Regional Transit System Plan

Final Report

October 2011

FAST FORWARD

Move the economy. Find A Solution with Transit.

INCOG
TWO WEST SECOND ST, SUITE 800 | TULSA, OK 74103
(918) 584-7526 (OFFICE) | (918) 583-1024 (FAX)

The Indian Nations Council of Governments (INCOG) is a voluntary association of local and tribal governments in the Tulsa metropolitan area in northeast Oklahoma. Established in 1967, INCOG is one of eleven Councils of Governments in the State of Oklahoma, and one of several hundred regional planning organizations across the country. INCOG provides planning and coordination services to assist in creating solutions to local and regional challenges in such areas as land use, transportation, community and economic development, environmental quality, public safety, and services for older adults.

Regional Transit System Plan

Final Report

PREPARED FOR:

Indian Nations Council of Governments (INCOG)

PREPARED BY:

Jacobs

IN ASSOCIATION WITH:

Whitehouse Group, Connetics Transportation Group,
BBP & Associates, ZigZag Planning and Design, Rex Public Relations,
Xposure Communications, Collective Strength

Adopted by the INCOG Transportation Technical Committee **September 21, 2011**
Adopted by the INCOG Transportation Policy Committee **September 29, 2011**
Adopted by the INCOG Board of Directors **October 13, 2011**

Special thanks to:

The Funder's Committee:

Doug Enevoldsen	*City Manager, City of Bixby*
Dave Wooden	*City Manager, City of Broken Arrow*
Mike Tinker	*City Manager, City of Jenks*
Rodney Ray	*City Manager, City of Owasso*
Rocky Rogers	*City Manager, City of Sand Springs*
Jeff Mulder	*City of Tulsa, Director of Public Facilities & Transportation*
Gary Corino	*Federal Highway Administration, Oklahoma Division Administrator*
Robert Patrick	*Federal Transit Administration, Region VI Administrator*
Bill Cartwright	*Metropolitan Tulsa Transit Authority, General Manager*
Gary Ridley	*ODOT, Secretary of Transportation*
Karen Keith	*Tulsa County, County Commissioner*
Mike Neal	*Tulsa Metro Chamber, President & CEO*
Rich Brierre	*INCOG, Executive Director*
Mark Liotta	*Tulsa County, Chief Deputy*

The Transportation Technical Committee:

Jared Cottle	*City of Bixby*
Tom Hendrix	*City of Broken Arrow*
Doug Alexander	*City of Catoosa*
Chris Cochran	*City of Claremore*
Vacant	*City of Collinsville*
Steve Whitlock	*City of Coweta*
Rick Malone	*City of Glenpool*
Robert Carr	*City of Jenks*
Roger Stevens	*City of Owasso*
Derek Campbell	*City of Sand Springs*
David Gilliland	*City of Sapulpa*
David Truelove	*Town of Skiatook*
Brent Stout	*City of Tulsa, Project Planning*
Mark Brown	*City of Tulsa, Traffic Engineering, Acting Chairman*
Newt Stephens	*Commissioner, Creek County*
Scott Hilton	*Commissioner, Osage County*
Mike Helm	*Commissioner, Rogers County*
Tom Rains	*Tulsa County Engineer*
Tim Kelley	*Commissioner, Wagoner County*
Chad Smith	*Cherokee Nation Principal Chief*
A. D. Ellis	*Creek Nation Principal Chief*
R.J. Walker	*Osage Nation*
Matt Meyer	*Pedestrians/Bikeways*
Liann Alfaro	*Metropolitan Tulsa Transit Authority*
Jon McGrath	*Railroad Interest*
Jeff Mulder	*Tulsa Airport Authority*
David Yarbrough	*City of Tulsa-Rogers County Port of Catoosa*
Richard Smith	*INCOG Air Quality Committee*
Rhonda Jeffries	*Oklahoma State Department of Environmental Quality*
Randle White	*ODOT, Division VIII Engineer*
Ken LaRue	*ODOT, Transit Programs Division*
Craig Moody	*ODOT, Transportation Division*
Rich Brierre	*Executive Director, Indian Nations Council of Governments*

Non-voting Members:

Jeff Riley	*Environmental Protection Agency, Region 6*
Bill Bell	*Federal Aviation Administration*
Isaac Akem	*Federal Highway Administration*
Pearlie Tiggs	*Federal Transit Administration*

The Transportation Policy Committee:

Doug Enevoldsen	*City of Bixby*
Mike Lester	*City of Broken Arrow*
Sandy Meyers	*City of Catoosa*
Daryl Golbek	*City of Claremore*
Steve Tinker	*City of Collinsville*
Robbie Morton	*City of Coweta*
Ed Tinker	*City of Glenpool*
Mike Tinker	*City of Jenks, Vice-Chairman*
Wayne Guevara	*City of Owasso*
Rocky Rogers	*City of Sand Springs*
Tom DeArman	*City of Sapulpa*
Martin Tucker	*Town of Skiatook*
Paul Zachery	*City of Tulsa, Public Works*
Newt Stephens	*Commissioner, Creek County*
Scott Hilton	*Commissioner, Osage County*
Mike Helm	*Commissioner, Rogers County*
Tim Kelley	*Commissioner, Wagoner County*
Chad Smith	*Cherokee Nation of Oklahoma*
A. D. Ellis	*Creek Nation of Oklahoma*
John Red Eagle	*Osage Nation of Oklahoma*
Bill Cartwright	*Metropolitan Tulsa Transit Authority*
David Giacomo	*Tulsa Parking Authority*
Jon McGrath	*Railroad Interest*
Jeff Mulder	*Tulsa Airport Authority*
David Yarbrough	*Tulsa-Rogers County Port of Catoosa*
Jim Hazeldine	*Oklahoma Turnpike Authority*
Richard Smith	*INCOG Air Quality Committee*
Craig Moody	*ODOT, Transportation Division*
John Bowman	*ODOT, Planning and Research Division*
Carlisle Mabrey III	*Oklahoma Transportation Commission, District 1*
Peter Regan	*Oklahoma Transportation Commission, District 8*
Rich Brierre	*Indian Nations Council of Governments Board of Directors*
John Shivel	*Tulsa Metropolitan Area Planning Commission*

Non-voting Members:

Mike Neal	*Tulsa Metro Chamber*
Mark Brown	*Technical Advisory Committee, Acting Chairman*
Edward Agnew	*Federal Aviation Administration (OK)*
Gary Corino	*Federal Highway Administration*
Pearlie Tiggs	*Federal Transit Administration*

The Board of Directors:

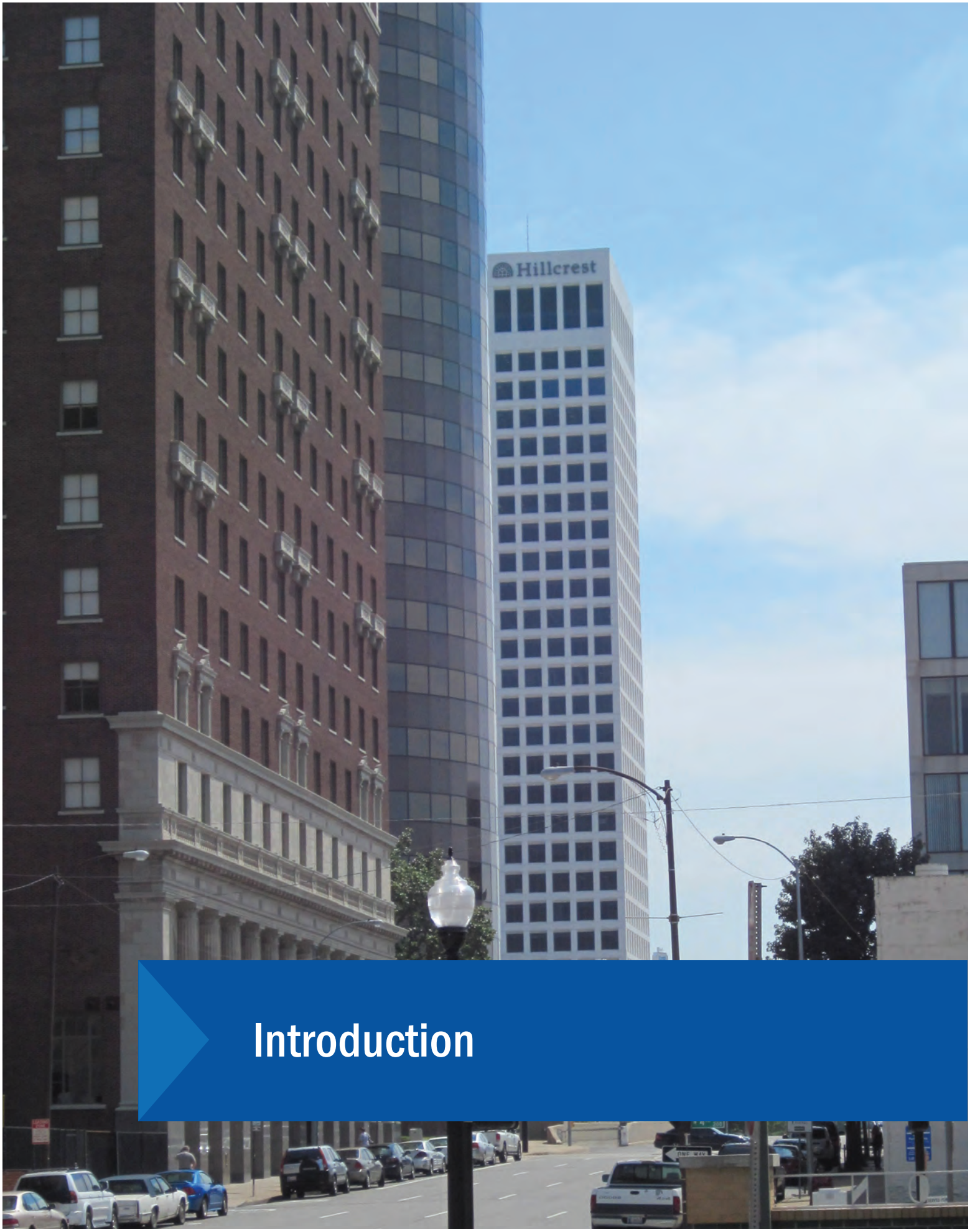
John Selph	*Chairman, Tulsa County*
Richard Carter	*Councilor, Broken Arrow*
John Smaligo	*Commissioner, Tulsa County*
Vic Vreeland	*Mayor, Jenks*
Ray Bowen	*Mayor, Bixby*
Ed Slyman	*Council Member, Bristow*
Mike Lester	*Mayor, Broken Arrow*
Sandy Myers	*Mayor, Catoosa*
Mickey Perry	*Mayor, Claremore*
Stan Sallee	*Mayor, Collinsville*
Robbie Morton	*Mayor, Coweta*
Johnny Burke	*Commissioner, Creek County*
Newt Stephens	*Commissioner, Creek County*
Danny Gann	*Commissioner, Creek County*
Mike Nunneley	*Creek County Towns, Creek County*
Tommy Carner	*Mayor, Glenpool*
Charles Fairweather	*Mayor, Hominy*
Kevin Dellinger	*Secretary of the Nation, Muscogee (Creek) Nation*
Jim Clark	*Commissioner, Osage County*
Scott Hilton	*Commissioner , Osage County*
Bob Jackson	*Commissioner, Osage County*
John Red Eagle	*Principal Chief, Osage Nation*
Wayne Guevara	*Council Member, Owasso*
Travis Finely	*Council Member, Pawhuska*
Dan DeLozier	*Commissioner, Rogers County*
Mike Helm	*Commissioner, Rogers County*
Kirt Thacker	*Commissioner, Rogers County*
Mike Burdge	*Council Member, Sand Springs*
J.D. Prather	*Trustee, Skiatook*
Dewey Bartlett	*Mayor, Tulsa*
Clift Richards	*Auditor, Tulsa*
Maria Barnes	*Council Member, Tulsa*
Bill Christiansen	*Council Member, Tulsa*
Jack Henderson	*Council Member, Tulsa*
Roscoe Turner	*Council Member, Tulsa*
Rick Westcott	*Council Member, Tulsa*
Karen Keith	*Commissioner, Tulsa County*
Fred Perry	*Commissioner, Tulsa County*
Stanley Glanz	*Sheriff, Tulsa County*
Earlene Wilson	*County Clerk, Tulsa County*
Bob Dick	*Tulsa County, Tulsa County*
Wes Smithwick	*Tulsa County*
Robert Breuning	*Tulsa County Towns*
Keith Crawford	*Mayor, Verdigris*
Chris Edwards	*Commissioner, Wagoner County*
James Hanning	*Commissioner, Wagoner County*
Tim Kelley	*Commissioner, Wagoner County*
Richard Keck	*Wagoner County Towns*

Contents

Tables and Figures

List of Figures

List of Tables



Introduction

Introduction

Project Background

Transportation investments throughout Tulsa history have facilitated economic viability and growth patterns during decades of urbanization. The earliest transportation establishment, predating the city's incorporation in 1898, was the initial development of a freight rail line spurring new investment in 1882.

The historical and existing networks of freight rail, streetcar tracks, arterial roadways, interstate highways, bridges, bus service, airports and river ports have helped support regional prosperity, development and growth in the Tulsa region.

Facing new and evolving challenges and opportunities, agencies and institutions have 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), under the direction of the Indian Nations Council of Governments (INCOG) provides the groundwork for establishing effective transit service within the region over the next 25 years.

As the first-ever public transportation system plan for the Tulsa region, the RTSP builds off the forward-thinking momentum created by PLANiTULSA, the City of Tulsa's long-range comprehensive plan, and focuses on transit for the region's communities including Tulsa, Bixby, Broken Arrow, Jenks, Owasso and Sand Springs as well as the rest of the Tulsa Transportation Management Area.

INCOG and various member communities in the Greater Tulsa Region initiated a RTSP to be developed to identify and prioritize high capacity transit corridors likely to require additional capacity over the next decades of growth. The RTSP will inform policy decisions in the region towards strategies which maximize efficient allocation of scarce resources. The RTSP process involved significant public participation to ensure that the options chosen are consistent with local community input.

Project Purpose

The RTSP institutes a comprehensive, long range, realistic system of transit corridors to help meet the region's transportation need 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.

In order to be eligible for Federal funding, capital-intensive transportation projects must emerge from a regional, multimodal transportation planning process. The comprehensive planning approach to the RTSP includes agency, stakeholder and public involvement, transportation needs assessment, identification and analysis of high capacity transit corridors, identification of high capacity transit technology, and evaluation of the existing bus system and identification of future bus service improvements.

The plan identifies and prioritizes the region's highest traffic areas, followed by an analysis of alternative transportation modes and recommendations for future public transportation needs. This is the first step to identify a financially-viable public transportation program for the greater Tulsa area.

Several guiding principles established the framework of progress towards the final RTSP. The RTSP guiding principles included:

- Achieve Regional Consensus
- Enhance Mobility
- Ensure Fiscal Responsibility
- Consider Appropriate Technologies
- Examine Effects on Corridors
- Consider Economic Development

In order to achieve a comprehensive transit vision for the community, the RTSP included a multi-faceted planning process. The RTSP planning process included two major components, extensive public outreach and data-driven technical research.

Organization of the Report

The progressive development of the RTSP, initiated in November 2010 and concluded in June 2011, guided the organization of this study report.

- **Chapter One** provides an introduction and overview of the project background, study purpose, approach and background information.
- **Chapter Two** outlines the development process, guiding principles and goals and objectives of the RTSP process.
- **Chapter Three** documents the innovative and wide-reaching public participation achieved throughout the development of the RTSP.
- **Chapter Four** includes an overview of the existing and anticipated local conditions which is comprised of future regional growth, mobility trends and assessments of the existing transit system, institutional and funding situations.
- **Chapter Five** includes an assessment of the regional needs and the corridor evaluation process.
- **Chapter Six** integrates the preferred alternatives into an overall regional transit system plan for the Tulsa Transportation Management Area.
- **Chapter Seven** provides implementation strategies and recommendations for the region to execute a range of bus service improvements and initiate high capacity transit service.
- **Appendices** to the report include supplemental documentation of the Needs Assessment Report, media coverage and public involvement results.

INCOG Region & Study Area

The study area assessed during the RTSP process included the entire area of the Tulsa Transportation Management Area (TMA), depicted by Figure 1.1. The Tulsa region is located in the northeastern corner of Oklahoma, approximately 100 miles northeast of Oklahoma City. The Tulsa TMA is comprised of 1,400 square miles, including all of Tulsa County and the adjacent urbanized parts of Creek, Osage, Rogers and Wagoner counties. It contains 18 incorporated municipalities, including: Bixby, Broken Arrow, Catoosa, Claremore, Collinsville, Coweta, Glenpool, Jenks, Kiefer, Liberty, Mounds, Owasso, Sand Springs, Sapulpa, Skiatook, Sperry, Tulsa and Verdigris; which have been considered in the development of the RTSP. This study evaluates and identifies high capacity transit corridors and a range of transit alternatives for transportation investments along major corridors in the TMA. The planning horizon for this study is the year 2035.

1 – Oklahoma Dept of Commerce 2000-2010 Census Counts

Many of the suburban and rural communities in the study area feature historic Main Streets, rich in history and local ownership. Often, residential development is based around the commercial and cultural centers located in the downtown district. Each municipality included within the RTSP provides unique resources, attractions and amenities for the region. Brief descriptions of the larger municipalities and communities with populations of 15,000 or greater included in the RTSP can be found below.

Tulsa

The City of Tulsa is the second most populous city in the state of Oklahoma and has the largest population and employment centers within the study area. Located on the banks of the Arkansas River, this 187 square mile city resides in the center of Tulsa County and extends to portions of Osage and Wagoner counties.

The population has remained fairly constant from approximately 393,049 in 2000 to 391,906 in 2010; a difference of approximately -0.3%[1].

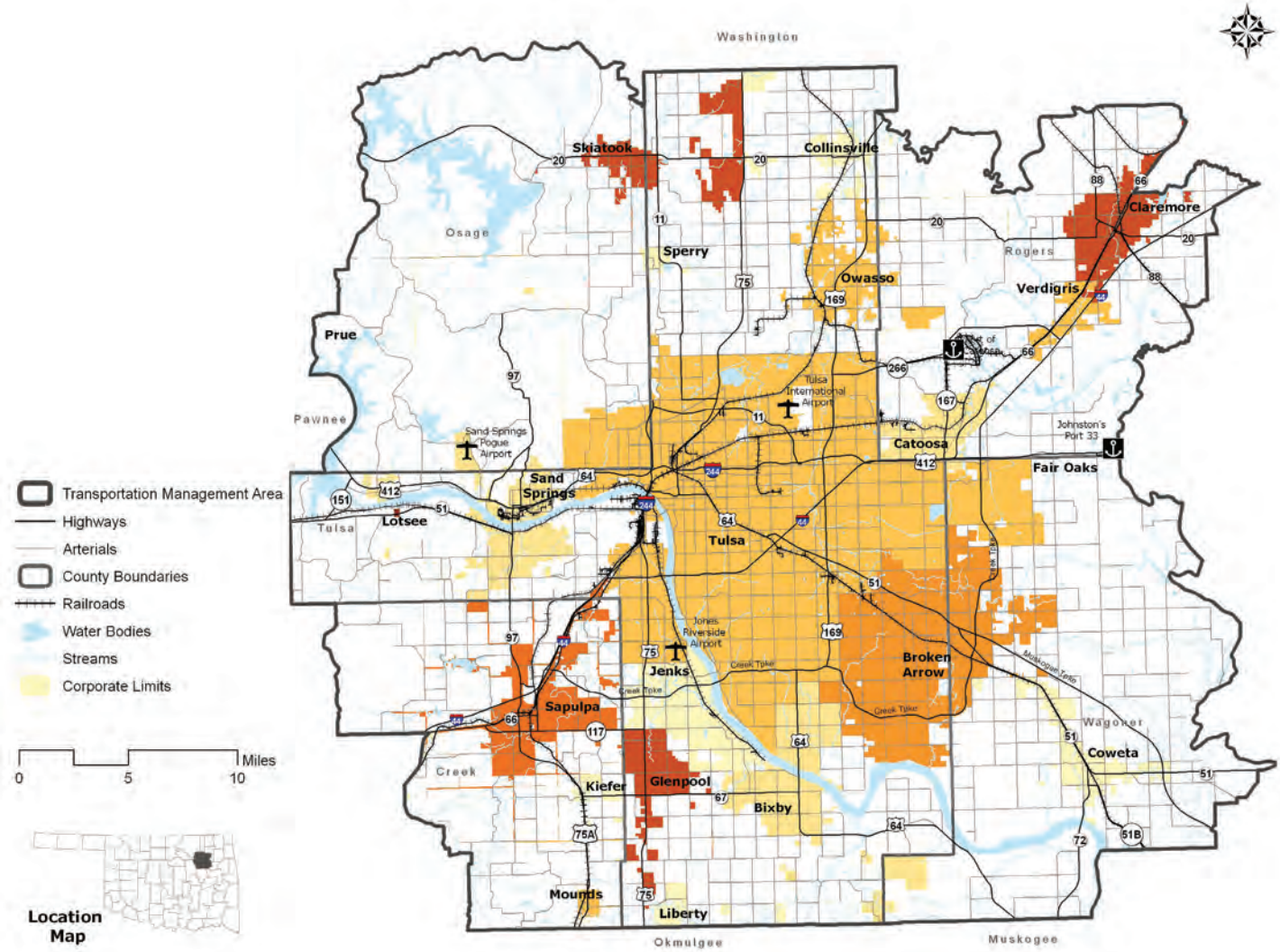
Known as the center for arts in Oklahoma, Tulsa has one of the largest concentrations of art deco architecture in the country as well as one of the largest collections of art and artifacts of the American West. Known as one of "America's Most Livable Communities" the city also boasts a diversified business base including: aerospace, telecommunications, manufacturing, construction, technology, healthcare, transportation and energy industries.

The City of Tulsa also contains several institutes of higher education, including: the University of Tulsa, Oral Roberts University, Oklahoma State University – Tulsa, University of Oklahoma - Tulsa, Langston University, and Tulsa Community College. The Tulsa Port of Catoosa, a major employment center of the region, is acclaimed as one of the largest, most inland river-ports in the United States.

Bixby

The City of Bixby is one of the fastest growing communities in Oklahoma. Bordering south Tulsa, the population has grown from approximately 13,336 in 2000 to 20,884 in 2010 (approximately 56.%)[1]. Bixby's total area is approximately 24 square miles and it is primarily served by US Highway 64 (South Memorial Drive) and State Highway 67 (151st Street South). The SpiritBank Event Center serves as a major attraction for regional residents hosting numerous concerts and events. US Highway 75, seven miles west of Bixby, I-44 (Turner Turnpike), eight miles north, and Highway 169 connects the Bixby area to the region.

Figure 1.1 : Tulsa Transportation Management Area



Broken Arrow

The city of Broken Arrow is the largest suburb of the City of Tulsa and fourth largest city in the state. Broken Arrow is located in southeast Tulsa County and extends into western Wagoner County. The city covers approximately 46 square miles and serves a growing population of approximately 74,859 in 2000 to 98,850 in 2010 (an increase of 32%)[1]. Broken Arrow contains the third largest concentration of industries within the state located along the Broken Arrow Expressway between I-44 and 166th East Avenue.

Primary highway facilities serving the Broken Arrow area are State Highway (SH) 51 (Broken Arrow Expressway) and the Creek Turnpike. Broken Arrow contains several of the region's major activity centers including: Bass Pro Shopping Area, the Shops at Broken Arrow, Broken Arrow Performing Arts Center, and the campuses of Tulsa Technology Center – Southeast and Northeastern State University - Broken Arrow.

Claremore

The City of Claremore is well known as the birthplace of Oklahoma's favorite son, Will Rogers. Known for its, family oriented community and groups, quiet neighborhoods and vibrant cultural activities. Claremore is located on the historic Route 66, approximately 25 miles to the northeast of Tulsa. It is also a major intersection of highways in the region, with I-44 crossing the city to the southeast and State Highways SH-88 and SH-20 intersecting outside of downtown Claremore.

The city has shown consistent population growth from 2000 to 2010, increasing in size from approximately 15,873 to 18,581 (17%)[1] during that time.

Jenks

The City of Jenks is located in Tulsa County, approximately eight miles south of the City of Tulsa, between the Arkansas River and US Route 75. Since the 2000 Census, the city of Jenks

1 – Oklahoma Dept of Commerce 2000-2010 Census Counts
2 – Tulsa Regional Coordinated Public Transit – Human Services Transportation Plan (May 2007)

has been one of the fastest growing cities in Oklahoma. The population has grown by 77%, from approximately 9,557 in 2000 to 16,924 in 20101.

It is only minutes away from Tulsa and has experienced much of its economic and employment growth from new families seeking to move into the emerging suburban community. The city offers regional tourist attractions such as: The Oklahoma Aquarium, drawing over a half million visitors annually; Riverwalk Crossing – northeastern Oklahoma's only riverfront shopping and entertainment district; and a vintage Main Street that has been known for many years as the "Antique Capital of Oklahoma". Jenks was also rated as the 43rd Best Place to Live in the United States by Money Magazine (2007).

Owasso

Owasso is a city with a total area of approximately 16 square miles and is located to the north of the City of Tulsa, with areas in both Tulsa and Rogers Counties.

It is one of the fastest growing communities in the state of Oklahoma with the population growing by approximately 56% from 2000 (18,502) to 2010 (28,915)[1]. One of the city's key industrial attributes is accessibility. Air, water and highway transportation are within reasonable distances, making the city a major part of the northeastern Oklahoma transportation hub. Owasso has direct access to State Highways 20 and 266 and US Highway 169. The area attracts many nearby residents to shopping and employment destinations within Owasso such as the Smith Farm Marketplace, Cherokee Industrial Park and American Airlines maintenance facility and Port of Catoosa.

Sand Springs

Sand Springs is approximately 22 square miles and located in Northeast Oklahoma, six miles west of Tulsa. The population has grown from approximately 17,451 in 2000 to 18,906 in 2010[1].

The area is served most directly by State Highways 51 and 7 and US Highway 412. The City owns and operates an 18-hole golf course, The Canyons at Blackjack Ridge, and the Sand Springs-Pogue Airport under the Sand Springs Municipal Authority. Other popular attractions include capitalizing on the many local parks, forests and trails as well as proximity to the Arkansas River. The west campus of Tulsa Community College also resides within Sand Springs.

Sapulpa

The 19 square mile city of Sapulpa directly abuts the western edge of Tulsa. The population has grown from approximately 19,166 in 2000 to 20,544 in 2010 (7%)[1]. The oil boom, the Frisco railroad, and the addition of two brick and four glass plants all combined to transform Sapulpa from a sleepy little village in Indian Territory to a bustling community of 20,000 by the mid-1920s.

"Sapulpa Station", as the city originated, was located at the juncture of two railroads. Better known today as "The Crossroads of America", the city is near the convergence of five (5) interstate, state and local highways, providing prime connection to the regional transportation system. One of these highways is the historic Route 66, which travels east-west through Sapulpa's historic downtown district. Vehicles traveling towards Tulsa from the south or southwest must travel through Sapulpa to reach Tulsa and points east.

Public Transportation Service Area

Projected population and employment growth across-the-board within the study area without a corollary increase to public transportation opportunities will lead to a greater population of underserved transit dependent citizens and choice riders.

The Federal Transit Administration (FTA) defines transit dependent persons as those 1) without private transportation; 2) elderly (over age 65); 3) youths (under age 18); or 4) persons below poverty or median income levels defined by the U.S. Census Bureau.

A significant percentage of the individuals within the Tulsa TMA have special mobility needs including people 65 years and older (12%), people 5 years and older with a disability (19%) and individuals below the poverty level (11%). By 2030, the population with disabilities has been projected to remain stagnant, while the percentage of individuals below the poverty level has been projected to increase by 10% and the median age of residents is also projected to increase.[2]

Future Changes and Updates

The RTSP was developed in consideration of existing conditions and long term projected regional needs. Due to the nature of long range planning, not all elements of growth and decline can be predicted, and therefore, as updated data and information become available, INCOG will review the RTSP and associated plan recommendations every five years. This periodic update

1 – Oklahoma Dept of Commerce 2000-2010 Census Counts
2 – Tulsa Regional Coordinated Public Transit – Human Services Transportation Plan (May 2007)

will allow INCOG to prioritize and align transit investment decisions to coincide with other regional projects and priorities.

Summation of Previous Studies and Plans

Facing new and evolving challenges and opportunities, agencies and institutions have taken the opportunity to engage the public, study alternative transportation solutions and create community visions to help guide regional success. A collection of these studies, reports and plans have influenced the development of the INCOG Regional Transit System Plan. Investigation of these documents allows the project team to develop an informed and comprehensive plan by maintaining consideration for future plans and objectives of regional entities. Previous regional studies and projects related to the Regional Transit System Plan are summarized below.

Previous Plans and Studies reviewed for relevance to the Regional Transit System Plan include:

- Regional Transportation Plan 2032 - INCOG (2011)
- Tulsa Transit Bus Service Needs Assessment - Metropolitan Tulsa Transit Authority (2010)
- PLANiTULSA: Tulsa Comprehensive Plan - City of Tulsa (2010)
- Downtown Area Master Plan - City of Tulsa (2010)
- Rail Transit Strategic Plan-INCOG (2008)
- Transportation Planning Capacity Building Peer Exchange: The Land Use and Transportation Connection - INCOG (2008)
- Owasso Demographic and Economic Base Study - City of Owasso (2008)
- Tulsa Regional Coordinated Public Transit-Human Services Transportation Plan - INCOG (2007)
- Broken Arrow to Tulsa Mass Transit Feasibility Study - Metropolitan Tulsa Transit Authority (2007)
- Sand Springs Strategic Plan - City of Sand Springs (2006)
- Jenks Comprehensive Plan - City of Jenks (2006)
- Destination 2030 Long Range Transportation Plan - INCOG (2005)
- Broken Arrow Downtown Master Plan - City of Broken Arrow (2005)
- Tulsa Regional Intelligent Transportation Systems (ITS) Implementation Plan - Oklahoma Department of Transportation (2003)
- Bixby Comprehensive Plan - City of Bixby (2001)

Information from these prior efforts was used to develop a framework for this study, and in some cases directly contributed to the list of options considered by the INCOG RTSP. The following sections provide summaries of prior studies to provide a general understanding of the scope and content of the previous study or plan which provides a foundation of political, social, financial, and technical influences affecting final plan recommendations. Each plan or study also has a brief summary describing the direct relevance to the INCOG RTSP.

Tulsa Transit Bus Service Needs Assessment - Metropolitan Tulsa Transit Authority, 2010

Developed by the Metropolitan Tulsa Transit Authority (Tulsa Transit), final Needs Assessment recommendations were established in order to bolster existing transit service to a level standard of comparable cities. In 2002, the Tulsa Transit budget saw dramatic decreases which resulted in a 50% reduction in bus service hours and workforce reduction of a third. Although Tulsa Transit bus service hours have remained limited, passenger ridership demand has continued to increase.

Existing service of Tulsa Transit, as evaluated by the Bus Service Needs Assessment, consists of fixed route bus service and ADA paratransit "Lift Program" service offered Monday through Saturday. Service provided on Saturdays is approximately 50% of the service level offered on weekdays and evening service, defined as service provided after 8pm, is about 12% of weekdays. At a total annual fixed route service level of 160,000 bus service hours, Tulsa has one of the lowest bus service hours per capita ratio of comparable US cities.

In order to raise service levels to meet the most pressing needs of the community, Tulsa Transit developed a series of recommendations to be implemented as funding becomes available through the Bus Service Needs Assessment process. The plan focuses on improving bus frequencies, improving evening service and implementing Sunday service. Weekday service recommendations include increasing service headways to 30 minutes or better for all routes. Evening service improvements include replacing mini-bus operations with regular fixed route service operating from 8pm to 1am, Monday through Saturday with headways greater than 30 minutes. Saturday and Sunday service adjustments include adding 26 buses each day for an additional 16,224 annual service hours both days. Tulsa Transit estimates a cost of $95,000 to improve express accessibility, which plans to include the addition of one bus to each existing express service route and the reinstatement of the eliminated

1 – Oklahoma Dept of Commerce 2000-2010 Census Counts
2 – Tulsa Regional Coordinated Public Transit – Human Services Transportation Plan (May 2007)

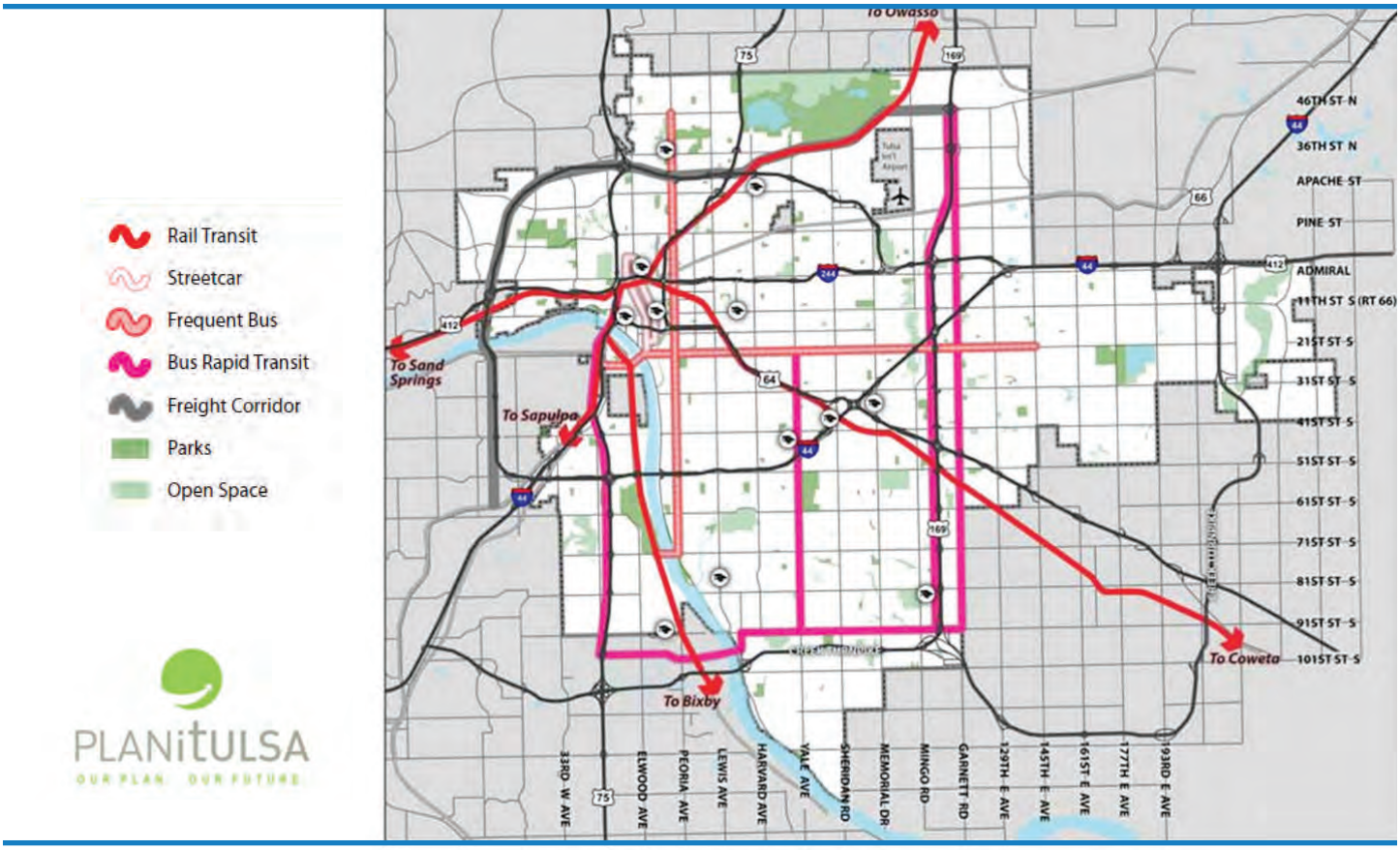


Figure 1.2 : PLANiTULSA Comprehensive Plan Transit Vision

route on 101st Street South to Riverside Drive to Downtown Tulsa. All recommendations for regular fixed route service expansion in area and hours also pertain to the Lift Program. These additional paratransit service costs were projected at $403,000. The assessment also recommended additional personnel in maintenance, operations and customer service.

The total recommended investment for all service improvements reached $7.2 million in operating investment and $10 million in capital expenditures. The needs assessment notes that high capacity options, such as rail or bus rapid transit, are important options and warrant further study.

Relevance to RTSP:

- Metropolitan Tulsa Transit Authority service hours are severely limited compared to service provided in other major US cities.
- Basic level of bus service needs to be restored.
- Demand for basic transit services has increased.
- Additional funding sources for Metropolitan Tulsa Transit Authority need to be identified to provide sufficient basic regional transit service.

PLANiTULSA: Tulsa Comprehensive Plan - City of Tulsa, 2010

Reaching unprecedented levels of public involvement during planning stages, the City of Tulsa created a comprehensive planning document, PLANiTULSA, which seeks to identify needs and goals of the community for 20 to 30 years into the future. The final PLANiTULSA document provides a framework for Tulsa's comprehensive plan which depicts the vision of Tulsa in terms of future economic development, housing, transportation, parks and open space.

Land Use specific guidelines were developed under five major categories: downtown, corridors, new centers, new neighborhoods and existing neighborhoods. According to PLANiTULSA findings, Tulsa has not experienced significant growth since 2000 compared to its peer cities in the south-central region of the United States. However, the Tulsa Metropolitan Statistical Area (MSA) has experienced an influx of population growth, indicating a greater share of the population in each of the outer-lying suburban communities. The trend of decentralization was found not only with population, but also pertaining to employment growth.

Specific land use category recommendations include a range of solutions to respond to the variety of community types and scales found throughout Tulsa. The "downtown core" is designated as a regional transit hub. Preferred sites for transit stations and bus stops are concentrated at "centers," or focal points of neighborhoods which contain a mix of neighborhood resources, residences and commercial activity. "Town centers" and "regional centers" are both identified as ideal locations for transit hubs, one serving surrounding neighborhoods and one serving major employers and activity centers. PLANiTULSA emphasizes the need to establish and maintain neighborhood intensities in terms of land uses, pedestrian and cycling accessibility, range of transit options, and parking recommendations. Final preferred growth scenarios saw concentrated growth in downtown and in new communities.

PLANiTULSA recommends improved collaboration between land use and transportation goals. Improvements to accessibility, according to PLANiTULSA, are possible with a concentrated effort to collocate homes and jobs near transit. Transportation related recommendations include provisions for greater modal choices including driving, biking, and reliable and frequent bus or rail transit. Tulsa residents indicated the preferred mode split of all regional trips would decrease vehicle share from the 2030 trend projected at 95% to 84%; increase pedestrian and cycling share from 4% to 9%; and increase transit share from 1% to 7%. Successful implementation of all land use and transportation related goals could result in transit ridership increases of 600% over the next 25 years.

Preliminary transit demand modeling results, conducted in concert with PLANiTULSA efforts, indicated the highest performing travel corridors were radial from downtown Tulsa to the southeast, south, east and north. The strongest non-radial corridors were north-south corridors, roughly following US Highway 169 and Yale Avenue. The plan recommended a greater focus of transit along the "Big T," or 21st Street and Peoria Avenue, to serve as a base transit network. PLANiTULSA emphasized the importance of the opportunity to use existing freight rail corridors along congested highways as potential transit alignments to serve commuters. The plan also stresses the importance of evaluating potential transit alignments in terms of ridership and development potential. A streetcar alignment was envisioned to revitalize inner-city Tulsa along Boulder and Cincinnati Avenues through downtown into adjacent neighborhoods. PLANiTULSA supported all transit related goals with a transit oriented development approach to provide a variety of housing and mobility options to create a vibrant, lively urban space. Potential incentives were identified and included reduction in parking requirements and tax increment financing.

Veering away from solving local transportation issues by expanding roadway capacity, PLANiTULSA focuses on creating livable networks where corridors are developed into inviting public spaces and effective transportation facilities. Utilizing Context Sensitive Solutions, the City of Tulsa can ensure quality design elements and consideration for all potential users of any new investment or enhancement.

Relevance to RTSP:

- Trends show greater growth rates in suburban communities in both population and employment.
- Identified community desire to increase transit options within Tulsa.
- Preferred growth is concentrated in downtown and in new communities.
- Identified potential high capacity corridors including:
  - Radial Corridor - downtown Tulsa extending southeast, along the existing UP freight line towards Broken Arrow;
  - Radial Corridor - downtown Tulsa extending south, along the existing BNSF freight line towards Jenks/Bixby;
  - Radial Corridor - downtown Tulsa extending east, along East 21st Street;
  - Radial Corridor - downtown Tulsa extending north, along North Peoria Avenue and S. Peoria Ave to 81st Street;
  - Radial Corridor - downtown Tulsa extending North along the SKOL Rail line;
  - Radial Corridor - Sand Springs Expressway Corridor along existing Sand Springs Railroad;
  - Non-radial Corridor - north-south corridor, roughly following US Highway 169;
  - Non-radial Corridor - north-south corridor, roughly following South Yale Avenue; and
  - Downtown Circulator - along Boulder and Cincinnati Avenues through downtown into adjacent neighborhoods.

Downtown Tulsa Area Master Plan - City of Tulsa, 2010

In an effort to coordinate multiple initiatives, studies and plan throughout downtown Tulsa, the Downtown Tulsa Area Master Plan was developed by the City of Tulsa. The plan was realized after several downtown initiatives focused on enhancing existing and planned development were identified by Vision 2025. Three major targets of the plan were identified as: revitalization of downtown; improving connection and accessibility to Tulsa River Parks system; and initiation of rail transit.

Two transit corridors were defined as priorities through the Downtown Master Plan process. One corridor extends along the west bank of the Arkansas River from 23rd and Jackson Street, northwest to the Oklahoma State University (OSU) Medical Center, and then northeast and across the river through downtown to the OSU-Tulsa Campus and the Evans-Fintube site. The corridor extends approximately 3.4 miles. The second corridor, reaching approximately 2.1 miles, is defined from 21st Street and Riverside Drive northward along Boulder Avenue to property located east of Brady Heights and west of OSU-Tulsa Campus. The transportation plan portion of the Downtown Area Master Plan specified types of rail transit technology solutions plausible for each corridor. Boulder Corridor was designated as a trolley corridor from OSU/Langston Campus to Veteran's Park. Potential commuter rail was designated to traverse from 23rd and Jackson Streets to Evans-Fintube. Both proposed corridor alignments take advantage of large sites with potential for infill and redevelopment opportunities. The total estimated cost for all transit improvements proposed by the Downtown Tulsa Area Master Plan reached $150 million.

Urban design elements included within the master plan add important elements to the downtown region which help support future transit investments. The master plan distributed major gateway locations around the downtown fringe to focus investment on designing urban gateways into the downtown core. These envisioned gateways create a sense of regionalism and provide increased safety to an assortment of users, whether transit patrons, pedestrians, cyclists, or motorists.

Relevance to RTSP:

- Identified two potential high capacity corridors including:
  - 2.1 mile corridor, reaching OSU/Langston Campus to Veteran's Park; and
  - 3.4 mile corridor, extending from 23rd and Jackson Streets to Evans-Fintube.

Rail Transit Strategic Plan, INCOG 2008

The Rail Transit Strategic Plan Ad Hoc Committee, formed by the INCOG Transportation Policy Committee, was tasked to recommend a series of near term and long term actions which promote development of a regional transportation system and to develop systematic transportation implementation strategies for consideration by the INCOG Transportation Policy Committee and the INCOG Board of Directors. The Final Rail Transit Strategic Plan investigated seven rail corridors in the Tulsa Transportation Management Area for rail transit service viability as part of a comprehensive transportation system.

A portion of the Rail Transit Strategic Plan appraised the amount of public support for transit as a potential regional transportation solution. Through a variety of survey instruments, the plan found that the community demonstrated a high level of support for implementation of transit alternatives, although individual automobile travel and roadway improvements remained high in priority level.

One priority set by the Strategic Plan was to secure funding to conduct Alternatives Analyses for all Tier 1 designated corridors. Tier 1 corridors included: Central Corridor -Downtown Tulsa to 23rd and Jackson; Broken Arrow to Downtown Tulsa; Bixby - via Jenks to Downtown Tulsa; Owasso via Tulsa International Airport to Downtown Tulsa; and Sand Springs to Downtown Tulsa. The plan highlighted three potential demonstration projects which warrant further study. The three corridors identified included: Broken Arrow to Downtown Tulsa; Jenks to Downtown Tulsa; and Evans-Fintube to 23rd and Jackson (Downtown Tulsa to River/ Downtown Tulsa to North).

Final recommendations solidified need for improvements in the region's transportation system with rail transit serving as a component. Rail transit was recognized as a fundamental element of a greater regional transportation system because of its economic, environmental, social and safety benefits.

Relevance to RTSP:

- Documented existing freight rail traffic by freight line.
- Identified five potential high capacity corridors warranting further study including:
  - Central Corridor -Downtown Tulsa to 23rd and Jackson;
  - Broken Arrow to Downtown Tulsa;
  - Bixby - via Jenks to Downtown Tulsa;
  - Owasso via Tulsa International Airport to downtown Tulsa; and
  - Sand Springs to Downtown Tulsa

Transportation Planning Capacity Building Peer Exchange - The Land Use and Transportation Connection, INCOG 2008

The Transportation Planning Capacity Building Peer Exchange report reflects activities of a one-day peer workshop held by INCOG including representation from Austin, Texas and Denver, Colorado regions. The purpose of the workshop was to discuss connection between land use and transit, peer city experience with project development and potential strategies for the Tulsa region as regional planning efforts progress. The workshop allowed INCOG and the Tulsa region to learn from peer agencies

and communities about a variety of public transit options available and the manner in which to advance projects into development.

Throughout the workshop, panelists from Austin and Denver encouraged the Tulsa Metro to develop a shared regional transit vision inclusionary of both the urban area of Tulsa and surrounding suburban and rural communities. The importance of public and business community input and collaboration during the regional planning process was stressed. One important plan recommendation was to focus on identification of priority corridors for transportation investments coinciding with land-use development, such as designated areas of transit oriented development (TOD) or urban villages. Both Denver and Austin used the Federal Transit Administration (FTA) New Starts program as a funding source for implementation of transit projects. Early identification of financial strategies was addressed as a crucial element during system plan development. The peer agencies advised that demonstrating the agency's capacity to successfully complete and operate initial projects is the best way to sustain public support for the entire duration of a long range system plan.

The workshop effectively aided in the education of the public, transit agency, regional planning organization, municipalities and business community concerning necessary steps to accomplish a regional transit vision. Learning from other communities successes and failures, the Tulsa region has the capacity to utilize the knowledge to lead a successful regional transit initiative.

Relevance to RTSP:

- Stressed importance of selecting "priority corridors" during regional system planning process.
- Established goal to create regional vision incorporating diverse stakeholder input of all citizens including urban, suburban and rural communities, business communities, and the general public.
- Established goal to incorporate planned and existing land use into criteria for corridor selection and prioritization.

Owasso Demographic and Economic Base Study - City of Owasso, 2008

Designated as one of Oklahoma's fastest growing cities, Owasso has been recognized for its low crime, good schools, family environment, and premium access to major employment centers including the Tulsa International Airport. The Owasso Demographic and Economic Base Study found that the steady annual population growth rate of 7.8% since 2000 was partially attributed to expansion of nearby Cherokee Industrial Park, prime commercial frontage along US-169 and widening of State Highway 20, 86th Street North, and other arterial streets.

According to the study, approximately 70,000 vehicles travel along US-169 each day. US-169 is a north/south, four-lane highway which serves as the major transportation facility for the entire community, providing for both local and commuting traffic. The study found a correlation between improved transportation access and increased local development. Completion of State Highway 20 improvements is predicted to cause a similar effect on development trends in the region.

Future growth in Owasso is expected to occur in four major commercial sites throughout the region. The commercial sites focused for development are located at the intersection of 96th Street North and Garnett Road, the intersection of 96th Street North and 129th East Avenue, the interchange of 116th Street North and US-169, and the interchange of Hwy. 20 and US-169.

Relevance to RTSP:

- Areas of future growth within Owasso are concentrated among the following sites:
  - 96th Street North and Garnett Road;
  - 96th Street North and 129th East Avenue;
  - 116th Street North and US-169; and
  - Highway 20 and US-169

Tulsa Regional Coordinated Public Transit-Human Services Transportation Plan, INCOG 2007

In an effort to collaborate regional transportation initiatives focused on older adults, persons with disabilities, and lower income populations, the Tulsa Regional Coordinated Public Transit-Human Services Transportation Plan was developed. The plan assesses existing transportation services and options including public transit fixed route systems, specialized dial-a-ride van programs, taxi vouchers, and volunteer drivers. Analyzing operations of such a vast variety of services, the study indicated a need for coordination due to inadequacies such as underutilized or inefficiently operated vehicles. All deficiencies are accentuated with rising numbers of people unable to access transportation services. The plan was developed in order to improve efficiencies and maximize limited community resources.

The plan, including an investigation into current transportation related human services, found that only 18% of organizations received federal funding and only 10% receive state funding. Organizations indicated an interest in collaborating to

maximize resources and minimize transport trips. The group of organizations specified most needed enhancements concentrate on services to seniors, increased resources, extended and expanded services, more funding availability, and a single entity responsible for coordination.

