What is NCTCOG?

The North Central Texas Council of Governments is a voluntary association of cities, counties, school districts, and special districts which was established in January 1966 to assist local governments in planning for common needs, cooperating for mutual benefit, and coordinating for sound regional development.

It serves a 16-county metropolitan region centered around the two urban centers of Dallas and Fort Worth. Currently the Council has 238 members, including 16 counties, 169 cities, 22 independent school districts, and 31 special districts. The area of the region is approximately 12,800 square miles, which is larger than nine states, and the population of the region is over 6.5 million, which is larger than 38 states.

NCTCOG’s structure is relatively simple; each member government appoints a voting representative from the governing body. These voting representatives make up the General Assembly which annually elects a 15-member Executive Board. The Executive Board is supported by policy development, technical advisory, and study committees, as well as a professional staff of 295.

NCTCOG’s offices are located in Arlington in the Centerpoint Two Building at 616 Six Flags Drive (approximately one-half mile south of the main entrance to Six Flags Over Texas).

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NCTCOG’s Department of Transportation

Since 1974 NCTCOG has served as the Metropolitan Planning Organization (MPO) for transportation for the Dallas-Fort Worth area. NCTCOG’s Department of Transportation is responsible for the regional planning process for all modes of transportation. The department provides technical support and staff assistance to the Regional Transportation Council and its technical committees, which compose the MPO policy-making structure. In addition, the department provides technical assistance to the local governments of North Central Texas in planning, coordinating, and implementing transportation decisions.

Prepared in cooperation with the Texas Department of Transportation and the U. S. Department of Transportation, Federal Highway Administration, and Federal Transit Administration.

"The contents of this report reflect the views of the authors who are responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the views or policies of the Federal Highway Administration, the Federal Transit Administration, or the Texas Department of Transportation."
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January 2014

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DNT
IH 20
IH 30
IH 35
IH 35E
IH 35W
IH 45
IH 635
IH 820
Loop 12
PGBT
SH 114
SH 121
SH 161
SH 183
SH 360
SP 97
SP 366
SP 408
SP 482
US 67
US 75
US 80
US 175
US 287

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OVERVIEW OF THE DALLAS-FORT WORTH CONGESTION MANAGEMENT PROCESS

Traffic Congestion In The Dallas-Fort Worth Region

With the Dallas-Fort Worth (DFW) urban area as its center, the North Central Texas region plays an important role in the State of Texas, as well as the entire southwestern United States. The region provides critical air and ground transportation hubs for the movement of people and goods throughout the United States and internationally. Locally, these transportation systems support many high technology manufacturers and telecommunications firms, large retail and wholesale distribution centers, and a growing convention and tourism industry.

In 2010, the 12-county DFW Metropolitan Planning Area (MPA) had a population of approximately 6.5 million.\(^1\) By the year 2035, these same 12 counties are forecasted to grow to 9.8 million residents. This growth represents a 45 percent increase in the population of North Central Texas over the next 22 years. Using population forecasts for 2013 and 2035, the total population of the MPA is projected to increase from 6,778,201 in 2013 to 9,833,378 in 2035. The rate of growth projected through 2035 is at a magnitude never before experienced in the DFW Metropolitan Area.

Urban activity in this area is supported by various ground transportation systems, including:

- 831 centerline miles of freeways
- 99 centerline miles of toll roads
- 75 miles of high occupancy vehicle lanes
- 2,395 miles of regional arterials
- 72 miles of light rail transit
- 56 miles of commuter rail transit

These systems will help alleviate a growing traffic congestion problem in the Metroplex. The rapid growth of the DFW region in the past decade has led to increasing transportation problems. A favorable business environment, tax advantages, and the availability of developable land continue to attract many businesses to the region. While growth has many benefits, the recent rate of growth has so overloaded the transportation system that available financial resources to improve transportation have not kept pace. The effects are now evident in increased traffic congestion and delay, and substandard air quality.

Congestion Management Process: A Management Solution

The Congestion Management Process (CMP) seeks a “management” solution to a growing traffic problem by targeting resources to operational management and travel demand reduction strategies. Although major capital investments are needed to meet the growing travel demand, the CMP also develops lower cost strategies that complement major capital recommendations. The result is a more efficient and effective transportation system, increased mobility, and safer travel.

Integrating a management approach into the provision of transportation services and infrastructure is a challenge. Traditional modeling and decision-making systems are biased to the evaluation and implementation of capacity improvements. Tempering these systems with a

\(^1\) 2010 Census, www.census.gov
Congestion management approach offers opportunities for stretching transportation resources and is a component of Moving Ahead for Progress in the 21st Century (MAP-21) metropolitan planning legislation.

As shown in Exhibit I-1, the CMP is fully integrated into the region’s transportation planning and programming processes. The diagram below illustrates the eight components to the CMP and the role of the conforming Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP), the Unified Planning Work Program (UPWP), and Progress North Texas in this process.
To complement Exhibit I-1, Exhibit I-2 identifies how the CMP is integrated into various planning functions. With the identification and mitigation of current and future traffic congestion as the foundation of planning and programming decision making, strategies for congestion mitigation are developed on the system level (in the MTP), on the corridor level (in corridor/National Environmental Policy Act (NEPA) studies), and on the project level (in the TIP).

**EXHIBIT I-2**

**Congestion Management Process**

*Foundation for Transportation Planning and Programming*

<table>
<thead>
<tr>
<th>Congestion Mitigation Strategies</th>
<th>Metropolitan Transportation Plan (System)</th>
<th>CMP Strategy Development Process <em>(Mitigation of Congestion)</em></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Corridor/NEPA Studies (Corridor)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transportation Improvement Programs (Project)</td>
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</table>

The need to operate the current transportation system as efficiently as possible is a top priority, because of the air quality and financial challenges faced by the DFW Metropolitan Area. The CMP comprises two types of management approaches proven to be cost-effective tools in addressing these challenges. Transportation System Management and Operations (TSM&O) and Travel Demand Management (TDM) are very cost-effective, quick-implementation projects, policies, and programs that encourage the use of alternate travel modes and improve the efficiency of the transportation system.
TSM&O seek to identify and implement cost-effective congestion mitigation strategies to improve traffic flow, safety, system reliability and capacity. Compared to major capacity and infrastructure improvements, management and operations projects are usually low-cost improvements that can be implemented or constructed quickly and with minimal impacts to the transportation network. TSM&O strategies include intersection improvements, traffic signal improvements, bottleneck removals, and Intelligent Transportation System (ITS).

TDM strategies address the demand side of travel behavior by reducing the number of vehicles that travel on roadways through the promotion of alternatives to driving alone. TDM strategies include employer trip reduction programs, rideshare programs (vanpool and carpool), park-and-ride facility development, and the operation of transportation management associations. Appendix A highlights the DFW TDM and TSM&O strategies.

**Congestion Management Process Goals And Objectives**

The CMP goals and objectives are aligned with the overall *Mobility 2035: The Metropolitan Transportation Plan for North Central Texas – 2013 Update* (Mobility 2035 – 2013 Update) goal themes. Mobility 2035 – 2013 Update goals support and advance the development of a transportation system that contributes to the region's mobility, quality of life, system sustainability, and continued project implementation. The three CMP goals are:

- **Goal One:** Identify quick-to-implement low-cost strategies and solutions to better operate the transportation system.
- **Goal Two:** More evenly distribute congestion across the entire transportation corridor.
- **Goal Three:** Ensure corridors have options and available alternate routes/modes to relieve daily congestion and during incidents and accidents.

Exhibit I-3 illustrates the integration of Mobility 2035 – 2013 Update goals with CMP Goals, Objectives and Performance.
## Congestion Management Process – 2013 Update

### EXHIBIT I-3
INTEGRATION OF MOBILITY 2035 – 2013 UPDATE GOALS WITH CMP GOALS, OBJECTIVES AND PERFORMANCE

<table>
<thead>
<tr>
<th>Mobility 2035 - 2013 Update Goals</th>
<th>CMP Goals and Action</th>
<th>Objectives</th>
<th>Performance Measures</th>
</tr>
</thead>
</table>
| **Mobility**: Support travel efficiency measures and system enhancements targeted at congestion reduction and management. | **Goal**: Identify quick-to-implement low cost strategies and solutions to better operate the transportation system. | - Reduce SOV trips through travel demand management strategies.  
- Increase usage of park-and-ride lots.  
- Provide all users with travel alerts and alternate routes in the case of incidents, special events, weather, construction, and severe congestion at choke points.  
- Increase the number of intersections that are equipped and operating with traffic signals that enable real-time monitoring and management of traffic flows.  
- Reduce mean roadway clearance time per incident (Defined as the time between awareness of an incident and restoration of lanes to full operational status.) | - Number of users in the region participating on Try Parking It.  
- Utilization rate of park-and-ride lots in the region.  
- Percent of routes where travel alert and alternate route information is provided in the case of incidents, special events, weather, construction, and severe congestion choking points.  
- Percent of intersections in the region equipped and operating with traffic signals that enable real-time monitoring and management of traffic flows.  
- Average roadway clearance times. |
| **Implementation**: Develop cost-effective projects and programs aimed at reducing the costs associated with constructing, operating, and maintaining the regional transportation system. | **Action**: Implement quick-to-implement low cost strategies and solutions to better operate the transportation system. | - Reduce the percentage of facility miles (highway, arterial, rail, etc.) experiencing recurring congestion during the peak period.  
- Maintain the rate of growth in facility miles experiencing recurring congestion as less than the population growth rate (or employment growth rate.)  
- Increase the number of HOV/Managed lanes in the region.  
- Increase alternative (non-SOV) mode share for all trips.  
- Increase active (bike/ped) mode share.  
- Increase mode share in transit.  
- Increase access to transit (within two miles) to specified percentage of the population. | - Percent of lane-miles operating at LOS F or V/C > 1.0.  
- Population growth rate.  
- Total number of HOV/Managed lanes in the region.  
- Share of employees walking, biking, telecommuting, carpooling/vanpooling, riding transit, driving. Track through Try Parking It website.  
- Share of trips by each mode of travel.  
- Percent of trips that take transit as a mode of travel.  
- Percent of population within two miles of a transit station. |
| **Quality of Life**: Preserve and enhance the natural environment, improve air quality, and promote active lifestyles. | **Goal**: More evenly distribute congestion across the entire transportation corridor. | - Increase the rate of growth in facility miles experiencing recurring congestion as less than the population growth rate (or employment growth rate.)  
- Increase the number of HOV/Managed lanes in the region.  
- Increase alternative (non-SOV) mode share for all trips.  
- Increase active (bike/ped) mode share.  
- Increase mode share in transit.  
- Increase access to transit (within two miles) to specified percentage of the population. | - Percent of lane-miles operating at LOS F or V/C > 1.0.  
- Population growth rate.  
- Total number of HOV/Managed lanes in the region.  
- Share of employees walking, biking, telecommuting, carpooling/vanpooling, riding transit, driving. Track through Try Parking It website.  
- Share of trips by each mode of travel.  
- Percent of trips that take transit as a mode of travel.  
- Percent of population within two miles of a transit station. |
| **System Sustainability**: Ensure adequate maintenance and enhance the safety and reliability of the existing transportation system. | **Goal**: Ensure corridors have options and available alternate routes/modes to relieve daily congestion and during incidents and accidents. | - Reduce buffer index on freeway system during peak and off-peak periods.  
- Reduce delay associated with incidents on arterials.  
- Conduct joint training exercises among operators and emergency responders in the region.  
- Increase the percentage of regional staff with incident management responsibilities that have completed and participated in the regional Freeway Incident Management Training. | - The buffer index (represents the extra time (“buffer”) travelers add to their average travel time when planning trips in order to arrive on-time 95 percent of the time.)  
- Incident response and clearance times.  
- Number of participants and joint training exercises conducted among operators and emergency responders.  
- Percent of staff in a corridor that have completed regional Freeway Incident Management Training. |
As indicated in the Exhibit I-3, each CMP goal has an associated action, objectives, and performance measures. The section below discusses each CMP goal and the specified action.

