Connected 2045
Regional Transportation Plan

Tulsa Metropolitan Area | Oklahoma | November 2017

INCOG

Transportation Management Area
Base Map

Legend

- Highways
- Major Streets
- Bodies of Water
- County Boundaries
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Connected 2045 Regional Transportation Plan

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View of Downtown Tulsa.

INTRODUCTION

Study Area

The 1,400 square-mile Tulsa Transportation Management Area (TMA) is comprised of Tulsa County and portions of the adjacent counties of Creek, Osage, Rogers, and Wagoner. It is a part of the seven-county Tulsa Metropolitan Statistical Area (MSA), which also includes Okmulgee and Pawnee Counties. The TMA is predominately urban, with nearly 85% of its population being within the incorporated cities of Bixby, Broken Arrow, Catoosa, Claremore, Collinsville, Coweta, Fair Oaks, Glenpool, Jenks, Kiefer, Mounds, Owasso, Sand Springs, Sapulpa, Skiatook, Sperry, Verdigris, and the core city, Tulsa.

As of 2015, the population of the TMA was 804,759, which accounts for 84% of the MSA population of 962,676. The Tulsa MSA is the 55th largest in the country and the primary city, Tulsa, is the 47th most populous city in the country.

INCOG's Role in the Transportation Planning Process

The Indian Nations Council of Governments (INCOG) is a voluntary association of local governments, and was designated by the governor as the area's Metropolitan Planning Organization (MPO). MPOs maintain the primary responsibility for developing transportation plans and programs for urbanized areas of 50,000 or more residents. Federal regulations recognize metropolitan areas with a population of 200,000 or more as Transportation Management Areas (TMA), which places further requirements on the MPO for congestion management, air quality attainment, increasing safety, and other issues.

All TMA transportation plans and programs are based on a continuous, coordinated, and comprehensive planning process, conducted in cooperation with local and state partners. Representatives of each member community (principally-elected officials) are appointed to INCOG's Board of Directors, which serves as a forum for cooperative decision making on issues of regional significance, including transportation.

The transportation planning process involves both long-term transportation system objectives and short-term implementation of projects. Long-term objectives are highlighted in the Regional Transportation Plan from which the implementation program is chosen. The Tulsa Metropolitan Area Major

Street and Highway Plan represents the ultimate street build-out plan for the area and guides the roadway classification for the right-of-way and development purpose, while the Regional Transportation Plan identifies planned transportation improvements to be implemented within the next 20 to 25 years and emphasizes a systematic approach to implement the comprehensive plans for the region. Short-term projects are outlined in the Transportation Improvement Program (TIP), which identifies the projects to be undertaken during the upcoming four years.

All aspects of the process are overseen by the Transportation Policy Committee (TPC) and the Transportation Technical Committee (TTC). Committee members meet monthly and represent federal, state, tribal and local governments and agencies; state and local authorities; and modal interests. The TTC, an advisory group to the TPC, provides technical expertise related to development of urban transportation plans and programs for the TMA. The TPC is an ongoing forum for policy development and adoption related to urban transportation planning, programming, and operation. Upon TPC approval, transportation plans and programs are forwarded to the INCOG Board of Directors for endorsement.

Economic and population projections provided a framework for predicting the transportation needs for 2045. Data were collected and analyzed for this purpose from the Census Bureau, Bureau of Economic Analysis, Oklahoma Employment Security Commission, and the Nationwide Personal Transportation Survey (Federal Highway Administration). Information is included for both the Tulsa TMA and the MSA.

View of the intersection of Peoria Avenue and E 35th St., in the Brookside Entertainment District in Tulsa

The Regional Transportation Plan

The purpose of the Regional Transportation Plan (RTP) is to anticipate the transportation needs for the TMA predicated on demographic and economic assumptions and forecasts for the entire region. It identifies various elements of the desired transportation system for the metropolitan community and the interrelationship of various modes of transportation. To ensure financial feasibility, the RTP summarizes implementation costs and presents practicable funding scenarios while addressing the resulting effects of the investments on the social and natural environments. The RTP will serve as a guide for the investment of local, state and federal resources, and will become a component of the Oklahoma Statewide Intermodal Transportation Plan. In addition, the RTP meets the requirements of federal law authorizing the adoption of a regional transportation plan for the metropolitan planning area for the expenditure of federal transportation resources in the future.

Federal regulations require that the RTP provides for a minimum planning horizon of 20 years, and the plan must be updated every five years. The most recent Regional Transportation Plan, adopted in December 2012, was prepared using 2005 base-year data, pending the outcome of 2010 Census. In the spirit of maintaining a continuous planning process, Connected 2045 was developed using the available 2015 Census data (American Community Survey - ACS).

In recent years, there were several significant developments that directly affected the regional transportation planning process. Those were:

- *Significant project funding through the American Recovery and Reinvestment Act (ARRA) and TIGER grant programs.*
- *Consideration of planning assumptions for land use adopted in July 2010 as part of PLANiTULSA, the Comprehensive Land Use Plan for the City of Tulsa, leaning towards more sustainable development.*
- *Recommended roadway configurations, increased density and public transit proposals, also originating from PLANiTULSA.*
- *Completion of the Regional Transit System Plan: Fast Forward project, endorsed by the INCOG Board of Directors in October 2011, aimed at studying various high-capacity transit corridors, and identifying feasible alternative transportation methods and funding sources.*
- *Completion of the GO Plan, Tulsa's regional bicycle and pedestrian master plan, endorsed by the INCOG Board of Directors in December 2015, aimed at providing resources, guidance and recommendations to improve safety, convenience, and connectivity through walking and cycling in the TMA.*

The timing of these developments, the adoption of PLANiTULSA in 2010, the completion of the Transit System Plan and Bicycle and Pedestrian Plan studies, the effects of ARRA and TIGER funded projects, and the availability of 2010 Census data, coupled with 2011-15 American Community Survey data, led to the development of the Connected 2045 RTP.

The Regional Transportation Plan, Connected 2045, will continue to ensure that a minimum 20-year planning horizon is intact and that transportation planning and project implementation proceeds smoothly. Along with addressing federal regulations for long range transportation planning, this update addresses the areas of Operational and Management Strategies, and Safety. The vision of Connected 2045 is to meet the needs of future TMA travelers focusing on improving roadways, transportation safety, bicycle-pedestrian mobility, and new technologies.

In addition, Connected 2045 includes specific performance measures to be tracked, and uses continuous measurement tools to aid in evaluating the investments made to the regional transportation system.

Population and Employment

The 2045 population and employment projection in the TMA show increases as a result of the growth scenario and the control totals available from Oklahoma Department of Commerce. The 2045 population projection of 1,079,652 represents an increase of nearly 26% from 2015. Likewise, the 2045 employment projection of 539,361 represents a 20% increase in employment totals from 2015, following actual trends.

Table 1. Population and Employment Projections within the TMA

	2015	2045	Change	Percent Change
Population	*804,759*	*1,079,652*	*+ 274,893*	*+ 25.5%*
Employment	*429,693*	*539,361*	*+ 109,668*	*+ 20.3%*

Source: Population data from Census; Employment data from InfoUSA.

The population's composition is also changing. The median age of residents at the MSA has risen from 35.1 in 2000 to 36.8 in 2015, according to current trends, the median age is expected to be 36.9 in 2045. The youth population (19 years of age and younger) of the MSA decreased from 28.3% in 2010 to 27.7% in 2015, as the older population (65 years of age and older) increased from 12.8% to 13.2% in the same period of time. Both groups will keep increasing at a slower pace. The percentage of older adults, as compared to other adult age groups, will increase and these changes will have significant effects on transportation needs.

Figure 1. Tulsa MSA Population and Projection - 1980 to 2045

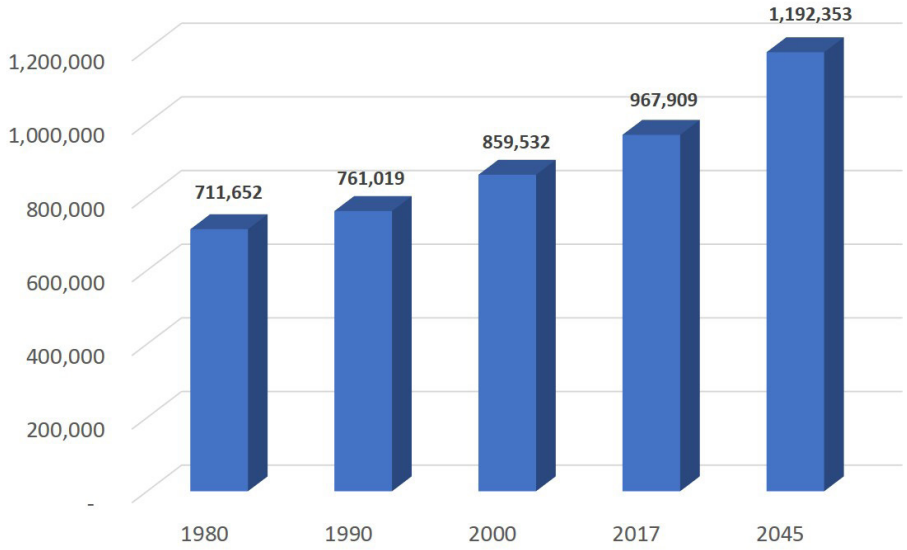
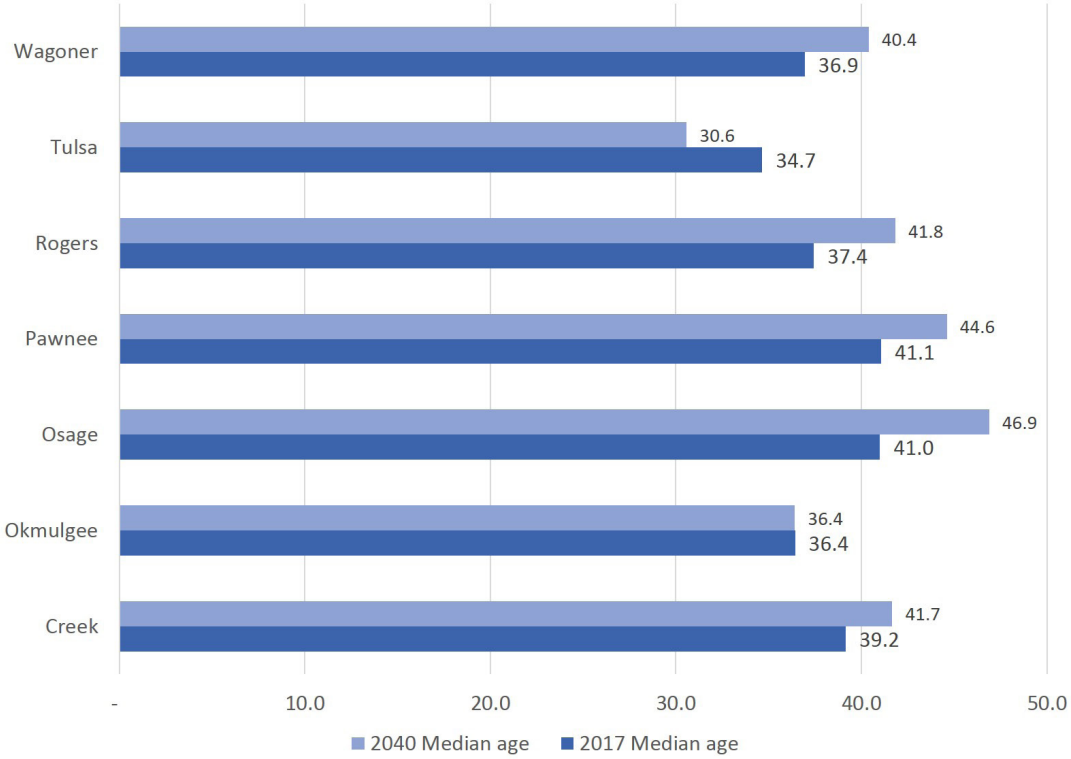
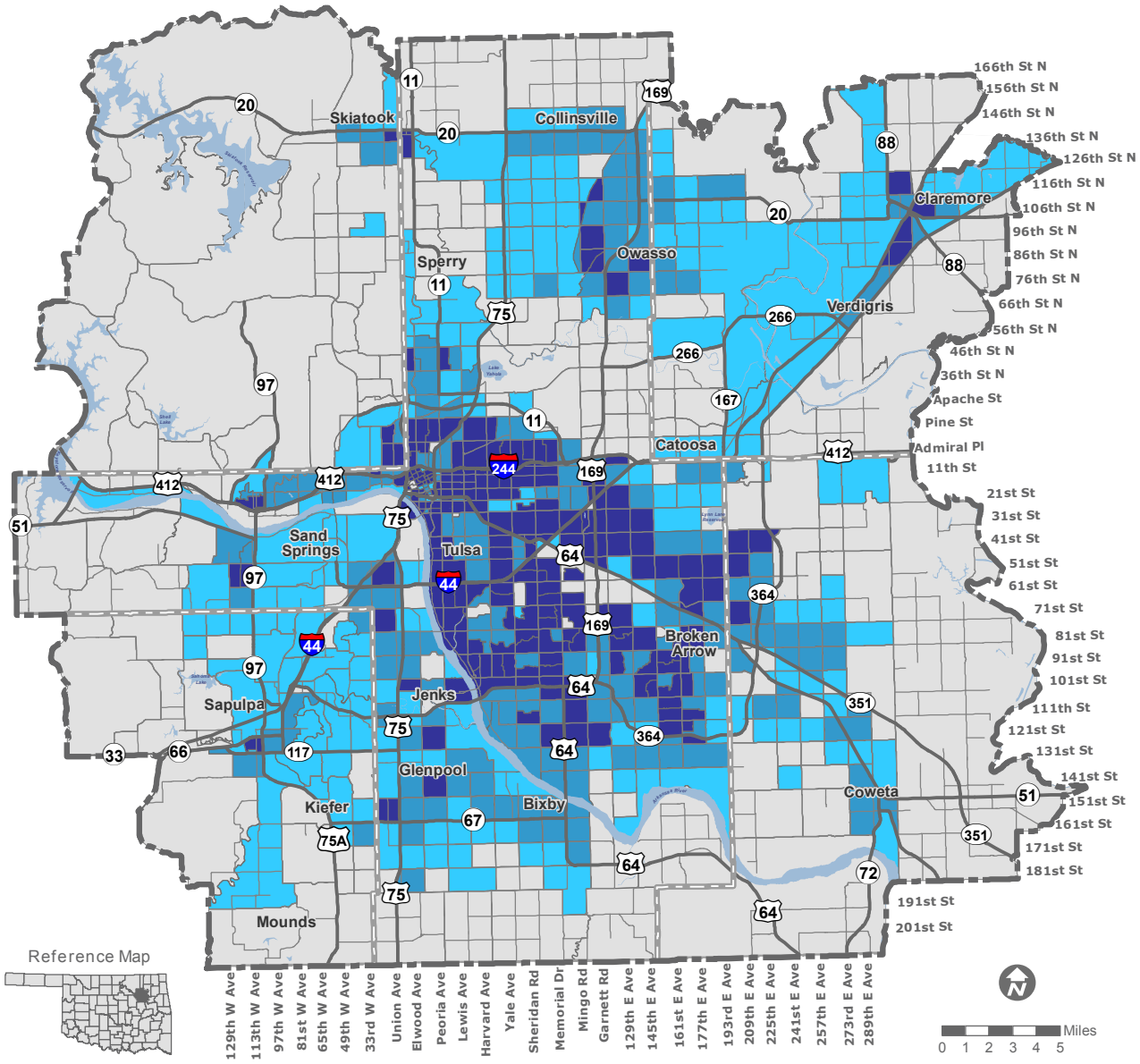


Figure 2. Resident Median Age by County - 2017 and 2040



Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year estimates; 2045 projections based upon trend line from 2017 to 2040 data provided by Woods & Pool 2008 State Profile.

Projected 2045 Population per Square Mile



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Population 2045

Persons per Square Mile

- 0.0 - 262.3 (Lowest 25%)
- 262.4 - 1,198.2
- 1,198.3 - 3,029.8
- Over 3,029.8 (Highest 25%)

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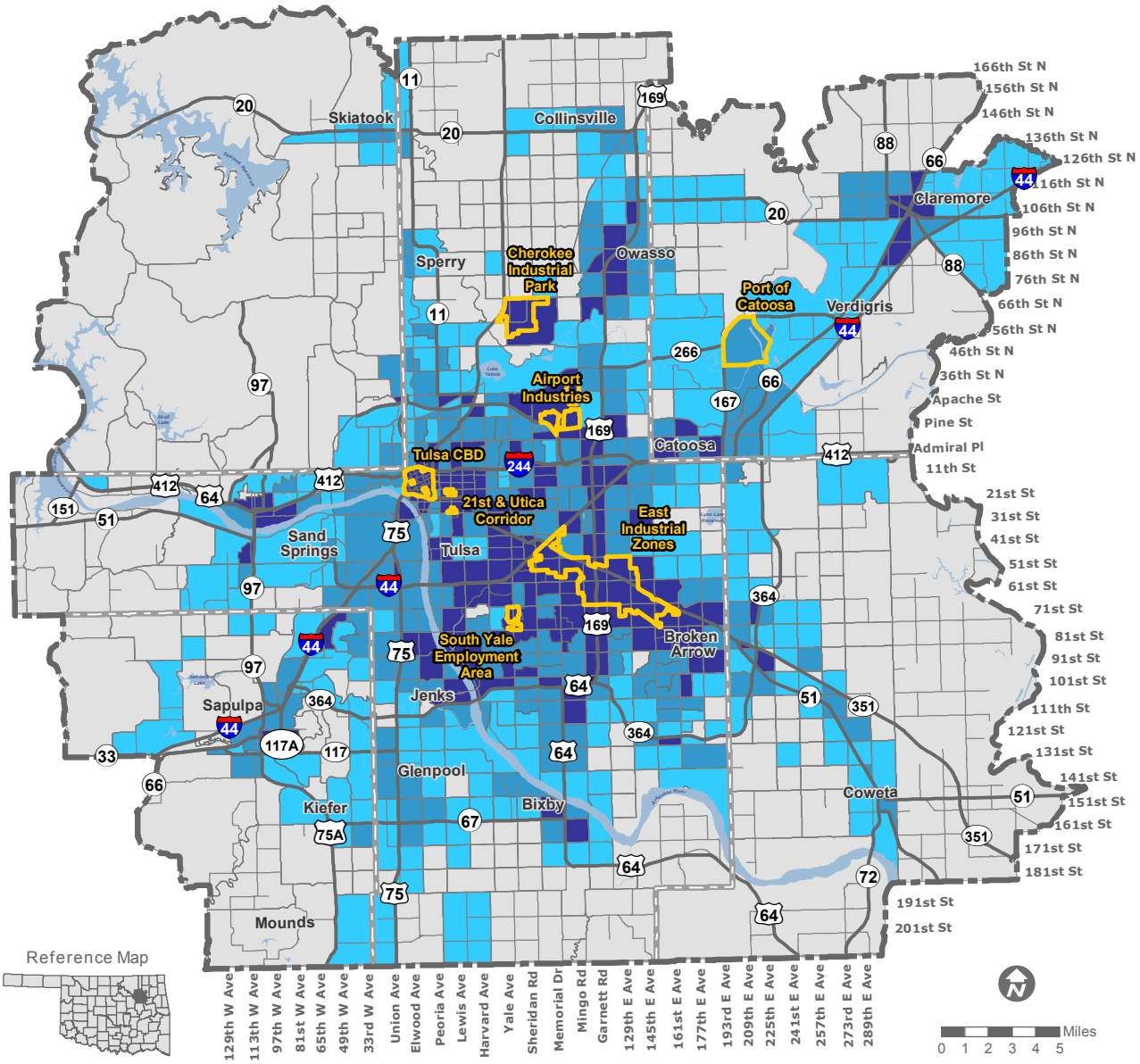
Projected 2045 Employment per Square Mile



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Employment 2045

Employees per Square Mile

- 0.0 - 35.4 (Lowest 25%)
- 35.5 - 329.2
- 329.3 - 1,377.8
- Greater than 1,377.8 (Highest 25%)

Major Employment Centers

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Figure 3. Elderly and Youth Residents in the Tulsa MSA

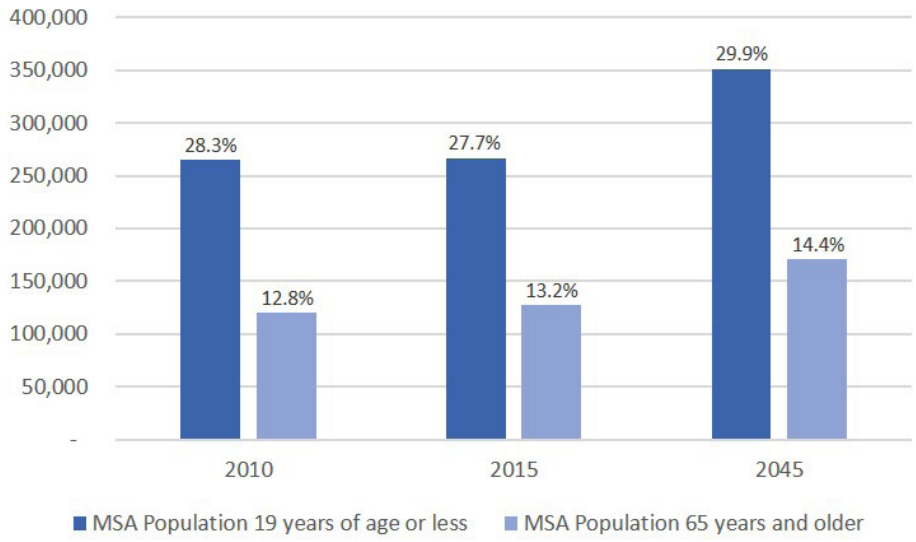
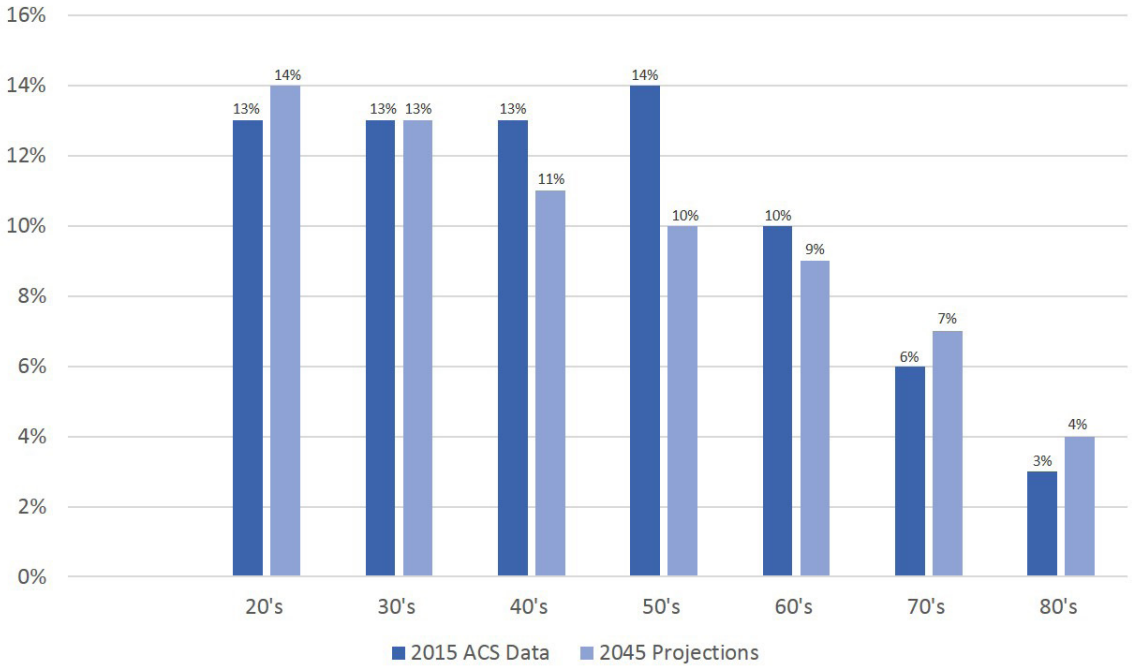


Figure 4. Percentage of MSA Population by Age Group - ACS 2015 and 2045 Projection



Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year estimates; 2045 projections based upon trend line from 2017 to 2040 data provided by Woods & Pool 2008 State Profile.

The decade from 2000 to 2010 was bracketed by two recessions which dramatically affected the local economy. A third recession took place in 2015, with the downturn of values in the oil and gas industries, leading to changes in employment and population. The region's employment growth has lagged behind the previous forecasts. With local employment at the current point in time virtually unchanged from fifteen years ago, job gains during periods of recovery were lost during the economic downturns. The strength of the local economy depended largely on the energy and healthcare industries and diverse investments that kept the Tulsa Metropolitan Area economy on the growth curve since 2008. The City of Tulsa population in 2015 is virtually unchanged from a decade ago.

According to InfoUSA, the health care and social assistance sector is projected to hold the largest share of 2045's total employment at 13.9%, followed by transportation and warehousing (12%) and manufacturing (11.8%). Higher growth rates in total employment within the TMA, from 2015 to 2045, will be experienced by sectors such as administrative, support and waste management and remediation services (from 3.9% to 6.9%), educational services (from 5.4% to 6.5%), and management of companies and enterprises (from 0.1% to 1.0%). Industries that will remain stagnant in terms of growth include agriculture, forestry, fishing and hunting (steady 0.1% from 2010 to 2015), mining (1.3%) and accommodation and food services (8.6%), while decreases will be experienced by finance and insurance (4.7% to 4.1%), real estate (2.7% to 2.0%), and construction (5.4% to 5.2%).

Employment growth in the metro area is anticipated to grow by 20% from 2015 to 2045, with increases primarily focused in employment centers: the 21st Street and Utica Avenue Corridor, the South Yale Avenue Corridor (from 61st to 71st Street South), the US-64/SH-51 (Broken Arrow Expressway) and US-169 Corridor, the Tulsa International Airport area, the Cherokee Industrial Park, and the Port of Catoosa.

Figure 5. TMA Employment Totals

Sources: Previous LRTP forecasts, leading to the actual 2045 forecast.

As for travel characteristics, Tulsa residents still rely primarily on personal automobiles for transportation. As of 2015, 93% of workers 16 years and over in the Tulsa TMA travel to their workplace by car, of which only 10% carpool, 0.6% use public transit, 1.3% walk, and 0.2% ride a bicycle as a means of transportation. It has been estimated that 399,170 motor vehicles are used in commuting by workers within the Tulsa TMA, and the median commute time is 21.3 minutes.

Other Considerations

- ***Alternative Modes.*** The roles of carpooling, vanpooling, transit, bicycling, walking, and telecommuting in the overall transportation system have taken on greater importance. These modes become more attractive when environmental impacts and cost-effectiveness are evaluated. Major obstacles exist, however, in the expansion of these modes. Key challenges to expansion include retrofitting residential and commercial development to provide convenient access to bicycle and pedestrian networks and transit services. The benefits and challenges of these modes are discussed in subsequent chapters.

- ***Land Use and Development.*** How available land is used or developed has predictable effect on transportation facilities and systems, and vice versa. Commercial developments typically have been designed to accommodate automobiles, with limited consideration for public transit, bicycles, and pedestrians. Close coordination of land-use planning and transportation planning is increasingly important.

- ***Congestion.*** Traffic congestion is relative depending on user experience and orientation, and acceptable levels must be defined locally. The region must then decide how best to address congestion from both demand reduction (carpooling, alternative mode usage) and supply provision (new and expanded roadways) approaches.

- ***Resource Utilization.*** Resource management will affect how the transportation vision for 2045 will be realized. Systems must be efficient, therefore planners, engineers, and policymakers must be innovative and flexible to maximize resources and community benefits. Priority uses and preferred facility funding streams must be identified.

Vision

The paramount purpose of the transportation system is to enhance and sustain the quality of life and economic vitality of the region. This will be accomplished by developing, maintaining, and managing a transportation system that meets the accessibility needs of people and goods in the region through safe, environmentally prudent, and financially sound means.

Connected 2045 Vision and Goals

During the public participation process described in a later chapter, each city defined the course INCOG should take in terms of strategic goals for the regional transportation system, followed by data research and a thorough analysis. The main components for the Connected 2045 Regional Transportation Plan include:

- *Evaluation of all major transportation modes and connections among modes: bike, pedestrian, transit, automobile, freight, rail, air, and water transport.*
- *Population and employment forecasts to identify future improvements or needs.*
- *Review of existing and proposed transportation system.*
- *Asset/system preservation.*
- *Energy and environmental considerations.*
- *Prioritized list of short and long range transportation needs.*
- *Funding alternatives to implement the plan.*

Steps for developing the Regional Transportation Plan

1. ***Establish policy goals and objectives***
2. ***Analyze transportation system conditions***
3. ***Perform needs analysis***
4. ***Set priorities***
5. ***Establish a funding plan***

In addition, the Federal Planning Factors considered when developing Connected 2045 include:

- *Support economic vitality.*
- *Address safety of the transportation system and the users.*
- *Ensure security for all motorized and non-motorized users.*
- *Increase accessibility and mobility of people and freight.*
- *Protect and enhance the environment, and promote energy conservation, and improve quality of life.*
- *Enhance the integration and connectivity of the system, across and between modes.*
- *Promote efficient system management and operation.*
- *Emphasize preservation of the existing system.*
- *Improve resiliency and reliability of the system.*
- *Enhance travel and tourism.*

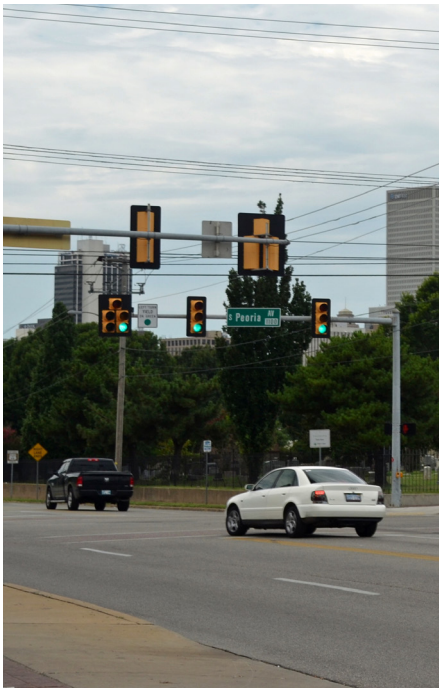
Table 2. Connected 2045 Plan Goals

Goal Area	Goal
Safety	*Achieve a significant reduction in traffic fatalities and serious injuries on all public roads for all users (motorized and non-motorized).*
Infrastructure Condition	*Maintain all public road and transit-related infrastructure in a state of good repair.*
Congestion	*Mitigate congestion at specific identified locations and/or segments.*
Freight Movement and Economic Vitality	*Improve National Freight Network (NFN) within the region and the last mile to increase access to other markets.*
Environmental Viability and Resilience	*Protect and enhance natural environment to complement the built environment, and mitigate any effects.*
Reduced Project Delivery Delays	*Reduce project costs by eliminating delays in development and delivery of public projects.*

View of the Arkansas River from the River Parks East Bank Trail.

ROADWAYS

Roadways in the Tulsa TMA are comprised primarily of expressways and arterials.



Area Roadways

The TMA roadway system is primarily composed of expressways and arterial streets on a roughly 1-mile grid system. The roadway system is well-served by Interstate highways (I-244 and I-44) and National Highway System (NHS) routes (US-75, US-169, US-64, US-412, SH-51 and SH-266), as well as numerous other state and local highways in the region. The existing-plus-committed roadway system comprises approximately 746 lane-miles of expressways, 314 lane-miles of turnpikes, 4,849 lane-miles of arterials and other regionally-significant streets, and thousands of miles of local streets. Major expressway traffic counts in general keep pace with national traffic trends.

Regional Transportation Computer Model

Geographic Information Systems (GIS) was used extensively in allocating current and future population and employment for the TMA at the zonal level. For the base year (2015), GIS was used to translate population data from Census Block Groups to the zonal level, as well as to geocode existing employment data to the

zones. For the year 2045, population projections were developed for each of the counties, or portion of counties, within the TMA. These projections were in line with the Oklahoma Department of Commerce projections for 2045, which were used as control totals. Employment projections were also developed for each of the counties within the TMA. Both projections were allocated to the zonal level, using GIS based attributes on the attractiveness of available land. Attractiveness is a function of the proximity to infrastructure, current development, and opportunities for growth based on access, land use, and services. Land within floodplains and other undevelopable areas was excluded.

These land use, population, and employment projections were then used to develop a transportation forecasting travel demand model. INCOG maintains a four-step travel demand model for the Tulsa TMA. Travel demand models forecast the traffic volumes based on the interaction of origins and destinations. INCOG's four-step, travel demand model involves following components: 1) trip generation, 2) trip distribution, 3) mode split or mode choice, and 4) trip assignment. The trip-generation components provide tables related to the person trips produced and attracted in each zone. It also considers different purposes of the person trips, such as work, school, shopping, and other trips. Trip distribution connects the origins and destinations based on the attractiveness of each zone. The mode-split component splits the trips based on the mode of choice such as, auto, transit, bicycle, or walking. The basis of mode split is determined with the help of National Household Travel Survey (NHTS) data for the Tulsa TMA. The trip-assignment component determines which route each trip will take while going from zone to zone. This involves assigning the traffic-volume forecast to the road network. This model is then calibrated based on current flows and traffic counts.

Many of our streets are built primarily to move vehicles as quickly as possible, with little consideration of pedestrians and bicyclists. View of Admiral Place, looking west from Memorial Drive.

Table 3. Roadway System Characteristics and Performances

	2015	2045	Difference	Percentage Change
Lane Miles				
Expressway	*746*	*881*	*+ 135*	*+ 18.1%*
Turnpike	*314*	*371*	*+ 57*	*+ 18.2%*
Arterials & Parkways	*4,849*	*5,437*	*+ 588*	*+ 12.1%*
Total Lane Miles	*5,909*	*6,690*	*+ 781*	*+ 13.2%*
Travel				
Vehicle Miles/Day	*36,374,500*	*47,705,000*	*+ 11,330,500*	*+ 31.1%*
Vehicle Hours/Day	*632,900*	*842,800*	*+ 209,900*	*+ 33.1%*
Average Speed (mph)	*35*	*38*	*+ 3*	*+ 8.6%*

Source: ODOT Traffic Counts (2015 traffic is weekday traffic count unadjusted for seasonal or other factors) and INCOG (2045 traffic is an average weekday forecast volume of traffic).