A large percentage of the total population of the Tulsa TMA have special mobility needs including people 65 years and older (11.6%), people 5 years and older with a disability (19.3%) and individuals below the poverty level (11.1%). By 2030, the population with disabilities has been projected to remain stagnant, while the percentage of individuals below the poverty level has been projected to increase by 10% and the median age of residents is also projected to increase. Addressing existing and future needs, the Tulsa Regional Coordination Public Transit-Human Services Transportation Plan made a variety of recommendations to improve mobility in the region.

Recommended improvements in the Tulsa Regional Coordinated Public Transit-Human Services Transportation Plan include safe routes for transit as well as increased transit service to regional medical facilities, employment centers and social activities. Enhanced transit facilities and amenities as well as increases to transit frequencies to fixed route service are all priorities established by the plan. Extended transit service hours to evenings, holidays and Sundays are also noted as important regional transit solutions. The final plan recommends various strategies and associated actions steps to accomplish transportation efficiencies throughout the Tulsa region.

Relevance to RTSP:

- Older adults, persons with disabilities, and lower income populations require greater levels of transportation services to adequately address needs.
- Increase demand for Human Services will rise due to shifting demographic trends.
- Human service agencies have limited resources to adequately serve patrons.

Broken Arrow Corridor Feasibility Study - Metropolitan Tulsa Transit Authority, 2007

The Metropolitan Tulsa Transit Authority completed the Broken Arrow Corridor Feasibility Study in April 2007, aimed at assessing the feasibility of implementing commuter rail and/or bus rapid transit (BRT) service within the Broken Arrow to Tulsa corridor. General alignments assessed were the Union Pacific Railroad, "Tulsa Branch", from the vicinity of Main Street in Broken Arrow to the area of 1st Street in downtown Tulsa as well as State Highway 51 from Broken Arrow to downtown Tulsa. Part of the feasibility study process was engaging citizen input of potential projects. The study found that, in general, the public was amenable to the idea of mass transit improvements along the corridor.

Union Pacific tracks along the study corridor are currently utilized by as many as three freight trains per day with a combination of local and through-routed destinations. The commuter rail option assessed included four stations and assumed a speed of 70 miles per hour, operating only during peak hours. Ridership forecasts predicted approximately 1,990 to 8,560 daily trips for commuter rail service along this corridor. Capital cost assumptions for service ranged from $43.4 to $49.2 million which considered both push-pull locomotive and Diesel Multiple Unit (DMU) technologies. Annual operating costs were estimated between $2.9 and $3.1 million.

The Broken Arrow Corridor Feasibility Study also evaluated State Highway 51, or the Broken Arrow Expressway, which currently serves as the main connection for transport in between Broken Arrow and Tulsa. The expressway carries between 75,000 and 90,000 vehicles per day with a majority of traffic occurring during peak commuting hours. The study reviewed many options for the BRT scenario and determined the most favorable alternative was to improve upon existing express service with high occupancy vehicle (HOV) lanes along the interior shoulder lanes. Assumed access to HOV lanes was limited to several points along the corridor. The BRT option was projected to have 270 weekday trips along the corridor. Capital costs estimated for the BRT option ranged from $21.3 to $23.4 million. Annual operating costs were estimated to reach $1.9 million.

The feasibility study recommended that both options, BRT and commuter rail, for the Broken Arrow corridor proceed towards further analysis and review. The final analysis determined that each transit alternative indentified was feasible, and any solution reaching 1,000 weekday trips has potential to reduce weekday trips by roughly 20% of total peak hour vehicular traffic within the travel corridor.

Relevance to RTSP:

- Identification of two potential high capacity corridors including:
  - Union Pacific Railroad, "Tulsa Branch", Main Street in Broken Arrow to 1st Street in downtown Tulsa; and
  - State Highway 51 from Broken Arrow to downtown Tulsa.
- BRT and Commuter Rail scenarios were determined as feasible along defined travel alignments.
- Estimated ridership ranged from 270 weekday trips (BRT) to 1,990-8,560 daily trips (commuter rail).

Sand Springs Strategic Plan - City of Sand Springs, 2006

The Sand Springs Strategic Plan, developed in 2006, outlines specific goals related to creating both a "Complete Community" and a "Destination City." The evolution of a "complete community" is measured by its ability to increase retail, dining, residential and other quality of life opportunities comparable with other cities. The five goals established to achieve the "Complete Community" include: enhancing retail and dining opportunities; improving residential capacity; improving quality of life; building infrastructure; and broadening employment opportunities. The process of becoming a "destination city" is measured by its success of becoming a highly visible, uniquely developed, progressive and attractive destination community by the river. The four main goals tied to the "destination city" ambition include: developing the river; creating recreational and entertainment opportunities; creating a tourism supportive environment; and creating public awareness and brand identity.

One established objective to improve residential capacity for a "complete community" is to increase rental property inventory which includes apartment complexes and downtown/river lofts, condos and townhouses. Other key objectives include revitalizing downtown and targeting development along corridors, specifically Keystone (US-412) and Highway 97. The Sand Springs "complete community" includes a focus on investment in green spaces and employment opportunities.

In order to attract the community to the river, the "destination city" plan is to promote development along the river along a potential river walk area. Other objectives include attracting activity centers, such as movie theaters, recreational facilities, and cultural events.

Relevance to RTSP:

- High density residential living is planned throughout downtown Sand Springs.
- Sand Springs intends to focus development and major activity centers along the river.

Jenks Comprehensive Plan - City of Jenks, 2006

The Jenks Comprehensive Plan, effective from 2006 to 2015, identifies a collective vision of the Jenks community. Land use intensities range from a majority of low density, residential units to a small portion of high intensity along Main Street. Medium land use intensities are found aligned adjacent to arterial streets near the downtown region. A large portion of development sensitive land has been allocated near the Arkansas River, Polecat Creek, Nickel Creek and Coal Creek.

The Comprehensive Plan includes special districts such as the Riverside Airport Clear Zone, the Fuel Transfer and Distribution District, the Industrial Special District, the Central Business Area, the Riverfront Entertainment/Tourism District, and the Appearance Review District.

Transportation related goals established by the Jenks Comprehensive Plan include a proposed interchange along US 75 at 111th Street South and a proposed bridge in the southeast region linking Yale Place, south of the Arkansas River, to South Yale Avenue, north of the river.

Relevance to RTSP:

- Highest density land uses are planned to be concentrated along the Main Street arterial.
- Additional access to Jenks will be available from US Highway 75 at 111th Street south with a proposed interchange.
- A proposed bridge project will connect Yale Place south of the Arkansas River to South Yale Avenue, north of the river.

Destination 2030 Long Range Transportation Plan - INCOG 2005

Adopted in August of 2005, Destination 2030 Long Range Transportation Plan identified transportation needs and priorities for the Tulsa Transportation Management Area (TMA). Recommendations include regard for roadways, public transportation, bicycle and pedestrian activity, freight movement and associated implementation strategies. During the Destination 2030 planning process, the public provided comment on transportation related issues and desires of the community. Among many identified issues, citizens indicated creation of alternative transportation options as a priority concern specifically in regards to expansion of trail and transit options. Destination 2030 also found that although the community demonstrated great interest in implementation of passenger rail, there was minimal willingness or commitment to provide necessary funding.

This study provided important background research on the region's growth trends and travel patterns. Destination 2030 found that the Tulsa Metropolitan Statistical Area (MSA) is projected to grow to over one million residents from 2000 to 2030, a 21% increase. It also found that the area's median age of residents has increased in the last 10 years with young people (19 years and younger) making up a decreasing share and the older population (65 years and older) growing to make a larger share of the total population. The region is also anticipating creation of approximately 50,000 new jobs.

Major areas of employment growth include 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. Destination 2030 found that 81% of all commute trips are single occupant trips and median trip length in the Tulsa region in 2000 reached 12.3 minutes.

Evaluating existing regional transit options, Destination 2030 determined that Metropolitan Tulsa Transit Authority (Tulsa Transit) ridership had decreased as a result of significant reduction in services between 2001 and 2004 due to economic constraints. Eliminating fixed bus route service hours by around 50%, Tulsa Transit experienced a 41% decrease in ridership. The proposed public transportation recommendations made by Destination 2030 include a new system design based on concentrated areas of employment, retail centers and existing transit facilities. The new system also responded to regions in the Tulsa area with high concentrations of demographic subgroups including households with no access to private vehicles, households with incomes below the defined poverty level, elderly citizens, youth (less than 16 years old), non-English-speaking individuals or households and areas having a higher-than-average population density.

A 14-mile commuter rail line traveling between downtown Tulsa and Broken Arrow is also recommended as a critical transportation solution by Destination 2030. The study findings encourage high capacity transit feasibility analysis for alternative regional rail corridors which parallel commuter corridors. Preferred corridors for further investigation include: the Arkansas River West Bank rail line to Jenks and Bixby to relieve US-75; a northeast Tulsa rail line to the Tulsa International Airport, Catoosa, and Claremore; the SKL rail line to Owasso, Collinsville and the Cherokee Industrial Park to relieve US-169; the rail line to Sand Springs parallel to US-412; and the rail line to Sapulpa parallel to 1-44.

Relevance to RTSP:

- Established community support for expanded transit options.
- Identified major regional employment centers as:
  - 21st Street and Utica Avenue Corridor;
  - South Yale Avenue Corridor (from 61st to 71st Street South);
  - US Highway 64/State Highway 51 (Broken Arrow Expressway);
  - US Highway 169 Corridor;
  - Tulsa International Airport area;
  - Cherokee Industrial Park; and
  - Port of Catoosa.
- Tulsa Transit service levels must increase to enhance ridership.
- Identified potential high capacity corridors including:
  - Radial Corridor - Downtown Tulsa extending southeast to Broken Arrow;
  - Radial Corridor - Downtown Tulsa extending south connecting Jenks and Bixby;
  - Radial Corridor - Downtown Tulsa extending northeast connecting Tulsa International Airport with Catoosa and Claremore
  - Radial Corridor - Downtown Tulsa extending northeast connecting Owasso, Collinsville and the Cherokee Industrial Park;
  - Radial Corridor - Downtown Tulsa extending west connecting Sand Springs; and
  - Radial Corridor - Downtown Tulsa extending southeast to connect Sapulpa.

Broken Arrow Downtown Master Plan - City of Broken Arrow, 2005

In an effort to focus a portion of Broken Arrow's rapid growth downtown, the City of Broken Arrow developed the Broken Arrow Downtown Master Plan. The plan covers two square miles of the total 60 square miles of incorporated Broken Arrow. Supporting other efforts including the city-wide land use plan and other regionally established plans, the downtown master plan was established with a set of goals and objectives focused on maintaining a strong downtown core for Broken Arrow. The Broken Arrow Downtown Master Plan established six major goals to achieve the established downtown vision. The goals indentified include: establishing downtown as the civic and cultural heart of the community; creating healthy downtown neighborhoods; instituting a unique and identifiable image for downtown; enhancing the downtown transportation network; developing a strong retail and mixed use core; and utilizing diverse funding strategies.

Major land use recommendations included creation of town centers, or central gathering places which incorporate mixed uses within a concentrated area. The overall vision created by the downtown master plan entailed generation of a mixed-use core to serve as a unified town center for the entire Broken Arrow community.

One fundamental transportation goal aimed to enhance the downtown transportation network is to establish priority to improve multi-modal access to downtown from other parts of the community, inclusive of automobiles, pedestrian and transit. Downtown Broken Arrow is currently served by both Broken Arrow Bus Service and Metropolitan Tulsa Transit Authority. The master plan recommends further investigation of a circulator bus system to link nearby higher education institutions like Rhema Bible College, Northeastern State University, and the Tulsa Technology Center. The master plan also recommends investigation into the feasibility of a shuttle or trolley service to connect downtown to the Bass Pro Shopping Area. Broken Arrow, through the master planning process, confirmed the need for increased bus service to the downtown core. In anticipation of high capacity transit within the regional, Broken Arrow has established commitment to downtown revitalization and increased densities to create a more transit-supportive environment.

Relevance to RTSP:

- Identified need for circulator bus system to link higher education institutions.
- Potential shuttle or trolley service to connect downtown to the Bass Pro complex.
- Increased existing bus service needed.
- Broken Arrow is committed to downtown revitalization and increased densities to create a more transit-supportive environment for future high capacity transit.

Tulsa Regional Intelligent Transportation Systems (ITS) Implementation Plan - Oklahoma Department of Transportation, 2003

To address growing need for improved traffic management in the Tulsa region, the Oklahoma Department of Transportation and the Indian Nations Council of Governments generated the Intelligent Transportation System (ITS) Implementation Plan. The final plan sets forth necessary considerations needed to address operational requirements of the system, roles and responsibilities of regional agencies, infrastructure requirements and an associated implementation strategy.

Creation of a regional Transportation Management Center (TMC) is a fundamental step in ITS implementation. Collaboration of many regional agencies is needed to ensure a successfully integrated system including linked traffic operations, emergency operations and transit agencies by real-time travel information. The major goals of the Transportation Management Center are to improve safety, improve information sharing, establish regional traffic management, establish regional incident management, disseminate traveler information to travelling public, and promote the use of transit.

Metropolitan Tulsa Transit Authority (Tulsa Transit) and Broken Arrow Bus System (BABS), (which has been operated by Tulsa Transit since 2005), are the two transit agencies representing the Tulsa region which would be involved in successful implementation of a regional Transportation Management Center. Many near term and long term transit related improvements have potential to impact the regional intelligent transportation systems. Metropolitan Tulsa Transit Authority currently operates automatic passenger counters and plans to implement an automatic vehicle location system for the vehicle fleet. Real time information kiosks and electronic payment systems at bus stations are also in plans of future investment. The implementation plan advises all agencies to utilize compatible hardware/software for communications with the Transportation Management Center.

Relevance to RTSP:

- Future ITS infrastructure is capable to support potential transit ITS initiatives such as:
  - Real time information kiosks;
  - Automatic vehicle location; and
  - Electronic payment systems.

The Bixby Comprehensive Plan 2001-2020 - City of Bixby, 2001

Framing Bixby's overall goals and objectives, the Bixby Comprehensive Plan consists of specific goals, objectives and policies which guide decision making concerning future physical development of the city. Bixby Comprehensive Plan focuses on major goals and policy initiatives directed towards urban development design, land use, transportation, public facilities and utilities, community visioning and specific corridor design elements.

Land use specific goals pertain to the ability to accommodate a variety of land uses, of which compatible uses co-locate to maintain continuity. Bixby land use designations fall within the following categories: agricultural; residential; commercial; industrial; park-recreation-open space; and public and quasi-public land. Highest intensity land uses are concentrated along 151st Street at South Harvard and Memorial. Medium intensity land use designations are planned for the majority of major intersections throughout the Bixby region.

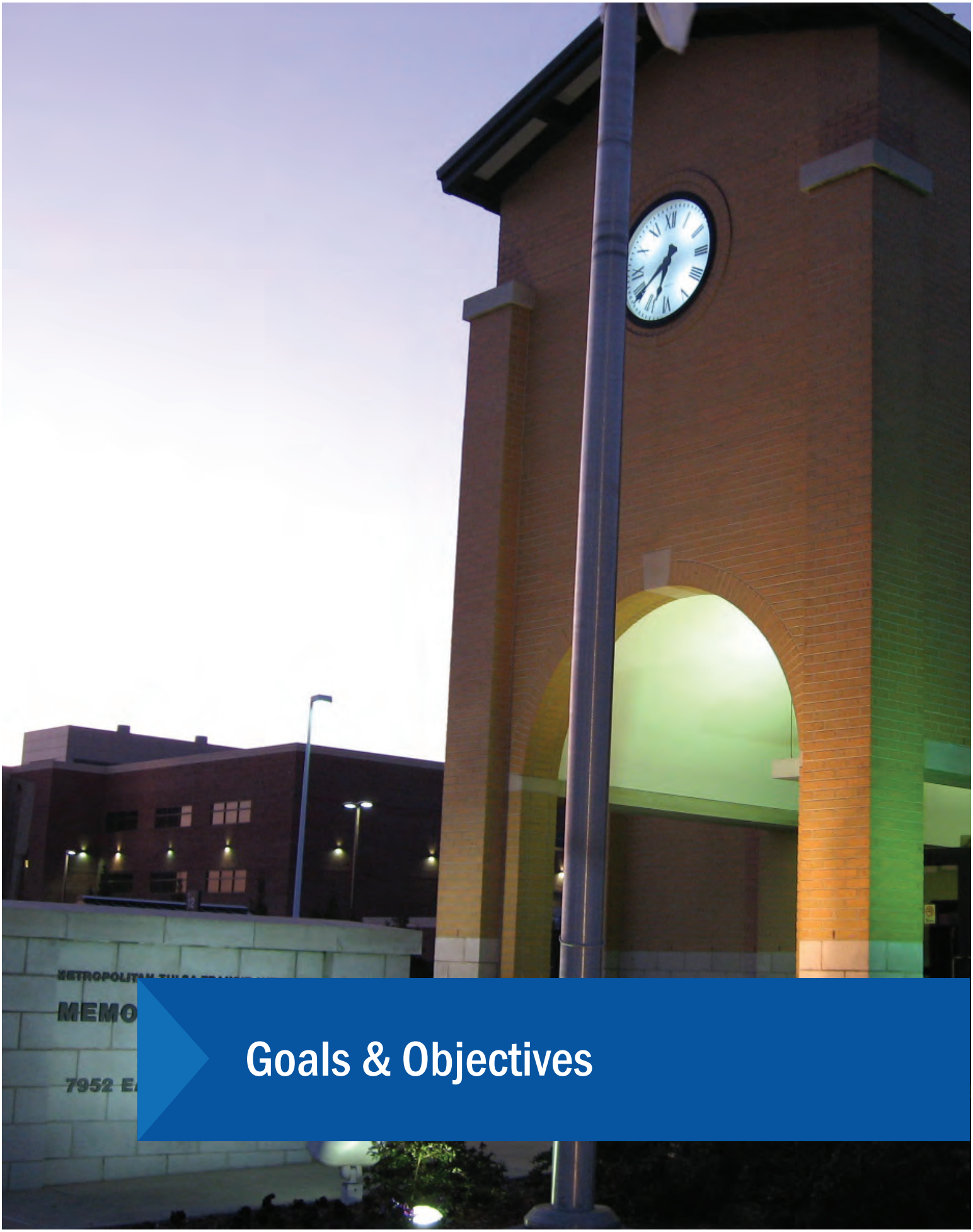
The plan identifies a range of transportation related issues including, roadway, pedestrian-ways and bikeways, transit, rail and air facilities. Supporting the Metropolitan Tulsa Area Transit System, the plan calls for supporting safe, efficient and economical service to the Bixby area according to need, specifically planned to serve designated corridor areas, special planning districts, and major activity centers. One rail policy, initiated by the Bixby Comprehensive Plan necessitates larger lot sizes for property adjacent to new or planned railways. The policy prohibits new residential lots positioning frontage along railway right of ways.

Relevance to RTSP:

- Designated high intensity land use along 151st Street at Harvard and Memorial.
- Bixby desires to maintain existing transit service for residents.

Closing

Accumulation of these documents has provided the RTSP development team with resources and references to values, expectations and desires of the regional community for near term and long term transit goals. These plans and studies continually influence the socio-economic, land use, transportation, and environmental development of the Tulsa regional area and provide vital information in creation of the RTSP. Identified high capacity corridors will be assessed and evaluated as part of the RTSP process. Areas of potential major activity and growth will also be considered as alternative transit corridors are identified. All historical plans and studies also provide an important context into the broad and increasing public demand for greater transit options. The information gathered throughout this process will inform the final recommendation to represent the broader, regional transit vision for the entire collective community.



Goals & Objectives

Goals & Objectives

Development Process

Simply stated, the development of the Regional Transit System Plan (RTSP) was a problem solving exercise. The process began by investigating existing and anticipated conditions, identifying transportation needs, assessing these needs, carefully considering a range of solutions to address these needs, and then developing an implementation program that identifies the most cost-effective solution. The RTSP used a multi-step, integrated decision-making process where the criteria for assessing and addressing needs all link back to the policies and goals set out in the Long-range Transportation Plan and those identified during public and community outreach. This process had six major integrated components:

- identify goals and objectives
- analyze existing and anticipated conditions
- identify and assess need
- regional transit system plan development
- programming implementation, and
- public involvement.

Figure 2.1 illustrates the components of the process.

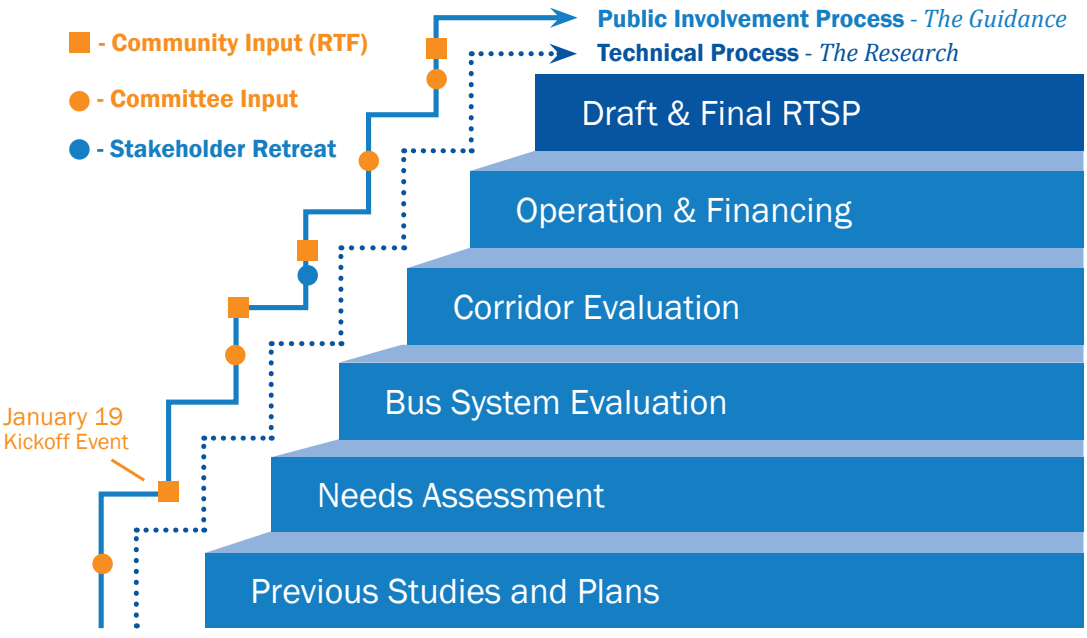
The Regional Transit System Plan is the cornerstone for understanding the risks and rewards of investing in transit programs and projects. The RTSP articulates the region's transit priorities and will guide future decisions and initiatives. The RTSP's horizon extends to 2035, and over that time intends to direct a major investment in transit programs and projects. The RTSP's fundamental purpose is to ensure that public resources are used in the best way possible to meet the transportation, safety, economic development, and environmental stewardship goals of the region.

Guiding Principles

Achieve Regional Consensus

1. In conducting the RTSP, follow all federal, state, and local regulations, policies, guidelines, and procedures to ensure an impartial study process.
2. Proactively solicit communication with city, regional, state and federal agencies and the public in general throughout the transportation decision making process, using a variety of methods.
3. Coordinate with the City of Tulsa, Metropolitan Tulsa Transit Authority (Tulsa Transit), Tulsa County, the Oklahoma Department of Transportation (ODOT) and any appropriate completed or on-going studies.
4. Coordinate with the City of Tulsa and surrounding municipalities, ODOT, and Tulsa Transit to assess the travel needs of the region.

Figure 2.1 : RTSP Planning Process



Enhance Mobility

5. Develop strategies that provide additional travel choices and increase capacity to serve the major travel patterns throughout the Tulsa metropolitan area and region.
6. Develop strategies that minimize transfers and duplicative services.
7. Develop strategies that consider origins and destinations for residents and employees among specific trip generators and activity centers that:
   - » Link residents of the corridors to employment and activity centers both within the corridors and outside the corridors.
   - » Link employment and activity centers to a regional transit system.
   - » Include transportation system management and travel demand management elements.
8. Develop strategies that recognize current and past planning efforts and commitments for transportation improvements in the corridors and consider new alternatives. Details of the current plans are in the PLANiTULSA Comprehensive Plan, the Tulsa Transit Needs Assessment, and the 2020 Destination Transportation Plan.
9. Examine ways to improve and enhance existing services as a part of strategies to meet mobility needs.

Ensure Fiscal Responsibility

10. Ensure affordability based on accepted financial planning parameters and reasonable cost estimates.

Consider Appropriate Technologies

11. Focus on proven fixed guideway transit solutions, but remain open to emerging technologies that can demonstrate advantages, while being compatible and complementary with existing modes.
12. Develop strategies with the appropriate mix of technologies that match the demand and nature of the mobility needs within the corridors and reinforce efficient system operation.

Consider Effects on the Corridors

13. Consider the effects of the strategies on environmentally sensitive areas, safety, quality of life, and the ability to promote transit supportive land use and economic development.
14. Consider the equity of the impacts and benefits of the transportation solutions on Tulsa's diverse areas and populations.

Economic Development

15. Define the opportunities for economic development at employment and activity centers identified in the RTSP Study Area.
16. Select prospective station location areas for maximum opportunity for economic development.
17. Coordinate with the region's development community and provide them with opportunities for input into the planning and station location processes.

Goals & Objectives

Although there are many uncertainties about the future, one thing remains constant – the collective desire to improve the quality of life for future generations, while celebrating the principles of self-sufficiency and individualism that have successfully guided the region though past challenges. The mission of the RTSP is to support the development of a transit system that enhances the quality of life through integrated transportation and land use planning, improved economic opportunities, and stewardship of natural resources. Four goals with associated objectives have been adopted to support the mission:

1. **Mobility & Accessibility** – support the continued population and economic growth of the region by providing multimodal options that improve mobility and accessibility by ensuring that congestion on the region's roadways does not reach levels that compromise productivity or quality of life. The following objectives will contribute to the achievement of this goal:
   - » Meet Population and Employment Increases
   - » Improve Access to Major Activity Centers
   - » Improve Access to Employment
   - » Improve Mode Choice Availability
   - » Identify Areas Underserved by Transit
2. **Efficiency & Safety** – ensure the best use of existing multimodal infrastructure and resources; minimize the loss of life; and, allow for a quick a response to both natural and man-made emergencies. The following objectives provide the foundation to accomplishing this goal:
   - » Maximize Transit Occupancy
   - » Improve Transit System Reliability

- Improve Regional Intermodal Connectivity
- Improve Safety and Reduce Emergency Response Times

3. **Economic Development** – ensure a pattern of growth and development that respects the history, the culture, the citizenry, and the strategic location of the region. The following objectives will drive the attainment of this goal.
   - Incorporate Local Goals and Objectives
   - Encourage and Support Development
4. **Environmental Stewardship** – ensure that multimodal investments are planned and implemented in a manner that is sensitive to the natural and social environment and maximizes energy conservation and sustainable development. The following objective will support this goal:
   - Minimize Negative Environmental Impact

Public Involvement

Public Involvement

Public Participation

Public Involvement Purpose

The purpose of the stakeholder involvement and public outreach (SIPO) portion of the plan was to achieve consensus with Metro Tulsa stakeholders by informing and educating them about the project through constructive and meaningful opportunities to exchange information and ideas.

The public input received from Metro Tulsa residents will be key to successful implementation of this plan.

The SIPO team created educational opportunities so all stakeholders were able to make informed decisions, provide informed input and engage in the regional goals and vision for regional transit as outlined in previously completed INCOG and member city comprehensive plans.

As with the public engagement campaign to update Tulsa's comprehensive plan –PLANiTULSA – not all affected citizens will participate in public meetings and workshops. To reach as many people as possible, the SIPO team utilized creative and unique engagement methods throughout the process to gather needed input. These tools and the entire SIPO process were compliant with FTA requirements and are based on proven practices used in similar planning projects in other regions.

The overall process of SIPO can be grouped into four distinct realms of general activities, as they occurred during the project:

- **Explore** – research and gather intelligence on the expectations of stakeholders
- **Explain** – Inform and advise stakeholders on the process and how they can participate
- **Engage** – Interact and invite feedback from stakeholders
- **Excite** – Infuse stakeholders with a sense of enthusiasm for the final product

Stakeholder Identification

The first step in the public involvement process included identifying local agencies and community stakeholders and their issues related to transportation. A list of known stakeholders at the time that the Public Participation Plan was produced is shown in Appendix A.

The list of stakeholders was used to develop a list of approximately 100 individuals for in-depth interviews completed by Collective Strength and then in organizing the Regional Task Force.

Committee Organization

The Stakeholder Involvement Public Outreach (SIPO) Team proposed several different working and advisement committees in order to most efficiently and properly manage any and all stakeholder guidance and input. Each committee represented a distinct grouping of relevant stakeholders with a specific set of similar purposes and interests. The Regional Task Force represented various organizations.

Committee Roles and Responsibilities

Regional Task Force

The Regional Task Force represented to be a collection of agencies, organizations, institutions, local governments, and businesses. For the initial meeting, the Regional Task Force was divided into three (3) groups; specifically a Technical Group, Economic Group, and Civic Group. Originally, the project team desired to have a Chairperson selected from each group to become responsible for directing their individual group. This proved to be unnatural for many of the attendees and was not used for the second meeting. During the second meeting, workgroups were formed by table. At both meetings, these groups reviewed the work of the project team and provided constructive comments, suggestions and raised questions that may not have been addressed otherwise. Specific organizations comprising the Regional Task Force are included in Appendix A.

The Regional Task Force served as an advisory group that identified issues related to technical feasibility, economic impact, and community impact. This group became a sounding board for the planning process. Feedback from this group was

incorporated into the process to the extent possible with regard to technical analysis.

The Regional Task Force met on the following dates: December 2, 2010 and March 8, 2011, Stakeholder Retreat on April 8, 2011, and July 8, 2011. During these meetings, Technical, Economic and Civic representatives were put into groups that identified several critical goals essential for RTSP development including:

- Access to employment centers and activity centers like schools, jobs, and training centers
- Choice – *intermodal connections and mode choice*
- Infill development – *dense development*
- Concern for affordable housing for seniors
- Safety
- Better communication between agencies
- Frequency vs. Route coverage
- Daytime vs. Nighttime needs
- Work vs. Play trip purposes
- Choice vs. Dependent riders
- Discussion of corridor rankings

Project Marketing

Branding

Review and Understand Research

In order to properly brand the plan, the 1,000 Household Phone Surveys and 100 In-Depth Interviews became the basis of branding development. From this research, it was clear that the themes of economic development and job growth were important to the Tulsa Region. Starting with these ideas, the SIPO Team created messaging and name/logo.

Message Development

The SIPO Team used information gathered through research combined with experience gleaned during previous outreach projects to develop key messages and a brand for the campaign. Xposure, Inc. provided minority-centered input on key message development for under-represented populations.

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

Name/Logo Development

In collaboration with Rex PR, the team developed a plan name and logo to be used on all public outreach material including the Transit Lab Bus, all press releases, the website, and any other public outreach material.

The plan name created was FAST Forward. FAST- Find A Solution with Transit. The tagline also reflected research findings related to economic development and job creation.

Soft Launch

Regional Task Force

After branding was complete, the team held a soft launch on December 2nd, 2010 at the Buddy LaFortune Community Center to engage the members of The Regional Task Force for the first time.

Regional Task Force, Soft Launch
December 2010

During the Soft Launch, the team introduced the project, as well as, unveiled elements of the public outreach effort. Two separate meetings were held on the same day for the Regional Task Force to allow a variety of individuals to attend. Approximately 55 individuals were present between both meetings.

This was the first time that many of these individuals had heard of the project, so it was critical to communicate clearly and allow for time to answer questions. Each meeting's agenda included:

- Three aspects of the benefits of having a Regional Transit System Plan including Economic, Mobility, and Quality of Life benefits.
- The process of corridor identification and delineation.
- A checklist for success was presented as a goal-orientation for the project.
- Discussion of the challenges of institutional structure and funding.
- Corridor mapping exercise amongst groups.

Date & Time	City/County	Presenters
Monday, Nov. 1, 7:00pm	Jenks City Council	James Wagner, Mike McAnelly
Tuesday, Nov. 2, 8:00am	Tulsa City Council Public Works Committee	James Wagner, Mike McAnelly
Tuesday, Nov. 2, Noon	City of Tulsa Transportation Advisory Board	James Wagner, Mike McAnelly
Tuesday, Nov. 2, 6:30pm	Broken Arrow City Council	James Wagner, Mike McAnelly
Monday, Nov. 8, 5:00pm	Bixby City Council – work session	James Wagner, Doug Duke
Tuesday, Nov. 9, 6:00pm	Owasso City Council – work session	James Wagner, Doug Duke
Wednesday, Nov. 10, 9:30am	Tulsa County Management Conference	Tim Armer, Doug Duke
Monday, Nov. 22, 7:00pm	Sand Springs City Council	James Wagner, Doug Duke

Presentations to City Councils and County Commissions

During the soft outreach phase of the project, the SIPO team made presentations to City Councils and the Tulsa County Commissioners. The purpose of these presentations was to inform elected officials of the RTSP process and timeline.

The Jacobs Project Manager, Deputy Project Manager and INCOG Project Manager were all involved in making these presentations.

Media Relations


INCOG bus drives plan to the public

Rex PR was responsible for creating connections and effective communication tools for the media. Before the public outreach process began, Rex PR was able to brief the Jacobs and INCOG Project Managers on best practices, important topics, and sensitive issues for better communication with the media. The INCOG Project Manager and Public Outreach Planner served as the primary spokespersons for all media questions.

Throughout the public involvement phase of the project, FAST Forward was able to gain media attention from print, radio and television outlets. The total value on earned media was: $ 454,727.10. This total represents broad coverage primarily of print and television. Throughout the outreach phase, the Fast Forward Plan was also covered on radio through interviews on Tulsa's NPR station, KRMG and KJAMZ. **See Media Value Report in Appendix A for details on specific coverage.**

Campaign Kick-Off

After organizing stakeholder committees and groups, producing needed project materials, and holding a soft launch of the outreach campaign, the major public outreach effort was launched on January 19th at the TCC Center for Creativity. The purpose of the campaign kick-off was to generate the first big burst of excitement and inform residents in the Tulsa region that this program was on its way to their communities to gather their input.

As part of this effort, a five minute informative video was produced to explain the process and engage the general public. The video was published on YouTube, provided on the campaign Web site and played on the bus during outreach.

The campaign began with a highly-publicized one-day event headlined by former Mayor of Charlotte, North Carolina- Pat McCrory. The day also included a press conference, Tulsa Metro Chamber sponsored luncheon, afternoon sessions with presentations focused on transit oriented development, and a public open house in the evening.

Event Preparation

INCOG staff selected the TCC Center for Creativity as the high profile event venue. Sponsorships were procured through the Tulsa Metro Chamber and Greater Tulsa Association of Realtors to cover luncheon rentals and catering. Display boards were prepared by Jacobs and INCOG and setup surrounding the venue.

High Profile Event Day Outline

10:30 a.m. - Press Conference (Including statements from Pat McCrory, former Mayor of Charlotte, SIPO Team)

11:30 a.m. – Luncheon with Tulsa Metro Chamber Featuring Pat McCrory "Transit and Economic Development Success in Charlotte, NC"

1:30 p.m. – Symposium: Introduction to the RTSP, 12 Steps to Transit Success in Charlotte, How Transit Moves the Economy

3:45 p.m. – Panel Discussion with Pat McCrory moderating (panel included: Mark Liotta, Mike Neal, Chris Benge, Reuben Gant, Bill Cartwright)

6:30 p.m. – Open House (Introduction of RTSP and Presentation of Charlotte's Success)

Campaign Activities

The main elements of the regionally-tailored outreach program included:

- Nine-week traveling campaign: Traveling outreach focused on the targeted communities with inclusion of minority/ low income communities
- Direct engagement with stakeholders in each community, specifically those who have not participated in the nine-week traveling campaign
- Survey Summary
- Unveiling draft and final Transit System Plan

After the kickoff, public participation activities began with the mobile engagement tactic, visiting Broken Arrow, Bixby, Jenks, Owasso, Sand Springs and Tulsa (North, East, South, West and Midtown). Other incorporated stops throughout these selected weeks were: Glenpool, Sapulpa, Coweta, Skiatook, Catoosa, Claremore and Sperry.

Structured to stimulate awareness, interest and excitement, the campaign visited each of the participating communities for a week of daily back-to-back activities and input opportunities. Targeted stops were created through partnerships of those organizations. Some stops were identified through the Soft Launch/Regional Task Force meeting on December 2nd, 2010. Other stops were identified through researching community traffic patterns.

In a week's time in each community, the campaign achieved high visibility among residents, reached out to minority and underserved demographics, informed and educated the public with presentations, and presented plenty of photo opportunities illustrating public participation.

Transit Lab Bus

The centerpiece of the public outreach program was a highly-visible, easily-recognizable, and "head-turning" mobile campaign unit. The centerpiece started as an old 40-foot city bus, which was renovated to incorporate educational materials, fun seating and a snackbar. This branded mobile unit soon became more than a bus with displays but rather, a comfortable platform where citizens could voice their opinions regarding transit service and needs in their individual communities. The staff which worked onboard the bus took on roles as community liaisons that were able to bridge the gap between the planning process and serving residents.

Equipped with a flat screen television and large panel information displays, the bus also operated as a mobile classroom to educate citizens about the plan and how the planning process works.

The Bus also functioned as a means of generating social media activity. The INCOG Public Outreach Planner and other staff provided real time status updates from the FAST Forward Facebook account, also "checking in" its current location and uploaded photos from various stops.

Between January 24th and April 1st, the bus was scheduled in a different community each week. Inclement weather forced the schedule to postpone two weeks (Broken Arrow and Owasso) of outreach that were then rescheduled for the end of the program. Each of its daily stops can be seen on the Mobile Outreach Schedule in Appendix A. Added stops from April 1st to May 5th are also included in this schedule.

The bus' stops included everything from schools, shopping centers, senior centers, libraries, churches, bus stations to

Chamber Luncheon, January 19, 2011

Rotary meetings, Tulsa Young Professionals meetings and other special events in the area. Once on the bus, visitors had the opportunity to take a 10 question survey (including comment section) which provided planners with valuable input about mode choice, fare price and travel time. This survey is located in Appendix A. Those that participated in the survey were entered to win an iPad which will be given away after the draft plan unveiling. The iPad giveaway serves as a strategy to invite more individuals onto the bus and produce more interest into the plan.

Broad Outreach Activities

For several stops each week, the bus was stationed in areas of high pedestrian and vehicle traffic, including large employment centers, libraries and shopping centers. These stops aided in gathering feedback about transportation needs and promoted the week's other activities and stops. The SIPO Team also used social media to generate interest in these stops and others throughout the week. Refreshments and snacks were available once onboard the bus and participants that participated in the survey or watched the educational video also took home a small reusable bag and button with their choice of "FAST for..." Families, Students, Seniors or Commuters.

Targeted Outreach Activities

Many stops were scheduled and partnered. These specifically chosen locales reached out to those not well represented or members of minority communities. These audiences tend to be frequent users of public transit therefore; their opinions were valuable to the plan. Careful communication took an important role in working with these audiences.

Broken Arrow, Wolf Creek Elementary School Fifth Graders

The Fast Forward Bus at the 2011 NCAA Men's Basketball Tournament

Broken Arrow Wal-Mart

(Photo before renovation)

(Photo after renovation)

Because of the size and diversity of the City of Tulsa, there was a need to conduct additional outreach to specific geographic areas of Tulsa that might feel planning apathy. This additional outreach included engagement of populations in north and east Tulsa.

For the minority community – including African Americans, Hispanics, and individuals with disabilities – the outreach team made special efforts to engage and overcome planning apathy and the sense of "voicelessness."

- A community dinner was hosted in east Tulsa at the Garnett Church of Christ, open to the public, providing dinner and education about the plan. Spanish interpreters were available to assist with input and dialogue with members of the Hispanic community at this event as well as, specific, broad outreach stops.
- Xposure scheduled an open dialogue meeting to include certain members of the north Tulsa and African American communities on February 11, 2011. The meeting included a briefing of the project and Q&A with INCOG and Xposure staff.

Presentations and Special Events

There were several opportunities to present the plan information and bus to the public through group meetings, luncheons and even special events.

Presentations were pre-planned and made to interested groups. The first presentation was made to the Jenks Chamber of Commerce at their monthly luncheon in February. Members were informed about the plan and were able to walk through the bus. Similar presentations were given to the Sand Springs Rotary, Downtown Tulsa Kiwanis Club, Tulsa Young Professionals' (TYPros) Sustainability and Urbanists Crews, The Center for Individuals with Physical Challenges, All Souls Unitarian Church's Adult Education Class and the Broken Arrow Chamber.

Despite the cold and inclement weather, the bus was able to make it to some special events around town. The first event was downtown Tulsa's Mardi Gras Parade which circled the "Blue Dome District". The bus was parked in the center of the parade and over 1,000 people were estimated in attendance.

The second special event was a trivia night at Joe Momma's pizza in downtown Tulsa. The bus was parked outside of the restaurant, allowing diners to come and go before or after trivia. During the trivia, staff passed out surveys and gave a brief presentation about the RTSP. One section of the trivia was designated to transportation related questions. Over 85 individuals were in attendance for the trivia night.

Another unique event opportunity was at Tulsa's BOK Center during the NCAA Tournament in March. The bus was conveniently parked across from the BOK Center in the midst of foot traffic during the festivities.

On one of the last weekends of outreach, the bus set out to engage students, teachers and environmentalists all in one day. TCC's Northeast Campus offers an annual Ecofest, which invites eco-related organizations or businesses to setup informational displays. The bus parked outside the main building and was able to survey over 110 individuals within a few hours. That same week, the bus opened its doors during the Tulsa Business Journal's Blue Green Expo and the OSU Sustainability Conference. Business leaders from the region attended the Blue Green Expo at the downtown Hyatt and stepped onboard the bus during their break. Greenies from across the state came to see headline speaker Robert F. Kennedy, Jr. at the OSU Sustainability Conference this year, making it a highly trafficked event for the bus.

Last but not least, Casa Laredo Restaurant in downtown Tulsa hosted its first Cinco de Mayo Street Party. The bus parked in the midst of salsa dancing, Mexican food vendors and other organizations promoting their services.

A fully-detailed outreach schedule can be found in Appendix A.

City	Number of Stops	Number of People
West and Midtown Tulsa	17	171
North and East Tulsa	20	270
Jenks	8	276
Sand Springs	13	250
Bixby	11	64
South and Midtown Tulsa	16	521
Broken Arrow (and makeup week)	17	403
Owasso	15	130
Total	**117**	**2,085**

Stakeholder Retreat

In order to gauge the attitudes, opinions, and expectations of direct project stakeholders (select members of the Regional Task Force and elected officials), INCOG hosted a retreat-style event at The Silo from 10 a.m. to 2 p.m. on April 8th, as an avenue for detailed discussion and polling that will help to identify transit needs, delineate potential corridors, and prioritize the needs and corridors.

Stakeholder Retreat, April 8th

Stakeholder Retreat, April 8th

The retreat's participants included elected leaders and staff from the greater Tulsa region's cities and counties. Officials from INCOG also participated, as did Metropolitan Tulsa Transit Authority (Tulsa Transit) officials and leaders from area Chambers of Commerce and other civic organizations. INCOG's consultants for the RTSP (Jacobs, Connectics Transportation Group, and Basile Baumann Prost & Associates LLC) participated in retreat preparations, presentations and discussions. INCOG engaged Strategic Community Solutions, LLC to design and lead the retreat.

The retreat had three primary objectives:

- Present transit system design issues to this group of key decision-makers;
- Discuss strategies for transit funding and governance structure; and
- Reach agreement on these issues that will allow INCOG staff and consultants to complete the INCOG Regional Transit System Plan.

The retreat included several presentations by INCOG staff and consultants. INCOG Executive Director Rich Brierre began the retreat by welcoming all participants. James Wagner, INCOG's Senior Transportation Planner, provided an overview of the FAST Forward process, its public outreach efforts and its results to date. Three presentations by consultant team members provided participants with new information on three key issues for the transit plan. Mike McAnelly FAICP, Project Manager for Jacobs and consultant team leader, presented the results of an initial evaluation of 21 potential transit corridors throughout the region. His presentation explained the identification of possible corridors, the evaluation criteria selected for this analysis and the initial results of this assessment. Andrew Ittigson, Senior Transit Planner for Jacobs, presented the work of Connectics Transportation Group focused on the operation and funding of the existing Tulsa Transit bus system. This presentation included an examination of Tulsa Transit's current system, rider demographics, costs and revenues and operational issues. It identified options to improve transit service with current or expanded funding levels. Jim Prost AICP, Principal at BBP & Associates, LLC, presented an analysis of system finance and governance. This presentation compared the greater Tulsa region's transit funding and institutional structure with those in other peer cities. It also evaluated alternative governance structures and financial options for the region's transit system.

A significant part of the retreat was structured to engage all participants in discussion about the choices facing the region as it prepares its transit plan. All retreat participants were assigned to one of seven teams. Each team included individuals with diverse backgrounds from varied parts of the region. During a working lunch, each team completed a series of exercises related to the three key issues discussed in the presentations. For each exercise, the teams were given specific assignments and tasks to complete.

Stakeholder Retreat Results

When asked to identify their primary stakeholder interests, two thirds of participants indicated they represented local government interests. Most of the other stakeholders (20%) indicated they represented business interests. Civic organizations, transit operations and academic interests were represented by fewer participants. Most retreat participants have been involved with the FAST Forward process prior to this session, with only 10% indicating that this was their first involvement. Over half the participants (53.4%) have provided technical support or leadership, or have been very active in the process. These responses confirm that the stakeholders participating in the retreat began the session with a strong

Stakeholder Retreat, April 8th

Stakeholder Retreat, April 8th

Hardesty Library, South Tulsa

base of information and understanding of this project and the issues it addresses.

Several questions asked participants for their views about transit and other alternative transportation modes. A strong majority of stakeholders believe that transit should be a viable option for anyone in the region.

What should be the primary role of the future public transit system?	
A viable option for anyone	66.7%
Serves major centers	16.7%
Serves suburban commuters	10.0%
Serve specific populations	3.3%
Something else	3.3%

Besides functionality & safety, what is the most important element of a transportation system?	
Economic benefits	53.3%
User friendliness	43.3%
Social factors	3.3%
Environmental impacts	0.0%
Visual impact & architectural design	0.0%
Something else	0.0%

What alternative transportation mode offers the best potential for mobility and community benefit?	
Rail transit	43.3%
Bus	30.0%
Telecommuting	13.3%
Carpooling	6.7%
Bicycle	3.3%
Something else	3.3%
Pedestrian	0.0%
Paratransit	0.0%

A series of keypad questions asked participants to indicate their agreement with the goals and objectives that have been established for this Regional Transit System Plan. There is strong agreement with these goals. When asked “how well do these goals reflect my own ideas of what we must accomplish?” 75% of participants indicated that the goals were ‘very consistent’ with their own ideas. Other participants (21.4%) felt these goals were somewhat consistent’ with their own ideas.

Discussion about the existing bus system also created some interesting responses. A very large majority (85.7%) did not think the existing budget for Tulsa Transit was enough to provide necessary service. Nearly 40% of participants strongly

Should this governance structure be established for the transit system's future?	Definitely Yes (5)	Probably Yes (4)	Maybe (3)	Probably Not (2)	Definitely Not (1)	Weighted Average
Create a transportation authority	42.3%	46.2%	7.7%	0.0%	3.9%	4.2
Continue the existing City of Tulsa Municipal Trust	7.4%	11.1%	14.8%	33.3%	29.6%	2.2
What geographic area should a transportation authority include?	**Definitely Yes (5)**	**Probably Yes (4)**	**Maybe (3)**	**Probably Not (2)**	**Definitely Not (1)**	**Weighted Average**
A group of cities (Tulsa and others)	37.0%	33.3%	14.8%	14.8%	0.0%	3.9
Tulsa County	26.9%	34.6%	30.8%	0.0%	7.7%	3.7
Multiple counties	25.9%	29.6%	29.6%	11.1%	3.7%	3.6
Just the City of Tulsa	0.0%	0.0%	0.0%	29.6%	70.4%	1.3

disagreed with the statement that the existing budget is enough to provide necessary service.

The final set of polling questions related to consultant presentations focused on the financing and governance of a regional transit system. The weighted averages in the table below show a clear interest in changing the system's governance and creating a transportation authority.

After the stakeholders discussed recommendations developed by each team, a final set of keypad polling questions was used to secure feedback on the overall direction resulting from the retreat. The first set of questions related to the Tier I corridors, for which teams had developed recommended plans for transit services and facilities. Participants were asked whether they would support these corridor recommendations if a vote were held on them tomorrow.

Would you vote in favor of the recommendations for this corridor?	Yes	No	Undecided
Broken Arrow Corridor	95.2%	0.0%	4.8%
21st Street Corridor	81.0%	9.5%	9.5%
Historic Streetcar Corridor	73.9%	17.4%	8.7%
Jenks/Bixby Corridor	73.9%	17.4%	8.7%
Peoria/Riverside Drive Corridor	68.2%	22.7%	9.1%
Downtown Circulator	61.9%	14.3%	23.8%
Harvard/Yale Corridor	54.6%	27.3%	18.2%

Evaluation and Success

Evaluation and monitoring activities conducted serve:

- To measure the awareness of and satisfaction with study activities from different target audiences;
- To ensure that comments received during the study process are being addressed and incorporated into the decision-making process;
- To determine the effectiveness of the program in increasing awareness and understanding of the different RTSP components;
- To identify ways in which the program can be improved in terms of reaching target audiences and methods of participation and education; and
- To insure that eventual recommendations have a realistic expectation of being adopted by the INCOG Board of Directors.