**Goal One: Identify quick-to-implement low-cost strategies and solutions to better operate the transportation system.**

To achieve CMP Goal One, the CMP offers an action of applying quick-to-implement low cost strategies and solutions to better operate the transportation system. These quick-to-implement strategies are incorporated into two types of management approaches, Travel Demand Management and Transportation System Management and Operations. Examples of quick to implement strategies and projects are included in Appendix A.

**Goal Two: More evenly distribute congestion across the entire transportation corridor.**

To achieve CMP Goal Two, the CMP recommends an action of conducting an inventory of the corridor characteristics to identify availability of existing options. To achieve this action, a corridor inventory of 25 regional limited access facilities was conducted. As part of this evaluation, each corridor was inventoried to determine the various options that exist along that corridor to help alleviate congestion from the main roadway facility. The inventory looked at four categories of options that may influence congestion levels: alternative roadway infrastructure (services), modal options (services), system demand (recurring), and system reliability (nonrecurring). More information on this inventory and analysis is included in the Corridor Analysis Section of this document.

**Goal Three: Ensure corridors have options and available alternate routes/modes to relieve daily congestion and during incidents and accidents.**

To satisfy Goal Three, the CMP recommends an action of prioritizing corridors based on available options and alternate routes and modes. To satisfy this action, the information collected through the corridor inventory was used in the CMP Corridor Scoring Criteria. This allowed the 25 inventoried limited access facilities to be scored, ranked and determine the current corridor system deficiencies. More information on this CMP Corridor Scoring Criteria and identification of corridor areas of deficiency are included in the Corridor Analysis Section.

**Integrating the CMP Into the Metropolitan Transportation Plan**

Mobility 2035 – 2013 Update was developed amidst growing concern for increased congestion, reduced air quality, and the lack of financial resources to fund many desired transportation projects and programs. To maximize available funds, a prioritization process was followed to maximize the existing transportation system, then invest strategically in infrastructure improvements. The principles used to allocate financial resources include: maintain and operate existing facilities; improve efficiency of existing facilities; reduce single-occupancy trips; improve land use/transportation connections; increase transit trips, and; increase auto occupancy. A diagram outlining the MTP development process is shown in Exhibit I-4.
The process began by assuming that the current infrastructure and other transportation strategies were in place. Funding necessary to maintain and operate the current transportation system was then allocated. Next, an assessment of the 2035 travel demand was done to identify future congested locations and to identify transportation system deficiencies. The first priority was to squeeze as much efficiency out of the current transportation system as possible and to eliminate as many trips as possible from peak travel times. Congestion mitigation strategies were developed to increase transportation system efficiency through transportation systems management and to reduce drive-alone travel through travel demand management, including bicycle and pedestrian strategies. With these strategies assumed, alternative rail systems were developed in an effort to reduce automobile travel. If trips could not be eliminated altogether, a mode change to transit was modeled. Following the identification of a recommended rail system, high-occupancy vehicle (HOV) and managed lane facilities were evaluated as a strategy to increase auto occupancy of the remaining trips. Finally, to accommodate the remaining demand, single-occupant vehicle capacity was evaluated in congested corridors. Throughout the development of each of these components, air quality and financial impacts were evaluated to ensure that financial feasibility and air quality conformity requirements could be met. In addition, each component was also reviewed for sustainable development and intermodal opportunities so that the recommendations minimized community impacts and accommodated freight movement.
Surface transportation projects, programs, and policies were developed that aggressively target traffic congestion and improve air quality for the DFW Metropolitan Area in a cost-effective manner. The recommendations reflect a balanced transportation system, both in terms of providing multimodal options and financial constraint. Exhibit I-5 shows the cost of each plan component, demonstrating a continued investment in traditional capital improvements, while prioritizing funds in more non-traditional modes, as well as a system-oriented approach to management and operations.

EXHIBIT I-5
MOBILITY 2035 – 2013 UPDATE EXPENDITURE SUMMARY

<table>
<thead>
<tr>
<th>Mobility 2035 – 2013 Update Expenditures</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure Maintenance</td>
<td>28.9</td>
</tr>
<tr>
<td>Management and Operations Strategies</td>
<td>4.8</td>
</tr>
<tr>
<td>Growth, Development, and Land-use Strategies</td>
<td>3.9</td>
</tr>
<tr>
<td>Public Transportation</td>
<td>15.6</td>
</tr>
<tr>
<td>Freeway, Tollway, Express/HOV, Tolled Managed Lanes, and Arterial System</td>
<td>45.5</td>
</tr>
<tr>
<td><strong>Total (Actual $, Billions)</strong></td>
<td><strong>98.7</strong></td>
</tr>
</tbody>
</table>

Values may not sum due to independent rounding

Congestion mitigation is an integral element of the MTP. It serves as a guide for implementing both near-term and long-range regional transportation improvements. The CMP identifies where congestion occurs or is expected, evaluates strategies to mitigate congestion, and develops plans for implementation of the most cost-effective strategies. While CMP strategies will be implemented across the entire area, the congested area has been targeted for more intensive data collection and monitoring efforts as part of the ongoing congestion management process.

The performance of the current and future transportation system was measured in conjunction with the plan development process. A variety of quantifiable system performance measures were used to identify the extent and duration of traffic congestion. Candidate strategies were assessed for their effectiveness and feasibility of implementation in the region. A number of regional congestion mitigation strategies were recommended for implementation. These were relatively low-cost measures designed to manage the transportation system and reduce travel demand.

This program includes operational management and travel demand reduction strategies anticipated to be the most cost-effective for this region. Total program cost for the congestion mitigation element of the plan is approximately $4.8 billion. This is in addition to the HOV and managed lanes system, public transportation, infrastructure maintenance, and sustainable development strategies which together total $93.9 billion.

The adopted congestion mitigation strategies include traffic signal and intersection improvements aimed at reducing delay on arterial streets. Freeway bottleneck removals combined with deployment of incident detection and response systems, including motorist assistance and accident clearance, are proposed to maintain traffic flow on the controlled-access highway system. TDM strategies such as employer trip reduction programs, park-and-ride facilities, and rideshare programs are also included.
Integrating the CMP into the Corridor Study and NEPA Process

Federal law prohibits single-occupant vehicle (SOV) capacity from being added in transportation management areas (urbanized areas with a population greater than 200,000) which are also nonattainment areas for ozone, unless the recommendation is part of the regional CMP. The CMP focuses on balancing additional capacity with congestion mitigation strategies to complement each other in a corridor analysis. The result may be that a given corridor may not include all of the capacity that would be required to eliminate all congestion at all times of day, but may provide enough physical capacity to eliminate much of the congestion in the off-peak periods and shoulders of the peak period, but will rely on identified congestion mitigation strategies to improve traffic flow in the peak periods. This approach allows for a series of scaled-back projects that may be proposed across the region rather than concentrating resources in a few heavily congested areas and providing no improvements in other areas.

Since these recommendations are the result of the system planning process which is aimed at maximizing system-level performance and financial issues, the result in each corridor must be refined to reflect the specific issues associated with the corridor. This refinement of the MTP and CMP is the result of corridor studies and NEPA. The corridor study refines the recommendations identified in the MTP while the NEPA process evaluates the environmental and social impacts of the proposed corridor recommendations. Often the corridor study and NEPA evaluation are performed concurrently. If the recommendations of the corridor/NEPA studies are different than those of the MTP or CMP, including the financial placeholder assumption, the MTP and CMP must be updated to reflect the recommendations. Since the MTP, including the TDM and TSM&O strategies, is financially constrained, any change in the financial assumption for the corridor will have impacts for the entire MTP and should be thoroughly evaluated.

Relationship of the CMP with Corridor/NEPA Studies

As the Dallas-Fort Worth region seeks to integrate a management philosophy into all aspects of transportation planning and programming, it is intended that congestion mitigation strategies be developed as part of all corridor studies and subsequently included as part of the NEPA evaluation. NCTCOG staff provides guidance and support to all corridor study lead agencies, as they seek to incorporate operational management and travel demand reduction strategies on proposed facilities. The evaluation of all reasonable congestion mitigation strategies is viewed as essential to progressive transportation planning in this region.

The CMP will have a role in all corridor studies conducted in the region. The CMP will conduct an analysis of expected benefits and costs for all TDM and TSM&O strategies to be considered in these corridors. This analysis will be done on an as-needed basis and will become part of the corridor study and subsequent NEPA documentation. In this way, the regional strategies identified in the MTP will be applied on a corridor level. Any additional congestion mitigation strategies identified will then be evaluated for their application on the corridor or sub-area level and, pending results of the corridor analyses, will be considered for inclusion in the regional MTP.
As portrayed in Exhibit I-6, the development of CMP strategies in corridor studies is conducted by first evaluating the effects of the adopted regional congestion mitigation strategies in the corridor. This is done by:

1. Identifying the committed TDM and TSM&O strategies from the TIP, the MTP, and local government bond programs; and
2. Quantifying the effects of the committed TDM strategies with regional travel model trip table adjustments; and
3. Quantifying the effects of the committed TSM&O strategies with regional travel model network speed and capacity adjustments. This CMP scenario becomes the baseline for all the corridor alternatives.

