network performance and the expected benefits of each implemented strategy in detail during the identification of strategies and performance measures suitable for the OCARTS area.

Only those strategies that are anticipated to provide the greatest and most feasible congestion mitigation impact were chosen. Their effectiveness will be closely monitored and evaluated.

DEVELOPMENT OF A STRATEGIES IMPLEMENTATION SCHEDULE

The completed Strategies Tool-Kit has been made available to all OCARTS area member entities. Each entity can select the most appropriate improvement from this tool-kit and apply them to a particular project as needed.

During the development of the Transportation Improvement Program (TIP), all desired projects will be evaluated against each other based on pre-determined quantitative criteria and those projects providing the greatest benefit to the region will be chosen for implementation. The most recent update of the "Criteria and Process for Evaluation of Surface Transportation Program Urbanized Area (STP-UZA) Projects" was approved by the Intermodal Transportation Policy Committee on September 27, 2007. The project selection process now includes specific criteria directly related to the strategies identified in the OCARTS area Congestion Management Process.

If appropriate, selected congestion mitigation projects will also be added to the long range transportation plan.

PERIODIC ASSESSMENT OF EFFECTIVENESS OF IMPLEMENTED STRATEGIES

Data collection and performance monitoring has been ongoing and although the OCARTS area is changing from a Congestion Management System to a more integrated Congestion Management Process, the periodic assessment of the network performance will be continued without any interruption. The biennial reporting to local stakeholders will continue as well.

The CMWG further agreed to a five year cycle for evaluation of the entire CM network, as well as the associated strategies and performance measures.

SUMMARY

Transportation partners in the OCARTS area have been working to mitigate the strangling effects that roadway congestion is having on the region's freeways and surface transportation system.

The purpose of the Congestion Management Process (CMP) is to cooperatively address the variety of transportation needs, offer strategies to prevent and alleviate congestion and increase mobility. The CMP also provides for the measurement of the efficiency and effectiveness of those strategies, so that improvements may be quantified and evaluated to support the formulation of quality recommendations. Furthermore, the CMP is to fully integrate the congestion mitigation efforts with other metropolitan transportation planning activities, in order to achieve the greatest return on investments into the OCARTS area intermodal transportation network.

ACOG, ODOT, and local jurisdictions have already implemented a number of physical and operational improvements intended to manage recurring and non-recurring congestion. Additional improvements are planned and/or funded for implementation as laid out in the 2030 OCARTS Plan and the Transportation Improvement Program.

As part of its commitment to the Congestion Management Process, ACOG will continue to gather relevant transportation data; evaluate current and future trends in roadway congestion and transportation science; research and identify proactive strategies to curb expanding roadway congestion; and collaborate with our local, state, and federal partners to efficiently implement roadway congestion countermeasures.

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- 1 - "01-07 CMS WG Meeting Highlights", ACOG, February 2007
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- 3 - "03-07 CMS WG Meeting Highlights", ACOG, April 2007
- 4 - "08-29-07 CMS WG Meeting Highlights", ACOG, September 2007
- 5 - "09-19-07 CMS WG Meeting Highlights", ACOG, September 2007

**ATTACHMENT 1:
LIST OF OCARTS AREA CONGESTION MANAGEMENT STRATEGIES**

Strategies:	Applicable to the Region	Resource and Staff Needs	Implementing Agencies	Status
Identify crash hotspots	x	Low	ODOT cooperation, ACOG, OKC	Limited effort at this time
Mitigate crash hotspots	x	High	Affected jurisdictions	New initiative
Identify geometric bottlenecks	x	Moderate	Affected jurisdictions	New initiative
Mitigate geometric bottlenecks	x	High	Affected jurisdictions	New initiative
Add capacity where needed	x	High	ODOT, ACOG, and all affected jurisdictions	Ongoing
Deploy additional ITS for Incident Management and Advanced Traveler Information Systems	x	High	ODOT	Ongoing
Deploy 511 system			ODOT	Very limited effort at this time
Continue implementation of regional IM recommendations	x	Low to high	Affected jurisdictions, ACOG, and ODOT	Limited effort at this time
Utilize Smart Work Zone ITS	x	Low	ODOT and affected jurisdictions	Ongoing
Use "Road Weather Information System" ITS	x	Low to Moderate	ODOT	Ongoing
Access management	x	Moderate	Affected jurisdictions and ACOG	Very limited effort at this time
Identify intersection, interchange and ramp problems	x	Moderate	ODOT and affected jurisdictions	New initiative
Mitigate needed intersection, interchange and ramp improvements	x	High	Affected jurisdictions	New initiative
Implement ramp meters				(Not considered for implementation at this time)
Encourage area employers to promote flexible work schedules and telecommuting	x	Low	ACOG	Ongoing (air quality campaign)
Determine variability of daily travel	x	Moderate	ACOG	New initiative