Table 4. Tulsa Area Expressways: 2015 Traffic and 2045 Forecast

Expressway Segment	2015 Traffic	2045 Forecast Traffic	Percentage Change
US-64/SH-51/Broken Arrow Exp. (31st St. to Yale Ave.)	*86,300*	*129,000*	*+ 49.5%*
US-64/SH-51/Broken Arrow Exp. (I-44 to US-169)	*102,600*	*152,000*	*+ 48.1%*
US-169 (I-44 to US-64/SH-51/Broken Arrow Exp.)	*106,379*	*154,000*	*+ 44.8%*
US-169 (US-64/SH-51/Broken Arrow Exp. to 81st St.)	*123,200*	*126,000*	*+ 2.3%*
I-244 (Yale Ave. to Sheridan Rd.)	*66,100*	*127,000*	*+ 92.1%*
I-44 (Yale Ave. to Sheridan Rd.)	*93,100*	*128,000*	*+ 37.5%*
I-44 (145th E Ave. to 161st E Ave.)	*73,200*	*139,000*	*+ 89.9%*
US-412/US-64 (33rd W Ave. to Downtown Tulsa)	*55,400*	*94,000*	*+ 69.7%*
US-75 (I-44 to 61st St. S.)	*55,600*	*106,000*	*+ 90.6%*
US-75 (36th St. N. to 56th St. N.)	*43,500*	*102,000*	*+ 134.5%*

Source: ODOT Traffic Counts (2015 traffic is weekday traffic count unadjusted for a seasonal or other factors) and INCOG (2045 traffic is an average weekday forecast volume of traffic).

Roadways and private automobiles continue to dominate travel in Tulsa TMA. Ensuring safety and mobility has been a cornerstone for the region.

Table 5. Federal Requirements for Metropolitan Transportation Plans

- *Plans must be for a period not less than 20 years into the future.*
- *Plans must reflect the most recent assumptions for population, travel, land use, congestion, employment and economic activity.*
- *Plans must be financially constrained, and revenue assumptions must be reasonable in that funds can be expected to be available during the time frame of the plan.*
- *Plans must conform to the Clean Air Act and its amendments, and to applicable State Implementation Plans for regional air quality.*
- *Plans must be developed through an open and inclusive process that ensures public input and seeks out and considers the needs of those traditionally underserved by existing transportation systems.*

Table 6. Ten Roadway Planning Factors

- *Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency.*
- *Increase the safety of the transportation system for motorized and non-motorized users.*
- *Increase the accessibility and mobility of people and for freight.*
- *Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns.*
- *Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.*
- *Promote efficient system management and operation.*
- *Emphasize the preservation of the existing transportation system.*
- *Improve the resiliency and reliability of the transportation system.*
- *Reduce or mitigate stormwater impacts of surface transportation; and enhance travel and tourism.*

The 2045 Roadways Plan identifies the following goals with regard to the mentioned planning factors as well as federal requirements:

Table 7. The 2045 Roadways Plan Goals

- *Partner with all state and local agencies, trusts and tribal entities in the region to achieve set goals and objectives to ensure safe and economic transportation for all people and goods. Support Oklahoma Department of Transportation (ODOT) and other state and local agencies under mutual agreements and partnership.*
- *Actively work with the Port of Catoosa, Tulsa International Airport Authority, Metropolitan Tulsa Transit Authority and public and private freight entities to advance regional connectivity, and economic competiveness.*
- *Support regional planning and process to advance the region's transportation goals, working with federal, state and local government partners, and community based organizations.*
- *Advance the Regional Intelligent Transportation System (ITS) deployment through annual work program and planning support.*

View of the Intersection of Utica Avenue and 11th Street (Route 66) in Tulsa, where the Hillcrest Medical Center is located.

The 2045 Roadways Plan identifies following strategies and actions to implement goals identified in the Plan:

Table 8. The 2045 Roadways Plan Actions

Strategy	Actions
Roadway Maintenance	• *Maintain sufficiency rating of "Adequate" or higher per ODOT standards on all NHS routes in the region.* • *Monitor and increase funding to adequately maintain area roadways that are deemed regionally significant per the Long Range Transportation Plan.* • *Maintain pavement condition index on local roadways and seek funding solutions to enhance roadway maintenance.*
Freight Network	• *Maintain sufficiency rating of "Adequate" or higher per ODOT standards on all NHS routes.* • *Improve access to freight terminals through intermodal connectors and freight network that sufficiently advances regional and statewide goals to all modes of transportation.* • *Assess and advance intermodal transportation activity based on economic development needs and goals.*
Bridges	• *Reduce or eliminate structurally deficient bridges on state, county and local roadways in the Tulsa TMA.* • *Improve access across the region with additional river crossings.* • *Pursue safer railroad crossings via grade separation where possible and feasible.* • *Pursue funding for interchanges via flyovers over the key movements at regional bottlenecks across the freeway system.*
Intelligent Transportation Systems (ITS)	• *Advance ITS and related activities to provide sufficient information to motorists and agencies to provide congestion relief.* • *Implement systems based on regional architecture to provide implementing agencies sufficient tools to advance the usage of ITS with respect to travel monitoring.* • *Provide real-time data access to the motoring public.*
Safety and Security	• *Explore and implement adequate level of traffic incident management for the region involving various stakeholders.* • *Ensure adequate safety in the region related to vehicular traffic.* • *Implement plans to improve safety with respect to multimodal traffic where needed.*
Financial Feasibility and Coordination	• *Coordinate all implementation activities to ensure timely completion of committed projects with all implementing agencies.* • *Ensure a financially viable plan of action related to each project and across the transportation system, to maintain the system that is built during its life cycle.*

Table 9. RTP Recommended Roadway Capacity Improvements

Expressways	Segment	Proposed Lanes
I-44 (East)	*I-44/I-244 Junction to SH-66*	*8 Lanes*
I-44 (East)	*SH-66 to Creek Turnpike*	*6 Lanes*
I-44/Will Rogers Turnpike	*US-412 to SH-20 in Claremore*	*6 Lanes*
I-44 (West)	*I-244 to US-75*	*6 Lanes*
US-169	*I-244 to 71st St. South*	*8 Lanes*
US-169	*61st St. North to SH-20 (116th St. North)*	*6 Lanes*
US-75	*I-244 to SH-67 (151st St. South)*	*6 Lanes*
US-75	*SH-11 (Gilcrease Exp.) to 86th St. North*	*6 Lanes*
Gilcrease Expressway	*I-44 to Edison Ave.*	*4 Lanes*

Expressway Interchange Reconstruction
I-44 and US-64/SH-51 (Broken Arrow Exp.)
I-44 and US-169
I-44 and SH-66 (East)
I-44 and US-75
I-244 and US-412/US-64 at the Northwest corner of the Inner Dispersal Loop
US-169 and US-64/SH-51 (Broken Arrow Exp.)

Grade-Separated Interchange Improvements
US-75 and 141st St. South
Blue Starr Road and SH-66/BNSF Railroad
SH-20 Bypass and Will Rogers Turnpike
Muskogee Turnpike (SH-351) and 273rd E. Ave.

Table 10. 2045 Roadways Element: Proposed Capacity Improvements

Roadway	Segment	Planned Through Lanes
SH-20	*225th E Ave I-44/Will Rogers Turnpike*	*4 Lanes*
SH-20	*SH-66 to SH-88*	*4 Lanes*
SH-20	*US-75 to 129th E Ave*	*4 Lanes*
SH-72	*SH-51 to 161st St. South*	*4 Lanes*
SH-88	*Blue Starr Rd./116th St. North to SH-20*	*4 Lanes*
SH-97	*Existing SH-97 to SH-20*	*2 Lanes*
SH-97	*2nd St. to 12th St.*	*4 Lanes*
SH-97/Wilson Rd.	*2nd St. to Morrow Rd.*	*6 Lanes*
SH-167/193 East Ave.	*I-44/US-412 to SH-266*	*4 Lanes*
SH-266	*US-169 to SH-167/193rd East Ave.*	*4 Lanes*
SH-266	*SH-167 to I-44/Will Rogers Turnpike*	*4 Lanes*
11th St. South	*129th East Ave. to 145th East Ave.*	*4 Lanes*
25th West Ave.	*Edison Rd. to Pine St.*	*4 Lanes*
33rd West Ave.	*61st St. South to 71st St. South*	*4 Lanes*
33rd West Ave.	*41st St. South to I-44*	*4 Lanes*
41st St. South	*129th E Ave to 177th East Ave.*	*4 Lanes*
41st St. South	*33rd West Ave. to 57th West Ave.*	*4 Lanes*
41st St. South	*Yale Ave. to Sheridan Rd.*	*6 Lanes*
41st West Ave.	*Apache St. to Newton Rd.*	*2 Lanes*
43rd St. North	*N 41st W Ave. to SH-97*	*2 Lanes*
49th/41st West Ave.	*Edison Rd. to Newton Rd.*	*4 Lanes*
51st St. South	*129th East Ave to 193rd East Ave.*	*4 Lanes*
51st St. South	*129th W Ave to SH-97*	*4 Lanes*
61st St. South	*Peoria to Lewis Ave.*	*4 Lanes*
61st St. South	*145th East Ave. to 209th East Ave.*	*4 Lanes*
61st St. South	*US-75 to 49th West Ave.*	*4 Lanes*
66th St. North	*145th E Ave to 161st E Ave.*	*4 Lanes*
71st St. South	*225th East Ave. to 273rd East Ave.*	*4 Lanes*
71st St. South	*33rd West Ave. to US-75*	*4 Lanes*
71st St. South	*US-75 to Arkansas River*	*6 Lanes*
76th St. North	*US-169 to 129th East Ave.*	*4 Lanes*
81st St. South	*Harvard to Sheridan Ave.*	*4 Lanes*
81st St. South	*Garnett to SH-51*	*4 Lanes*

Table 10. 2045 Roadways Element: Proposed Capacity Improvements (Continued)

Roadway	Segment	Planned Through Lanes
81st St. South	*SH-97 to SH-66*	*4 Lanes*
86th St. North	*US-75 to 145th E Ave*	*4 Lanes*
86th/91st St. South/Canyon Rd.	*49th West Ave. to SH-66*	*4 Lanes*
91st St. South	*Delaware Ave. to Memorial Dr.*	*4 Lanes*
91st St. South	*Garnett to 193rd E Ave.*	*4 Lanes*
91st St. South	*Elwood Ave. to Peoria Ave./Elm St.*	*4 Lanes*
96th St. North	*US-169 to 145th East Ave.*	*4 Lanes*
96th St. North	*Memorial Dr. to Garnett Rd.*	*4 Lanes*
96th St. North	*US-75 to Peoria Ave.*	*4 Lanes*
101st St. South	*Riverside Drive to SH-51*	*4 Lanes*
103rd/106th St. North	*Osage Dr. to Cincinnati Ave.*	*2 Lanes*
106th St. North	*Garnett Road to 145th East Ave.*	*4 Lanes*
116th St. North	*US-75 to US-169*	*4 Lanes*
121st St. South	*Memorial Drive to 129th E Ave.*	*4 Lanes*
121st St. South	*161st E Ave to 129th E Ave.*	*4 Lanes*
129th West Ave.	*41st St. South to 51st St. South*	*4 Lanes*
131st St. South	*Peoria Ave./Elm St. to Yale Pl.*	*4 Lanes*
131st St. South	*Yale Pl. (Sandusky Ave.) to Sheridan Rd.*	*4 Lanes*
141st St. South	*193rd East Ave. to SH-51*	*4 Lanes*
141st St. South	*Elwood Ave. to Peoria Ave./Elm St.*	*4 Lanes*
129th East Ave.	*96th Street N to 106th Street N.*	*4 Lanes*
129th East Ave.	*51 Street S. to 71st Street S.*	*4 Lanes*
145th East Ave.	*I-44 to 41st St. South*	*4 Lanes*
145th East Ave.	*71st St. South to 101st St. South*	*4 Lanes*
145th East Ave.	*111th St. South to 135th St. South*	*4 Lanes*
145th East Ave.	*106th St. North to 116th St. North*	*4 Lanes*
145th East Ave.	*41st St. South to 71st St. South*	*6 Lanes*
161st East Ave.	*66th St North to 76th St North*	*4 Lanes*
161st East Ave.	*Admiral Pl. to Tiger Switch Rd.*	*4 Lanes*
177th East Ave.	*71st St. South to 91st St. South*	*4 Lanes*
193rd East Ave.	*I-44 to 121st St. South*	*4 Lanes*
Apache St.	*Osage Expressway to N. 41 W Ave.*	*4 Lanes*

Table 10. 2045 Roadways Element: Proposed Capacity Improvements (Continued)

Roadway	Segment	Planned Through Lanes
Edison Rd.	*Gilcrease Museum Road to Gilcrease Expressway*	*4 Lanes*
241st East Ave.	*101st St. South to 141st St. South*	*4 Lanes*
Adams Rd.	*10th St. South to 12th St. South*	*4 Lanes*
Admiral Pl.	*Garnett Rd. to 129th East Ave.*	*4 Lanes*
Admiral Pl.	*145th East Ave. to Creek Turnpike*	*4 Lanes*
Delaware Ave.	*81st St. South to 91st St. South*	*4 Lanes*
Elwood Ave.	*SH-67/151st St. South to 141st St. South & 71st St. South to 141st St. South*	*4 Lanes*
N. 41st / 52nd W Ave.	*Apache St. to SH-20*	*4 Lanes*
Garnett Rd.	*11th St. South to Pine St.*	*4 Lanes*
Garnett Rd.	*81st St. South to 111th St. South*	*4 Lanes*
Lewis Ave.	*81st St. South to 91st St. South*	*4 Lanes*
Memorial Dr.	*161st St. South to Mingo Rd.*	*4 Lanes*
Memorial Dr.	*I-44 to Creek Turnpike*	*6 Lanes*
Memorial Dr.	*111th St S. to 151st Street S.*	*6 Lanes*
Mingo Rd.	*21st St. South to 41st St. South*	*4 Lanes*
Mingo Rd.	*71st St. South to 121st St. South*	*4 Lanes*
Peoria Ave./Elm St.	*91st St. S to 96th St S & 111 th to151st St. S*	*4 Lanes*
Pine St.	*Mingo Road to SH-66*	*4 Lanes*
Port Rd. Extension	*SH-11 to Sheridan Rd.*	*4 Lanes*
Riverside Dr.	*101st St. South to 121st St. South*	*4 Lanes*
Riverside Dr.	*I-44 to 101st St. South*	*6 Lanes*
Riverside Dr. (Scenic Parkway)	*Houston Ave. to 21st St. & 41st St. to I-44*	*4 Lanes*
Sheridan Rd.	*Apache St. to 36th St. North*	*4 Lanes*
Union Ave.	*51st St. South to 91st St. South*	*4 Lanes*
Wekiwa Rd.	*SH-97 to 129th East Ave.*	*4 Lanes*
Yale Ave.	*101st St. South to 121st St. South*	*4 Lanes*
Yale Ave.	*Pine St. to Apache St.*	*4 Lanes*
Yale Ave.	*US-64/SH-51 (Broken Arrow Exp.) to I-44*	*6 Lanes*
Yale Ave.	*61st St. South to 81st St. South*	*6 Lanes*
Yale Ave.	*101st St. South to 111th St. South*	*6 Lanes*
Yale Ave. / Yale Pl.	*121st - 151st St. South (include River Bridge) - Option #1*	*4 Lanes*
131st St.	*River Crossing - Option #2*	*4 Lanes*

Congestion Management Process

The Tulsa Congestion Management Process (CMP) provides methodology to identify and monitor congestion as inputs into the Regional Transportation Plan (RTP) and the Transportation Improvement Program funding.

A CMP further provides analytical, systematic methods to monitor and evaluate system performance while attempting to deal with congestion in a holistic manner. Options related to land use, travel demand management, traffic or transit operations, as well as new capacity, are all considered and evaluated as a part of the process.

The Tulsa CMP identifies the regional transportation network as defined by the RTP as the basis of the geographic extent for addressing congestion. Congestion is identified in two categories:

Recurring Congestion: Congestion experienced by the user on any travel mode.

Non-Recurring: Congestion or delay due to crashes, construction and other unforeseen events.

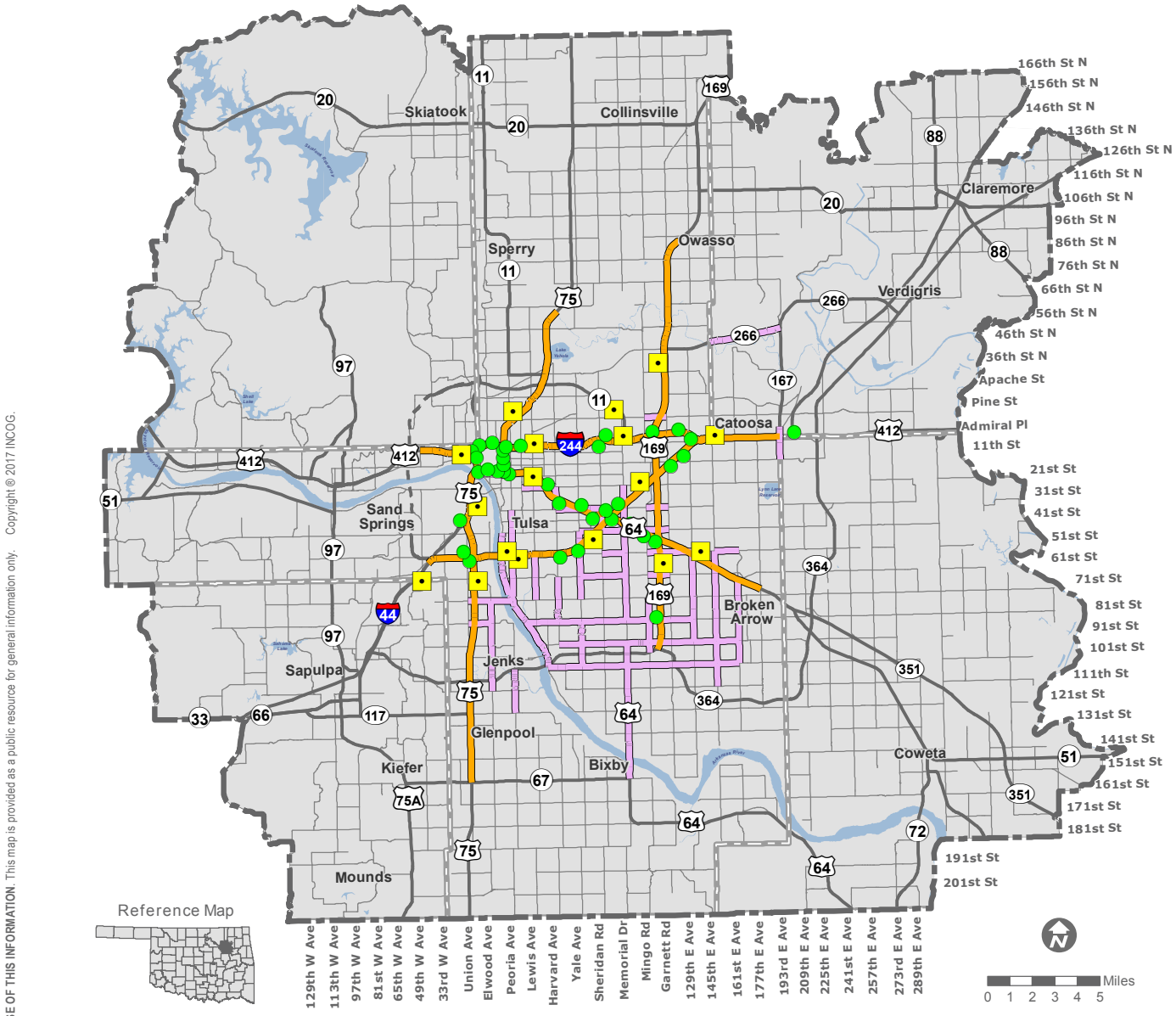
Each is addressed with a different set of strategies. Specifically, roadways not meeting a defined set of levels of performance as below are considered congested.

- *Average Daily Traffic (ADT) count or peak hour count for Roadways (measuring level of service), and*
- *Intersection traffic count (measuring travel delay).*

Various Transportation Control Measures (TCM) grouped under Transportation Demand Management (TDM) options and Transportation System Management (TSM) options are identified specifically for implementation with specific schedules and responsibilities. Monitoring implementation of strategies on a recurring basis is required.

Non-recurring congestion is considered the most predominant cause of congestion for Tulsa TMA. The 2045 Plan identifies safety and traffic management as priorities to alleviate non-recurring congestion. The CMP document adopted by INCOG in 2009 will be updated with changes in traffic, safety studies, and infrastructure changes.

Existing Congestion Management within the Transportation Management Area



Legend

- Existing and Planned Video
- Existing and Planned Video and Dynamic Message Signs

2015 Base Year Model Congestion

- Congested Highways (Travel Speed at Peak < 50 mph)
- Congested Arterials (Travel Speed at Peak < 25 mph)

Connected 2045 Regional Transportation Plan

INCOG

The Congestion Management Process Framework

Tulsa TMA adapted the framework suggested by the Federal Highway Administration (FHWA) guidance, and involved several stakeholders to further develop the guidelines based on local standards. The process of addressing congestion was developed through identification of the region and objectives, as well as system definition.

The following table summarizes the short-listed strategies along with the linkages to the TIP and RTP for Tulsa TMA.

Table 11. TIP and RTP Strategies for Tulsa TMA

Implementation Strategy	Implementation Term	Effectiveness	Funding Through TIP	Regional Plan Activity
Promote trip sharing	*1-5 Years*	*Very Effective*	*Yes*	*Yes*
Enable telecommuting	*1-5 Years*	*Effective*	*Yes*	*Yes*
Promote alternative work hours	*1-5 Years*	*Very Effective*	*No*	*Yes*
Enhanced public transit	*5-10 Years*	*Very Effective*	*Yes*	*Yes*
Non-motorized transportation improvements	*1-10 Years*	*Effective*	*Yes*	*Yes*
Intersection lane improvements	*5-10 Years*	*Very Effective*	*Yes*	*Yes*
Traffic signal improvements	*1-10 Years*	*Very Effective*	*Yes*	*Yes*
Incident detection and management	*1-10 Years*	*Very Effective*	*Yes*	*Yes*
Land use strategies	*1-10 Years*	*Effective*	*No*	*Yes*
Access management	*1-10 Years*	*Effective*	*No*	*Yes*
Roadway improvement strategies	*1-10 Years*	*Effective*	*Yes*	*Yes*
Parking management	*1-5 Years*	*Effective*	*No*	*Yes*

ACTIVE TRANSPORTATION

Vision

The Tulsa Metropolitan Area is a place where walking and biking are viable and appealing choices for transportation and recreation. Safety, comfort, and convenience for users are addressed along roads, at crossings, on multi-use trails and at key destinations.

Introduction

INCOG, as the regional transportation planning organization, provides a vision for transportation, administers funding programs, and provides member jurisdictions with resources to plan and implement projects at the local level. Integrated, multi-modal transportation that provides safer active transportation choices for residents is a priority for the region.

Active transportation alternatives are crucial to ensure more inclusive and accessible urban environments.

Building a connected network of bicycle and walking facilities will help the Tulsa region. A connected network can increase mode share by making more routes comfortable and accessible, enabling residents to walk or ride more often. Network may improve safety through separation from automobile traffic in high-volume, high-speed locations, and by encouraging higher use and visibility of bicyclists and pedestrians. It will link neighborhoods to destinations, and position communities in the region to be recognized by national organizations, such as the Bicycle Friendly Community designation from the League of American Bicyclists. INCOG is helping its member jurisdictions build this network through the implementation of the GO Plan, the MPO-approved regional pedestrian and bicycle plan.

GO PLAN
Tulsa Regional Bicycle & Pedestrian Master Plan
A PLAN FOR PEOPLE POWERED MOVEMENT

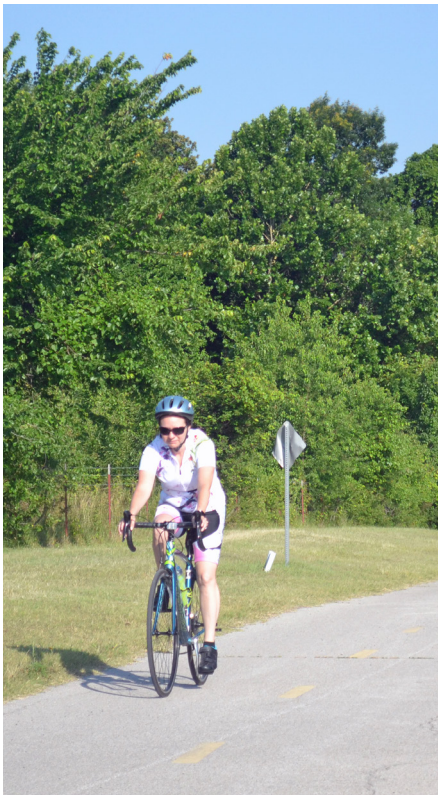
The GO Plan seeks to create a bicycle network that connects major destinations in the region, including significant employment centers, downtown business districts, schools and universities, and the existing trails system. Pedestrian improvements are addressed through recommendations in a community-chosen focus area in each jurisdiction, and through design approaches to typical pedestrian challenges in the region. The implementation of the facility recommendations will be an important start to improving pedestrian and bicycling conditions. The routine application of the Plan's design guidelines for each mode will have an even greater effect over the long term. The GO plan is proposed to be a blueprint to develop future active transportation mode choices.

American Community Survey (ACS) data show that the City of Tulsa has the highest bicycle commute mode share in the region, at 0.3 percent.

Existing Conditions

Use of bicycles for commuting is low in the Tulsa region today. American Community Survey (ACS) data show that the City of Tulsa has the highest bicycle commute mode share in the region, at 0.3 percent. All other jurisdictions are estimated to have an average commute mode share of less than 0.1 percent. ACS data also indicate that fewer than 15 percent of those bicycle commuters are women. Commute mode share is at this level given that most residents travel five miles or more to their jobs.

The Creek Turnpike Trail is one of Tulsa's main bicycle pedestrian networks.



Employment centers are clustered throughout the region in many locations that do not have nearby residential land use. The predominantly suburban development pattern of the region has separated home and work far enough that most residents choose to drive. Despite the distances, bicycle commuting could be encouraged by improving the connections between neighborhoods, the existing trails system, and transit lines. Additionally, the City of Tulsa has updated its zoning code to allow and encourage more mixed-use development.

The region's large trails system forms the backbone of existing bicycle infrastructure in and around Tulsa. These trails take advantage of rail, highway and natural corridors to provide long distance, separated connections between cities and towns. They are used both for transportation and recreation, and are an attractive amenity for residents, visitors, prospective residents, and businesses. On-street bicycle facilities are limited but growing. Some of the bikeways identified within the City of Tulsa in the 1999 Plan have had bike route signage added and bike symbols that predated the Manual on Uniform Traffic Control Devices (MUTCD) standards. Many of the signed bike routes in Tulsa are on comfortable, low-volume local/collector streets and have been adopted into the network for the GO Plan.

Needs Assessment

Transportation planning in Tulsa has typically focused on vehicular usage of streets and highways as the traditional means for transportation. Bicycling and walking facilities have generally been considered recreational amenities and have not yet realized their potential as transportation modes. In recent years, air quality issues, public advocacy, and increased traffic congestion have led to the integration of bicycle and pedestrian planning into the overall transportation planning process. The result is an emerging focus on a more balanced transportation system among all modes of travel. In the Tulsa TMA, bicycle and walking facilities can complement motorized transportation and provide useful travel choices for many users, particularly for short trips, throughout the year.

Stakeholder Priorities

The bicycle and pedestrian planning process has included public involvement through stakeholder meetings. An inventory of local comprehensive plans, policies, requirements, and the identification and assessment of existing facilities was also conducted. Key recommendations originated from the public outreach effort and they are listed in order of priority on the table below.

Table 12. Stakeholder Priorities in Order

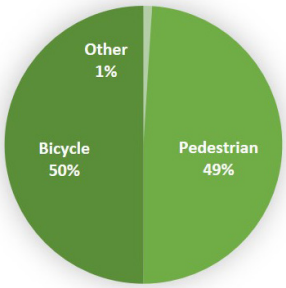
Stakeholder Priorities	Actions Needed
1. Safety	*Improving safety for citizens should be done by addressing the relationship between wider lane widths and safety hazards, educating law enforcement in each community on cyclist and pedestrian laws, and implementing policies like "Vision Zero" in communities that get policymakers involved.*
2. Connectivity	*Connect people and places by working with MTTA and Tulsa Bike Share to create "last mile" connections, as well as multi-modal options; update and implement well-designed crosswalks near schools, intersections, and destinations with high-pedestrian counts; and improve sidewalks by clearing the paths of excess signage, and poles.*
3. Livability	*Create livable areas by increasing land use diversity and density, make the right-of-way attractive to other walkable uses, and seek to mitigate or eliminate minimum parking requirements, which encourage driving and higher VMTs (vehicle miles traveled) and traffic congestion.*
4. Public Health	*Encourage active lifestyles by designing infrastructure to be user-friendly for bicycle and pedestrian uses, and work with the Tulsa Health Department to educate the public on the link between the built environment and public health.*
5. Equity	*Design infrastructure in a way that makes bicycling and walking a viable, attractive choice for those who may not be able to drive, or with no vehicle access and/or live in areas with limited access to bicycle and pedestrian facilities.*
6. Ridership/Usage	*Acquire adequate data to design facilities that accommodate all citizens, applying for funding for projects, and identifying potential opportunities for incremental change.*

Trails and Bikeways Utilization

In 2010, INCOG began a biennial process of collecting trail count data. Counts for 2017 are underway. New count data should assist with the evaluation of the trails by determining the changes in usage between 2010 and 2017. Each trail is counted twice over a two-hour period; once on a weekday (6-8 am) and once on a weekend (8-10 am).

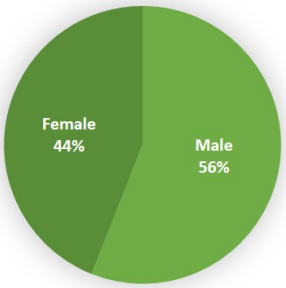
Thus far, all observation days were sunny or slightly overcast. Temperatures ranged between 72 and 85 degrees Fahrenheit. Counts were divided into 15-minute segments for accuracy. Direction of travel was not recorded and users were observed as pedestrians (including runners), bicyclists or other (including skateboarding and rollerblading). Assumed/perceived gender and helmet usage was also recorded.

Activity



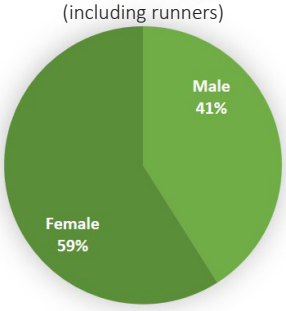
Number Total: 2,254
Bicycle: 1,140
Pedestrian: 1,101
Other: 13 activities, including skateboarding and rollerblading

Gender



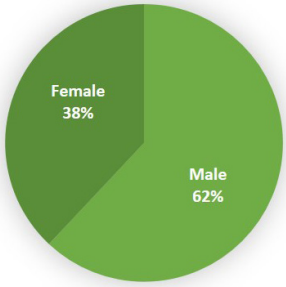
Number Total: 2,254
Male: 1,256
Female: 998

Pedestrian
(including runners)



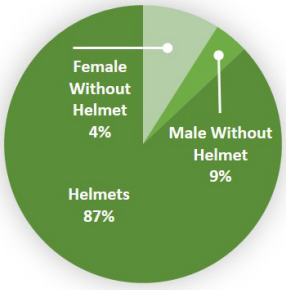
Number Total: 1,101
Male: 449
Female: 652

Bicycling



Number Total: 1,140
Male: 703
Female: 437

Helmet Usage



Number Total: 1,140
With Helmets: 992
Males Without Helmet: 103
Females Without Helmet: 45

Results

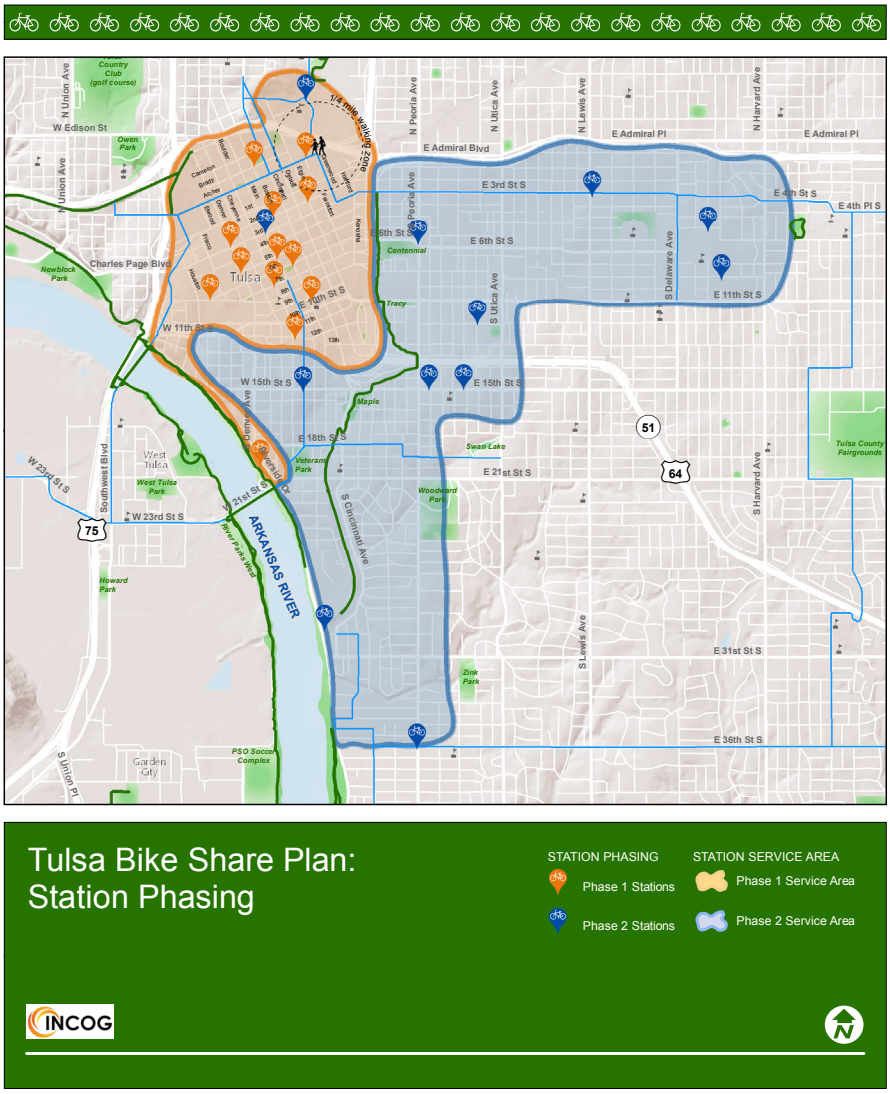
The pie charts depict the statistics for the trail system as a whole for the year 2015. Counts for weekdays and weekends were added together for each trail and then all trails were totaled together. Individual reports for each trail are similar to the overall data.