Next, using this CMP baseline, a TSM&O/TDM-Only Alternative is developed which attempts to accommodate travel demand in the corridor without the major transportation investment. This is done using the following steps:

1. Conduct an inventory of the corridor’s transportation systems and facilities;
2. Assess current and future corridor conditions;
3. Identify transportation deficiencies and problems in the corridor;
4. Identify strategies which can be implemented directly by individual agencies without needing evaluation;
5. Identify corridor-level TDM and TSM&O strategies which address the problems and deficiencies in the sub-area, and the specific actions which support those strategies; and
6. Conduct an evaluation of the actions to assess their impacts in the corridor, documenting the extent to which these actions can alleviate travel demand in the corridor.
EXHIBIT I-6
CMP STRATEGY DEVELOPMENT IN CORRIDOR STUDIES

Evaluate the effects of the adopted regional Congestion Management Process strategies in the corridor. This scenario becomes the Baseline for the corridor alternatives.

Using the Baseline, develop a TDM and TSM&O only alternative to accommodate travel demand in the corridor without the major transportation investment.

If the CMP-only alternative cannot meet all travel demand needs, develop congestion mitigation (TDM and TSM&O) strategies to complement the locally preferred major transportation alternative. These are inventoried in the regional CMP, and monitored for staged implementation through the TIP.

If the CMP-only alternative cannot satisfactorily address the congestion issues, additional capacity alternatives are evaluated along with appropriate CMP strategies which complement the capital investment. This is done through the following tasks:

1. Identify problems and deficiencies in the corridor that are unique to the locally preferred alternative;
2. Review strategies for their compatibility with the locally preferred alternative and identify opportunities for staged implementation;
3. Identify TDM and TSM&O actions which address the problems and deficiencies in the corridor and enhance the operation of the facility;
Congestion Management Process – 2013 Update

4. Conduct an evaluation of the locally preferred alternative (which includes the CMP complement);

5. Recommend a program of TDM and TSM&O strategies that can be incorporated into the facility and in the corridor. Identify implementation responsibilities and outline an implementation schedule;

6. Incorporate recommended CMP strategies into the NEPA evaluation and commit to them as part of the corridor development planning.

Using the strategies described above, the following questions are addressed:

- What are the effects of TDM and TSM&O strategies in the corridor?
- How much travel demand can be accommodated by TDM and TSM&O strategies?
- Is the major transportation investment really needed? Can it be scaled down?
- What is the most appropriate mix of transportation infrastructure and management strategies for this corridor?

Corridor/NEPA Study Recommendations

As the Metropolitan Planning Organization (MPO) for the DFW region, NCTCOG is involved in several ongoing corridor/NEPA studies. These studies represent very different transportation challenges in the region and are varying in scope. Once the lead agency has completed a draft corridor/NEPA study, the recommendations must be endorsed by the lead agency. Following the lead agency endorsement, NCTCOG’s Regional Transportation Council (RTC) must endorse the recommendations, including the CMP strategies. The recommendations of the corridor/NEPA study must be the same as the recommendations in the MTP and CMP for the subject corridor. If differences exist and the RTC endorses the results of the study, the MTP and CMP are modified to reflect the results.

The operational management and travel demand reduction strategies identified in a corridor/NEPA study are seen as commitments being made by the DFW region at two levels: project-level and program-level implementation. In February 1998, the RTC passed Resolution Number R98-01 (Appendix B), which requires that all major investment studies (MIS) (now referred to as corridor/NEPA studies) include an evaluation of operational management and travel demand reduction solutions to congestion and air quality concerns. The resolution also required that an inventory of all commitments made in environmental documents be created and used to monitor the timely implementation of these commitments. In July 2013, the RTC adopted a policy directive that requires the review and application of congestion mitigation strategies to correct corridor deficiencies identified in the CMP when performing corridor and environmental studies and report findings back to NCTCOG. Program-level commitments are inventoried in the financially constrained MTP and future resources are earmarked for their implementation. At the project implementation level, these projects are monitored so they can be added to the regional TIP at the appropriate time with respect to the single-occupancy vehicle facility implementation.
Congestion Management Process – 2013 Update

CMP strategy development is critical to the successful integration of congestion mitigation into the Corridor Study process. However, traditional evaluation tools and decision-making systems, geared to supporting major capital investment decisions, are perhaps relied upon too heavily to make decisions on the appropriate level of operational management and travel demand reduction strategies. Additionally, the need for developing management strategies as part of a corridor/NEPA study is not clearly understood by some individuals who may serve on technical and policy groups. For these reasons, it is imperative that the MPO play an active role in educating strategy development committees on the need for an open debate of all reasonable congestion mitigation strategies.

Integrating the CMP into the Transportation Improvement Program Process

The MTP is both a strategic planning document and a detailed, long-range plan for future investment in the DFW region. It identifies and prioritizes projects and programs designed to enhance the roadway network, transit services, and goods movement through the year 2035. The long-range plan is constrained by available revenues to fund the maintenance, operation, and construction of the transportation system and by vehicle emissions budgets established to attain clean air standards. Candidate MTP projects have been identified from city, county, state, and transit agency submittals. Additional projects have been added to the list based upon needs identified by the MPO.

In order to make sound programming decisions and to ensure that selected projects conform to air quality and financial planning mandates, it is necessary to evaluate programs and projects proposed for inclusion in the TIP. This evaluation process is described in the following paragraphs.

Regionally and Non-Regionally Significant Added Capacity Projects

Regionally significant arterials are identified and included in the Mobility 2035 – 2013 Update based on their role to complement and enhance the major roadway and transit systems by providing the necessary transportation support and access to and from local land uses. This system of arterials is forecast to carry approximately 20 percent of all vehicular traffic in the region. This network is comprised of several key components including facilities which serve regional transportation needs, provide service to regional activity centers, aid in intra-community connectivity, and maintain access to and from areas outside of the region.

In addition to regionally significant arterials, the Mobility 2035 – 2013 Update includes a program of improvements for non-regionally significant arterials which is also reflected in the financial component of the plan. The timing and identification of specific funding sources for each facility are reviewed on a quarterly basis in conjunction with development and/or modification of the TIP project programming process. These projects go through a public involvement and an administrative approval process as part of the TIP amendment.

“SOV Analysis” Exempt Projects

Single Occupancy Vehicle (SOV) analyses are performed on all federal and state-assisted added-capacity projects on regionally and non-regionally significant roadways. However there are projects in Mobility 2035 – 2013 Update that are exempt from congestion mitigation analysis.
Projects that are being proposed to solve a safety problem, such as grade-separations, are exempt. Candidate projects that solve a bottleneck problem by widening or adding lanes are also classified as exempt projects. Other project types include sustainable development, land use, and access related projects. These projects do not require an SOV analysis. The SOV Justification Process is outlined in Exhibit I-7.
Summary

The CMP is a systematic process for determining acceptable congestion levels in a region, measuring the congestion performance of the transportation system, and prioritizing strategies for managing that congestion. Federal requirements define the required elements of a CMP and specify that areas with populations over 200,000 must implement and maintain a CMP.

The CMP for the DFW region is fully implemented into the planning and programming process performed as an MPO. The process is integrated in the development of the MTP, the TIP, the UPWP, and Progress North Texas, as well as corridor studies.

Three goals have been established for the CMP that align with the overall Mobility 2035 – 2013 Update. These goals include the identification of quick-to-implement low cost strategies and solutions to better operate the transportation system; more evenly distribute congestion across the entire transportation corridor, and; ensure corridors have options and available alternate routes/modes to relieve congestion daily and during incident and accidents.

Based on the demographics highlighted at the beginning of this section, the DFW region is expected to continue to grow at a magnitude never before experienced. As the region continues to grow, traffic congestion is expected to increase. The CMP will continue to be a critical component of the planning process, and operational management and travel demand reduction strategies will be necessary to keep the region desirable for future residents and employers.
SYSTEM IDENTIFICATION

The DFW Metropolitan Transportation System is comprised of three major components – the regional freeway and tollway system, the regional arterial system, and the regional transit system. The regional freeway and tollway system is typically characterized by controlled-access general purpose lanes, HOV lanes, managed lanes, and frontage roads. The freeway and tollway system carries nearly half of all vehicle travel in the area, and this is anticipated to continue through the year 2035. The regional arterial system provides support and access to the freeway and tollway system. Lastly, the regional transit system is comprised of passenger rail, bus routes, ridesharing programs, and park-and-ride facilities. The regional transit system is operated by the Dallas Area Rapid Transit (DART), the Denton County Transportation Authority (DCTA), and the Fort Worth Transportation Authority (The T). These agencies provide traditional transit service throughout much of the DFW Metropolitan Area.

Despite ongoing technological advances, expanded transit systems, and increased awareness/sensitivity to environmental concerns, there will continue to be significant demand placed on the regional transportation system. The continued demand will warrant continued system improvements and expansion well into the future.

Regional Freeway And Tollway System

System expansion, operation and maintenance of the regional freeway and tollway system are expensive ventures. Mobility 2035 – 2013 Update faces the challenge of balancing a huge demand on an already overused system with less than adequate funding resources from traditional fuel tax and vehicle registration fee revenues. However, with the adoption of the toll road policy that allows the implementation of new statewide toll roads, the Texas Transportation Commission authorized the Texas Department of Transportation (TxDOT) to evaluate a roadway project during any phase of development or construction for consideration as a toll road. This also includes new location and expansion highway projects on controlled-access roadways, such as adding lanes or constructing new main lanes. State law allows TxDOT to study, design, construct, operate, expand, enlarge, or extend a toll road project as part of the State highway system.

Historically, TxDOT has financed highway projects on a “pay-as-you-go” basis, using motor fuel taxes and other revenue deposited in the State highway fund. However, population increases and traffic demand have outpaced the efficiency of this traditional finance mechanism. Developing projects as toll roads can help bridge the gap between transportation needs and financial resources, and people are gradually becoming more receptive to this user-fee-based system. Recent bills by the Texas Legislature have provided innovative tools for TxDOT, the North Texas Tollway Authority (NTTA), and public-private partnerships through Comprehensive Development Agreements (CDA) to finance, build, and operate toll roads and managed facilities. The legislation also enables toll bonds, concession fees, and excess revenues to fund supplemental roadway projects that are either adjacent to those new corridors or of greatest need in the TxDOT districts where the corridors are constructed.
Mobility 2035 – 2013 Update contains recommendations for an elaborate and widespread managed facility system. These recommendations are the result of analyses of the current and proposed freeway/tollway system in conjunction with the proposed managed facility system. There is recognition that the freeway and managed facilities work together and thus are analyzed in that manner. Exhibit II-1 shows the lane miles per county for the regional freeway and tollway system for 2012 and 2035.