Surveys and Comments

Surveys and comment cards were distributed at all presentations, committee meetings and public outreach stops with the bus.

Within the public involvement phase, over 1,500 surveys were filled out and collected. These surveys provided key feedback on mode choice, ride frequency, zip code and participation in public meetings.

Two unique questions were included on the survey: "Have you ever participated in transportation planning meeting prior to today?" "What is your home zip code?" These questions enable planners to determine how many disengaged individuals participated in something they wouldn't have done otherwise and whether the individuals surveyed come from areas not typically reached.

All comments submitted via survey, comment card, voicemail, E-mail or Web site were posted online. The total of comments, 718, have been reviewed by the INCOG Project Manager and appropriately incorporated into the plan. Comments ranged from complaints about current bus service to hopeful praise of the FAST Forward Plan. All comments can be viewed by visiting www.FastForwardPlan.org looking under Participate then, Comments. Figure 3.2 shows the frequency of words found within the online comments.

Web Site

The plan's public Web site (www.FastForwardPlan.org) was created and then made live after the public kickoff on January 19th. The site provided basic information on the plan, a timeline of the planning process, updates on media attention and meeting agendas. The site also provided a platform for feedback or questions. From the week of the public kickoff through May 8th, the number of Web hits (or Web site visits) was totaled by Google Analytics. There were 1,942 visits.

What type of transit might you use if there was an option to get conveniently from home to work? *(select all that apply)*?

	Non-transit User (#)	Non-transit User (%)	Transit User (#)	Transit User (%)	All Respondents (#)	All Respondents (%)
Convential Bus	235	34%	416	51%	654	43%
Express Bus	206	30%	294	36%	501	33%
BRT	188	27%	309	38%	499	33%
Streetcar	255	37%	288	35%	545	36%
Light Rail	286	42%	348	42%	636	42%
Commuter Rail	167	24%	213	26%	381	25%
All Modes	44	6%	81	10%	126	8%
Total Respondents	**688**		**823**		**1,517**	

Table 3.1 : Survey Question and Responses

Which of the following amenities would encourage you to use the current bus system more often?

	Non-transit User (#)	Non-transit User (%)	Transit User (#)	Transit User (%)	All Respondents (#)	All Respondents (%)
More frequent service	308	45%	421	52%	730	49%
Extended hours	205	30%	386	48%	592	39%
Better transfers	315	46%	346	43%	662	44%
More express buses	136	20%	194	24%	331	22%
Quality buses and seats	188	27%	171	21%	359	24%
Lower fares	213	31%	269	33%	483	32%
All amenities	22	3%	35	4%	57	4%
Total Respondents	**685**		**809**		**1,499**	

Table 3.2 : Survey Question and Responses

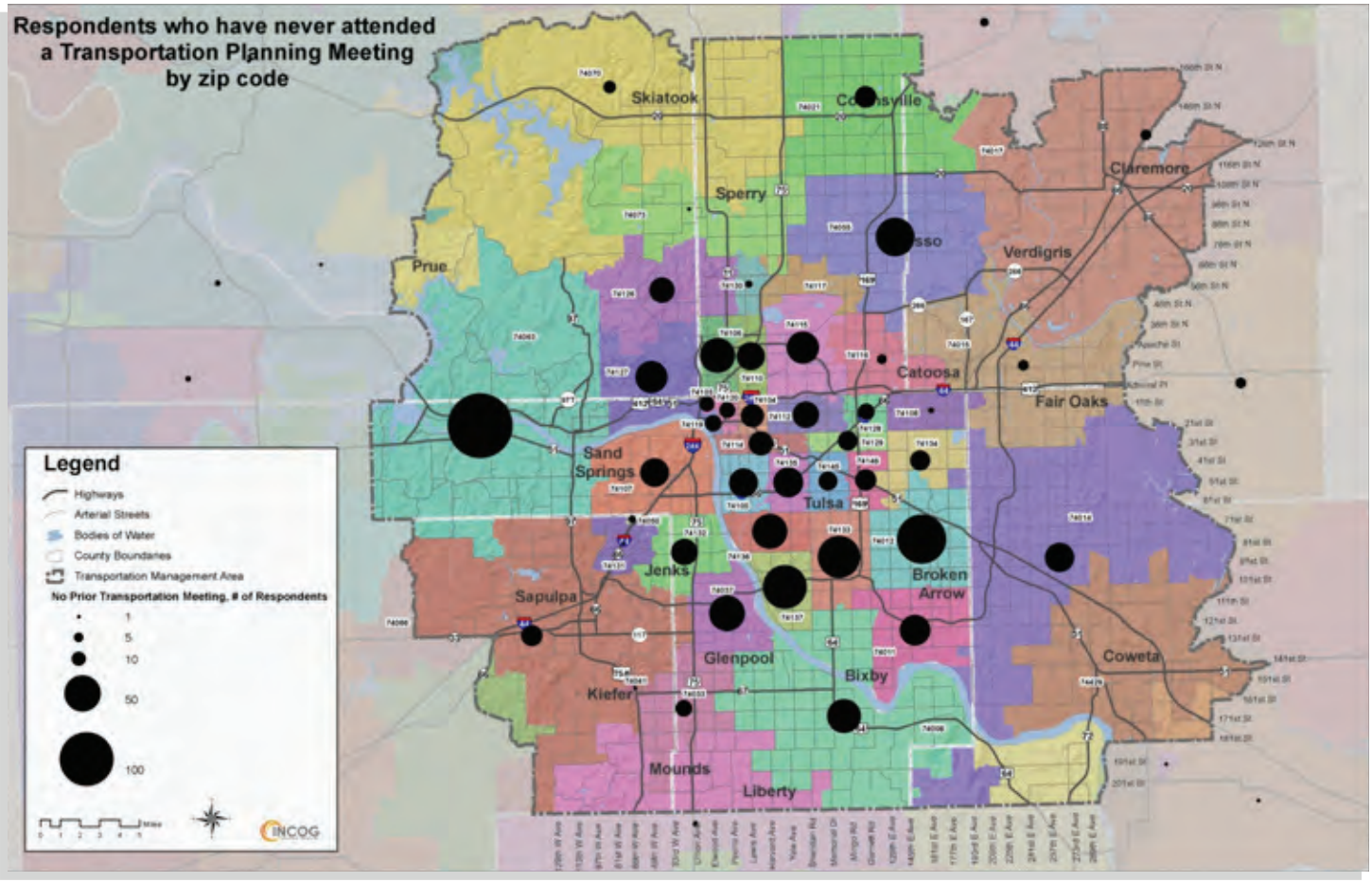


Figure 3.1 : Surveyed Respondents and Home Zip Codes

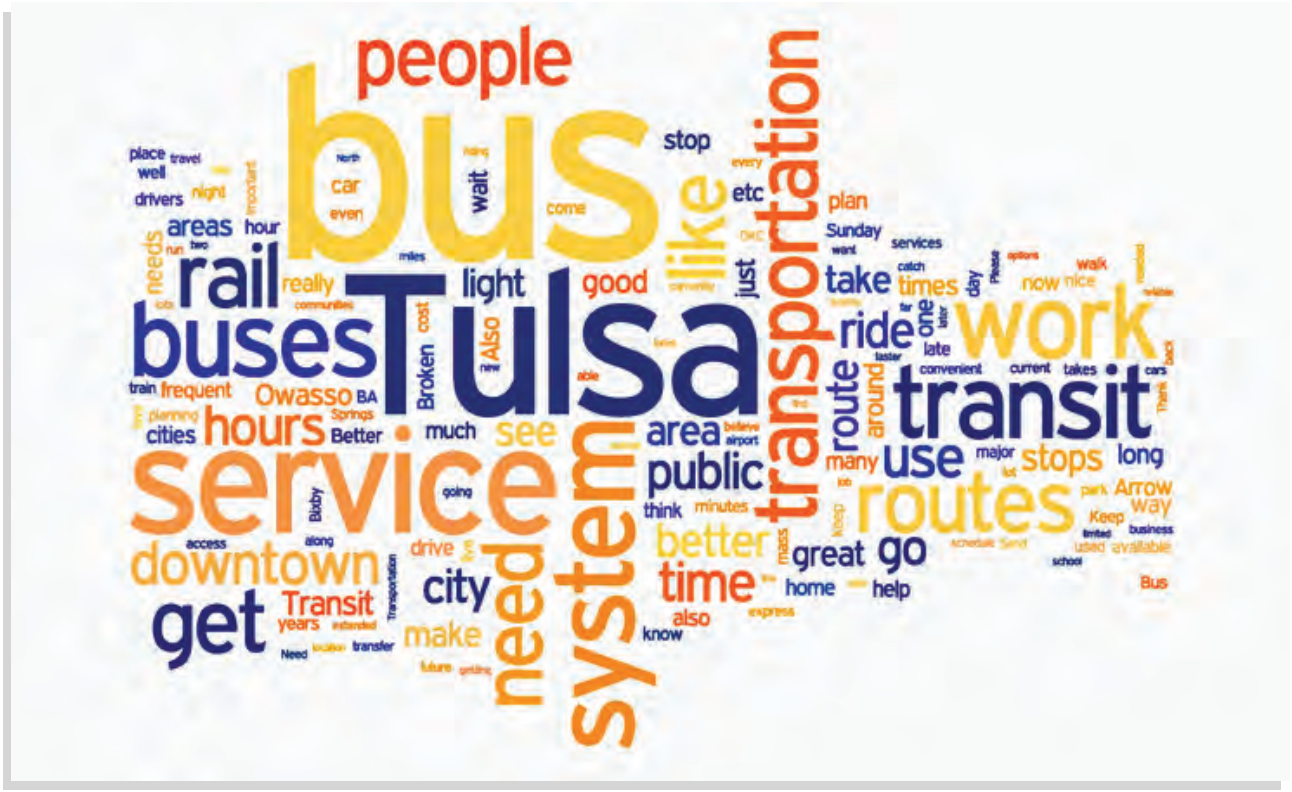
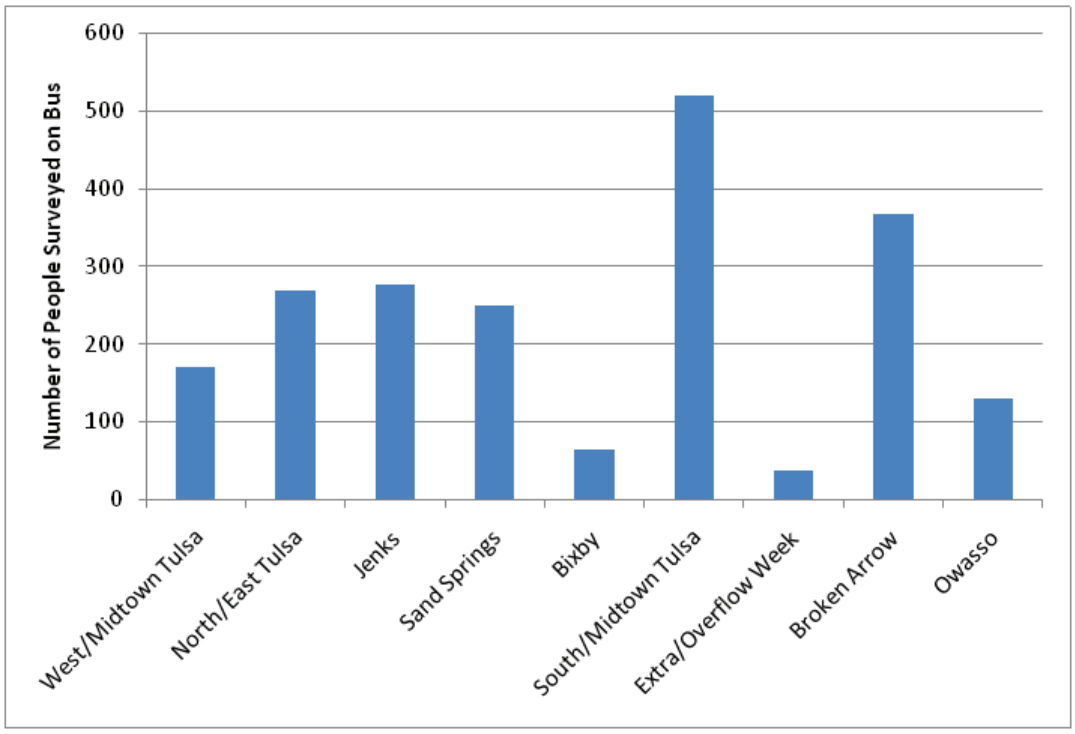


Figure 3.2 : "Wordle". Frequently Occuring Words in Online Comments

Figure 3.3 : Number of People Engaged Through Bus Outreach



Jenks Main Street

Jenks High School

Jefferson Elementary, South Tulsa

Summary of Participation Level

Over the course of these nine weeks, 2,085 individuals came onboard the bus and were surveyed. Before the first week of outreach, a goal was set of reaching approximately 250 individuals per week. Figure 3.3 demonstrates the amount of traffic on the bus for each community. Although short of the goal by 165 individuals, the count of visual impressions cannot be measured. The bus was often in high traffic areas, within vision from the street or nearby intersection.

Qualitative Research

In October and November of 2010, Collective Strength conducted 1,000 quantitative interviews with members of the general public from the Tulsa region. Interviews were conducted via telephone and included methodology to capture cell phone only households proportional to the Census data used to validate the survey. The survey utilized standard market research practices mirroring local demographic estimates and is accurate at the +/-3% level.

Of the respondents, 55% were female and 45% male. The majority (52%) moved to Tulsa as adults. Responses reveal an automobile dependent region, with most households (71%) owning two or more vehicles and only one-third having ever used Tulsa's bus system. However, over a quarter of households (28%) reported having persons of driving age who were dependent on public transportation or rides from friends and relatives because they do not own a car or do not drive.

Concurrently with the phone survey, Collective Strength conducted 111 "In-Depth Interviews" (IDIs) with regional stakeholders to determine attitudes about public transportation and how it fit into the goals of the organizations the stakeholders represented. Interviewees were selected to represent a cross-section of the community geographically and based on interest. Representatives included business leaders, elected officials, philanthropic organizations, minority leaders, academic institutions, healthcare providers, advocacy groups, railroad operators, transportation officials, city planners and many others. Care was taken to ensure that the participants represented a geographic cross-section of the Tulsa metropolitan area.

1,000 Sample Quantitative Public Opinion Survey

Demographic Profile

An attempt was made to match the surveyed sample as closely as possible with the demographic characteristics of the Tulsa Metro Area (defined as the Tulsa Transportation Management Area) based on 2009 Census Estimates. To better understand the differences in attitudes towards transit based on geographic parameters, the data was also segmented by region: North, South, East and West as shown in Figure 3.4.

Respondents were asked for their zip code so that the location could be geocoded to ensure good geographic coverage. Figure

Figure 3.4 : Tulsa Transportation Management Area by Geographic Subdivision

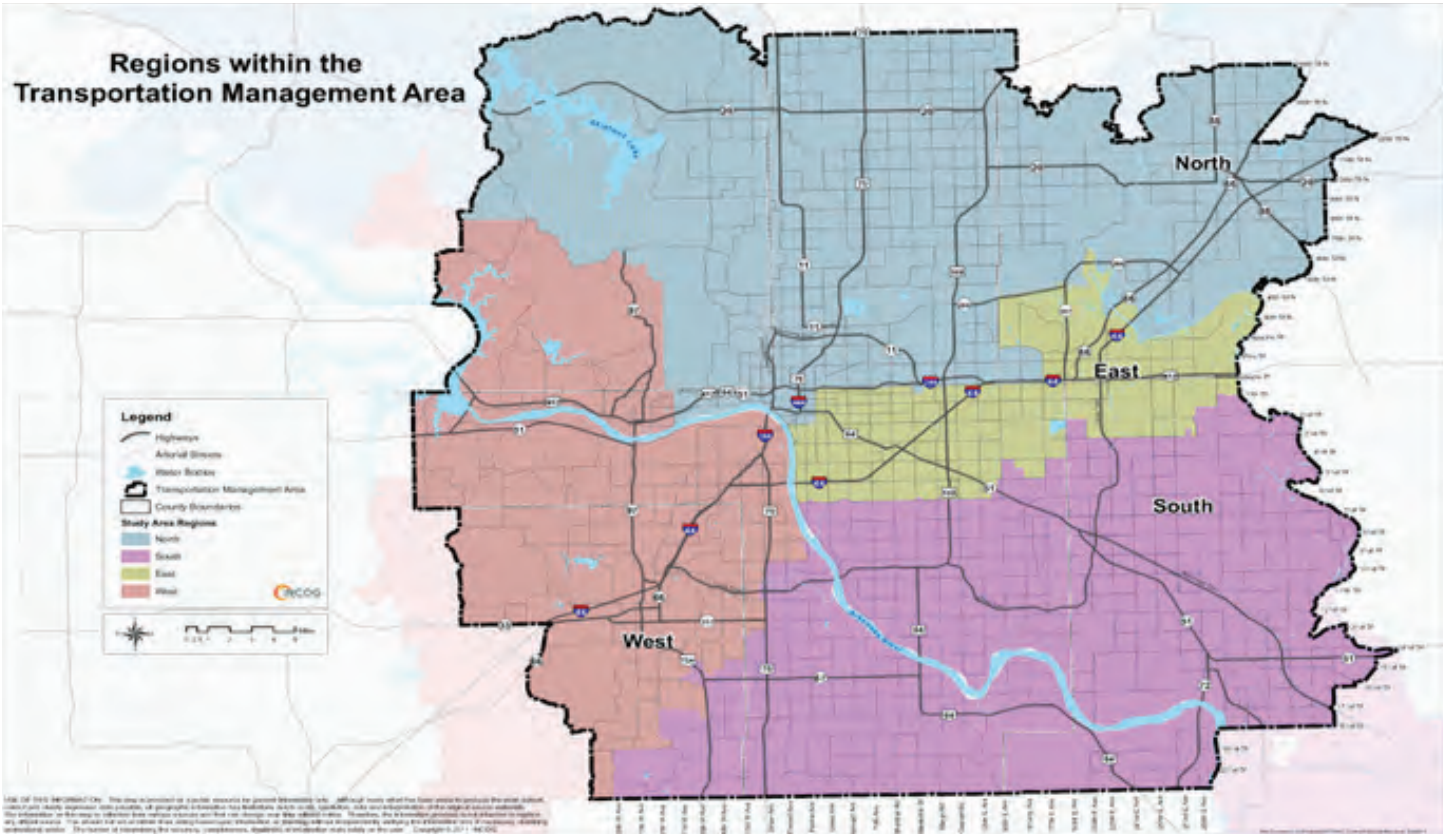


Figure 3.5 : Demographics of Respondents

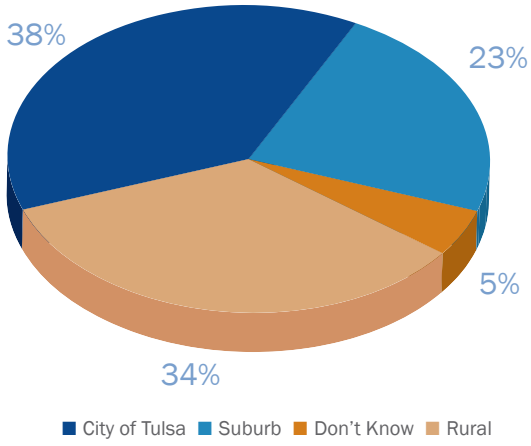


Table 3.3 : Survey Question and Responses

Race		Household Income		Age	
Caucasian	70%	Under $20k	21%	18-34	28%
African American	10%	$20k-$49k	35%	35-44	19%
Hispanic	7%	$50k-99k	26%	45-54	20%
Native American	8%	$100k+	10%	55-64	15%
Multi-racial/ other	4%	Don't Know/ Refused	7%	65+	17%
Asian/Island Pacific	1%				

3.5 shows the percentage of respondents who indicated that they lived in the City of Tulsa, in a suburb, or in a rural area. This closely matched the 2009 Census estimates. A cross-section of age, race, and income was also considered and is shown in Table 3.3.

Results

Overall respondents were supportive of increasing funding of public transportation. Respondents overwhelmingly agreed with with the statements shown in Table 3.4.

The support of transit alternatives went beyond agreeing with statements related to vehicle ownership costs, infrastructure investment, and transportation choices. Respondents also emphasized that they would support elected leaders that would pursue alternatives to the car. Eighty-five percent of respondents indicated that they wanted their elected leaders to encourage development of alternatives to the car. Forty-nine percent of respondents said that they would be more willing to vote for elected officials who are strongly in favor of improving Tulsa's public transportation system while another 40% indicated that their support for that leader would remain the same. Only 8% indicated that strong support for public transit would make them less inclined to support a candidate in favor of improving the transit system.

Respondents were asked the question "Indicate whether you see the item as a current problem, emerging problem, or not a

Table 3.4 : Agreement with Statements in the Phone Poll

Percent Who Agreed	Statement
90%	I don't use public transportation but I support it because it helps others who don't have cars or can't drive.
85%	Investing in infrastructure projects like roads, rail transit and bridges is a good way to create jobs.
84%	Owning a car is getting more and more expensive.
77%	We need better transportation alternatives in order to keep our air clean.
76%	Working people, seniors and young adults really need better public transportation alternatives than Tulsa has now.
74%	We need to invest in more transportation choices so we can reduce our dependence on oil.
73%	If we had a better transportation system in Tulsa, it would help our economy.
72%	Other cities have much better transportation choices than we have.
64%	If we had a better transportation system in Tulsa, we would be able to attract more young professionals to our area.
64%	I drive because I have to, not because I want to.
62%	I'd like to be able to drive a little less than I do.
55%	I love driving around the Tulsa region.
36%	We should spend our tax money only on maintaining and upgrading the roads we already have.
36%	We shouldn't invest in public transportation because we need to spend resources on higher priorities.
35%	We don't need any new transportation systems.
24%	We don't need any other transportation choices because everyone drives their car here.
13%	We shouldn't invest in public transportation because no one uses it.

problem in the Tulsa Region." Responses to this question are shown below. They are ranked by issues where respondents answered that the issue was a current problem or an emerging problem in Table 3.5.

Experience with Transit

Respondents had varying levels of experience with transit. Thirty-six (36%) percent of respondents had taken transit at some point in their lives in Tulsa, but 72% had taken transit somewhere else, such as while on vacation or while living in another city. For those who had taken transit in Tulsa, when asked about their experience, 41% rated it a positive experience, 43% had a neutral response, and only 16% rated their experience negative.

How to Increase the Use of Public Transportation

Respondents had a range of ideas on how to increase use of public transportation. The question was asked of respondents "Of the following choices, which would help you use public transit more often?" Several statements were read to the respondents and the most popular answers are listed below.

- Streetcars or rail transit service instead of buses 52%
- More frequent service 52%
- More extended service hours 51%
- More express buses 50%
- Lower fares on buses 48%
- Better quality buses and seats 46%
- Wi-fi on buses 28%

Service levels, both in terms of frequency and span of service rated higher, while amenities such as Wi-Fi rated lower. Rail transit options were also very popular. An open ended question asking if there were any other enhancements that would encourage more transit use yielded two prominent answers, 1) more stops/ routes in my area and; 2) service to rural areas and suburbs with 9% and 4%, respectively, indicating those improvements would encourage the respondent to use transit more often.

Table 3.5 : Current and Emerging Transportation Problems in the Tulsa Metro

Rank	Issue	Current Problem	Emerging Problem	Not a Problem
1	Inadequate roadway maintenance	69%	16%	13%
2	Congestion on N/S roads in the Metro	59%	18%	16%
3	Congestion on E/W roads in the Metro	56%	21%	16%
4	Congestion on Highways	56%	21%	20%
5	Capacity of roadways keeping up with development	53%	24%	19%
6	Availability of transportation for elderly & disabled	45%	25%	20%
7	Air Quality	34%	32%	30%
8	Lack of safe & accessible sidewalks	47%	17%	32%
9	Lack of public transportation/bus service	36%	26%	33%
10	Too much truck traffic	35%	20%	41%
11	Lack of bicycle trails and bike lanes	35%	17%	43%
12	Traffic delays caused by freight trains	15%	9%	72%

Table 3.6 : Solutions

Question: How likely you or other members of your household would be to use:	
	Likely or Very Likely
Door-to-door shuttle service for seniors & persons with disabilities	**62%**
Rail service from suburbs to downtown Tulsa	**52%**
Streetcar/trolley to shopping areas/museums	**51%**
Park-and-ride lots with rail or bus	**46%**
Dedicated lanes on expressways for cars with 2+ people	**46%**
Rapid bus service with priority at traffic lanes & a separate lane	43%
Bus service on fixed routes where you live	43%
Bus service between suburbs and downtown Tulsa	40%
Carpools or vanpools	30%
Paying a toll to use an uncongested lane when other lanes are backed up	28%

Modes of Transit Preferences

The survey also asked about modes of transit or alternatives transportation that would be most likely for the respondent to utilize if it were available. Many favored rail service over improved bus service with 52% indicating they would be likely or very likely to use rail service to downtown and 51% choosing streetcar service to locations for shopping/recreational use. Bus service rated somewhat lower with "rapid bus" service being favored

by two points over regular bus service. Park-and-ride lots were also popular among respondents with 46% saying that they would be likely to use that option.

The $100 Question

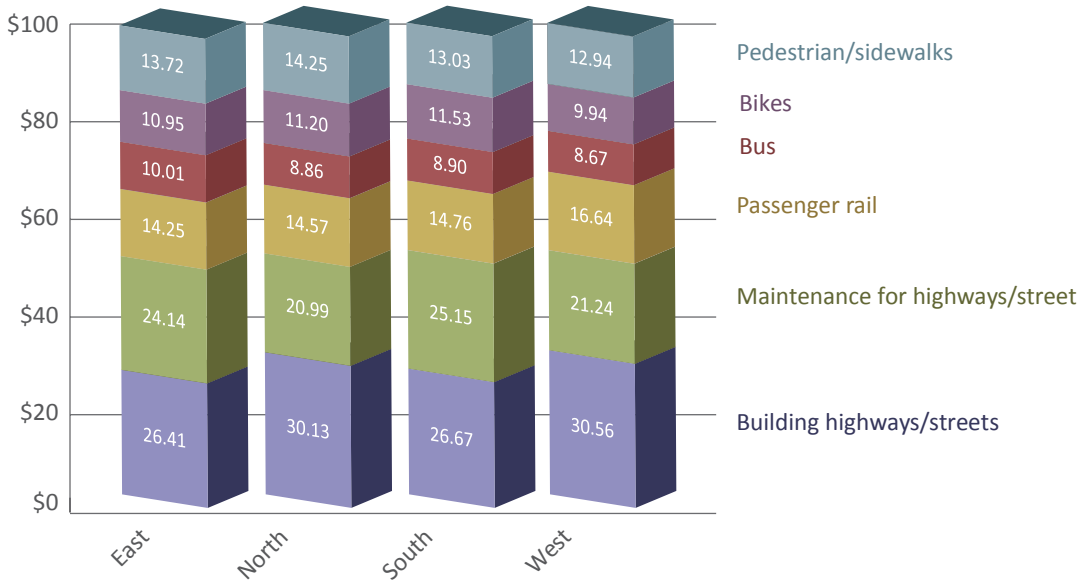
A question that helps to get a good grasp on the priorities of transportation is an often used "$100 Question" that asks respondents to divide $100 among transportation modes commonly supported by tax dollars. Respondents were asked to allocate among three modes: highways & streets, public transportation and bicycle/pedestrian. The results are shown in Table 3.7 and are compared with the most recent spending allocation for federal funds in the Tulsa Transportation Management Area. The results clearly show that citizens want a shift in the way transportation dollars are spent.

Table 3.7 : $100 Question Results

Transportation Mode	2009-2010 Transportation Spending (Tulsa Metro Area)*	Survey Results
Highways and Streets	$80	$52
Public Transportation	$17	$28
Bicycle/Pedestrian	$3	$20
TOTAL	$100	$100

*Source: INCOG

Figure 3.6 : $100 Question by Region



These $100 question results were consistent by region of the metropolitan area as shown in Figure 3.6. Very little variance between these results suggests regional consensus on funding allocation for transportation modes is strong. This result indicates that citizens in the Tulsa Metro may be ready to shift from an 80/20 split between highways and alternative transportation to something closer to a 50/50 split.

In-Depth Interviews

Collective Strength conducted 111 "In-Depth Interviews" (IDIs) with regional stakeholders to determine attitudes about public transportation and how it fit into the goals of the organizations the stakeholders represented. Interviewees were selected to represent a cross-section of the community geographically and based on interest. Representatives included business leaders, elected officials, philanthropic organizations, minority leaders, academic institutions, healthcare providers, advocacy groups, railroad operators, transportation officials, city planners and many others. A complete list can be found in Appendix A. Care was taken to ensure that the participants represented a geographic cross-section of the Tulsa metropolitan area.

The 111 in-depth interviews (IDIs) were designed to get a solid understanding of how leaders in the region were thinking with regard to transit. The interviews were conducted in November 2010 with the understanding that the individual comments would be kept confidential, but that the summary results would be released to the public. Table 3.8 lists the questions that were asked during the IDIs.

In summary, the interviews reflected similar sentiments as the randomly selected phone poll. There were several themes that emerged from the IDIs:

- Community leader feedback was largely congruent with the polling data. There was no significant incongruence
- A "chasm" exists between those who are interested only in rail options and those who want the existing bus system fixed first
- The perception of Tulsa Transit is anemic. Many interviewees commented that the transit system is not "visible" and that its services are not well understood by the general public
- Overpowering interest in light rail. Very "ho-hum" about Bus Rapid Transit, trolley, streetcars. Reasons given were tied to economic development considerations and ridership expectations

- Bicycle & pedestrian support, but not as "transportation" instead for recreation
- Concern about funding. No real sense about what is possible
- Dreams vs. Constraints – some tension exists
- Deep connection to the human side of transportation

Because most of the questions in the IDIs were open ended questions, analyzing the results quantitatively was difficult. To mitigate this challenge, a "wordle" was constructed to determine the themes from the comments on Question #1, "When you think about public transportation in the Tulsa region, what is the first word that comes to mind?" A wordle allows the words recorded in the 111 interviews to be compiled into a single graphic shown in Figure 3.7. It paints a clearer picture of the themes as the number of times the word appeared dictates the size and position of the word. The most common themes for this question were the words "inadequate," "bus," "lacking," and "limited."

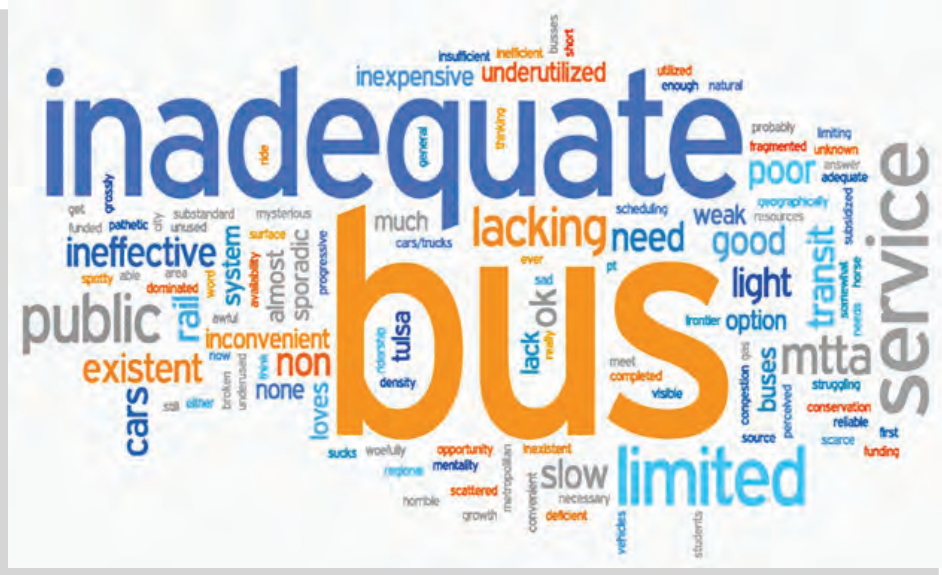


Figure 3.7 : The First Word That Comes to Mind When Asked About Public Transit in the Tulsa Region

Table 3.8 : Selected Questions for the In-Depth Interviews

1.	When you think about public transportation in the Tulsa region, what is the first word that comes to mind?
2.	On a scale of one to ten, how satisfied are you with the public transportation in the region? Why is that? 1 = unsatisfactory, 10 = excellent service
3a.	Have you taken public transportation in Tulsa?
3b.	Have you taken public transportation in other cities?
4.	What is your highest hope for public transportation in your region?
5.	What is your biggest fear about public transportation?
6.	What would an ideal public transportation look like?
7.	If that public transportation system existed today, what groups of people would benefit most? (If asked, meaning businesses? Students? Lower income working people?)
8.	What are the most important priorities for you regarding public transportation?
9.	What concerns or ideas do you have about funding public transportation options?
10a.	Please provide your comments on each of the following: Improving existing bus services
10b.	Adding express bus services or bus rapid transit
10c.	Passenger rail or commuter rail
10d.	Fast train service between Tulsa and other cities
10e.	Adding Streetcars or trolley systems
10f.	Building a light rail system
10g.	Adding bike lanes, bike trails or other bike facilities
10h.	Building or improving sidewalks and other pedestrian facilities
10i.	Improving the movement of freight in and out of Tulsa
11.	Of the list we just went through, which should the highest priorities? Which should be the lowest?

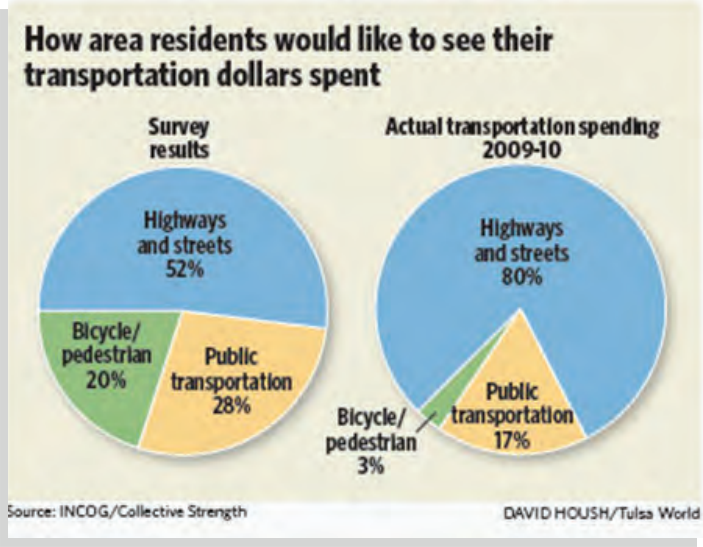
Media Coverage

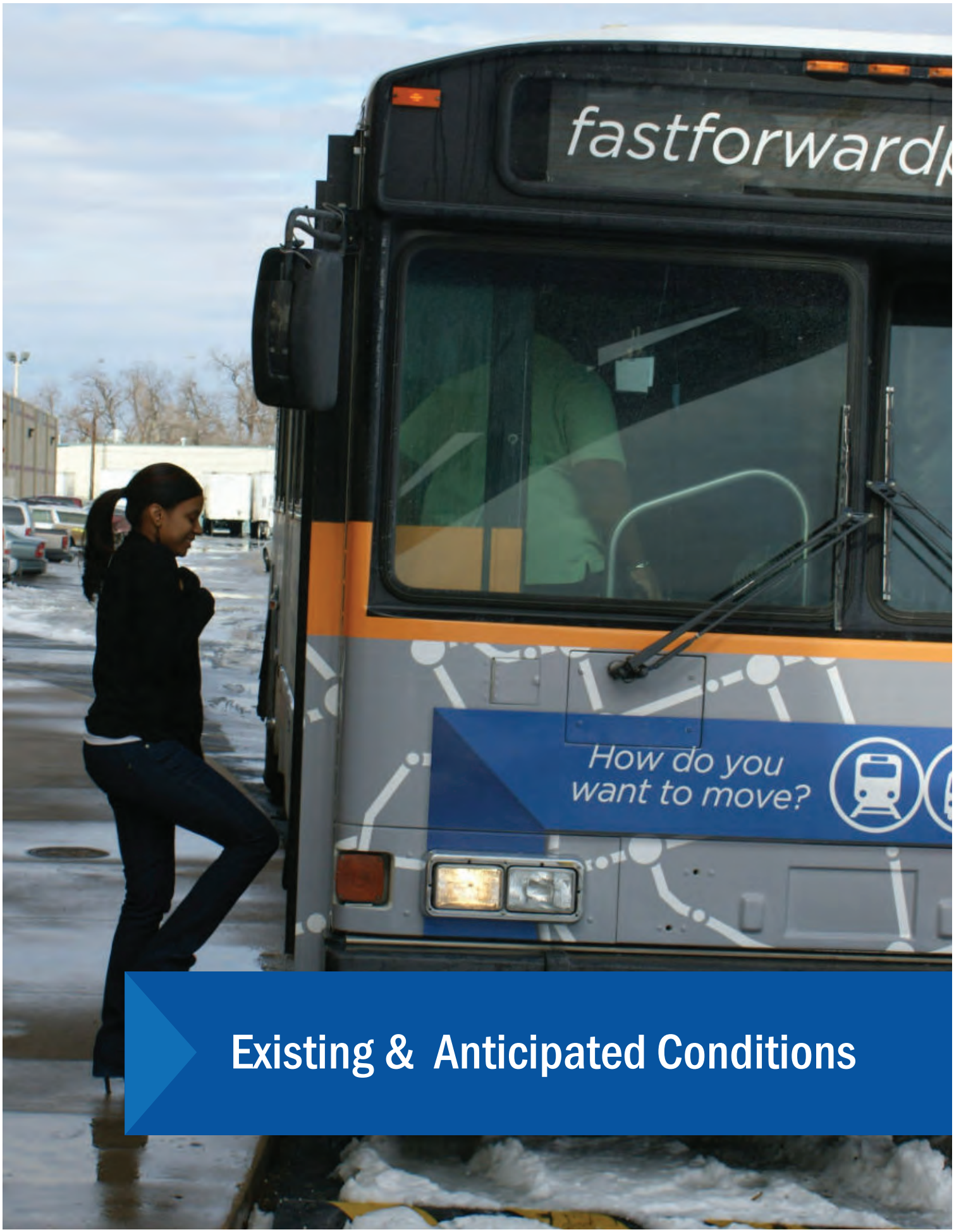
The Tulsa World covered a story on the survey results in its March 10, 2011 edition. The story highlighted the difference between the allocation of funds among highways & streets, bicycle/pedestrian, and transit modes. Figure 3.8 is an image from the article.

In addition, the March 23, 2011 edition of Studio Tulsa, a locally renowned half-hour radio program hosted by Rich Fisher on KWGS 89.5 FM, included an interview with Robin Rather, CEO of Collective Strength where the results of the survey and In-Depth Interviews were discussed. The interview can be accessed in the archives of KWGS at www.kwgs.org.

A complete listing of media coverage for all aspects of the FAST Forward project can be found in Appendix A.

Figure 3.8 : Tulsa World Coverage on Survey Results





Existing & Anticipated Conditions

Existing & Anticipated Conditions

Demographic and Economic

Population Estimates & Forecasts

The Tulsa Transportation Management Area population grew from 705,994 in 2000 to 778,051 in 2010, an increase of 1.02% per year. This is faster than the annual rate of Oklahoma's population growth during the same period (0.87%) and makes the Tulsa region one of the fastest growing in the State. Table 4.1 summarizes the historic population growth and increases in densities for each county within the region.

More than 56% of the overall population growth in the region occurred in Tulsa County (40,104), while 20% (14,324) occurred in Wagoner County, 17% (12,207) in Rogers County, 6% (3,964) in Osage County and 2% (1,458) in Creek County, respectively. Tulsa, Rogers and Wagoner counties experienced similar yearly increases in densities (6.83, 5.96 and 5.95 persons per square mile, respectively) while Osage and Creek counties experienced less than one fourth (1.54 and 0.94 persons per square mile, respectively) of the yearly increase experienced by Tulsa county.

The Tulsa region is expected to grow from 778,051 in 2010 to 1,030,471 in 2035, an increase of 1.3% per year. This is an increase of approximately 0.28% per year than that observed between 2000 and 2010 (1.02%), which is consistent with the rates utilized by the Oklahoma Data Center. Table 4.2 displays the projected population growth and increases in densities for each county within the Tulsa Transportation Management Area.

Table 4.1 : County-level Population and Densities, 2000-2010

Demographic	County*	Persons				Density (persons per sq. mile)		
		2000	2010	Yearly Growth	% Increase	2000	2010	Yearly Growth
Population	Creek	38,181	39,639	146	0.4%	247.13	256.56	0.94
	Osage	20,521	24,485	396	1.9%	79.95	95.39	1.54
	Rogers	45,619	57,826	1,221	2.7%	222.77	282.38	5.96
	Tulsa	563,299	603,403	4,010	0.7%	959.69	1,028.01	6.83
	Wagoner	38,374	52,698	1,432	3.7%	159.35	218.83	5.95
	TOTALS	**705,994**	**778,051**	**7,206**	**1.0%**	**489.01**	**538.92**	**4.99**

** Represents the Transportation Management Area (TMA), which includes all of Tulsa County and part of Creek, Osage, Rogers and Wagoner counties.*

Table 4.2 : County-level Population and Densities, 2010-2035

Demographic	County*	Persons				Density (persons per sq. mile)		
		2010	2035	Yearly Growth	% Increase	2000	2035	Yearly Growth
Population	Creek	39,639	52,685	522	1.3%	256.56	341.00	3.38
	Osage	24,485	33,197	348	1.4%	95.39	129.34	1.36
	Rogers	57,826	94,164	1,454	2.5%	282.38	459.82	7.10
	Tulsa	603,403	771,381	6,719	1.1%	1,028.01	1,314.20	11.45
	Wagoner	52,698	79,044	1,054	2.0%	218.83	328.23	4.38
	TOTALS	**778,051**	**1,030,471**	**10,097**	**1.3%**	**538.92**	**713.75**	**6.99**

** Represents the Transportation Management Area (TMA), which includes all of Tulsa County and part of Creek, Osage, Rogers and Wagoner counties.*

More than 67% of the overall population growth projected in the region is anticipated to occur in Tulsa County (167,978), while 14% (36,338) is expected in Rogers County, 10% (26,346) in Wagoner County, 5% (13,046) in Creek County and 3% (8,712) in Osage County. Tulsa and Rogers counties are expected to experience the highest yearly increases in densities (11.45 and 7.10 persons per square mile, respectively) while Wagoner and Creek counties are anticipated to experience less than one half (4.38 and 3.38 persons per square mile, respectively) of the yearly increase experienced by Tulsa County. Osage County is estimated to experience only a slight increase in densities (1.36 persons per square mile).

Figure 4.1 displays the historic and projected population growth of Creek, Osage, Rogers, Tulsa and Wagoner counties.

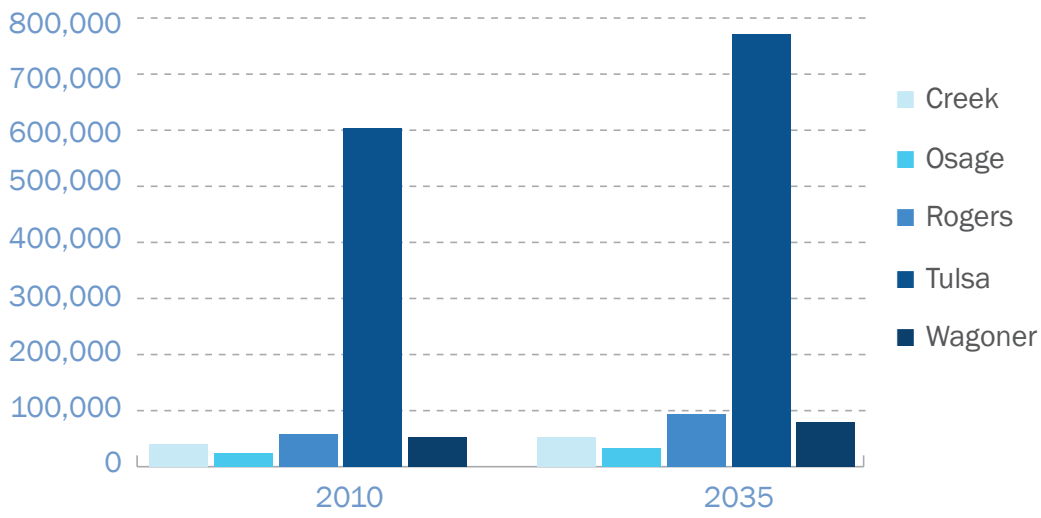
Every household within the Tulsa Transportation Management Area demands goods and services and will generate trips for work, school, shopping, errands, etc. As such, these trends indicate that the Tulsa region will experience increased demand on its transportation infrastructure for the next 24 years; therefore the historic and projected population growth alone will require additional transportation infrastructure preservation, expansion and maintenance.

Employment Estimates & Forecasts

The Tulsa Transportation Management Area has grown consistently over recent years. According to the United States Bureau of Economic Analysis, its gross domestic product, a measure of the value of all goods and services produced, grew from $31 billion in 2001 to $47 billion in 2009 (a 6% yearly increase). The Tulsa region's expanding economy has created employment opportunities for its growing labor force.

Employment within the Tulsa region grew from 420,021 in 2000 to 421,387 in 2005, an increase of 0.07% per year. This is a fairly slow rate of growth, but does indicate a stable regional economy. Table 4.3 summarizes the historic employment and density changes for each county within the region.

Figure 4.1 : Historic and Projected Population Change, 2010-2035



More than 66% of the overall employment growth in the Tulsa region occurred in Rogers County (9,465), while 15% (2,105) occurred in Wagoner County, 14% (1,984) in Creek County and 5% (721) in Osage County. Tulsa County observed a decline in employment of a little more than 3%. Rogers County experienced the highest yearly increases in employment density

Table 4.3 : County-level Employment and Densities, 2000-2005

Demographic	County*	Persons				Density *(persons per sq. mile)*		
		2000	2005	Yearly Change	% Change	2000	2005	Yearly Growth
Population	Creek	13,061	15,045	397	3.0%	84.54	97.38	2.57
	Osage	2,323	3,044	144	6.2%	9.05	11.86	0.56
	Rogers	16,742	26,207	1,893	11.3%	81.75	127.97	9.24
	Tulsa	384,559	371,650	-2,582	-0.7%	655.17	633.18	-4.40
	Wagoner	3,336	5,441	421	12.6%	13.85	22.59	1.75
	TOTALS	**420,021**	**421,387**	**273**	**0.1%**	**290.93**	**291.87**	**0.19**

** Represents the Transportation Management Area (TMA), which includes all of Tulsa County and part of Creek, Osage, Rogers and Wagoner counties.*

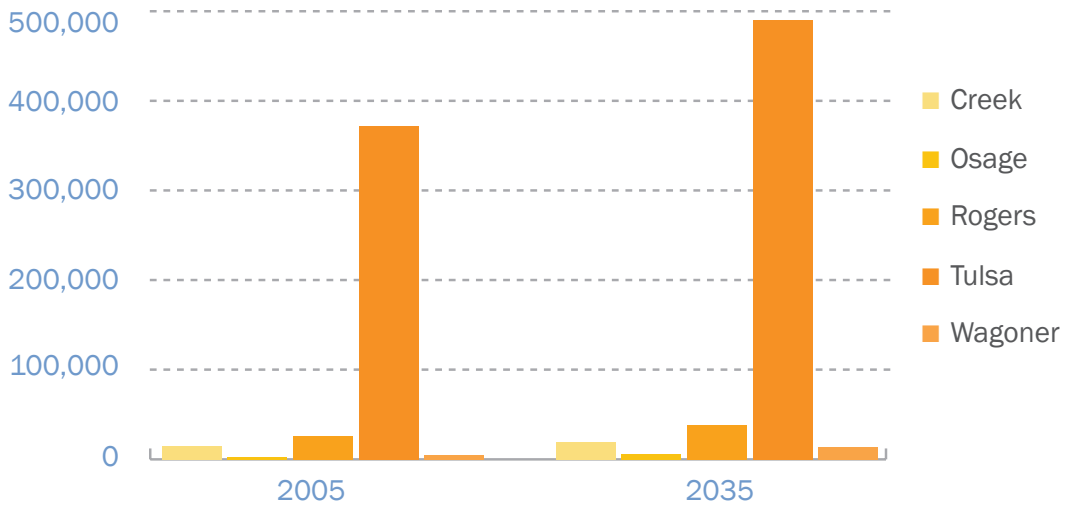
Table 4.4 : County-level Employment and Densities, 2005-2035

Demographic	County*	Persons				Density (persons per sq. mile)		
		2005	2035	Yearly Change	% Change	2005	2035	Yearly Growth
Population	Creek	15,045	19,908	162	1.1%	97.38	128.85	1.05
	Osage	3,044	5,638	86	2.8%	11.86	21.97	0.34
	Rogers	26,207	38,245	401	1.5%	127.97	186.76	1.96
	Tulsa	371,650	490,121	3,949	1.1%	633.18	835.02	6.73
	Wagoner	5,441	14,282	295	5.4%	22.59	59.31	1.22
	TOTALS	**421,387**	**568,194**	**4,894**	**1.2%**	**291.87**	**393.56**	**3.39**

** Represents the Transportation Management Area (TMA), which includes all of Tulsa County and part of Creek, Osage, Rogers and Wagoner counties.*

(9.24 persons per square mile) three times higher than Creek and Wagoner counties (2.57 and 1.75 persons per square mile, respectively). Meanwhile, Osage County observed a slight increase in density (0.56 person per square mile) and Tulsa County witnessed a yearly decrease in density (-4.40 persons per square mile).