Bike Share

Tulsa was the first city in North America to install a bike share system. The program, Tulsa Townies, began in 2007, and is located in River Parks. It continues to have some of the highest ridership numbers in the nation. In 2018, a new bike share system focused on transportation will launch in downtown Tulsa. Initially there will be 18 stations and more than 200 bikes placed at various locations where bicycle infrastructure is planned to be added to the roadway. The non-profit, Tulsa Bike Share Inc. is a public-private partnership with many stakeholders and sponsors. The second phase will expand the coverage outside the downtown area, connecting destinations like the University of Tulsa, Cherry Street, Brookside, and A Gathering Place for Tulsa.

A parking-protected bike lane on MLK Blvd. in downtown Tulsa's Brady Arts District.

Figure 6. Tulsa Bike Share Stations - Phases 1 and 2



Funding

Bicycle and pedestrian projects are broadly eligible for most of federal transportation funding programs. Nationally, of the $1.5 billion of federal aid program funds obligated to bicycling and walking programs in fiscal years 2013 and 2014, 36 percent came from the Transportation Alternatives Program (TAP) or its predecessor the Transportation Enhancements Program (TEP). Several other federal programs contributed significant portions, as well. The Surface Transportation Program (STP) and the Congestion Mitigation and Air Quality Improvement Program (CMAQ) contributed 15 and 12 percent, respectively. The Highway Safety Improvement Program also contributed two percent of the funds spent on bicycling and walking during that period. INCOG is involved in the selection and administration process for the TAP, STP and CMAQ programs. Local funding of pedestrian and bicycle infrastructure generally comes from bond referenda, capital improvement programs, sales tax initiatives, and development fees.

Table 13. Available Funding Sources and Programs

Source	Description
Surface Transportation Program (STP)	*INCOG receives more than $14 million per year in STP funds, and may consider funding bicycle and pedestrian projects. STP is perhaps the most flexible federal funding program.*
Transportation Alternatives Program (TAP)	*INCOG administers regional TAP funds and opens funding rounds every other year, awarding approximately $2.2 million each funding cycle ($1.1 million per year). Combining two years' worth of funding into one selection cycle allows for funding larger projects. TAP is a common source of federal funding for pedestrian and bicycle projects.*
Congestion Mitigation and Air Quality Program (CMAQ)	*INCOG receives approximately $650,000 per year in CMAQ funds. In the past, INCOG has used CMAQ funds to install bike racks, to conduct a bike share study, and to fund signage for bicycle facilities.*
State Funding Sources	*Oklahoma Department of Transportation (ODOT) promotes active transportation facilities through the implementation of eligible projects using statewide TAP funding.*
Local Funding Sources	*Local funding of pedestrian and bicycle infrastructure has generally come as part of street improvement projects in the region, and occasionally from stand-alone trail projects. Other local funding sources have been sales taxes, bond referenda, development fees, or capital improvement plans.*

Strategies

The GO Plan addresses bicycle and pedestrian strategies in detail in chapters 2 and 3, and non-infrastructure strategies in chapter 5. Below is a summary of these strategies.

Table 14. GO Plan Bicycle/Pedestrian Plan Stategies

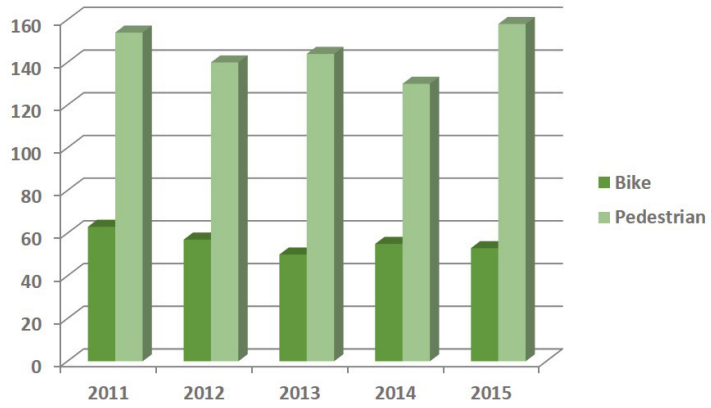
Strategy	Description
Bicycle Strategy	*The overall bicycle strategy includes developing a network of bicycle facilities for the Tulsa region to connect major regional destinations to one another, and to connect neighborhoods to the existing backbone network of trails. Examples of regional destinations are downtowns, large commercial districts, colleges and universities, and regional parks and activity centers. In general, the network is intended to serve both transportation and recreation purposes for a wide range of users. The bicycle network for the Tulsa region sets an ambitious vision for connecting these major destinations via an 800-mile system of on-street facilities and routes, 165 miles of side paths and 408 miles of off-street trails. The full build-out of this network will link communities to one another and important destinations within each community.*
Pedestrian Strategy	*The overall pedestrian strategy is safety, equity and connectivity for the entire Tulsa region. It is broken down into four action steps, which include the prioritization of the existing INCOG sidewalk gap inventory, a detailed assessment and recommendations for one or more focus areas per jurisdiction, concept designs for typical challenging pedestrian scenarios, and policy recommendations. Residents indicated on the Plan survey that they view it as great means of exercise, but walking for transportation today is limited. Sidewalk construction along arterial streets in many communities has been ad hoc as development occurs. All of the sidepath and trail recommendations in the bicycle network will also benefit pedestrians. Some sidepath recommendations will close small sidewalk gaps, while others will provide longer distance connections more likely to be used by recreational walkers and runners.*
Non-infrastructure Strategy *Bicycle and pedestrian planners typically approach improving the environment for those modes through a "Four Es" model: education, enforcement, encouragement, and evaluation and planning.*	***Enforcement.*** *Work with local law enforcement to target efforts in problem areas to keep all road users safe. Action items include working on adding bicycle patrol units on the streets and bicycle friendly training in CLEET courses.* ***Education.*** *Inform all road users of their rights and responsibilities to ensure safe roads for all. Organizations in the region such as the Tulsa Hub and the afterschool bicycle programs at Tulsa Public Schools are already providing strong education resources about bicycling. INCOG should lend support to these efforts where it can through the BPAC, as well as utilize FHWA and Highway Safety grant money for messaging throughout the region.* ***Encouragement.*** *Create a strong culture that celebrates walking and bicycling. Some of the programs in effect are bike-to-work events, bike-to-school day at schools, accessible walking and biking maps, and an upcoming bike share program.* ***Evaluation.*** *Collect data on walking and bicycling to help plan for these modes as safe and viable transportation options. INCOG manually conducts a biennial count on the trails. Permanent and movable counters should be used. Tulsa is currently designated as a bronze Bicycle Friendly Community by the League of American Bicyclists (LAB), and the City of Tulsa is currently applying for silver status.*

Safety

Recommendations for bicycle facilities on arterial streets focus on providing sidepaths or protected bike lanes, facilities separated from fast, high-volume traffic, where feasible. Close to 75% of bicycle crashes occurred on arterial streets between July 2009 to July 2014. Bicyclists do not avoid riding on arterials since they are often the most direct route, but may ride on the sidewalk. A larger percent of these arterial crashes resulted in incapacitating injuries or fatalities than those on local streets and collectors, likely due to the higher speed of automobiles involved in the crashes.

Table 15. Reported TMA Bicycle and Pedestrian Crashes

Year	Bicycle	Pedestrian
2011	*63*	*154*
2013	*57*	*140*
2013	*50*	*144*
2014	*55*	*130*
2015	*53*	*158*



Implementation:

Funding, Issues and Actions, Development Practices

The bicycle component of the GO Plan was divided into a set of 700 projects for the purposes of recommending implementation approaches and developing a prioritized list, with cost estimates, by jurisdiction. The network was divided into projects through the following method:

Geography

- *Recommendations located wholly within a city were assigned to that city.*
- *Recommendations with a majority of their mileage located within a city were assigned to that city.*
- *Recommendations with a majority of their mileage outside a city were assigned to the appropriate county.*
- *Recommendations located on a street along a jurisdictional boundary (city-city or city-county) were assigned to the appropriate county.*

Facility

- *Projects are located along a single street or trail corridor.*
- *Signed routes are bound by logical end points (e.g. a destination, or major street or direction change) and often include more than one street.*
- *Where the facility type changes along a corridor, recommendations were broken into separate projects*
    - *Exception: a project that calls for a bike lane along part of a street and a shared-lane marking for part of that street is considered one project.*

This method is intended to produce a project list that will lead jurisdictions logically toward implementation. Individual projects will connect to one another to create the full network. Bicycle and pedestrian projects are typically implemented in one of two ways: as part of a larger roadway project, or as a standalone effort. While planned and programmed street improvements can help guide the implementation schedule for this plan, jurisdictions should also consider prioritizing projects on streets where bicycle and pedestrian projects are recommended.

Local governments will have primary responsibility for implementing projects in the GO Plan. Responsibility for design and construction of projects will be taken on by each jurisdiction individually; however, because the GO Plan network intends to connect major regional destinations, and many projects connect across city lines, INCOG will assist in securing federal funding and providing technical assistance with project development. It will be advantageous for communities to partner in implementing projects that provide regional connections, both from the standpoint of creating a more connected network and for the efficiencies gained through economies of scale in constructing larger projects.

View of the Osage Prairie Trail leaving Central Park, in Skiatook.

Design Guidelines

The design guidelines are intended to broaden the range of design options for streets in the Tulsa region, recognizing that streets and public rights-of-way comprise a significant portion of a city's area and as such must maximize the public benefit they offer.

For many decades beginning in the mid-twentieth century, street design focused primarily on motor vehicle movement, and the emerging discipline of traffic engineering worked to integrate cars and trucks into pre-existing urban forms. While there were benefits to accommodating automobile movement through the city, the negative effects have become increasingly evident over the last forty years. The focus on automobiles has resulted in a different form of land development patterns, namely emphasizing access for vehicles to buildings and property, but not access for people. This access comes at the expense of other uses of the street and other transportation choices. A detail of design guidelines is included in Appendix A.

Prioritization

All projects in the bicycle network and sidewalk gap inventory were prioritized as part of the GO Plan. Each project is scored based on a set of criteria and weighting determined by the steering committee, and reflect the vision and goals of the project. The scoring uses a combination of selected factors and variables such as stakeholder input, safety, demand, connectivity, and equity. All bicycle projects were scored in the same manner across the region. The full regional list of prioritized bicycle projects and scores was subdivided into lists for each participating community. City-specific prioritized lists are provided in Tables 1 through 11 in the appendix of the GO plan.

Policy Review

As a central element of both the analysis of existing conditions and the recommendations in the GO Plan, the planning team performed a thorough analysis of the region's policy documents that influence the design of streets, street networks, and off-street bicycle and pedestrian facilities. Sidewalk requirements are present in most communities' subdivision regulations or zoning codes. The GO Plan recommended adopting standard regional design guidelines and practices for sidewalks, buffer, bike lanes, signage, and other visible infrastructure.

GO Plan Recommendations

The GO Plan also made recommendations regarding funding and policy after evaluating the existing conditions and strategies for future implementation, including:

Table 16. GO Plan Recommendations for Funding

- *Encourage member jurisdictions to continue funding for street improvements that include GO Plan recommendations.*
- *Encourage member jurisdictions to set aside a percentage allowance for bicycle and pedestrian improvements on any sales tax dedicated to infrastructure.*
- *Provide member jurisdictions with data on the cost-effectiveness of bicycling and walking projects from safety, economic, and transportation perspectives.*
- *Encourage prioritization of street projects that include high-priority bicycle and pedestrian improvements identified in this plan.*
- *Pursue available funding opportunities that support the implementation of trails and bikeways as recommended.*
- *Align the INCOG TAP application scoring system to the project prioritization process identified within the GO Plan.*
- *Publicize the eligibility and competitiveness of pedestrian and bicycling projects for STP and CMAQ funding among local jurisdictions.*
- *Increase the weighting for multi-jurisdictional projects with regional implications and possible connections between communities for all competitive funding opportunities.*
- *Provide application assistance to member communities to identify projects that have greater effects.*
- *Include feasibility/opportunity/project readiness into the scoring of the applications.*

Table 17. GO Plan Recommendations for Policy

- *Adopt regional standards for pedestrian and bicycle facility design as described within the GO Plan Design Guidelines.*
- *Encourage adoption of similar design guidelines in each jurisdiction to make facility implementation consistent.*
- *Subdivision regulations should require construction of sidewalks and bicycle infrastructure in both residential and non-residential areas.*
- *Regulations should also require connectivity to local and regional trails as part of site review. Fees in lieu and bonding could also be considered by additional communities in the region to fund construction within new developments and connections to trails. Homeowners' associations should be encouraged to maintain sidewalks and bicycle infrastructure.*
- *Local governments are encouraged to address missing gaps and improve connectivity as part of resurfacing, redevelopment and retrofit projects. This could be accomplished through local projected funding association fees or sidewalk grants allocated specifically for these connections.*
- *Encourage jurisdictions to adopt bicycle parking standards that include incentives to add bicycle parking and reduce requirements for off-street parking spaces.*
- *Encourage jurisdictions to adopt zoning code elements that result in a more pedestrian-friendly development pattern for downtown areas and neighbor centers, such as off-street parking behind buildings, and other strategies outlined in the new Tulsa zoning code.*

Table 18. Regional Priorities: Trail / Sidepath Projects

Segment	Length	Estimated Cost
Trail along Gilcrease Expressway from S. 49th W. Ave. to Katy Trail	*5.5 Miles*	*$4.8M*
West bank trail from 71st St. S. to 96th St. S.	*3.3 Miles*	*$3M*
East Bank Trail from Delaware Ave. to Fry Ditch Creek	*4.8 Miles*	*$4M*
Trail along US-169 from 51st St. S. to 71st St. S.	*2 Miles*	*$2M*
Sidepath along 101st St. S. from Riverside to Creek Turnpike	*5.5 Miles*	*$4M*
Sidepath along SH-97 from Sapulpa to Sand Springs	*8.6 Miles*	*$6M*
Ranch Creek Trail from E. 76th St. N. to E. 96th St. N.	*2.5 Miles*	*$2.2M*
Sidepath along Route 66 from Verdigris River to Will Rogers Blvd. in Claremore	*9 Miles*	*$8M*

Bicycling Facilities

Bike Lane

Conventional bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. They have a minimum width of 5 feet. Similar to 4th Pl. between Yale Ave. and Sheridan Rd.

GO Plan example: 3rd St. from Downtown to Yale Ave.
Cost per mile: $70,000

Cycle Tracks / Protected Bike Lane

A facility in the right-of-way that is physically separated from automobile traffic for the exclusive use of bicyclists. Separation is provided by vertical elements, whether pylons, bollards, parked cars, curb, planters, or by the cycle track being at a different height than the street.

GO Plan example: 11th St. from Elgin Ave. to Sheridan Rd.
Cost per mile: $120,000

Buffered Bike Lane

Buffered bike lanes are conventional bicycle lanes paired with a designated minimum 3 foot buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.

GO Plan example: 11th St. from Sheridan Rd. to Garnett Rd.

Cost per mile: $71,000

Sidepath

Similar to a trail, but adjacent to a roadway. Sidepaths are within the street right-of-way, but at curb level and separated by a buffer from traffic. Similar to Elm St. in Jenks between the Creek Turnpike and 111th St.

GO Plan example: 81st St. from Riverside Dr. to Garnett Rd.
Cost per mile: $719,000

Source: GO Plan

Bicycling Facilities

Signed Route

A known bike route with "Share the Road" signage to alert drivers to the presence of cyclists.

Cost per mile: $800-$18,000

Shared Lane Marking (Sharrows)

Marked shared lanes are indicated by specific bicycle symbols with two chevrons positioned above a bicycle symbol.
Similar to 36th St. in Tulsa.
GO Plan example: 36th St. between Riverside Dr. and Hudson Ave.
Cost per mile: $33,000

Priority Shared Lane Marking

Shared lane markings (sharrows) can be enhanced with a green colored backing. They do not represent a dedicated bike lane, but suggest that bicycles have priority in the right lane.
GO Plan example: 15th St. from Peoria Ave. to Utica Ave.
Cost per mile: $77,000

Trail

A minimum 10-foot, 2-way path shared by bicyclists, runners, walkers skateboards. Similar to the Creek Turnpike Trail or the River Parks trails. Usually located on open land, along watercourses or former rail lines.
GO Plan example: Mingo Trail from 51st St. to 71st St.
Cost per mile: $888,000
Dual Trail: $1.6 million

Source: GO Plan

TRANSIT

Users on board being surveyed on MTTA's public transit service.

Introduction

Public transit has long been an integral part of Tulsa's transportation network. Numerous private streetcar lines continued to develop the city until 1935. The region also saw the creation of two interurban rail lines connecting the cities of Sand Springs and Sapulpa to the city of Tulsa. Today, the TMA has one primary transit service provider, the Metropolitan Tulsa Transit Authority (MTTA). MTTA was created in 1968, and operates bus services for the region, as well as some of the region's paratransit services. MTTA provides 3 million fixed-route trips and 120,000 paratransit trips (through their Lift service) annually. Though presently passenger rail does not exist in Tulsa, there are many significant corridors identified for future implementation as the need develops in the region.

Facing new and evolving challenges and opportunities, INCOG has taken the opportunity to engage the public, study alternative transportation solutions, and create community visions to help guide regional success. One such initiative, the Regional Transit System Plan (RTSP or the Fast Forward Plan), recommends a comprehensive, long-range, realistic system of transit corridors to help meet the region's transportation needs over the next 25 years. The plan defines corridor priorities for the region and defines policy needs for feasible development. Throughout the study, the RTSP was centered on a technically sound, data-supported planning process which enables the region to be well positioned

for potential future grant funding. The RTSP plans to guide the region's transportation investments to meet the growing needs of the community, and is the foundation for all transit-related guidance and recommendations of Connected 2045.

Following the adoption of the Fast Forward Plan, voters in the City of Tulsa approved a local tax package which included capital and operational funding for Bus Rapid Transit (BRT) projects mentioned later. Bus Rapid Transit is a premium fixed-route bus service which provides more frequent, faster service, and more reliable travel times than the traditional bus services, with fewer stops along each route. The first of these routes is the Peoria BRT line, which will travel along Peoria Ave. from the northern and southern edges of the city. This project is currently underway with the final design to be completed in 2017, construction in 2018, and operation set to begin in spring 2019. The second BRT line is planned to travel east-west, on 11th and 21st streets. This project is anticipated to be completed and operational by spring 2021.

"Between 2001 and 2009, the average number of miles driven by 16 to 34 year-olds dropped by 23 percent, as a result of young people taking fewer trips, shorter trips, and a larger share of trips by modes other than driving."

(Dutik and Inglis, 2014) [1]

Needs Assessment

The importance of transit has received much political recognition in the region in recent years. The Mayor of the City of Tulsa, G.T. Bynum, emphasized the importance of access to quality transit in his administration's goals, the most obvious of these being a primary goal to increase the population within half mile of transit. Currently 24.8% of Tulsa's residents fit this criteria.

By providing greater access to convenient, reliable transit, vehicle ownership is not necessary for mobility and transportation needs, thereby potentially reducing household expenses on transportation. Research has also found that providing transit access to students has proven to both decrease absenteeism (23%) and increase involvement in additional after-school learning opportunities (Fan & Das, 2015)[2]. This likely results in increasing high school graduation rates. The region has already taken action and created other partnerships between MTTA, Tulsa Public Schools, Tulsa Community College, and others, providing free services to students through the programs TPS Rides and TCC Rides Free.

1. http://www.uspirg.org/sites/pirg/files/reports/Millennials%20in%20Motion%20USPIRG.pdf
2. Assessing the Impacts of Student Transportation on Public Transit, at http://www.atten-danceworks.org/wordpress/wp-content/uploads/2013/01/Minneapolis-Student-Pass-Study.pdf

This need for transit is also evidenced by the growth the Tulsa metro is currently experiencing. In 2015, Tulsa County accounted for 77 percent of the population of the total TMA. Tulsa County is expected to experience the highest growth in population density by 2045, adding approximately 331 persons per square mile. In terms of changing travel patterns, as the population increases, trip patterns will become more dispersed. This growth translates into comparable, if not greater, increases in vehicle miles traveled (VMT), vehicle emissions, fuel consumption, and collisions.

In 2015, Tulsa County contained 88% of the TMA's total employment, approximately 74% of the employment growth in the future is expected to occur within Tulsa County. These trends support the possibility that expanding the capacity of the transit system to meet these demands is perhaps one of the greatest economic and organizational challenges the region faces.

While congestion is not currently a serious problem in the region, a high-quality transit system and corresponding transit-oriented development (as supported by PLANiTulsa, the City of Tulsa's Comprehensive Plan) provide a more economically-sustainable pattern of growth and infrastructure efficiency. Additionally, technology in the transportation sector is undergoing rapid change, and with it comes changing societal expectations of how mobility is integrated into daily life. Tulsa's transit system and the transportation network as a whole must prepare for the future of tomorrow.

The integration of technology will play an integral role in the future of transit and its ridership. Numerous studies have found that the millennial and subsequent generations both drive less and are increasingly choosing forms of transportation other than vehicle ownership, including ride-sharing, public transit, or various means of active transportation. Also well documented is the attachment these same generations have to technology and demand-response services. When applying this knowledge to the future of transit in the Tulsa region, it becomes increasingly important for transit professionals to adopt technologies that allow the agency to better understand how riders are using their system and how it can be improved.

It is essential to utilize technology that enables transit services to more easily integrate into daily life, whether this is reflected in partnerships with ride-sharing services for first-mile/last-mile connections or the utilization of big data and smart infrastructure to better adapt and predict ridership needs. The end goal should be to make using transit the easy and convenient choice.

Users will combine transit with other active means of transportation and technology to fit new needs and lifestyles.

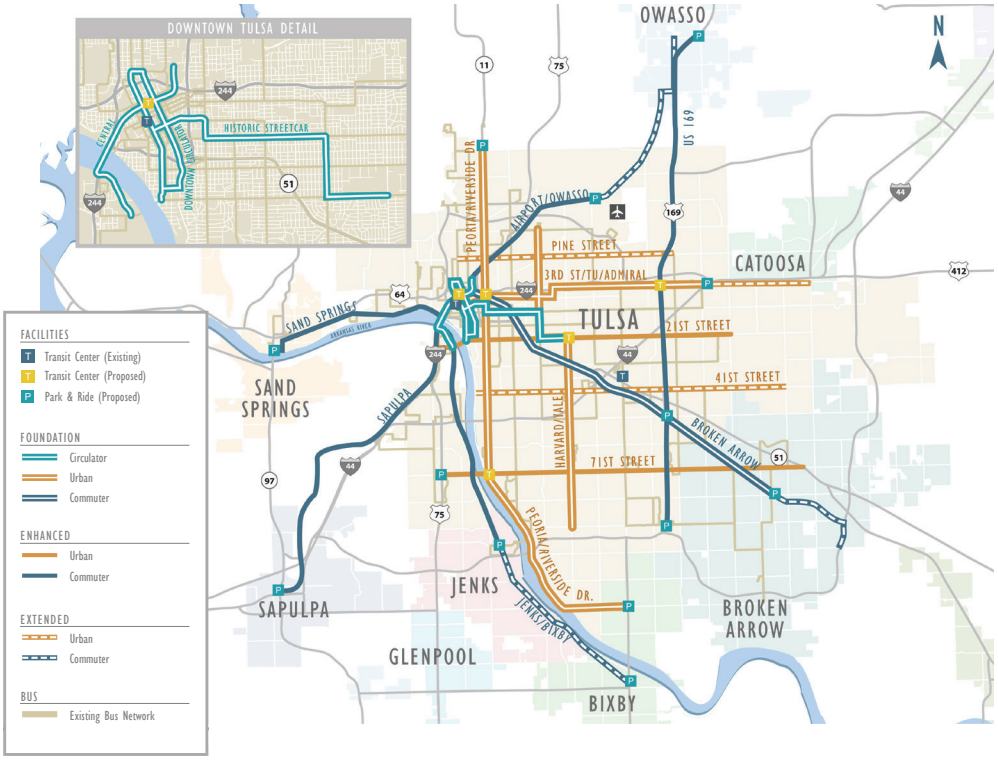
Transit Corridor Prioritization

The RTSP, better known as the Fast Forward Plan, established three transit market groups in order to discern the relative difference in high capacity transit needs among corridors with like characteristics. Transit market groups were defined as Circulator, Commuter and Urban Corridors. Typical travel demand, built environment, and operating characteristics of each market group are described in the following table:

Table 19. Transit Market Groups and Networks

Corridor Type		
Circulator	**Commuter**	**Urban**
• *Provides transit service throughout downtown central business district.* • *Supports commuter and transit networks.*	• *Established highway or rail corridors connecting suburban and rural areas to the urban core.* • *Trips are generally inter-urban, work based, and occur during peak travel times.*	• *Compact, developed urban and suburban areas.* • *Serves high population and employment density corridors with a more even distribution of peak and off-peak trips.*
Network Type		
Foundation	**Enhanced**	**Extended**
• *High usage corridors with high transit demand.* • *Corridor needs are addressed with implementation of high-capacity transit technology: commuter rail, light rail, streetcar, and bus rapid transit.* • *Higher investment improvements, requiring significant capital investment and used in conjunction or in lieu of improvements identified for Enhanced or Extended Network corridors.*	• *Corridor needs are addressed with a variety of transit and/or roadway improvements, including high capacity technologies and service improvements.* • *Proven low-cost solutions may be deployed in advance of more significant investment projects to improve efficiency or customer service; success of improvements to be evaluated within 3-6 months.*	• *Areas with limited transit service needs within the RTSP planning horizon year (2045).* • *Immediate improvements may be introducing fixed route service, providing stops, and basic shelter, etc.* • *May be eligible for Enhanced Network Improvements, though within a longer timeframe.*

Source: Fast Forward Regional Transit System Plan (2011), INCOG.



FAST FORWARD
Move the economy.
Find A Solution with Transit.

Fast Forward: Regional Transit System Plan (2011), INCOG.

Interregional Public Transportation

There are four interregional bus services that travel daily through the Tulsa region. Greyhound operates ten buses per day with direct connections to Kansas City, St. Louis, Memphis, Dallas, Oklahoma City, and Denver. Jefferson Lines operates two regional buses per day; one travels from Kansas City to Wichita Falls, TX and another from Wichita Falls, TX to Minneapolis, MN. The third and fourth services are Turimex Internacional and Zavala Plus. Each operate one bus per day in Tulsa, with connections to thirteen southern and eastern states in the US, and twelve northern and central states in Mexico.

Implementation Strategy

Informing local officials and the community on the benefits, costs and effects of transportation options is crucial for project implementation.

Foundation corridors will be advanced to planning, environmental review, and engineering and design before they reach construction. The first phase of advanced planning is established in the form of an Alternatives Analysis (AA). An AA evaluates transit technology and alignment options for a corridor. Informing local officials and community members on the benefits, costs and effects of transportation options, enables the community to identify a preference. This phase is complete when local and regional decision makers select a locally-preferred alternative that is adopted by INCOG into the region's long-range transportation plan.

The second phase of project development concerns the preliminary engineering and environmental review. During the preliminary engineering (PE) phase of project development for transit projects, consideration for all design options is established to refine the locally-preferred alternative and complete the National Environmental Policy Act (NEPA) process. Preliminary engineering improves estimates of project costs, benefits, and effects. Final design is the third and last phase of project development, and includes preparation of final construction plans, detailed specifications, and bid documents.

Development timelines fluctuate depending on the total length of the corridor, the transit technology mode, and funding sources. As corridors are individually studied, they will be assessed to verify projected transit demand and needs.

Funding Strategies

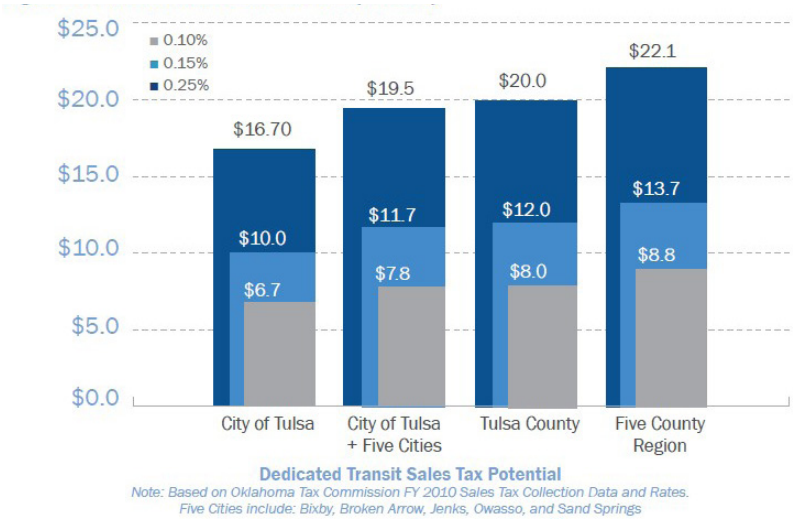
The RTSP (Fast Forward Plan) recommended maintaining momentum for cost-neutral transportation/bus enhancements prior to the availability of dedicated regional tax revenues. It was recommended that the City of Tulsa, other neighboring jurisdictions, and Tulsa County significantly increase local funding for transit.

Based in part on these recommendations, in April 2016, voters in the City of Tulsa passed a permanent sales tax of 0.085% in the city's Vision 2025 package. This includes funding for transit operations and capital projects. Fifteen year projections indicate this amounts to $58M for transit funds. This is the first permanent local funding source for transit in state history.

Table 20. Transit Revenue Forecasts

Source	2015	2045	Notes
Local Funding (dedicated to public transportation)	*$6M*	*$6-22M*	*Local funds are typically only used for operations and providing a 20% match for federal grant funds.* *Local funds depend on the scope and scale of the system proposed and varies based on city/county initiatives.*
Federal Funding	*$8M*	*$8-12M*	*Federal funds are typically used for capital investment projects. Amounts are based in part on ridership and MTTA service miles.* *Federal funding is contingent on future authorization of transportation legislation.*
Fare, Advertising and Other	*$4M*	*$4-6M*	*Amounts are based in part on ridership. Projections range from no change to a 50% increase in ridership.* *Fares and advertising revenue as collected depends on the extent of the system and ridership.*

Fast Forward: Regional Transit System Plan (2011).



Dedicated Transit Sales Tax Potential

Note: Based on Oklahoma Tax Commission FY 2010 Sales Tax Collection Data and Rates. Five Cities include: Bixby, Broken Arrow, Jenks, Owasso, and Sand Springs

The region suffers from many gaps in sidewalks and infrastructure.

The RSTP (Fast Forward Plan) recommends exploring amending enabling legislation to allow for alternative financing mechanisms, which include property taxes, vehicle fees, car rental fees, vehicle lease fees, parking fees, utility fees, motor fuel taxes, and battery taxes to fund transit. The RTSP also highly recommends pursuing all federal funding sources. Any local commitment of resources toward capital and operations can be successfully leveraged and complemented with all federal avenues for funding of capital projects. In addition to future potential capital-intensive projects, it was recommended that various categories of funding be pursued, including:

- *The State of Good Repair Initiative.*
- *The Livability Expansion Initiative, which includes the Alternatives Analysis program and Bus and Bus Facilities.*
- *Other FTA programs, including the Clean Fuels program and the Transit Investment.*

In order to adopt proposed transit improvements into the fiscally-constrained Regional Transportation Plan, conceptual cost estimates must be developed to the greatest extent possible to allow for accurate projection of cost, as well as identification of revenues and funding sources. Transit technology modes and service operating characteristics are discussed in greater detail within the full Regional Transit System Plan (Fast Forward Plan).

Governance

The RTSP (Fast Forward Plan) recommends regional action on critical issues pertaining to governance and finance of the transit system, including both high-capacity and fixed-route bus services. As a result, the Task Force on Transit Governance and Funding was created with a mission to implement the transit projects previously recommended by the RTSP and PLANiTULSA.

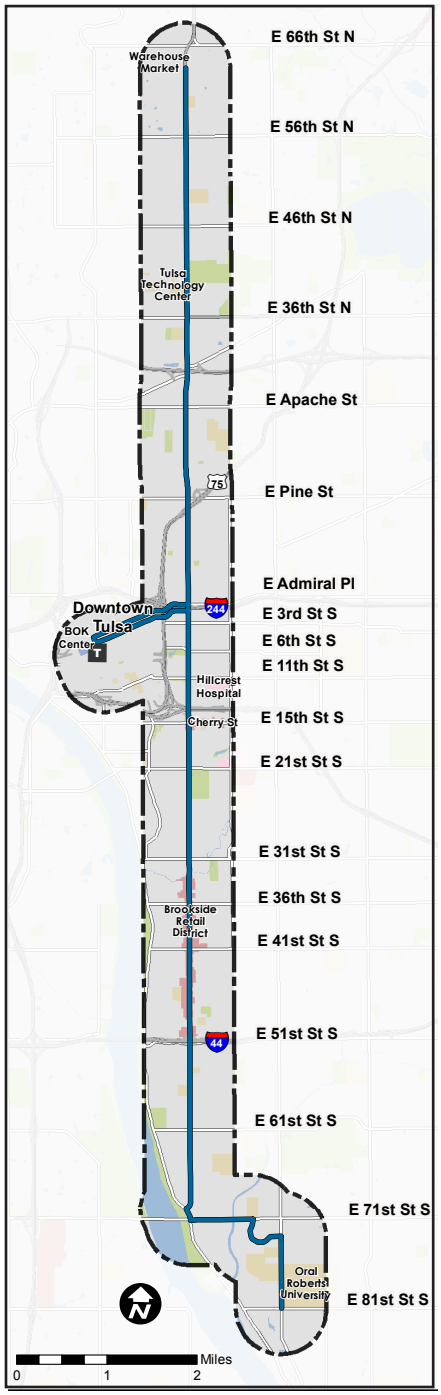
Below are recommendations established throughout the technical process in consultation with input from regional stakeholders. The recommendations include:

Table 21. Governance and Finance Recommendations of the Transit System

- *Expand the existing Tulsa Transit Board of Trustees to include more regional representation; specifically, the municipalities that contract with MTTA (such as a rotating seat on the board, filled by a contracting municipality).*
- *Establish necessary interim steps to move forward with the recommended governance mechanism.*
- *Generate additional funds to maintain and improve existing transit service.*
- *Develop a specific plan and program of investments for which additional funding is needed, and demonstrate the benefits that are expected from the proposed investments.*
- *Clearly identify established roles, responsibilities, and procedures for executing the funding and investment strategy and implementing the proposed improvements.*
- *Design and carry out a public education and advocacy plan and campaign.*
- *Develop sustained leadership and demonstrable, sustained support.*

Next Steps for Regional Transit Implementation

The planned Peoria BRT Line, going from North to South Tulsa.