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<tr>
<th>County</th>
<th>Year 2012</th>
<th>Year 2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collin</td>
<td>404</td>
<td>693</td>
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<tr>
<td>Dallas</td>
<td>1,959</td>
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<tr>
<td>Denton</td>
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<td>521</td>
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<tr>
<td>Ellis</td>
<td>344</td>
<td>506</td>
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<tr>
<td>Hood</td>
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<td>0</td>
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<tr>
<td>Hunt</td>
<td>123</td>
<td>123</td>
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<tr>
<td>Johnson</td>
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<td>186</td>
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<tr>
<td>Kaufman</td>
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<td>237</td>
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<tr>
<td>Parker</td>
<td>157</td>
<td>160</td>
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<tr>
<td>Rockwall</td>
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<tr>
<td>Tarrant</td>
<td>1,308</td>
<td>1,712</td>
</tr>
<tr>
<td>Wise</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,079</strong></td>
<td><strong>6,759</strong></td>
</tr>
</tbody>
</table>
Exhibit II-2 highlights the funded limited access facility recommendations for the Mobility 2035 – 2013 Update. The total cost for the implementation of the freeway, tollway, and managed facility improvements is $36.1 billion. Costs from the plan are based on current planning and engineering studies, were reviewed by TxDOT and NTTA, and represent total project cost reflected in year of expenditure dollars consistent with federal planning requirements.

EXHIBIT II-2
MOBILITY 2035 – 2013 UPDATE FREEWAY, TOLLWAY, AND MANAGED LANE IMPROVEMENTS RECOMMENDATIONS

Funded Recommendations
Freeway, Tollway, and Tolled Managed Lane Improvements

Facility recommendations include transportation need, corridor-specific alignment, design, and operational characteristics for the freeway/tollway system will be determined through ongoing project development.
Regional Arterial System

The Designated Regionally Significant Arterial System, shown in Exhibit II-3, is a critical component of the Mobility 2035 – 2013 Update in providing transportation support and access. This system of arterials is forecasted to carry approximately 20 percent of all vehicular traffic in the region. The significance of regional arterials to the region’s transportation system becomes increasingly essential as reliever facilities to parallel controlled access facilities, as well as supporting accessibility to other regional facilities to and from local land uses.

EXHIBIT II-3
DESIGNATED REGIONALLY SIGNIFICANT ARTERIALS

Regionally Significant Arterials provide necessary transportation support to the freeway/arterial system and also provide access to and from local land uses.
The regionally significant arterials that are currently funded for improvement, or anticipated to be funded within the timeframe of the Mobility 2035 – 2013 Update, are shown in Exhibit II-4. The Mobility 2035 – 2013 Update has designated $5 billion for arterial improvements; a majority of this funding will come from local sources.
Regional Transit System

Public transportation services throughout the DFW Metropolitan Area are provided by small and large transit-focused organizations. The three largest organizations, DART, DCTA, and The T, provide traditional transit service throughout much of the DFW Metropolitan Area. Other more local organizations provide complementary services that coordinate transit operations and human services in less densely populated areas in North Central Texas. There are an additional 80 known public, private, and specialized transportation service providers in North Central Texas.

DART was created by voters in 1983 and is funded with a one-cent sales tax by 13 member cities. DART’s nearly 700-square-mile service area includes a broad range of services such as 130 bus routes, 72 miles of light rail transit (LRT), paratransit service for the mobility impaired, ridesharing programs, corporate travel demand management programs, and other general mobility programs. DART continually expands and upgrades transit facilities throughout their service area by reviewing routes to maximize efficiency. Local feeder routes improve the potential for increased rail ridership by providing reliable connections from residential areas to rail stations.

Dallas Area Rapid Transit - Member Cities: 13

1. Addison
2. Carrollton
3. Cockrell Hill
4. Dallas
5. Farmers Branch
6. Garland
7. Glenn Heights
8. Highland Park
9. Irving
10. Plano
11. Richardson
12. Rowlett
13. University Park

Service Area: 689 square miles; Service Area Population: 2.4 million
Source: 2009 National Transit Database

Denton County voters recognized the need to establish reliable and progressive transportation as they voted to confirm DCTA, a coordinated county transportation authority, on November 5, 2002. The outcome of the DCTA election held on September 13, 2003, resulted in three municipalities, Denton, Highland Village, and Lewisville, approving a half-cent sales tax to fund various transportation services in their cities. Collection of their sales tax began January 1, 2004. DCTA’s service plan, which opened in June 2011, includes rail service on the A-train between the cities of Denton and Carrollton. Other aspects of the service plan are a park-and-ride transfer network along the rail corridor to connect to all planned services, regional connector bus service as an interim measure where rail service will eventually be implemented, local fixed-route bus services operating in Denton and Lewisville serving the most dense portions of the county, demand response service to member cities for the elderly and disabled, and a local assistance program to help improve traffic mobility in the near term.
Denton County Transportation Authority - Member Cities: 3
1. Denton
2. Highland Village
3. Lewisville
Service Area: 157 square miles; Service Area Population: 235,000
Source: 2009 National Transit Database

The T provides fixed-route bus, express bus, and/or Rider Request service throughout Fort Worth, Richland Hills, and Blue Mound. Express routes allow virtually non-stop travel weekdays from downtown Fort Worth and the Trinity Railway Express (TRE) commuter rail station at the Intermodal Transportation Center (ITC). Park-and-ride locations offer a convenient meeting point for carpools and vanpools; all-day parking is free, complements of The T, participating businesses, and churches. The Rider Request Program within Richland Hills offers the choice of having a bus meet a passenger where they desire as long as travel is within the route’s designated service area.

Fort Worth Transportation Authority - Member Cities: 3
1. Blue Mound
2. Fort Worth
3. Richland Hills
Service Area: 350 square miles; Service Area Population: 730,000
Source: 2009 National Transit Database

The TRE is a cooperative commuter rail service provided by DART and The T. The TRE includes approximately 35 miles of track, linking downtown Fort Worth, downtown Dallas, and Dallas/Fort Worth International Airport. Scheduled train service is provided Monday through Saturday. No regularly scheduled service is available on Sunday. Special Sunday service may be promoted for announced special events only.

Exhibit II-5 highlights the existing regional passenger rail lines for DART, DCTA, and The T.
The funding of management and operations, transit system improvements, and expansions are included as part of the development of specific recommendations of the Mobility 2035 – 2013 Update, and of the entire transit system as a whole, including the existing rail, bus, and paratransit networks. Project examples include, but are not limited to, double tracking, rail station improvements, bus stop improvements, and system modernization and safety improvements for the system and rail/road crossings. The recommended rail system and its various components are shown in Exhibit II-6. Approximately 497 miles of rail are identified in the recommended system. Of that, 141 miles are existing service, 74 miles are programmed projects and projects currently under development, and the remaining 282 miles are projects utilizing funding identified through other sources.
Summary

With a population that is expected to grow to 9.8 million residents by 2035, the need for a reliable transportation system in North Central Texas is particularly important. Transportation professionals and policy makers are working to develop creative solutions to these challenges. Recent bills by the Texas Legislatures have provided innovative ways to finance and build these highway projects that are shown of greatest needs through toll bonds, concession fees, and excess revenues. The Regional Arterial System, which is forecasted to carry approximately 20 percent of vehicular traffic in the region, is also designated for $5 billion in improvements, according to the Mobility 2035 – 2013 Update. Finally, the proven ability of rail service that DART, DCTA, The T, and other local transit operations provide will help improve mobility in the region. These joint efforts by the transit agencies will play a crucial role in meeting those future transportation needs and the current system demand in North Central Texas.
TRANSPORTATION SYSTEM PERFORMANCE AND CRITERIA

System Performance

A transportation system’s performance can be measured in several ways, especially when dealing with a multimodal transportation system. It is often measured in terms of how successful the system is in reducing roadway traffic congestion. If multimodal options, trip reduction programs, system management projects, and other travel policies are effective, the result will be reflected through reduced congestion on the roadway system. However, demographic growth may increase faster than transportation system capacity can be provided, either due to implementation issues or financial constraint.

In 2013, the daily vehicle miles of travel in the region was over 181 million miles. Currently, travel throughout the region takes approximately 32 percent longer to complete due to congestion, resulting in nearly 1.2 million daily vehicles hours spent in delay. This delay equates to an annual cost of congestion of $4.7 billion for the region. Exhibit III-1 shows the regional peak period congestion levels for 2013.

EXHIBIT III-1
2013 PEAK PERIOD CONGESTION LEVELS

Levels of Congestion: 2013

Legend

- No Congestion
- Light Congestion
- Moderate Congestion
- Severe Congestion

Major Roads

Fort Worth CBD

Dallas CBD

Cost of Congestion: $4.7 billion

*Congestion index is based on a percent increase in travel time.
If the projects, programs, and policies contained in the Mobility 2035 – 2013 Update are implemented, travel time due to congestion is expected to increase nearly 46 percent with an annual congestion cost of $10.2 billion in 2035. Severe congestion will spread to include southeast Denton County and additional portions of north Dallas and south Collin Counties. Financial, environmental, and social constraints will make it very difficult to accommodate the increased demand for travel resulting from the regional growth. If the region is to meaningfully reduce congestion levels, additional congestion mitigation strategies aimed at reducing drive-alone travel and making the transportation system operate more efficient will need to be pursued. Exhibit III-2 shows the regional peak period congestion levels for 2035 with planned improvements.

**EXHIBIT III-2**

**2035 PEAK PERIOD CONGESTION LEVELS**

The implementation of congestion mitigation strategies continues to involve the public sector, private sector, and public/private partnerships. Transportation policies need to be developed to strengthen land use/transportation decision-making processes and to guide investment toward cost-effective solutions. Mobility 2035 – 2013 Update emphasizes that we cannot afford to build our way out of our traffic congestion problem. While the construction of new facilities will take place, we must also find effective and practical solutions to address the air quality and traffic congestion challenges that confront us.
Develop Performance Measures – Transportation System

Data collection and system performance monitoring provide a high level overview of congested facilities and the severity of congested facilities. The mix of data collection and performance measures evaluated through the CMP look at multiple elements that affect traffic congestion on our metropolitan transportation system. Some of those data elements include corridor analysis, level of service analysis, reliability and speed data, traffic volumes, light rail and commuter rail ridership, and bicycle and pedestrian accessibility analysis. Exhibit III-3 shows 15-Minute Minimum Speed data in the region for the average Monday through Friday. The map was developed using Nokia Traffic Data, which was collected over time.