ATTACHMENT 1 (CONT.):

Strategies:	Applicable to the Region	Resource and Staff Needs	Implementing Agencies	Status
Implement congestion pricing				(Not considered for implementation at this time)
Promote use of alternate modes of transportation (Bike, Ped., Transit)	x	Moderate	ACOG and affected jurisdictions	Limited effort at this time
Increase transit service and coverage	x	High	COTPA, CART, affected jurisdictions	Ongoing
Provide real-time transit information	x	Moderate	COTPA, CART	Limited effort at this time
Provide trip itinerary planning	x	Moderate	COTPA, CART	New
Promote transit services	x	Moderate	COTPA, CART	Ongoing
Promote park-and-ride or car-pooling	x	Low	COTPA	Ongoing

Source: Meeting minutes of the Congestion Management Work Group meeting on January 17, 2007

ATTACHMENT 2: DISCUSSION OF POTENTIAL OCARTS AREA CMP PERFORMANCE MEASURES

The CMWG discussed multiple performance measures (PM), which are to be used for the evaluation of the system prior to, during, and after the implementation of the chosen strategies. The work group anticipates to capture the following characteristics:

- Throughput, such as Volume-to-Capacity Ratio
- Average Congestion Conditions, such as Travel Time, Bottlenecks, Accidents
- Reliability, such as Planning Time

The table shows the performance measures that were discussed for use within the OCARTS area. The table contains information concerning the agencies responsible for the monitoring and the collection of the associated data, along with the current status and the CMWG discussion highlights for each PM (shown in red). PMs scheduled for inclusion are highlighted in green; PMs in yellow require further investigation.

Table: List of Appropriate Performance Measures

Performance Measures	<i>Desired Outcome</i>	<i>Applicable to Objective?</i>	<i>Resource and Staff Needs</i>	<i>Collecting Agencies</i>	<i>Current Status</i>	Data needed? (# - Indicates data is used for more than one PM)
Accident rate -- recent revamp of ODOT system discussed	Reduction	A	no add. resources anticipated	ODOT	Ongoing	Accident data
Average travel time -- extensive discussion on required resources, especially when considering the use of GPS travel run data on the entire network; however, group recognizes the importance of this PM	Reduction	A, B	resource needs dependent on CM network extent	ACOG, OKC	Ongoing	GPS travel run (1) -- this PM is applicable to objectives A, B, and C, and once collected can be used in several different ways
-- discussed the difference between TRI and TTI, also as it applies to regional, vs. corridor application; at this time it is unknown if the Texas Transportation Institute will monitor TTI, but PM should be kept in mind			discussed difficulties measuring and mitigating incident caused congestion	(ACOG has previously calculated the Travel Rate Index - TRI)	New	Travel Time Index
-- qualitative log to take note of trouble spots and bottle necks; it was suggested to create a public Web site; also discussed was the possibility of staff taking notes on morning/ evening commute experience	Reduction	A, B	Public Web site would be very staff intensive to analyze; GIS based solution is not available at this time	?	New	Travel log (1)

Table: List of Appropriate Performance Measures (cont.)