As previously discussed, the Peoria BRT project is currently in the design phase and is on track for a spring 2019 operational start date. Upon completion of the Peoria BRT, the second phase of the BRT construction will begin with the development of the East-West BRT corridor. The exact route has not been defined, though it is planned to be a combination of 11th st. and 21st st., extending from Downtown Tulsa to the Eastgate Metroplex at the intersection of 21st st. and 145th E. Ave. This 11-mile BRT route will provide an essential connection to the Peoria BRT.

The Bus Rapid Transit lines will include the following amenities:

- *15-minute frequency during peak hour; 20-minute frequency off-peak.*
- *Signal preemption.*
- *Stations approximately every half mile.*
- *Level boarding, often resulting in stops of less than 20 seconds.*
- *Real-time travel information displays.*
- *Off-board, on-board, and online payment options.*
- *Bicycle storage.*

Examples of key destinations on the Peoria Corridor and within 10 minutes of walking distance

Downtown Tulsa

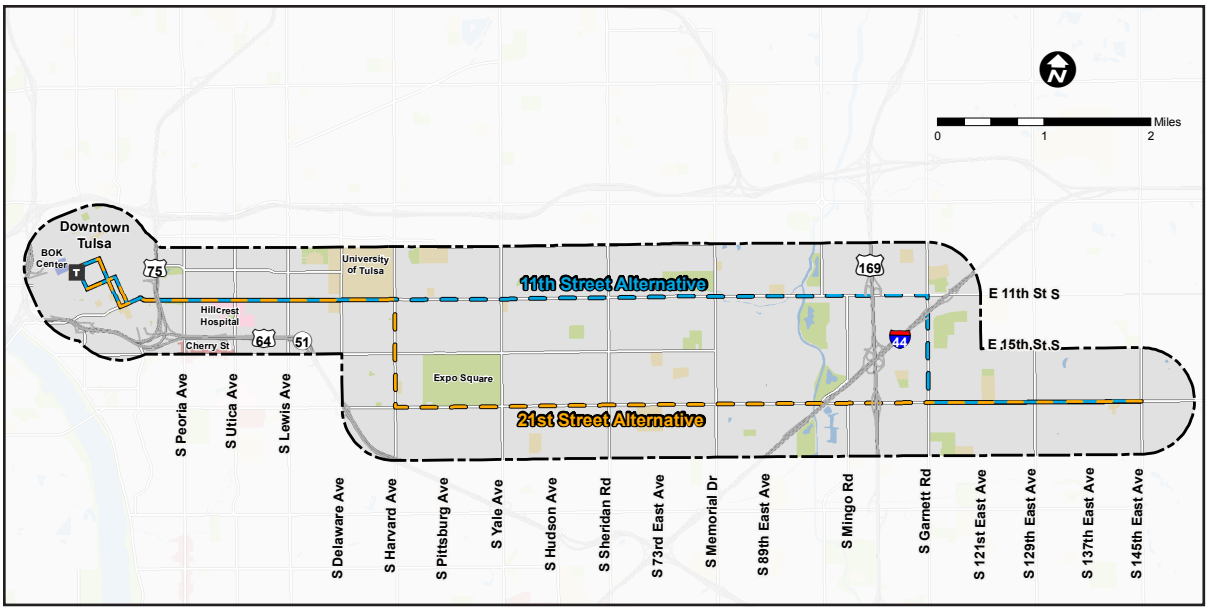
Tulsa Technology Center

Markets

Entertainment Districts

Oral Roberts University

St. John and Hillcrest Hospitals



The East-West BRT Corridor is being planned along 11th St./ 21st St.

Examples of key destinations on the 21st St. Corridor

Downtown Tulsa on the west end and the Eastgate Metroplex on the other end of the BRT line.

Tulsa Fairgrounds

Markets / Shopping Center

McClure Park

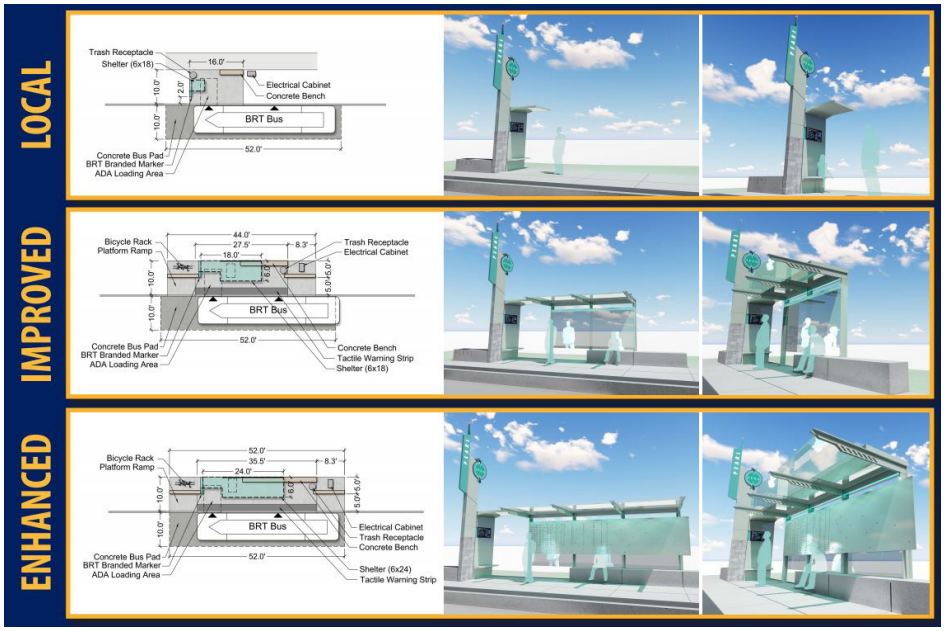
Examples of key destinations on the 11th St.Corridor

Rose Bowl Event Center

Route 66 Destinations

The University of Tulsa

Potential branding for buses and station design concepts for the new Peoria BRT Line, unveiled by the City of Tulsa in July 2017.



Flier highlighting workshops and public engagement for the BRT implementation process.

Evaluation and Performance

The introduction of the premium transit service provided by the BRT lines will enable an opportunity for a change to include faster service to connect primary hubs for transfers such as the Denver Avenue Station and major destinations. Tulsa Transit envisions that these two BRT routes will become the primary hubs for transfers, rather than those currently occurring at the Denver Avenue Station. This will modernize the entire route network, expand the capacity and efficiency of the system, and positively affect the riders themselves and their mobility experience.

A necessary component of a comprehensive review of the network is data availability. Presently, there is limited data available to Tulsa Transit for ridership analysis. Much of the existing knowledge regarding ridership boarding and alighting has come from additional studies conducted externally; however, MTTA is in the process of purchasing on-board automated passenger counters (APCs) for all system buses. These will allow MTTA to track a route's boarding and alighting by location, time, and direction of travel, providing a critical data need which has not been readily available to MTTA without a labor- and cost-intensive study. The APCs are planned to be operational on all MTTA buses by fall 2017, providing ridership data almost immediately.

Connected 2045 recommends that MTTA utilize the ridership data and complete a Comprehensive Operational Analysis (COA). With the additional data availabilities, Connected 2045 proposes the establishment and tracking of the following performance measures:

Table 22. Transit Performance Measures

Measure	Description
Ridership	*Annual ridership totals should be compiled for comparison to the 2011 Bus Operations Plan and the 2017 Route Integration Study, both prepared by Connectics Transportation Group. At the time of the Bus Operations plan, ridership was holding steady at 2.5 million annually. Daily ridership peaked in 2015 at approximately 12,000 daily riders; however economic events (such as lower fuel costs) have resulted in ridership counts trending downwards. Today, daily ridership varies between 9,000 and 11,000.* *The demographic profile of riders depicted a largely transit-dependent rider base. With the amenities and benefits provided by addition of the BRT routes, it is anticipated that the number of choice riders will increase. Ridership should be watched for increases in ridership totals, as well as increases in choice riders.*
Revenue Service	*Revenue service refers to the amount of time (hours, miles, or trips) a vehicle is available to the public, and there is an expectation of carrying passengers. Revenue service data should be compiled for comparison against the 2011 Bus Operations Plan analysis, which shows a 20% decrease in revenue hours over the years between 2002 and 2009.*
Service Effectiveness	*Measures used to evaluate service effectiveness include passengers per revenue hour and passengers per revenue mile. Both measures saw increases in 2004, before decreasing and stabilizing through 2009. Service effectiveness should be measured annually, along with ridership and revenue to determine overall quality of transit service being provided.*

Tulsa Transit's Route 105, going north on Peoria Avenue.

HUMAN SERVICE TRANSPORTATION AND COORDINATION

Purpose

The purpose of the Coordinated Public Transit Human Services Transportation Plan is to identify the transportation needs of the target populations and develop alternatives to address these needs. These alternatives are developed by INCOG in coordination with the region's transit providers and the Regional Council for Coordinated Transportation (RCCT).

Obstructions including event equipment and road construction signs are often found on sidewalks.

Introduction

SAFETEA-LU, the federal transportation reauthorization act, required the establishment of a locally-developed Coordinated Public Transit-Human Services Transportation Plan for three FTA human services transportation programs — the Job Access and Reverse Commute Program (JARC, Section 5316), New Freedom (Section 5317), and the Formula Program for Elderly Individuals and Individuals with Disabilities (Section 5310). Under SAFETEA-LU, to receive program funding from FFY 2006 on, federal program grantees must certify that approved projects were derived from the coordinated plan developed through a process that includes representatives of the general public as well as public, private, and non-profit transportation and human services providers. In June 2012, the Federal government signed into law a new two-year federal surface transportation authorization entitled Moving Ahead for Progress in the 21st Century (MAP-21). The new authorization maintained most of the coordinated planning provisions under SAFETEA-LU but made significant changes to the specialized transportation grant programs under the new bill.

Under MAP-21, the New Freedom Program, which provided grants for services for individuals with disabilities that went above and beyond the requirements of the Americans with Disabilities Act (ADA), was consolidated with the existing Section 5310 program for the Enhanced Mobility of Seniors and Individuals with Disabilities. In addition to renaming the program, the new legislation expanded

the activities eligible for funding and allowed more flexibility in the administration of the program. While funds were previously allocated directly to the State, MAP-21 allows MPOs to be the designated recipient of these funds and be responsible for program administration. JARC, which focused on providing services to low-income individuals to access jobs, was consolidated into Section 5307 Urbanized Area Formula Program, and the coordinated planning requirement for this program was eliminated.

Continued under the current legislation, Fixing America's Surface Transportation Act (the FAST Act), Section 5310, the Enhanced Mobility of Seniors and Individuals with Disabilities Program is the only funding program with coordinated planning requirements. For distribution of any funds under Section 5310, projects selected should be included in the coordinated public transit-human services transportation plan, developed and approved through participation of seniors, people with disabilities, representatives of public, private, and non-profit transportation and human service providers, and other members of the public, and services coordinated with other transit providers.

The Gatesway Foundation is one of Tulsa's non-profit agencies that serves individuals with disabilities and partners with INCOG.

The Tulsa TMA faces many challenges to human service transportation.

Human service transportation offers a variety of options to meet the needs of a diverse population.

Description

Human service transportation includes a broad range of transportation service options designed to meet the needs of a variety of populations. Choices range from the public transit fixed-route system, specialized dial-a-ride van programs, and taxi vouchers, to volunteer drivers. The array of services often results in multiple, underutilized, inefficiently operated vehicles. At the same time, there are often large numbers of people unable to access transportation services when and where they need them. Coordination of transportation program services, appropriately implemented, reduces individual inefficiencies and encourages sharing of existing community resources. In communities where coordination is a priority, all citizens benefit from having more transportation choices through expanded service, lower costs, and easier access.

INCOG, in coordination with local officials, was designated by the Governor of Oklahoma as the organization responsible for developing and implementing the Coordinated Public Transit-Human Services Transportation Plan (CTP) and a competitive process to select and prioritize projects for the Tulsa TMA.

The 2015 Coordinated Plan was developed with ongoing participation by representatives from public, private, and agency transportation providers, Departments of Human Services, Health, Mental Health, Rehabilitation Services Employment, and Education, along with the Area Agency on Aging, faith-based organizations, and private, non-profit organizations such as the United Way. It focuses on transportation services for older adults and persons with disabilities. With these populations rapidly growing, it is vital to identify ways to meet the demand and mobility needs of these populations. This plan assists transit

agencies and human service organizations in identifying and addressing gaps and needs in transportation services provided to the Tulsa region citizens, and serves as a resource to transportation providers in the region.

The Coordinated Public Transit-Human Services Transportation Plan (CTP) also endorsed the creation of an ongoing planning committee to promote adequate funding, inter-organizational coordination, and oversee the implementation of all the recommendations presented in the Coordinated Plan. The Regional Council on Coordinated Transportation (RCCT) was established in February 2008, and has met every other month since its creation. It is represented by state and local organizations, as well as tribal agencies.

The 2015 Coordinated Plan update focuses on engaging stakeholders and the public in the coordination process, developing an inventory of services provided in the region, determining transportation needs and gaps, and establishing strategies to be implemented in the future.

The full plan update may be accessed at:
http://www.incog.org/Transportation/coordinatedplan.htm

Action Plan

The action plan identified the following needs:

1. *List all the transit providers in the Tulsa TMA.*
2. *Inventory service, equipment, and facilities available.*
3. *Assess service gaps, equipment, and facilities needs.*

Gaps and Needs

The action plan further identified the following:

Table 23. Gaps and Needs identified in the Coordinated Plan

- *Limited transit funding prohibits the expansion of services.*
- *Little or no service provided to Tulsa's surrounding communities.*
- *Funding sources restrict services to specific populations for specific purposes and therefore, under-capacity vehicles from different organizations can be traveling the same route at the same time unable to pick up additional riders.*
- *No transit service on holidays.*
- *Limited service in the evenings.*
- *Human service agencies are often limited by federal requirements that restrict services to specific target population or destination type.*
- *Barriers to accessibility to routes such as lack of transit and pedestrian-friendly developments.*
- *Depending on the need and program, riders need to make different arrangements with different providers.*
- *Multiple operators have different phone numbers and operating procedures.*
- *Vehicles are not used efficiently (church buses, school buses, etc.).*
- *Some agencies can only provide services to people who are eligible for ADA and Medicaid programs.*
- *Different transit systems have different fares and policies, which can be confusing.*
- *Human service agencies need a better understanding of the transportation system infrastructure to accomplish coordination objectives.*
- *Agencies wrongly believe that the cost of liability insurance will increase if they transport riders who are not their clients.*
- *Confusion about how nightline systems work, what routes are available, and calling for deviations.*
- *Lift service is not always on time making it difficult to schedule pick up from doctors' appointments.*
- *Human service agencies have limited capacity for scheduled services (shortage of seats).*
- *Call centers are operated individually by each organization.*
- *Different eligibility requirements for each program.*

Table 23. Gaps and Needs identified in the Coordinated Plan (Continued)

- *"Turfism" (concerns about loss of control over services, riders, funding).*
- *On-board safety and nighttime safety.*
- *Requiring advanced scheduling does not allow riders to be spontaneous about their trips.*
- *Lack of transportation and planning for emergencies/disasters.*
- *Due to limited funding for marketing, riders are not aware of the options available to them.*
- *Lack of education and advertising to alleviate transit stigma and low usage.*
- *Individual purchase of vehicles and equipment.*
- *Skepticism about benefits.*
- *Driver training programs are operated individually by each organization.*
- *In-house vehicles maintenance programs are operated individually by each organization.*

Based on discussions of the Tulsa area gaps and needs, the RCCT developed strategies and solutions to address the region's transportation problems and prioritized these strategies for the implementation of the Coordinated Public-Transit and Human Service Transportation Plan. The strategies and solutions address the needs of a growing population of the elderly, low-income, and people with disabilities. Nearly all new programs recommended are low-cost, non-traditional services to be implemented with new or additional state funding and Section 5310 funding.

Strategies and Actions

Table 24. Strategies and Actions in the Coordinated Plan

Strategies and Actions
Goal 1. Safety and Accessibility
• *Increase transit service area to include regional medical facilities, employment centers, and social activities.*
• *Develop and implement Pedestrian Master Plan to assess sidewalks, safe routes to transit, and elimination of barriers.*
• *Incorporate FHWA and NACTO guidelines for new streets and highways that are accessible for aging and disabled populations.*
• *Improve facilities and amenities at regional stops and transfer stations.*
• *Implement policies and programs that address safety concerns at bus stops, transfer stations, and on-board, especially at night.*
• *Encourage provision of travel hosts to assist people making transfers, persons with disabilities, users needing door-to-door service, visitors, or those with other transit concerns.*
• *Create and implement an emergency/disaster plan and an inclement weather plan that addresses the needs of those without personal transportation.*
Goal 2. Mobility
• *Increase transit frequency to allow users to make health care and other appointments, look for employment, and chain trips for both paratransit and fixed route service.*
• *Increase service area to connect neighboring communities outside the Tulsa metro area.*
• *Develop a Mobility Management Center.*
• *Extend transit service to evenings.*
• *Provide transit service on holidays.*
• *Establish an authority to oversee implementation and ongoing operations of Mobility Management Center.*
• *Increase human service agencies capacity for scheduled services.*

Strategies and Actions

Goal 3. Develop Awareness

- *Educate transit providers and human service agencies about the benefits of coordination.*
- *Provide human service agencies with travel information resources or tools, and help caseworkers and other appropriate agency representatives understand the lowest cost transportation options for their clients.*
- *Add transit links to the human service 211 hotline.*
- *Encourage projects that engage community members or other partners in spreading the word about available mobility options.*
- *Develop innovative marketing and information partnerships and strategies that alleviate the stigma of riding transit and illustrate available services.*
- *Add transit/mobility center links to sites for services provided to the elderly, low-income, and people with disabilities.*
- *Create a transit options brochure and website that are user-friendly and which details options available to potential customers.*
- *Expand exposure of regional fixed routes and ride share programs to policy makers, funders, and untapped markets.*

Goal 4. Funding

- *Allow mixing of funding so agencies aren't restricted to serving specific target populations or specific destination types.*
- *Diversify and expand funding sources by partnering with the private sector (both for-profit and non-profit).*
- *Promote mileage reimbursement for volunteer drivers, volunteer exchange to trade skills, carpooling, and taxi vouchers to reduce trip cost.*

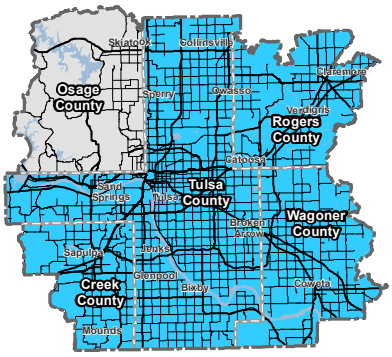
Goal 5. Efficiency

- *Increase service efficiency to decrease delayed pick-ups.*
- *Develop a unified policy that allows all providers to accept transit users regardless of their individual eligibility (ADA, Medicaid and other programs).*
- *Incorporate Intelligent Transportation Infrastructure Technology options to integrate the use and function of each transportation mode.*
- *Agree upon common fare structure for all agencies represented in the vehicle pool.*
- *Decrease lead-time needed in scheduling for paratransit service.*
- *Increase the ability of school districts and churches to be part of the community transportation provider pool.*

Following the adoption of the Plan by the INCOG Board of Directors, INCOG developed a competitive selection process and criteria, and solicits applications from eligible entities for disbursement of the funds allocated to our region. Applications for 5310 funding within the Tulsa TMA must meet a need identified by the Coordinated Plan. To ensure consistency with the Coordinated Plan, 5310 applications are evaluated based on the selection process included in the Plan. As the Plan continues to guide projects in successive years, this review process will be evaluated and refined as necessary to ensure projects funded under this program are complementary to one another and fit into the vision and goals of the Coordinated Plan.

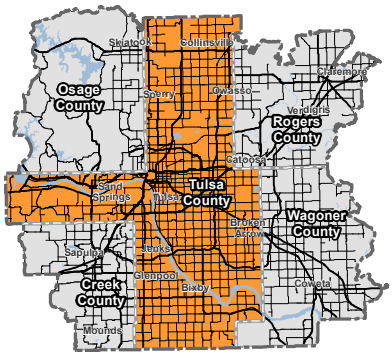
Coordinated Plan Area of Service within the Transportation Management Area

New Leaf



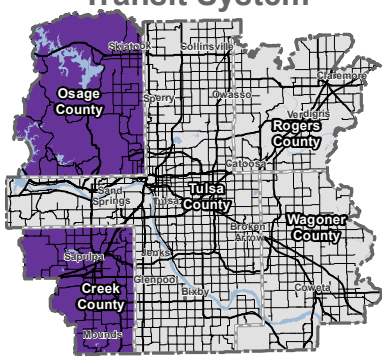
Serving:
- Creek County
- Rogers County
- Tulsa County
- Wagoner County

Gatesway



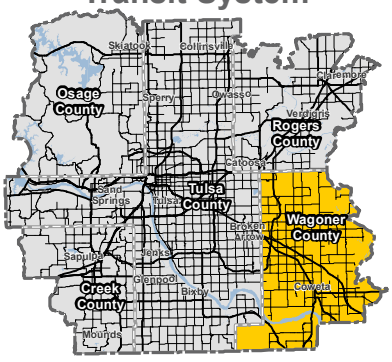
Serving:
- Tulsa County

Cimarron Public Transit System



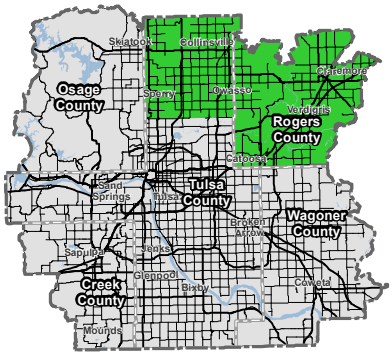
Serving:
- Creek County
- Osage County

KiBois Area Transit System



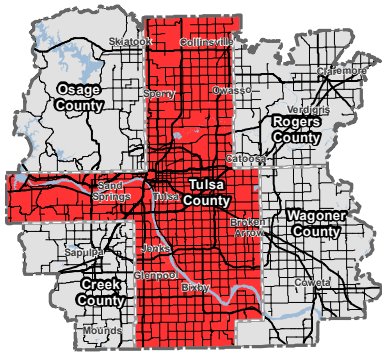
Serving:
- Wagoner County

Pelivan Transit



Serving:
- Rogers County
- Northern Tulsa County

Morton Comprehensive Health Services



Serving:
- Tulsa County

Legend

- New Leaf
- Gatesway
- Cimarron Public Transit System
- KiBois Area Transit System
- Pelivan Transit
- Morton Comprehensive Health Services

Connected 2045 Regional Transportation Plan

INCOG

Since FY 2013, INCOG has allocated more than $1.5 M to transit agencies and human service organizations in Section 5310 funds.

Table 25. Allocated Section 5310 Funds

Transit Agencies / Human Service Organization	Use of Funding
United Community Action (Cimarron)	*Operating and capital assistance to provide transportation for clients to social services, employment, and education, for people with disabilities and seniors in Creek and Osage Counties, and connecting to the Tulsa metro area.*
KiBois	*Operating and capital assistance to support and expand public transportation to address the needs of persons with disabilities and seniors, including transportation to and from jobs, social service providers, shopping, training, and recreation, beyond required by ADA in Wagoner County, Tulsa, and surrounding areas. Door-to-door services also linking to MTTA fixed routes.*
DaySpring Villa	*Operating and capital assistance to provide transportation for clients to jobs and mental health services.*
Morton	*Operating and capital assistance to continue improvement of existing social transportation services. Addition of a Saturday route.*
MTTA	*Enhanced accessibility to 27 bus shelters on 11 bus routes across the City of Tulsa. Improvements include correcting the slope on the concrete pads leading to shelters, extending the shelter slab, connecting the shelter pad to nearby sidewalks, repairing broken sidewalks adjacent to the shelter, and moving the shelter to a more accessible location.*
Gatesway	*Operating and capital assistance to provide transportation services to people with intellectual and physical disabilities to work, medical appointments, shopping, recreation, and leisure.*
A New Leaf	*Operating and capital assistance to provide transportation services to individuals with developmental disabilities to employment, medical appointments, and social activities in Tulsa, Rogers, Wagoner, Creek, Okmulgee, and Muskogee Counties.*
Pelivan Transit	*Operating and capital assistance to the Rogers County area for demand response service for medical transportation for people with disabilities.*

FREIGHT


MWCX
461743
UTLX 660959
BRADY DISTRICT PARKING
$2.00 THURSDAY, FRIDAY
SATURDAY NIGHT

Freight includes movement by air, water, and land.

Introduction

Freight transportation plays an integral role in the economy. It is defined as the movement of raw materials to manufacturers for production, then the movement of manufactured goods to businesses and consumers. The movement of goods affects quality of life, economic vitality, safety, congestion, and air quality. Freight planning is required as part of the long-range transportation planning process.

Due to the increasing size and complexity of urban areas, intra-regional goods movements have outpaced goods movement between regions. According to the Federal Highway Administration (FHWA), the freight transportation system relies on a variety of modes to support domestic and international supply chains. As shown in the next table, trucks carry the majority of freight in the continental United States, both by tonnage and value. Pipelines carry the second largest tonnage, although this mode involves only specific liquid and gaseous commodities.

Table 26. Mode Share by Tonnage and Value in the United States, 2015

Domestic Mode	Milllions of Tons				Billions of 2015 USD			
	Domestic Only	Export	Import	Total	Domestic Only	Export	Import	Total
Air (include truck-air)	*0%*	*0%*	*0%*	*0%*	*1%*	*17%*	*14%*	*4%*
Multiple modes and mail	*2%*	*5%*	*3%*	*2%*	*12%*	*6%*	*6%*	*11%*
Other modes and unknown	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*2%*	*0%*
Pipeline	*19%*	*13%*	*16%*	*18%*	*9%*	*4%*	*4%*	*8%*
Rail	*9%*	*15%*	*9%*	*9%*	*3%*	*5%*	*5%*	*3%*
Truck	*66%*	*52%*	*35%*	*64%*	*73%*	*57%*	*53%*	*69%*
Water	*4%*	*15%*	*11%*	*5%*	*3%*	*10%*	*9%*	*4%*
No Domestic Mode	*0%*	*0%*	*25%*	*2%*	*0%*	*0%*	*7%*	*1%*
Total	*16,045*	*912*	*1,099*	*18,056*	*15,558*	*1,745*	*2,567*	*19,871*

Source: Federal Highway Administration at https://ops.fhwa.dot.gov/publications/fhwahop16083/ch1.htm#t1

The Moving Ahead for Progress in the 21st Century (MAP-21) Act and its successor, the Fixing America's Surface Transportation (FAST) Act provided the basis for states and metropolitan areas to examine and address freight transportation issues in the context of metropolitan Long Range Transportation Plans. The Connected 2045 Long Range Transportation Plan (LRTP) Freight Transportation Element highlights the multimodal aspects of the infrastructure that facilitates freight movement in the region, including two internal ports, an international airport, two Class I railroads, several short-line railroads, and trucking. These strategic regional facilities are well connected to one another and to the National Highway System (NHS) .

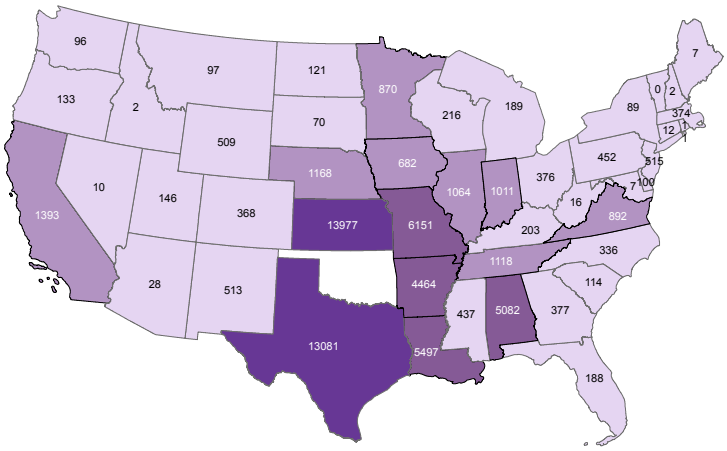
Development Process

Developing the freight movement element of the Connected 2045 RTP involved the collection of data related to the five modes of moving goods in the Tulsa area, including trucking, rail, water, and air transportation. The local freight operators and stakeholders, including the Tulsa Port of Catoosa, Tulsa International Airport, and several freight operators were consulted. Data acquisitions and data collection efforts provided information that was used in developing the freight element.

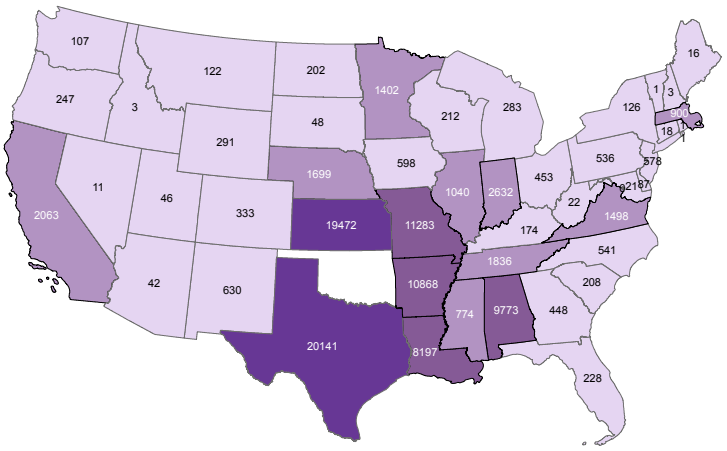
The RTP freight transportation element examines the importance of the freight and goods movement and highlights the freight flow changes in the region. The major data source for this analysis is the Fright Analysis Framework (FAF). FAF is a partnership between Bureau of Transportation Statistics (BTS) and FHWA. It integrates data from a number of sources to create a picture of freight movement among states and major metropolitan areas by all modes of transportation. According to FAF data, Texas is the largest exporter of freight to Oklahoma, and that is expected to remain the case in 2045. Texas and Kansas are the two largest destinations of Oklahoma freight, currently and in 2045. The remaining large origins and destinations of freight are shown in the following figure. Surrounding states are the major freight partners for Tulsa, at the same time, Tulsa has freight-flow connections with more distant states such as California, and North Carolina.

Figure 7. Inbound and Outbound Freight Flow

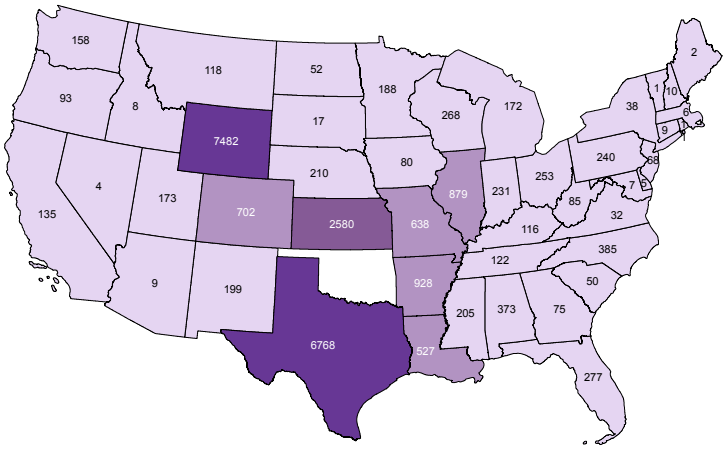
States Receiving Freight from Tulsa 2015 (Thousand Tons)



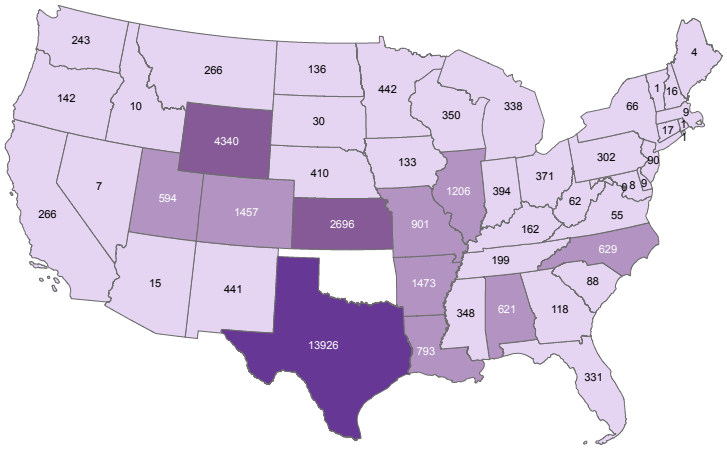
States Receiving Freight from Tulsa 2045 (Thousand Tons)



States Sending Freight to Tulsa 2015 (Thousand Tons)



States Sending Freight to Tulsa 2045 (Thousand Tons)

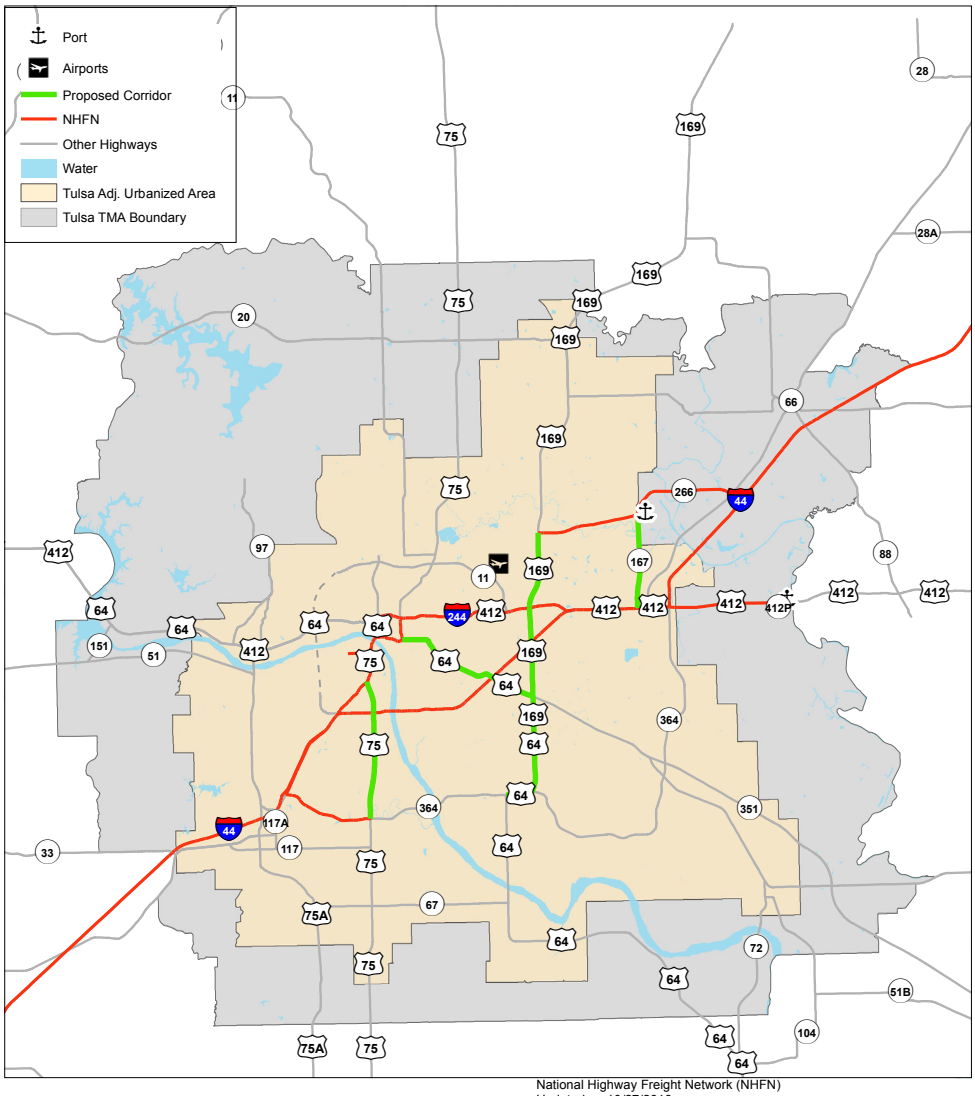


The National Highway System (NHS) consists of the Interstate Highway System, plus selected other US and state highways, links, and connections that serve the major population centers, ports, airports, public transportation facilities, intermodal transportation facilities, and major travel destinations. The NHS network of significant highways was approved by congress in 1995.