EXHIBIT III-3
15-MINUTE MINIMUM SPEEDS

The mix of data collection and performance measures outlined in this chapter were chosen to look at multiple elements that effect traffic congestion on our metropolitan transportation system. These performance measures focus on recurring and non-recurring congestion. The data collection and performance measures continue to expand over time as more data becomes available and as other performance measures mature. Exhibit III-4 outlines the existing system monitoring and data collection programs at NCTCOG that focus on the metropolitan transportation system.
### EXHIBIT III-4
**DATA COLLECTION**
**METROPOLITAN TRANSPORTATION SYSTEM**

(Controlled Access Facilities, Regional Arterial System, Multimodal Freight, and Rail Transportation)

<table>
<thead>
<tr>
<th>Observed or Modeled Data</th>
<th>Data Element</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modeled</td>
<td>Level Of Service</td>
<td>DFW Regional Travel Model</td>
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<td>Observed/Modeled</td>
<td>Corridor Analysis</td>
<td>NCTCOG</td>
</tr>
<tr>
<td>Observed</td>
<td>Reliability/Speed</td>
<td>ITS Data Archive Project Nokia Traffic Data (NTD)</td>
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<td>Observed</td>
<td>Volumes (7-day and 24-hour vehicle counts)</td>
<td>Regional Traffic Signal Retiming Program (RTSRP) Traffic Count Website</td>
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<tr>
<td>Modeled</td>
<td>Truck Traffic Forecast</td>
<td>DFW Regional Travel Model</td>
</tr>
<tr>
<td>Observed</td>
<td>Vehicle Classification Counts</td>
<td>TxDOT and RTSRP</td>
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<td>Observed</td>
<td>Crash Data</td>
<td>DPS/TxDOT</td>
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<td>Observed/Modeled</td>
<td>Regional Demographic Data</td>
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<td>Observed</td>
<td>DART Light Rail Train Ridership</td>
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<td>TRE Average Weekday Ridership by Station</td>
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<td>DCTA A-train Ridership</td>
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<td>The T Bus Ridership</td>
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<tr>
<td>Observed</td>
<td>Bicycle and pedestrian accessibility to transit, major employers, and other major destinations</td>
<td>NCTCOG Cities</td>
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Included in Exhibit III-5 is a list of future performance data elements that may be collected.

**EXHIBIT III-5**
**FUTURE DATA COLLECTION**
**METROPOLITAN TRANSPORTATION SYSTEM**

*(Controlled Access Facilities, Regional Arterial System, Multimodal Freight, and Rail Transportation)*

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<th>Observed or Modeled Data</th>
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<td>DFW Regional Travel Model</td>
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<td>Modeled/Observed</td>
<td>Vehicle Classification</td>
<td>DFW Regional Travel Model, ITS Data Archive, TxDOT Saturation Counts</td>
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<td>Modeled</td>
<td>Vehicle Miles of Travel (VMT) or Travel Time Contour</td>
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<td>Level-of-Service</td>
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<td>Observed</td>
<td>Turning Movement Counts</td>
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<td>Travel Time</td>
<td>ITS Data Archive, RTSRP</td>
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<td>Vehicle Classification Counts</td>
<td>RTSRP, TxDOT Saturation Counts, ITS Data Archiving Project</td>
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<td>Vehicle Emissions (Nox and VOC)</td>
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<tr>
<td>Modeled</td>
<td>HBW, HNW, NHB and all Transit Person Trip Reduced</td>
<td>TransCAD - Transit Summary Report, Transit Summary Daily Report and Mode of Access Reports</td>
</tr>
<tr>
<td>Modeled</td>
<td>Transit Passenger Miles</td>
<td>TransCAD - Transit Summary Report and Transit Summary Daily Report</td>
</tr>
<tr>
<td>Modeled</td>
<td>Forecasted Transit Flow Information in Each Route</td>
<td>TransCAD - Flow Table</td>
</tr>
<tr>
<td>Modeled</td>
<td>Transit Route System</td>
<td>TransCAD - ACTTRNT</td>
</tr>
<tr>
<td>Observed</td>
<td>Subsidy per Passenger - All Modes, Light Rail, Commuter Rail</td>
<td>DART/FWTA/DCTA/NTD</td>
</tr>
<tr>
<td>Observed</td>
<td>Transit Ridership - System-wide, Light Rail, Commuter Rail</td>
<td>DART/FWTA/DCTA/NTD</td>
</tr>
</tbody>
</table>
## Observed or Modeled Data

<table>
<thead>
<tr>
<th>Data Element</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed On-Time Performance—All Modes, Light Rail, Commuter Rail</td>
<td>DART/DCTA</td>
</tr>
<tr>
<td>Observed Parking Utilization</td>
<td>Transit Agencies/Local Agencies</td>
</tr>
<tr>
<td>Observed Inventory of Bicycle and Pedestrian Facilities and Accommodations</td>
<td>NCTCOG/Cities</td>
</tr>
<tr>
<td>Observed Bicycle and Pedestrian Use Within the Region</td>
<td>NCTCOG/Cities</td>
</tr>
<tr>
<td>Observed Inventory of Bicycle and Pedestrian Facility Gaps and Missing Connections</td>
<td>NCTCOG/Cities</td>
</tr>
<tr>
<td>Observed Safety Enhancements for Bicyclists, Pedestrians, and Motorists through Infrastructure Improvements</td>
<td>NCTCOG/Cities</td>
</tr>
<tr>
<td>Observed Bike User Counts to Select a Group of Regionally Significant Trails</td>
<td>NCTCOG/Cities</td>
</tr>
</tbody>
</table>

Exhibit III-6 highlights the performance measures associated with the established CMP goals and objectives as discussed in the Overview section.
### CMP Goals and Action

<table>
<thead>
<tr>
<th>CMP Goals and Action</th>
<th>Objectives</th>
<th>Performance Measures</th>
</tr>
</thead>
</table>
| **Goal:** Identify quick-to-implement low cost strategies and solutions to better operate the transportation system.  
**Action:** Implement quick-to-implement low cost strategies and solutions to better operate the transportation system. | Reduce SOV trips through travel demand management strategies.  
Increase usage of park-and-ride lots.  
Provide all users with travel alerts and alternate routes in the case of incidents, special events, weather, construction, and severe congestion at choke points.  
Increase the number of intersections that are equipped and operating with traffic signals that enable real-time monitoring and management of traffic flows.  
Reduce mean roadway clearance time per incident (Defined as the time between awareness of an incident and restoration of lanes to full operational status.) | Number of users in the region participating on Try Parking It.  
Utilization rate of park-and-ride lots in the region.  
Percent of routes where traveler alerts and alternate route information is provided in the case of incidents, special events, weather, construction, and severe congestion choking points.  
Percent of intersections in the region equipped and operating with traffic signals that enable real-time monitoring and management of traffic flows.  
Average roadway clearance times. |
| **Goal:** More evenly distribute congestion across the entire transportation corridor.  
**Action:** Conduct inventory of corridor system to identify availability of existing options. | Reduce the percentage of facility miles (highway, arterial, rail, etc.) experiencing recurring congestion during the peak period.  
Maintain the rate of growth in facility miles experiencing recurring congestion as less than the population growth rate (or employment growth rate.)  
Increase the number of HOV/Managed lanes in the region.  
Increase alternative (non-SOV) mode share for all trips.  
Increase active (bike/ped) mode share.  
Increase mode share in transit.  
Increase access to transit (within two miles) to specified percentage of the population. | Percent of lane-miles operating at LOS F or V/C > 1.0.  
Population growth rate.  
Total number of HOV/Managed lanes in the region.  
Share of employees walking, biking, telecommuting, carpooling/vanpooling, riding transit, driving. Track through Try Parking It website.  
Share of trips by each mode of travel.  
Percent of trips that take transit as a mode of travel.  
Percent of population within two miles of a transit station. |
| **Goal:** Ensure corridors have options and available alternate routes/modes to relieve daily congestion and during incidents and accidents.  
**Action:** Prioritize corridors based on available options and alternate/modes routes. | Reduce buffer index on freeway system during peak and off-peak periods.  
Reduce delay associated with incidents on arterials.  
Conduct joint training exercises among operators and emergency responders in the region.  
Increase the percentage of regional staff with incident management responsibilities that have completed and participated in the regional Freeway Incident Management Training. | The buffer index (represents the extra time (“buffer”) travelers add to their average travel time when planning trips in order to arrive on-time 95 percent of the time.)  
Incident response and clearance times.  
Number of participants and joint training exercises conducted among operators and emergency responders.  
Percent of staff in a corridor that have completed regional Freeway Incident Management Training. |
Monitor And Evaluate Performance - Corridor Analysis Methodology

System performance for the transportation system is measured in a number of different ways. Maps are used to show both recurring (expected) and non-recurring (unexpected) congestion on limited access facilities and the DFW Regional Travel Model simulates levels of service designations. The CMP utilizes various performance measures to conduct a transportation system corridor analysis to evaluate the overall transportation system. The initial step in the corridor analysis process is to conduct a corridor-level inventory to determine the various options that exist along the corridor that may assist in alleviating congestion on the main roadway facility. The inventory looks at four categories of options that may influence congestion levels: alternative roadway infrastructure (services), modal options (services), system demand (recurring), and system reliability (non-recurring). This section provides an overview of the elements that were analyzed within the four categories.

Alternative Roadway Infrastructure

The factors that influence alternative roadway infrastructure include the presence of parallel freeways, toll roads, frontage roads, parallel arterials, and direct connections or interchanges. These elements are critical components of the regional transportation system.

Freeways and tollways in North Central Texas are critical elements in the regional transportation system. These roadway facilities are characterized by controlled-access general-purpose lanes, express/HOV, tolled managed lanes, and frontage roads. The freeway and tollway system accounts for a small percentage of the total roadway lane miles in the DFW Metropolitan Area, but carries nearly half of all vehicular travel in the region.

In addition to freeway and tollway system, regionally significant arterials are identified based on their role to complement and enhance the major roadway and transit systems by providing the necessary transportation support and access to and from local land uses. This network is comprised of several key components including facilities which serve regional transportation needs, provide service to regional activity centers, aid in intra-community connectivity, and maintain access to and from areas outside of the region. More information on these components is included in the System Identification section.

Modal Options

The factors that influence modal options include the presence of transit options (bus and/or rail), park-and-ride facilities, HOV/Managed lanes, and bicycle/pedestrian options.

Transit Options

Public transportation services throughout the DFW region are provided by small and large transit-focused organizations. The three largest organizations include DART, DCTA, and The T. Each agency operates in an established service area and offers transit services that range from traditional bus route services to light rail train services. DART’s service area is nearly 700 square miles and has a service population of 2.4 million people. DCTA’s service area is 157 square miles and has a service population of 235,000 people. The T’s service area is 350 square miles and has a service population of 730,000 people. Exhibit III-7 highlights the service areas for these...
agencies. In an effort to improve travel across the region, the transit agencies have coordinated their fare structures to provide riders seamless connections between service providers and modes. More information on the regional transit system and the services provided by each is located in the System Identification section.