Figure 4.2 : Historic and Projected Employment Change, 2005-2035



Employment within the Tulsa region is expected to grow from 421,387 in 2005 to 568,194 in 2035, an increase of 1.2% per year. This is an increase of approximately 1.09% per year than that observed between 2000 and 2005 (0.07%). Table 4.4 displays the projected growth in employment and increases in densities for each county within the region.

More than 81% of the overall employment growth within region occurred in Tulsa County (118,471), while 8% (12,038) occurred in Rogers County, 6% (8,841) in Wagoner County, 3% (4,863) in Creek County and 2% (2,594) in Osage County. Tulsa County is expected to experience the highest yearly increases in densities (6.73 persons per square mile) while Rodgers, Wagoner and Creek counties are anticipated to experience less than one third (1.96, 1.22 and 1.05 persons per square mile, respectively) of the yearly increase experienced by Tulsa County. Osage County is estimated to experience only a slight increase in densities (0.34 persons per square mile).

Figure 4.2 displays the historic and projected growth employment of Creek, Osage, Rogers, Tulsa and Wagoner counties.

As with households, every job within the Tulsa region generates trips from the delivery of supportive goods and services. As such, these trends further support the need to preserve, expand and maintain the region's transportation infrastructure.

Notable Trends & Shifts

The Tulsa Transportation Management Area (TMA) is forecasted to grow at reasonable rates between 2010 and 2035. Population is expected to grow by 32% (252,420) while employment is forecast to grow 35% (146,807). While most of the additional people and jobs will be in Tulsa County, the other four counties are forecast to grow more rapidly, and some of the heavy concentrations of growth are expected to occur in those counties. This growth will place greater demands on the region's transportation infrastructure for the next 24 years, while the greater densities expand the options available to implement cost-effective multimodal solutions.

In 2010, Tulsa County's population was 78% of the regional total; while in 2035 it is projected to be 74% of the total.

This stems largely from the slightly higher anticipated rate of population growth in the surrounding four counties. In addition, 65% of the total regional population growth is expected to occur within Tulsa County. It should also be noted that although Tulsa County has the lowest percent of population growth (31%) when compared to the other four counties, it is expected to experience the highest growth in population density adding approximately 202 persons per square mile. In 2005, Tulsa County's employment was 88% of the regional total; while in 2035 it is projected to be 86% of the total. This decline in the overall percent is largely due to the high percentage of employment growth within the other four counties; however, approximately 80% of the employment growth is expected to occur within Tulsa County.

In terms of changing travel patterns, the Tulsa Transportation Management Area will continue to see strong demand for regional activity centers, such as the University of Tulsa, and major employment centers, such as downtown Tulsa. As the population increases, trip patterns to these areas become more dispersed and concentrated. This growth translates into comparable, if not greater, increases in vehicle miles traveled, vehicle emissions, fuel consumption, and accidents. This means that the planned transportation improvements cannot keep pace with the Tulsa region's growth or accommodate the congestion levels that will be experienced along corridors with substantial employment concentrations or sufficient population densities.

Census 2010 Review

Much of the data underpinning the regional travel demand forecasts were built on data released as part of the 2000 Census, including the origin and destination of workers. The question arose during development of the Plan as to how much the travel patterns of workers had changed over the previous decade. It is a simple enough question, but not one that is readily answered without a more contemporary dataset.

In early 2011, the Association of State Highway and Transportation Officials (AASHTO) along with the Census Bureau released the 2006-2008 Census Transportation Planning Package (CTPP) based on the American Community Survey (ACS). This provided the first and most obvious way to see what changes had occurred in the Tulsa region and how those changes may validate or invalidate the assumptions regarding the stability of regional travel patterns. Although traffic-analysis data from the 2006-2008 CTPP is not available, the comparisons indicated that the 2006-2008 county-to-county travel patterns are consistent with those observed in the 2000 CTPP. The result of the analysis did not identify any "red flags" and further verified that the Regional Transit System Plan was built on "reasonable" information and assumptions.

Regional Travel Demand

INCOG utilizes the regional travel demand model to predict future transportation conditions. The model integrates information from several subset models (trip generation, trip distribution, mode choice and trip assignment) to forecast travel demand on future transportation systems. The population and employment forecasts help to determine the number of trips that will be generated in specific areas of the Tulsa Transportation Management Area. (In this case, travel patterns are summarized into 29 separate travel districts.) The geographic location of people and jobs as well as the number of trips produced and attracted helps to determine how the trips will be distributed across the region. These trips are then categorized by the likely mode (drive-alone, rideshare, transit, etc.) the traveler will choose based on the utility of each mode. That is, the model considers which travel mode a traveler will select based on the actual cost of the trip, the cost of time and the accessibility to and availability of other travel modes. These trips are then assigned to transportation networks (roadway and transit) based on the capacity and operational characteristics of the systems.

Generated Person Trips

The population and employment forecasts, among other variables, are used to generate trips in terms of trips produced and trips attracted by a specific geographic coverage according to the purpose of the trip. In this case, generated home-based and non-home based trips are summarized into 29 separate travel districts covering the entire TMA. Home-based trips produced (also referred to as trip productions) within a travel district can be thought of as the residential (or household) end of a trip while trips attracted (also referred to as trip attractions) to a travel district as the employment (or job location) or activity (or shopping or school location), end of a trip. Non-home based trips are produced and attached to travel districts that are employment or activity locations. After the productions and attractions are generated by the model, it balances them to ensure the number of regional trips produced equal the number of regional attractions.

The INCOG travel demand model generates daily person trips for three (3) separate trip purposes:

- Home-Based Work (HBW)
- Home-Base Other (HBO)
- Non-Home Based (NHB)

Table 4.5 : County-level Employment and Densities, 2000-2005

Trip Purpose	Daily Person Trips			
	2005	2035	Yearly Growth	% Increase
HBW	393,288	507,256	3,799	.97%
HBO	1,233,130	1,593,480	12,012	.97%
NHB	917,664	1,183,720	8,868	.96%
TOTALS	**2,544,082**	**3,284,456**	**24,679**	**.97%**

Table 4.5 displays the growth in daily person trips within the Tulsa Transportation Management Area.

The model matches and distributes these exchanges (production to attractions) to and from all locations within the Tulsa region. As the magnitude of the productions and attractions increases so does the propensity for the exchange of trips while the spatial relationship between the locations (distance and time) detracts from the propensity of trip exchanges. This procedure generates district-to-district travel flows.

District and Activity Center Travel Flows

While regional daily person trips shows the magnitude of travel desires, it does not illustrate the exchange of trips from one area to another To do this, home-based and non-home based person trips are summed and assigned to a "spider network," which depicts the number of trips "flowing" between areas, or districts. Figure 4.3 illustrates the district boundaries used display district-to-district travel flows.

There are a total of 29 districts, covering the entire TMA. Table 4.6 provides descriptions and general characteristics for each district.

Figure 4.3 : Travel Districts

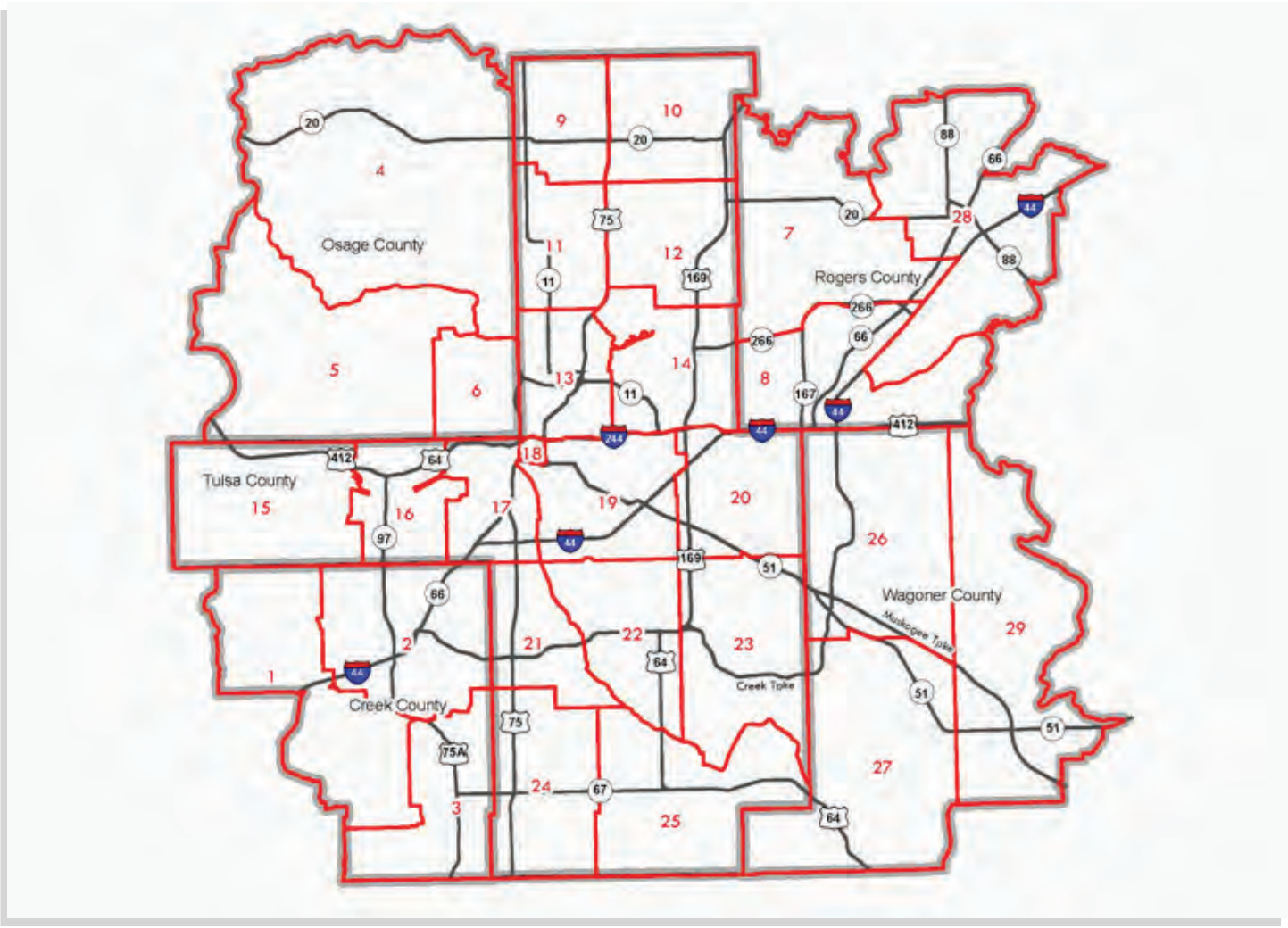


Table 4.6 : District Descriptions and Characteristics

District Number	Total Area (square miles)	Daily Person Trips			
		2005	2035	Yearly Growth	% Change
1	61.66	47,219	52,776	185	0.39%
2	53.42	113,510	156,541	1,434	1.26%
3	39.38	16,535	23,574	235	1.42%
4	146.11	27,285	40,867	453	1.66%
5	90.62	19,088	27,873	293	1.53%
6	19.91	18,816	29,849	368	1.95%
7	68.93	41,206	71,882	1,023	2.48%
8	52.21	75,562	94,330	626	0.83%
9	25.69	10,405	14,616	140	1.35%
10	38.25	39,746	52,920	439	1.10%
11	27.04	12,659	18,459	193	1.53%
12	35.39	87,264	123,743	1,216	1.39%
13	26.72	171,136	225,719	1,819	1.06%
14	38.13	113,732	167,808	1,803	1.58%
15	51.90	22,012	31,962	332	1.51%
16	25.85	80,392	108867	949	1.18%
17	23.37	113,858	160,187	1,544	1.36%
18	1.40	112,698	191,010	2,610	2.32%
19	39.71	607,966	832,644	7,489	1.23%
20	36.05	295,833	410,534	3,823	1.29%
21	25.67	50,579	100,794	1,674	3.31%
22	37.02	390,057	513,305	4,108	1.05%
23	53.48	292,400	380,130	2,924	1.00%
24	43.38	51,221	75,881	822	1.60%
25	57.81	27,438	42,916	516	1.88%
26	71.18	72,747	109,545	1,227	1.69%
27	84.94	47,552	85,909	1,279	2.69%
28	83.45	125,192	155,264	1,002	0.80%
29	84.91	32,839	33,046	7	0.02%

The spider networks in the following figures represent district nodes and links. The nodes depict the center point of the district whereas the links have distances that represent the only loading constraint to the flow of travel. Trip are allowed to pass though district nodes during the assignment, which is determined by the path that provides the shortest possible path according to travel time. Figure 4.4 and Figure 4.5 illustrate the 2005 and 2035 district-to-disctrict travel flows.

Figure 4.4 : Daily Person District-to-District Travel Flows (2005)

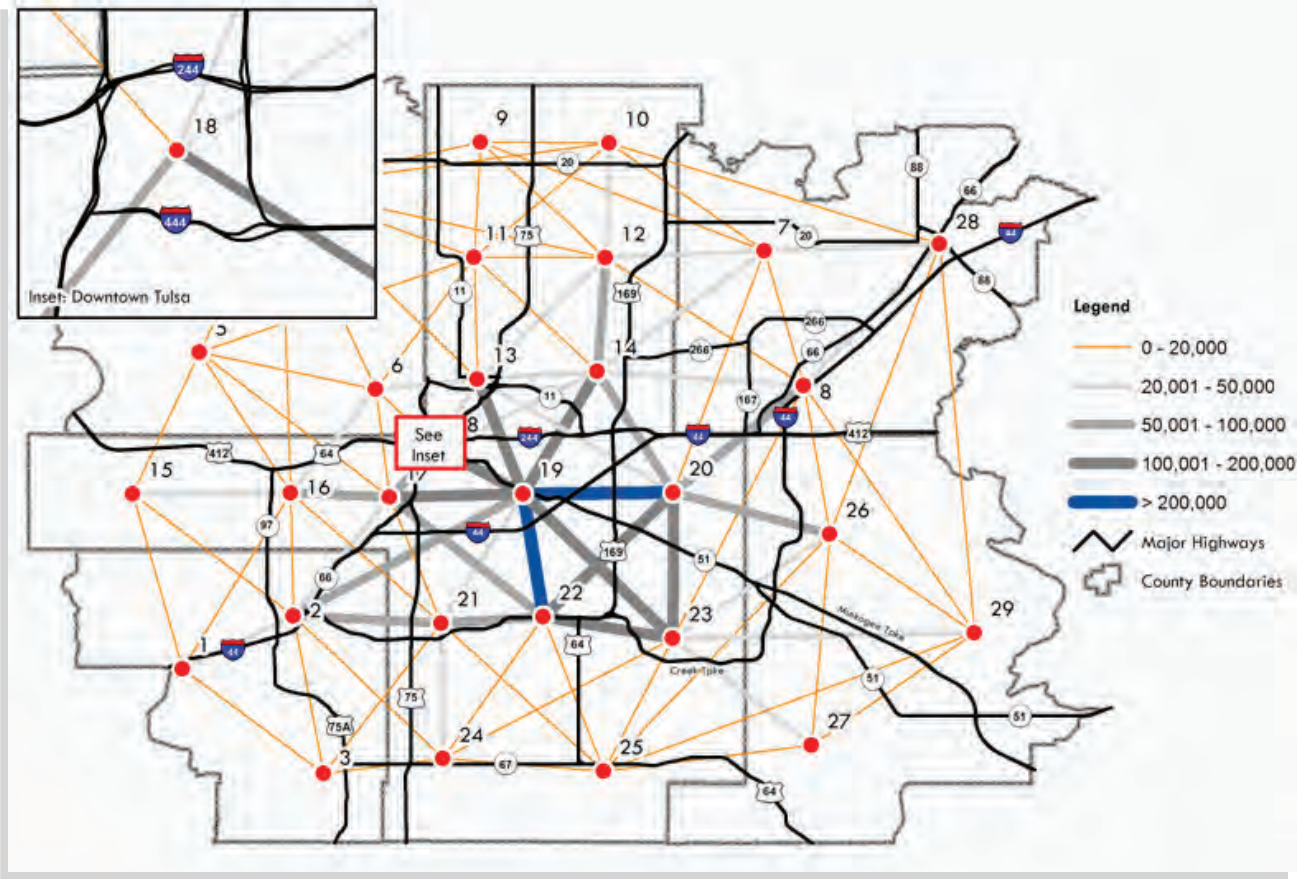
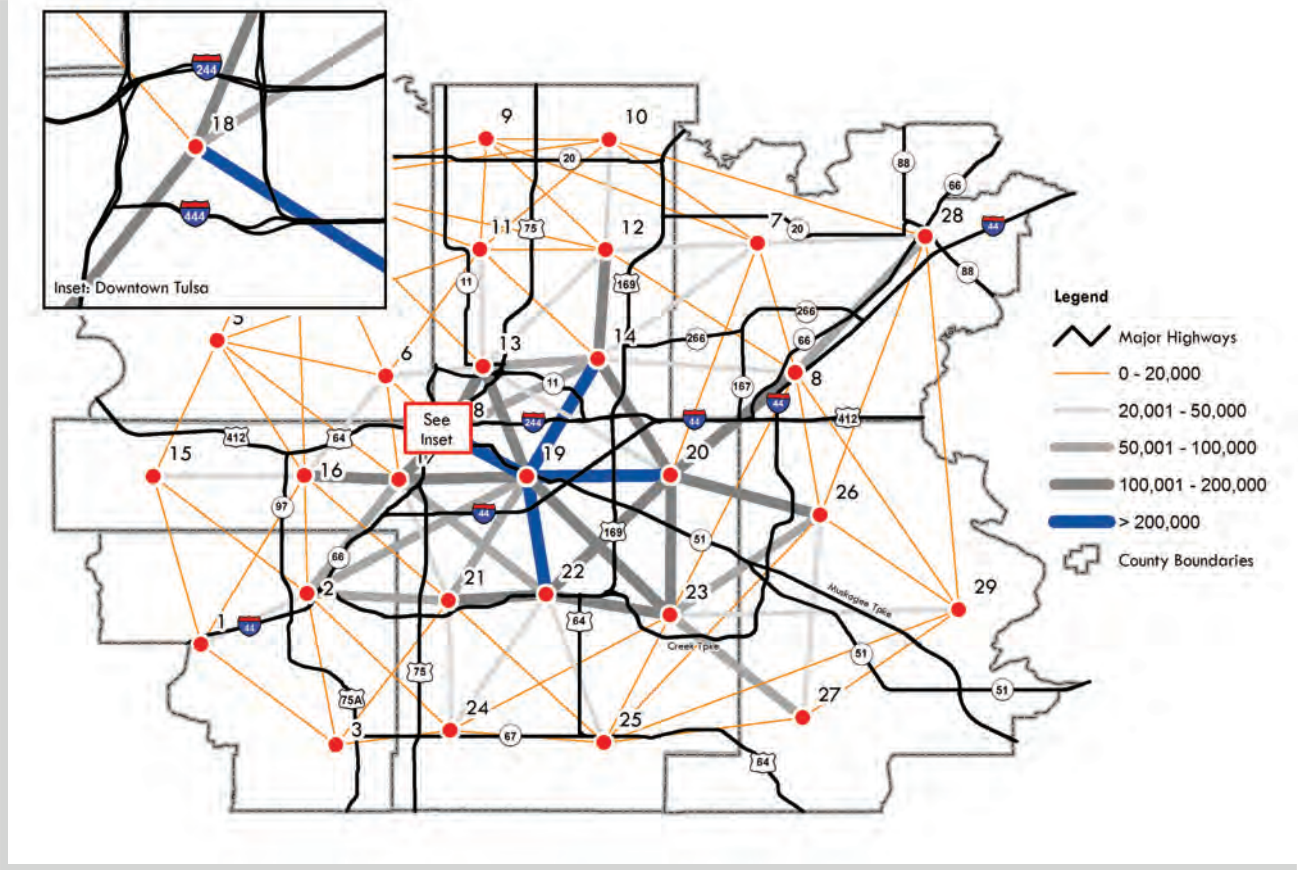


Figure 4.5 : Daily Person District-to-District Travel Flows (2035)



To better understand the directionality of trip attractions, the top five activity centers were isolated and assigned to a spider network. Figure 4.6 through Figure 4.13 illustrate the daily person trips to the following activity centers:

- Total 2005 and 2035 daily person trips to the Tulsa Airport
- Total 2005 and 2035 daily person trips to the Tulsa Promenade
- Total 2005 and 2035 daily person trips to the Eastgate Metroplex
- Total 2005 and 2035 daily person trips to the Woodland Hills Mall

Figure 4.6 : Daily Person Travel Flows to the Tulsa Airport (2005)

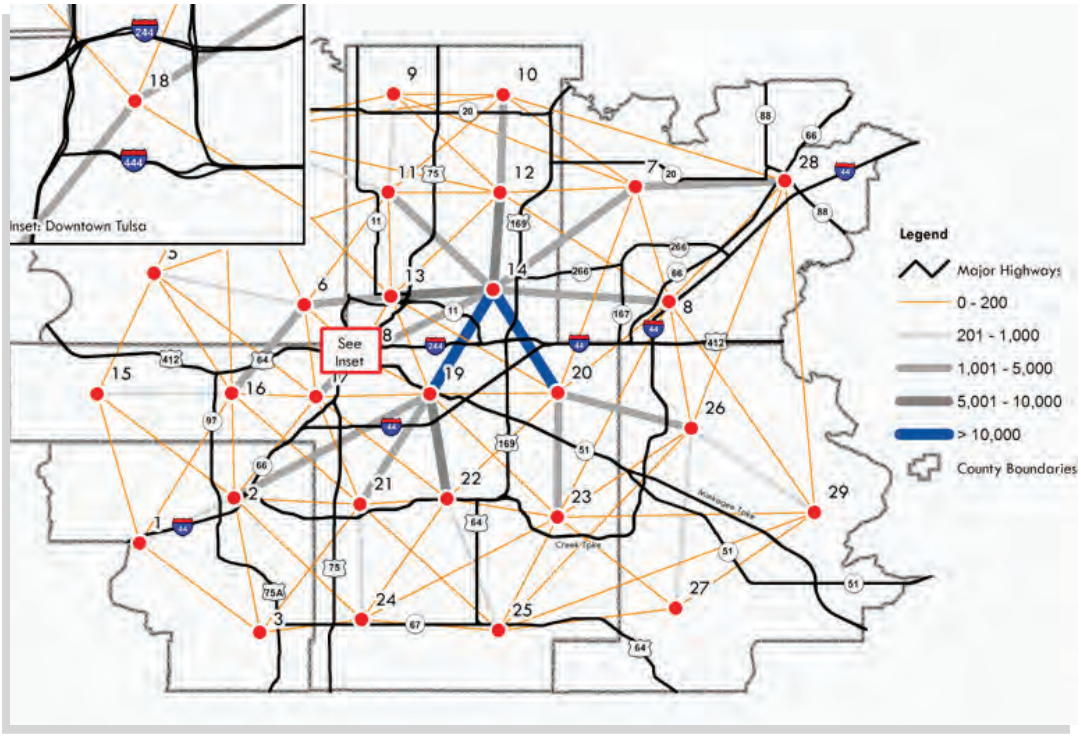


Figure 4.7 : Daily Person Travel Flows to the Tulsa Airport (2035)

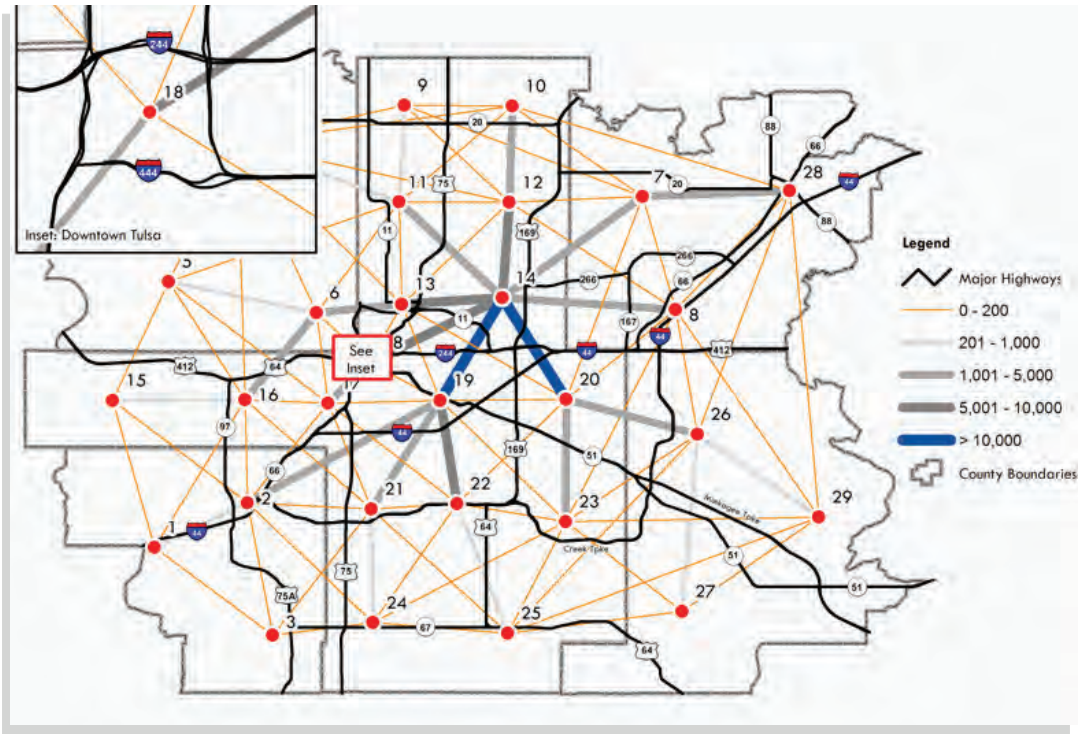


Figure 4.8 : Daily Person Travel Flows to the Tulsa Promenade (2005)

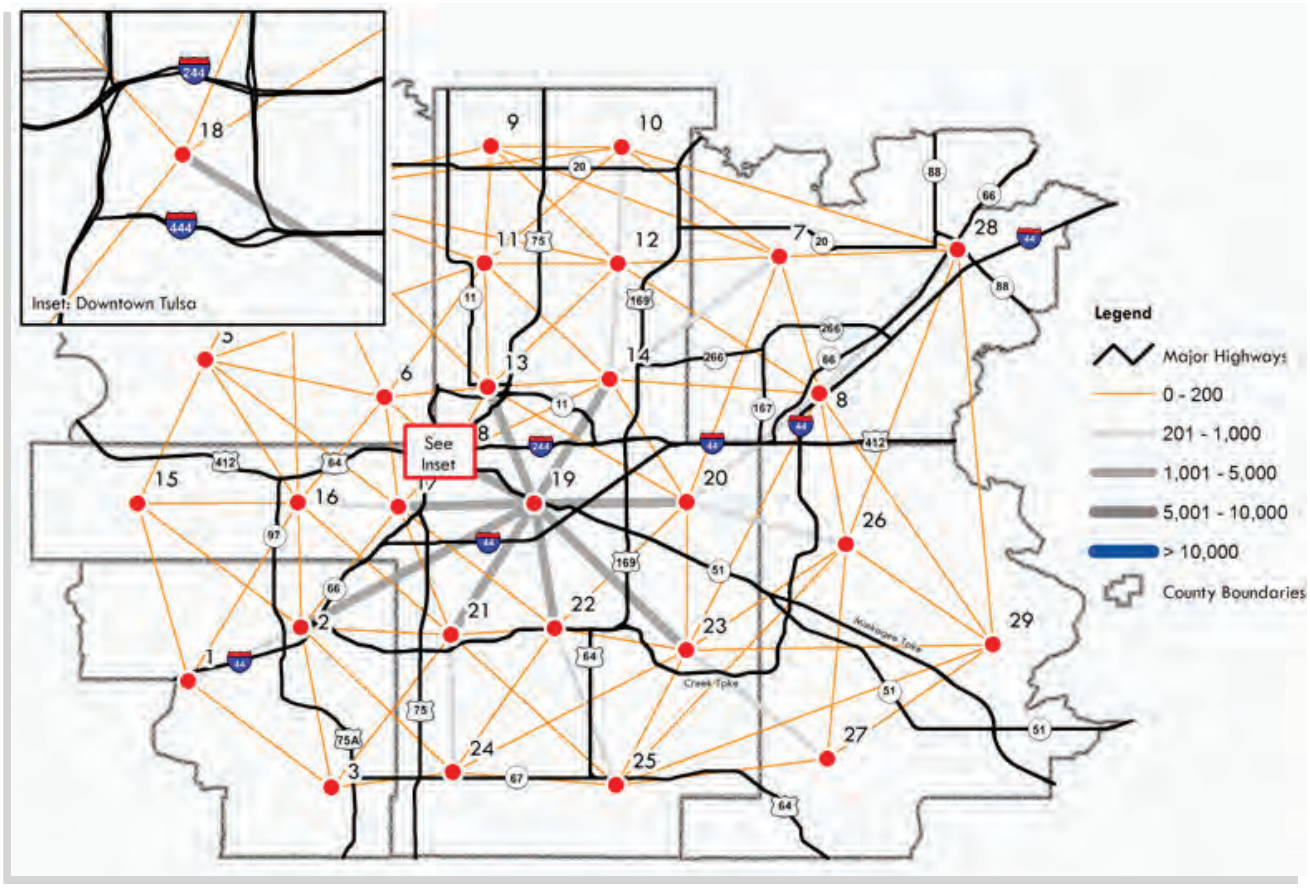


Figure 4.9 : Daily Person Travel Flows to the Tulsa Promenade (2035)

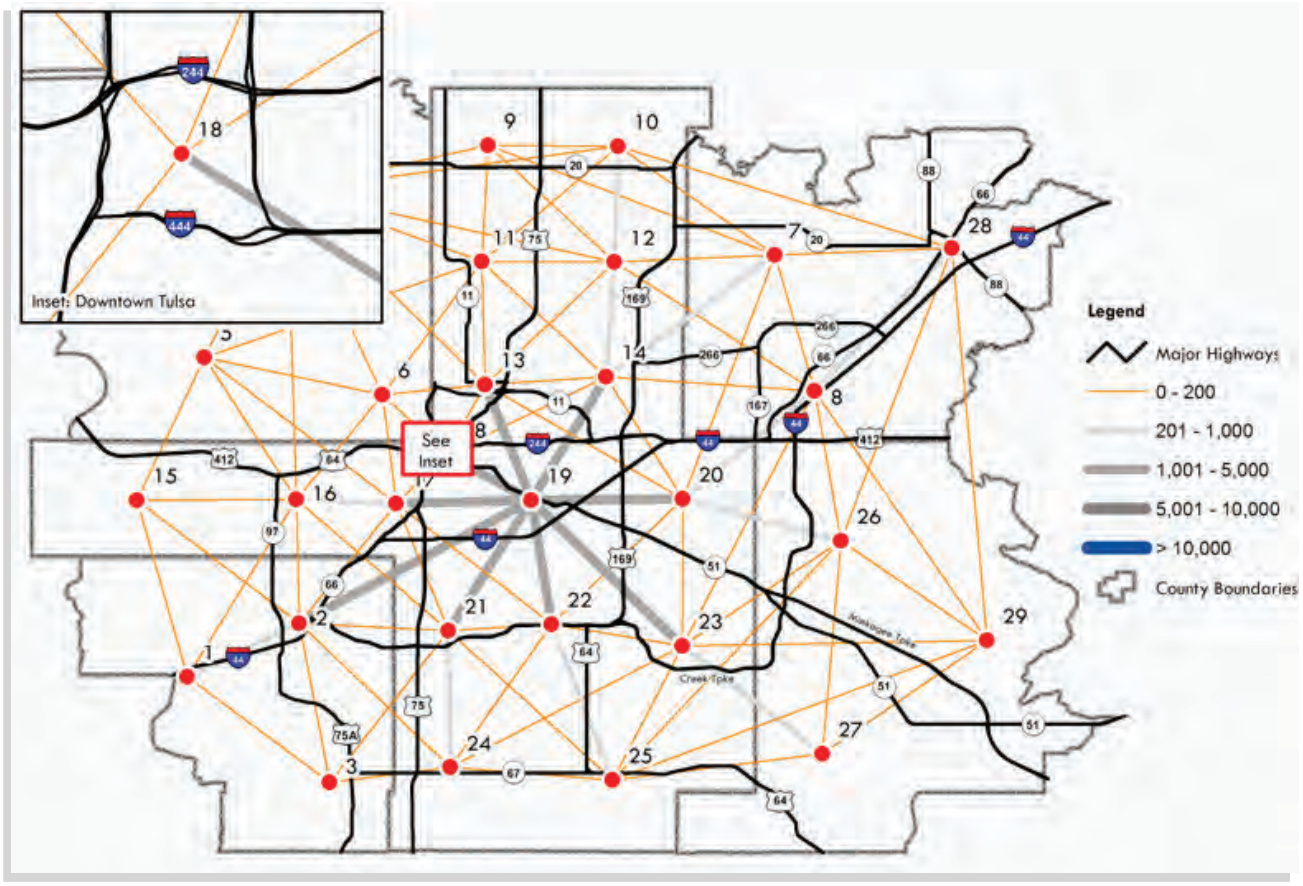


Figure 4.10 : Daily Person Travel Flows to the Eastgate Metroplex (2005)

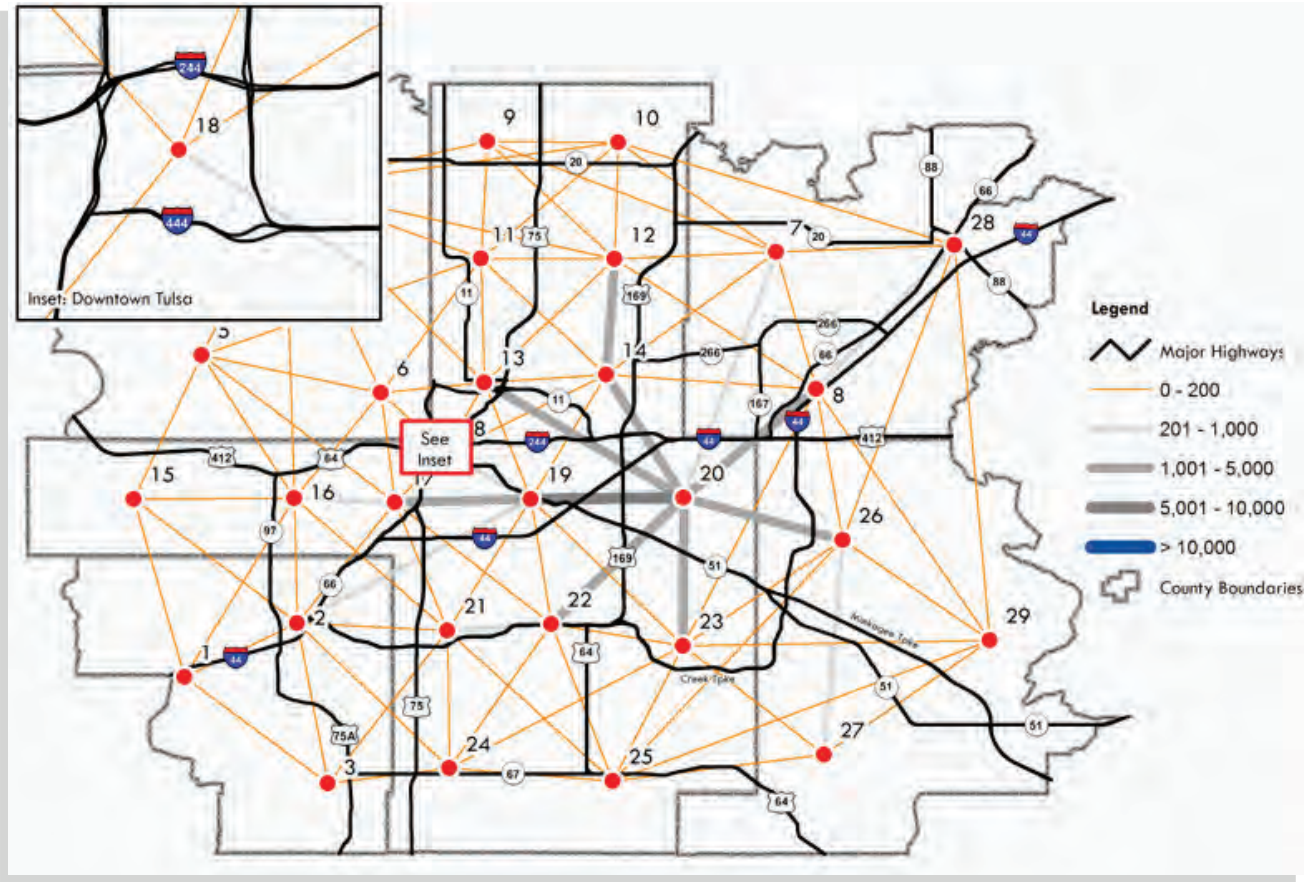


Figure 4.11 : Daily Person Travel Flows to the Eastgate Metroplex (2035)

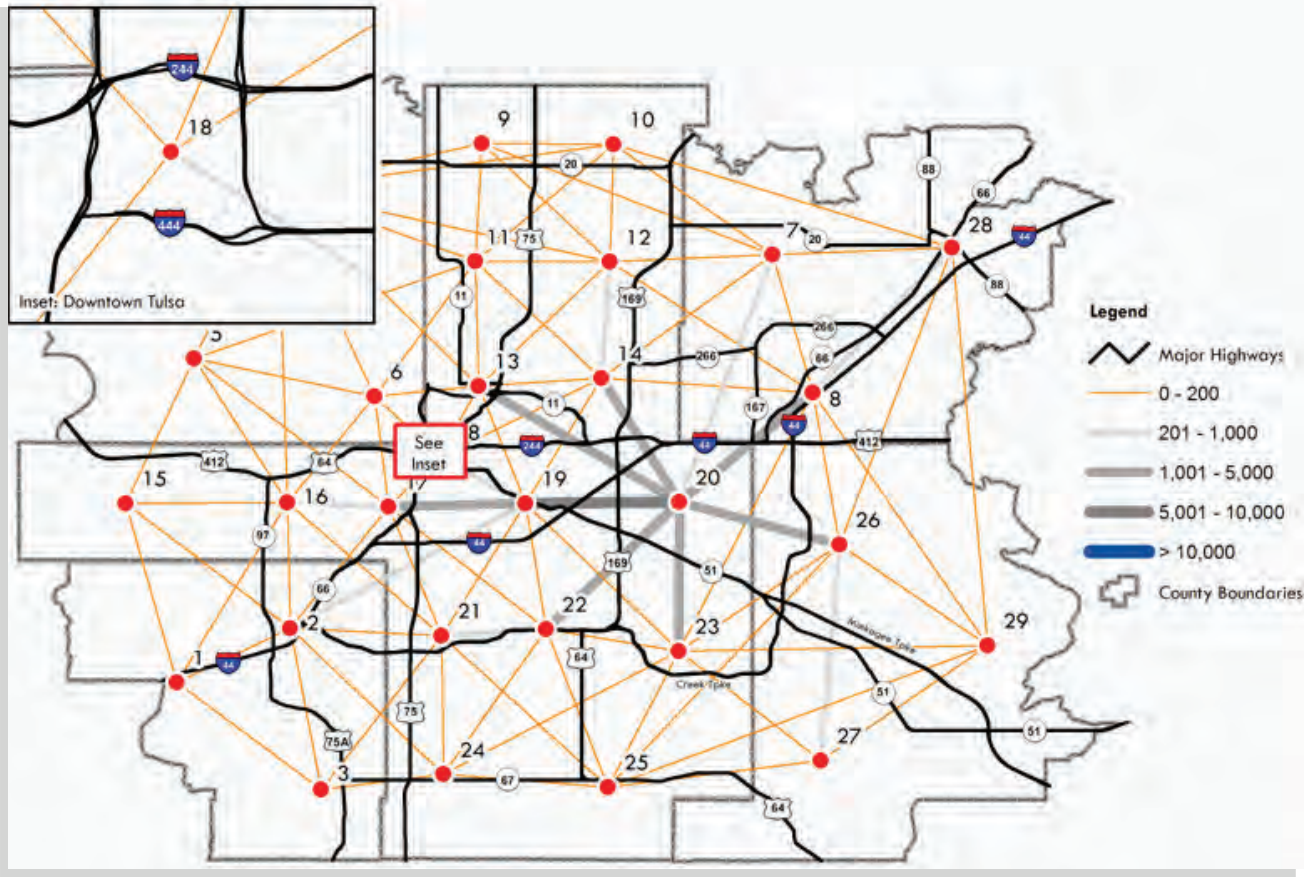


Figure 4.12 : Daily Person Travel Flows to the Woodland Hills Mall (2005)

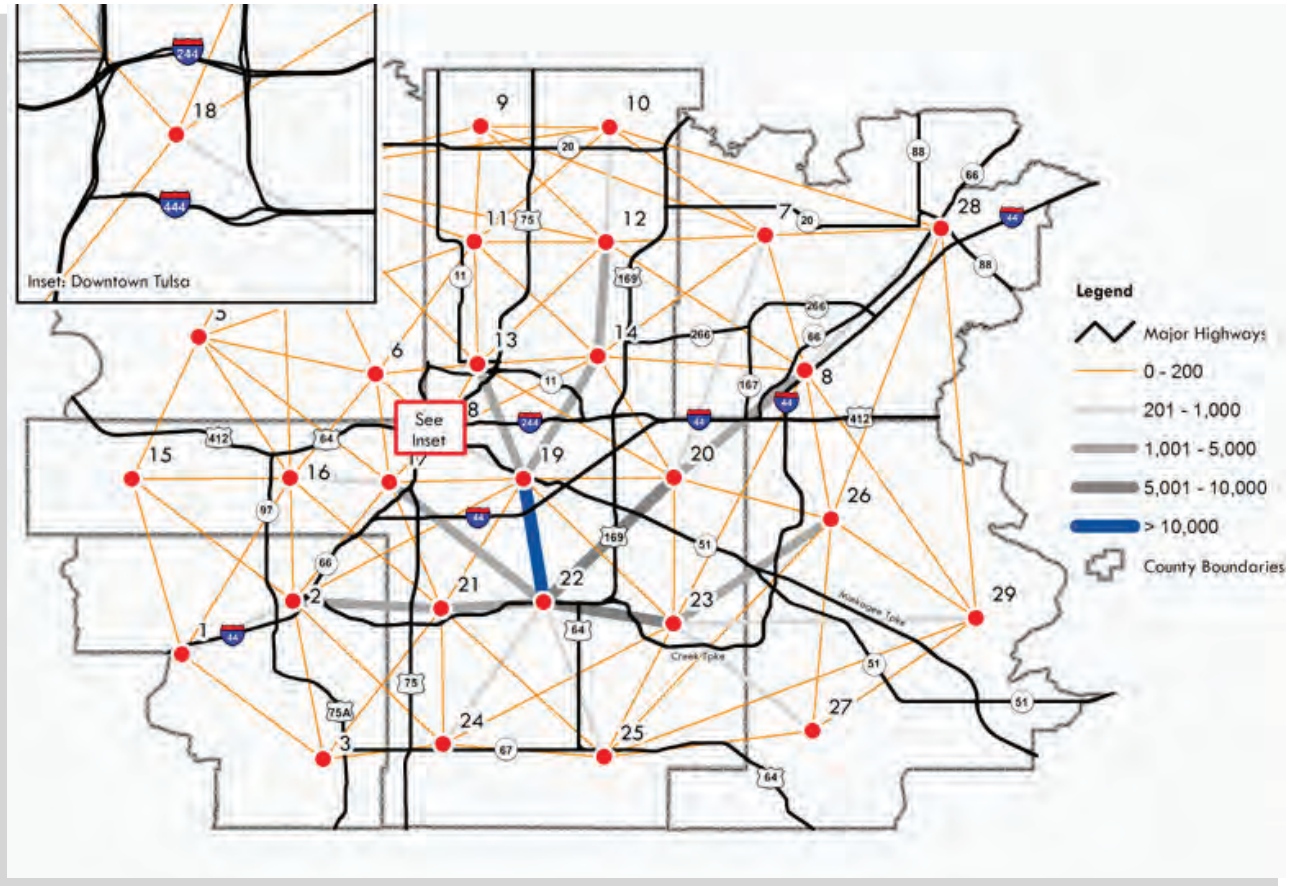
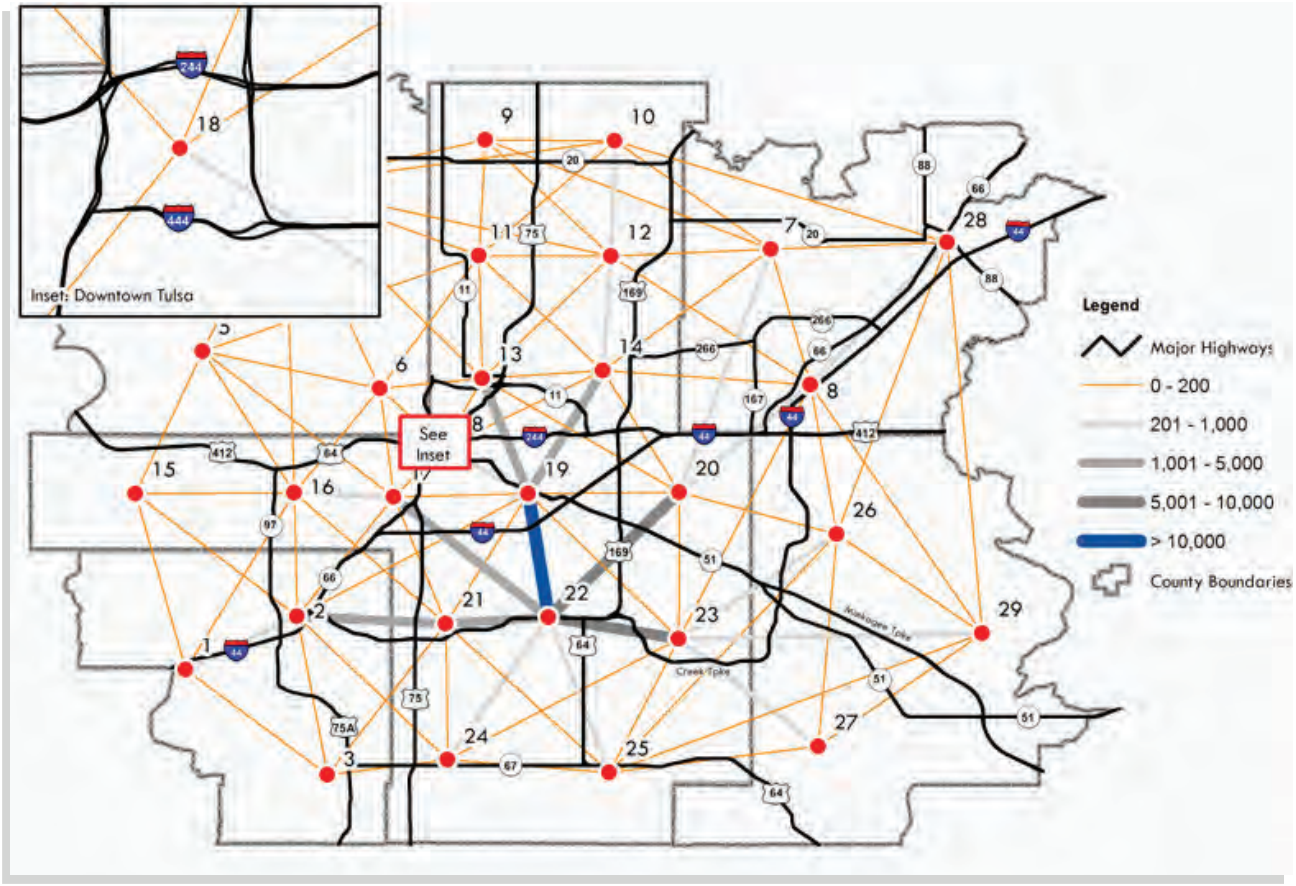


Figure 4.13 : Daily Person Travel Flows to the Woodland Hills Mall (2035)



Regional Transit Trips

The travel demand model outputs three transit trip purposes segmented into two time periods by mode-of-access (walk or drive). The model categorized trip purposes and time periods into three separate groups:

- HBW, Peak Period
- HBO, Off-peak Period
- NHB, Off-peak Period

Table 4.7 summarizes 2005 and 2035 person trip total by transit mode-of-access. These trips represent linked trip forecasts and do not reflect transfer boardings.

The 2035 trips assume that Tulsa Transit maintains similar service parameters as in 2005.