Freight Analysis Framework from https://ops.fhwa.dot.gov/freight/freight_analysis/faf/index.htm

INCOG and ODOT are responsible of designating public roads for the critical national freight corridors in accordance with Section 1116 of the Fixing America's Surface Transportation Act (FAST Act), and the designated National Highway Freight Network (NHFN) by FHWA. The freight corridors and NHFN are important as the National Highway Freight Program (NHFP) provides formula funds to the states to improve the efficient movement of freight on the NHFN. Oklahoma anticipates receiving approximately $18 million annually through this program. The map below shows the NHFN network and proposed freight corridors in Tulsa TMA. It also includes significant freight locations, such as Tulsa International Airport and the Tulsa Port of Catoosa.

Figure 8. National Highway Freight Network (NHFN): Tulsa, OK



As shown in Table 26, the primary mode of freight transportation in the Tulsa TMA is by truck, but rail and water freight are also significant and have opportunities for growth. The Tulsa TMA is a net exporter of freight, according to FAF data.

Table 27. Mode Share by Origin and Destination to the Tulsa Region

Thousand Tons	Tulsa Origin (Export)			Tulsa Destination (Import)		
	2015	2045	Percentage Change	2015	2045	Percentage Change
Rail	*10,479*	*19,383*	*+ 85%*	*9,243*	*7,052*	*- 24%*
Truck	*75,030*	*115,789*	*+ 54%*	*40,587*	*56,156*	*+ 38%*
Water	*8,975*	*10,214*	*+ 14%*	*141*	*292*	*+ 107%*
Grand Total	***104,682***	***155,409***	***+ 48%***	***63,883***	***83,530***	***+ 31%***

Source: Freight Analysis Framework from https://ops.fhwa.dot.gov/freight/freight_analysis/faf/index.htm

Rail Corridors

As Oklahoma's second largest city, Tulsa became attractive to railroad companies when a federal post office was opened and an influx of goods and money from ranchers and farmers began. The implementation of the railroad resulted in easy access to the city and rapid growth. The favorable economy in Tulsa brought one of the most prestigious railroads of the country, the Santa Fe Railway, to Tulsa in 1905. The railroad had a profound effect on the development of the city and numerous businesses established along the rail tracks. The effects can also be seen on the alignment of downtown streets oriented in northeast-southwest and northwest-southeast directions at right angles, parallel and perpendicular to the Frisco railroad tracks.

Today, rail transportation in the Tulsa area is provided by two class-I carriers and five short-line carriers. The class-I carriers are Union Pacific (UP) and Burlington Northern Santa Fe Railway Company (BNSF). Together, they operate approximately 200 miles of track in the area. The five short lines that operate in the Tulsa region are the South Kansas and Oklahoma Railroad (SKOL), Tulsa-Sapulpa Union Railroad (TSU), Sand Springs Railroad (SS), Tulsa Port of Catoosa (PC), and Stillwater Central. The short lines operate on approximately 66 miles of track in the area. The two major commodities transported by the railroads in Oklahoma are coal and grain, with coal terminating in the state and grain being shipped beyond Oklahoma. Most of the freight movement within the state is between the Oklahoma City and the Tulsa areas.

The Burlington Northern Santa Fe Railroad (BNSF) has the largest rail yard in the area, located southwest of downtown Tulsa. Access to the BNSF yard is from US-75 and I-44 provide access to the BNSF yard. Approximately 5,400 tons of freight and 160 rail cars are operated daily, originating and terminating in the Tulsa area. The trains generally run east-west, and destinations vary greatly, with bulk industrial products being the primary cargo. BNSF provides rail access to the Tulsa Port of Catoosa and the manufacturing plants near the Tulsa International Airport. BNSF operates on about 150 miles of track in the Tulsa region.

The Union Pacific line runs between Muskogee and Tulsa, and their warehouse is the former Katy yard near 51st and Mingo. The Union Pacific Railroad operates on about 40 miles of track at two train yards in the Tulsa area, processeing four trains per day, including support operations for the UP regional terminal facility in Muskogee. UP transports most of the coal utilized at electric generating plants outside the Tulsa metropolitan area in Chouteau, Muskogee, and Oologah.

The short-line railroads serve primarily as the connection between shippers and class-I rail carriers. The Sand Springs Railroad is owned by OmniTrax Inc., and it operates service between downtown Tulsa and Sand Springs with 32 miles of track connecting freight cars daily with the Burlington Northern Santa Fe Railroad, Union Pacific Railroad, and the South Kansas Oklahoma Railroad (SKOL). Their covered storage facility is multimodal and contains 100,000 square feet.

The South Kansas and Oklahoma Railroad (SKOL) is a segment of the former Santa Fe line to Kansas City. The company warehouse is located in Owasso between 76th St. N. and 86th St. N., one mile west of US-169. The trains run north out of Owasso and south to Tulsa, connecting with BNSF and UP. It also serves the Tulsa Port of Catoosa daily via an eight-mile

track from Owasso to the Port. The Tulsa-Sapulpa Union Railroad is primarily a switch carrier between Class I carriers (BNSF and UP) and customers located on TSU railway. It serves the metropolitan area, running from Sapulpa to West Tulsa to Jenks on a total of 23 miles of track. It is one of Oklahoma's oldest and smallest operating railroads. In January 2001, TSU became operator of UP track connecting Tulsa and Jenks, and connecting with the BNSF railroad in Sapulpa.

Stillwater Central operates a 97-mile line between Sapulpa and Oklahoma City. In Sapulpa, it interchanges the cars to BNSF, which then distributes the cars accordingly. In cases where Stillwater Central interchanges cars with SKOL, SKOL carries the traffic across to Tulsa.

The Port of Catoosa, five miles from Tulsa, is one of the country's most inland ports, and it operates its own railroad. It has two switch engines, and serves customers on 13 miles of rail track. The Port is also served directly by BNSF and SKOL.

Water Transportation

The Tulsa Port of Catoosa is located at the head of the navigation channel for the McClellan-Kerr Arkansas River Navigation System. The 445-mile waterway links Oklahoma and the surrounding five-state area with ports on the U.S. inland waterway system, and foreign and domestic ports beyond, by way of New Orleans and the Gulf Intracoastal Waterway. The Port is owned jointly by the City of Tulsa and Rogers County, and is operated through a public authority appointed by both governments.

The Port complex encompasses a 2,000-acre industrial park, offering fully developed sites for prospective industry, and a 500-acre terminal area for public and private barge-handling operations. The port channel is 1.5 miles long, and the port facilities include two towboats for barge switching, liquid cargo loading and unloading docks, a grain-handling facility, a dry-cargo wharf, an overhead-traveling crane, and dolphins for barge mooring. The port area also contains dry bulk-storage compartments, sites for warehousing and fabrication, and other terminal operations within the industrial complex. The Port's intermodal capabilities include barge switching service, in-port rail operations, pipelines, and access to class-I rail service.

The Port is accessible from I-44 and US-169 via SH-266 (Port Road), and SH-167, and is located about eight miles northeast of Tulsa International Airport. In December 1979, the Port was designated as a duty-free port, or Foreign Trade Zone No. 53. This designation covers an area of 52 acres, including an area that may be used by individual companies for construction of their foreign trade-zone facility. A foreign trade zone is an area considered outside the customs territory of the United States, where foreign and domestic merchandise may be admitted for storage, exhibition, assembly, processing, manipulation, relabeling, sampling or manufacturing, duty free and without quota, while being processed for the consumer market. Payment of customs duties on foreign goods is not required unless and until the merchandise enters customs territory for domestic consumption. The port handled 1,551,808 tons of freight in 2015. Of this, 670,510 tons or approximately 43% was inbound, while 881,298 tons or 56% was outbound, as shown in the table below:

Table 28. 2015 Tulsa Port of Catoosa Tonnage Data

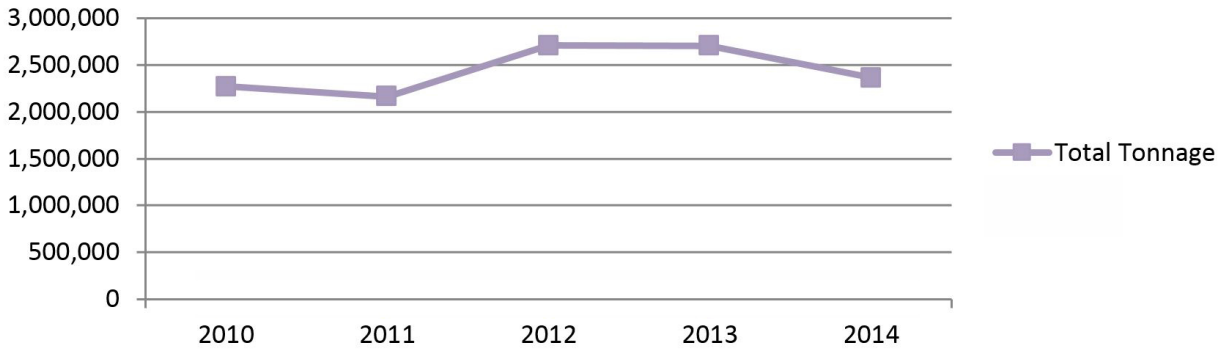
Tonnage Report 2015	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	TOTAL
INBOUND TONS / BARGES													
Total Tons	*85,189*	*82,452*	*88,771*	*85,998*	*32,436*	*13,992*	*50,033*	*71,130*	*49,128*	*48,523*	*35,194*	*27,734*	*670,510*
Total Barges	*56*	*53*	*58*	*56*	*21*	*9*	*33*	*45*	*32*	*32*	*25*	*19*	*439*
OUTBOUND TONS / BARGES													
Total Tons	*117,572*	*65,883*	*77,236*	*60,689*	*14,370*	*44,278*	*18,481*	*84,860*	*44,496*	*122,228*	*111,216*	*119,989*	*881,298*
Total Barges	*63*	*39*	*48*	*39*	*6*	*22*	*12*	*45*	*27*	*68*	*63*	*68*	*500*
TOTAL (INBOUND AND OUTBOUND)													
Total Tons	*202,761*	*148,335*	*166,007*	*146,687*	*46,806*	*58,200*	*68,514*	*155,990*	*93,624*	*170,751*	*146,410*	*147,723*	*1,551,808*
Total Barges	*119*	*92*	*106*	*95*	*27*	*31*	*45*	*90*	*59*	*100*	*88*	*87*	*939*
CUMULATIVE (JAN 1971 TO 2015)													
Total Tons	*76,370,345*	*76,518,680*	*76,684,687*	*76,831,374*	*76,878,180*	*76,936,380*	*77,004,894*	*77,160,884*	*77,254,508*	*77,425,259*	*77,571,669*	*77,719,392*	*77,719,392*
Total Barges	*46,604*	*46,696*	*46,802*	*46,897*	*46,924*	*46,955*	*47,000*	*47,090*	*47,149*	*47,249*	*47,337*	*47,424*	*47,424*

Source: Tulsa Port of Catoosa from http://www.tulsaport.com

Additionally, Johnston's Port 33, a privately-owned and operated port facility, is located at the eastern boundary of the TMA near the intersection of US-412 and the navigation channel. It consists of five separate docks for simultaneous loading and unloading, two service boats, and capacity for several barges, conveyor systems, barge unloading excavators, and a scrap handling magnet. The Port has capacity for open bulk storage, including fertilizer and grain storage. The Port's primary outbound shipments consist of liquid bulk and agricultural products, as well as grain transported by truck from Enid, Oklahoma.

Water transportation will continue to play an important role in the Tulsa area. According to figures provided by the Tulsa Port of Catoosa, the total annual tonnage grew a little more than 19% from 2011 to 2013, followed by a slight decrease in 2014, attributed to factors including excessive rain affecting navigability.

Figure 9. Tulsa Port of Catoosa Total Tonnage Data by Year



The number of businesses located at the Port of Catoosa also continues to grow, and now stands at 72. The Port is involved in an ongoing marketing program offering prime industrial sites for lease or sale in the adjacent Riverview Business Park. Port officials are predicting that the growth in total tonnage transported and in the number and variety of industries at the port will continue.

Air Transportation

The Tulsa International Airport (TIA) is owned by the City of Tulsa and operated by the Tulsa Airport Authority. Established in 1928 on a 390-acre tract, Tulsa International today encompasses more than 4,300 acres just 10 minutes northeast of downtown. The airport complex is classified as a medium hub, primary commercial service airport by the FAA's National Plan for Integrated Airport Systems (NPIAS). It presently covers 4,360 acres and operates with three runways, along with parallel and connecting taxiways that provide aircraft access to the airport terminal and other airport facilities. Air carrier, general aviation, military, and air taxi aircraft utilize these runways. The airport's air carrier terminal is currently set up to operate as many as 22 passenger loading gates, serving 10 passenger air carriers, and processing 2.8 million passengers in 2016. There has been nearly a 15% decrease in enplanements and deplanement since 2007, and only a 2.56% increase from 2012 to date.

Table 29. Summary Data - Tulsa International Airport (U.S. Flights Only)

	2016**	2017**	Percentage Change	Rank***
Passengers				
Arrival	*1,356k*	*1,335k*	*- 1.53%*	*79*
Departure	*1,354k*	*1,335k*	*- 1.38%*	*79*
Scheduled Flights				
Departures	*19,323*	*18,751*	*- 2.96%*	*79*
Freight/Mail (lb.) (Scheduled and Non-Scheduled)				
Total	*115m*	*111m*	*- 3.10%*	*65*
Carriers				
Scheduled	*18*	*20*	*+ 11.11%*	

Source: Bureau of Transportation Statistics from https://www.transtats.bts.gov

** Scheduled enplaned revenue passengers.*
*** 12 months ending April of each year.*
**** Among 789 U.S. Airports, 12 months ending May 2017*

Airport facilities include passenger terminals serving major air carriers, including American, Delta, Southwest, United Airlines, and regional commuter air carriers including Northwest Airlink, American Eagle, Comair, and Atlantic Southeast. The air cargo terminal facility is located directly south and east of the passenger terminal building. The air cargo terminal consists of a landside and an airside, where incoming and outgoing cargo is processed and loaded from trucks to aircraft and vice versa. The air cargo terminal is currently occupied by Airborne, Burlington, Emery, Federal Express, Martinaire, and United Parcel Service. In addition, some freight and mail, including US Postal Service mail, is transported on scheduled air carrier and commuter airlines serving the airport.

Tulsa International Airport

The Tulsa International Airport (TIA) handled 53,612 tons of cargo in 2016 including airmail and airfreight, transported by airfreight carriers and in the cargo-hold of passenger aircraft. This total included nearly equal amounts of inbound and outbound cargo. Total air cargo activity at TIA has decreased by about 5% since 2012. Direct access to TIA is provided via SH-11/Gilcrease Expressway, which runs east-west along the southwest corner of the air carrier terminal. Access is also provided from the north by SH-266 (Port Road). The airport is accessible from I-244, US-169 and US-75 via SH-11/Gilcrease Expressway. In addition, the airport is accessible from several major north-south arterials in the area, including Memorial Dr., Sheridan Rd., and Mingo Rd.

The Burlington Northern Santa Fe Railway (BNSF) operates a line that runs east-west along the southern edge of the airport. Another rail line operated by the SKOL is located north of the airport and veers in a northeasterly direction. A rail spur that branches out from the BNSF rail line provides rail access to the manufacturing plants adjacent to the airport; however, there is no direct rail connection with the airport terminal facility at this time. A general aviation airport in the area, Richard Lloyd Jones, Jr. Airport (Riverside), is designated by the Federal Aviation Administration (FAA) as a reliever for TIA. This reliever is part of the Tulsa metropolitan area Airport System Plan and is located about 15 miles south and west of TIA, near Jenks. This airport is equipped to handle potential excess capacity at TIA. The current access to the airport is adequate and provided through a variety of roadways and streets from the south and east; however, as the airport grows and expands, design and engineering will be initiated as necessary to improve any traffic bottlenecks.

Issues and Actions

Since freight transportation is a means to various regional economic ends, changes to the regional economy, such as manufacturing and retail, directly affect freight transportation and vice versa. In addition, access to raw materials and markets are key factors in the location decision of most manufacturing and distribution companies. Building efficient freight infrastructure will require coordination among the various modes of freight transportation. An efficient freight movement system would expand markets, increase opportunity, production, and competition. The major issues associated with freight transportation in the TMA can be grouped into five broad categories, including land and regulatory, energy efficiency, safety, economic development and physical infrastructure. These issues have been evaluated, and the following actions are proposed:

Table 30. Issues and Actions for Freight

Issue	Actions
Land and Regulatory	
According to an Oklahoma trucking industry survey, the most burdensome issue in the goods movement process continues to be government regulation. In spite of federal deregulation of the trucking and airline industries in the late 1980s and early 1990s, individual states have continued to maintain restrictions on the weight and size of trucks that can operate within their borders.	• *In conjunction with the chambers of commerce, and local freight transporters, identify any legal and regulatory impediments to freight movement in the Tulsa area. A key concern is the Tulsa Port of Catoosa DPS (Department of Public Safety) inspection and permitting system and legislative issue with nightly freight/shipping issues.*
Energy and Efficiency	
The current system for moving freight relies heavily on trucking, which is one of the least fuel-efficient modes. Trends in freight transportation (just-in-time, next day delivery, etc.), appear to suggest that trucking and airfreight are the wave of the future. *One prominent goal is to develop a Transportation System that ensures energy efficiency. In order to advance such a goal, the freight element of the LRTP identifies resources that foster the development of more efficient freight vehicles, better technology, or operational strategies that minimize the use of energy. An energy efficient goods movement plan should focus on the following actions.*	• *Encourage the use of cleaner burning alternative fuels and their potential application in the goods movement process.* • *Support the development of more efficient freight vehicle technology and the use of energy efficient alternatives such as double stacked railcars, longer trailers, electronic sorting and tracking of packages, freight consolidation techniques, satellite distribution centers, etc.* • *Support the local emergency/hazardous materials management agency in identifying alternative routing options in the area, for transportation of potential hazardous materials.* • *Develop an Oversized Load Dispatch process to direct shippers to proper routes to accommodate necessary weight, height, and axle spacing.* • *Support efforts to maximize efficiency in the goods movement process, including handling and transporting goods to minimize air emissions and achieve air quality goals.*

Table 30. Issues and Actions for Freight (Continued)

Issue	Actions
Safety	
The goods-movement process is concerned with issues of safety. Freight movement involves safety at facilities, vehicle operational safety, and safety along the roadways. The safety issues associated with individual terminal facilities are the responsibility of terminal operators; however, drivers must be certified, and vehicles must pass safety inspections in order to operate on the roadways. *Similarly, the local roadway network must meet the minimum design standards to maximize safety for vehicles and other road users. Therefore, the freight transportation plan for the region must address the issue of safety from the perspective of the driver, the vehicle, and the roadway. The LRTP must also address safety as it relates to trains, barges, and other freight transportation modes.*	• *Identify the high incident/collision locations involving freight movement in the region, including highways, railroads, railroad crossings, and waterways. Work with the local freight operators to identify and address safety-related issues on the road network and elsewhere.* • *In conjunction with ODOT, rail operators and local governments, develop and maintain an inventory of rail/highway crossings in the area, including at-grade and grade separated crossings, and use the results to guide the prioritization and selection of potential projects.* • *Collect and maintain data related to truck collisions and truck safety on the region's primary roadways.* • *Encourage the development and use of improved vehicle technologies to enhance safety, such as collision mitigations systems, and support a vehicle life cycle tracking system and ongoing vehicle safety inspection program for all modes.* • *Identify bottlenecks, missing links, safety hazards, and other needed components of the regional infrastructure.*
Economic Development	
Because the movement of freight is closely related to regional economic activity, changes in the economy are likely to affect the volume and pattern of regional goods distribution. Trends in regional production, manufacturing, and distribution will be closely monitored and characterized to get a better understanding of freight activity in the Tulsa area. As the region grows and expands economically, so will the need for freight service. Therefore, the goods movement planning process must support regional economic development activities.	• *Work with local businesses, chambers of commerce, local governments and authorities to identify freight-related long-range and short-range transportation projects and encourage their funding and implementation.* • *Support the use of state and local economic development programs to develop regional transportation facilities, improving industrial areas and other freight activities that have the potential to strengthen the local economy.* • *Encourage public/private partnership ventures that provide leverage for local freight transportation projects.*

Table 30. Issues and Actions for Freight (Continued)

Issue	Actions
Physical Infrastructure	
Regional freight infrastructure consists of networks, vehicles, and terminal facilities. These include airports, port facilities, and roadways that are built, maintained, and operated by the public sector. *A significant portion of the infrastructure belongs to the private sector, including airplanes, barges, towboats, trains, rail facilities, trucks, truck terminals, pipelines, etc. This difference in ownership may present some challenges when it comes to planning for future infrastructure needs. The focus of the freight element is on the infrastructure that is built, maintained and operated by the public sector. Following are some actions that would facilitate the smooth flow of goods into and through the Tulsa region.*	• *Work with the Oklahoma Department of Transportation and other agencies to continue development and maintenance of the roadways and bridges in the area, including those that connect the manufacturing, storage, and distribution centers in the area to other market areas beyond the TMA. Most freight companies would support increased diesel tax if additional funds were to be used for road maintenance.* • *Develop criteria to evaluate and monitor the performance of the freight movement infrastructure including roadways, railways, airports, and other networks in the area.* • *Encourage feasibility studies to designate/add interstates, and investigate opportunities to improve the Mingo and Pine corridors, and US-75, US-169, and I-44 to facilitate freight movement between Tulsa and the surrounding metropolitan areas of Dallas/Ft. Worth, Texas; Kansas City and St. Louis, Missouri; and Wichita, Kansas.* • *Support development of regional ITS applications, in compliance with national ITS architecture for truck facilities and operations in the TMA.* • *Enhance the development of the Tulsa International Airport and the Port of Catoosa through implementation of planned physical infrastructure improvements, including additional air cargo facilities and improved landside access, and additional dock capacity at the Port of Catoosa for general cargo, dry bulk, and container cargo; support efforts to widen and deepen the Port of Catoosa water channel .*

SAFETY

Safety and congestion are both public issues; however, congestion, is repeatedly ranked as number one or two in urban polls. The public expects the DOTs to address the issue and judges their effectiveness on its ability to alleviate congestion; therefore, substantial funding is aimed at strategies to reduce congestion.

Study results suggest the public needs to better understand the societal costs associated with crashes, to elevate safety as a policy issue of equal importance[3.]

Introduction

An assessment of the crash data from 2011-2015 in the TMA revealed that there were 390 collisions that resulted in at least one fatality. Over this same time period, there were 28,551 collisions resulting in an injury; 2,699 of these included an incapacitating injury in which at least one occupant was unable to continue normal activities (such as walking or driving) as a result of the collision. The societal impacts of these collisions are significant, both socially and financially. Yet the financial perspective is often unknown to the general public. Because of this, the defining objectives of this chapter are to discuss the importance of emphasizing safety in transportation matters and highlight what INCOG and the region are doing to address this issue.

In 2011, the American Automobile Association (AAA) published *Crashes VS. Congestion: What's the Cost to Society?* [3] and according to report, the FHWA estimated that the average cost of a single motor vehicle fatality is $6,000,000 (equivalent to $6,956,025 in 2017 dollars). The study estimated that the cost of

3. http://newsroom.aaa.com/wp-content/uploads/2011/11/2011_AAA_CrashvCongUpd.pdf

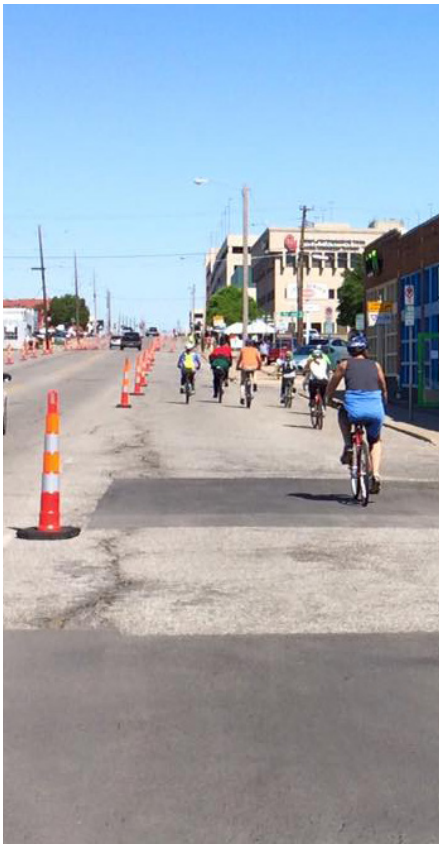
an injury averages $126,000 (in 2009 dollar values). For year 2009, AAA found that the Tulsa MSA reported 163 fatalities and 9,989 injuries. As a result, Tulsa experienced a financial loss of $2.237 billion, including $978 million from fatalities and $1.2 billion from injuries in 2009 dollars. This equates to approximately $2,408 per resident. Of the 99 metropolitan areas analyzed, Tulsa recorded the 3rd highest cost per person among the 31 medium-sized metros and the 8th highest overall.

The collision costs are strongly contrasted by the costs of congestion in which Tulsa reported some the lowest costs in the country. According to AAA, the urbanized area lost $202 million due to congestion (only 9% of the total collision costs). This is approximately $289 per person (12% of the collision costs). This ranked Tulsa as 24th of the 31 medium-sized metros for highest financial losses due to congestion, and 75th among all metros evaluated. These costs are in line with the *2011 Urban Mobility Report (Texas Transportation Institute)* [4] which reported the Tulsa Urban Area lost $183 million due to congestion ($368 per auto driver). This report aligns with INCOG's findings when comparing the collision patterns of the Tulsa metro to other peer cities. According to this report, the INCOG region experiences a significantly greater financial loss from collisions than it does from congestion. As a result, it is the recommendation of Connected 2045 that a greater regional emphasis and greater resource allocations should be placed on transportation safety initiatives.

INCOG's Role in Regional Transportation Safety

As the MPO for the region, INCOG's involvement in safety is comprehensive in nature. From hosting local conferences taught by practicing engineering and design professionals, to conducting media campaigns targeting the region's highest priority areas for awareness of bike and pedestrian safety, INCOG has taken a holistic approach to further safety in the region. Though INCOG has been involved in education and outreach, the primary responsibility includes providing the resources and guidance necessary for the planning and evaluation of member agencies' transportation safety projects. Through the creation of planning documents such as the GO Plan (the regional bicycle and pedestrian master plan) and Connected 2045, INCOG has made a significant effort in identifying regional needs and priorities to further the safety of all modes of transportation.

4. https://nacto.org/docs/usdg/2011_urban_mobility_report_schrank.pdf



INCOG also provides services for collisions data analysis to all member governments seeking to identify and address safety concerns in their municipalities. By using the Oklahoma DOT Collision Database (SAFE-T) in combination with various mapping tools, INCOG is able to evaluate historical crash data to assess existing conditions and collaborate with traffic/design engineers to determine solutions. INCOG representatives also serve on multiple safety-related boards, including the state Traffic Incident Management Coalition, the High Crash Task Force (City of Tulsa), and the Bicycle & Pedestrian Advisory Committee (BPAC), at the Tulsa metro.

Collision Analysis - Automobiles

When evaluating all TMA crashes, the majority of these occur with the City of Tulsa. As shown in the following maps, when evaluating highway/interstate collisions, there are two areas with the highest number of collisions: the Broken Arrow Expressway interchanges at Interstate 44, and at U.S. Highway 169. When evaluating non-interstate/highway crashes, the areas showing the highest number of collisions are downtown Tulsa and the 61st to 71st corridors, between South Memorial Dr. and South Mingo Road.

The majority of motor vehicle collisions in the TMA occur within the City of Tulsa.

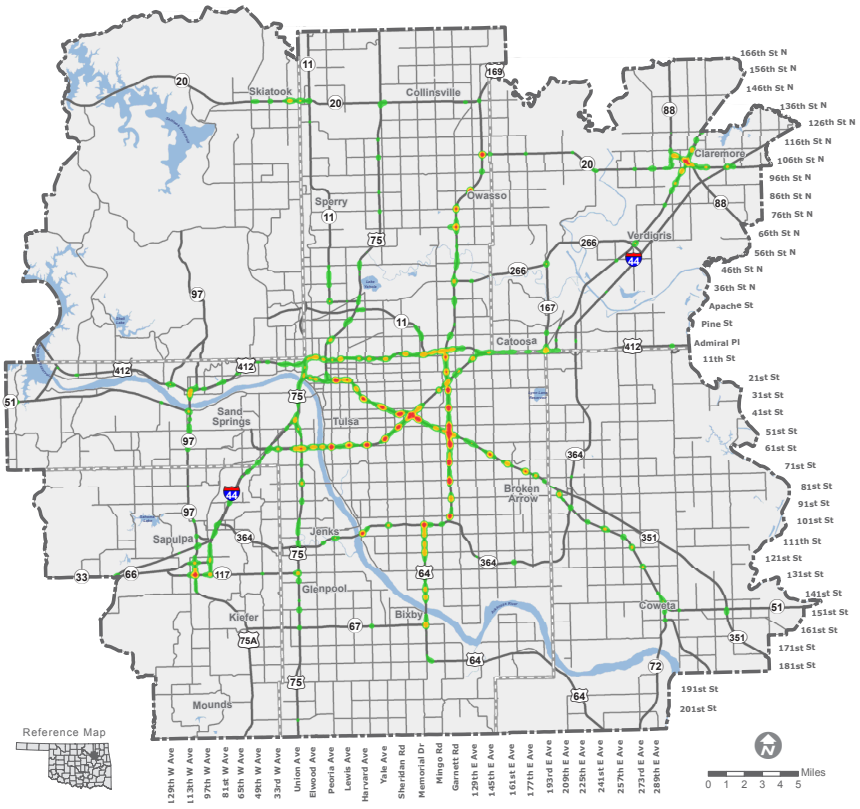


Figure 10. Highway Crashes within the TMA

Legend

Highways
Major Streets
Bodies of Water
County Boundaries
TMA Boundary

Density of Crashes

Greater — Less

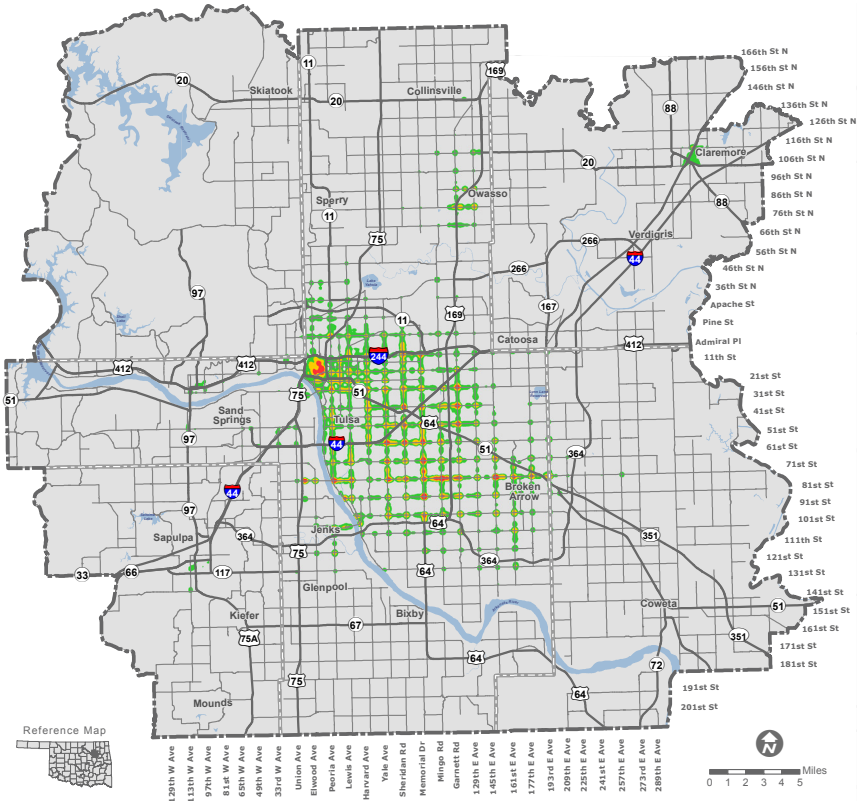


Figure 11. Street Crashes within the TMA

Legend

Highways
Major Streets
Bodies of Water
County Boundaries
TMA Boundary

Density of Crashes

Greater — Less

The majority of non-highway collisions occur at (or approaching) the intersections of major arterials. It is at these locations where high volumes of traffic converge, often traveling at high speeds. Based on frequent land use and access management practices, these areas also tend to have high numbers of access points leading to unpredictable yet frequent turning movements. This produces a higher number of collisions and more high-severity collisions resulting from cross-traffic, angle turns. When studying collisions at these locations, there are numerous ways in which this data may be evaluated. Common practices include ranking intersections by the number of collisions, cumulative severity, or a collision rate based on traffic volume, such as AADT (Annual Average Daily Traffic). The table below lists the TMA's top 25 intersections ranked by total number of collisions. These alone contributed nearly 5,000 collisions from 2011-2015, acounting for 7% of all crashes in the TMA.