**EXHIBIT III-7**
PUBLIC TRANSPORTATION SERVICE AREAS

Park-and-Ride Facilities

Park-and-ride facilities serve as collection areas for persons transferring to higher-occupancy vehicles. They are normally located and designed to serve bus or rail transit, but many are used by car- and vanpoolers as well. Park-and-ride facilities can be located near a central business district to serve public transit and pedestrian activity areas or in suburban areas to collect riders near the origin of their trips. Combined with HOV/managed lanes, park-and-ride facilities can be an effective incentive for increasing vehicle occupancy, thus reducing congestion and vehicle emissions. Existing, planned, and candidate park-and-ride facilities in the DFW region are provided in Exhibit III-8.
Congestion Management Process – 2013 Update

EXHIBIT III-8
EXISTING, PLANNED, AND CANDIDATE PARK-AND-RIDE FACILITIES

Park-and-Ride Locations

HOV/Managed Lanes

HOV/managed lanes in the DFW area are typically constructed in the medians of existing corridors. The HOV facilities in operation today are considered part of an interim system and are based on the more traditional two plus occupancy requirement. It is intended and recommended in Mobility 2035 – 2013 Update that in order to better manage the available capacity in these HOV corridors and to promote reliability of the overall system, the existing interim HOV corridors would evolve, either all together simultaneously or separately over time, into an HOV/managed lane system. The existing interim HOV lane network includes the following corridors:
IH 30: East R.L. Thornton Freeway
- Contra-flow lane with a moveable barrier
- Limits: Dallas Central Business District to Northwest Drive in Mesquite

IH 30: Tom Landry Highway
- One- to two-lane reversible, barrier-separated facility
- Limits: Center Street in Arlington to Sylvan Avenue in Dallas

IH 35E: Stemmons Freeway
- One lane concurrent flow in each direction, buffer-separated facility
- Limits: IH 635 in Dallas to FM 3040 in Lewisville

IH 635: LBJ Freeway
- One lane concurrent flow in each direction, buffer-separated facility
- Limits: IH 35E to Oates Drive/Galloway Avenue in Mesquite

IH 35E/US 67: South R.L. Thornton Freeway/Marvin D. Love Freeway
- One reversible, barrier-separated lane on IH 35E and part of US 67
- One lane concurrent flow in each direction, buffer-separated on US 67
- Limits on IH 35E: Dallas Central Business District to US 67
- Limits on US 67: IH 35E to IH 20

US 75: Central Expressway
- One lane concurrent flow in each direction, buffer-separated facility
- Limits: IH 635 in Dallas to Bethany Drive in Allen
Exhibit III-9 includes a map of the existing and planned HOV/Managed lane system in the DFW region. Exhibit III-10 includes the HOV/managed lanes miles per county.

EXHIBIT III-9
HOV/MANAGED LANE SYSTEM

HOV/Managed Lane System

Legend
- Current Express/ HOV Lanes
- New Managed Lanes

EXHIBIT III-10
HOV/MANAGED LANE SYSTEM MILES PER COUNTY

North Central Texas Council of Governments
May 31, 2013
### EXHIBIT III-10
HOV/MANAGED LANE MILES PER COUNTY

<table>
<thead>
<tr>
<th>County</th>
<th>Year 2012</th>
<th>Year 2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collin</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Dallas</td>
<td>110</td>
<td>250</td>
</tr>
<tr>
<td>Denton</td>
<td>6</td>
<td>90</td>
</tr>
<tr>
<td>Tarrant</td>
<td>5</td>
<td>218</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>135</strong></td>
<td><strong>566</strong></td>
</tr>
</tbody>
</table>

Source: Expanded Dallas-Fort Worth Regional Travel Model, NCTCOG

### Bike Options

The Regional Veloweb is a network of off-street shared-use paths designed for use by bicyclists, pedestrians, and other non-motorized forms of transportation. The Veloweb serves as the regional expressway for bicycle transportation. Facilities of this type have a proven track of attracting users and provide recreational, air quality, health, economic development, and mobility benefits to communities across the nation. Linking high quality facilities together to provide intraregional routes which favor bicycle travel will encourage increased use of the bicycle for utilitarian trip purposes.

The original Regional Veloweb map was developed in 1997 based on an extensive study conducted by the NCTCOG Bicycle and Pedestrian Advisory Committee. In 2008, work began to update the Regional Veloweb alignments based on feedback received by local governments and community members and the general need to reassess the functionality and alignment of the Veloweb. The results of the Regional Veloweb update include approximately 1,024 miles of added facilities, bringing the total Veloweb to approximately 1,668 miles. Exhibit III-11 includes a map of the existing, planned, and funded bicycle and pedestrian off-street facilities.
System Demand (Recurring)

The factors that influence system demand include volume over capacity ratios, truck volumes, the number of employees along that roadway corridor by block, and residential population.

Volume-to-Capacity (Level of Service)

Level of service (LOS) is one performance measure that has been identified in the CMP to assess the performance of the controlled access system. LOS analysis measures the operational performance of a roadway during the most congested times of the day. LOS is expressed using “A”, “B”, “C”, “D”, “E”, and “F” designations. Vehicles operating on a roadway performing at a LOS of A, B, or C travel at posted speeds with little interference from other vehicles. Vehicles driving on roadways operating at LOS D or E experience speeds much slower than the posted speed limits.
When the volume of traffic on a roadway exceeds the actual capacity, the result is a LOS F condition, causing vehicles to experience stop and go or standstill conditions.

LOS ABC
A LOS of A, B, or C represents a relatively uncongested facility. Vehicles can move freely with little interference.

LOS DE
A LOS of D or E represents a relatively congested facility. Vehicles can move with some interference.

LOS F
A LOS of F represents the worst level of congestion. Vehicles are unable to move freely without interference.

Source: NCTCOG
Exhibit III-12 illustrates the performance of the DFW limited access facilities in 2013, based on peak hour roadway level of service.

EXHIBIT III-12
PEAK HOUR LEVEL OF SERVICE
LIMITED ACCESS FACILITIES

Aside from recurring congestion or expected delay, non-recurring congestion or unexpected delay is another measure that needs to be quantified on the controlled access facilities. According to the Texas Transportation Institute’s Urban Mobility Study, 52 to 58 percent of delay experienced by motorists in urban areas is caused by unexpected incidents, such as accidents and stalled vehicles. Using the Intelligent Transportation System data and data from the private sector that is available in the region, non-recurring congestion can be measured.
Truck Volume Percentage

Freight transportation is a key component in the DFW regional economy. A number of trade routes intersect in the DFW region creating a need for efficient freight flows. Interstate Highway (IH) 35, the North American Free Trade Agreement (NAFTA) Superhighway, runs through the heart of the region, providing crucial connections to the national interstate highway system. As a result, 98 percent of the U.S. population can be reached from the DFW region within 48 hours by truck.¹ Freight is vital to our regional economy, as well as the Texas economy. In 2008, the region accounted for 32 percent of the Texas Gross Domestic Product.² The North Central Texas region represents one of the largest inland ports in the nation where freight is moved, transferred, and distributed to destinations across the state and around the world. The region has one of the most extensive surface and air transportation networks in the world, providing extensive trade opportunities for the more than 700 motor/trucking carriers and freight forwarders that operate within the region. An inventory of regional freight transportation facilities is shown in Exhibit III-13.

EXHIBIT III-13
REGIONAL FREIGHT TRANSPORTATION FACILITIES

Exhibit III-14 illustrates daily truck volume on major roadways within the DFW region. The areas highlighted in red represent the corridors with the highest truck volumes, which include sections of IH 20, IH 30, IH 35E, IH 35W, IH 635, and US 75.

**EXHIBIT III-14**
REGIONAL COMMERCIAL TRUCK VOLUMES

<table>
<thead>
<tr>
<th>Legend</th>
<th>Total Trucks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,000 - 2,000</td>
</tr>
<tr>
<td></td>
<td>2,001 - 4,000</td>
</tr>
<tr>
<td></td>
<td>4,001 - 8,000</td>
</tr>
<tr>
<td></td>
<td>8,001 - 16,000</td>
</tr>
<tr>
<td></td>
<td>&gt; 16,000</td>
</tr>
</tbody>
</table>

Total truck traffic includes only commercial vehicle traffic

Regional Population and Employment Trends

In 2010, the 12-county DFW Metropolitan Planning Area (MPA) had a population of approximately 6.5 million. By the year 2035, these same 12 counties are forecasted to grow to 9.8 million residents. This growth represents a 50 percent increase in the population of North Central Texas over the next 25 years. Historical population growth is important to understanding where populations will grow in the future. Regional population and employment trends and forecasts also determine where residents currently live, work, and carry out leisure activities and where they will be undergoing these activities in the future. The DFW region continues to experience high levels of population growth and forecasts project this trend will continue through 2035. Exhibit III-15 highlights the projected change in population density by county between 2013 and 2035.

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3 2010 Census, www.census.gov
Regional Employment

The DFW region is home to 18 Fortune 500 companies and represents 32 percent of the state’s economy. Employment within the 12-county MPA is projected to increase 44 percent from 4,292,516 jobs in 2013 to 6,177,016 in 2035. During the same period, the average employment density is projected to increase from 455 to 654 jobs per square mile in the region. Employment growth by county is shown in Exhibit III-16.

4 2012 Fortune 500 Companies. www.money.cnn.com
EXHIBIT III-16
DALLAS-FORT WORTH REGION EMPLOYMENT GROWTH

<table>
<thead>
<tr>
<th></th>
<th>2012 Employment</th>
<th>2035 Employment</th>
<th>Growth</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collin</td>
<td>380,184</td>
<td>628,349</td>
<td>248,165</td>
<td>65%</td>
</tr>
<tr>
<td>Dallas</td>
<td>2,146,783</td>
<td>2,854,287</td>
<td>707,504</td>
<td>33%</td>
</tr>
<tr>
<td>Denton</td>
<td>233,187</td>
<td>406,105</td>
<td>172,918</td>
<td>74%</td>
</tr>
<tr>
<td>Ellis</td>
<td>63,260</td>
<td>116,145</td>
<td>52,885</td>
<td>84%</td>
</tr>
<tr>
<td>Hood</td>
<td>21,035</td>
<td>37,036</td>
<td>16,001</td>
<td>76%</td>
</tr>
<tr>
<td>Hunt</td>
<td>48,140</td>
<td>78,163</td>
<td>30,023</td>
<td>62%</td>
</tr>
<tr>
<td>Johnson</td>
<td>70,283</td>
<td>132,917</td>
<td>62,634</td>
<td>89%</td>
</tr>
<tr>
<td>Kaufman</td>
<td>42,630</td>
<td>81,646</td>
<td>39,016</td>
<td>92%</td>
</tr>
<tr>
<td>Parker</td>
<td>49,360</td>
<td>91,660</td>
<td>42,300</td>
<td>86%</td>
</tr>
<tr>
<td>Rockwall</td>
<td>25,924</td>
<td>53,934</td>
<td>28,010</td>
<td>108%</td>
</tr>
<tr>
<td>Tarrant</td>
<td>1,098,965</td>
<td>1,644,463</td>
<td>545,498</td>
<td>50%</td>
</tr>
<tr>
<td>Wise</td>
<td>30,427</td>
<td>52,311</td>
<td>21,884</td>
<td>72%</td>
</tr>
<tr>
<td>Total</td>
<td>4,210,178</td>
<td>6,177,016</td>
<td>1,966,838</td>
<td>47%</td>
</tr>
</tbody>
</table>

System Reliability (Non-Recurring)

Lastly, the factors that influence system reliability include facility crash data, roadway shoulders, an incident management training inventory, truck lane restrictions, and the presence of Intelligent Transportation Systems technology.