Table 4.7 : Linked Transit Person Trips (2005-2035)

Forecast Year	Mode of Access	Peak Period	Off-Peak Period		Daily Total
		HBW	HBO	NHB	
2005	Walk	3,459	2,155	2,481	8,095
	Drive	90	-	-	90
	Totals	3,549	2,155	2,481	8,185
2035	Walk	4,214	3,282	2,552	10,048
	Drive	60	-	-	60
	Total	4,274	3,282	2,552	10,108
Total Change	Walk	755	1,127	71	1,953
	Drive	-30	-	-	-30
	Total	725	1,127	71	1,923
% Change	Walk	21.8%	52.3%	2.9%	24.1%
	Drive	-33.3%	-	-	-33.3%
	Total	20.4%	52.3%	2.9%	23.5%

Fixed Route Bus System

Description of Services

General public transit service within the region is currently provided by the Metropolitan Tulsa Transit Authority (MTTA, or Tulsa Transit). This system provides weekday and Saturday bus service in Tulsa, Jenks, Broken Arrow, and Sand Springs. In FY2009, it operated nearly 300,000 revenue hours and 5 million revenue miles of service on a budget of nearly $20 million, providing almost 3 million annual transit rides.

Regular service runs from 5:00 a.m. to 8:00 p.m. Monday through Friday and 7:00 a.m. to 7:00 p.m. on Saturday. Limited late-night route deviation service (Nightline) is offered on weekdays and Saturdays, which operates until 12:00 midnight. There is no service on Sundays. Complementary ADA paratransit service (the Lift Program) is offered concurrent with regular service.

The fixed route system is based on a modified grid network. While routes primarily serve either east-west or north-south arterials, some routes may cover more than one corridor. Tulsa Transit operates eighteen all-day routes, five Nightline routes, and two weekday express routes. Tulsa Transit also operates a few special event shuttles in connection with major events at the BOK Center, as well as a seasonal once-a-month service to the Tulsa Air & Space Museum and Tulsa Zoo.

Service frequencies for daily routes range from 25 minutes to over 60 minutes. In many cases headways are based on being able to provide the most frequent service given the route's cycle time, which may lead to limited ability to coordinate connections.

Tulsa Transit operates two major transit centers: the Denver Avenue Station (DAS) in downtown Tulsa, and the Memorial Midtown Station (MMS) near the junction of Broken Arrow Expressway and I-44. All but two routes connect to one or both of these transit centers. Fourteen of the eighteen daily bus routes serve DAS, as well as both express routes and all nightline routes. Eight routes serve MMS.

The DAS facility at 319 South Denver consists of ten bus bays and includes a customer service desk, restroom facilities, and an indoor passenger waiting area. The MMS facility at 7952 East 33rd Street is designed with twelve bays (nine of which are currently active), and also includes a customer service desk, restroom facilities and an indoor waiting area. Three Park-N-Ride lots serve the two express routes and are located in Broken Arrow at the Church at Battle Creek, Indian Springs Baptist Church, and Union Intermediate High School. Additionally, Tulsa Transit has arrangements to provide free parking for transit users at 13 "park and save" locations along local routes, usually churches or community facilities.

Table 4.8 presents a listing of routes, span of service and each route's service frequency by day of the week and time of day. Figure 4.14 illustrates daily routes, while Figure 4.15 shows Nightline service.

Table 4.8 : Tulsa Transit Fixed Route Service

Route	Route Name	Transit Stations Served	Weekday				Saturday		
			Span of Service	Peak	Midday	Night	Span of Service	Day	Night
Local									
100	Admiral	DAS	5:20 am - 7:15 pm	40	40	--	7:00 am - 6:15 pm	80	--
101	Suburban Acres	DAS	4:50 am - 7:30 pm	30	45	--	6:58 am - 6:55 pm	45	--
105	Peoria	DAS	5:25 am - 8:06 pm	30	30	--	6:57 am - 6:02 pm	50	--
111	11th Street	DAS	5:25 am - 6:55 pm	45	45	--	6:51 am - 6:00 pm	90	--
112	Lewis/Jenks	DAS	5:20 am - 7:43 pm	60	60	--	7:12 am - 5:46 pm	80	--
114	Charles Page/ Sand Springs	DAS	5:08 am - 7:52 pm	55	55	--	6:27 am - 6:40 pm	114	--
117	Union/Southwest Blvd	DAS	5:10 am - 6:40 pm	45	90	--	7:50 am - 6:20 pm	90	--
118	33rd West Ave	DAS	4:50 am - 7:30 pm	55	110	--	7:05 am - 6:57 pm	110	--
203	Airport	DAS & MMS	4:56 am - 7:07 pm	65.5	65.5	--	6:58 am - 6:54 pm	70	--
210	Harvard	DAS & MMS	5:14 am - 7:13 pm	45	67.5	--	7:00 am - 5:50 pm	130	--
215	15th Street	DAS & MMS	5:15 am - 7:11 pm	38	76	--	7:00 am - 6:16 pm	76	--
221	21st St/Eastgate	DAS & MMS	5:25 am - 7:58 pm	45	67.5	--	7:20 am - 5:43 pm	70	--
222	Pine/41st Street	DAS & MMS	5:17 am - 7:30 pm	70	70	--	7:05 am - 5:55 pm	65	--
251	Fast Track	DAS & MMS	5:15 am - 7:45 pm	25	50	--	7:10 am - 6:20 pm	50	--
306	Southeast Industrial	MMS	6:40 am - 7:45 pm	60	60	--	--	--	--
318	Memorial	MMS	5:30 am - 7:45 pm	45	90	--	6:30 am - 5:35 pm	90	--
471	71st Street	none	6:05 am - 7:25 pm	100	100	--	7:00 am - 5:50 pm	100	--
508	Broken Arrow Connection	none	5:55 am - 6:20 pm	85	240	--	--	--	--
Express									
902	Broken Arrow Express	DAS	6:20 - 8:33 am / 4:06 - 6:03 pm	4 trips	--	--	--	--	--
909	Union Exress	DAS	6:50 - 7:37 am / 4:47 - 5:45 pm	1 trip	--	--	--	--	--
Nightline									
840	North Nightline	DAS	8:15 pm - 12:59 am	--	--	5 trips	7:30 pm - 12:10 am	--	5 trips
860	East Nightline	DAS	8:05 pm - 12:06 am	--	--	4 trips	7:45 pm - 12:08 am	--	5 trips
870	South Nightline	DAS	8:00 pm - 12:13 am	--	--	8 trips	7:30 pm - 12:08 am	--	8 trips
880	Southeast Nightline	DAS	8:00 pm - 11:15 pm	--	--	4 trips	7:30 pm - 11:00 pm	--	4 trips
890	West Nightline	DAS	8:00 pm - 12:02 am	--	--	5 trips	7:30 pm - 11:43 pm	--	5 trips

Figure 4.14 : Tulsa Transit Fixed Route System Map

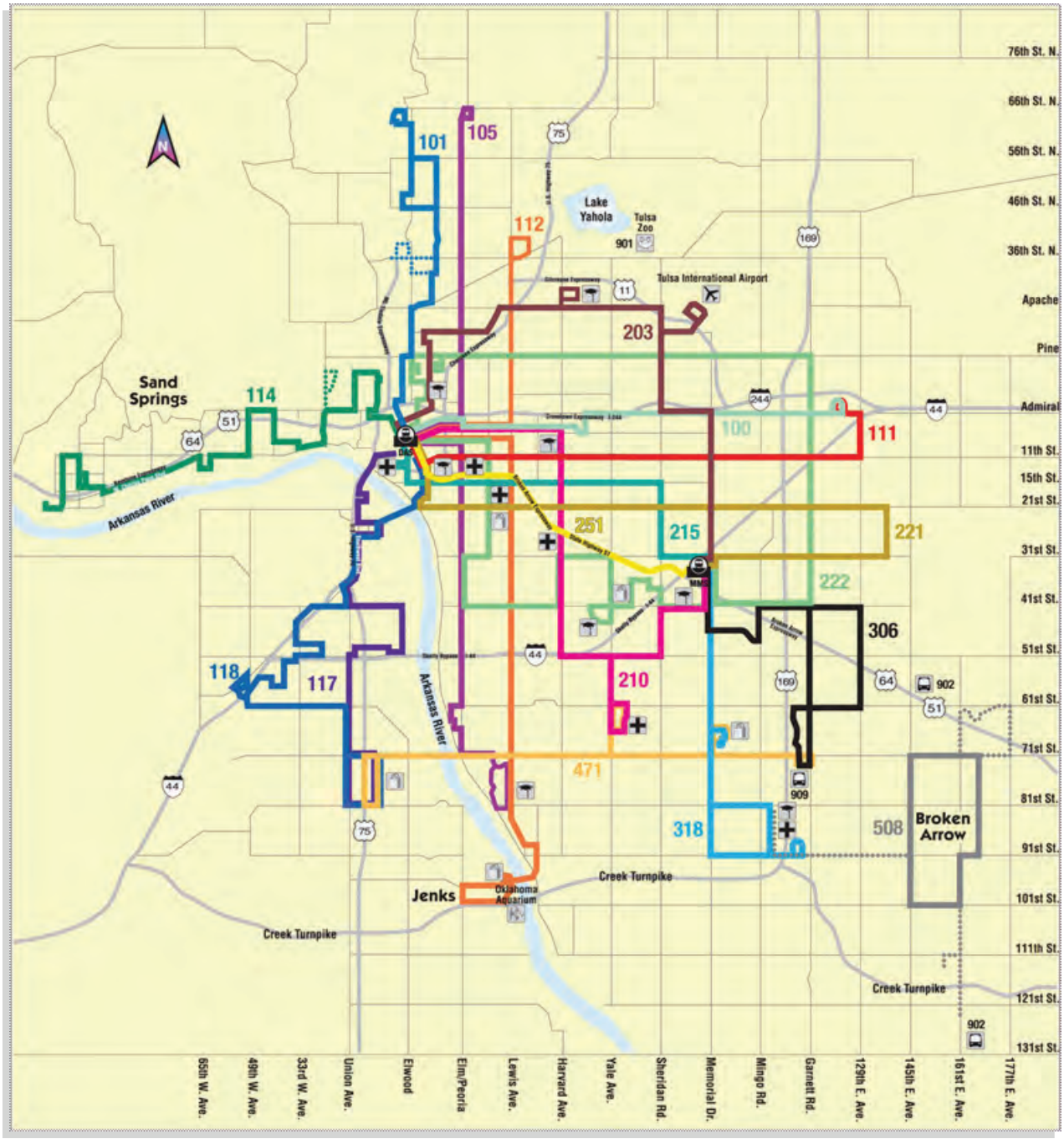
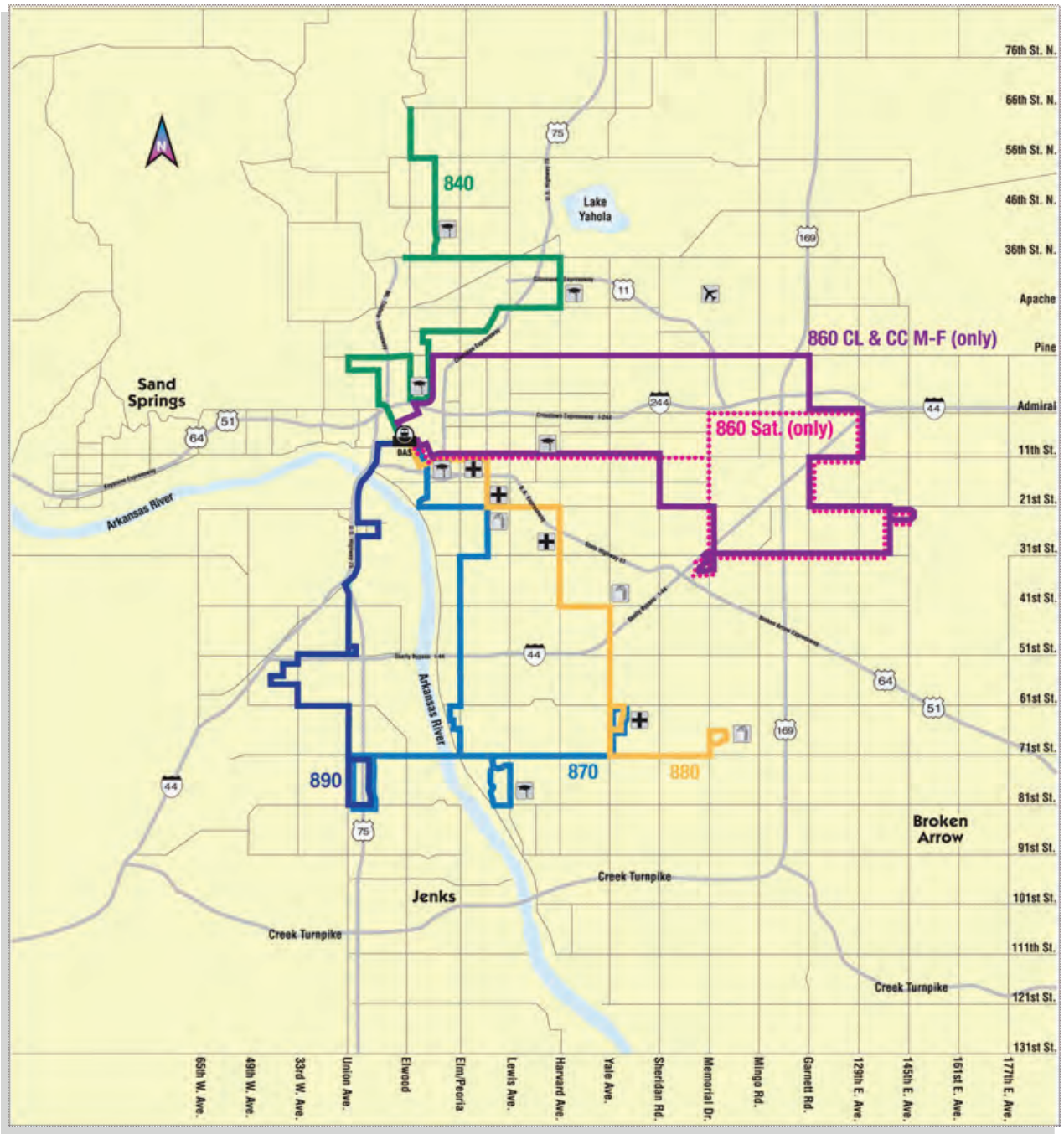


Figure 4.15 : Tulsa Transit Nightline System Map



A system and route level evaluation of Tulsa Transit's current services was conducted based on data provided by Tulsa Transit and other sources, and included the following:

- Historical ridership data (2001-2010), provided by Tulsa Transit
- GFI farebox data (October 2010), provided by Tulsa Transit
- Fixed route operating statistics (October 2010), provided by Tulsa Transit
- Historical operating data (2002-2009), provided by the National Transit Database (NTD)
- On-board rider survey results (January/February 2010), provided by INCOG

A comprehensive analysis can be found in a separate document (*Bus System Evaluation and Service Plan Technical Memorandum #1: Existing Services Evaluation,* Updated Draft, March 2011). Key findings highlight a picture of a transit agency that has suffered massive cuts to fixed route service in the past decade, resulting in deep ridership losses that only recently have rebounded.

Strapped by a lack of funding, Tulsa Transit has not evolved with time. Service spans on the core routes are limited to daylight hours only, with no Sunday service. Only one of eighteen local routes has a frequency less than thirty minutes. The route structure has not been adjusted for changes in trip patterns or travel times, leaving many headways off clock-cycles and timed transfers rare, both a deterrent to new and choice riders. This is confirmed by survey results that show that only the most transit-dependent of Tulsa citizens use the fixed route system.

Over the same time (and perhaps as a result of fixed route cuts), the complementary Americans with Disabilities Act (ADA) program has grown rapidly both in service levels and costs, making demand responsive service a larger part of Tulsa Transit's operations than in the past, or at other transit agencies. Key results include the following:

- **Fixed route ridership has still not recovered from massive service cuts within the past ten years.** Significant cuts of more than 20% to fixed route service from 2002-2004 stunted ridership, but it has come back somewhat without an increase to service levels. Service productivities have not significantly changed in that time, while cost efficiencies have decreased slightly.

  Over the last three years, ridership has been stabilizing at 2.5 million annually, with a weekday average just under 10,000 riders and a Saturday average of around 3,000. With an average of 17.6 riders per hour and 1.15 riders per mile, local routes perform lower than national averages for midsize urban cities. On the other hand, the two express routes perform well for their functional mode, averaging 22.7 riders per hour and almost 20 riders per trip.

- **Ridership demographics and travel patterns reflect a highly transit dependent base.** Three out of five riders have no driver's license or auto availability, and four out of five riders are in households earning under $25,000 annually. A large segment of riders takes advantage of deep-discounted multiuse fare products in order to utilize the system.

  Ridership is spread fairly evenly across the day, and by trip purpose. It is geographically concentrated in north Tulsa, along the Admiral corridor, the Peoria corridor, and the area around Promenade Mall. Not surprisingly, these areas correspond to the most productive routes in the system (Routes 105, 101, 100, and 222).

- **Riders often utilize transfers despite onerous transfer conditions.** About one in three riders require a transfer to complete his or her trip, with the most common patterns occurring between Routes 105, 101, 222, and 251. While the transfer facilities themselves are quite welcoming with good passenger amenities, timetables are not synched to allow timed transfers or clock headways, making transferring a time-intensive activity.

- **Transit system walk accessibility is limited.** While a majority of people and jobs within the City of Tulsa limits have quarter-mile access to transit on weekdays and Saturdays, large portions of the city, and areas across the region, do not. In addition, evening coverage is severely limited across the service area. This is reflected in walk access and egress times that each average over five minutes, the typical time for a quarter-mile walk. In the future, the situation is exacerbated as more population and employment are projected to develop in areas that do not currently have transit service.

- **While fixed route service levels have stagnated, demand responsive service has increased considerably.** Demand responsive service and ridership have increased steadily since 2005, possibly a result of passengers shifting from fixed route to demand responsive service, or as a result of institutional policies for demand responsive customers. As such, costs for this service have increased by 26%, while service productivities have decreased.

As a result of the increases in demand responsive service over time, costs in 2009 made up 29% of the overall operating budget, up from 24% in 2002. This five percent shift translates to almost a million dollars moving from fixed route operations to demand responsive operations, or a loss of more than 20,000 annual fixed route revenue hours (11%). It is worth noting that since July 2009, Tulsa Transit has made efforts toward more

efficient paratransit operations, including fare changes, tighter eligibility requirements, and modifications to a variety of service policies. These changes are likely to lead to appreciable reductions to the operating budget as well as improved service efficiency.

Peer Agency Analysis

A peer analysis provides the means to compare various performance measures of a transit agency to other transit agencies of similar size and operating characteristics. Transit agencies report such information to the Federal Transit Administration (FTA), which records the information annually in the National Transit Database (NTD). NTD has strict requirements regarding the manner in which cost and service characteristics are reported by agencies. Thus, NTD provides a consistent set of measurable data that can be used in a peer systems analysis.

While a peer analysis based on NTD data provides operational service and financial information, it is important to consider other aspects of service quality that are not reported in NTD, such as passenger satisfaction, vehicle cleanliness and comfort, schedule adherence and route connectivity. Likewise, unique operating and financial characteristics that may be associated with a particular transit agency are also important unreported factors.

Select criteria were used to identify transit agencies that had similar service area characteristics to Tulsa Transit. Primary criteria included:

- Service area population
- Service area population density
- Urbanized area population
- Service area size

After a thorough comparison, the screening process yielded a selection of eight peer cities and their respective transit agencies for the final peer agency comparison. The cities and respective agencies emerging from the screening are listed below and the cities are shown in Figure 4.16.

- Akron, OH: Metro Regional Transit Authority (Metro)
- Baton Rouge, LA: Capital Area Transit System (CATS)
- Colorado Springs, CO: Mountain Metropolitan Transit (MMT)

Figure 4.16 : Peer Agency Locations

- Dayton, OH: Greater Dayton Regional Transit Authority (RTA)
- Grand Rapids, MI: Interurban Transit Partnership (The Rapid)
- Oklahoma City, OK: Central Oklahoma Transportation and Parking Authority (COTPA)
- Sarasota, FL: Sarasota County Area Transit (SCAT)
- Tucson, AZ: SunTran

Table 4.9 summarizes urbanized area population, service area population, square mileage of the service area, and population density for the peer transit systems selected for analysis. Tulsa has approximately the same population density as the peer average of 1,962 persons per square mile. Service area populations have about a 25% range from Tulsa Transit's service area population of 512,645 people. In addition to population data, Table 4.10 compares the operational data (such as revenue miles and hours, fleet size and ridership) of the peer agencies to Tulsa Transit. Table 4.11 lists financial information such as operating expense, sources of income, and fare data.

A comprehensive analysis can be found in Appendix B (Bus System Evaluation and Service Plan Technical Memorandum). Fixed route service was analyzed separately from demand responsive service for each agency and results are profiled and compared for each agency.

Table 4.9 : Peer Agency Listing with Comparative Data

Service Area						
City	**Transit Agency Name**	**UZA Population**	**Service Area Population**	**Service Area (sq. mi.)**	**Population Density (pers./ sq. mi.)**	**Srv. Area Coverage**
Akron, OH	Metro Regional Transit Authority	570,215	542,899	420	1,293	95.2%
Baton Rouge, LA	Capital Area Transit System (CATS)	479,019	430,317	296	1,454	89.8%
Colorado Springs, CO	Mountain Metropolitan Transit (MMT)	466,122	438,000	200	2,190	94.0%
Dayton, OH	Greater Dayton regional Transit Authority (RTA)	703,444	559,062	274	2,040	79.5%
Grand Rapids, MI	Interurban Transit Partnership (The Rapid)	539,080	482,740	185	2,609	89.5%
Oklahoma City, OK	Central Oklahoma Transportation and Parking Authority (METRO Transit)	747,003	650,221	244	2,665	87.0%
Sarasota, FL	Sarasota County Area Transit (SCAT)	559,229	398,854	213	1,873	71.3%
Tucson, AZ	Sun Tran	720,425	544,000	230	2,365	75.5%
	Peer Average	598,067	505,765	258	1,962	86.6%
Tulsa, OK	**Tulsa Transit**	**558,329**	**512,645**	**261**	**1,964**	**91.8%**
	Difference from Peer Average	-6.6%	1.4%	1.3%	0.1%	6.0%

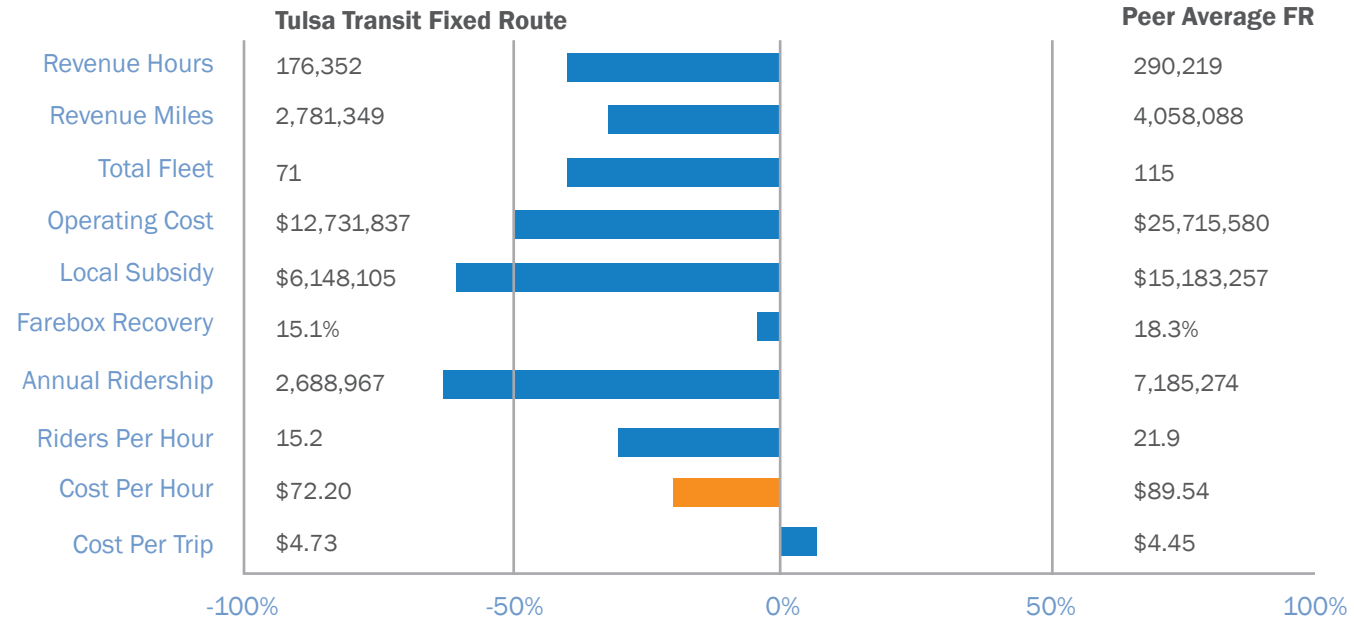
Table 4.10 : Peer Agency Operating Characteristics Data

Service Area					Operating Data				
City	**Transit Agency Name**	**Service Area Population**	**Service Area (sq. mi.)**	**Population Density (pers./ sq. mi.)**	**Annual Vehicle Revenue Miles**	**Annual Vehicle Revenue Hours**	**Total Fleet (VAMS)**	**Peak Fleet (VOMS)**	**Ridership (Annual UPT)**
Akron, OH	Metro	542,899	420	1,293	4,645,909	344,139	275	212	5,023,042
Baton Rouge, LA	CATS	430,317	296	1,454	2,849,793	198,515	94	67	3,799,779
Colorado Springs, CO	MMT	438,000	200	2,190	5,267,538	308,170	217	159	3,436,385
Dayton, OH	RTA	559,062	274	2,040	8,678,679	592,397	245	207	10,390,103
Grand Rapids, MI	The Rapid	482,740	185	2,609	7,466,633	548,923	281	238	9,336,708
Oklahoma City, OK	METRO Transit	650,221	244	2,665	3,333,554	204,342	111	74	2,743,675
Sarasota, FL	SCAT	398,854	213	1,873	4,037,912	282,229	132	100	2,729,968
Tucson, AZ	Sun Tran	544,000	230	2,365	10,969,765	846,154	327	269	22,044,269
Peer Average		505,765	258	1,962	5,906,223	415,609	210	166	7,437,911
Tulsa, OK	**Tulsa Transit**	**512,645**	**261**	**1,964**	**4,769,938**	**289,044**	**157**	**122**	**2,920,946**
Difference from Peer Average		1.4%	1.3%	0.1%	-19.2%	-30.5%	-25.3%	-26.4%	-60.7%

Table 4.11 : Peer Agency Financial Data

Service Area	Financial Data						
Transit Agency Name	**Operating Expense**	**Local Funds**	**State Funds**	**Federal Assistance**	**Other Funds**	**Fare Revenues**	**Fare Revenues (% of Budget)**
Metro	$ 33,811,097	$ 24,738,890	$ 1,003,295	$ 3,655,202	$ 620,875	$ 3,832,667	11%
CATS	13,792,380	5,183,137	808,912	4,701,563	158,027	3,226,893	23%
MMT	22,431,263	13,063,199	269,040	4,758,467	186,059	4,154,498	19%
RTA	55,884,908	28,779,070	388,141	16,491,391	1,337,659	8,888,647	16%
The Rapid	35,227,655	16,777,328	10,235,988	2,528,292	357,548	5,343,687	15%
METRO Transit	21,299,527	11,018,581	863,087	7,142,537	217,308	2,118,497	10%
SCAT	18,778,856	14,880,597	1,537,161	704,787	184,984	1,471,327	8%
Sun Tran	61,968,610	41,421,415	3,273,738	6,042,439	461,599	10,769,419	17%
Peer Average	$ 32,899,287	$ 19,482,777	$ 2,297,420	$ 5,753,085	$ 440,507	$ 4,975,704	15.1%
Tulsa Transit	**$17,976,402**	**$ 8,680,664**	**$ 993,435**	**$ 4,933,724**	**$ 619,607**	**$ 2,541,089**	**14.1%**
Difference from Peer Average	-45.4%	-55.4%	-56.8%	-14.2%	40.7%	-48.9%	-6.5%

Figure 4.17 : Tulsa Transit Fixed Route Service Indicators Compared to Peer Average

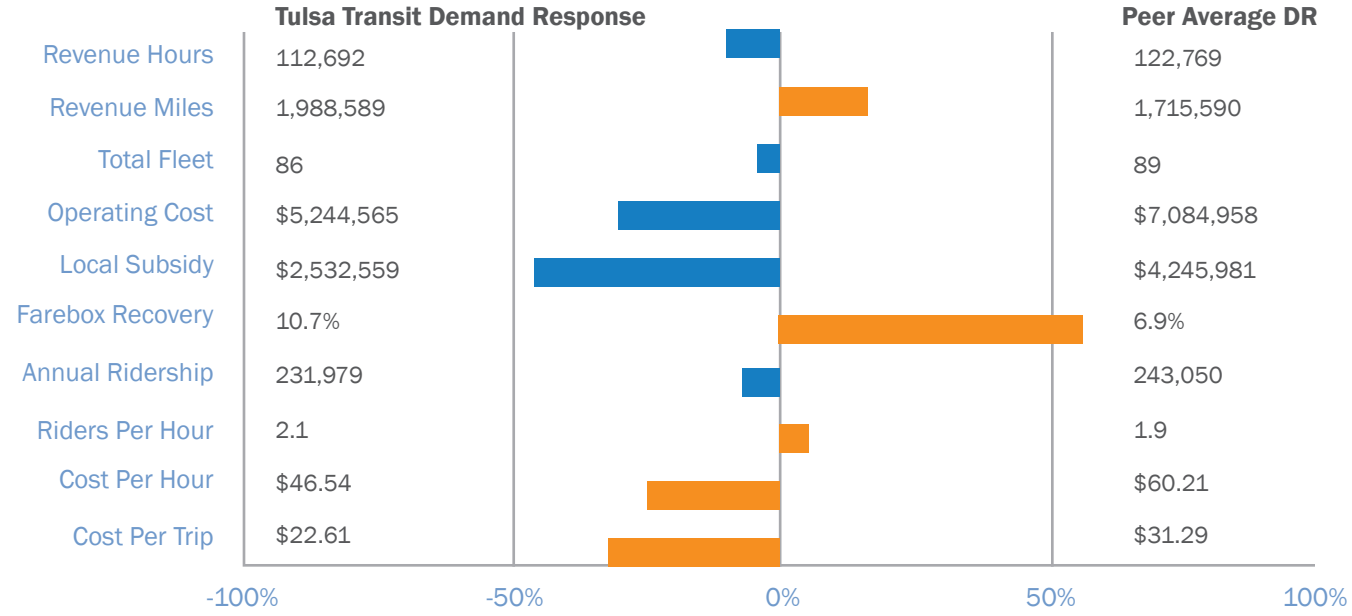


The findings that result from this analysis show that Tulsa Transit has a considerably lower level of service and investment in its fixed route (FR) system as compared to its peers, but a roughly average level of demand responsive (DR) service. As a result, total FR riders and riders per unit of service (hours or miles) are significantly lower for Tulsa Transit than the peer average. On the bright side, costs per unit of service and per rider are notably better than peers, for both FR and DR services. This indicates that despite operating far less FR service than its peers, Tulsa Transit has been able to maintain a cost efficient operation, which bodes well for the economics of transit expansion.

Figure 4.17 compares Tulsa Transit's performance to the peer average for some of the key measures analyzed for the FR system. Trends above the peer average are orange while trends below are blue. The review determined that, in comparison to the peer average for FR service, Tulsa Transit:

- Ranks in the bottom third for level of service operated overall and per capita, with service indicators (such as hours, miles, or vehicles operated) typically 30-40% below average
- Ranks in the bottom third for operating dollars spent and local subsidy provided overall and per capita – with indicators typically more than 50% below average, but is only slightly below average in regards to farebox recovery

Figure 4.18 : Tulsa Transit Demand Response Service Indicators Compared to Peer Average



- Ranks in the bottom third for overall riders and riders per unit of service (hours and miles), with overall ridership more than 60% below average, and riders per unit of service 30-40% below average
- Ranks in the top third for cost per revenue mile and revenue hour with indicators 20-30% lower than average, but ranks near average with other cost indicators such as subsidy per rider

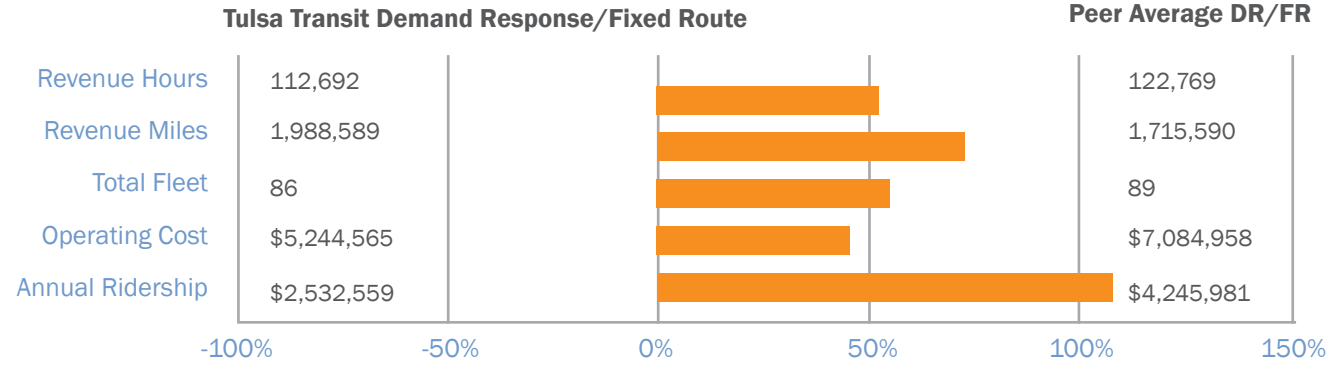
Figure 4.18 shows how Tulsa Transit's DR service stacks up to the same key performance measures. The review found the service had higher than average revenue miles, farebox recovery and riders per hour as well as lower than average operating cost per hour and trip. However, revenue hours were below average and major financing were well below average. Total fleet was also slightly smaller than the peer average.

Meeting the average level of demand responsive measures despite limitations in overall service spans (no Sunday service, and limited evenings) indicates a complementary paratransit service that is quite rich. It could point to policies or service levels that encourage high demand responsive ridership or reflect the reality that demand responsive behavior is driven by a community's need, unlike fixed route ridership which is driven more by service levels.

To gain a fuller understanding of how the two service modes were related for Tulsa Transit and its peers, the amount of DR service compared to the amount of FR service provided by an agency was queried to determine how robust the DR service is in each community. Figure 4.19 shows the amount of Tulsa Transit's DR service, Lift Program, that was provided for every 100 units of Tulsa Transit's FR service. For example, for every 100 revenue hours of FR service Tulsa Transit provides, it is also providing 63.9 revenue hours of DR service (compared to the peer average, which is 42.3 DR hours for every 100 FR hours). Likewise, for every $100 spent on FR service, Tula Transit's DR service would spend $41.2, 47% higher than the peer average.

In nearly every category Lift Program appears to be well above average in terms of the DR service provided as a function of FR investment. For instance, revenue miles are 73% higher than average, and annual ridership for Lift Program is 108% higher than average.

Figure 4.19 : Tulsa Transit Demand Response Service Indicators (Per 100 Fixed Route Units) Compared to Peer Average



Freight Rail Corridor Assessment

The Oklahoma Department of Transportation (ODOT) is doing a State Rail Plan study. The intent of the study is to make recommendations to maintain and improve capacity for future growth in freight rail service.

Several of the proposed high capacity transit corridors resulting from the initial public outreach and stakeholder involvement are existing freight rail corridors. Many of these freight corridors are owned and operated by private railroads that service multiple industrial and manufacturing facilities in the region. As part of the public involvement process undertaken in the development of this Regional Transit System Plan, INCOG conducted individual coordination meetings to engage these rail operators and discuss the potential of operating both freight and passenger services within the railroad right of way (ROW). Railroads with ownership or operating rights on proposed RTSP transit corridors are:

- **Burlington Northern Santa Fe Railroad (BNSF)** – is the owner and operator of one of the largest railways in the US and the largest rail yard in the Tulsa region. Trackage owned in the state of Oklahoma crosses nearly half of the counties in the state. Wide options are available for contracting options for BNSF to lease or provide yard and maintenance facilities to other railroads. BNSF operates on approximately 150 miles of track in the Tulsa region and provides rail access to the Port of Catoosa and manufacturing plants near the Tulsa International Airport via two spur tracks.
- **South Kansas and Oklahoma Railroad (SK&O)** – operates over 500 miles of rail lines in Kansas, Oklahoma and Missouri. The line in the RTSP study area runs from Collinsville, through downtown Owasso, to downtown Tulsa. SK&O has a company warehouse located in Owasso and runs trains north out of Owasso, turning south to Tulsa and connecting with BNSF and UP lines to continue to points beyond. They also serve the Port of Catoosa via eight miles of trackage from the Port to Owasso.
- **Sand Springs Railroad (SS)** – operates approximately 32 miles of trackage in the Sand Springs and Tulsa, OK area. UP and BNSF often deliver cars overnight and on weekends, and SS leaves cars for pickup by UP and BNSF. Historically, trolley tracks ran on the north side of the existing SS line, between the freight line and the trail. The old ROW is owned by the Charles Page Home Foundation. SS Railroad freight traffic connects with UP, BNSF and SK&O rail lines west of downtown, on the north bank of the Arkansas River.

- **Tulsa Sapulpa Union Railway Company (TSU)** – is one the Tulsa region's longest operating railroads. Regular operations occur on weekdays from 8am to 8pm. It has a direct connection with the Union Pacific in Tulsa, and Burlington Northern Santa Fe (BNSF) railroad in Sapulpa, serving customers throughout the area. TSU also leases and operates the Jenks Industrial Lead from Union Pacific, which runs approximately thirteen miles from downtown Tulsa to Jenks, OK. TSU also operates switch service with UP at the Sinclair Refinery, where UP drops cars at the south side of the refinery and TSU operations begin at the north end of the refinery. There are no dedicated windows of usage of its rail corridors. They are used as needed.
- **Union Pacific Railroad (UP)** – has daily interchange of freight rail traffic with BNSF, Sand Springs and Tulsa Sapulpa Union railroads in the Tulsa area. The UP operates on approximately 40 miles of track at two train yards in the Tulsa area – near 51st Street South and Mingo Avenue, and near 31st Street South, west of the Arkansas River. It processes up to six trains per day, including support operations for the UP terminal facility in Muskogee, Oklahoma.

Table 4.12 : RTSP Existing Freight Rail Corridors

Corridor Name	From	To	Ownership / Operations	Daily # of Trains	Speed
Broken Arrow	Union Station	Main Street, Broken Arrow	BNSF / UP	2 trains; 4-6 switch trains	25 mph
Jenks / Bixby	Union Station	Main Street, Jenks	TSU / UP	2	10 mph
Airport / Owasso	Union Station	Tulsa Int'l Airport	SK&O	3	10 mph
Sand Springs	Union Station	State Hwy 97	SS	2	10 mph
Sapulpa	Union Station	State Hwy 97	BNSF	10	55 mph
Central Corridor	OSU (Tulsa)	23rd St and Jackson Ave	BNSF; TSU / UP	2 trains; 4-6 switch trains	25 mph

Freight Corridor Operations

The existing freight rail corridors identified for evaluation as part of this Regional Transit System Plan and the railroads that own and operate them are identified in Table 4.12 and illustrated in Figure 4.20 [study area corridors]:

Broken Arrow Corridor: the Union Pacific owned line through downtown Broken Arrow to downtown Tulsa operates parallel to State Highway (SH) 51 East of I-44 and runs down the median of SH 51 in between downtown Tulsa and I-44. BNSF also shares this line with UP to operate switch trains throughout the day in between Tulsa and Broken Arrow.

Jenks / Bixby Corridor: The Union Pacific railroad owns the trackage on the west bank of the Arkansas River which connects downtown Tulsa to the Jenks. Although owned by UP, this line is operated by TSU.

Airport / Owasso Corridor: the SK&O Railroad owns this trackage, which parallels US Highway 75 outside of downtown Tulsa before continuing northeast past the Tulsa International Airport to downtown Owasso. This corridor also contains a spur line of track to the Cherokee Industrial Park, a business park accommodating thousands of regional employees.

Sand Springs Corridor: Sand Springs Railway operates the six to eight miles of trackage connecting downtown Tulsa to Sand Springs industrial parks. Freight traffic operates seven days a week from 8am to 8pm. The line is single track with sidings for storing tank cars and ten miles-per-hour operating speed.

Sapulpa Corridor: There are two lines of trackage connecting downtown Tulsa to Sapulpa, one operating on both the north and south side of I-44 / US Route 66. The line operating on the North side of the highway is owned by BNSF and the line on the South side, parallel to I-44, is operated by TSU. For the purposes of this Regional Transit System Plan, the BNSF line was considered due to state of rail infrastructure and its higher operating speed.

Figure 4.20 : RTSP Study Area Freight Rail Operators

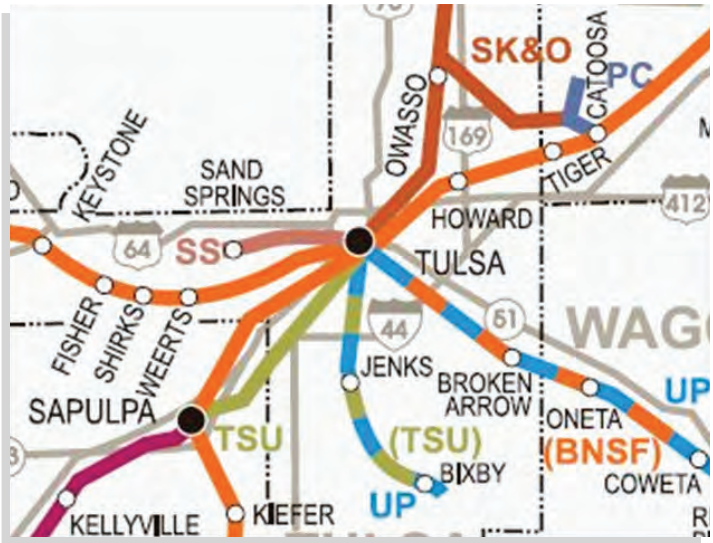


Figure 4.21 : Study Area Freight Rail Operators (Detail)

Central Corridor: This corridor is approximately 3.3 miles of trackage from the existing BNSF yard facility at 23rd Street and Jackson Avenue to north of the OSU Tulsa medical campus at I-244 and Charles Page Boulevard. UP and TSU operate switch service on this corridor, by which cars from one company's trains are exchanged and transferred to the other to continue travel to their final destination.

Although short in length, this corridor may prove crucial to the development of a regional commuter rail system. Referring to Figure 4.21, the individually owned and operated rail lines connecting the RTSP communities of Bixby, Broken Arrow, Jenks, Sand Springs, Sapulpa and Owasso to downtown Tulsa all utilize this Central Corridor as a point of interchange to transport goods through the region. This existing infrastructure serves many of the same regional passenger travel demand patterns and was determined to have potential for development as a transit corridor.

Where commuter service is proposed on a minimally used line, railways potentially may be willing to sell at a fair market value. General operating guidelines for a passenger and freight rail corridor would be to operate both services on independent tracks. In the event of derailment, a minimum separation of at least fifty (50) feet is recommended. If track separation or relocation is not feasible, passenger trains must share the track with freight trains.

Continued Coordination

During the interview process with regional railroad operators, several railroad representatives expressed common concern over several key areas of coordination if commuter rail transit operating on freight rail ROW is a transportation solution to be pursued.

- Combined freight and commuter operations
- Public Safety
- Infrastructure inspection, maintenance and repairs

While each railway operator contacted expressed a willingness to discuss the potential operation of commuter services within their ROW or along rail lines with continued freight traffic, two of the potential contributing railroads, BNSF and UP, have had experience in coordinating planning, construction and operations of commuter transit services along their lines. Through previous successes and learning experiences, each has developed a set of guiding principles to inform commuter rail planners and agencies on operational constraints and agreements needed to develop new passenger service. The goal of these principles is to maintain the railroads' ability to meet the current and future

demands of its freight customer base while contributing to the development of commuter service.

Although all RTSP study area railways contacted did not have expressly stated guidelines for consideration of commuter rail proposals, it is assumed that similar principles will apply unilaterally in freight rail coordination efforts.

Union Pacific Railroad published Commuter Access Principles in February 2009, which apply to their potential participation in passenger rail planning efforts. The principles include policies addressing competition between freight and passenger rail, preserving freight rail capacity, funding for commuter rail improvements, compensation for studying proposals, and avoiding risk to serving customers.

BNSF Railway has published similar guidelines in the form of their Commuter Principles, August 17, 2007. The full documents are available for further reference in Appendix E.

Combined Operations of Freight Rail and Passenger Rail

As discussed, there are several railways and transit agencies who have successfully constructed are currently operating freight and passenger rail service. In order to enter into agreements with the existing railways, the potential transit agency must develop a reasonable proposal to operate a viable transportation service, with adequate funding to sustain operations after implementation.

The recommendations made within this RTSP identify several possible scenarios in which the appropriate steps may be taken to satisfy the needs of all parties.

This document identifies a process for selection of the study area corridor with the greatest potential for successful

implementation of high capacity transit. If the locally preferred alternative of the recommended corridor utilizes an existing rail line, a proposal will be developed to satisfy, at a minimum, the following coordination needs:

- **SAFETY** is the first and foremost priority of all rail operators. Potential passenger transit service must be constructed and operated in a safe environment that does not adversely impact freight operation. This may require additional bridge or rail infrastructure improvements and applies to all vehicles and equipment needed for operation of passenger services.
- The next obligation of freight rail operators is to continue to provide quality, efficient transportation **SERVICE** to their customers and protect the public benefits of freight transportation. Often, right of way ownership and operating rights to freight lines are proprietary assets that can be leased, borrowed or otherwise contracted to allow joint or operational use. Railways will likely retain all operational control over both freight and passenger rail operations along the line(s).
- As the terms and parameters of passenger operation are determined, transportation agencies may be required to assume full **LIABILITY** for improvements needed for the new or additional passenger service and insurance during operations. Enhancements to grade crossing protection, inter-track fencing and other accident mitigating measures may be required of the transportation agency to reduce risk.
- As a commercial entity, freight rail operators must be conscious of the **CAPACITY** and condition of their rail lines in order to grow their operations and service over time. If ROW becomes constrained, transportation agencies and railways must be able to negotiate accommodations to allow for the railways' need to locate new markets and expand their infrastructure needs.
- The participation of the railways in any passenger related transportation studies, program development or implementation is strictly voluntary. As such the freight companies have the right to **COMPENSATION** for the time and resources dedicated to the advancement of any new passenger operations within their jurisdiction. Indemnification from negative financial impacts such as potential increases to sales or property tax burden, may also be negotiated. Railways may be responsible to provide actual cost structure and construction schedules and labor models for financial forecasting purposes.

Existing Freight Rail Conditions

As regional urbanization has occurred over the decades since construction of freight rail infrastructure, the built environment presents several safety and operability concerns that have already been identified through initial coordination meetings held with area railroad operators as well as visual inspection and observation. Potential areas of additional coordination need for the existing rail corridors analyzed as part of this RTSP are summarized below:

Safety

The existing rail lines operate through both urban and rural environments presenting a variety of at-grade and grade separated crossing situations. Hundreds of locations exist along the various proposed rail corridors, ranging from private pedestrian to major thoroughfares; will need to be individually analyzed for operational safety. The safety concerns of citizens living adjacent to proposed corridors must also be understood and addressed.

ROW Constraints

During preliminary coordination meetings held with local freight rail operators, several locations have been identified where the available ROW width narrows to approximately 50 feet, making the installation of a parallel line for passenger service infeasible. Another example of existing constraints is the Broken Arrow rail corridor, which travels within a barrier separated median of SH 51 as it leaves downtown Tulsa traveling southwest.

Service Operations and Capacity

Rail operators have communicated locations where railroad cars often have to wait for passage through yard locations in order to interchange with lines belonging to other railways. Temporal separation of passenger and freight would be a challenge. As identified, local railways were found to operate trains on their lines as needed or at times which may conflict with potential passenger demand. Other lines experience significant daily freight traffic today and may have plans to expand their operating capacity to allow for forecast volume increases.

Infrastructure

A state of repair analysis must be conducted on the entire existing infrastructure to evaluate improvements needed to comply with FRA and FTA standards for passenger operations on any proposed rail corridor. Many existing rail lines connecting RTSP communities operate at minimal speeds due to the condition of their current infrastructure, facilities and urban surroundings. In order to operate an efficient passenger service, trackage may need to be built, re-laid, relocated or barrier separated. Bridge structures may also need to be widened or replaced to accommodate capacity needs and desired operating speeds.

Institutional and Funding Options

Peer Cities Analysis of Financing and Funding

In order to compare the Tulsa Transit with regards to service/funding characteristics, demographic/transit characteristics, and application of dedicated local transit funding, a peer city review of twenty cities was conducted.

Peer cities were selected based on location and similarity of service type and area to that of Tulsa Transit and include: Oklahoma City, Oklahoma; Birmingham, Alabama; Baton Rouge, Louisiana; Omaha, Nebraska; Wichita, Kansas; Shreveport, Louisiana; Memphis, Tennessee; Columbus, Ohio; Des Moines, Iowa; Corpus Christi, Texas; Nashville, Tennessee; Louisville, Kentucky; Indianapolis, Indiana; Colorado Springs, Colorado; Albuquerque, New Mexico; El Paso, Texas; Dayton, Ohio; Tucson, Arizona; and, Austin, Texas.