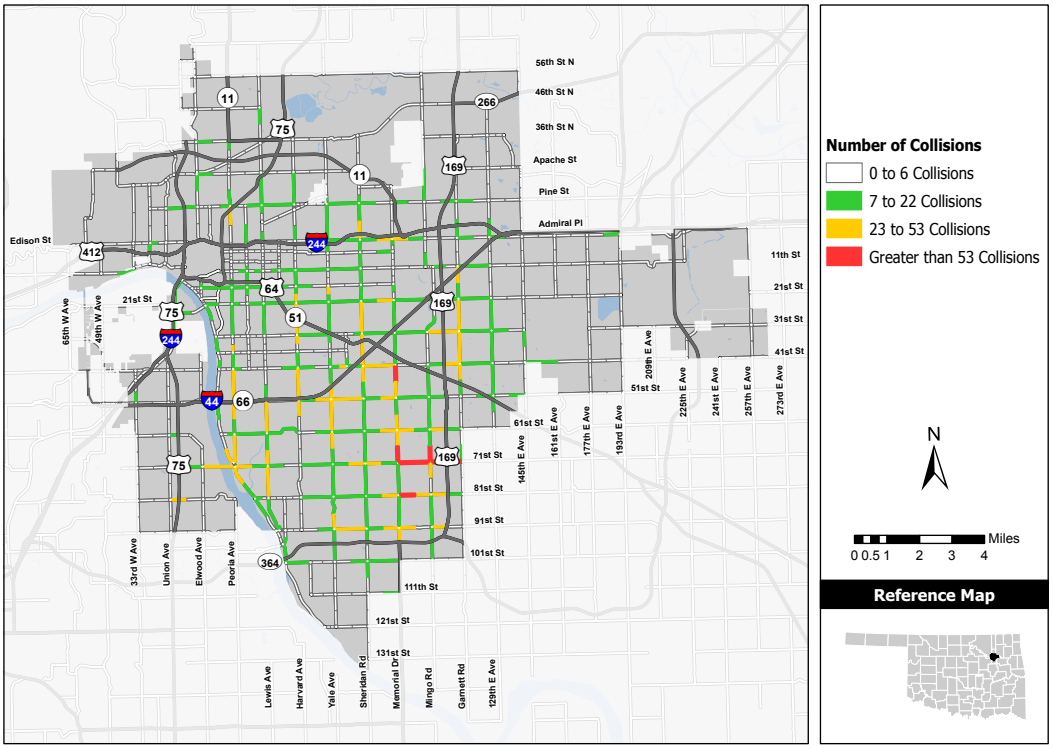
Table 31. INCOG TMA Crashes 2011-2015

Intersection	Number of Crashes	Rank by Rate	Rank by Number of Crashes	Sum of all Traffic Counts	AADT (Based on Weekdays-270)	Rate per 1M Vehicles Entering
Aspen Ave. and Kenosha St.	*342*	*1*	*3*	*93,157*	*46,579*	*5.44*
Memorial Dr. and 81st St.	*346*	*2*	*2*	*108,200*	*54,100*	*4.74*
Mingo Rd. and 71st St.	*354*	*3*	*1*	*139,400*	*69,700*	*3.76*
109th E. Ave. and 71st St.	*154*	*4*	*21*	*60,959*	*30,480*	*3.74*
101st E. Ave and 71st St.	*199*	*5*	*9*	*94,000*	*47,000*	*3.14*
Garnett Rd. and 41st St.	*198*	*6*	*10*	*94,200*	*47,100*	*3.11*
92nd E. Ave and 71st St.	*210*	*7*	*6*	*104,200*	*52,100*	*2.99*
Kenosha St. and 23rd St.	*158*	*8*	*18*	*79,520*	*39,760*	*2.94*
Garnett Rd. and 31st St.	*186*	*9*	*11*	*95,300*	*47,650*	*2.89*
Riverside Dr. and 71st.	*224*	*10*	*5*	*119,800*	*59,900*	*2.77*
Sheridan Rd. and 31st. St.	*167*	*11*	*16*	*90,000*	*45,000*	*2.75*
Memorial Dr. and 61st St.	*239*	*12*	*4*	*132,500*	*66,250*	*2.67*
Garnett Rd. and 21st St.	*178*	*13*	*14*	*100,600*	*50,300*	*2.62*
Memorial Dr. and 51st St.	*176*	*14*	*15*	*106,200*	*53,100*	*2.46*
Olympia Ave. and 71st St.	*201*	*15*	*8*	*121,600*	*60,800*	*2.45*
Sheridan Rd. and 51st. St.	*166*	*16*	*17*	*104,500*	*52,250*	*2.35*
Yale Ave. and 91st St.	*134*	*17*	*29*	*87,900*	*43,950*	*2.26*
Mingo Rd. and 81st St.	*142*	*18*	*26*	*93,700*	*46,850*	*2.25*
Memorial Dr. and 71st.	*202*	*19*	*7*	*135,300*	*67,650*	*2.21*
Kenosha St. and 9th St.	*136*	*20*	*27*	*92,808*	*46,404*	*2.17*
Mingo Rd. 51st St.	*149*	*21*	*25*	*102,300*	*51,150*	*2.16*
Sheridan Rd. and 71st St.	*182*	*22*	*12*	*132,200*	*66,100*	*2.04*
Memorial Dr. and Admiral Pl.	*135*	*23*	*28*	*98,800*	*49,400*	*2.02*
Memorial Dr. and 41st St.	*153*	*24*	*22*	*115,100*	*57,500*	*1.97*
Lewis Ave. and 71st St.	*156*	*25*	*19*	*119,800*	*59,900*	*1.93*

Source: SAFE-T collission database at https://www.oksafe-t.org/

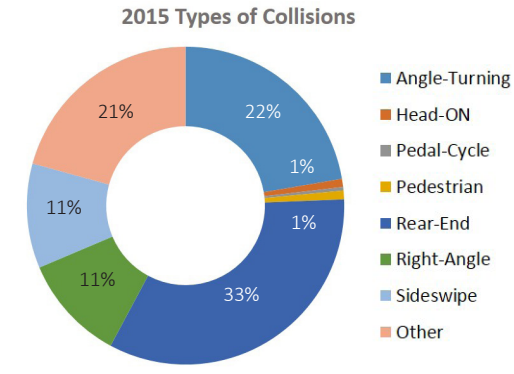
INCOG also uses collision data to assist member governments in prioritizing street projects. As an example, staff were able to evaluate and rank all half-mile arterial segments within the City of Tulsa based on the total number of crashes. This method was selected to better coincide with the City of Tulsa's existing street project funding and implementation practices. At their request, this was done while excluding all collisions within the intersections themselves, as these equally impact conditions on all "legs" touching the intersection. The result is a true ranking of non-intersection collisions occurring on arterials. The following map presents these findings.

Figure 12. City of Tulsa 2013-2015 Crashes, By Half-Mile Segments on Arterials only



Source: SAFE-T collission database at https://www.oksafe-t.org/

In terms of trends, over the past decade the region has experienced little change in collision rates. In 2006, the City of Tulsa reported a rate of 10.2 auto-related fatality collisions per 100K population. In 2015, there were 8.9. Over this same time period, injury collisions have experienced a slow and steady decline, going from 1,200 collisions per 100K population to a rate of 1,000. There is also little fluctuation in the percentages of each type of collision that occurs. The chart on the right includes percentages for each type of crash in 2015. Each category has changed no more than 1% since 2011.



Types of Collisions for each type of crash in 2015 within the TMA. INCOG.

When comparing the INCOG region to peer and neighboring metros, the Tulsa region does produce higher collision rates based on population. The following table shows that the City of Tulsa had the highest fatality rate and the second highest injury rate of the ten cities evaluated. These findings support those of the aforementioned AAA study.

Table 32. Peer City Collision Comparisons

Year	City	Population Estimate	Fatality Collisions	Injury Collisions	Property Damage	Total Crashes	Fatality Collision Rate (Per 100 K)	Injury Collision Rate (Per 100 K)	Property Damage (Per 100 K)	Rate of Total Crashes (Per 100 K)
2014	**Tulsa, OK**	395,599	47	4,082	5,687	9,816	11.88	1031.85	1437.57	2481.30
2013	**Little Rock, AR**	195,092	23	2,401	4,911	7,335	11.79	1230.70	2517.27	3759.76
2014	**Dallas, TX**	1,240,985	143	10,137	17,490	27,770	11.52	816.85	1409.36	2237.74
2015	**Tucson, AZ**	531,641	53	2,468	2,487	5,008	9.97	464.22	467.80	941.99
2014	**Fort Worth, TX**	778,573	77	4,841	7,898	12,816	9.89	621.78	1014.42	1646.09
2014	**Oklahoma City, OK**	600,729	53	4,526	10,360	14,939	8.82	753.42	1724.57	2486.81
2014	**Arlington, TX**	375,305	28	2,508	3,141	5,677	7.46	668.26	836.92	1512.64
2014	**Wichita, KS**	385,518	27	2,609	5,399	8,035	7.00	676.75	1400.45	2084.21
2014	**Austin, TX**	864,218	54	6,592	5,374	12,020	6.25	762.77	621.83	1390.85
2014	**Overland, KS**	178,945	3	886	2,876	3,765	1.68	495.12	1607.20	2104.00
2014	**Kansas City, MO**	459,787	44	4,106	13,008	17,158	9.57	893.02	2829.14	3731.73

Source: State highway safety offices city crash statistics.

Collision Analysis- Pedestrians and Cyclists

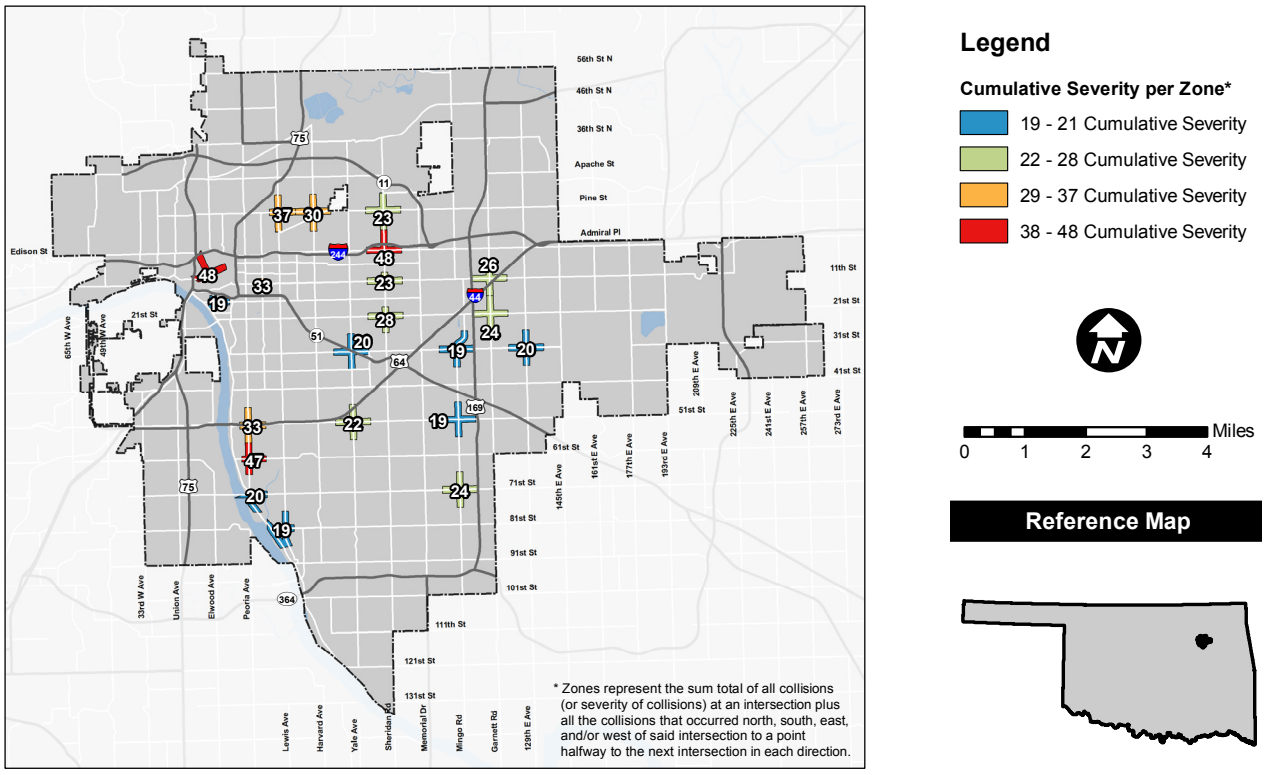
INCOG has long had a strong presence in advancing the needs and safety concerns for the bicycle and pedestrian communities. Over the past decade the region has undergone significant improvements to the regional, off-street trails network as well as the advancement of local policies for sidewalks and ADA accessibility. Despite these efforts, the region is experiencing a significant increase in pedestrian fatalities. In 2006, there were 7 pedestrian fatalities in the region. Since then, fatalities have been on the rise, resulting in 13 fatalities in 2015. Over the past decade, pedestrians bicycle fatalities have been average 17% of all collision fatalities. In 2015, that number rose to 23% with no bicycle-related fatalities. Estimates indicate that the 2016 number of pedestrian fatalities continues to increase.

To better understand these trends, INCOG partnered with the regional Bicycle and Pedestrian Advisory Committee (BPAC) to identify the priority areas where these collisions are occurring. The map below ranks all City of Tulsa intersections by cumulative severity of all pedestrian/bike collisions in each "Zone", which represent the sum total of all collisions at an intersection plus all the collisions that occured north, south, east and/or west of said intersection to a point halfway to the next intersection in each direction.

Cumulative Severity is the sum of all collision severities for crashes occurring within a defined geographical boundary. Collision Severity is a 5-point scale which relates to the level of injury the individuals involved in a collision received as a result of the collision. This includes a fatality (5) collision, incapacitating injury (4), non-incapacitating injury (3), possible injury (2), and property damage a (1) if the individual(s) has no apparent injuries. Only a single value may be assigned per collision and must equate to the highest severity of injury reported in the collision. A collision with one fatality and one serious injury is considered a fatality-5 collision.

With this information, INCOG has been able to target these priority areas with a media campaign. INCOG also uses this information to provide a pedestrian/cyclist perspective on upcoming street rehabilitation projects. There are plans to further study these areas and more clearly define the present issues and solutions, whether based in engineering/design, enforcement, education, etc.

Figure 13. City of Tulsa Severity of Pedestrian and Bicycle Collisions (2012-2015) by Zone



Source: SAFE-T collission database at https://www.oksafe-t.org/

Governmental Priorities on Transportation Safety

Transportation safety has reached new heights for awareness and advancement. Throughout the nation, cities and governments are adopting policies, programs, and funding packages that are aimed at preventing all traffic-related deaths. This focus on safety is present in the Tulsa TMA. Tulsa Mayor G.T. Bynum has named decreasing the number of traffic fatalities as one of his top administrative goals. Tulsa City Councilors have also sought to address transportation safety through the creation of the High Crash Task Force, a multi-disciplinary team tasked with studying the regional intersections with the highest crash rates.

The federal government has also taken a special interest in transportation safety. In 2016, the FHWA published the Highway Safety Improvement Program (HSIP) and Safety Performance Management Measures (Safety PM) Final Rules. The rule, effective date of April 14, 2016, establishes five safety performance measures, with a purpose of establishing measures for State Department of Transportation (DOTs) to use to carry out HSIP and to assess:

(1) Number of Fatalities
(2) Rate of Fatalities per 100 Million Vehicle Miles Traveled (VMT)
(3) Number of Serious Injuries
(4) Rate of Serious Injuries per 100 Million VMT
(5) Number of Non-motorized Fatalities and Non-motorized Serious Injuries

The Safety PM Final Rule also defines the process for state DOTs and MPOs to establish and report their safety targets, and the process that FHWA will use to assess whether State DOTs have met or made significant progress toward meeting their safety targets. The Safety PM Final Rule also establishes a common national definition for serious injuries. These regulations are intended to improve data; foster transparency and accountability, and allow safety progress to be tracked at the national level. They will inform state DOT and MPO planning, programming, and decision-making for the greatest possible reduction in fatalities and serious injuries.

Funding for Transportation Safety

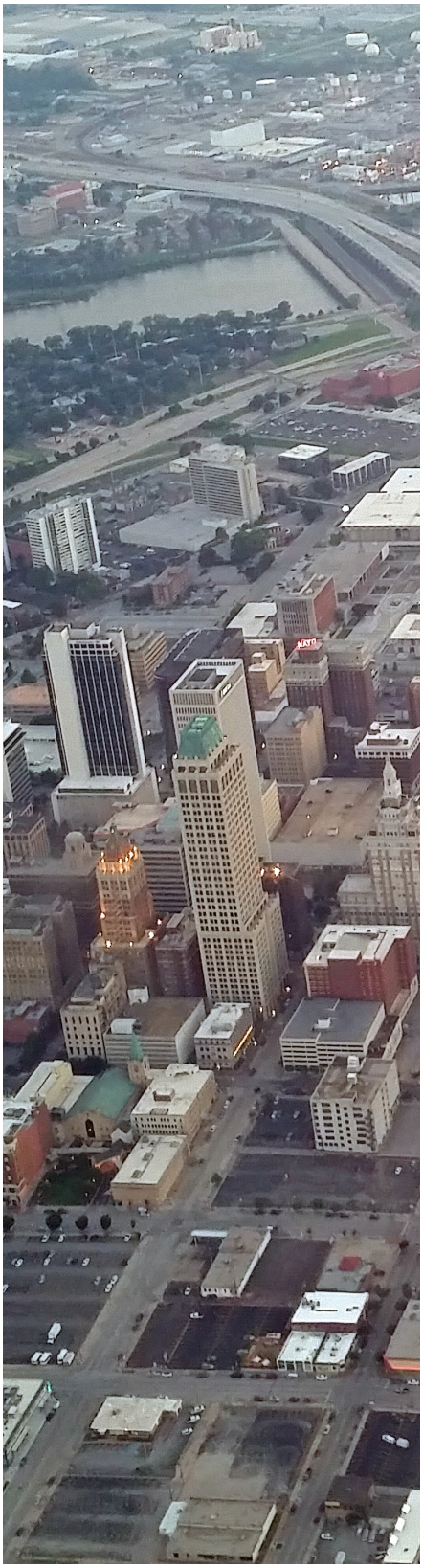
Apart from data analysis, the most significant responsibility INCOG has regarding safety is to evaluate local surface transportation projects on funding allocations. INCOG evaluates member government projects and makes recommendations with consideration to transportation safety improvements. Though the implementation of these countermeasures are carried out by member governments, INCOG plays a crucial role in this process. During project review, INCOG staff evaluates each project and assigns points based on a variety of categories, including safety. INCOG's project selection criteria is weighted for safety when final recommendations are made using federal funds.

Currently there are three sources of federal funds available to INCOG member governments for the implementation of transportation safety projects: (1) Transportation Alternatives Program (TAP), (2) Surface Transportation Program (STP), and (3) Congestion Mitigation and Air Quality Improvement Program (CMAQ).

Table 33. Federal Funding Sources for Transportation Safety Programs

Program	Description
Transportation Alternatives Program (TAP)	*The Transportation Alternatives Program was authorized under Moving Ahead for Progress in the 21st Century Act (MAP-21) in 2012. At this time, ODOT began suballocating a portion of these funds to the INCOG region with the potential to use a portion for Safe Routes to School (SRTS) projects. INCOG administers $1.1 million in TAP funds per year; however, the selection process occurs once every two years, resulting in $2.2 million each funding cycle. Eight projects were selected for fiscal years 2014 and 2015.*
Surface Transportation Program (STP)	*Beginning in 2016, the FAST Act converted the long-standing Surface Transportation Program into the Surface Transportation Block Grant Program, acknowledging that this program has the most flexible eligibilities. INCOG receives more than $13 million per year in STP funds.*
Congestion Mitigation and Air Quality Improvement (CMAQ) Program	*As part of a recent safety-focused initiative, INCOG began allocating a portion of CMAQ funds to purchase transportation safety materials for member governments. These funds are for small-scale safety improvements. The materials available for purchasing include thermoplastic paint for restriping crosswalks, Rectangular Rapid Flashing Beacons, bicycle safety equipment, signage (e.g. in-street crosswalk signs), etc. Additionally, INCOG has an agreement with Tulsa County for sign fabrication.*

In conjunction with the materials purchasing, member agencies may seek INCOG assistance in identifying priority areas needing safety improvements, utilizing the ODOT SAFE-T Collision database.



Highway Safety Improvement Program

In addition to the three funding sources available, the Highway Safety Improvement Program (HSIP) is a core federal aid program and plan providing guidance with the purpose of achieving a significant reduction in traffic fatalities and serious injuries on all public roads, including non-state-owned roads and roads on tribal land. HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance. HSIP provides guidelines and criteria to be considered when allocating resources to problem locations, giving consideration to the number of fatalities, the amount of travel, and the lane-miles of public roadway available.

Outlook of Transportation Safety in the Region

Technology is rapidly redefining the transportation safety arena. Whether it is autonomous vehicles, pedestrian detection systems, or vehicle-to-vehicle communications, it is becoming increasingly important for regional and local governments to be aware of the present and future state of the transportation industry as it affects policy and investment decisions. As previously discussed, INCOG has taken a proactive approach to transportation safety by devoting resources, funds, and staff to evaluate the existing conditions in the region, and by seeking to implement change through planning, policy, and collaboration.

The INCOG region has experienced the advancement of Intelligent Transportations Systems (ITS) technologies, as well as the creation of Traffic Management Center (TMC) housed at the City of Tulsa traffic operations office. With these technologies, transportation professionals can examine existing conditions and deliver real-time information and guidance to emergency responders or the traveling public, resulting in a reduction of crashes, alternate route notification, reduced congestion, and an overall more efficiently-run transportation network.

With the development of the physical infrastructure comes the need for accompanying local agreements and policy framework to guide the efforts between varying agencies and governing bodies. The Tulsa Regional Intelligent Transportation Systems (ITS) architecture plan was developed in 2003, in

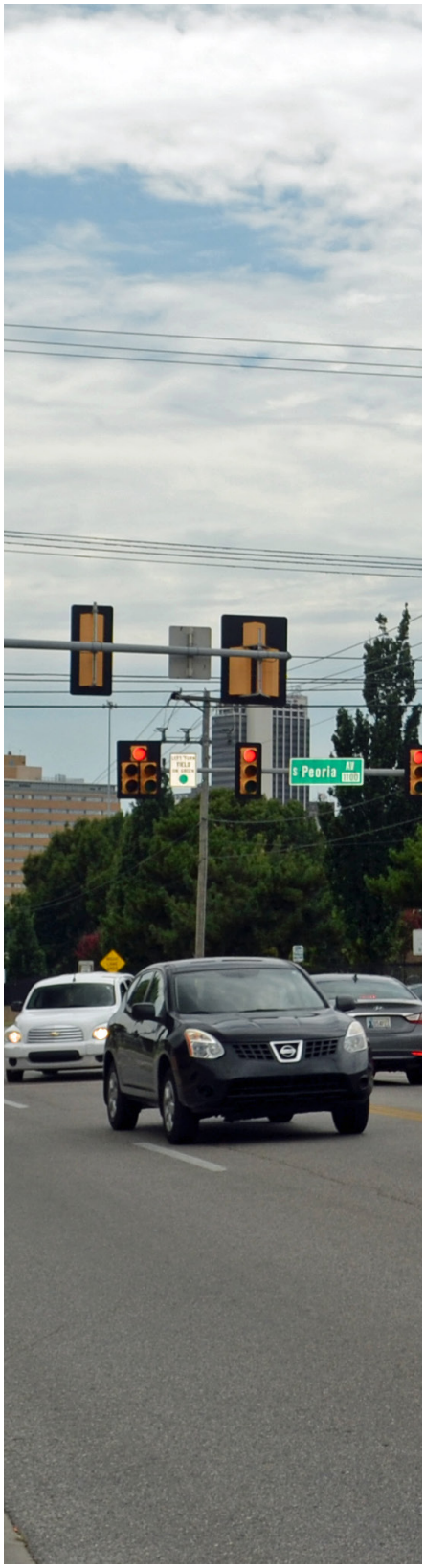
coordination with the U.S. Department of Transportation and ODOT. It includes three main sections and was developed as a means to define:

1. ***Communications*** **-** How information is transferred between transportation systems.

2. ***Transportation*** **-** Which transportation systems transfer what information.

3. ***Institutional*** **-** The supporting institutional structure, policy, and strategies ensuring specific services are implemented.

Much progress has been made in region since this plan was created. Because of the physical and policy infrastructure changes, Connected 2045 recommends updating the Tulsa Regional ITS architecture plan.



Safety Evaluation and Performance

As highlighted throughout this chapter, there are numerous efforts underway to further safety in the region; however, the majority of these efforts focus on individual member governments or single modes of travel. There is a lack of regional cooperation and oversight for safety initiatives, even though many transportation safety concerns are rarely confined by corporate boundaries. Therefore, Connected 2045 recommends the creation of an INCOG Regional Safety Council to aid in the creation of a regional safety plan, explore and promote best engineering and design practices, and establish goals and priorities for the region.

A transportation safety plan would include the regions priorities and goals for addressing transportation safety concerns, as well as identifying the strategies, responsibilities, and resources necessary for achieving these goals. The plan would seek to provide guidance and promotion of best practices in terms of engineering and design, and direction towards academic resources and case studies to validate promoted best practices. The plan would also seek to provide assistance on enforcement and public policy related to transportation safety, as well guidance for public outreach, promotion, and other education activities involved in safety. Connected 2045 recommends that the Regional Safety Council and the safety plan be created and implemented within the next five years.

In addition to a regional plan, INCOG plans to further develop collision analysis tools and strategies. INCOG's current practices are heavily reliant on historical crash data and seek to address high crash locations after they become problem areas. This process is referred to as "hot spot" analysis; however, transportation safety is a rapidly evolving field. Some transportation professionals are developing methods of predictive analysis which seek to identify future high-crash locations before they become problem areas.

Another key component to improving transportation safety in the region is the creation of a transportation safety committee within INCOG to oversee safety-related programs and projects and monitor progress on goals established by the regional transportation safety plan, as well the performance measures established by the FHWA.

- Number of Fatalities
- Rate of Fatalities
- Number of Serious Injuries
- Rate of Serious Injuries
- Number of non-motorized fatalities and serious injuries

Attendees of the Strong Towns Summit in Tulsa test tactical speed reduction techniques by narrowing travel lanes.

PUBLIC INVOLVEMENT

Mission Statement

The intent of the Public Participation Plan is to encourage and support active public participation throughout the planning and decision-making process related to the development of proposed transportation plans, programs, and projects so that a safe, efficient transportation system reflecting the needs and interests of all stakeholders can be provided.

Introduction

Public participation processes inform citizens, groups, and organizations about specific decisions likely to affect their lives, ensure that planning and decision making consider views and inputs from stakeholders, and resolve issues and problems, taking into consideration multiple interests and concerns. Above all, public participation processes encourage citizens and organizations to take an active role in their community's transportation issues, building a relationship for better communication and cooperation.

Public participation is encouraged when planning in order to achieve better results and benefit all of the community.

Public Participation Process

INCOG maintains a website where citizens can review posted information and send comments via online forms and email. The website hosts information of interest to the public: meeting schedules and agendas, the RTP, the updated TIP, planning products available from INCOG, and demographic and traffic data. A brochure with a brief description of the regional transportation planning process is also published and distributed. In addition, the INCOG database is used to provide citizens, affected public agencies, emergency response agencies, representatives of public transportation employees, freight shippers, providers of freight transportation services, private providers of transportation, representatives of users of public transportation, representatives of users of pedestrian and bicycle transportation facilities, representatives of persons with disabilities, and other interested parties with a reasonable opportunity to comment on the RTP and TIP and become involved with the transportation planning process, in accordance with federal regulations.

Various provisions of MAP-21, the federal transportation law, require expanded consultation and cooperation with federal, state, local and tribal agencies responsible for land use, natural resources, and other environmental issues. Throughout the planning process INCOG will seek to engage and will incorporate comments from such agencies. INCOG will seek to engage these segments of the community and incorporate their comments throughout the planning process. INCOG will also undertake appropriate consultant and coordination activities with agencies related to safety planning and security planning. Appropriate consideration of these two factors will be included in all projects and planning activities.

According to the 2015 American Community Survey, 83,312 people 5 years and older (11.1%) in the Tulsa TMA speak a language other than English at home.

Specific Environmental Justice and Limited English Proficiency (LEP) Considerations

State and federal policies and regulations, including Environmental Justice initiatives, reinforce the need of agencies to focus attention on reaching low-income and minority households. There are many individuals whose primary language is not English. Individuals who do not speak English as their primary language and who have a limited ability to read, write, speak or understand English are known as Limited English Proficient (LEP). This language barrier may prevent individuals from accessing services and benefits. To include traditionally underserved communities in the decision-making process, it is necessary to identify key stakeholder groups that have low or no participation, what is preventing them from participating, and what can be done to overcome barriers and increase the levels of participation. Some explanations for the lack of participation include cultural and language barriers, disabilities, economic constraints, and lack of participation opportunities.

Environmental Justice initiatives in the planning process will help benefit all diverse groups in the community.

To ensure that cultural and language barriers are overcome, LEP procedures will be implemented, such as making information readily available and having documents translated and public notices broadcast for Spanish-speaking populations, since that is the most common non-English language spoken at home (74% of the total non-English homes in Tulsa County). Meetings and/or public hearings shall be made accessible and user friendly for all stakeholders, taking into consideration convenient locations and schedules. In addition, INCOG will provide appropriate accommodations for citizens with hearing and/or sight impairment. Effective participation, education and communication shall be tailored to specific non-traditional transportation stakeholders and problems.

To assist the LEP populations in the Tulsa TMA and assure that persons with limited ability to speak, read, write, and understand the English language participate in all INCOG's programs, INCOG will develop a list of vital plans and documents, essential for public participation, that should be translated. Public participation meeting notices will be posted in accessible locations, both in English and Spanish, with INCOG's contact for further assistance to other languages translation. INCOG will keep a database of personnel with foreign language skills that will be posted on INCOG's website and internal website.

Once a year, INCOG personnel will be trained on how to effectively provide assistance to the LEP population and how to use telephone translation services when needed. A language chart will be available to help identify what language a LEP person speaks and will be located in public areas. The public will be notified of the availability of translation services for all public meetings. Upon request, interpreters will be made available to assist LEP persons. INCOG will forward emails written in foreign languages for translation and an interpreter will provide assistance to the sender. INCOG will maintain the Four Factor Analysis (see right) updated to monitor and evaluate the language assistance plan and to keep it updated to better serve the LEP population.

To reach the LEP population, a "Four Factor Analysis" outlined in the US Department of Transportation policy guidance will be followed:

1. *The number or proportion of LEP persons eligible to be served or likely to be encountered by a program, activity, or service of the recipient or grantee.*
2. *The frequency with which LEP individuals come in contact with the program.*
3. *The nature and importance of the program, activity, or service provided by the recipient to people's lives.*
4. *The resources available to the recipient and costs.*

Regional Transportation Plan

The Regional Transportation Plan (RTP) has at least a 20-year horizon and is necessary for the effective programming and implementation of transportation improvements. The RTP is predicated on demographic and economic assumptions and forecasts for the region. It identifies the various transportation systems: roadways, public transportation (transit), bicycle/pedestrian, and freight systems desired for the TMA, as well as how the transportation modes interrelate with each other. The RTP summarizes the costs of the investments that will be needed, the resources necessary and expected to achieve the recommended improvements, and the resulting effects or impacts such investments will produce. The RTP serves as a guide for the investment of local, state, and federal resources, and becomes a component of the Oklahoma Statewide Intermodal Transportation Plan. It also serves as the foundation for plans to improve the overall transportation system.

Public participation is an integral part of the RTP, and the plan itself must reflect the desires of the communities within the region to help them attain their transportation goals. To this end, INCOG, in addition to its outreach efforts as required by federal and state laws, will seek to interact with the following specific groups through techniques aiming to inform, involve, give feedback, and achieve significant participation:

Table 34. Stakeholder Target Groups for Public Participation

Neighborhood / Homeowners' Associations	*Particularly groups that are directly affected by a proposed project.*
Business Professionals	*Tulsa's Young Professionals, local business leaders, and other organizations, chambers of commerce, etc.*
Schools	*Tulsa Community College, Tulsa Technology Center, public and private schools (elementary, middle, high schools and universities), and others as appropriate.*
Churches / Religious Institutions	*Religious venues located in affected areas.*
Media Representatives	*Reach out to reporters who have worked with INCOG in the past and form new relationships with representatives from various media types, including television, newspaper, radio and online.*
Elected Officials / Community Representatives	*Engage local elected officials, community planners, and planning commissioners on a regular basis.*
Civic / Focus Groups and Emergency Response Agencies	*Speak with organizations at their regularly scheduled meetings. Host retreats to encourage participation from particular organizations and businesses with a vested interest in transportation.*

Public participation is a crucial part of the Regional Transportation Plan.

INCOG engages the public throughout the process of developing the Regional Transportation Plan using the following actions:

1. Early and Continuing Public Participation. A visioning session that started with Technical Advisory and Transportation Policy Committees became broad-based goals for the region, reflecting what is important to residents. Additionally, a contact list based on previous public participation efforts, including civic groups, neighborhood associations, chambers of commerce, special interest groups, and other interested parties is updated on a continual basis. When appropriate, INCOG conducts visual and descriptive presentations as well as other visualization techniques. Extended stakeholder group meetings are conducted to seek input into the overall process as well as specific elements of the plan.

2. Timely Information. INCOG provides information about transportation issues and processes to interested parties and citizens affected by the transportation plan. INCOG has done so by: providing news releases to local media outlets, producing and distributing newsletters, publishing a web-based newsletter, attending area community group meetings to disseminate information, and talking with area public officials to encourage them to reach out to local civic groups within their jurisdictions.

3. Reasonable Public Access. INCOG seeks opportunities to participate in existing meetings or events to educate and/or involve the public. INCOG further provides citizens and interested parties affected by the transportation plan opportunities to view technical and policy information used in the development of the plan. This includes holding group sessions to review information, providing a summary of detailed demographics, and disseminating demographic details in a newsletter available at area libraries.

4. Adequate Public Notice. INCOG provided public notice of public participation activities and public review and comment periods at key decision points. Notices of public meetings are posted in area newspapers, libraries and on the INCOG website. Invitations are also sent to the established contact list.

5. Explicit Consideration and Response. INCOG follows the process as defined in the respective plan or program for demonstrating to the public that their input during the planning and development process is received. All comments received are documented, along with specific responses to significant comments. The comments and responses are made available via website, newsletter, and the final documents.