Regional Crash Rate

NCTCOG receives crash data from TxDOT’s Crash Records Information System (CRIS) annually. The collected data helps to identify crash hotspots and assist in the development of improvement strategies for the locations. Exhibit III-17 displays crash rates by corridor in comparison to the regional crash rate average of slightly over 75 crashes per 100 million vehicle miles traveled. This average crash rate was developed based on 2012 regional crash data. Corridors that have a higher crash rate than the regional average are shown in red, while counties with a rate below the regional average are shown in green.
As it relates to system reliability, shoulders are extremely important in the management of traffic incidents. One advantage of shoulders is that the space can be used for vehicles to stop because of mechanical difficulties or other emergencies. Emergency vehicles and responders can also utilize the shoulder when responding to traffic incidents or making traffic stops. The effective utilization of shoulders during traffic incidents is a main component of the NCTCOG Freeway Incident Management (FIM) Training Course. Exhibit III-18 highlights the regional limited access facilities that have both inside and outside shoulders or varying shoulder configurations.
Freeway Incident Management Training

NCTCOG was the first agency in the nation to formalize incident management training for all responders in the region. Initiated in 2003, the goal of the FIM training course is to initiate a common, coordinated response to traffic incidents that will build partnerships, enhance safety for emergency personnel, reduce upstream traffic accidents, improve the efficiency of the transportation system, and improve air quality in the DFW region. The courses are designed to increase awareness of responder safety issues, improve multi-agency coordination, reduce response and clearance times for traffic incidents, and reduce confusion over roles, responsibilities, and jurisdictional lines. Exhibits III-19 and III-20 display police and fire department attendance for the FIM Training courses.
EXHIBIT III-19
FREEWAY INCIDENT MANAGEMENT TRAINING POLICE ATTENDANCE MAP
2003 – OCTOBER 2013

Freeway Incident Management Police Coverage

Legend
1 – 6 Personnel
7 – 15 Personnel
16 + Personnel

North Central Texas Council of Governments: May 31, 2013
Truck Lane Restrictions

The concept of a truck lane restriction is to improve safety and mobility on the roadway system by providing additional guidance to the interaction of two classes of vehicles with very different operating characteristics. Based on traffic studies, truck lane restrictions have been shown to improve mobility, safety, and air quality. For a corridor to be eligible to be considered for truck lane restrictions there must be three or more traffic lanes (excluding frontage roads) in each direction, be a controlled access facility, on the State system, and there cannot be left exits/entrances.

In June 2009, NCTCOG completed the Truck Lane Restriction Expansion Study for the expansion of truck lane restrictions along IH 20, IH 30, IH 45, and IH 820. The corridors included in the study built upon the test segments along sections of IH 30 in Tarrant County and IH 20 in Dallas County put in place during the Truck Lane Pilot Study in 2005-2006. On October 29, 2009, the Texas Transportation Commission approved the expansion of truck lane restrictions within the region.
and the expanded restrictions were operational by summer 2010. This expansion added 187 miles of truck lane restrictions for a total of 245 miles of restrictions throughout the region. In 2013, TxDOT District staff completed the third truck lane restriction expansion study for the expansion of truck lane restrictions along 15 additional segments in the region. These additional corridors include portions of IH 20 in Parker County, IH 30 in Dallas and Rockwall Counties, IH 35E in Dallas and Ellis Counties, IH 35W in Tarrant County, IH 45 in Ellis County, IH 635 in Dallas County, IH 820 in Tarrant County, SH 114 in Dallas County, SH 121 in Tarrant County, SH 360 in Tarrant County, State Loop 12 in Dallas County, US 75 in Dallas and Collin Counties, and US 175 in Dallas County. Exhibit III-21 includes the existing and planned Truck Lane Restriction corridors.

**EXHIBIT III-21**

**POTENTIAL TRUCK LANE RESTRICTION CORRIDORS**

Potential Truck Lane Restriction Corridors

All freeway/tollway corridors require additional study for capacity, geometric, and safety improvements related to truck operations.
Intelligent Transportation Systems

Intelligent Transportation Systems (ITS) applies advanced technologies of electronics, communications, computers, control, sensing and detection to transportation systems in order to improve safety, efficiency and service, and travel time reliability through transmitting and applying real-time information. In the DFW region, ITS aids transportation operators and emergency response personnel as they monitor traffic, detect and respond to incidents, and inform the public of traffic conditions via the Internet, roadway devices, and the media. Traffic monitoring and incident detection and response systems are operating on portions of the freeway system in Collin, Dallas, Denton, and Tarrant counties. TxDOT Dallas and Fort Worth Districts each manage and operate traffic management centers (TMCs) in Dallas and Tarrant counties. In addition, the North Texas Tollway Authority (NTTA) manages and operates the TMC for the tolled facilities. The ITS components of the TxDOT and NTTA TMCs include closed-circuit television, lane control signals, dynamic message signs, mobility assistance patrols, and vehicle detectors on the limited-access facilities. Exhibit III-22A, Exhibit III-22B, Exhibit III-22C, and Exhibit III-22D highlight the existing ITS technology in the DFW region.

EXHIBIT III-22A
EXISTING CLOSED-CIRCUIT TELEVISION (CCTV) TECHNOLOGY

---

EXISTING DYNAMIC MESSAGE SIGNS (DMS) TECHNOLOGY

EXHIBIT III-22B

Intelligent Transportation Systems

Legend

- DMS
- Major Roads

EXISTING DYNAMIC MESSAGE SIGNS (DMS) TECHNOLOGY

- Wise
- Denton
- Collin
- Hunt
- Rockwall
- Hood
- Tarrant
- Dallas
- Kaufman
- Ellis
- Johnson
- Parker

EXHIBIT III-22B
EXISTING DYNAMIC MESSAGE SIGNS (DMS) TECHNOLOGY

Intelligent Transportation Systems

Legend

- DMS
- Major Roads

EXISTING DYNAMIC MESSAGE SIGNS (DMS) TECHNOLOGY

- Wise
- Denton
- Collin
- Hunt
- Rockwall
- Hood
- Tarrant
- Dallas
- Kaufman
- Ellis
- Johnson
- Parker

EXHIBIT III-22B
EXISTING DYNAMIC MESSAGE SIGNS (DMS) TECHNOLOGY

Intelligent Transportation Systems

Legend

- DMS
- Major Roads

EXISTING DYNAMIC MESSAGE SIGNS (DMS) TECHNOLOGY

- Wise
- Denton
- Collin
- Hunt
- Rockwall
- Hood
- Tarrant
- Dallas
- Kaufman
- Ellis
- Johnson
- Parker

CONGESTION MANAGEMENT PROCESS

North Central Texas Council of Governments May 31, 2013
EXHIBIT III-22C
EXISTING VEHICLE DETECTOR TECHNOLOGY

Intelligent Transportation Systems

Legend
- Detectors
- Major Roads

North Central Texas Council of Governments May 31, 2013
Summary

Evaluating a transportation system’s performance is an integral aspect of the CMP. The mix of data collection and performance measures evaluated through the Congestion Management Process look at multiple elements that affect traffic congestion on our metropolitan transportation system. Some of those data elements include corridor analysis, level of service analysis, reliability and speed data, traffic volumes, light rail and commuter rail ridership, and bicycle and pedestrian accessibility analysis. There are several ways data can be measured, especially when dealing with a multimodal transportation system. It is often measured in terms of how successful the system is in reducing roadway traffic congestion. If multimodal options, trip reduction programs, system management projects, and other travel policies are effective, the result will be reflected through reduced congestion on the roadway system.
CORRIDOR ANALYSIS AND STRATEGY IDENTIFICATION

Corridor Analysis Process

The CMP recommends an action of conducting an inventory of the corridor system to identify availability of existing options. To achieve this action, a corridor evaluation of 25 regional roadways was conducted. Those 25 corridors were broken down into 93 segments based on corridor characteristics, including alternate routes, modal options, and available decision points. As part of the evaluation, each corridor was inventoried to determine the various options that exist along that corridor to help alleviate congestion from the main roadway facility. A map of the 25 corridors evaluated in the CMP – 2013 Update is included in Exhibit IV-1 along with the corridor names and segment information in Exhibit IV-2.

EXHIBIT IV-1
CORRIDORS INCLUDED IN THE CONGESTION MANAGEMENT PROCESS
EXHIBIT IV-2
INVENTORY OF REGIONAL CORRIDORS

<table>
<thead>
<tr>
<th>Highway Name</th>
<th>Evaluated Segments</th>
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<tr>
<td>DNT</td>
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<tr>
<td>IH 20</td>
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<tr>
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<td>PGBT</td>
<td>5</td>
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<td>SH 114</td>
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<td>5</td>
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</table>

The inventory looked at four categories of options that influence congestion levels: alternative roadway infrastructure (services), modal options (services), system demand (recurring), and system reliability (non-recurring). The factors that influence alternative roadway infrastructure include the presence of parallel freeways, frontage roads, parallel arterials, and direct connections or interchanges. The factors that influence modal options include the presence of transit options (bus and/or rail), park-and-ride facilities, HOV/Managed lanes, and bicycle/pedestrian options. The factors that influence system demand include traffic volume, truck volume/percentage, number of employees along that roadway corridor by block, and residential population. Lastly, the factors that influence system reliability include facility crash rates, agencies that participate in incident management training, truck lane restrictions, roadway shoulders, and the presence of Intelligent Transportation Systems (ITS) technology.