Operating Characteristics

Operating characteristics evaluated as part of the Peer Cities Analysis include:

- Operating expenses
- Sources of operating funds expended
- Sources of capital funds expended
- Modal characteristics including operating expenses, fare revenues, and use of capital funds
- Service efficiency including operating expense per vehicle revenue mile, operating expense per vehicle revenue hour, and operating expense per passenger mile

In comparison to the twenty peer cities evaluated, operating characteristics of Tulsa Transit differed from others peer cities in that:

- Tulsa Transit provides fewer passenger miles per capita
- Tulsa Transit spends about the same operating expenses per passenger mile as cities without dedicated funding and less than those with dedicated funding
- Tulsa Transit provides less local funding per capita than those cities without dedicated funding and much less than cities with dedicated funding

Figure 4.22 : Fixed Route Service Miles per Capita

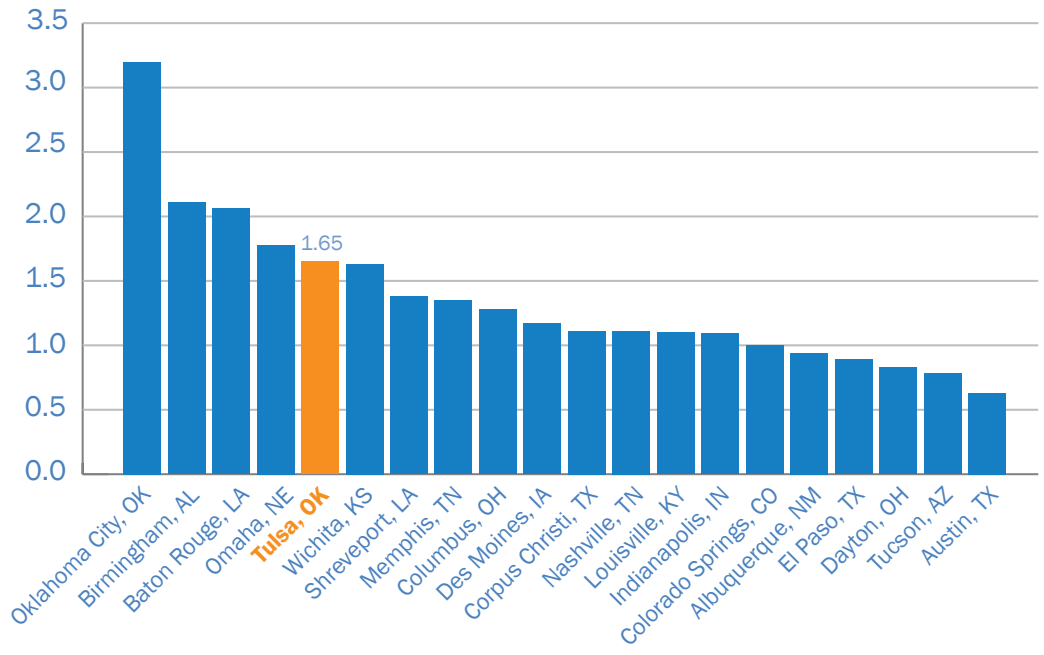
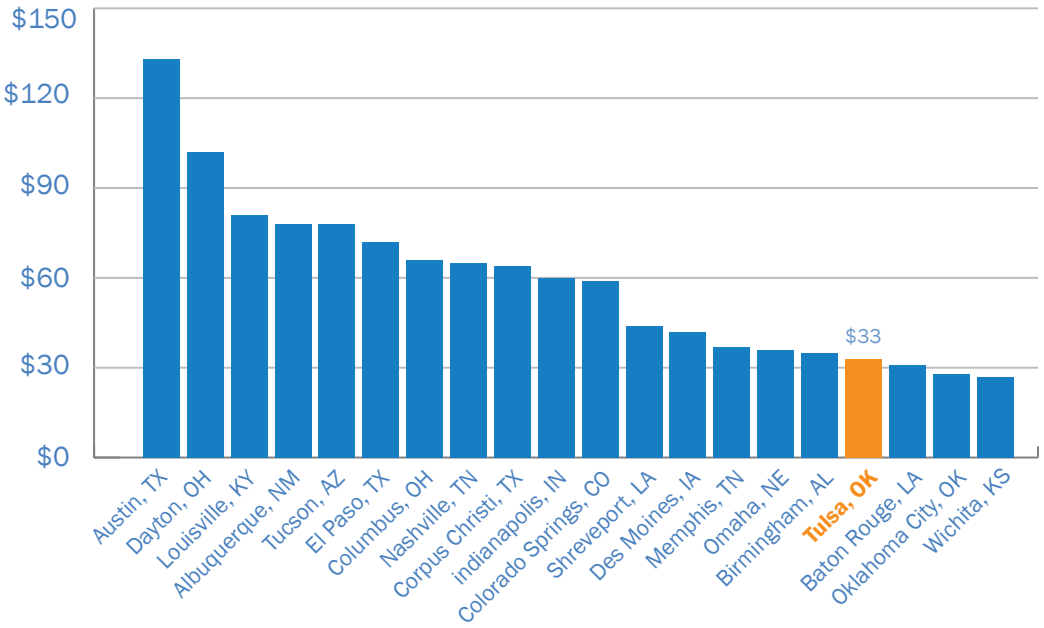


Figure 4.23 : Operation and Maintenance Spending per Capita



- Local funding per passenger mile are similar to cities without dedicated funding and less than those with dedicated funding
- Tulsa Transit is more dependent on federal and less dependent on state funding sources
- Tulsa Transit has similar fare box recovery and miscellaneous funding sources (parking fees, concessions, advertising, etc.)

Compared to the twenty peer cities evaluated, with regard to fixed route service miles per capita, Tulsa Transit ranks 5th at 1.65, Oklahoma City, Oklahoma ranks 1st at 3.20, and Austin, Texas ranks last at 0.63, as shown in Figure 4.22.

Compared to the twenty peer cities evaluated, with regard to operation and maintenance spending per capita, Tulsa Transit ranks 17th at $33, Austin, TX ranks 1st at $133, and Wichita, KS ranks 20th at $27, as shown in Figure 4.23.

Figure 4.24 : Local Funding per Capita

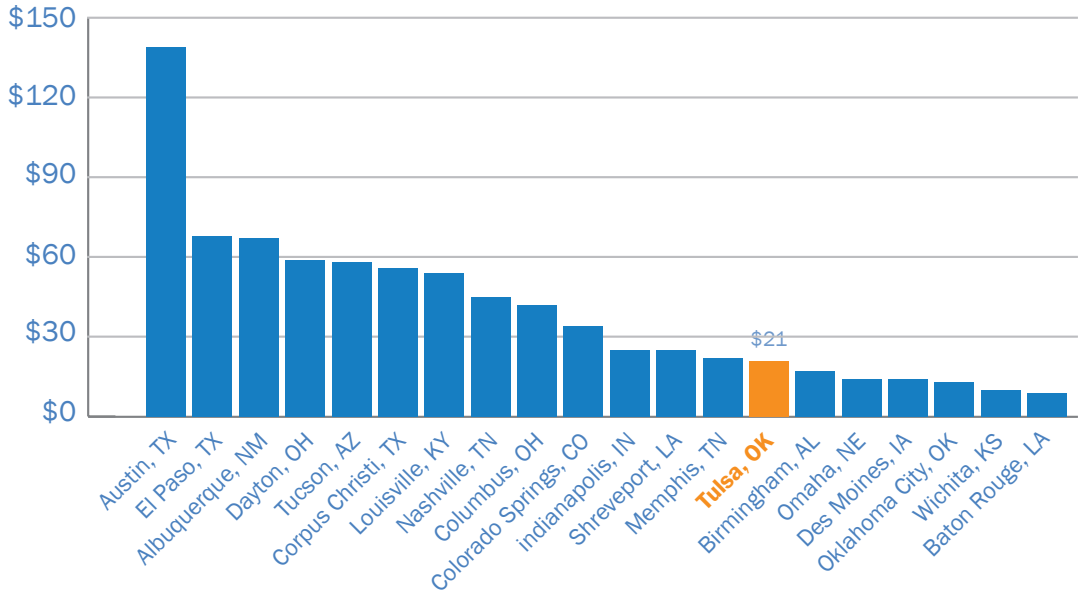
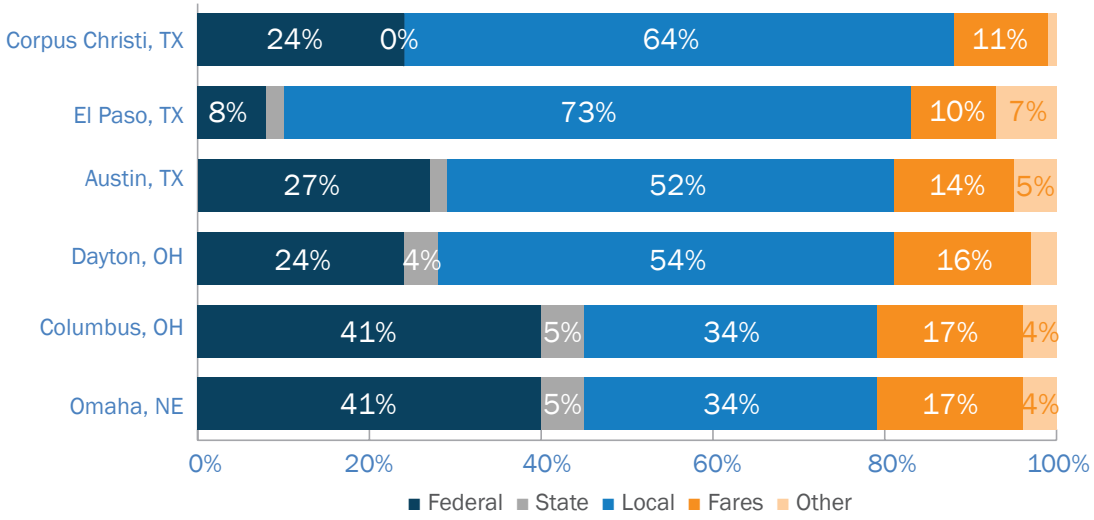


Figure 4.25 : Funding Sources



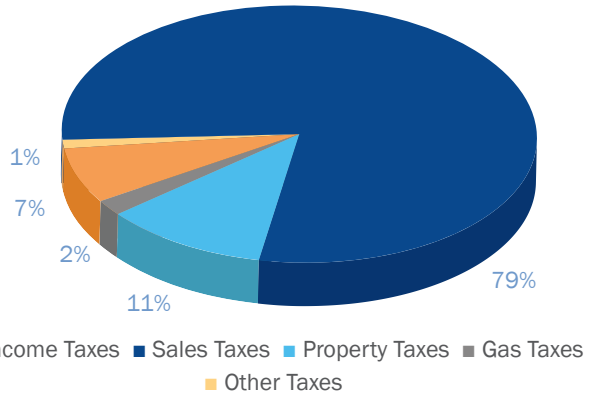
Compared to the twenty (20) peer cities evaluated, with regard to local funding per capita, Tulsa Transit ranks 14th at $21, Austin, TX ranks 1st at $139, and Baton Rouge, LA ranks 20th at $9, as shown in Figure 4.24.

Dedicated Local Funding

Of the twenty peer cities evaluated, the following results relate to dedicated local funding:

- Six out of the twenty peer cities have a dedicated funding source
- Five out of the six cities which have a dedicated funding source have a sales tax rate of 0.5%
- One of the six cities which have a dedicated funding source has a property tax rate of $0.085 per $100 of assessed value

Figure 4.26 : Local Dedicated Funding Sources for Operations: Nationwide Totals (2009)



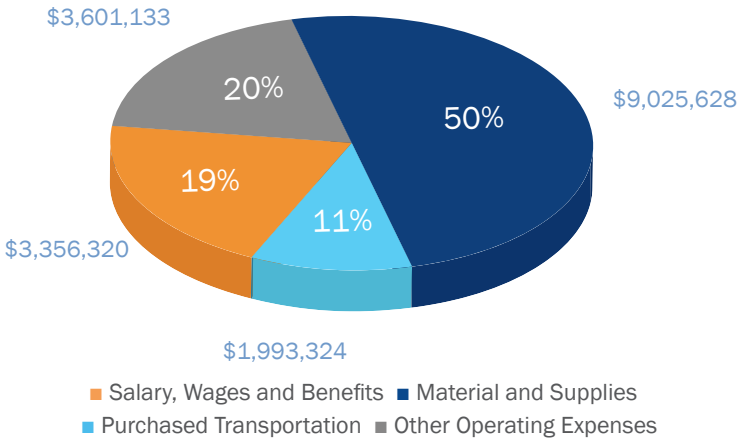
Source: National Transit Database 2009

- Dedicated tax replaces local general fund contributions
- Local funding percentage tends to be higher in cities with dedicated funding

A chart illustrating the sources of funds for those peer cities which have a dedicated funding source is shown in Figure 4.25.

Of the nationwide totals, representing 73%, sales taxes are the primary source of local dedicated funding for operations. Other sources (12%), along with property taxes (11%), gasoline taxes (3%) and income taxes (1%) are also preferred alternative local dedicated funding sources, as shown in Figure 4.26.

Figure 4.27 : Tula Transit – Operating Expenses (2009)



Existing Funding Sources/Notable Trends & Shifts

Operating Expenses

Providing bus service to the City of Tulsa and surrounding areas, with approximately 10,000 passenger trips a day, Tulsa Transit's operating expenses total approximately $17,768,520 in 2009 and include salary, wages, and benefits ($9,025,628), purchased transportation ($3,601,133), materials and supplies ($3,356,320), other operating expenses ($1,993,321), and reconciling cash expenditures (-$207,882).

Table 4.13 : Operating Expenses (Tulsa, Oklahoma)

From	2002	2009	Change (2002 - 2009)	
			Dollar ($)	Percent
Salary, Wages and Benefits	$9,397,912	$9,025,628	-$372,284	-4.0%
Material and Supplies	$2,255,713	$3,356,320	$1,100,607	48.8%
Purchased Transportation	$2,068,669	$3,601,133	$1,532,464	74.1%
Other Operating Expenses	$2,279,118	$1,993,321	-$285,797	-12.5%
Total Operating Expenses	$16,001,412	$17,976,402	$1,974,990	12.3%
Source: National Transit Database, 2009				

Table 4.14 : Operating Fund Sources (Tulsa, Oklahoma)

From	2002	2009	Change (2002 - 2009)	
			Dollar ($)	Percent
Fare Revenues	$2,659,854	$2,541,090	-$118,764	-4.0%
Local Funds	$7,705,519	$8,680,664	$975,145	12.7%
State Funds	$550,841	$993,435	$442,594	80.3%
Federal Assistance	$4,161,271	$4,933,724	$772,453	18.6%
Other Funds	$609,923	$619,607	$9,684	1.6%
Total Operating Expenses	$15,687,408	$17,768,520	$2,081,112	13.3%
Source: National Transit Database, 2009				

Operating expenses expended by Tulsa Transit increased by $1,974,990, or 12%, from $16,001,412 in 2002 to $17,976,402 in 2009. Most notably, purchased transportation increased by $1,532,464, or 74%, from $2,068,669 in 2002 to $3,601,133 in 2009. Material and supplies expenses increased by $1,100,607, or 48.8%, from $2,255,713 in 2002 to $3,356,320 in 2009 while salary, wages and benefits decreased slightly by $372,284 from $9,397,912 in 2002 to $9,025,628 in 2009, as shown in Table 4.13.

Sources of Funds

Of the $17,768,520 in operating funds, the operating expenses were funded by local funds ($8,680,664, 49%), federal assistance ($4,933,724, 28%), fare revenues ($2,541,090, 14%), state funds ($993,435, 6%), and other funds ($619,607, 3%), as shown in Figure 4.28.

Overall, operating funding increased by $2,081,112, or 13%, from $15,687,408 in 2002 to $17,768,520 in 2009. Most notably, state funding increased by 80%, from $550,841 in 2002 to $993,435 in 2009, however the largest dollar amount increase occurred in local funding, increasing $975,145, or by 13%, from $7,705,519 in 2002 to $8,680,664 in 2009. Funding provided by federal assistance and other funds increased minimally, while fare revenues slightly decreased, as shown in Table 4.14.

Figure 4.28 : Sources of Operating Funds Expended (2009)

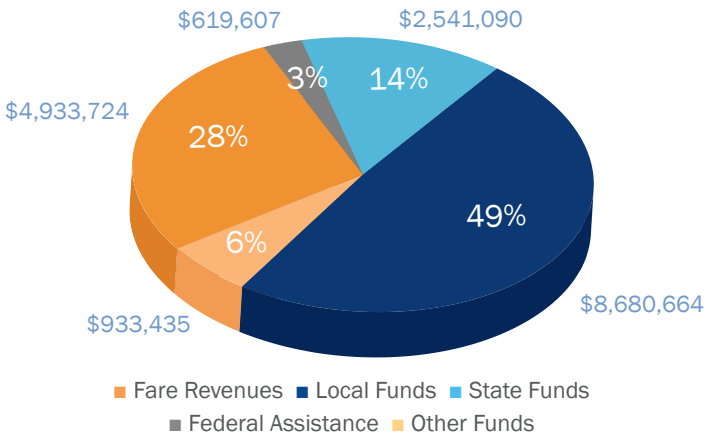


Figure 4.29 : Tulsa Transit Operating Expenses (2009)

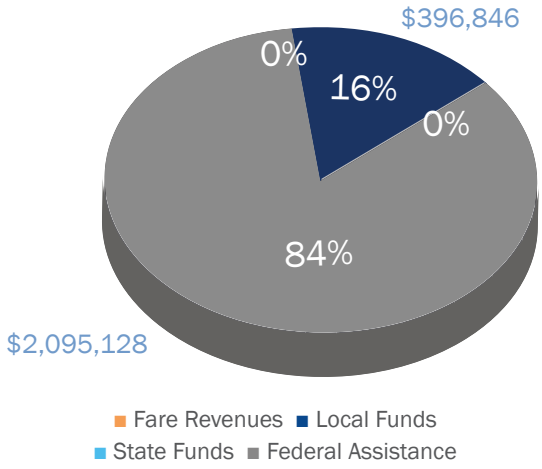


Table 4.15 : Capital Funds Sources (Tulsa, Oklahoma)

From	2002	2009	Change (2002 - 2009)	
			Dollar ($)	Percent
Local Funds	$191,218	$396,846	$205,628	107.5%
State Funds	$0	$0	$0	0.0%
Federal Assistance	$697,244	$2,095,128	$1,397,884	200.5%
Other Funds	$0	$0	$0	0.0%
Total Operating Expenses	$888,462	$2,491,974	$1,603,512	180.5%

Source: National Transit Database, 2009

In addition to operating funds, Tulsa Transit expended $2,491,974 in capital funds in 2009, which were funded primarily through federal assistance ($2,095,128, 84%) along with local funds ($396,846, 16%), as shown in Figure 4.29.

Overall, capital funding increased by $1,603,512, or 180.5%, from $888,462 in 2002 to $2,491,974 in 2009. Most notably, capital funding provided by federal assistance increased by 200%, from $697,244 in 2002 to $2,095,128 in 2009, while local funding increased by $205,628, or by 107%, from $191,218 in 2002 to $396,846 in 2009. Capital funding provided by state and other funds remained at $0.

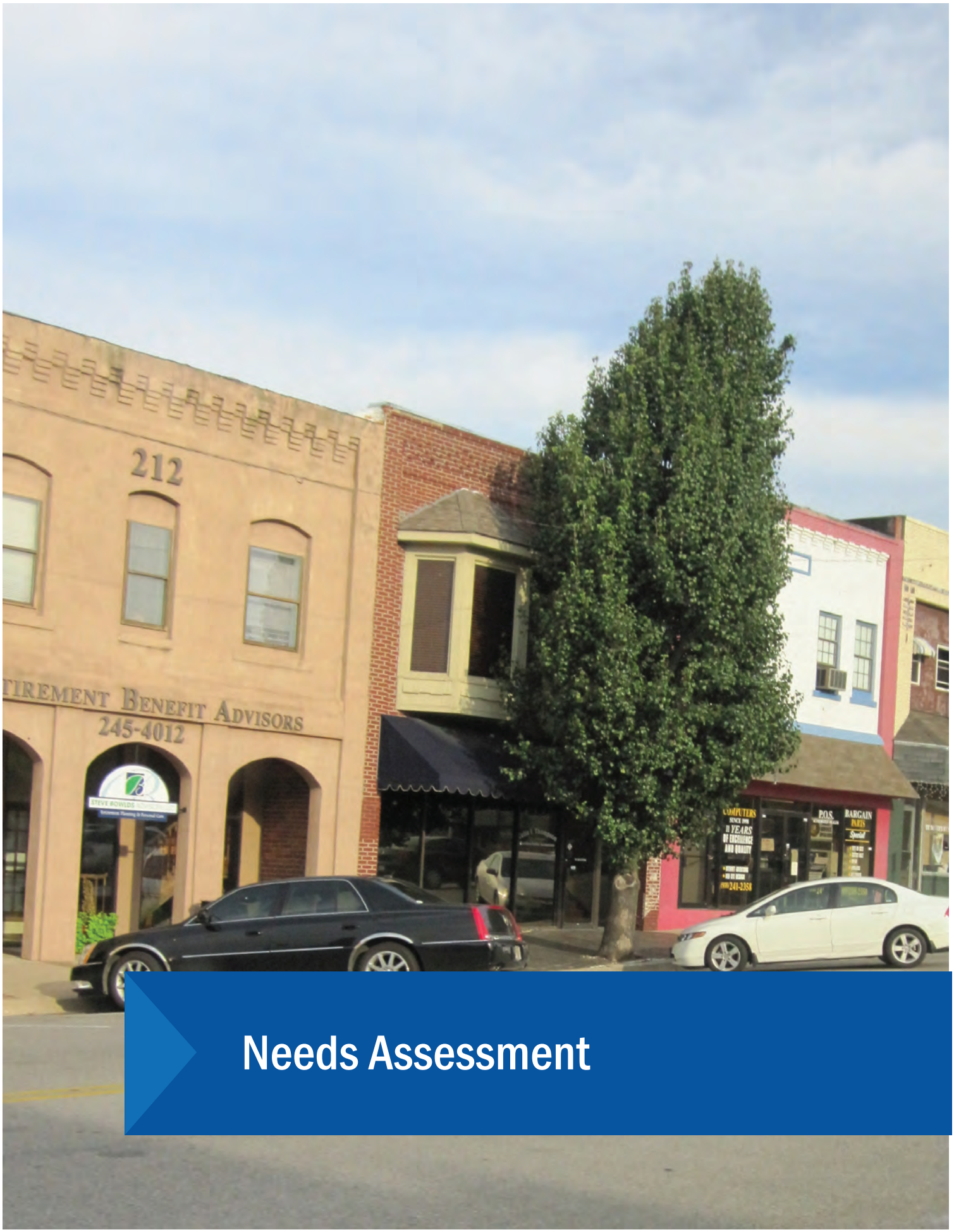
Financial Options

In addition to the existing funding sources, other alternative funding sources may include:

- General revenues
- Regional sales tax
- Property taxes
- Contract / purchase-of-service revenue
- Advertising revenue
- Dedicated tax sources (gasoline, automotive registration fee, parking fee, new resident, tourism related, event fees, car rental, utility impact fees, etc.)
- Special assessment districts (tax increment zones, special benefit districts, etc.)
- Parking fees
- Donations

When evaluating these potential alternative funding sources, Tulsa Transit should take into consideration the following performance factors, including:

- Stability
- Revenue yield
- Cost efficiency
- Equity
- Economic efficiency
- Legal constraints
- Acceptability



Needs Assessment

Needs Assessment

Regional Issues

Sustainable Development

The amount of urbanized area in the Tulsa Transportation Management Area has been expanding at a fairly brisk pace, while the region continues to add population and employment at a far slower rate. Sustaining this pattern of growth by providing adequate infrastructure and public services is becoming increasingly difficult. Expanding the capacity of the transportation system to meet the demands of an ever-enlarging Tulsa region, while adequately maintaining existing facilities, is perhaps one of the greatest economic and political challenges the region faces. Figure 5.1 shows how the urbanized area in the region has expanded steadily since 1970.

Figure 5.2 illustrates how accompanying land consumption within the region over a 40 year period has increasingly outpaced population growth, with the urbanized area growing by 124% (173.63 square miles), while population only grew by 46% (276,956 persons). At the same time, social and economic changes have increased the amount of trips generated per household. Combine these trends and today the Tulsa Metropolitan Area has a greater portion of its population and jobs dispersed in a larger area along with a rapid upsurge in the number and length of person trips. This condition has created a landscape where the automobile has become almost a necessity to achieve an acceptable degree of mobility and accessibility.

Figure 5.1 : Change in Urbanized Area, 1970 - 2000

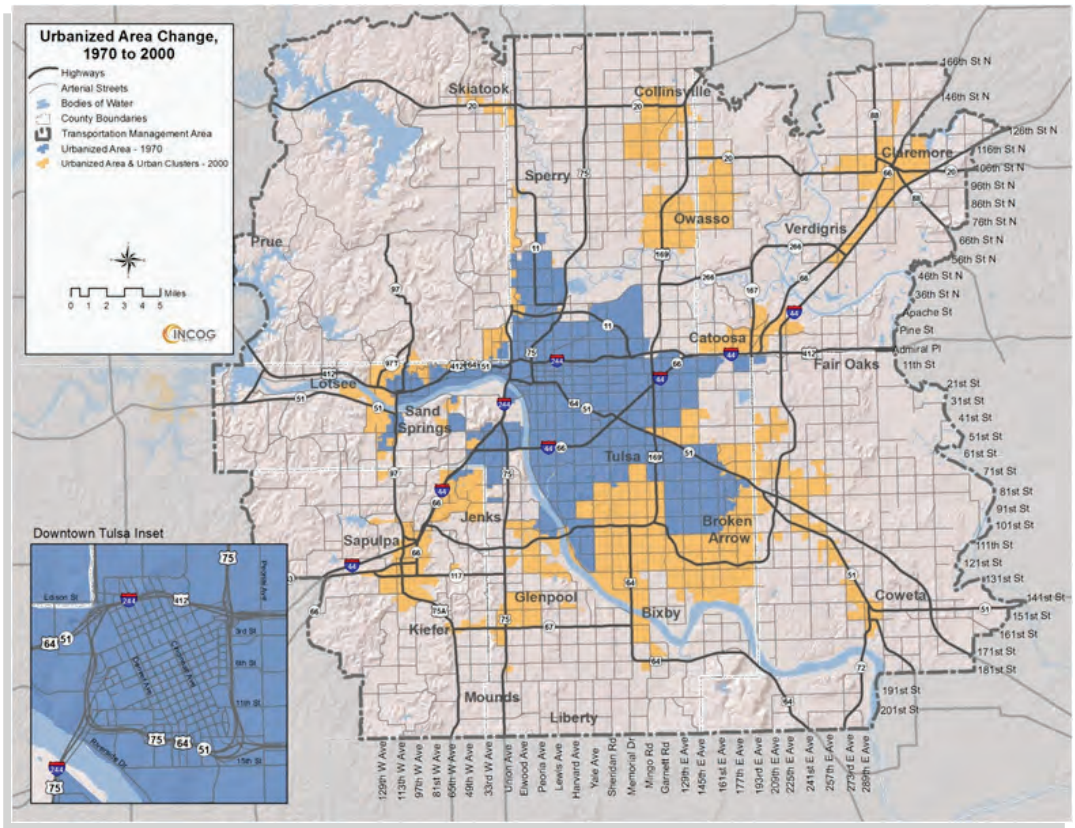
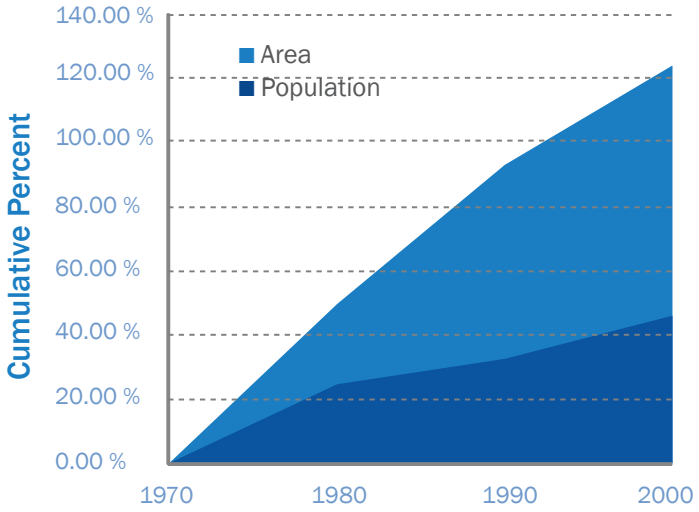


Figure 5.2 : Growth in Area and Population, 1970 - 2000



Lower population densities have spread out from the City of Tulsa, while employment has spread out across the region along major highway and arterials. Figure 5.3 illustrates the mismatch between persons and jobs.

Areas with greater population density originate more home-based trips, while areas with greater employment density add to the destination end of work trips. A balance of housing and jobs in closer proximity would produce a higher percentage of shorter trips and allow for more effective use of transit. Figure 5.3 shows the effect of the increasing distance between residential populations and employment centers and the greater reliance upon single-occupant vehicles as the primary means of travel.

The current pattern of growth and development in the Tulsa Transportation Management Area may not remain sustainable over time. Increasing demand for transportation capacity to serve an expanding region is not matched by the increasing fiscal capacity that might come from an expanding economy. Consequently, the difference between the public expectation to maintain a high standard of transportation service and the fiscal ability to meet that standard is growing. This is a subject that involves the overall future of the Tulsa Transportation Management Area, including coming to terms with the region's economic, social, and environmental goals and the role that multimodal alternatives play in advancing those goals.

Access to Opportunity

The transportation system within the Tulsa Transportation Management Area provides access to activities and places – both those that are necessary and those that simply improve the quality of life. For those residents who have full and complete access to that system, few opportunities are beyond reach, whether it's a good job, education, recreation or shopping. For those who are disconnected from the system by physical disability, age, income or location, many of those activities are inaccessible. As the Tulsa region grows outward and activities are more dispersed, those without access to an automobile become more and more isolated.

Nearly every corner of the Tulsa region is accessible by auto within a reasonable time. Figure 5.4 shows the percentage of the region's 421,387 jobs that an auto commuter could reach within 21 minutes during the peak hour. Inside the I-244/I-44/ Arkansas River ring, auto accessibility is very high, with a majority of residents having access to 81% to 100% of the jobs within 21 minutes, even during congested conditions.

Figure 5.3 : Dispersal of Employment and Population, 2005

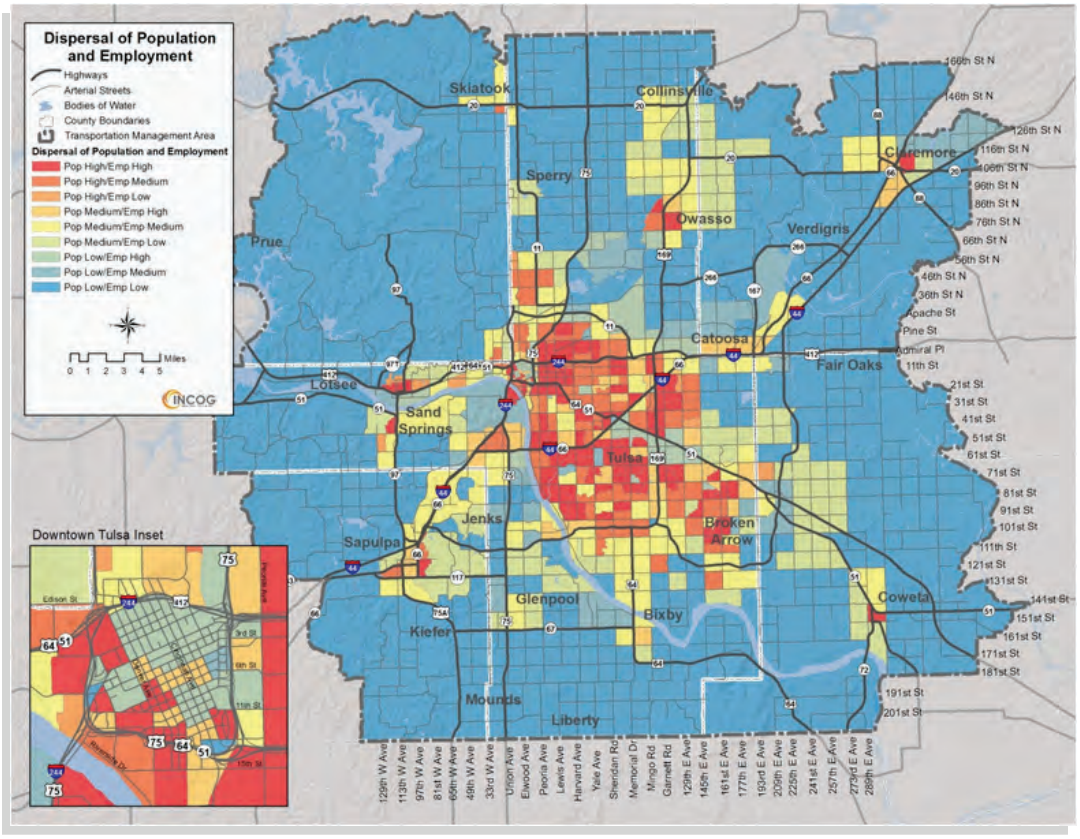


Figure 5.4 : Dispersal of Employment and Population, 2005

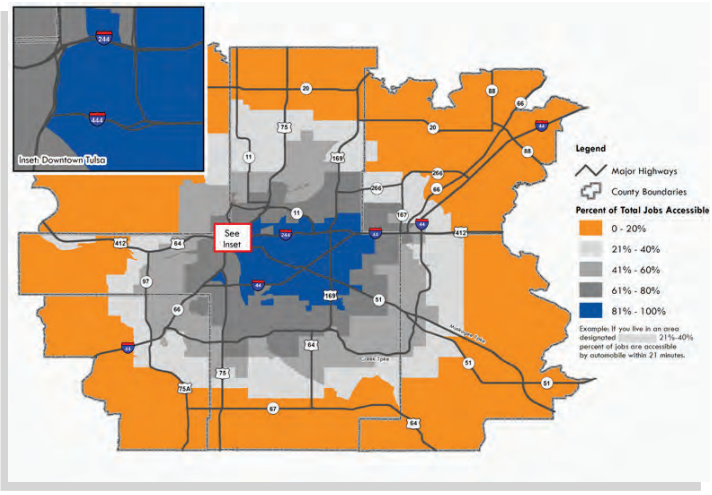
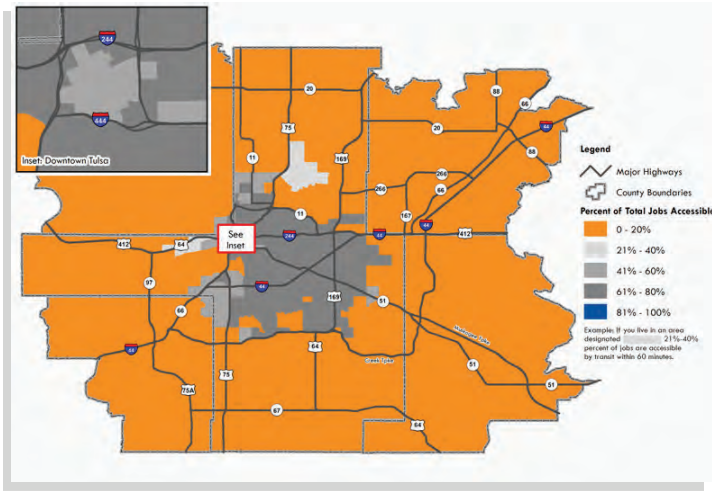


Figure 5.5 : Peak Hour Job Accessibility by Transit, 2005



Traveling by transit can be difficult and exact a large toll in time lost. Many areas of the Tulsa region are simply inaccessible by transit. Figure 5.5 shows the percentage of jobs that a transit user can get to within 60 minutes (the higher standard recognizes the increased time associated with using transit). The disparity between the number of jobs within reach for transit users and auto users with the Tulsa Transportation Management Area is enormous.

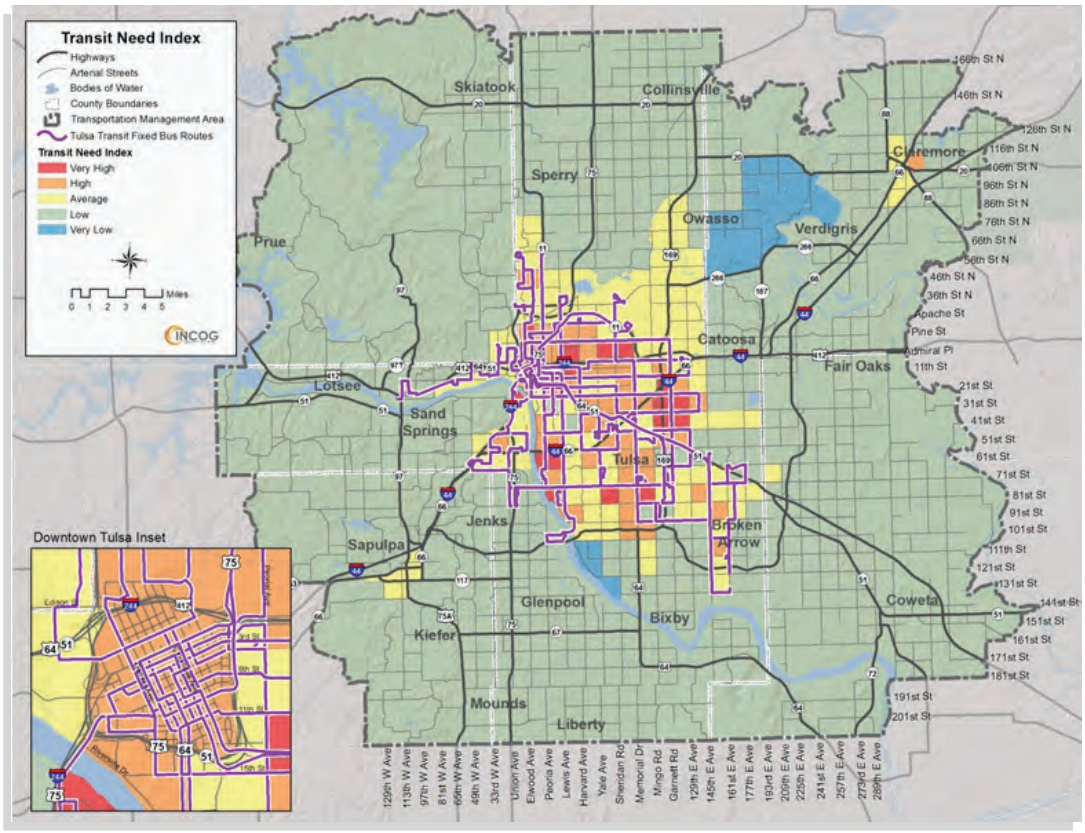


Figure 5.6 : Transit Need, 2005

The spatial mismatch between affordable housing and entry-level jobs is also a barrier for many in the Tulsa region. Between 2000 and 2005, 100% (1,366 jobs) of the total net job growth in the Tulsa Transportation Management Area occurred outside the I-44/US169/SH11/Arkansas River ring. As a result, the share of regional jobs bounded within this area fell from 54% (227,560 jobs) in 2000, to 48% (204,413 jobs) in 2005. For those without access to an automobile, this increase in the dispersal of jobs made this vital commute difficult. In 2005, nearly 75% (6,854) of all households without an automobile were within the region's urban core, which is a disproportionate share of the transit-dependent population, since only 37% (112,029) of all households were within this central area. Considering that 100% of the job growth was located outside this core, much of the region's underemployed or unemployed labor force is increasingly disconnected from new employers, causing problems for potential employees and employers alike.

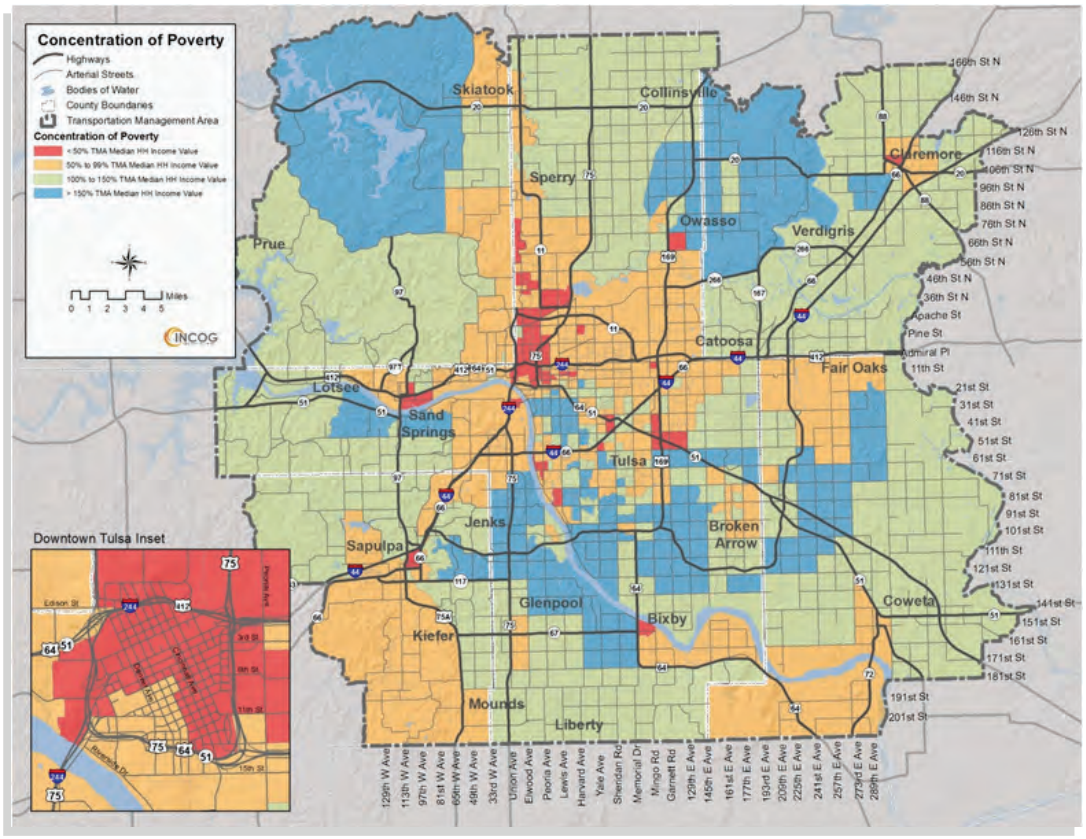
These trends have a social justice dimension as well. Figure 5.6 illustrates that predominant share of residents with the greatest need (low-income, minority populations, zero-car households, etc.) for transit services resides within the core of the Tulsa region.

Making regional mobility even more challenging, Figure 5.7 illustrates that a growing portion of low-income households, which have a higher probability of being a zero-car household reside outside the core region.

Congestion

Forecasts show that some conditions are only going to get worse as traffic volumes within the Tulsa Transportation Management Area continue to grow, and the expansion of roadway capacity cannot keep pace. Between 2000 and 2009 traffic on major roadways has grown by nearly 7%, while roadway capacity has not grown.

Figure 5.7 : Concentration of Poverty, 2005



Congestion comes at a high cost. Not only is it a nuisance for Tulsa commuters, but congested roadways worsen air pollution, waste fuel and time, and decrease productivity. The 2010 Urban Mobility Report, published by the Texas Transportation Institute at Texas A&M University, estimates that congestion costs the Tulsa Transportation Management Area $202 million each year in wasted fuel and lost time, a cost of $407 per peak hour traveler. Table 5.1 summarizes the historic mobility and performance trends within the Tulsa region.

Table 5.1 : Mobility & Performance Measures, 2000-2009

		2000	2009	Yearly Growth	Yearly % Increase
Daily VMT (1000s)	Freeways	6,500	6,997	55	0.8%
	Arterials	8,365	8,820	51	0.6%
	TOTALS	14,865	15,817	106	0.7%
Public Transportation	Annual Psgr Miles (millions)	18.9	13.9	-0.6	-2.9%
	Annual Psgr Trips (millions	3.3	2.7	-0.1	-2.0%
Congested Travel	% of peak VMT	25	21	0	-1.8%
	% of lane miles	31	31	0	0.0%
Fuel Consumed	Total Fuel (1000 gallons)	8,306	8,434	14	0.2%
	Fuel per Peak Commuter (gallons)	19	17	0	-1.2%
Annual Delay	Total Delay (1000s person hours)	6,756	8,621	207	3.1%
	Delay per Peak Commuter (person hours)	15	18	0	2.2%
Travel Time	Average Time per Peak Commuter	21.2	21.4	0.0	0.1%
Congestion Cost	Total Cost ($ millions)	138	202	7	5.2%
	Cost per Peak Commuter ($)	413	407	-1	-0.2%

The 2010 Urban Mobility Report states that the average commuter in the Tulsa region was spending an extra 18 hours a year on the highway due to delay in 2009. The Institute has developed a method for measuring the severity of congestion among metropolitan areas—the Travel Time Index (TTI). This index is a measure of the amount of additional time needed to make a trip during a typical peak hour compared to traveling at free-flow travel speeds, including both recurring and non-recurring delay. The Tulsa region was given a TTI value of 1.07. This indicates that for a 20 minute trip commuters can expect to travel an additional 1.4 minutes, a 12% increase in travel time since 1989.

Identification of Potential Corridors

The Tulsa Transportation Management Area (TMA) Regional Transit System Plan (RTSP) is being prepared under the direction of the Indian Nations Council of Governments (INCOG) to support the identification of local and regional transit related needs as well as to identify and prioritize corridors suitable for high capacity transit service. Upon identifying proposed corridors, INCOG will select the corridors most favorable for development of high capacity transit solutions to move forward into an Alternatives Analysis (AA).

The Purpose and Need Statement guides the development of the RTSP. It provides the basis and rationale for major transportation improvements in the Tulsa TMA. The purpose of this needs assessment is to identify the regional transportation needs that may be addressed through public transportation and high capacity transit improvements.

This report discusses the Purpose and Need for the Tulsa TMA RTSP, which was developed based on a set of goals established by INCOG and the RTSP Regional Task Force (RTF) at the onset of the study. These goals are as follows:

1. Enhance Transportation Mobility & Accessibility
2. Improve Transportation Efficiency & Safety
3. Promote Environmental Benefits
4. Guide Economic Development

This needs assessment documents the characteristics of the study area in terms of the municipalities in the TMA and their ability to meet the overall transportation goals identified above.

Existing and Anticipated Conditions

An initial set of potential high capacity corridors was identified through a multi-facetted evaluation of existing regional transportation improvement plans, relevant demographic data, projected regional travel demand and community input from stakeholders. These plans included the 2008 Rail Transit Strategic Plan, the 2010 City of Tulsa Comprehensive Plan (PLANiTULSA) and the Downtown Area Master Plan.

Previous Plans and Studies

Facing new and evolving challenges and opportunities, agencies and institutions have taken the opportunity to engage the public, study alternative transportation solutions and create community visions to help guide regional success. A collection of these studies, reports and plans have influenced the development of the INCOG Regional Transit System Plan. Investigation of these documents allowed the project team to develop an informed and comprehensive plan by maintaining consideration for future plans and objectives of regional entities. Information from these prior efforts was used to develop a framework for this study, and in some cases directly contributed to the list of options considered by the INCOG RTSP.

Detailed information regarding the previous regional studies and projects related to the Regional Transit System Plan are found in Chapter 1.

Demographics Analysis

INCOG has developed and adopted forecasts of population and employment for Traffic Analysis Zones in each of the five counties that make up the TMA Region. The region includes all of Tulsa County and portions of Creek, Osage, Rogers and Wagoner Counties.

Given the connection and interaction between land use and transportation, population and economic forecasts were reviewed and analyzed in order to discover relevant findings and underlying assumptions for future population and employment growth. The 2005 estimates and 2035 forecasts were developed by INCOG in order to complete the development of Connections 2035, the upcoming long range transportation plan for the Tulsa region. For both population and employment, multi-step processes were applied to each Traffic Analysis Zone (TAZ), the smallest units of geographic data, as well as changes in residential/employment location and density. These forecasts fully incorporated the population and employment forecasts from the 2010 Tulsa Comprehensive Plan to determine attractiveness for new residential development or new employment opportunities.

As shown in Table 5.2 and Table 5.3, the regional population and employment levels are forecasted to grow by approximately 284,000 people (38%) and 146,000 jobs (35% by the horizon

Table 5.2 : CTMA Change in Population (2000 – 2035)

County	Persons[1]				Density[1] (persons per sq. mile)		
	2000	2035	Average Annual Growth	Average Annual % Change	2000	2035	Average Annual % Change
Creek	38,181	52,685	414	1.1%	247	341	2.7%
Osage	20,521	33,197	362	1.8%	80	129	1.4%
Rogers	45,619	94,164	1,387	3.0%	223	460	6.8%
Tulsa	563,299	771,381	5,945	1.1%	960	1,314	10.1%
Wagoner	38,374	79,044	1,162	3.0%	159	328	4.8%
Total	705,994	1,030,471	9,271	1.3%	489	714	6.4%

Source: RTSP Demographic Review and Analysis Memorandum (Nov 12, 2010) [1] – Data are based on county population residing within the TMA

Table 5.3 : TMA Change in Employment (2000 – 2035)

County	Jobs[1]				Density[1] (jobs per sq. mile)		
	2000	2035	Average Annual Growth	Average Annual % Change	2000	2035	Average Annual % Change
Creek	13,061	19,908	196	1.5%	85	129	1.3%
Osage	2,323	5,638	95	4.1%	9	22	0.4%
Rogers	16,742	38,245	614	3.7%	82	187	3.0%
Tulsa	384,559	490,121	3,016	0.8%	655	835	5.1%
Wagoner	3,336	14,282	313	9.4%	14	59	1.3%
Total	420,021	568,194	4,234	1.0%	291	394	2.9%

Source: RTSP Demographic Review and Analysis Memorandum (Nov 12, 2010) [1] – Data are based on county population residing within the TMA

year 2035). The growth is not evenly distributed, but distributed to zones based on a number of factors including proximity to existing development, accessibility, and major developments. The proximity of transit services to major points of origin for the labor force must also adapt to the changing distribution of residents.