6. Seeking Out and Considering the Needs of Those Traditionally Underserved. INCOG identifies concentrations of traditionally-underserved households (such as low-income and minority households that face challenges for accessing employment and other amenities) within the region and pursues opportunities to encourage public participation from these communities. INCOG provides for interpreters to overcome language barriers as needed, publishes educational materials about the process in bilingual formats, and submits news releases to local media outlets that serve these groups.

7. Periodic Review. The effectiveness of the public participation plan will be reviewed to ensure it provides full and open access to all, and portions of the process that are not meeting the needs of our constituencies will be revised. After a public participation activity has taken place, INCOG will evaluate its effectiveness and incorporate desired changes based upon that evaluation.

Different ways of engaging with the public during the planning process.

Documentation Process

In accordance with federal regulations, INCOG documents all aspects of the public participation process. This information includes sign-in sheets, meeting minutes, outreach materials, and other essential meeting details and data. The following table includes feedback provided by stakeholders per city.

Table 35. Stakeholder Meeting Feedback

Date / City	Comments
February 3rd, 2017 Broken Arrow	*Comments included adding express buses to the transit plan. Broken Arrow staff mentioned 81st St. (Houston) was having some friction with freight traffic, and suggested an elevated crossing. Congestion issues included 91st St., Aspen between 41st St. and 51st St., the corridor of County Line Road (193rd E. Ave.) from 51st St. to US-412, and 161st E. Ave. (Elm). The railroad crossing over 91st St in Wagoner County is not in good condition and a new grade crossing is needed both there and north of NSU. Map insights included adding bicycle and pedestrian improvements to the OK-51 bridge expansion, as well as along expansion of bridge and addition along 81st St. (Houston), from Lynn Lane to OK-51.*
February 3rd, 2017 Jenks	*Comments included a desire for expanding Main St., and returning one-way streets to two-way traffic. There is strong interest in trails and pedestrian improvements in the area. Congestion issues included 121st and Elwood. Map insights indicated a desire to expand US-75 from 81st St. to 96th St.; upgrade Elm St. from 111th to 131st, and the need for pedestrian upgrades for a new school site on Adams St.*
February 7th, 2017 Owasso	*Comments mentioned the slow pace and multiple delays each day caused by the South Kansas and Oklahoma railroad grade crossings. Comments also suggested 76th St. N. needs turning lanes. People also wanted to add bike lanes to a planned expansion off 129th E Ave. Individuals expressed concern on increased traffic from Macy's Distribution Center seasonal workers on US-75, and heavy freight traffic from the National Steak and Poultry facility and Cherokee Industrial Park. US-169 has congestion issues north of the recent lane expansions. There is interest in having transit service for Owasso residents from Council. City staff commented on slow timelines with ODOT projects.*
February 7th, 2017 Bixby	*Comments expressed a desire to connect Bixby to the regional trail system, intersection modification at specific locations, interlocal agreements to maintain streets on the periphery, connecting south Bixby with the north by building a bridge at Yale Ave. or another arterial, and signal maintenance.*
February 8th, 2017 Coweta	*Comments included a desire to prioritize connecting the Liberty Trail at NSU-BA. A mapping error of 121st St. in the previous LRTP was mentioned. Residents noted that the sports complex parking lot is being used as an unofficial park and ride location for many residents. The city is experiencing growth issues with the rural water supply and is seeking options.*

Date / City	Comments
February 9th, 2017 Claremore	*Comments included the need to update the map to reflect Lowry Rd. as a four-lane road. The City staff commented that processes with ODOT are slow and laborious. There is a diamond crossing at the north end of town and the city doesn't have the resources to fix it; however traffic funneled from the state is growing. City staff mentioned there is a need to build a bridge over the railroad crossing.*
February 9th, 2017 Sapulpa	*Comments Included concern over the high rate of collisions on 49th W. Ave. at OK-117. The city desires to bring the Ozark Trail to SH-117 and SH-66. There is a desire to put in a trail along OK-97 to connect Sand Springs and Sapulpa. Residents also mentioned the need for sidewalks on Wickham Rd. leading up the school.*
February 21st, 2017 Collinsville	*Commentors were interested in a bypass for SH-20 and I-44 to improve access to I-44. The city plans to connect to the Tulsa trails system and Mohawk Park. The city mentioned struggling with a slow process on a Safe Routes to Schools grant. Commentors also mentioned a high crash spot at SH-20 and the Yale access road.*
February 21st, 2017 Glenpool	*Commentors mentioned an unofficial park and ride location at 141st and US-75. US-75 from 151st St. to 171st St.has a lot of freight traffic and there is a need for an arterial east of US-75 from 151st St. to 171st. St. City staff highlighted a plan to install a bike path along 131st St. The school district is buying land at Elwood Ave. and 141st St. and is interested in a possible Safe Routes to School application to identify the crosswalk sections. There is southbound congestion on US-75 from 141st St. to 161st St. City staff highlighted signalization changes on 121st and Elwood Ave., 145th and Peoria, and at 121st and SH-117.*
February 22nd, 2017 Tulsa County	*Commentors expressed a desire for a bridge over Posey Creek using Vision funding. Staff mentioned a potential HAWK beacon on the 111th St. trail project. County leaders indicated potential signalization changes to County Line Rd. at 31st St.and 41st St. School zones have used RRFB's. By statute, money can only be spent for maintenance. Staff also mentioned that Tulsa County doesn't maintain trails unless it's a side path, on a county road.*
February 24th, 2017 Tulsa	*Staff mentioned that primary arterials of Memorial and Yale are designated to be expanded; 25th West Ave to Gilcrease Museum is being considered for a three-lane road with a turning lane for safety; and that 21st St. is more of a central point in East Tulsa than 11th St., and the BRT line, which follows 11th St. and drops down to 21st at Harvard Ave. and continuing on 21st St. should be studied.*
March 2nd, 2017 Sand Springs	*Comments included the need for extended bus service to Tulsa Community College down from the current stop. There is a process for community feedback on the service currently underway. There is also interest in connecting with a trail to Sapulpa, and conversations between the two communities will be happening in the near future.*

PLAN EFFECTIVENESS

Public Transit leaving the Denver Avenue Station, in downtown Tulsa.

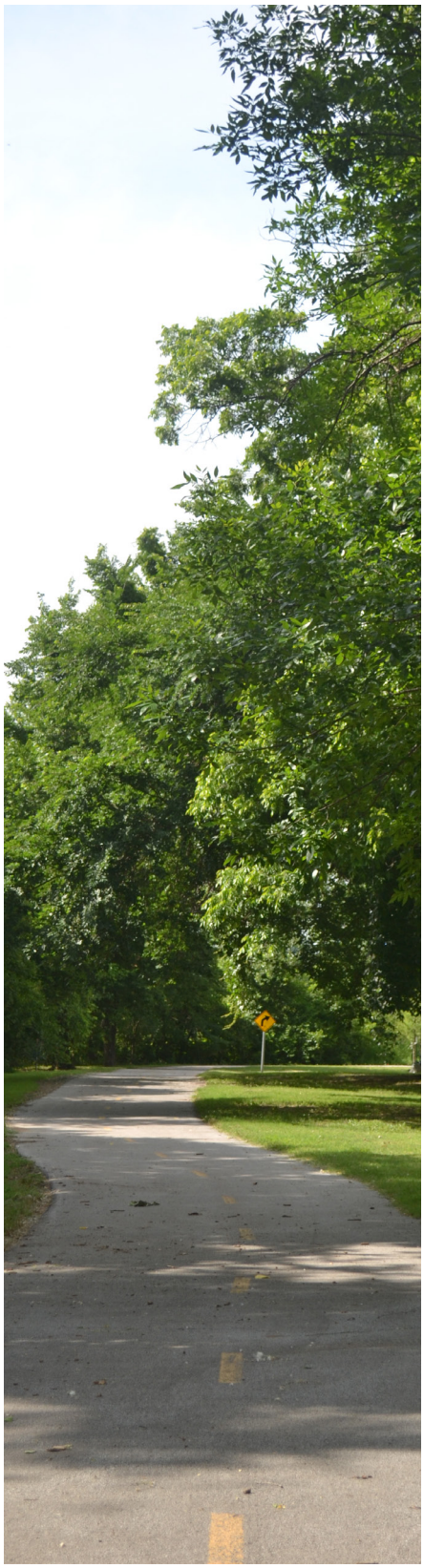
Introduction

Federal regulations require that the Connected 2045 LRTP be financially feasible and demonstrate fiscal constraint over the long-range planning horizon. Implementation of transportation improvements is contingent on available funding, and a plan is considered fiscally constrained when revenue is available to build the planned projects as well as fund the maintenance and asset management of the existing system across all modes of transportation. The 2045 LRTP must estimate costs and identify expected sources of revenue available to projects and programs listed in the plan, as well as any additional financial strategies used to implement the plan. The financial plan for the 2045 LRTP must also involve public transit operators in the development of funding estimates and estimating year of expenditure dollars for all projects and strategies.

Funds may be federal, state, and/or local. Federal funds are available through various programs administered by the state for roadway construction and other multimodal projects including, but not limited to, pedestrian, bicycle, and transit facilities. By reviewing projected and expected funding resources, the program of projects was linked to reasonable and expected funding sources, resulting in a financially-feasible plan.

Financial Plan

The Connected 2045 Regional Transportation Plan is financially constrained. This fiscal constraint is designed to ensure that revenue will be available to build the planned projects as well as fund the maintenance and asset management of the existing system across all modes of transportation.



Cost Considerations

Cost considerations to estimate the plan expenditure utilized cost estimates that were currently available based on year of expenditure. These estimates are based on several inputs from member entities.

- *ODOT 8-Year Construction Program.*
- *City of Tulsa Capital Improvement Program and historical funding.*
- *Estimates outside the 8-Year Construction Program for critical pieces of infrastructure.*
- *Cost of operations as available from the existing transit service provider, MTTA.*
- *All additional costs associated with Transit System Plan and High Capacity Transit Alternatives are assumed to have matching revenue streams, as identified in those plans.*

Expressways and highway interchanges are estimated to account for 34% of the total cost of maintaining and reconstructing the system. Arterials would cost approximately 38% of the total cost of the transportation plan. The current Public Transportation System represents 20% of the total cost of the plan whereas 2% of the plan expenditure is estimated to be toward pedestrian and bicycle linkages. These costs do not include costs incurred for residential streets or linkages outside of the significant transportation facilities. Table 35 illustrates the total cost and cost estimates.

Table 36. 2015 - 2045 Cost Estimate Summary
(in Thousands)

Facility / Source	Operating and Maintenance Costs	Construction and Capital Costs	Total Costs	Percent of Total
Expressways	*$ 282,000*	*$1,345,000*	*$1,627,000*	*26.0%*
Turnpikes	*$119,000*	*$250,000*	*$369,000*	*5.9%*
Arterials	*$1,740,000*	*$587,000*	*$2,327,000*	*37.2%*
Highway Interchanges	*$0*	*$480,000*	*$480,000*	*7.7%*
Subtotal	***$2,141,000***	***$2,662,000***	***$4,803,000***	***76.7%***
Percent	***44.6%***	***55.4%***	***100%***	
Public Transportation (Current System)	*$400,000*	*$50,000*	*$450,000*	*7.2%*
Dedicated Public Transportation	*$400,000*	*$500,000*	*$900,000*	*14.4%*
Bicycle/Pedestrian Links	*$22,000*	*$86,000*	*$108,000*	*1.7%*
Subtotal	***$822,000***	***$636,000***	***$1,458,000***	***100%***
Total	***$2,963,000***	***$3,298,000***	***$6,261,000***	
Percent	***47.3%***	***52.7%***	***100%***	

Revenue Estimates

The revenue was estimated using the most recent available information from local, state and federal agencies and organizations that have historically provided funding for TMA projects.

Following sources for revenue estimates are used:

- *ODOT, state and federal budget estimates*
- *City of Tulsa Public Works operations and capital budget estimates*
- *City of Tulsa sales tax and bond program*
- *Community and county Vision Programs*
- *Tulsa County 4-to-Fix program*

- *Other municipal and county revenue for transportation estimate*
- *FTA support for Tulsa Transit program*
- *Oklahoma Turnpike Authority capital budget estimate*
- *INCOG Surface Transportation Program Revenue forecast*
- *Transportation Alternative Program Revenue forecast*

In addition, the revenue available for future transit expansion in the areas of corridor-based projects, as well as potential high-capacity improvements and the turnpike portions of spending, is assumed to come from the respective entities through dedicated monies.

Local resources (cities and counties) are estimated to provide 37% of the total revenue. About 22% of the total is estimated for implementation of the public transportation system plan which is contingent upon that revenue stream.

The following table illustrates the total revenue estimates.

Table 37. 2015 - 2045 Revenue Estimates Summary

Revenue Source	Estimated Revenue
Local (City and County tax and bond evenue estimate)	*$2,350,000*
ODOT revenue estimate (state and federal) and federal discretionary grants	*$1,710,000*
Federal urbanized area surface transportation program and Transportation Alternatives Program estimate	*$483,000*
OTA revenue estimate to match projected spending for capital projects within TMA	*$369,000*
Public transportation (current system at cost)	*$450,000*
Dedicated transit/city/federal (to match the planned costs estimated)	*$900,000*
Total	***$6,262,000***

Social Environment

Increasing the number of decision makers and overall involvement from historically underrepresented communities, known as Socially Sensitive Groups (SSG's), is a key consideration of this Regional Transportation Plan (RTP). A SSG is a population within the Tulsa Transportation Management Area (TMA) that encompasses a majority percentage of minorities, Hispanics, low-income, elderly and/or children of single parent female-headed households. As part of the National Environmental Policy Act (NEPA) process and the Executive Order on Environmental Justice (1994), the RTP identifies any SSG (particularly minority and/or low-income populations) that reside in proximity to planned projects and examines issues and effects associated with the proposed projects.

Regulations and Mission

Title VI of the 1964 Civil Rights Act states *"No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance."* Title VI prohibits intentional discrimination as well as any discriminatory policy or practice that has a negative effect on protected groups.

The 1994 presidential executive order stated, "Federal Actions to Address Environmental Justice in Minority and Low-income Populations." The Executive Order focuses federal attention on the environmental and human health conditions of minority and low-income populations, promotes nondiscrimination in federal programs affecting human health and the social environment, and provides minority and low-income populations access to public information and an opportunity to participate in matters relating to the environment.

In 1999, the FHWA and the FTA drafted a memorandum titled Implementing Title VI Requirements in Metropolitan and Statewide Planning. This document clarifies the process by which metropolitan and statewide planning agencies evaluate long-range plans and potential effects on communities with high percentages of minority and low-income populations. Both orders relate directly to addressing environmental justice activities in the transportation planning process.

It is INCOG's intent to ascertain during the planning process if any SSG would be disproportionately affected by the recommended transportation projects in the LRTP. In order to accomplish this end, it is essential for both planning organizations and implementing bodies to be conscious of possible effects from improvements to the transportation system. Informed planners and engineers will be able to make better decisions if the LRTP includes information identifying locations of socioeconomic groups covered by the Executive Order on Environmental Justice and Title VI provisions.

Methodology for Identifying Socially Sensitive Groups (SSG)

The analysis INCOG conducted was to ensure the plans do not disproportionately affect any Socially Sensitive Areas (SSAs), a region defined as having a concentration of minority, Hispanic, low-income, elderly (65 and older), youth (under 18 years of age), persons with disabilities, persons who have Limited English Proficiency and/or single-parent, female-headed households with children younger than 18. A review of the 2011-2015 American Community Survey data was conducted for the TMA for potential environmental justice issues including:

- *Displacement/relocation of minority and low-income residents.*
- *Effects on local commute times and availability of public transportation.*
- *Access to bike/pedestrian trails.*
- *Separating/bisecting minority and/or low-income communities.*

The SSA map included in this chapter shows the greatest concentration of all the groups in the TMA comprising socially-sensitive areas, particularly minority and low-income populations. Additional maps in the chapter show the TMA's greatest concentration of SSG populations in relation to TMA roadway (Social Environment and Planned Roadways), transit (Social Environment and Planned Public Transportation) and multimodal routes (Social Environment and Planned Trails & Bikeways).

Studies were conducted for neighborhoods affected by the planned public transportation system and the planned bicycle/pedestrian system. Results from that examination showed areas with high concentrations of minority and/or low-income households are well-served by the proposed projects and that particular consideration should be given to those areas when specific projects are implemented.

In addition to looking at the geographical impacts of the proposed improvements, a broad analysis was conducted of the mean travel time for SSA residents. Median commute time for the Tulsa TMA was computed based on 2015 ACS data and compared with the SSAs for the same year. The TMA median commute was 20.34 minutes while the SSA commute time was 19.02 minutes. Therefore, it is expected that the median travel time for SSA residents will be proportional to that of TMA residents overall.

Special Populations

For the purposes of this LRTP and in conformance with the Executive Order, minority and low-income populations are defined as follows:

- ***Minority*** refers to persons who are Black (having origins in any of the black racial group of Africa or African American); Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); Asian American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or Native American Indian and Alaskan (having origins in any of the original people of North America maintaining cultural identification through tribal affiliation or community recognition). The U.S. Census separates Hawaiian (including people of the Pacific Islands) from Asian American.

- ***Low-income*** refers to total income for a family or unrelated individuals that fall below the relevant poverty thresholds, then the family and every individual in it or unrelated individuals are considered in poverty. As of 2016 the poverty threshold for a family of 4 was $24,339 (U.S. Census Bureau). The median household income in the Tulsa Transportation Management Area is $51,466 (ACS 2011-2015).

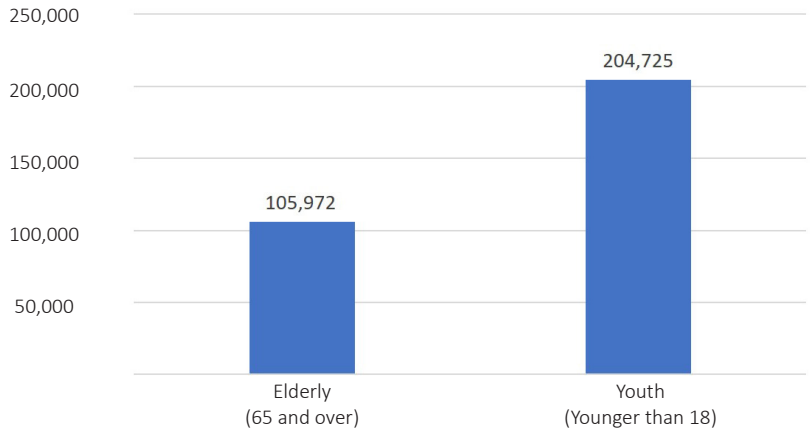
The FHWA and the FTA reference Health and Human Services (HHS) Federal Poverty Guidelines in determination of poverty. These guidelines are based on the U.S. Census Bureau's poverty thresholds. Tulsa TMA population determined by the 2015 ACS estimate to be below the poverty threshold were mapped, as seen on the Persons Below Poverty Levels in the Transportation Management Area map included in this chapter.

For planning purposes, the INCOG Transportation Planning Division uses a broader definition of low-income that includes more residents. In addition, areas where 51% or more of households make less than 80% of the median household income (the U.S. Department of Housing and Urban Development [HUD] definition of low/moderate income) were also analyzed. Using these definitions of low-income allows INCOG to extend its planning and outreach considerations.

Although the U.S. Census data give a demographic profile of the study area, further research was conducted to identify low income populations and to gain a better awareness or "sense of place" within those communities. This research included insight from area planning officials and comments submitted by neighborhood and civic organization representatives, as well as the general public. Census data indicate a range of socioeconomic and demographic characteristics within the TMA. Statistically, most of the neighborhoods immediately north and west of Downtown Tulsa were found to have the greatest concentrations of minority populations and households with incomes below the national poverty level.

Areas having high concentrations of elderly and youth were also studied in order to identify possible needs for new or modified facilities and public involvement. Elderly is defined as TMA residents age 65 and older. According to the 2015 ACS, 105,972 persons (13.1% of the general population) in the TMA are age 65 and over. Most of this group is situated within the east and southeast sections of Tulsa's corporate limits.

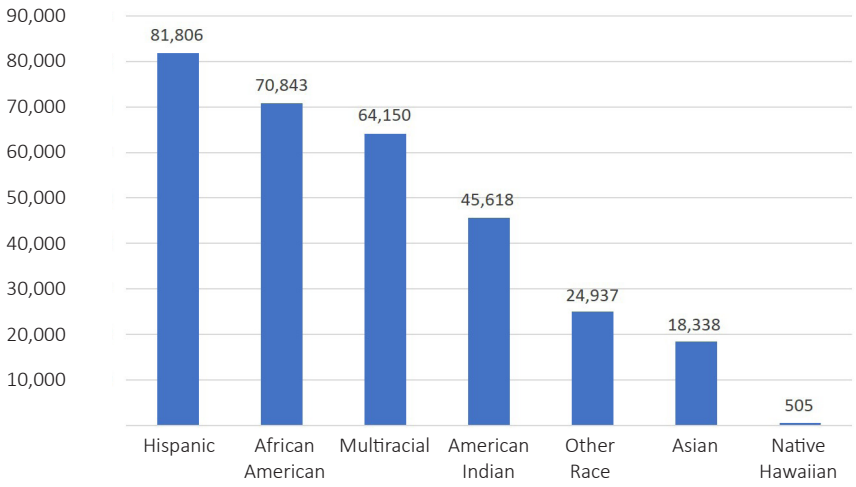
Figure 14. Elderly vs Youth Residents in the Tulsa TMA - ACS 2011-2015



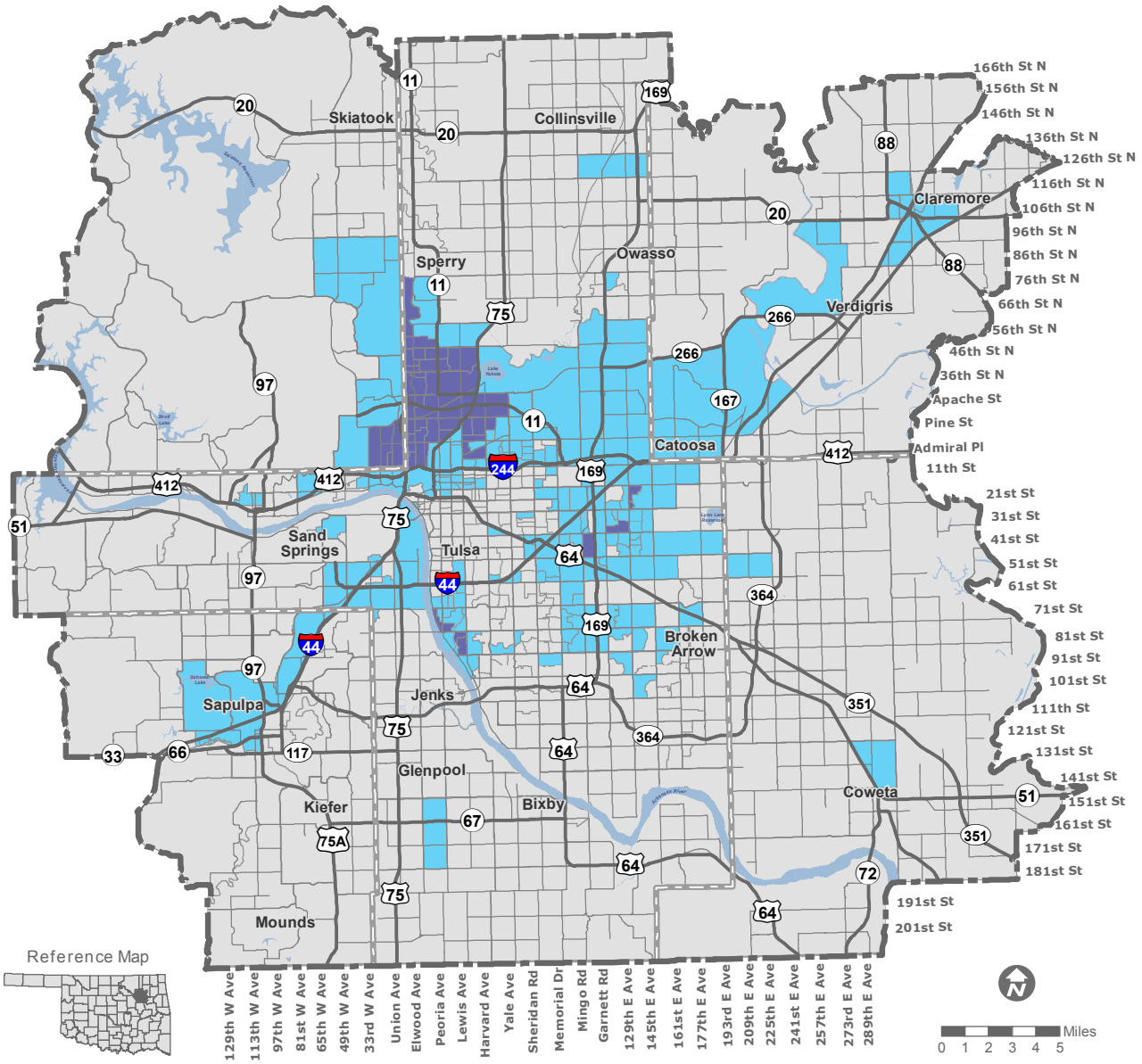
The youth demographic is often overlooked in the transportation planning process. Nearly 205,000 persons in the Tulsa TMA are younger than 18 (almost 25.4% of the population). A key indicator of youth possibly lacking adequate transportation is the number of single-parent female-headed households with children younger than 18. According to 2015 ACS data, there are nearly 29,000 single-parent, female-headed households in the TMA, and this group represents nearly 9.3% of the total households. Many persons in this category, according to most statistics, live in low-income areas with little or no means of reliable transportation. Therefore, access to transportation facilities, such as transit routes and on-street bikeways, is vital and creates a dual benefit that serves not only the parent, who may need transportation to commute to work, but also the youth who relies on safe transportation to school or community centers. Residents with a disability also account for a significant portion of the TMA population. More than 108,000 residents 5 years old or older have a reported disability, which accounts for 13.6% of the population.

INCOG staff utilize census data and maps displaying the geographic distributions of the socioeconomic groups relative to major highway and transit projects. This data is used to analyze the benefits and burdens of the RTP, the Public Transit – Human Services Coordinated Plan, and other proposed transportation projects in the Tulsa TMA on transportation-disadvantaged groups. Minority-population information obtained from 2015 ACS estimate showed that the TMA minority population was approximately 27.8% of the general population. The chart below presents the number of TMA residents who belong to each race/ethnicity classification.

Figure 15. Minority Race/Ethnicity Residents in the Tulsa TMA - ACS 2015



Minority Population Concentration within the Transportation Management Area



Legend

Index Value All Minorities

- Less than 1.00
- 1.00 to 1.99
- Greater than 2.00

Total population within the TMA = 804,758

Total All Minorities population within the TMA = 224,391

Percent All Minorities population within the TMA = 27.88%

The index value is the comparison of the percentage of the All Minorities population for the block group to the same percentage of the All Minorities population for the whole TMA. The higher the index number the greater the concentration of the All Minorities population.

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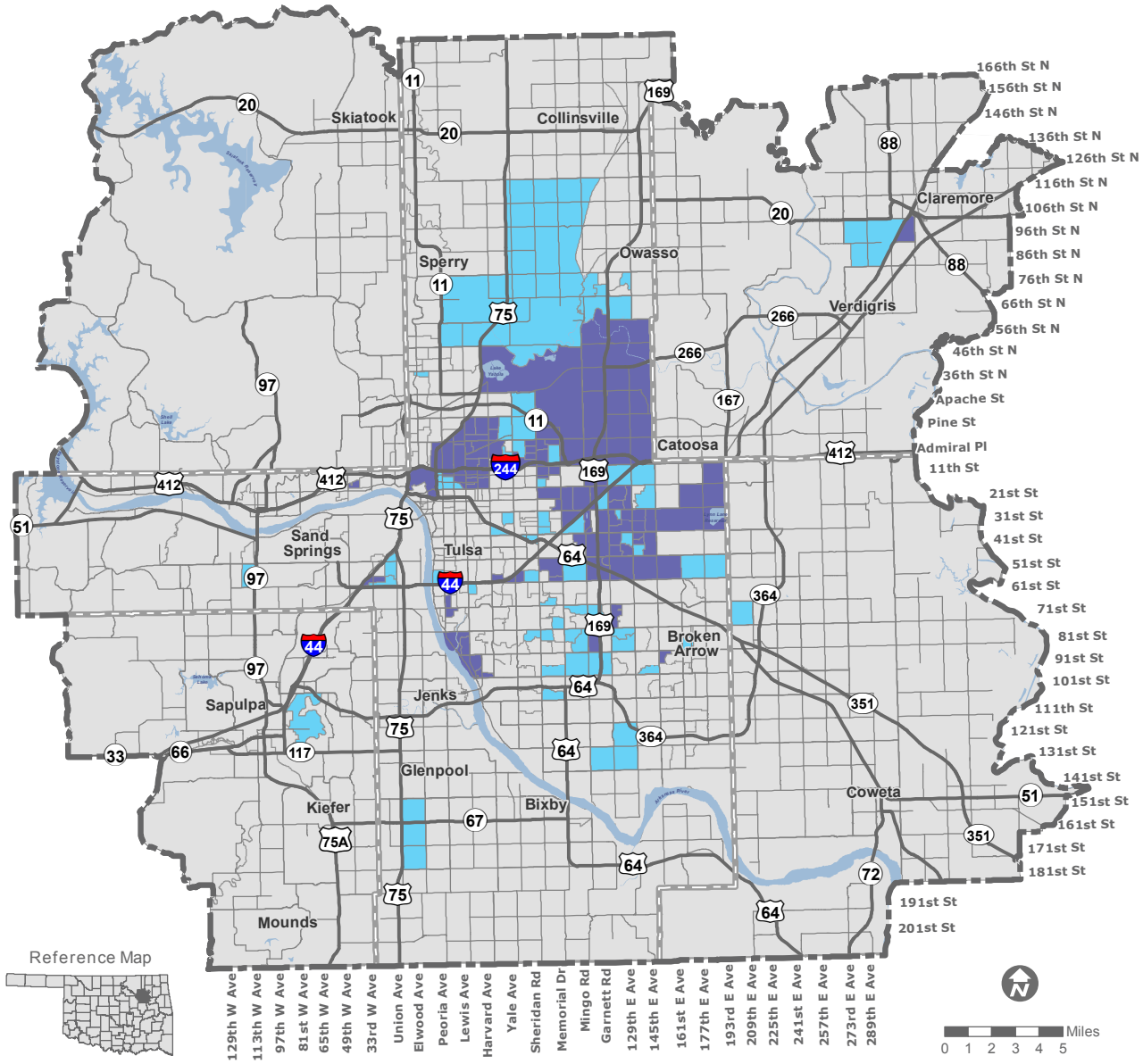
Concentration of Persons with Limited English Proficiency within the Transportation Management Area



Legend

Index Value Persons who speak English "not well" or "not at all"

- Less than 1.00
- 1.00 to 1.99
- Greater than 2.00

Total population 5 years and older within the TMA = 747,386

Total Population who speak English "not well" or "not at all" within the TMA = 19,267

Percent Population who speak English "not well" or "not at all" within the TMA = 2.58%

The index value is the comparison of the percentage of the population who speaks English "not well" or "not at all" for the block group to the same percentage of the population who speaks English "not well" or "not at all" for the whole TMA. The higher the index number the greater the concentration of the population who speaks English "not well" or "not at all."

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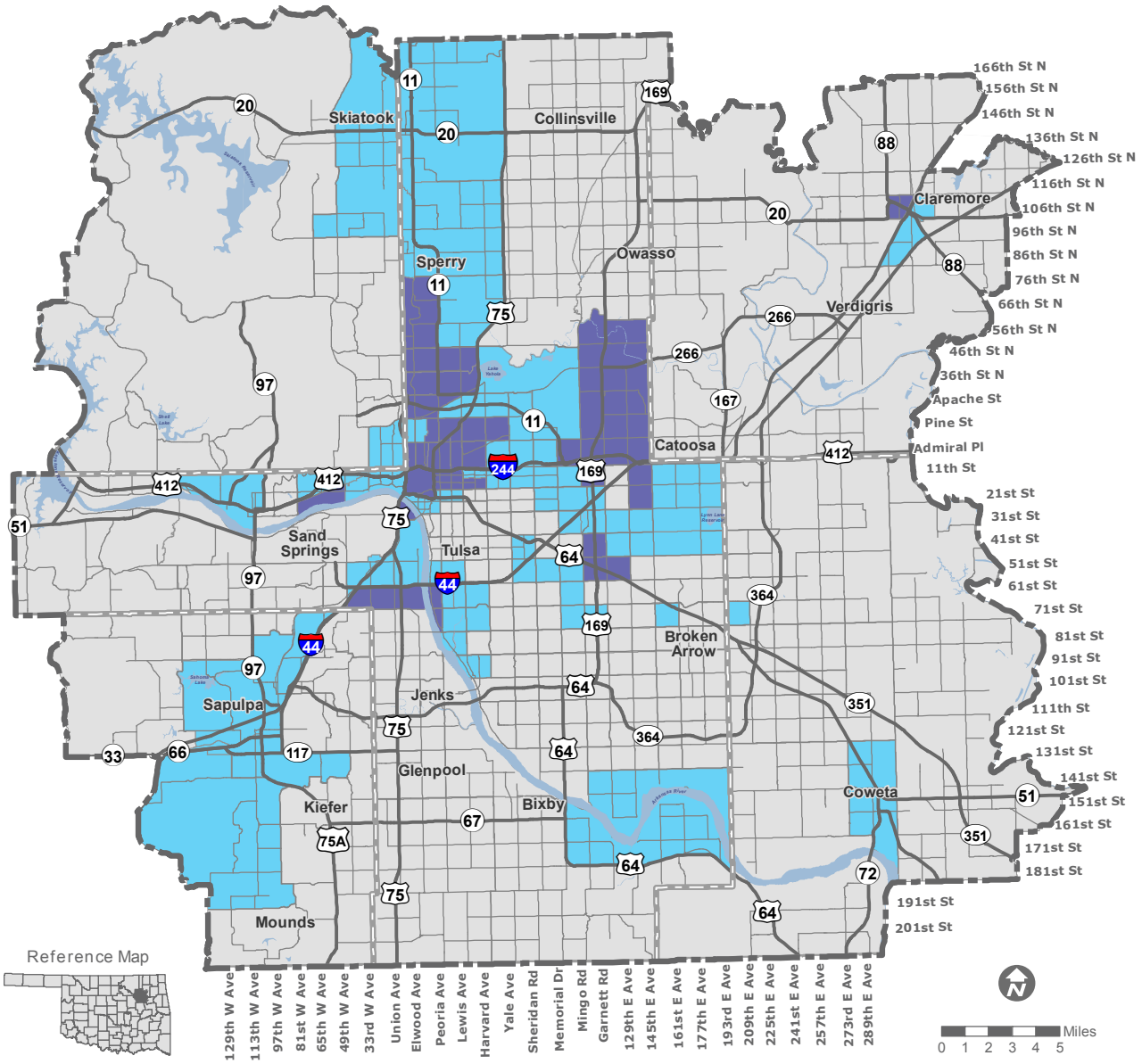
Concentration of Persons Below Poverty within the Transportation Management Area



Legend

Index Value Below Poverty

- Less than 1.00
- 1.00 to 1.99
- Greater than 2.00

Total population for whom poverty is determined within the TMA = 794,927

Total population below poverty within the TMA = 115,835

Percent population below poverty within the TMA = 14.57%

The index value is the comparison of the percentage of the population below poverty for the block group to the same percentage of the population below poverty for the whole TMA. The higher the index number the greater the concentration of the population below poverty.