Performance Measures	<i>Desired Outcome</i>	<i>Applicable to Objective?</i>	<i>Resource and Staff Needs</i>	<i>Collecting Agencies</i>	<i>Current Status</i>	Data needed? (# - Indicates data is used for more than one PM)
Level of Service -- (changed from "Capacity")	Steady/ Improvement	A	no add. resources anticipated	ACOG, Member Jurisdiction	Ongoing	Traffic count (1)
			no add. resources anticipated	ACOG, Member Jurisdiction	Ongoing	Volume/Capacity (V/C) Ratio
Real-time traveler information -- no traveler info provided at this time; CMP objectives do not prescribe traveler info; it was suggested that it would be best to wait until ODOT's 511 site was up; the group also looked at traffic.com	Increased Output	A, B	too resource intensive at this time	(ACOG investigate)	New	# of notifications to media/public
			too resource intensive at this time	(ACOG will investigate -- possibility of getting Web hits from traffic.com)	New	Traveler info Web site hits -- group looked at public- access and data- side "traffic.com"; limited marketing of site
Response to and clearance of incidents -- discussed OK's Quick Clearance legislation and the failed public education and enforcement effort; clearance time discussed multiple times during multi- agency traffic incident management meetings	Decrease in time	A		(ACOG will investigate -- ACOG sits in on the Records Council mtgs. And will bring up the issue)	New	Response and clearance time for accidents
Work zone safety -- discussed the new requirement for state DOTs to have plan for work projects	Reduction crash/ severity	A		(ACOG will investigate -- work zone crash info on accident reports?)	New	Work zone accidents/fatalities
Work zone delay -- discussed the new requirement for state DOTs to have plan for work projects; discussed including work zone delay (and incidents) as part of the GPS travel runs; also discussed using transit AVL data for delay study	Reduction in delay	A		(ACOG will investigate and check with ODOT on smart work zone data)	New	Travel log (2)
			(see above)	(see above)	New	GPS travel run (2)

Table: List of Appropriate Performance Measures (cont.)

Performance Measures	<i>Desired Outcome</i>	<i>Applicable to Objective?</i>	<i>Resource and Staff Needs</i>	<i>Collecting Agencies</i>	<i>Current Status</i>	Data needed? (# - Indicates data is used for more than one PM)
Weather related delays -- discussed use of traffic.com data to monitor inclement weather related slower speeds – to create “region wide” ratio; however, it was questioned how useful this information would be; it was suggested that this could be captured through analysis of accident data	Reduction in delay	A		(ACOG will investigate)	New	Weather related accidents/fatalities
Overall speed -- discussed difficulties of using point data for corridor speed evaluation; however, it will give us variation over time	Free-Flow Speed (changed from “Increase”)	B	(see above)	ACOG, Member Jurisdiction	Ongoing	GPS travel run (3)
				ACOG	New	Traffic.com data (1)
Delay at (signalized) intersections -- discussed the possibility of capturing data through signal timing plans	Reduction	B	resource needs dependent on CM network extent	Member Agencies	Limited effort	Arterial travel time studies (1)
			(see above)	ACOG, Member Jurisdiction	Ongoing	GPS travel run (4)
Delay at interchanges and ramps	Reduction	B	(see above)	ODOT -- high \$ projects	New	GPS travel run (5)
Occurrence of flexible work schedules and telecommuting -- data also desired for Air Quality	Increased occurrence	B, C		(ACOG will investigate)	New	Transportation "customer" survey (1)
Travel time reliability – calculated from GPS travel runs	Increase	C		ACOG	New	Planning time (incl. index and buffer)
					New	Travel log (3)
			(see above)	ACOG, Member Jurisdiction	New	GPS travel run (6)
				ACOG	New	Traffic.com data (2)
			(see above)	Member Agencies	Limited effort	Arterial travel time studies (2)
System-wide VMT	Steady/Reduction	D		ACOG, Member Jurisdiction	Limited effort	Traffic count (2)
				ACOG, ODOT	Limited effort	Vehicle Miles of Travel (VMT)
Use of alternate modes of transportation	Increased use	D		(ACOG investigate)	New	Transportation "customer" survey (2)

Source: Meeting minutes of the Congestion Management Work Group meeting on February 14, 2007