For further information on the development of population and employment forecasts throughout the TMA Region, please refer to the INCOG RTSP *Demographic Review and Analysis Memorandum (November 2010)*.

Regional Travel Demand

The locally adopted regional transportation model was used to demonstrate existing vehicle trip patterns as well as those projected according to population, employment and development forecasts in the horizon planning year of 2035. Travel patterns of the TMA were analyzed according to travel between distinguished land use districts. Passenger trips analyzed were in the form of two types of trips between an origin-destination pair of districts. The types of trips analyzed were: home-based work trips and home-based other trips. The conventional relationship between these two trip types is the commuter demand (home-base work) versus travel demand patterns for all other activities and events (home-based other).

Table 5.4 and Table 5.5 identify the most popular (existing and projected) home-based work & home-based other trips occurring in the region and ranks the origin-destination land use district pairs in order of frequency. For additional information, please see the INCOG RTSP Travel Demand Forecast Memorandum (March 2011).

Regional travel demand forecasts were performed for forecast year 2035 to provide insight into the projected travel patterns and potential for public transportation demand.

Notable Trends and shifts identified from the regional travel model forecasts included the following:

- Rate of increase in population and employment in suburban communities and local municipalities is far greater than in the City of Tulsa
- Decentralization of employment is shown through job growth in TMA districts outside of downtown Tulsa

Local Input

This RTSP seeks to actively engage and interact with the Transportation Management Area (TMA) citizens, agencies and community stakeholders to understand local issues as well as perceived needs and benefits of the existing public transportation system. In association with INCOG, a Stakeholder Involvement and Public Outreach (SIPO) team has been formed to educate the public on the purpose and goals of the RTSP as well as accept their comments and ideas to assist in the development of transit solutions that can be successfully implemented and accepted by the people of the region.

Table 5.4 : CTMA Change in Population (2000 – 2035)

Rank	District ID	Description	Trips	% Region	Act Centers
1	19	C Tulsa	64,964	16.5%	9
2	14	NE Tulsa	41,951	10.7%	4
3	22	SE Tulsa	40,520	10.3%	7
4	20	E Tulsa	39,207	10.0%	2
5	18	CBD	36,454	9.3%	1

Table 5.6 : Top Ranked Home-Based Work Trip Destination Districts (2035)

Rank	District ID	Description	Trips	% Region	Act Centers
1	19	C Tulsa	94,152	18.6%	9
2	20	E Tulsa	49,809	9.8%	2
3	14	NE Tulsa	48,462	9.6%	4
4	18	CBD	47,992	9.5%	1
5	22	SW Tulsa	46,411	9.1%	7

Table 5.5 : Top Ranked Home-Based Other Trip Destination Districts (2005)

Rank	District ID	Description	Trips	% Region	Act Centers
1	19	C Tulsa	243,221	19.7%	9
2	22	SE Tulsa	158,499	12.9%	7
3	23	SW Tulsa	102,104	8.3%	4
4	20	E Tulsa	99,769	8.1%	2
5	14	NE Tulsa	43,940	3.6%	4

Table 5.7 : Top Ranked Home-Based Other Trip Destination Districts (2035)

Rank	District ID	Description	Trips	% Region	Act Centers
1	19	C Tulsa	306,159	19.2%	9
2	20	E Tulsa	174,583	11.0%	2
3	18	CBD	142,208	8.9%	1
4	22	SW Tulsa	124,476	7.8%	7
5	23	SE Tulsa	99,095	6.2%	4

Figure 5.8 : TMA Daily Home-Based Vehicle Trips by Land Use District (2005)

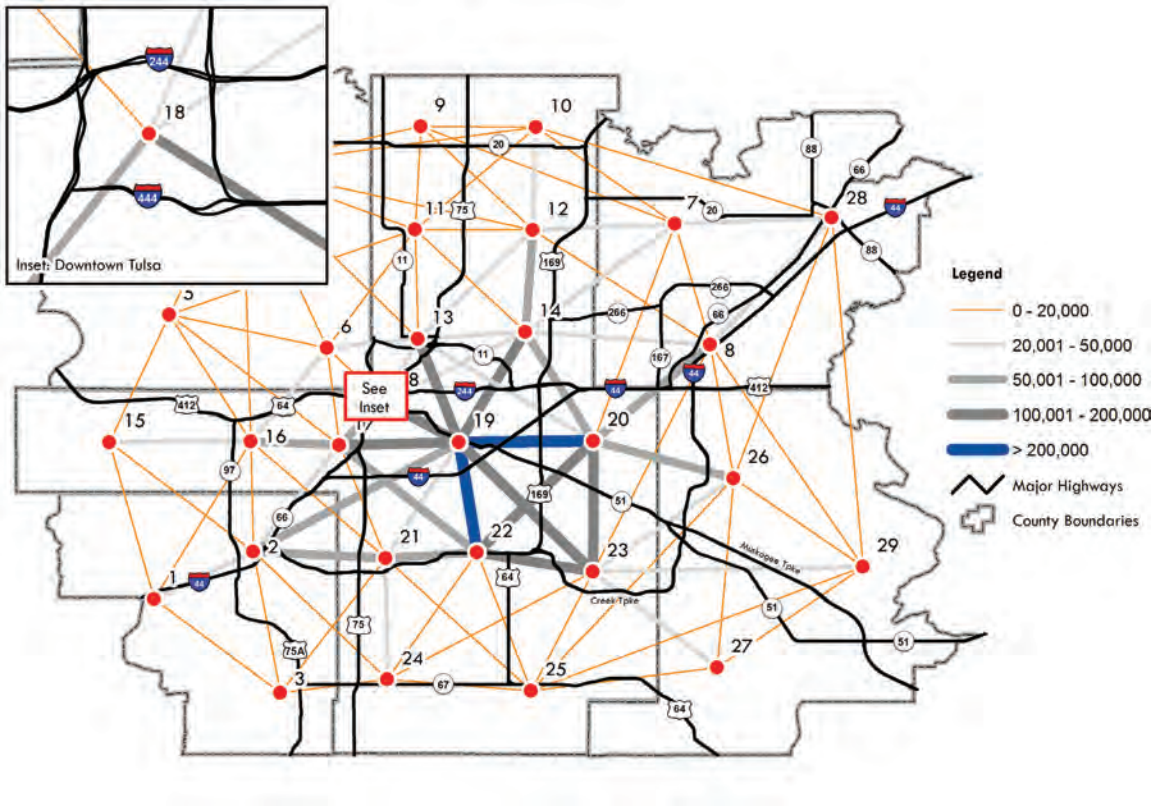


Figure 5.9 : TMA Daily Home-Based Vehicle Trips by Land Use District (2035)

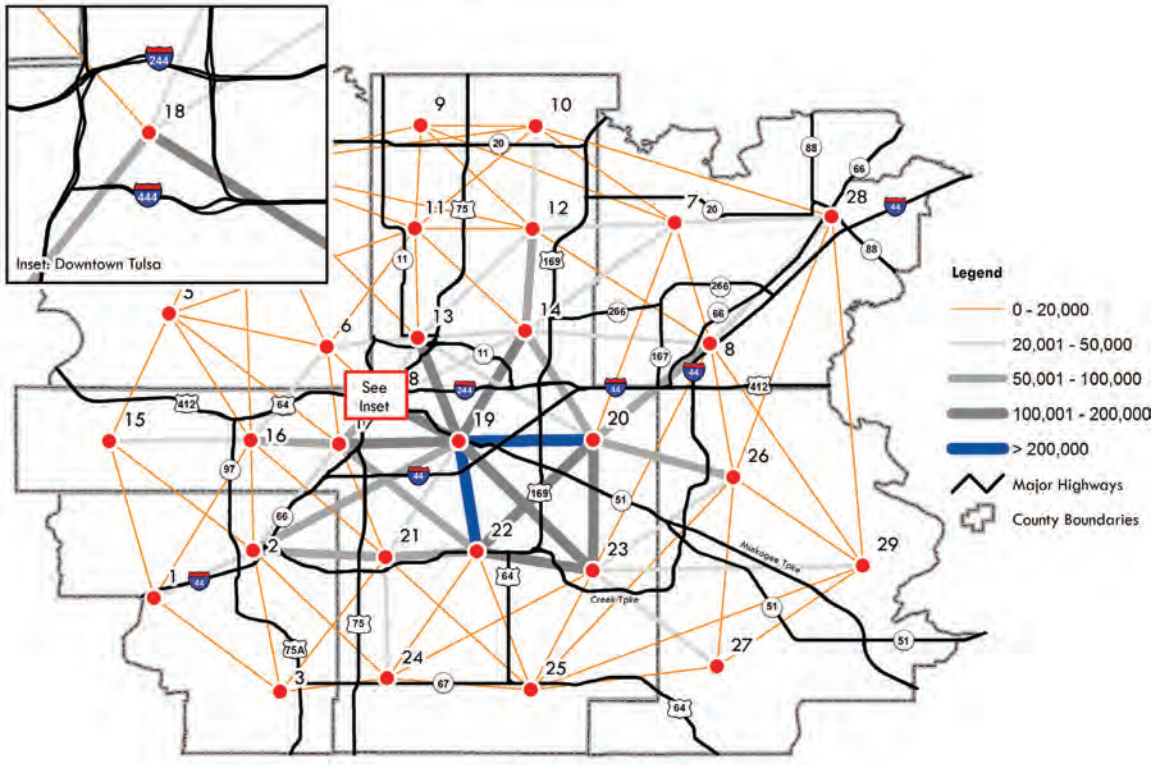


Table 5.8 : Current & Emerging Transportation Problems to Tulsa Metro Residents

Rank	Issue	Current Problem	Emerging Problem	Not a Problem
1	Inadequate roadway maintenance	69%	16%	13%
2	Congestion on N/S roads in the Metro	59%	18%	16%
3	Congestion on E/W roads in the Metro	56%	21%	16%
4	Congestion on Highways	56%	21%	20%
5	Capacity of roadways keeping up with development	53%	24%	19%
6	Availability of transportation for elderly & disabled	45%	25%	20%
7	Air Quality	34%	32%	30%
8	Lack of safe & accessible sidewalks	47%	17%	32%
9	Lack of public transportation/bus service	36%	26%	33%
10	Too much truck traffic	35%	20%	41%
11	Lack of bicycle trails and bike lanes	35%	17%	43%
12	Traffic delays caused by freight trains	15%	9%	72%

Members of the SIPO team scheduled and conducted 111 in-depth interviews of area policy makers, professionals, as well as community and business leaders to gain further understanding of stakeholder concerns and how to effectively communicate with them. Field and random phone surveys were also conducted to sample the public opinion on issues such as: perceived regional transportation problems, experience using transit, and mode choice incentives. The results of the phone poll surveys are summarized below.

Respondents had varying levels of experience with transit. Thirty-six percent of respondents had taken transit at some point in their lives in Tulsa, but 72% had taken transit somewhere else, such as while on vacation or while living in another city. For those who had taken transit in Tulsa, when asked about their experience, 41% rated it a positive experience, 43% had a neutral response, and only 16% rated their experience negative.

Many respondents, however, had a range of ideas on how to increase use of public transportation. The question was asked of respondents "Of the following choices, which would help you use public transit more often?" Several statements were read to the respondents and the most popular answers are listed below:

Streetcars or rail transit service instead of buses	**52%**
More frequent service	**52%**
More extended service hours	**51%**
More express buses	**50%**
Lower fares on buses	**48%**
Better quality buses and seats	**46%**
Wi-fi on buses	**28%**

Service levels, both in terms of frequency and span of service rated higher, while amenities such as Wi-Fi rated lower. Rail transit options were also very popular. An open ended question asking if there were any other enhancements that would encourage more transit use yielded two prominent answers, 1) more stops/routes in my area and; 2) service to rural areas and suburbs with 9% and 4%, respectively, indicating those improvements were would encourage the respondent to use transit more often.

Draft lists of potential high capacity transit corridors were developed based on previous plans and studies as well as the preliminary demographic analysis conducted. The lists were then refined and presented to the Regional Task Force and Funders' Committee members for discussion and comment. The results of input received from these stakeholders saw the addition of several new regional corridors for evaluation. A total of 22 corridors were selected to go through the needs assessment evaluation process as part of the RTSP development.

Potential High Capacity Corridors

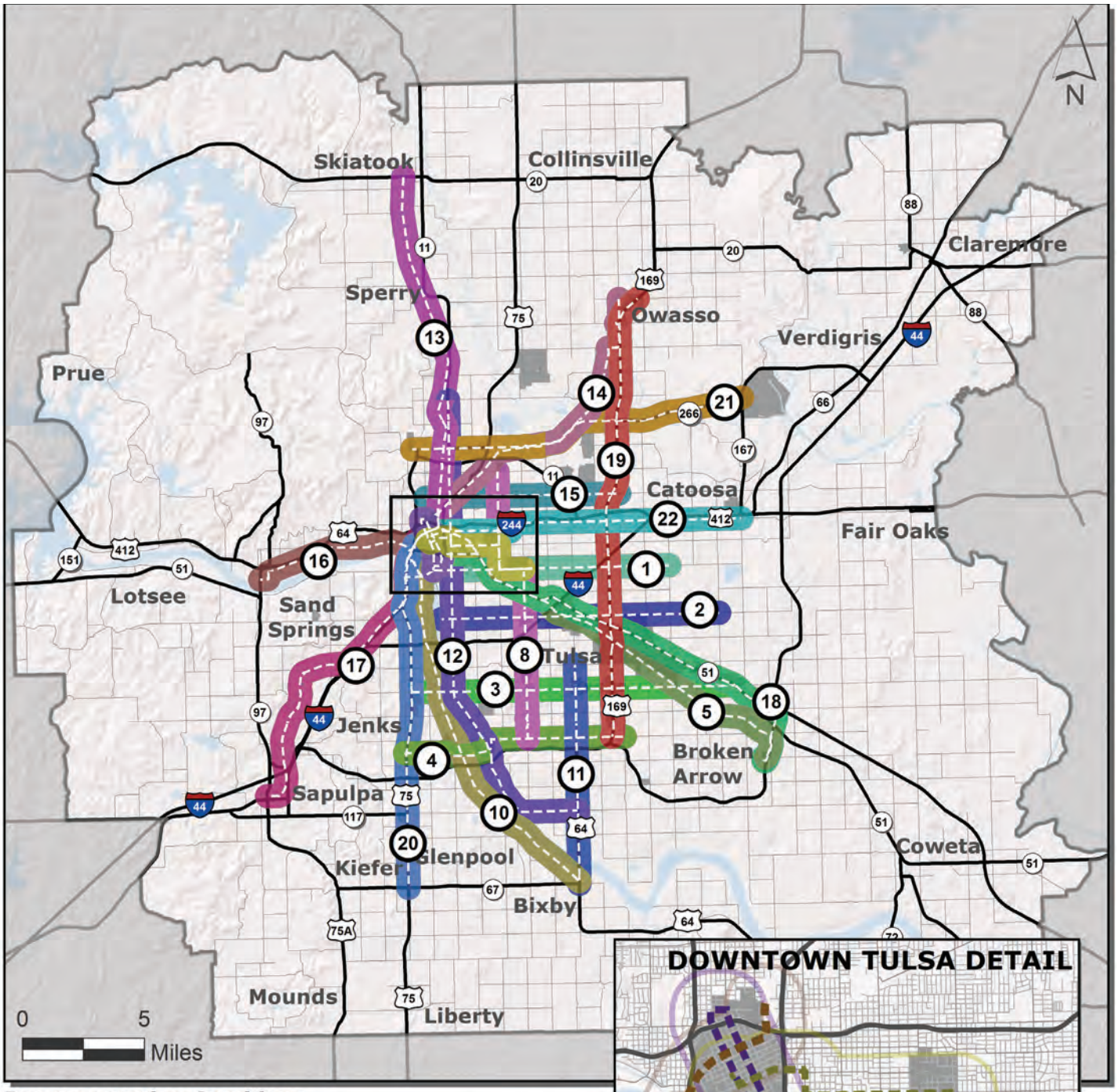
Potential high capacity transit corridors that were evaluated within the TMA and their termini are identified in Table 5.9 and Figure 5.10. Corridors were identified for analysis based on recommendations from recent regional planning documents, known travel patterns and transit demand, as well as local input from study area stakeholders.

Corridor limits were selected based on existing land use, activity/employment centers, transit service area and travel demand and proposed development opportunities. Several proposed corridors were divided into two segments to comparatively evaluate the needs of each. Segment termini were selected based on regional destinations and activity centers that distinguish corridors into potential "starter segments" with high transit demand versus service extensions to lower demand market areas. Segment termini may also differentiate changes in corridor character.

Table 5.9 : RTSP Representative Study Corridors

Corridor Number	Name	Length (Miles)	Extent A	Extent B	Right of Way
1	21st Street South Corridor	10.9	US Highway 75	145th East Ave	Roadway
2	41st Street South Corridor	11.4	Riverside Dr	Lynn Lane Rd	Roadway
3	71st Street South Corridor	12.1	US Highway 75	SH-51	Roadway
4	91st Street South Corridor	9.5	US Highway 75	Garnett Rd	Roadway
	Segment A	*5.9*	*Riverside Dr*	*Garnett Rd*	
	Segment B	*3.6*	*US Highway 75*	*Riverside Dr*	
5	Broken Arrow Corridor	17.8	Union Station	NSU-Broken Arrow	Rail
	Segment A	*13.9*	*Union Station*	*Main Street, Broken Arrow*	
	Segment B	*3.9*	*Main Street, Broken Arrow*	*NSU-Broken Arrow*	
6	Central Corridor	3.3	OSU-Tulsa	23rd and Jackson	Rail
7	Downtown Circulator	4.8	John Hope Franklin Blvd	21st St	Roadway
8	Harvard/Yale Corridor	12.1	91st St	Apache St	Roadway
	Segment A	*7.0*	*21st St*	*91st St*	
	Segment B	*5.1*	*21st St*	*Apache St*	
9	Historic Streetcar Corridor	5.4	Downtown (DAS)	Expo Square (21st & Yale)	Roadway
10	Jenks/Bixby Corridor	17.4	Union Station	Memorial Dr	Rail
	Segment A	*10.2*	*Union Station*	*Main Street, Jenks*	
	Segment B	*7.2*	*Main Street, Jenks*	*Memorial Dr*	
11	Memorial Drive Corridor	8.0	61st St	151st St	Roadway
12	Peoria/Riverside Dr Corridor	20.2	56th St N	Memorial Dr	Roadway
	Segment A	*6.0*	*56th St N*	*11th St*	
	Segment B	*14.2*	*11th St*	*Memorial Dr*	
13	Osage Prairie Trail Corridor	14.6	OSU-Tulsa	Skiatook (Rogers Blvd)	Trail
	Segment A	*5.0*	*OSU-Tulsa*	*56th St N*	
	Segment B	*9.5*	*56th St N*	*Skiatook (Rogers Blvd)*	
14	Airport/Owasso Corridor	14.0	Union Station	96th St N	Rail
	Segment A	*6.4*	*Union Station*	*Airport*	
	Segment B	*7.6*	*Airport*	*96th St N*	
15	Pine Street Corridor	8.0	Cincinnati Ave	Garnett Rd	Roadway
16	Sand Springs Corridor	7.9	Union Station	State Highway 97	Rail
17	Sapulpa Corridor	14.5	Union Station	State Highway 97	Rail
18	State Highway 51 Corridor	17.8	SE Leg of IDL	NSU-Broken Arrow	Roadway
19	US 169 Corridor	18.5	91st St S	96th St N	Roadway
20	US Highway 75 Corridor	14.3	SW Leg of IDL	SH 67 (151st St)	Roadway
	Segment A	*6.2*	*SW Leg of IDL*	*71 st St*	
	Segment B	*8.1*	*71 st St*	*SH 67 (151 st St)*	
21	36th St North Corridor	14..3	Osage Million Dollar Casino	Tulsa Port of Catoosa	Roadway
	Segment A	*6.2*	*Osage Million Dollar Casino*	*Sheridan Rd*	
	Segment B	*8.1*	*Sheridan Rd*	*Tulsa Port of Catoosa*	
22	3rd Street/TU/Admiral Corridor	13.4	Downtown (DAS)	193rd East Avenue	Roadway
	Segment A	*9.4*	*Downtown (DAS)*	*129th East Avenue*	
	Segment B	*4.0*	*129th East Avenue*	*193rd East Avenue*	

Figure 5.10 : RTSP Representative Study Corridors



Representative Corridors

1. 21st Street Corridor
2. 41st Street Corridor
3. 71st Street Corridor
4. 91st Street Corridor
5. Broken Arrow Corridor
6. Central Corridor
7. Downtown Circulator
8. Harvard/Yale Corridor
9. Historic Streetcar Corridor
10. Jenks/Bixby Corridor
11. Memorial Drive Corridor
12. Peoria/Riverside Dr Corridor
13. Osage Prairie Trail Corridor
14. Airport/Owasso Corridor
15. Pine Street Corridor
16. Sand Springs Corridor
17. Sapulpa Corridor
18. State Highway 51 Corridor
19. US 169 Corridor
20. US Highway 75 Corridor
21. 36th St North Corridor
22. 3rd Street/TU/Admiral Corridor

Needs Assessment Objectives

This section establishes regional transportation system objectives and measures the system's ability to meet existing as well as projected transportation needs. The need for improved transit services in the TMA is supported by the transportation goals outlined in Chapter 2. This chapter identifies the specific objectives that meet the goals of the TMA as well as establish the qualitative and quantitative measures utilized to evaluate corridors with potential high capacity transit needs. A table summarizing the goals, objectives and measures by which the regional transportation system was evaluated is shown in Table 5.10.

Transportation Mobility & Accessibility

The health and effectiveness of a region's transportation system are critical to the region's ability to further its economic growth and development. "The ultimate goal of transportation is 'access,' people's ability to reach desired goods, services and activities. Transportation decisions often involve tradeoffs between different forms of access." The specific objectives of this needs assessment and subsequent Regional Transit System Plan (RTSP) were developed to guide the recommendation of transit related solutions to improve overall regional access to opportunity.

Table 5.10 : RTSP Needs Assessment Goals, Measures & Objectives

Rank	Issue	Current Problem
Enhance Transportation Mobility & Accessibility	Meet Demands Created by Increases in Population and Employment	Population Density (persons / sq mi) within 0.5 miles of corridor (2035)
		Employment Density (jobs / sq mi) within 0.5 miles of corridor (2035)
		Miles of Roadway with Level of Service (LOS) "D" or lower within 0.5 miles of corridor) (2035)
	Improve Access to Major Activity Centers	# of Activity Centers, Parks and Public Spaces per corridor mile (within 0.5 miles of corridor) (2035)
		Central Business District (CBD) Trips (# of daily trips along corridor to/ from CBD) (2035)
	Improve Mode Choice Availability	# of Zero (0) Car Households (within 0.5 miles of corridor) (current)
		Miles of Parallel Bus Routes (within 0.5 miles of corridor) (current)
		# of Transit Stops (within 0.5 miles of corridor) (current)
Improve Transportation Efficiency & Safety	Improve Multimodal Connectivity	Miles of Adjacent Bike Paths per corridor mile (within 0.5 miles of corridor) (2035)
		Miles of Adjacent Sidewalk per corridor mile (within 0.5 miles of corridor) (2035)
	Safety	# of Vehicle Crashes per corridor mile (within 0.5 miles of corridor) (2009)
Promote Environmental Benefits	Minimize Environmental Impact	Acres of Floodplains per corridor mile (within 0.5 miles of corridor) (current)
		Total Auto Emissions Caused by Delay Along Corridor (2035)
Support Economic Development	Incorporate Local Goals & Objectives	# of Recently Developed Parcels per corridor mile (within 0.5 miles of corridor) (10 yrs historic data)
	Encourage and Support Development	# of Vacant Parcels per corridor mile (within 0.5 miles of corridor) (current)
		Adjacent TIFF Districts (within 0.5 miles of corridor) (current)

Objective 1.1: Meet the demands of increasing population and employment

The Tulsa TMA is projected to undergo a marked population increase by the planning horizon year of 2035. There are also emerging employment centers throughout the RTSP study area. One of the unique dimensions of the region is the rapid growth of the suburban and rural communities versus the regional epicenter of the City of Tulsa.

Together with the redistribution of the regional population base, numerous developing employment centers are emerging throughout the RTSP study area. These decentralized employment centers impact regional travel patterns. Land Use Zones surrounding the Central Business District of the City of Tulsa show a marked increase in employment density. As a result of this growth, the transportation system local to these new employment centers will be placed under additional strain.

Corridors operating below their designed peak level traffic volumes and capacities are generally more congested than those operating at or near design parameters. Transit may be a reasonable alternative to travel in a personal vehicle, thus reducing vehicle volume along the corridor.

Objective 1.2: Improve access to major regional activity centers

Analyzing existing and proposed travel patterns of a region generally reveals a high frequency of trips to major regional activity centers, or "trip generators". These generators take the form of major residential or employment developments, parks, public spaces, health or educational institutions or commercial/ retail developments.

Transit service that can efficiently link multiple activity centers is vital for those dependent on transit for mobility and may present a reasonable alternative to personal vehicles.

The ability of the existing and future transit system to provide potential users direct access to these activity centers will directly impact metrics such as system ridership and operating revenues.

Objective 1.3: Mode choice availability

The evaluation of mode choice availability identifies areas with greater concentrations of potential users who have limited, or no personal transportation options. This objective also considers the overall accessibility of potential users to transit, measured by proximity and volume of existing transit stops and service to the corridors.

Transportation Efficiency

The decision to utilize public transportation as opposed to private means requires an attractive and efficient alternative. The choice to use transit is largely influenced by the time required to reach a selected destination using public versus private transportation. Travel times for individual trips are dependent upon distance traveled to reach transit, associated transit mode, wait time for transit service, transit travel time and distance travelled to reach final destination.

Tulsa Transit has recently been faced with additional challenges in providing efficient transit service in the form of reductions to public transportation funding. Agency budget reductions have resulted in:

- Service reductions; bus headways and hours of service
- Service increase demand
- Staff reductions
- Human Resource retention and turnover

Objective 2.1: Improve Multimodal Connectivity

Cities encourage alternative forms of transportation for citizens providing numerous benefits including economic, health, mobility and safety. Mobility improvements generally involve establishing connections between transit, automobiles, bicycles and walk access for users.

Tulsa Transit currently utilizes commercial and private properties as park-n-ride facilities. No formal agreements are in place to use the locations and there are no existing shelters or facilities at the park-n-rides; only designated boarding locations with signage and benches. Tulsa Transit currently operates two transfer facilities, Denver Ave. Station (DAS) in downtown Tulsa and Memorial Midtown Station (MMS) in east Tulsa near I-44 and Memorial.

The City of Tulsa has a well developed bicycle and pedestrian trail system that extends several miles outside of the city and into the communities of Bixby, Broken Arrow, Jenks, Owasso, Sand Springs and Skiatook. The vast network of trails in the Tulsa area provides safe access to the region's activity centers to area cyclists and pedestrians. The existing system of trails serves as an important asset in the development of an overall transit system plan. Combining cyclists and pedestrian activity with transit service is important to the success of any system.

Objective 2.2: Improve Transportation Safety

Transit can provide safe and reliable travel for the community. Improvements to existing roadway and transit facilities contain components which focus on increasing safety for travelers. Focusing on areas with high crash rates may give commuters a way to increase the safety of their travel.

Promote Environmental Benefit

Objective 3.1: Minimize Environmental Impact

Environmental related goals consist both of promoting transit-related environmental benefits as well as minimizing adverse impacts. Transit related infrastructure should be developed to minimize impact on parklands, historic properties, wetlands, and waterways. Capturing positive environmental effects is growing in importance for the Tulsa region, especially as the Environmental Protection Agency (EPA) air quality standards become more stringent.

Support Economic Development

Objective 4.1: Incorporate Local Goals and Objectives

Local goals and objectives provide critical support for transit investments in the region. Areas with supportive infrastructure such as well-maintained bicycle paths, sidewalks, parks and public spaces provide an opportunity to coalesce accessible neighborhoods by providing safe infrastructure for cyclists, pedestrians and transit users. Many municipalities within the RTSP area have implemented policies and incentives which have resulted in new investment as well as redevelopment of target areas.

Objective 4.2: Encourage and Support Development

Transit supportive development patterns can help communities benefit from the full value of transit investments. Local jurisdictions need to establish policies which create dense mixed use areas that help ensure the feasibility of high capacity transit. Communities can maximize the benefits of a transit investment through transit oriented development (TOD), a concentration of mixed uses within a 10-minute walk of a transit stop.

Many regions in the Tulsa area demonstrate potential for growth and the implementation of transit to serve those areas could help spur development.

Cities within the RTSP study area have similar goals of promoting economic growth through infill building and reinvestment in established communities. Regional urbanization trends found in comprehensive plans throughout the region indicate a strong desire to develop downtown and central business districts as commercial, residential and retail communities.

Corridor Evaluation Methodology

The purpose of the Needs Assessment study is to evaluate regional needs and to identify potential high capacity transit corridors within the Tulsa Transportation Management Area. The integrity of the assessment lies in its ability to perform an equally weighted comparative evaluation among the various corridors identified in the RTSP study area. To accomplish this, the overlying transit Goals and Objectives identified in the previous chapter were organized into quantifiable measures that could be comparatively evaluated and ranked.

Evaluation Measures

Data used in the evaluation of measures identified in Table 3-1 was gathered from the most recent sources available. The horizon year for the development of the RTSP is 2035. As such, 2035 figures were used to analyze measures for which horizon year forecast data was available and appropriate. Transportation facility, land use and development improvements identified and adopted in previous municipal planning documents were also assumed to be deployed into service for measures evaluated using 2035 data.

Appropriate steps were also taken to ensure that measures were not biased towards corridors of any specific character. Normalization was performed for evaluation measures which may be biased towards corridors with very long extents and reaching multiple population, employment or activity centers. Normal figures were calculated from absolute values and based on a 'per corridor mile' metric.

GOAL 1:
Improve Transit Accessibility and Mobility

Objective 1.1: Meet the demands of increasing population and employment

Measure 1.1.1: Population density along the corridor

Measures projected 2035 population density within ½ mile of the study corridor.

Corridors with greatest concentrations of residents were ranked to reflect higher demand for transit service.

Measure 1.1.2: Employment density along the corridor

Assesses projected 2035 employment concentrations within ½ mile of corridor area. Corridors with higher concentrations of projected employment were ranked as the higher priority corridors for high capacity transit.

Measure 1.1.3: Level of Service (LOS) along the corridor

Evaluates the Level of Service (LOS) along each corridor. LOS is a term used to denote the ability of a roadway to operate at its designed capacity and operating speeds. Corridors operating below their designed peak level traffic volumes and capacities are generally more congested than those operating at or near design parameters. Transit may be a reasonable alternative to travel in a personal vehicle, thus reducing vehicle volume along the corridor.

Corridors projected with the most miles of roadway with LOS rating of "D" or poorer within ½ mile of the proposed corridor were ranked higher for improved transit service. Several corridors evaluated within this assessment are currently used exclusively for freight rail operations and there are no major roadways within ½ mile. For corridor segments that were isolated from alternate roadway routes by greater than this radius, LOS figures were calculated based on a ½ mile radius about the major roadway that best replicated the travel pattern of the proposed transit corridor.

Objective 1.2: Improve access to major activity centers

Measure 1.2.1: Activity centers, parks and public spaces per corridor mile

This evaluates regionally significant activity centers such as hospitals, major commercial and retail developments, which generally serve as major employment centers and destinations for regular vehicle trips. The number of parks and public spaces within ½ of the corridor were included in this evaluation as regional destinations.

Values were normalized to be evaluated on a 'per corridor mile' basis. Corridors reaching a larger amount of activity centers were ranked more favorably than corridors provided access to less activity centers.

Measure 1.2.2: CBD trips along the corridor

The Central Business District (CBD) of the TMA lies within downtown Tulsa and adjacent Districts to the North, South and East. The average number of daily vehicle trips occurring to and from the CBD along each corridor was compared and those with the most trips were ranked highest.

Objective 1.3: Improve Mode Choice Availability

Measure 1.3.1: Number of zero (0) car households along the corridor

In order to identify potential transit dependent markets, US Census data was used to analyze the number of households within ½ mile of potential corridors which reported households with no automobile ownership. Corridors having the greatest quantity of zero car households rank as those with the greatest need for public transportation improvements.

Measure 1.3.2: Miles of parallel bus routes to the corridor

The relative amount of transit coverage adjacent to study area corridors was inferred from this metric. Proposed corridors having the greatest distance of parallel fixed route bus service within ½ mile were ranked highest.

Measure 1.3.3: Number of transit stops along the corridor

This measure evaluated perceived transit access using the number of MTTA bus stops within ½ mile of each proposed corridor. Corridors with the greatest number of transit stops in proximity were ranked highest.

GOAL 2:
Improve Transit System Efficiency and Safety

Objective 2.1: Improve Multimodal Connectivity

Measure 2.1.1: Miles of adjacent sidewalk per corridor mile

Availability of pedestrian trails and sidewalks are important to provide access to transit stops and stations from neighborhoods. Areas within corridors which have more existing sidewalk infrastructure were ranked higher than those which have a lack of pedestrian amenities. Values were normalized to be evaluated on a 'per corridor mile' basis.

Measure 2.1.2: Miles of adjacent bicycle facilities per corridor mile

This measure evaluated the miles of bicycle lanes and on-street bikeways available within each corridor. Corridors which provide access to a greater number of bicycle lanes and bikeways ranked higher than those which have limited connection to bicycle amenities. Values were normalized to be evaluated on a 'per corridor mile' basis.

Objective 2.2: Improve transportation safety within the corridor

Measure 2.2.1: Number of vehicle crashes occurring within ½ mile of the corridor (per corridor mile)

Measures the number of vehicle crashes on local highways and interstates within an eleven month period, from January 1, 2009 to November 30, 2009. Crash data was compiled from local and state law enforcement agencies. Values were normalized to be evaluated on a 'per corridor mile' basis. Corridors with higher frequencies of vehicle crashes were ranked higher in need of improved transit service.

GOAL 3:
Provide Environmental Benefit

Objective 3.1: Minimize environmental impact within the corridor

Measure 3.1.1: Acres of protected floodplains per corridor mile

The acres of protected floodplain areas were assessed to determine the potential impact of development of transit infrastructure. Corridors with the fewest acreage of identified floodplains within ½ mile were rated higher. Values were normalized to be evaluated on a 'per corridor mile' basis.

Measure 3.1.2: Vehicle emissions produced due to delay along the corridor

High volume traffic corridors generate greater total emissions, causing the most environmental impact to air quality standards. The introduction or enhancement of high capacity transit is viewed to have the greatest need and utility within corridors with the highest reported emissions levels. Those corridors calculated to generate the most emissions were ranked in higher need for improved transit service.

Note: According to EPA calculation of vehicle emissions generated. The amount of emissions produced due to congestion is calculated based on vehicle miles traveled along the corridor. Due to the rail technology currently operating within the corridors and absence of vehicle traffic, vehicle emissions data for proposed rail corridors was not able to be calculated.

GOAL 4:
Guide Economic Development

Objective 4.1: Incorporate Local Goals and Objectives

Measure 4.1.1 Number of recently developed parcels per corridor mile

Recent shifts in the local demographics have led to the identification of several regions of the TSM area that have experienced a significant amount of new investment and redevelopment. As access to quality transit service is viewed as a support mechanism to continue positive development trends, those corridors with greater recent development and investment levels were ranked higher for improved transit services. Values were normalized to be evaluated on a 'per corridor mile' basis.

Objective 4.2: Encourage and support development

Measure 4.2.1: Number of vacant parcels per corridor mile

The numbers of vacant parcels within ½ mile of the proposed corridor were identified. Corridors with greater amounts of vacant parcels were considered to have potential for investment in redevelopment and transit supportive development and were thus rated more favorable for improved transit services. Values were normalized to be evaluated on a 'per corridor mile' basis.

Measure 4.2.2: Number of TIF districts adjacent to the corridor

The Tulsa region has existing Tax Increment Financial districts (TIF) which support revitalization efforts of the district. Corridors with existing districts were identified and ranked accordingly due to the ability to accommodate mass transit implementation.

Evaluation Methodology

A multi-step needs evaluation process was applied to all proposed transit corridors to develop a "Cumulative Needs Score". This score was used to make a comparative distinction among the proposed corridors. The steps involved in the needs assessment evaluation and calculation of the Cumulative Needs Scores are described below:

1) Population and employment demographic data, existing transit service information and planned capital improvements corresponding to the evaluation measures identified above were input into GIS software. A one-half mile transit accessibility buffer was then applied to each of the proposed corridors to identify applicable demographic for each of the evaluation measures.

2) Corridor segments identified in Table 2-7 were each treated as individual corridors and evaluated comparatively, according to the measures identified, against all other segments as well as those corridors that were not segmented.

3) Corridors were assigned numerical rankings, for each evaluation measure, in descending order, from the corridor with the (statistically) greatest need for high capacity transit improvements to the one with the lowest.

4) A cumulative needs score was calculated for each corridor segment by summing the numerical rankings per evaluation measure from Step #3.

5) Corridors were then ranked by cumulative needs score. As the corridors with the greatest perceived need for high capacity transit were ranked highest, those corridors with the (numerically) lowest cumulative needs score were ranked the highest for deployment of high capacity transit improvements.

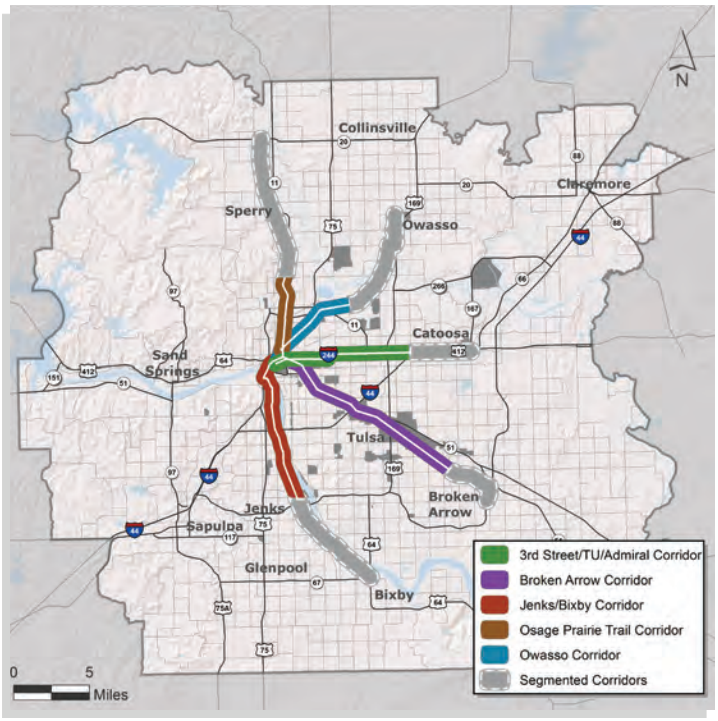
6) To identify transit corridors with potentially underperforming segments (A or B), corridors receiving segmentation were analyzed to identify the magnitude of difference in transit "need" between segments.

   a. Corridors having less than a 50% difference in cumulative needs score were moved forward into the overall comparison as a single, combined corridor and using aggregated demographics data.

   b. Of, those segmented corridors identified having a range of greater than 50% change in cumulative needs score between segments, only the higher scoring segment was moved forward into the overall comparison of corridors' full alignment extents. The extents of the higher performing segment were viewed as logical termini for the initial deployment of improved transit service as part of the final Regional Transit System Plan.

   c. The lower ranking corridor segment will be included as a potential future extension of the recommended transit service improvements along the corridor in the final Regional Transit System Plan.

Figure 5.11 : RTSP Segmentation Filter Results



See Figure 5.11 for further reference and summary of Segmentation Filter (steps 2-6) results.

7) The truncated corridors were then re-evaluated with those corridors not receiving segmentation and the combined corridors not impacted by the segmentation filter.

This evaluation of full alignments was conducted according to steps 2 thru 5 for all twenty-two corridors. The results of this comparative evaluation are shown in Table 5.11.

Evaluation Results

As described in the previous section, the needs assessment measures evaluated proposed high capacity transit corridors as individual segments, where applicable, to determine if there were any corridors with underperforming segments or if a natural terminus existed within the full extent of the corridor.

Table 5.11 : Preliminary Needs Assessment Evaluation Results

Description	Segment	Score	Rank
Downtown Circulator	full	100	**1**
Broken Arrow	A	112	**2**
Peoria / Riverside Drive	full	115	**3**
Historic Streetcar	full	116	**4**
3rd Street/TU/Admiral Corridor	A	128	**5**
Central Corridor	full	133	**6**
Harvard / Yale Avenue	full	142	**7**
State Highway 51	full	147	**8**
21st Street South	full	153	**9**
Airport/Owasso	A	159	**10**
Osage Prairie Trail	A	164	**11**
71st Street South	full	175	**12**
41st Street South	full	183	**13**
US Highway 169	full	188	**14**
Sapulpa	full	189	**15**
Jenks / Bixby	A	193	**16**
Pine Street	full	194	**17**
Sand Springs	full	202	**18**
Memorial Drive	full	229	**19**
91st Street South	full	231	**20**
US Highway 75	full	237	**21**
36th Street South	full	285	**22**

Preliminary Needs Evaluation

Upon inspection, five corridors were impacted by this preliminary Segmentation Filter evaluation process, having been identified to have underperforming segments. The results of this evaluation led to the modification of the terminal extents of the following corridors (See Figure 5.11 for additional information):

- **3rd Street/TU/Admiral:** Segment B was truncated from full alignment
- **Broken Arrow:** Segment B was truncated from full alignment
- **Jenks / Bixby:** Segment B was truncated from full alignment
- **Owasso:** Segment B was truncated from full alignment
- **Osage Prairie Trail:** Segment B was truncated from full alignment

After application of the Segmentation Filter, the revised demographic data for the full extent of proposed corridors was re-evaluated to rank their relative high capacity transit needs.

Transit Market Group Identification

When reviewing the cumulative needs scores calculated for the proposed high capacity transit corridors, several observations were made:

- Three (3) of top six (6) performing corridors (Downtown Circulator, Historic Streetcar and Central Corridor) provide similar circulator services to the greater downtown Tulsa area.
- Proposed high capacity transit corridors providing overarching regional connectivity among the City of Tulsa and surrounding communities and municipalities (excluding Broken Arrow and SH 51 Corridors) were found to score similarly.

The identification of the trends previously listed led to a refinement of the evaluation process to only perform comparative analysis among corridors with similar transit demand markets and operating characteristics. Three Transit Market Groups were established in order to discern the relative difference in high capacity transit need among corridors with like characteristics. Transit Market Groups established were: Circulator, Commuter and Urban Corridors. Typical travel demand, built environment and operating characteristics of each market group are described below:

Circulator Corridors

Potential high capacity transit corridors identified as Circulator Market Corridors primarily provide transit service to the downtown central business district (CBD) area only. Circulator transit service generally connects major activity centers and distribution points around the downtown, CBD, and/or entertainment districts of a metropolitan area. Due to the limited service area however, passenger trips are limited to downtown-to-downtown trips only. Travel demand is also more consistent throughout the day, having less distinguishable peak versus off-peak periods, since passenger trips are predominantly non home-based and activity driven. Circulator services are also seen as support to commuter and urban transit networks to distribute users upon arrival to CBD. Urban Corridors identified through the preliminary needs assessment and their preliminary evaluation scores were as follows:

1. **Central Corridor** (133)
2. **Downtown Circulator** (100)
3. **Historic Streetcar** (116)

Commuter Corridors

Proposed Commuter Market Corridors were often observed to be established highway or rail corridors through suburban or rural environments. Corridors are identified by natural urban concentrations at termini, with high population and employment densities at terminal "anchors" accompanied by low concentration of trip generators and activity centers in between "anchors". As a result, the majority of transit demand is for inter-urban, work based trips typically occurring during the peak AM and PM travel demands periods. Urban Corridors identified through the preliminary needs assessment evaluation were as follows:

1. **Airport / Owasso** (159)
2. **Broken Arrow** (112)
3. **Jenks / Bixby** (193)
4. **Sand Springs** (202)
5. **Sapulpa** (189)
6. **State Highway 51** (147)
7. **US 75** (237)
8. **US 169** (188)

Urban Corridors

The characteristics identified as typical of Urban Market Corridors are resultants of the nature of the geographically compact, developed metropolitan and suburban areas served. Urban Corridors were found to serve high population and employment density corridors having multiple concentrations of activity centers. There is a high demand for multi-purpose intra-urban trips to local employment and activity centers resulting in more evenly distributed peak and off-peak travel demand. Urban Corridors identified through the preliminary needs assessment evaluation were as follows:

1. **21st Street South** (153)
2. **36th Street North** (285)
3. **41st Street South** (183)
4. **71st Street South** (175)
5. **91st Street South** (231)
6. **3rd Street/TU/Admiral Boulevard** (128)
7. **Harvard Ave / Yale Ave** (142)
8. **Memorial Drive** (229)
9. **Osage Prairie Trail** (164)
10. **Peoria / Riverside Drive** (115)
11. **Pine Street** (194)

The Needs Assessment Methodology described in Section 4.2 was then applied to each of the transit Market Group subsets identified above. The results of the Segmentation Filter remained consistent with the preliminary evaluation, finding the Segment B of the: Admiral, Broken Arrow, Jenks / Bixby, Airport / Owasso and Osage Prairie Trail corridors to be underperforming.

Transit Market Groups were then re-evaluated using full alignments of corridors, after applying the Segmentation Filter. The results of the evaluation are shown in Table 5.12 thru Table 5.14.

Table 5.12 : Needs Assessment Evaluation Results (Circulator Market Group)

Description	Segment	Score	Rank
Downtown Circulator	Full	28	**1**
Historic Streetcar	Full	31	**2**
Central Corridor	Full	34	**3**

Table 5.13 : Needs Assessment Evaluation Results (Commuter Group)

Description	Segment	Score	Rank
Broken Arrow	A	39	**1**
State Highway 51	Full	56	**2**
Airport / Owasso	A	63	**3**
Jenks / Bixby	A	75	**4**
Sapulpa	Full	78	**5**
US 169	Full	80	**6**
Sand Springs	Full	81	**7**
US 75	Full	99	**8**

Table 5.14 : Needs Assessment Evaluation Results (Urban Market Group)

Description	Segment	Score	Rank
3rd Street/TU/Admiral Corridor	A	62	**1**
Peoria Ave/Riverside St	Full	64	**2**
Harvard / Yale	Full	69	**3**
21st Street South	Full	80	**4**
Osage Prairie Trail	A	84	**5**
71st Street South	Full	85	**6**
41st Street South	Full	98	**7**
Pine Street	Full	106	**8**
Memorial Drive	Full	121	**9**
91st St South	Full	121	**9**
36th Street North	Full	151	**11**

Refinement of Transit Market Groups

A review of cumulative needs scoring was performed for all Transit Market Group evaluations to verify results and continue to refine trends in performance. Additional measures were applied to transit market groups evaluations in order to more efficiently identify prime corridors for inclusion into the RTSP and receive further study.

Redundancy Filter

In analyzing proposed high capacity transit corridors by transit market served, the data set used in the evaluation may include multiple corridors which serve the same travel sheds. When approaching the Regional Transit System Plan (RTSP), this redundancy of service within corridors should be consolidated to identify only a single proposed corridor to achieve the desired connectivity. Although Parallel routes and alignments may be viable alternatives to the corridors identified by this study, a more detailed alternatives analysis is recommended to effectively identify the potential differences between them.

Proposed transit corridors identified as redundant pairs are:

- Broken Arrow vs. SH 51
- Jenks / Bixby vs. US 75
- Osage Prairie Trail vs. Peoria / Riverside Drive

Of these redundant pairs, the Broken Arrow, Jenks / Bixby and Peoria / Riverside Drive Corridors were the better performing corridors and will move forward to be included in the final recommended RTSP.

Underperformance

The reasonableness of a corridor's need for high capacity transit in relation to the perceived future demand of the area served was verified. Underperforming corridors identified during market group analysis were:

- 91st Street South
- Memorial Drive
- 36th Street North

The poor performance of these corridors infers a limited capacity to support demand for high capacity transit improvements. As such, specific recommendations for deployment of enhanced transit services along corridors will not be included in the RTSP.

After application of the Redundancy and Underperformance filters identified, the Circulator, Commuter and Urban Corridors that will be further analyzed for appropriate implementation of improve and high capacity transit services are illustrated in Figure 5.12 thru Figure 5.14.