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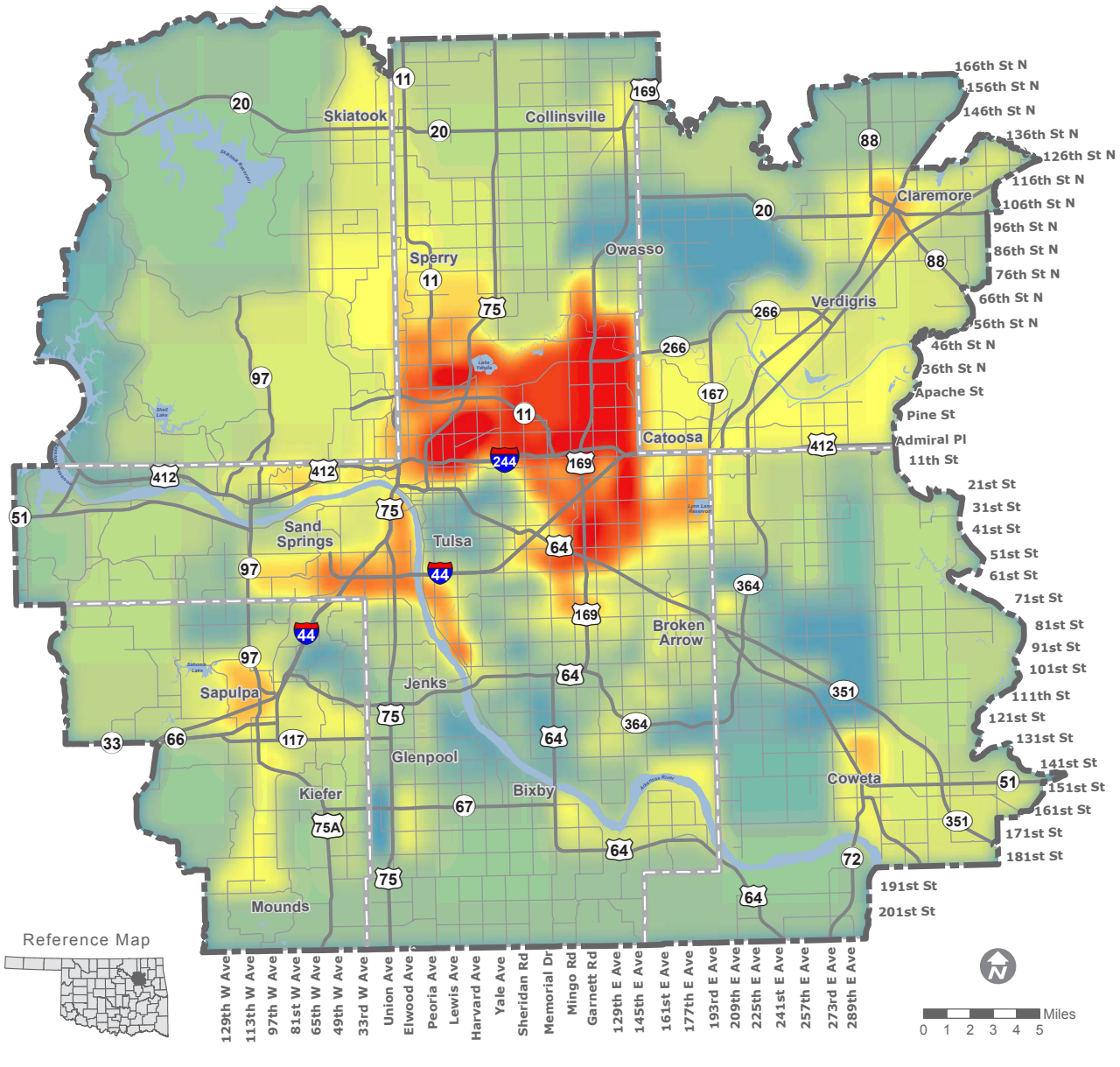
Socially Sensitive Areas
within theTransportation Management Area



Legend

Concentrations

Greater

Less

The map is a combination of all the environmental justice factors considered, including:

- African American race
- American Indian race
- Asian race
- Native Hawaiian race
- Some Other race
- Two or more races
- Hispanic origin
- Persons 65 years or older
- Persons under 18 years of age
- Persons with disabilities
- Persons below poverty
- Persons with limited English Proficiency
- Female headed households with kids

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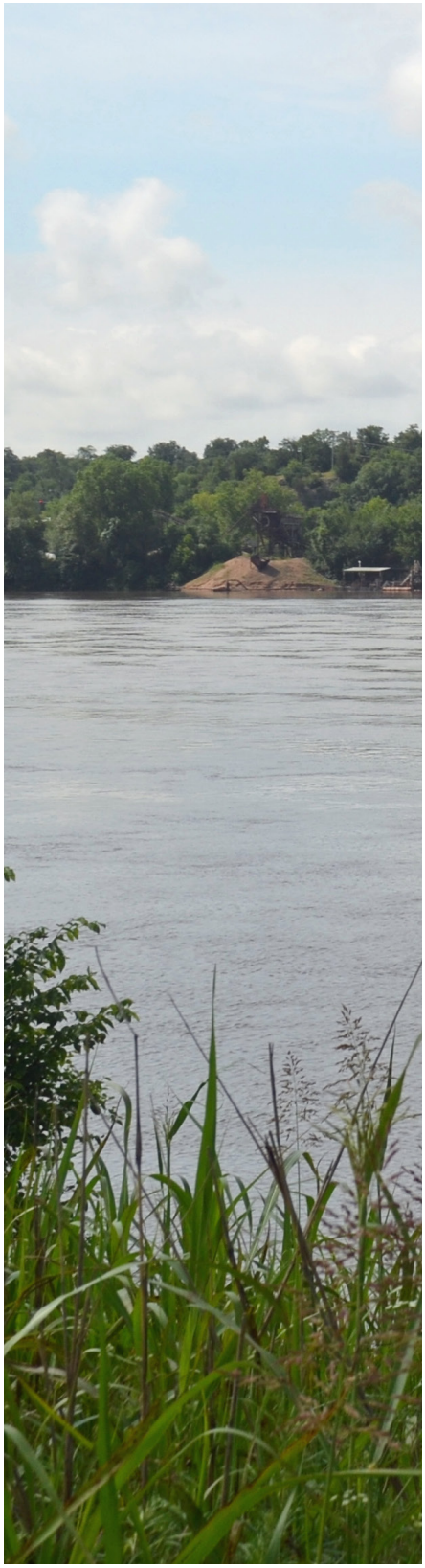
Natural Environment Review

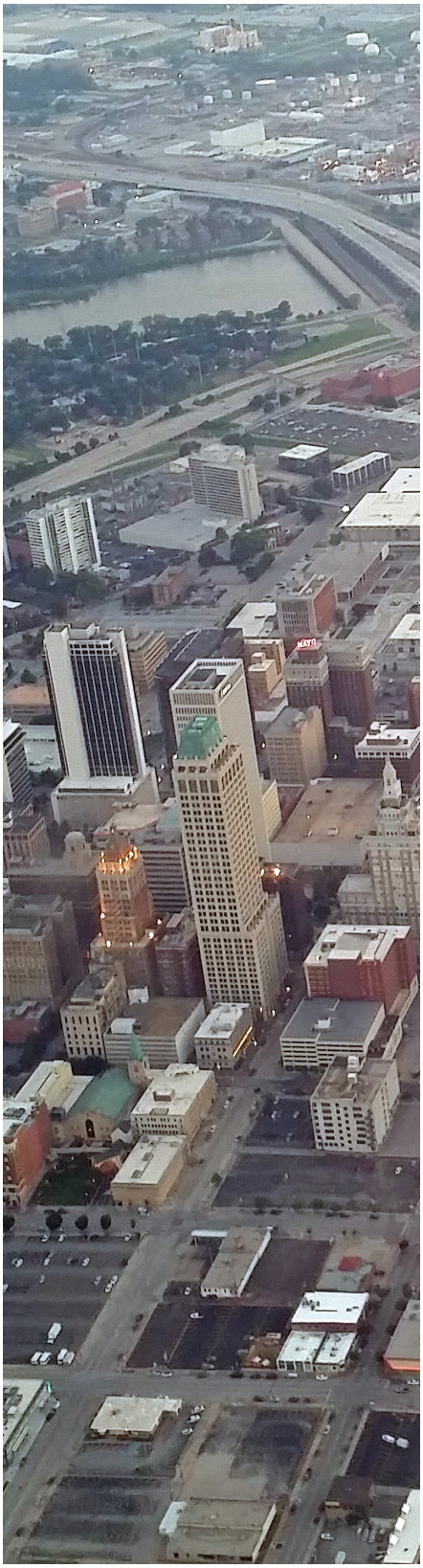
The natural environment is an important consideration in transportation planning. It is the purpose of this section to provide information that may expedite and enhance the planning, permitting, and implementation process for planned projects where environmental issues must be considered.

For the purpose of this section, various environmental considerations specific to the TMA were selected based on the data that was available for analysis on a regional basis:

- *Lakes, ponds, or other water bodies*
- *Impaired streams (including a 1⁄4 mile buffer)*
- *100-year floodplain*
- *McClellan-Kerr Navigation System (including bordering property owned by the Army Corps of Engineers)*
- *Bald Eagle habitat and nesting areas (including a one-mile buffer)*
- *Arkansas River Least Tern Preserve*
- *Parks (including a quarter-mile buffer)*
- *Skiatook Wildlife Management Area*
- *Oil and gas wells*
- *Keystone Ancient Forest (Sand Springs)*
- *Prime farmland*

These considerations were mapped, combined to create an index of environmentally sensitive areas, and compared with planned transportation projects for roadways, public transportation and bicycle/pedestrian facilities. Areas showing clusters of multiple considerations adjacent to planned projects were termed Environmentally Sensitive Areas (ESAs). These areas were considered in relation to planned roadway, bicycle/pedestrian, and public transportation projects.





Effects on ESAs by bicycle/pedestrian facilities and public transportation projects were mitigated during the planning process; however, these projects will still require permitting and interagency cooperation during implementation. Planned roadway projects were determined to have the greatest potential effects on ESAs. These projects will require more rigorous environmental reviews and cooperative strategies between federal, state, tribal and local agencies. It is recommended that all parties involved in any aspect of planned projects in ESAs engage the various state, tribal and federal permitting agencies early in the development of the transportation projects. INCOG will monitor the ESAs and project proposals to ensure the early and continuous involvement of all affected agencies.

As part of its long-term planning process, INCOG strives to ensure the preservation of historical archeological sites, as identified by the Oklahoma Archeological Survey (OAS) and in cooperation with the State Historic Preservation Office of the Oklahoma Historical Society. These sites range from prehistoric occupations dating back some 9,000 years to historic manifestations of the 1930s and 1940s. According to OAS, there are more than 1,650 prehistoric and historic archeological sites in the Tulsa TMA (184 in Creek County, 714 in Osage County, 330 in Rogers County, 170 in Tulsa County, and 253 in Wagoner County).

Although many of these sites fall some distance from urbanized areas, they remain as key features that will continue to have a bearing on the long-term directional growth patterns of the TMA. Comprehensive cultural resource studies should be undertaken with all transportation infrastructure projects.

Air Quality Consideration

Primary Pollutants, Hydrocarbons (HC), Nitrogen Oxides (NOx) and Carbon Monoxide (CO) are below the 2010 base year modeled estimates for the plan year 2045.

INCOG has transitioned to the Environmental Protection Agency (EPA) recommended MOVES Model to estimate mobile emissions. INCOG uses national setting for vehicle mix because of lack of complete inventory of vehicles by type and use at the present time.

Ozone Alert! ScoreCard

Consideration of air quality issues is vital to long-term transportation planning. Areas not in compliance with one or more of the six National Ambient Air Quality Standards (NAAQS) may be designated by the Environmental Protection Agency (EPA) as a federal non-attainment region. In addition to the impediment created by transportation conformity analysis requirements, federal nonattainment designation hinders regional economic growth. Through aggressive and significant voluntary emission reduction efforts, the Tulsa region has successfully remained in attainment with all federal air quality standards.

The Tulsa region's Ozone Alert! program and its multi-faceted public education and outreach efforts improve air quality by promoting voluntary strategies to reduce the emissions that create ground-level ozone (O3). The program's website, www.OzoneAlert.com , is a key resource providing regional air quality information including tips and strategies for reducing air emissions, geographically-based real-time air monitor data, and the ozone season's Scorecard which reflects daily monitor values as they relate to compliance with the EPA ozone standard.

The ozone Scorecard indicates when a monitor exceeds the standard as well as the first through fourth highest daily values for the five regional ozone monitors. The ozone standard is exceeded when any monitor records a daily value greater than 70 parts per billion (ppb). As the ozone season progresses, the fourth highest value for each monitor is averaged with the established fourth highest value from the two prior years, and a current three-year average Ozone Design Value is reflected daily. The Ozone Design Value must also be no greater than 70 ppb to meet the ozone standard. The ozone season daily ScoreCard provides a valuable educational resource and tool for public officials, media, and the general public.

Since 2015, the Tulsa area has experienced eight Ozone Alert! days, three of which took place in the summer of 2017, and only five of them catalogued as exceedance days. By comparison in 2011, the Tulsa Area experienced 25 Ozone Alert! and exceedance days, and 21 Ozone Alert! and 26 days in exceedance in 2012.

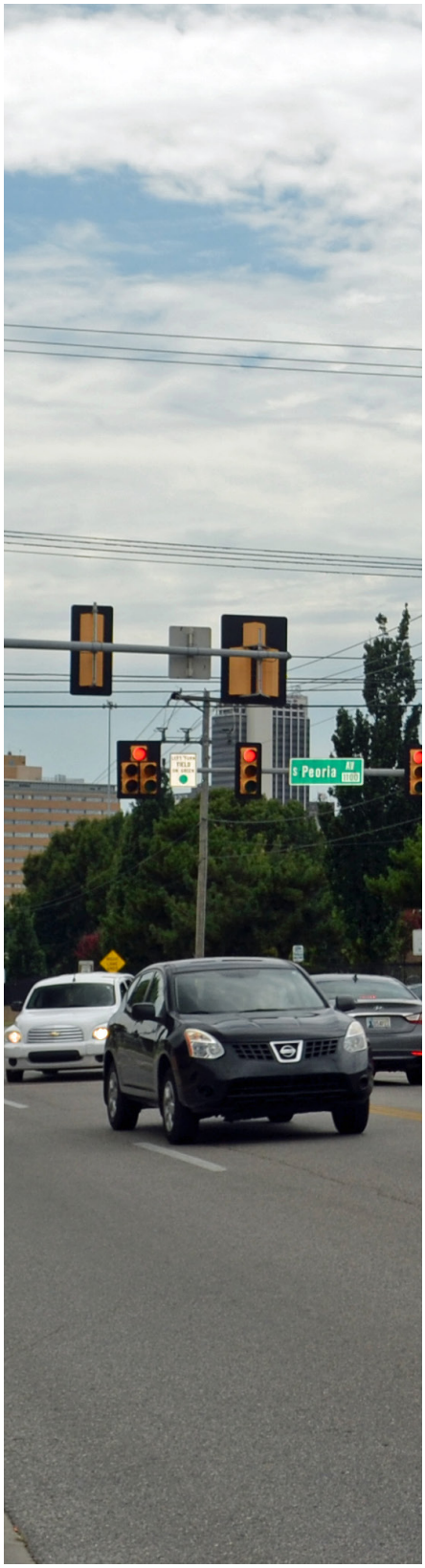


Figure 16. Ozone Alert! Scorecard

OZONE ALERT.COM
LET'S CLEAR OUR AIR

2017 SEASON OZONE SCORECARD

Tulsa Area Ozone Trends Chart

Exceedance Days: Sept. 14 — *Last updated 10/23/2017 at 7:45 am*

Monitor Site			2017 Highest 8-Hr Ozone Averages (ppm)* (1st through 4th highest daily readings)				DESIGN VALUE 3-Year Average of the 4th highest readings	
2014 4th High	2015 4th High	2016 4th High	1st Highest *date*	2nd Highest *date*	3rd Highest *date*	4th Highest *date*	*2014-2016 3-Yr Avg*	**2015-2017 3-Yr Average**
West (#144 Mannford)			.066 *2-Aug*	.065 *7-Apr*	.064 *7-Jun*	.064 *19-Jun*	*.064*	**.063**
.066	.063	.064						
East (#178 Lynn Lane)			.068 *26-May*	.068 *7-Jul*	.065 *3-Aug*	.064 *13-Sep*	*.063*	**.064**
.063	.065	.063						
Central (#1127 Tulsa)			.063 *7-Apr*	.063 *7-May*	.062 *8-May*	.062 *13-May*	*.065*	**.064**
.065	.068	.062						
North (#226 New Location in Skiatook)			.073 *14-Sep*	.065 *7-Apr*	.065 *8-May*	.064 *7-May*		
		.064						
South (#174 Glenpool)			.069 *23-Jul*	.066 *6-Jun*	.065 *7-Jun*	.063 *7-Apr*	*.062*	**.062**
.062	.061	.064						

An Ozone Exceedance = .071 ppm or greater
Exceedance days are unhealthy air days and shown in red in the table above.

The EPA Ozone Standard uses the Design Value: Although certainly concerning, exceedance days are not the same thing as 'violating the ozone standard'. The standard uses the 4th highest reading each year and averages it with the 4th highest readings from the two prior years. This 3-year average is called the Design Value. In the table above, the middle columns with dates show this year's 1st through 4th highest daily readings for each monitor. The 4th highest column is the one that counts at year end - the one that is averaged with the 4th highest readings from the two previous years. Each monitor's readings and averages are calculated uniquely and whichever Design Value is the highest becomes the area's Ozone Design Value.

A Violation of the ozone standard = Design Value .071 or greater.

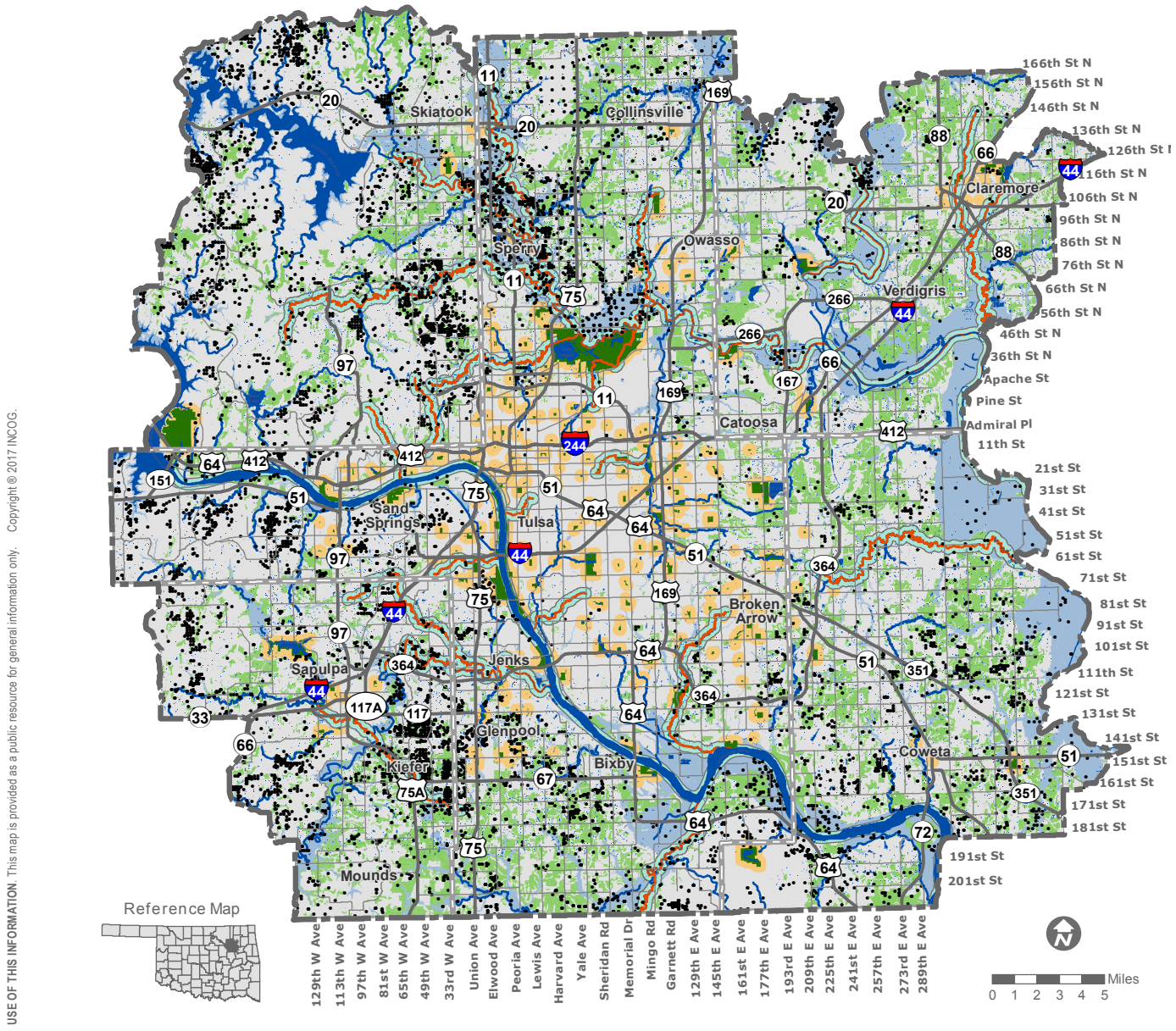
Our current Design Value is .064 ppm calculated by the CENTRAL monitor's averaging 2015's 4th high value (.068), 2016's 4th highest value (.062) and our 2017 current 4th highest reading of .062 ppm (the standard uses no rounding).

Does our 2015-2017 Design Value meet the EPA ozone standard? Yes.

*2017 data is preliminary and subject to change as a result of the ODEQ/EPA verification process

Source: http://ozonealert.org

Environmentally Sensitive Areas
within the Transportation Management Area



Legend

- Oil and Gas Wells
- Streams
- Bodies of Water

Impaired Streams

- Stream (Impaired)
- 1/4 mile buffer zone

Floodplains

- 100-year Floodplain

Parkland

- Park
- 1/4 mile buffer

Prime Farmland

- Prime Farmland

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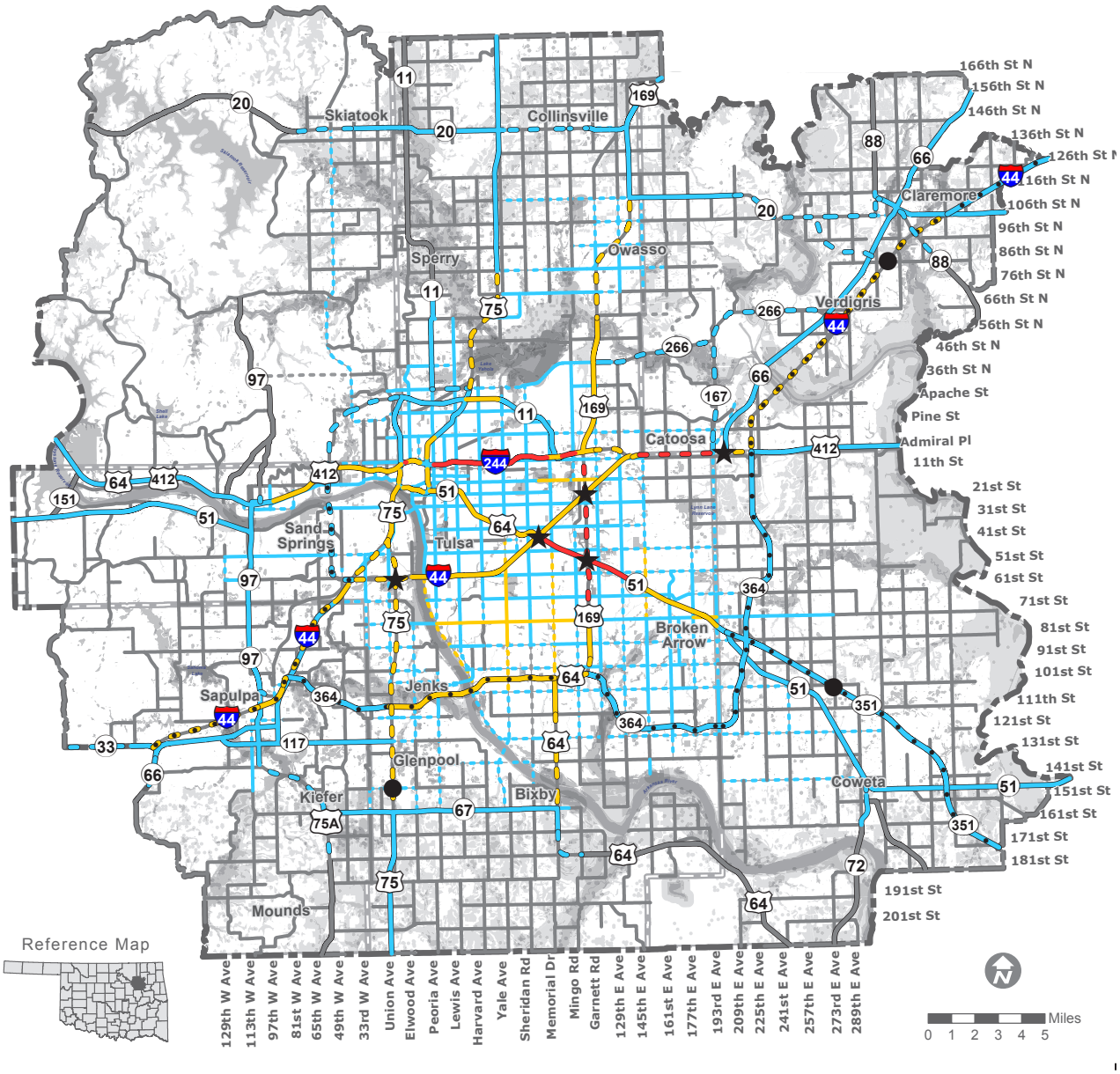
Environmentally Sensitive Areas with Planned Roadways



Legend

- Expressway Interchange
- Grade-Separated Interchange

Roadway Type

- Arterial
- Highway
- Turnpike

Roadway Status

- New/Changed Roadway
- No Roadway Changes

Roadway Through Lanes

- 2 Lanes
- 4 Lanes
- 6 Lanes
- 8 Lanes

Environmental Factors

- 1 Factor
- 2 Factors
- 3 Factors
- 4 Factors
- 5 Factors
- 6 Factors

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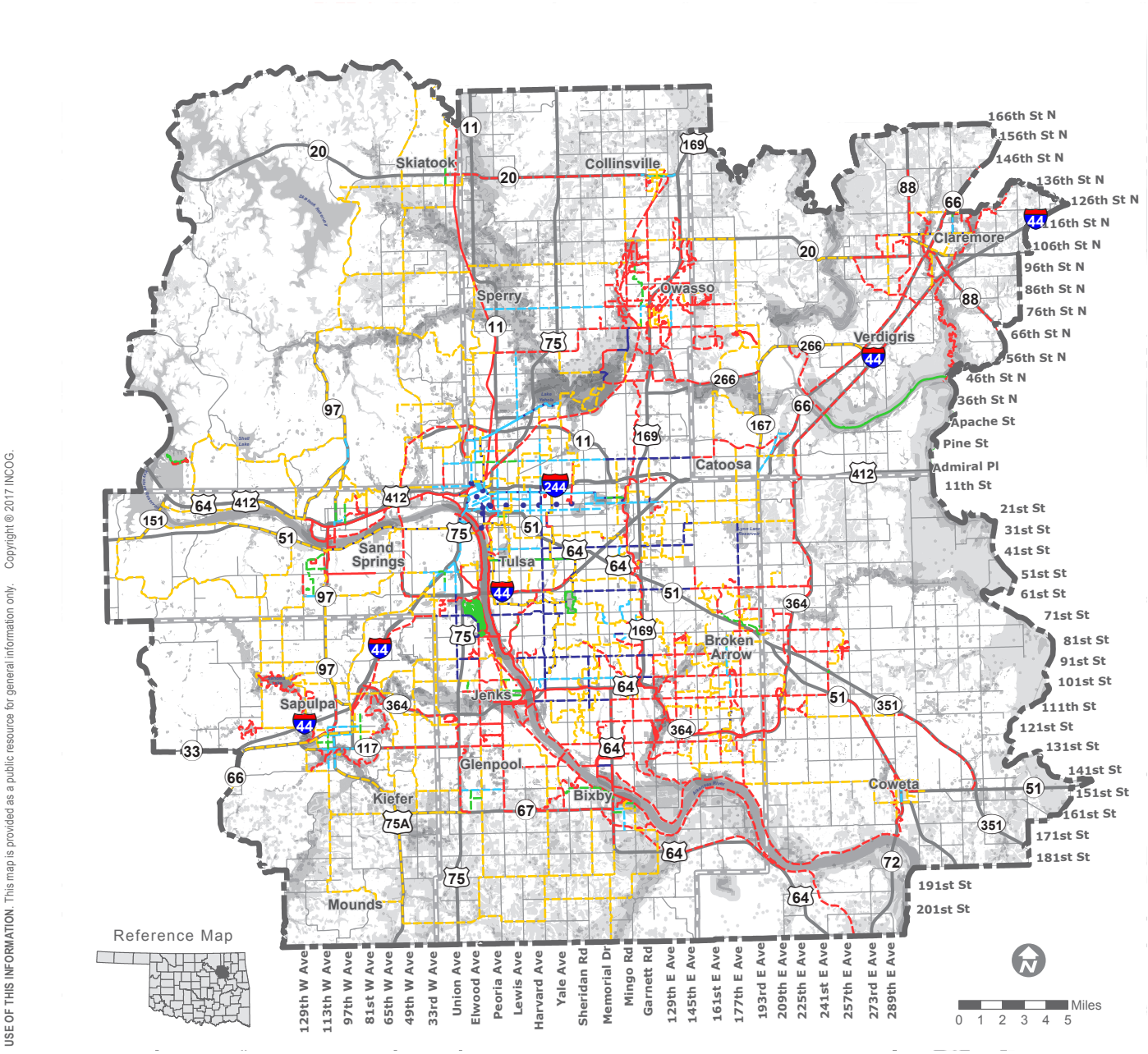
Environmentally Sensitive Areas with Existing and Planned Trails and Bikeways



Legend

GO Plan Recommendations

- Bike Lane/Buffered Bike Lane
- Bike Corridor
- Cycle Track
- Priority Shared lane/ Sharrow
- Signed Route
- Sidepath/Trail

Existing Trail Type

- Bike Lane
- Bikeway
- Trail
- Unpaved Trail

Environmental Factors

- 1 Factor
- 2 Factors
- 3 Factors
- 4 Factors
- 5 Factors
- 6 Factors

Connected 2045 Regional Transportation Plan

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Connected 2045: Technology Enhancements for Tulsa TMA

The Connected 2045 Transportation Plan will be updated every five years with specific improvements related to technological advances that will take place as they are deployed throughout the region.

Many of those projects will be common factors among metropolitan transportation choices people will adapt to make a safe and convenient transport for all involved. As public and private spending increases in areas that make it possible, deployment of technologies in the following areas is anticipated:

- ***Integrated Data Exchange.*** Data from multiple sources is coming together so we can make better decisions and solve problems more efficiently for more people.
- ***Connected Vehicles.*** Equipped cars that communicate with other cars with the same devices. This allows cars to "talk" to each other, notify drivers of possible problems, and avoid collisions.
- ***Common Payment.*** Pay once technology to get rid of unneeded complexity that affects lives every day.
- ***Multimodal Trip Planning.*** Trip planning is expected to be at one place with less time worrying how to get to destinations.
- ***Smart Mobility Hubs.*** Biking, driving and taking the bus are all great ways of getting around so several of these will be co-located – a hub – at select spots so residents can get to them – and onto where they need to go – more easily.
- ***Street Lighting.*** Light-emitting diode (LED) lights in the community can improve safety, and Wi-Fi connectivity with lighting operations is on the horizon.
- ***Collision Avoidance.*** A system that uses camera technology will spot potential human-bus collisions and alert bus drivers to it. That makes neighborhoods safer in the short run, and the data captured shapes bus system route decisions in the long run.
- ***Mobility Assistance.*** Helping people with cognitive disabilities get around by designing technology suited especially for them.

Source: Smart Columbus Initiative

- ***Enhanced Permit Parking.*** As our urban core flourishes, more visitors seek out downtown's amenities. Residents get tech-enabled parking permit that help city staff to quickly distinguish what vehicles belong where.

- ***Event Parking Management.*** With technology that tells users where parking exists and helps them access it, we'll get them there more directly, reduce congestion, and improve the experience of residents and visitors alike.

- ***Delivery Zone Availability.*** Real time answer to scheduling deliveries and coordination to make it easier and get goods where they need to go better.

- ***Connected Electric Autonomous Vehicles (CAV).*** CAV corridors will connect riders and potentially deliveries through popular retail and commercial hubs – to first and last mile stops. CAVS can make getting around safer.

- ***Truck Platooning.*** Expressways will be introduced to long-haul trucks coupled via sensors that let them "talk" to one other. This saves on fuel and reduces emissions.

- ***Oversize Vehicle Routing.*** Tulsa can become an even better place to do business when technology will provide a better guide to wide and tall trucks, giving drivers what they need to know to avoid low clearances and narrow corridors.

- ***Interstate Truck Parking.*** Trip planning can become safer and more efficient for long haul drivers when we work to build a platform for them that locates truck parking options.

Source: http://www.suratsmartcity.com

CONTACT INCOG

In developing the Connected 2045 Regional Transportation Plan, INCOG's Transportation Planning Division has concentrated on producing a document that is both useful and comprehensive. If during your review of this document you have any questions or need additional information, please feel free to contact the Transportation Planning Division using the contact information below.

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