The information collected through the corridor inventory was used in the CMP Corridor Scoring Criteria. Each category could receive a maximum of 25 points and the maximum score that a corridor could receive was 100 points. For each category, a score of 25 to 15 resulted in a rating of Sufficient; a score of 14 or below resulted in a rating of Needs Improvement. Each corridor segment then received a Segment Score, which allowed the segment to be ranked.
The higher the assigned points, the more options that were available along that corridor. The lower the assigned points, the less options that were available along that corridor. The corridors that received the lower scores are considered to have a more immediate need for improvements. The CMP Corridor Scoring Criteria is included in Exhibit IV-3. The CMP Corridor Analysis for each corridor segment is included in Appendix C.
EXHIBIT IV-3
CORRIDOR SCORING CRITERIA

<table>
<thead>
<tr>
<th>Category</th>
<th>Inventory</th>
<th>Measure</th>
<th>Points</th>
<th>Max Number of Points</th>
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<tr>
<td><strong>Alternative Roadway Infrastructure (Services)</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Parallel Freeway/Toll Roads(^a) (5 mi)</td>
<td>Yes</td>
<td>12</td>
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<tr>
<td>Frontage Roads(^a)</td>
<td>Entire Limits</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partial Limits</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel Arterials(^a)</td>
<td>Entire and Partial Limits</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Entire Limits</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partial Limits</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Connections (Interchanges)(^b)</td>
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</tr>
<tr>
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<tr>
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<tr>
<td></td>
<td>Rail</td>
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<tr>
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<tr>
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<td>Average - 0.692</td>
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<td>Truck Volume Percentage(^a)</td>
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<td></td>
<td>Average - 9%</td>
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<tr>
<td>Number of Employees (by TSZ)(^a)</td>
<td>Below or Average</td>
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<tr>
<td></td>
<td>Average - 62,549</td>
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<td>Average - 74,511</td>
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<td>**2012 Crash Rate(^a)</td>
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<td>Regional Rate Average - 75.19</td>
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<td><strong>System Reliability (Non Recurring)</strong></td>
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<tr>
<td>FIM Attendance/Training(^a)</td>
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<td>Truck Lane Restrictions(^a)</td>
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<tr>
<td>Intelligent Transportation Systems(^a)</td>
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</tbody>
</table>

Source: \(^a\) Google Earth Aerial Image; \(^b\) DART, The T, DCTA Data; \(^c\) NCTCOG Data; \(^d\) NCTCOG 2040 Demographic Forecast - 2012 Data
Exhibits IV-4 through IV-8 highlight the Roadway Infrastructure Deficiency Map, the Modal Options Deficiency Map, the System Demand Deficiency Map, the System Reliability Deficiency Map, and the Top 25 Worst Corridor Segments Map. These maps identify the corridors that need improvement. In addition, the maps include future rail projects, corridors with construction, and the Integrated Corridor Management (ICM) project.
Thirty-four corridor segments were identified as “Needs Improvement” under the Roadway Infrastructure category.

EXHIBIT IV-4
ROADWAY INFRASTRUCTURE DEFICIENCY MAP

Legend
- Future Rail Projects
- Construction (Current, Future or Completed)
- I-30 Corridor Project
- Needs Improvement
Seventy-five corridor segments were identified as “Needs Improvement” under the Modal Options category.
Thirty-three corridor segments were identified as “Needs Improvement” under the System Demand category.
Twenty-six corridor segments were identified as “Needs Improvement” under the System Reliability category.
EXHIBIT IV-8
TOP 25 WORST CORRIDOR SEGMENTS MAP
Exhibit IV-9 highlights the Corridor Statements table used to assign the overall corridor status designation for each roadway segment.

Top 25 Worst Corridors

Legend
- Future Rail Projects
- Construction (Current, Future or Completed)
- I-35 Corridor Project
- Top 25 Worst Corridors

Exhibit IV-9
**EXHIBIT IV-9**
CORRIDOR STATEMENTS

<table>
<thead>
<tr>
<th>Roadway Infrastructure</th>
<th>Modal Options</th>
<th>System Reliability</th>
<th>System Demand</th>
<th>Statement</th>
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<tr>
<td>Sufficient</td>
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<td>Sufficient</td>
<td>Sufficient</td>
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<td>Needs Improvement</td>
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<td>Sufficient</td>
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<td>Needs Improvement</td>
<td>Needs Improvement in D.R.</td>
</tr>
<tr>
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<td>Sufficient</td>
<td>Needs Improvement</td>
<td>Sufficient</td>
<td>Needs Improvement in M&amp;O</td>
</tr>
<tr>
<td>Sufficient</td>
<td>Needs Improvement</td>
<td>Sufficient</td>
<td>Needs Improvement</td>
<td>Needs Improvement in Modal Options and D.R.</td>
</tr>
<tr>
<td>Sufficient</td>
<td>Needs Improvement</td>
<td>Needs Improvement</td>
<td>Sufficient</td>
<td>Needs Improvement in Modal Options and M&amp;O</td>
</tr>
<tr>
<td>Sufficient</td>
<td>Needs Improvement</td>
<td>Needs Improvement</td>
<td>Needs Improvement</td>
<td>Needs Improvement in M&amp;O and D.R.</td>
</tr>
<tr>
<td>Sufficient</td>
<td>Needs Improvement</td>
<td>Needs Improvement</td>
<td>Needs Improvement</td>
<td>Needs Improvement in Modal Options, M&amp;O, and D.R.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Roadway Infrastructure</th>
<th>Modal Options</th>
<th>System Reliability</th>
<th>System Demand</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needs Improvement</td>
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<td>Sufficient</td>
<td>Sufficient</td>
<td>Sufficient</td>
</tr>
<tr>
<td>Needs Improvement</td>
<td>Sufficient</td>
<td>Sufficient</td>
<td>Needs Improvement</td>
<td>Needs Improvement in R.I. and D.R.</td>
</tr>
<tr>
<td>Needs Improvement</td>
<td>Sufficient</td>
<td>Sufficient</td>
<td>Needs Improvement</td>
<td>Needs Improvement in R.I., and M&amp;O</td>
</tr>
<tr>
<td>Needs Improvement</td>
<td>Sufficient</td>
<td>Needs Improvement</td>
<td>Needs Improvement</td>
<td>Needs Improvement in R.I., M&amp;O, and D.R.</td>
</tr>
<tr>
<td>Needs Improvement</td>
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<td>Needs Improvement</td>
<td>Needs Improvement in R.I., Modal Options, and M&amp;O</td>
</tr>
<tr>
<td>Needs Improvement</td>
<td>Needs Improvement</td>
<td>Needs Improvement</td>
<td>Needs Improvement</td>
<td>Needs Improvement in R.I, Modal Options, and D.R.</td>
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<td>Needs Improvement</td>
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</tr>
</tbody>
</table>

**Key**
- D.R. = Demand Reduction
- M&O = Management and Operations (System Reliability)
- R.I. = Roadway Infrastructure
The CMP ranking for the 93 segments is included below in Exhibit IV-10. The table highlights the CMP ranking, segment score, and the areas of deficiency for each corridor segment. Included in Appendix D is a more detailed rankings table that includes roadway construction status and corridor statements.

### EXHIBIT IV-10
**CORRIDOR RANKINGS**

<table>
<thead>
<tr>
<th>Num</th>
<th>Highway</th>
<th>From</th>
<th>To</th>
<th>Segment Score</th>
<th>Roadway Infrastructure</th>
<th>Modal Options</th>
<th>System Reliability</th>
<th>System Demand</th>
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<tbody>
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<td>1</td>
<td>DNT</td>
<td>SH 121</td>
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<td>2</td>
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<td>FM 407</td>
<td>SH 114</td>
<td>41</td>
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<td>○</td>
<td>○</td>
<td>✔</td>
</tr>
<tr>
<td>3</td>
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Of the 93 corridor segments evaluated, 49 segments were identified as Sufficient and 44 were identified as Needs Improvement. These corridor segments were filtered to remove the segments identified as currently under construction, funded, or recently completed construction. This filtering resulted in five segments identified as Needs Improvement in Roadway Infrastructure; 17 segments identified as Needs Improvement in Modal Options; 15 segments identified as Needs Improvement in System Demand; and nine segments identified as Needs Improvement in System Reliability. Exhibits IV-11 and IV-12 include maps of these corridors.
EXHIBIT IV-11
CORRIDORS – NEED IMPROVEMENT

Needs Improvement

Legend
- Future Rail Projects
- Construction (Current, Future or Completed)
- ICM Corridor Project
- Needs Improvement

North Central Texas Council of Governments
May 31, 2013
EXHIBIT IV-12
CORRIDORS – NEED IMPROVEMENT WITH NO PLANNED CONSTRUCTION
Exhibit IV-13 includes a list of the corridors inventoried that need improvements but have no construction planned in the near future.
EXHIBIT IV-13
INVENTORY OF CORRIDORS
NEED IMPROVEMENT WITH NO PLANNED CONSTRUCTION

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Strategy Identification

Congestion management strategies on the transportation system include the implementation of Travel Demand Management (TDM) and Transportation System Management and Operations (TSM&O) improvements. All TDM and TSM&O strategies are outlined in Appendix A. A variety of strategies can be deployed to alleviate congestion on the transportation system. The type of strategy implemented depends on the type of congestion experienced.

TDM strategies attempt to reduce the demand for single-occupant vehicle (SOV) travel on roadways by offering alternatives to driving alone. Some TDM strategies include employer trip reduction programs, vanpool programs, and rideshare programs. Operational strategies offer low-cost improvements to get more capacity out of the transportation network. Some recommended TSM&O strategies include operation of changeable message signs to divert traffic around traffic incidents and special events, closed-circuit television for traffic monitoring, incident verification and clearance, lane control signals for traffic management/incident management, traffic signalization projects, intersection and street improvement projects, bottleneck removal projects, signage and striping improvements. Other strategies include FIM training, truck lane restrictions, and Mobility Assistance Patrol Program coverage.
Strategy Selection/Project Implementation

Strategy selection and project implementation are initiated through the Transportation Improvement Program (TIP). The selection of operational and travel demand reduction strategies are based on the type of strategies that yield the largest benefit cost ratio. In the current TIP, the transportation funds have been allocated to a variety of strategies. These strategies include freeway bottleneck removal, ITS deployment, and bicycle and pedestrian trails. In addition to these operational strategies, travel demand reductions strategies are implemented along the corridor in cooperation with transit agencies and major employers. Some of these strategies include vanpools, ride-matching, and discounted transit passes. Additional strategies are outlined in Appendix A.

Project Performance Evaluation

The goal of the project performance evaluation studies is to have an on-going program to evaluate the benefits of transportation programs and projects that reduce SOV travel and peak period travel, and improve the efficiency of our existing transportation system through operational improvements. Exhibit IV-14 identifies current and future project performance evaluations.
EXHIBIT IV-14

PROJECT PERFORMANCE EVALUATION
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Summary

A major component of the DFW Metropolitan System is the regional freeway/toll road/HOV/managed lane system. The system continues to carry nearly half of all vehicular travel in the area. Even considering the availability of other multimodal options and advanced traffic management strategies, there will be significant demand placed on the region’s roadway system. In the region, many initiatives are underway to address current and future traffic congestion. In addition to constructing new facilities, a number of cost effective programs are in place in the DFW area to manage both existing freeway/toll road/HOV/managed lane system facilities and travel demand. These programs are being used to maximize the capacity of the system and increase the system’s overall efficiency.

Additionally the Regional Arterial System is a heavily utilized transportation infrastructure in our region and is expected to become more congested with regional growth. There are several existing and planned system monitoring and data collection programs utilized in the region. These system monitoring measures will help the region better understand where congestion is impacting the arterial system the most, as well as changes in system congestion patterns. As the region continues to grow, it is essential that strategies and programs that provide support and access to alleviate gridlock on the transportation system are identified and implemented.