Figure 5.12 : Preliminary Circulator Transit Market Corridors

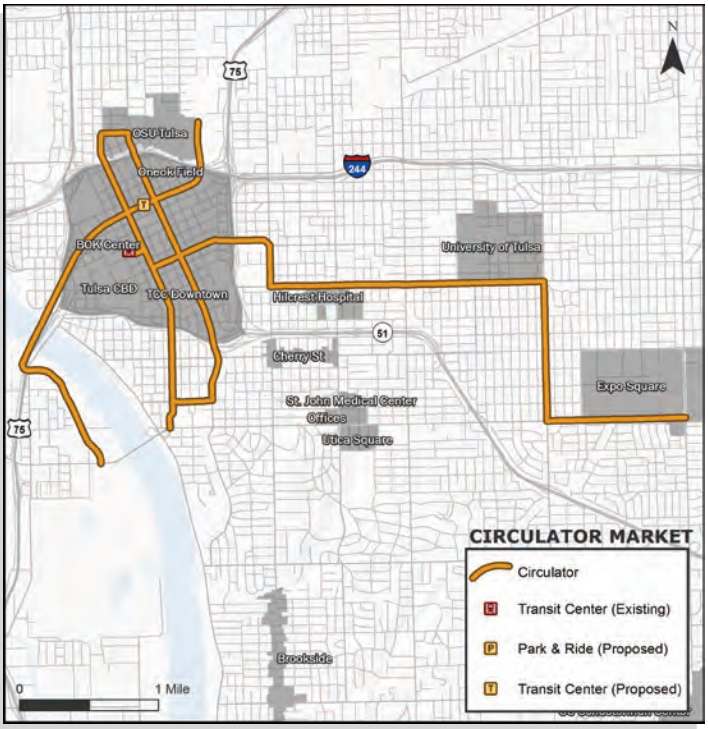


Figure 5.13 : Preliminary Commuter Transit Market Corridors

Through the needs assessment and evaluation process, study area corridors were put through a rigorous screening to assess the potential for successful deployment of a high capacity transit solution to resolve regional transportation and mobility needs.

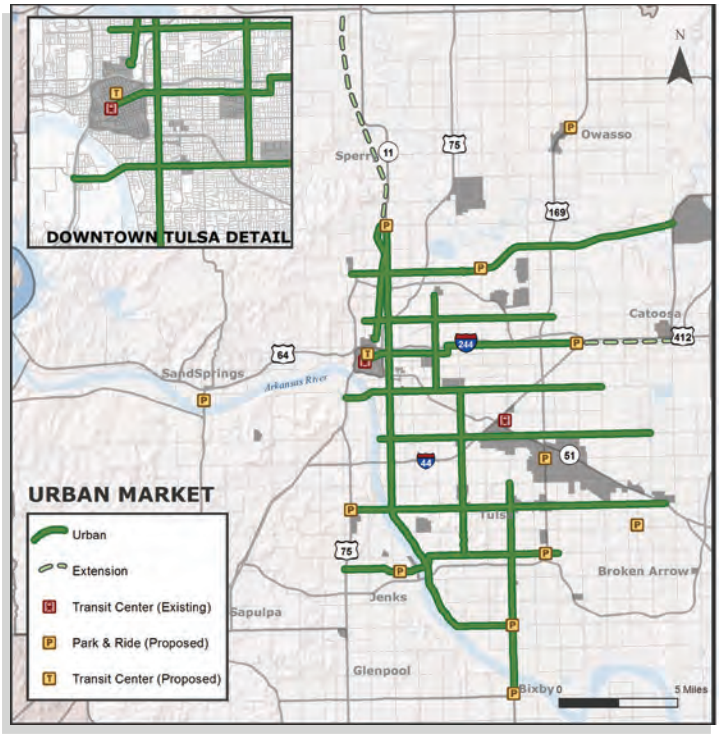
This process is also used to develop a set of scenarios that fulfills the individual goals outlined in the Needs Assessment, delivers the greatest distribution of regional equity, capitalizes on established planning investments, accounts for redundant alignments as well as interconnectivity and provides the best opportunity to develop high capacity transit service within the Transportation Management Area.

One of the goals of this assessment is the prioritization of the most appropriate transit corridor upon which to conduct an Alternatives Analysis study. Results of the needs assessment evaluation will be moved forward and incorporated into additional screening processes for the development of conceptual transit system plans.

The project team will also conduct an evaluation to prioritize the study area corridors for implementation of recommended improvements. Corridor prioritization will be evaluated independent of Needs Assessment ranking, as the corridors with the most immediate need for enhanced transit and mobility services may not require significant capital investment. An implementation strategy will also be developed to assist in the temporal orchestration of deployment.

An Alternatives Analysis (AA) is recommended to identify the appropriate transit mode technology, alignment and operating parameters to meet the future transit needs of the corridors most appropriate for significant investment in high capacity transit services.

Figure 5.14 : Preliminary Urban Transit Market Corridors



Regional Transit System Plan

Regional Transit System Plan

Corridor Prioritization and Scenario Development

One of the goals of the RTSP is the prioritization of the most appropriate transit corridor upon which to conduct an Alternatives Analysis study for major capital investment. Results of the needs assessment evaluation were moved forward and incorporated into additional screening processes for the development of conceptual transit system plans. Transit corridor market groups were categorized into one of three potential priority levels for implementation. Priority categories were identified by natural groupings, or breaks, in the cumulative needs assessment scores and are listed below. The prioritization of Foundation, Enhanced and Extended Network Corridors by transit market group are shown in Table 6.1 thru Table 6.3. Strategies for deployment of transit services are further discussed in Chapter 7, Implementation Program.

Table 6.1 : Circulator Corridor Prioritization Results

Rank	Description	Score	Priority
1	Downtown Circulator	28	Foundation
2	Historic Streetcar	31	Foundation
3	Central Corridor	34	Foundation

Table 6.2 : Commuter Corridor Prioritization Results

Rank	Description	Score	Priority
1	Broken Arrow	39	Foundation
3	Jenks / Bixby	75	Enhanced
2	Airport / Owasso	63	Enhanced
6	Sand Springs	81	Enhanced
4	Sapulpa	78	Enhanced
5	US 169	80	Enhanced

Table 6.3 : Urban Corridor Prioritization Results

Rank	Description	Score	Priority
1	3rd Street/TU/Admiral Corridor	62	Foundation
2	Peoria Ave/Riverside	64	Foundation
3	Harvard / Yale	69	Foundation
4	21 St	80	Enhanced
5	71 St	85	Enhanced
6	41 St	98	Extended
7	Pine Street	106	Extended

RTSP Scenario Development

A review of cumulative needs scoring was performed for all Transit Market Group evaluations to verify results and continue to refine trends in performance. Evaluation results were reviewed for redundancy and underperformance in order to more efficiently identify prime corridors for inclusion into the RTSP and receive further study.

Proposed transit corridors identified as redundant pairs are:

- Broken Arrow vs. SH 51
- Jenks / Bixby vs. US 75
- Osage Prairie Trail vs. Peoria Ave/Riverside

Of these redundant pairs, the Broken Arrow, Jenks / Bixby and Peoria / Riverside Drive Corridors were the better performing corridors and will move forward to be included in the final recommended RTSP.

Underperforming corridors identified during market group analysis were:

- 91st Street
- Memorial Drive
- 36th Street (N)

The poor performance of these corridors infers a limited capacity to support demand for high capacity transit improvements. Local fixed route bus service will likely be sufficient to address future transit demand along these corridors. As such, recommendations for deployment of high capacity improvements were not included in the final RTSP.

The resulting recommendations for deployment of high capacity transit services are shown in Figure 6.1.

Many proposed corridors were divided into two segments to comparatively evaluate the needs of each. Segment termini were selected based on regional destinations and activity centers that distinguish corridors into potential “starter segments” with high transit demand versus service extensions to lower demand market areas. Segment termini may also differentiate changes in corridor character.

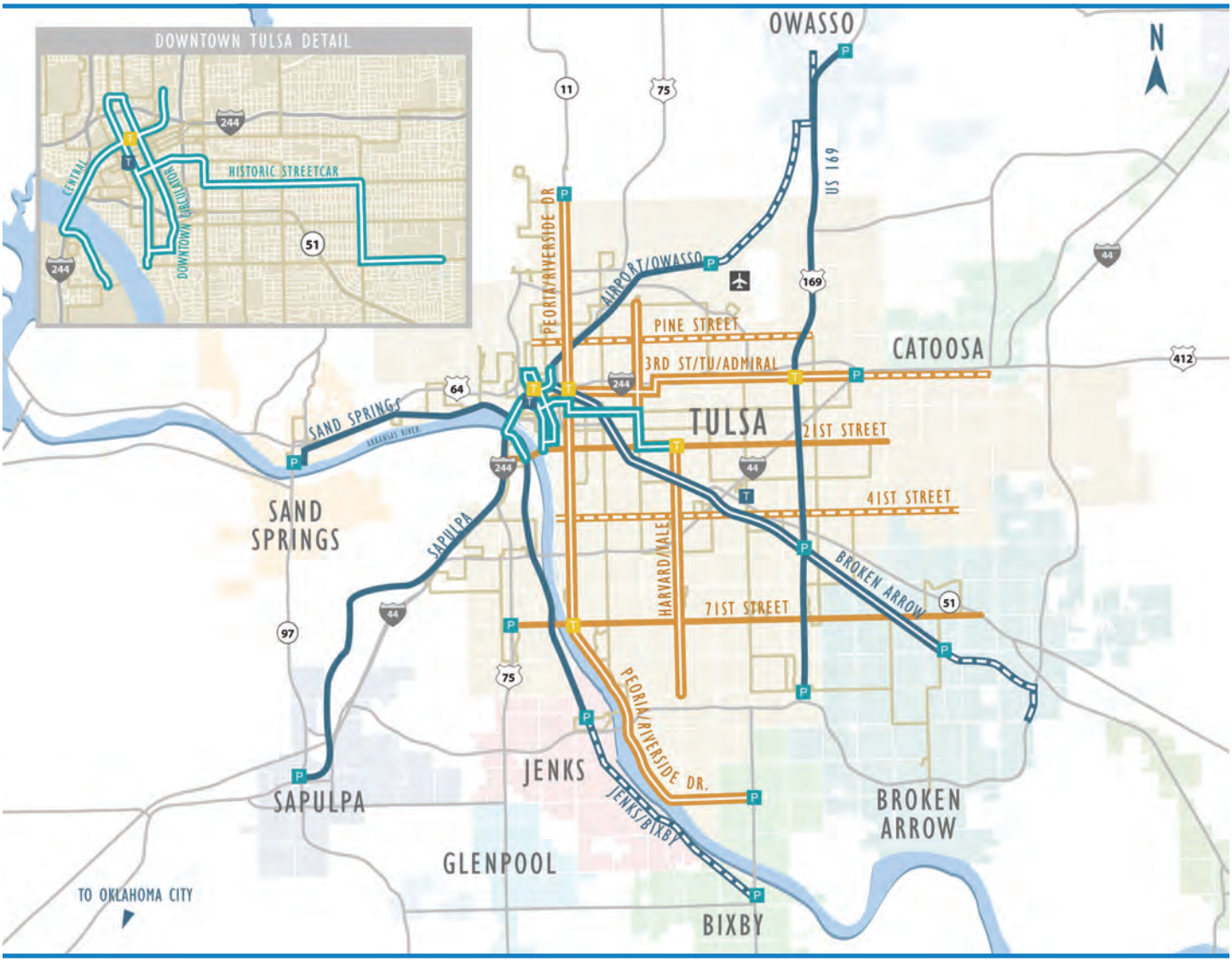
The terminal extents of several proposed corridors were identified as underperforming segments during the needs assessment analysis. These corridors were modified for refined analysis to evaluate only the "starter segment" to the first logical terminus or urban center:

- 3rd Street/TU/Admiral Corridor
- Airport / Owasso
- Broken Arrow
- Jenks / Bixby
- Osage Prairie Trail

As future population and employment demand beyond the initial segment of these corridors grows, the secondary extents which were included in the final RTSP as part of the "Extended Transit Network", which will be further analyzed to determine potential enhanced or high capacity transit service needs in the future.

While Circulator, Commuter and Urban corridors identified by the needs assessment proved to have different forecast demand for high capacity transit, implementation of alternative transportation improvements may be viable in the short term. Possible improvements are discussed in detail later in this plan.

Figure 6.1 : Regional Transit System Plan



Fixed Route Bus System Improvement Plan

A well-functioning bus system is the backbone of any successful transit system plan. The bus system improvement plan identifies specifics of routes, service levels, and associated bus transit improvements that can be implemented in the near term, mid-term, or long term timeframe.

Near-term strategies must focus on improvements that are essentially cost-neutral. The thrust of these would be to maximize scant existing resources by making the current route system more efficient, streamlined, and easier to understand for both existing and potential new riders. This effort has identified key strategies that can be pursued immediately:

- Set standard service frequencies systemwide (e.g., every 30 minutes, 45 minutes or 60 minutes) to facilitate bus connections as well as improve schedule comprehension for riders.
- Implement timed transfers at transit centers to minimize connection times between routes.
- Simplify circuitous routings to improve travel time and route comprehension for riders.
- Replace separate Nightline route service with evening and night service hours on key regular routes to improve system integration and reduce customer confusion.
- Develop a downtown detailed transit map for inclusion in Tulsa Transit Route Guide.
- Pursue aggressive rebranding, marketing, and education of Tulsa Transit and the system changes to existing riders and the general public to highlight the economy, efficiency, and environmental benefits of riding the new Tulsa Transit.

Other potential near term improvements depend on securing additional funding, possibly through grants:

- Develop improved facilities such as kiosks, shelters and bus turn-outs at key transfer locations (beyond the existing two major transit centers).
- Provide schedule and route information at bus stops.
- Introduce real-time passenger information at key bus stops.

Mid-term and long term strategies assume that more funding becomes available. Ultimately, the bus system is envisioned to provide improved geographic coverage, solid service frequencies, strong customer service/information, and coordinated connections with high capacity projects and transfer centers.

The bus system improvement plan will be developed in greater detail once the regional transit system plan is confirmed, and will be provided in a separate document.

Tulsa Bus Service

Bus Rapid Transit Vehicle

Transit Technology Alternatives

Throughout the INCOG RTSP process, multiple service levels have been identified to meet the transportation needs of the Tulsa region. Meeting the regional, local and circulation needs of the study area, the RTSP will utilize a range of different transit technologies. This report defines and evaluates transit technology alternatives for potential high capacity transit corridors. The purpose of this alternatives evaluation is to identify the transit technology alternatives that have potential application for the INCOG Transportation Management Area.

Identification of Transit Technology Alternatives

The process for selecting the transit technology for a specific corridor identified during the RTSP involves the Alternatives Analysis (AA) study. During the AA, the multiple options will be considered and evaluated to determine which technology best meets the needs and goals of the corridor and surrounding community. The process of evaluating technologies as a part of the system plan will help identify a range of suitable technologies for further investigation during the AA process.

This chapter addresses a wide range of transit technologies suitable to meet the region's varying transportation needs. The assessed technologies include: conventional bus service; bus rapid transit; light rail transit; historic streetcar; modern streetcar; commuter rail; heavy rail; and monorail.

Conventional Bus Service

The primary advantages of bus operations are low cost and high level of flexibility. Buses do not require a significant initial investment in infrastructure. Capital costs are primarily limited to vehicles. Routes can be flexible. Routing changes can be implemented, for all practical purposes, immediately. Buses can serve a wide range of passenger demand, and bus size can be adapted to passenger loads. Small or mid-sized buses can be assigned to routes with lower peak demand. For high ridership routes with frequent service, economies of scale can be realized with articulated buses which can accommodate 50% more passengers with one bus operator.

Buses are compatible with the existing transit system. However, the efficiency and effectiveness of additional routes in attracting ridership and providing a significant improvement in travel time would be less than those of a fixed guideway option. Operating costs would also rise substantially to provide significantly increased capacity. Bus stops are typically low cost and easily accessible due to frequent stop spacing. Buses on streets and roadways are subject to traffic delays. Diesel emissions create a localized environmental impact, but use of alternative fuel buses may reduce bus emissions.

Bus Rapid Transit (BRT)

Bus Rapid Transit (BRT) on busways provides the speed and guideway advantages typically attributed to rail lines with the added advantage of circulation within local areas. Busways allow high-speed operation, express/non-stop service and one-seat rides. BRT vehicles are designed to look more like rail vehicles, with wide doors, large windows, and low-floor access. BRT stations are also designed to resemble rail stations, with off-vehicle fare collection and intelligent transportation systems (ITS) that show the arrival time for the next bus. This technology has been implemented at various levels of exclusive right-of-way and operates effectively in several cities. Required right-of-way is wider than that for a rail line and may result in significant impacts. For an at-grade busway to be effective and provide faster operating speeds, the number of grade crossings should be limited, transit priority signal systems should be installed, and/or queue jump lanes should be added. Bus Rapid Transit vehicles may operate in mixed traffic, but often have a dedicated lane for a substantial part of the route.

Guided bus technology is appropriate for corridors where right-of-way is severely restricted or joint operation over a narrow streetcar/LRT trackway is required. Guided buses can be

Light Rail Vehicle, Dallas, Texas

Streetcar, Portland, Oregon

operated at very close intervals along the guideway without interference from other traffic. Operating along narrow rights-of-way similar to a streetcar or a light rail route, or along roadways, buses allow one-seat rides and fewer required transfers for a larger percentage of passengers.

Whereas BRT uses a guideway or street right of way and standard buses, guided bus technology requires specially adapted buses. Guided bus technology is less flexible since buses cannot bypass each other, except perhaps, at stations. Operation along a guideway within a downtown activity center is possible. However, the guideway may prove to be a hazard and visually intrusive. Therefore, buses would operate in mixed traffic in activity centers and would be subject to congestion delay.

Light Rail Transit (LRT)

The primary advantage of modern light rail transit is its adaptability to a variety of operating environments and passenger capacities. Furthermore, the lower labor requirements and higher passenger capacities generally allow light rail to be operated at a lower cost per passenger than bus alternatives. LRT trains can consist of up to four vehicles, thereby accommodating ten times the number of passengers as in buses. Capital costs for LRT can range from $50 – $90 million per mile, making this technology unaffordable for many communities.

Light-rail can operate at-grade and can cross roadways at-grade. These operations can be cost-effective, particularly in areas where grade separation is unnecessary. Station spacing can be close enough to provide convenient walk access. Stations can be simple sidewalk stops with a shelter or as elaborate as desired. Light rail is a higher capacity cost alternative compared to buses, requiring more costly investment in tracks, electrification, and modifications to streets and traffic control. In some cases, delaying some features such as selected stations, structures, or trackage can defer construction costs over several years. This would allow the corridor to have service sooner with upgrades provided as ridership grows and funds become available.

Light rail at-grade operation can be affected by traffic in areas of shared right of way. This can be mitigated by provision of exclusive right of way and traffic control that favor light rail. LRT can operate in multi-car trains at speeds up to 70 mph. The number of grade crossings and on-street sections will slow operating speeds significantly. Improvements to benefit transit may impact traffic flow and pedestrian movements.

Flexibility and relatively low cost, compared to other rail alternatives, could allow an LRT system to emerge as a viable alternative in any high capacity transit corridor. While less flexible than a busway, potentially lower operating costs may prove LRT a viable transit option. Moreover, LRT may play a significant role in transit oriented development and redevelopment near its stations.

Historic Streetcar

Historic streetcars are a specialized type of service or tourist attraction that is appropriate for a shuttle or circulator function. Historic streetcars would be compatible with LRT insofar as their ability to operate along the same trackway. However, a historic streetcar would have limited ability to meet overall community mobility needs. Vehicle capacity is limited and performance characteristics, such as acceleration and maximum speed, restrict its utility for line-haul service, but they could provide connection between other modes and circulator service within or between growth centers. A historic streetcar route could also operate on a portion of modern light rail tracks, such as Charlotte's historic streetcar. However, LRT as a line-haul transit service may not operate on tracks, at stations, or with a power system designed specifically for a historic streetcar. This does not, however, preclude operation of historic streetcar service as a feeder or shuttle service that could complement a line-haul transit service.

Modern Streetcar

Modern streetcar technology has passenger capacity and operating characteristics approaching those of LRT with predominately on-street, at-grade operations. Vehicles and

Commuter Rail Vehicle, Albuquerque, New Mexico

Monorail Vehicle, Las Vegas, Nevada

power systems are generally lower in cost than higher speed, higher capacity light rail systems. In areas where maximum speeds are restricted by street-running operations, modern streetcars may represent a lower cost alternative to light rail.

A modern streetcar could serve a variety of functions in the Tulsa region. A downtown circulator could connect commercial and residential areas to major employment centers. As a frequent service on relatively short routes, modern streetcars could operate in a line-haul transit service between Tulsa's regional activity centers.

The flexibility and relative low cost compared to other rail alternatives could allow a modern streetcar system to emerge as a viable alternative in any high capacity transit corridor. While this option is similar to light rail, a streetcar alternative may be further differentiated from LRT as a low-cost option by minimizing station features and design, maximizing single-tracked and on-street operations, and procuring off-the-shelf technologies (i.e. minimizing custom design features).

Modern streetcars can also serve to improve the image of public transportation in the region and is an investment in the future that tends to attract community support. As such, it strengthens the appeal of other transit technologies.

Commuter Rail

Passenger capacity, speed and access to central cities are the primary advantages of commuter rail. Trains can comfortably accommodate a large number of seated passengers over a long distance. Provided that track and signal system conditions are good, service can be implemented at a relatively low cost and within a short time frame. Commuter rail is often ill suited to areas where closer station spacing is required. The slower acceleration rate of commuter rail as compared to heavy or light rail is mitigated by wider station spacing, which allows faster travel times, but diminishes its accessibility for walk-on passengers.

Commuter rail often does not penetrate the core of a central business district (CBD) or activity center as stations are often located at one edge of the CBD. In Tulsa, the proposed Union Station Multi-modal Center is on the periphery of the CBD and will not provide passengers with "front door" service. However, commuter rail coupled with a modern streetcar circulator or bus circulator could provide passengers access to the employment and entertainment centers of downtown Tulsa.

Commuter rail usually takes advantage of already-existing railroad infrastructure in an urban area. Extending commuter rail to better serve urban activity centers requires grade separated right of way. Introduction of commuter rail may not be feasible where limited by geometric constraints, conflicts with freight traffic, inconvenient access for vehicles and pedestrians, or where extensive rehabilitation or track and structures is needed to meet acceptable operating criteria. Grade separation of commuter rail to serve a downtown or activity center would be expensive and probably less cost-effective than an at-grade light rail extension.

Heavy Rail

Heavy rail can reliably transport high number of passengers per hour at a high average speed. However, the capital cost per mile can be significantly higher than LRT or commuter rail. Because total guideway separation is required, heavy rail routes are inflexible to existing community conditions. Alignment changes can be costly unless implemented in an existing separated right of way. Like the guideway, stations must be separated from traffic. These requirements lead to higher cost stations that typically have high platforms and elevators. Downtown alignments would be elevated or in subways. Unless passenger volumes are very high, construction and operation of heavy rail would offer few benefits over those of a comparable light rail system that is completely grade-separated. Moreover, it is unlikely that the current development patterns in Tulsa could generate ridership to warrant such a high capacity transit investment, and high construction costs would likely exceed the region's ability to fund such a system.

Monorail

Monorail can provide fast operation along an elevated guideway that is often perceived as less intrusive than those for other rail modes. The rubber-tired vehicles operate quietly. No overhead wires are required, and the single-beam structure may be perceived as less visually intrusive than other elevated transportation modes.

Station costs are higher than for at-grade rail and similar to grade-separated heavy rail. Guidebeam switching is more complicated than with conventional track switches. The switch issue has tended to relegate monorails to shuttle or loop service within an activity center and limited its use for line-haul transit. An elevated monorail guideway could be extended along roadways or other rights-of-way, but this may be considered visually intrusive in some areas.

Alternatives Evaluation Criteria

In determining which transit technology alternative would be potentially applicable for corridors in the Tulsa region, a set of evaluation criteria was established for testing general applicability. The following are the corridor technology evaluation criteria:

Ability to Satisfy Operations and Service Levels

This criterion will determine how well a technology accommodates the initial and future ridership projections and how well it satisfies the required levels of service. Such factors as service frequency, trip time, vehicle capacity, fleet size, and operational efficiency and flexibility will be considered.

Compatibility with Existing Transit System

The technology should be compatible with the existing and planned Tulsa Transit systems as well as community desires and travel needs of the Tulsa region. The chosen technology should coordinate with planned and existing bus routes. The chosen technology should facilitate more direct and convenient travel and decrease in travel time.

Cost Effectiveness

This criterion will evaluate the capital, operations and maintenance costs associated with a technology and its system, evaluated at least on a low, medium, high basis.

System Accessibility

Stations should be easily accessible for passengers and allow for easy coordination with the transit network. This relates to the number of stations; station type (at-grade or grade separated) and the type of platform (high, low, center, or side). Station spacing should allow for convenient walk access. If bus access is required to reach a station, the total number of transfers for most trips should be low.

System Flexibility

The technology should be adaptable to a variety of operating environments. This refers to grade separation requirements, ease or feasibility of system extension, transfer convenience, and feasibility of implementation in various rights-of-way.

Service Frequency

Service frequency should increase ridership and should be coordinated with existing Tulsa Transit bus service. The technology should provide sufficient operating capacity for expected ridership.

Environmental Impacts

This criterion involves a qualitative assessment of potential traffic, visual, historic, and other environmental impacts. The technology should not result in extensive environmental impacts.

Land Use Compatibility

The technology should be compatible with existing and planned land uses. The chosen technology should be appropriate based on a qualitative assessment of existing and planned development densities, mixed uses, socio-economic factors, neighborhood compatibility, and other factors which could affect level of transit demand.

Availability of Technology

The availability and production requirements of a technology will be evaluated under this criterion.

Evaluation and Conclusion

The results of the evaluation of each alternative transit technology are based on a qualitative evaluation based on the general understanding of the transportation needs of the region along with the operational requirements of the various transit technologies. Each transit technology was assessed on a scale ranging from 1, representing minimal support, to 5, representing maximum support of each criterion by the transit technology within the Tulsa region.

Detailed Evaluation Results

Table 6.4 through Table 6.11 present details responding to each technology's assessment based on the transit technology evaluation criteria. Each qualitative score reflects the ability of each technology to meet each evaluation criterion within the context of the Tulsa region.

Table 6.4 : Conventional Bus Assessment Details

Conventional Bus	Rank
Ability to Satisfy Operations and Service Levels	4
Conventional bus service is capable of meeting the majority of existing regional transit demand. However as the system grows, conventional bus service may prove an inefficient means of service large quantities of patrons. Bus routes in high ridership corridors often face street congestion, and lower bus speeds require additional vehicles to provide a comparable level of service as compared to a rail alternative. Even where large (articulated) buses are used, bus services can be limited by traffic congestion and other factors that impact operating speed and adherence to published schedules. High volume bus routes are seldom as efficient, in terms of operating cost per passenger, as comparable rail services.	
Compatibility with Existing Transit System	5
Expanding bus service would be compatible with Tulsa Transit's existing fleet, operating and maintenance facilities.	
Cost Effectiveness	4
Although rail technologies are often more cost-effective in terms of operating costs, bus services have a low capital cost requirement and are therefore considered cost-effective for this evaluation.	
System Accessibility	4
Local bus services offer frequent stops, providing a high degree of accessibility to most potential passengers. While many areas of the region lack sidewalks or accessibility to persons with mobility limitations, these infrastructure problems can be corrected around affected bus stops with minimal expense.	
System Flexibility	5
Local bus services are highly flexible, and routes can be changed as demand fluctuates. Only customer service, policy, funding, administrative reasons, politics and local opposition limit the ability to make rapid changes to the bus network; other transit options generally require construction.	
Service Frequency	4
Bus services are able to adapt to increasing passenger demands by increasing bus frequency. Buses operating every few minutes on a single route in a congested corridor are generally far less cost-effective than a comparable rail transit service. While limited capital improvements can often improve operating performance on high-demand routes, frequent bus services in a congested corridor are less reliable than grade-separated options.	
Environmental Impacts	3
Emissions can be mitigated through use of alternative fuels, but noise from internal combustion buses can impact residential areas. In most other respects, bus services do not significantly impact their operating environments any more significantly than other traffic but large volumes of buses can impact traffic and pedestrian movements.	
Land Use Compatibility	3
Bus services have not been shown to have any significant positive or negative impact on surrounding land use. Bus services do not require any infrastructure that may negatively impact surrounding land uses.	
Availability of Technology	5
Buses are manufactured by numerous vendors in North America and are operated in a wide variety of services, environments, and conditions.	

Table 6.5 : Bus Rapid Transit Assessment Details

Bus Rapid Transit (BRT)	Rank
Ability to Satisfy Operations and Service Levels	5
Buses of all sizes can operate frequent service that allows BRT to approach the carrying capacity of rail lines when operated on its own right of way.	
Compatibility with Existing Transit System	5
A BRT improvement combined with expanded bus services would be compatible with Tulsa Transit's existing fleet and operating and maintenance facilities and allows a high ranking of BRT technology. This ranking excludes consideration of guided bus technology, which may not be compatible with the existing bus fleet.	
Cost Effectiveness	4
Although rail technologies are often more cost-effective in terms of operating costs, a BRT alternative would not necessarily require procurement of a new bus fleet or maintenance facilities. BRT also eligible may allow the region to leverage a higher share of federal funds.	
System Accessibility	4
Local bus services offer frequent stops, providing a high degree of accessibility. Local bus services can operate on a busway for a degree of flexibility. Increased services and improved operating speeds could improve access for many passengers.	
System Flexibility	4
Local bus services are highly flexible, and routes can be changed as demand fluctuates. Only customer service, policy, funding, administrative reasons, politics and local opposition limit the ability to make rapid changes to the bus network; other transit options generally require construction.	
Service Frequency	4
Bus services are able to adapt to increasing passenger demands by increasing bus frequency. Buses operating every few minutes on a single route in a congested corridor are generally far less cost-effective than a comparable rail transit service. However, many different bus routes can branch from the busway, allowing localized services in neighborhoods while maintaining a high cumulative frequency on a busway. Operation on exclusive lanes in streets, however, may be constrained by signal time at intersections.	
Environmental Impacts	3
Emissions can be mitigated through the use of alternative fuels, but noise from internal combustion buses can impact residential areas. In most other respects, bus services do not significantly impact their operating environments any more significantly than other traffic.	
Land Use Compatibility	3
The limited number of busways in North America has not shown notable impact on transit oriented development or transit related land uses in either a positive or negative sense.	
Availability of Technology	5
Buses are manufactured by numerous vendors in North America and are operated in a wide variety of services, environments, and conditions. Busways, as conventional streets, are also a proven technology.	

Table 6.6 : Light Rail Transit Assessment Details

Light Rail Transit (LRT)	Rank
Ability to Satisfy Operations and Service Levels	4
Light rail vehicles can be operated in trains that allow a high carrying capacity.	
Compatibility with Existing Transit System	3
LRT would be a new technology in the Tulsa region, requiring new guideway and operating and maintenance facilities.	
Cost Effectiveness	3
Although rail technologies are often more cost-effective in terms of operating costs than comparable bus services, LRT alternatives require a high level of capital investment. Much of this cost could be funded by federal grant programs, but the local cost remains quite high.	
System Accessibility	3
While feeder bus services can provide system access, many residents will not have direct access to the LRT system.	
System Flexibility	3
LRT can operate in a separate guideway (at-grade, elevated or subway) in reserved lanes in city streets, or in mixed traffic. It has the speed to provide a travel time savings in an exclusive guideway with wide station spacing and can fulfill a distribution/ circulation function with station spacing of a few blocks in a central business district environment.	
Service Frequency	5
LRT has the ability to operate services every few minutes on a double-tracked alignment. This frequency of service allows this category to be ranked highly.	
Environmental Impacts	5
Electrically-powered LRT can reduce emissions where ridership is substantial. LRT is generally quiet and typically has few negative impacts on surrounding land uses.	
Land Use Compatibility	5
LRT has often encouraged transit oriented development, allowing new land developments around stations to support additional ridership while reducing automobile usage.	
Availability of Technology	3
LRT is widely used around the world. Light rail vehicles are manufactured in both mass productions and custom configurations by a number of manufacturers.	

Table 6.7 : Historic Streetcar Assessment Details

Historic Streetcar	Rank
Ability to Satisfy Operations and Service Levels	4
Historic trolley services could operate as frequently as other light rail and bus transit options.	
Compatibility with Existing Transit System	3
Historic streetcars would be a new transit technology in the Tulsa region, requiring new guideway and operating and maintenance facilities.	
Cost Effectiveness	3
Although rail technologies are often more cost-effective in terms of operating costs than comparable bus services, historic trolley alternatives can require a high level of capital investment. Likewise, the cost to procure, restore and maintain an authentic historic vehicle is typically high. A replica historic car may be more economical to procure.	
System Accessibility	2
While feeder bus services can provide system access, many residents will not have direct access to the streetcar system, and it is unlikely that a historic streetcar system could be expanded as a regional service. Additionally, older vehicles are often not ADA-accessible, and ensuring that the system maintains full access may be a formidable issue.	
System Flexibility	4
Although historic streetcar systems operate slowly, which limits future expansion, the smaller size and shorter turning radius of the vehicles allows them to operate in dense urban areas where other vehicles may not be as compatible. The low passenger capacity and low maximum speed of the vehicles do not limit this mode's potential to serve a large metropolitan area.	
Service Frequency	4
Similar to LRT, historic streetcar services have the ability to operate services every few minutes on a double-tracked alignment in a moderate speed operation.	
Environmental Impacts	3
Electric powered vehicles would be environmentally friendly. Lower ridership generally results in fewer mobility benefits than with some other modes.	
Land Use Compatibility	5
Historic streetcar systems have often encouraged transit oriented districts, encouraging new land development along transit lines. Closer stop spacing may result in denser corridor development than with light rail. Moreover, historic streetcars are often more compatible in historic districts where visual impacts might be more severe for modern transit options.	
Availability of Technology	4
Manufacturers can supply replica equipment using new vehicle chasses and components with antique-looking bodies. In addition, several suppliers remanufacture older equipment into working condition.	

Table 6.8 : Modern Streetcar Assessment Details

Modern Streetcar	Rank
Ability to Satisfy Operations and Service Levels	5
Modern streetcars can operate in single or double car configurations with capacities similar to small LRT trains or single LRT vehicles.	
Compatibility with Existing Transit System	3
Modern streetcars would be a new transit technology in the Tulsa region, requiring new guideway and operating and maintenance facilities.	
Cost Effectiveness	3
Modern rail technologies are often more cost-effective in terms of operating costs than comparable bus services. However, modern streetcar alternatives can require a high level of capital investment.	
System Accessibility	3
While feeder bus service can provide system access, many residents will not have direct access to the streetcar system. Future expansion of streetcar service could allow the service to branch to several neighborhoods or growth centers.	
System Flexibility	2
Modern streetcar options are ranked low since systems operate slowly, limiting future expansions, and may operate in dedicated lanes that could, require conversion of auto lanes to exclusive transit use.	
Service Frequency	5
Like LRT, modern streetcar services have the ability to operate frequently on a double-tracked alignment.	
Environmental Impacts	4
Modern streetcar technology is rated highly in terms of environmental impact. Electrically-powered vehicles, along with high transit ridership, could help improve air quality.	
Land Use Compatibility	5
Similar to historic streetcars, modern streetcar systems are likely to encourage transit-oriented districts along transit lines. Moreover, modern streetcars are often compatible in neighborhood districts where smaller vehicles would be more widely accepted.	
Availability of Technology	5
Although modern streetcars are not widely used in the US, over 60 cities are in the process of planning modern streetcar systems. Moreover, modern streetcars are now being manufactured in the US. Modern streetcar technology is very similar to LRT technology and, therefore, represents a technology that is compatible with light rail.	

Table 6.9 : Commuter Rail Assessment Details

Commuter Rail Transit (CRT)	Rank
Ability to Satisfy Operations and Service Levels	5
Commuter rail services have a very high passenger capacity due to the large potential train length.	
Compatibility with Existing Transit System	4
Commuter rail would be a new transit technology in the Tulsa region, requiring new guideway and operating and maintenance facilities. However, with the vast amount of existing freight lines traversing the city, existing lines might be utilized.	
Cost Effectiveness	3
Extremely high operating costs contribute to other rail technologies' greater cost-effectiveness. Commuter rail offers a lower capital cost than other technologies; however, commuter rail systems that reach their maximum operating speeds and carrying capacity often require a high level of capital investment and dedicated operations that severely limit freight railroad traffic. These requirements could limit the cost-effectiveness of commuter rail alternatives.	
System Accessibility	2
Commuter rail stations are generally located several miles apart, and many existing freight corridors would place stations in industrial areas, flood plains, and other areas where access to the system is limited. A preliminary review of existing and potential commuter rail corridors indicates that the primary mode of access to the system would be by auto. While feeder bus service can provide system access, many residents would not have direct access to the rail system without driving or taking a bus.	
System Flexibility	3
Commuter rail systems operate on a dedicated guideway. Several existing low-capacity freight rail corridors could prove ideal for commuter rail operations. High freight volumes may limit applicability of commuter rail in some corridors. Creation of new corridors within the existing urban environment would present numerous challenges.	
Service Frequency	3
Commuter rail services do not operate as frequently as other rail modes.	
Environmental Impacts	5
Commuter rail operations would occur within existing railroad rights of way where there would be limited impacts from construction or operations on adjacent land uses. Most freight railroad operations are in industrial or transportation corridors (adjacent to existing roadways or highways), and impacts to residential and commercial areas from increased frequency of operations would be limited. It is likely that the dominant access mode would be by automobile, and air quality benefits would only be realized on longer transit trips or where commuter rail significantly reduced congestion.	
Land Use Compatibility	3
Existing freight railroad tracts often lie in industrial areas, limiting opportunities for new transit-oriented development.	
Availability of Technology	5
Commuter rail is widely used around the United States and the world. Commuter rail vehicles are manufactured in both mass production and custom configurations by a number of manufacturers. Aside from locomotives that pull several self-propelled passenger cars, some vehicles are essentially passenger cars powered by a hidden motor.	

Table 6.10 : Heavy Rail Assessment Details

Heavy Rail	Rank
Ability to Satisfy Operations and Service Levels	4
Heavy rail services have very large passenger capacities.	
Compatibility with Existing Transit System	2
Heavy rail would be a new transit technology in the Tulsa region requiring new guideway, operating and maintenance facilities.	
Cost Effectiveness	1
Although rail technologies are often more cost-effective in terms of operating costs than comparable bus services, heavy rail alternatives can require an extremely high level of capital investment. Requirements that guideway and stations be grade separated add to capital costs. The extremely high capital costs rate this option negatively, since they are not likely commensurate with expected ridership levels.	
System Accessibility	2
While feeder bus services can provide system access, many residents will not have direct access to the rail system, particularly since heavy rail stations are generally spaced father apart than other transit options (besides commuter rail).	
System Flexibility	1
Heavy rail systems operate on dedicated guideway that requires full grade separation.	
Service Frequency	4
Heavy rail services have the ability to operate frequently.	
Environmental Impacts	3
Heavy rail vehicles are electrically powered. However, negative environmental impacts would result from construction of subways or aerial structures.	
Land Use Compatibility	2
Like LRT, heavy rail systems have often encouraged transit orientated development, supporting new land development near transit stations. Heavy rail can influence dense land uses.	
Availability of Technology	2
Heavy rail operates in cities worldwide and in North America, but due to the high cost of construction, few heavy rail lines have been constructed in recent years.	

Table 6.11 : Monorail Assessment Details

Monorail	Rank
Ability to Satisfy Operations and Service Levels	4
Monorail services have large passenger capacities.	
Compatibility with Existing Transit System	3
Introducing monorail, a new technology in the Tulsa region would require a new operations and maintenance base for ongoing system support.	
Cost Effectiveness	1
Grade-separated alignments and stations result in high capital costs for monorail. Monorail in the US is limited to many shuttle operations; Las Vegas monorail is the only line-haul monorail systems in operation. Low operating costs and high ridership found on Seattle's monorail shuttle, a popular tourist attraction, may not be realized in a larger monorail transit system. High capital costs and largely unknown operating costs rate this technology low.	
System Accessibility	1
Monorail requires complete grade separation, and stations are typically several stories above street level, adding time for passengers to access stations.	
System Flexibility	1
Monorail operations are ranked low since systems operate on a dedicated guideway. Systems are proprietary, meaning that there is no one "standard" and that future procurements generally have to use the same company that supplied the original equipment. Monorail often faces opposition from local neighborhoods due to the visual intrusion, further limiting project planning location.	
Service Frequency	4
Monorail operates as frequently as other rail modes.	
Environmental Impacts	1
Monorail ranks low as aerial structures would represent a notable visual intrusion, which is of particular concern for The Tulsa region's historic districts.	
Land Use Compatibility	1
Where monorail is planned as part of a development, stations can be incorporated directly inside buildings. Over time, new developments may also incorporate stations as part of the overall development. Where monorail is constructed as part of existing development, however, aerial stations are often difficult to integrate into existing developments, particularly in areas with historic buildings.	
Availability of Technology	1
Monorail is a proven technology for short shuttle services; however, no line-haul monorail systems exist. This category is rated low since monorail manufacturers are limited, and systems consisting of several lines are limited to applications in Japan. It is likely that implementation of monorail in the Tulsa region would require a large degree of customization of vehicles and power systems.	

Conclusion

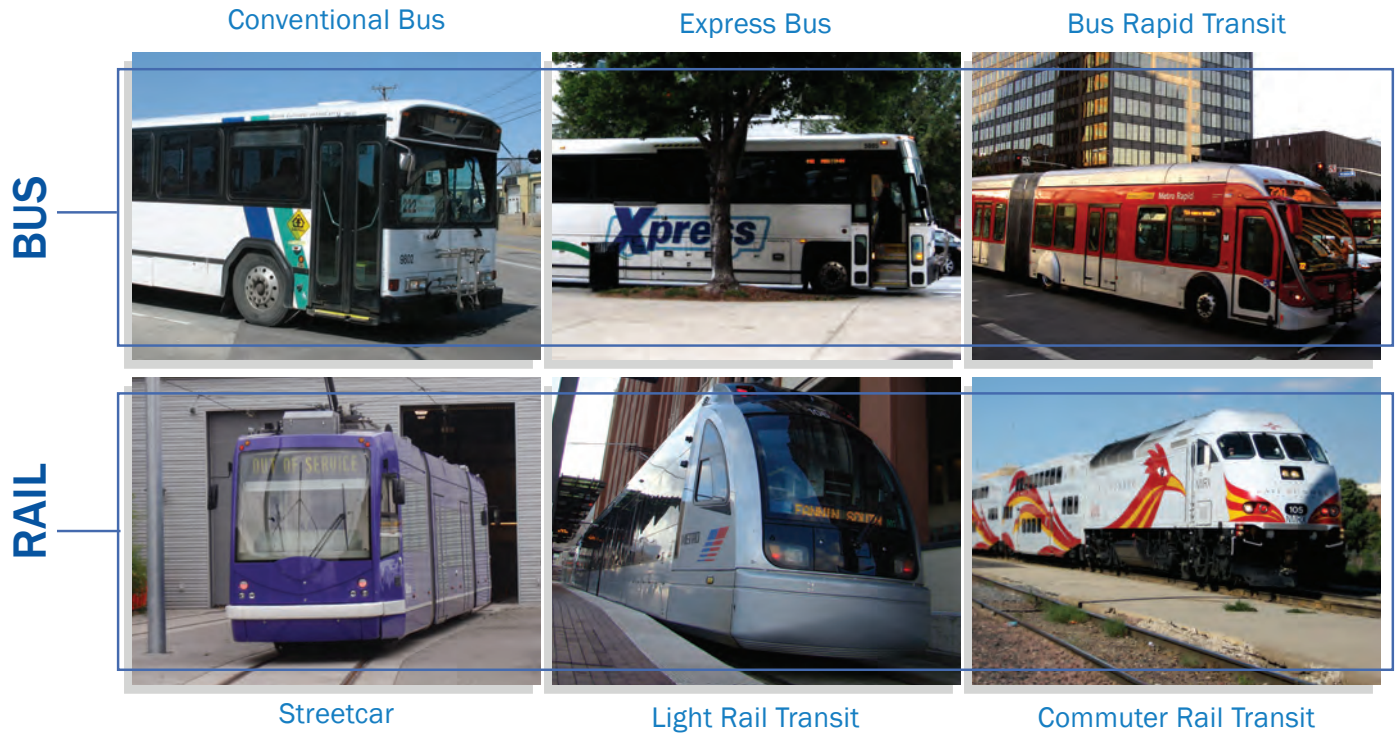
This Transit Technology Alternative Assessment identifies advantages and disadvantages of each technology in the Tulsa region. Table 6.12 shows the summary of the technology alternative assessment.

Technologies that received a score of 25 or higher in the nine categories are recommended for further consideration. As shown in Figure 6.2, conventional bus service, bus rapid transit, light rail, historic streetcar, modern streetcar, and commuter rail are the selected transit technology alternatives are considered in the next level of analysis. During the next level of analysis, these technologies will be further analyzed to determine which technology would be best for each corridor.

Table 6.12 : Technology Alternative Evaluation Summary

Evaluation Criteria	Ability to Satisfy Operations and Service Levels	Compatibility with Existing Transit System	Cost Effectiveness	System Accessibility	System Flexibility	Service Frequency	Environmental Impacts	Land Use Compatibility	Availability of Technology	Total
Bus	4	5	4	4	5	4	3	3	5	37
BRT	5	5	4	4	4	4	3	3	5	37
LRT	4	3	3	3	3	5	5	5	5	36
Historic Streetcar	4	3	3	2	4	4	3	5	4	32
Modern Streetcar	5	3	3	3	2	5	4	5	5	35
Commuter Rail	5	4	3	2	3	3	5	3	5	33
Heavy Rail	4	2	1	2	1	4	3	2	2	21
Monorail	4	3	1	1	1	4	1	1	1	17

Figure 6.2 : Recommended Technology Alternatives

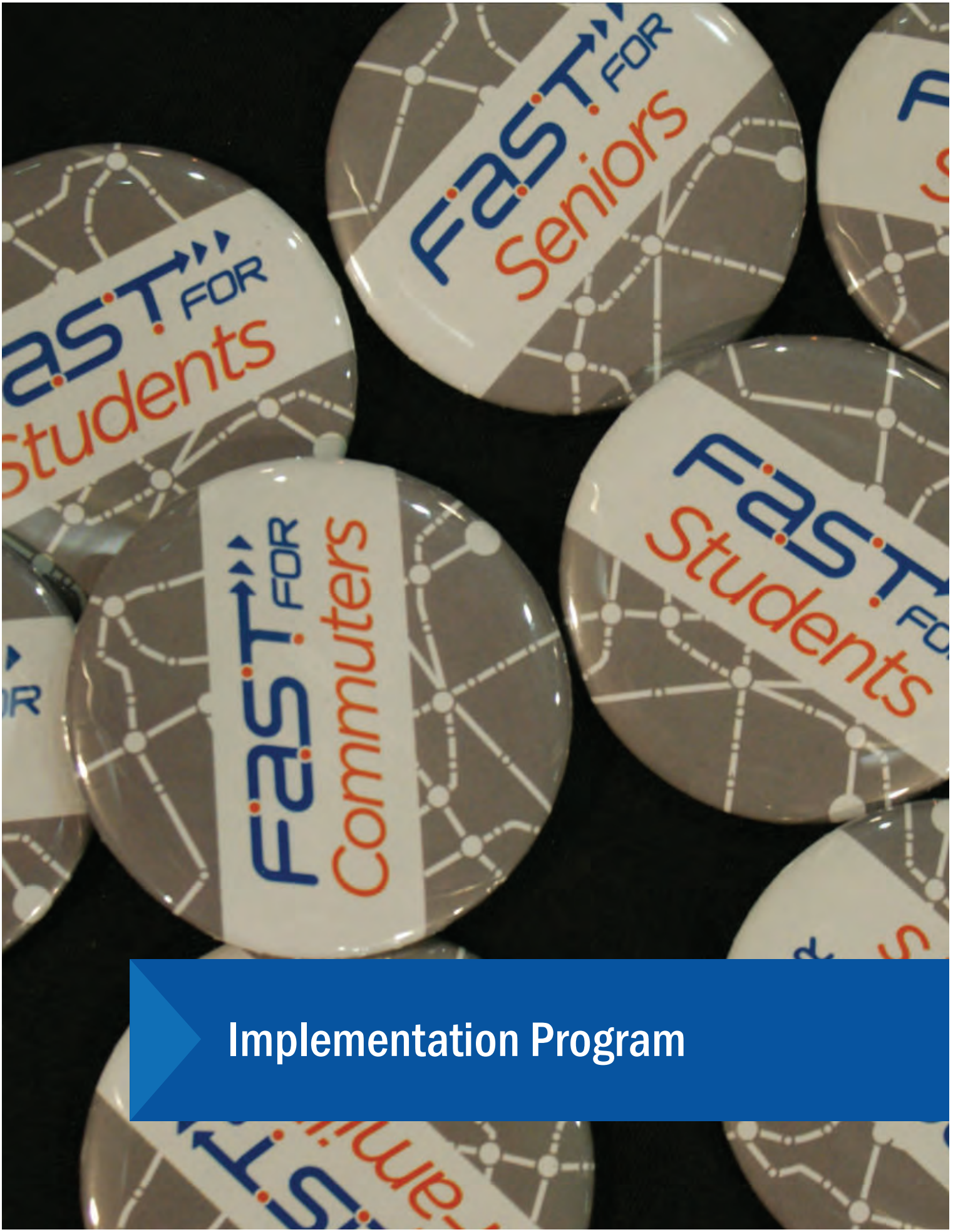


Future studies, including potential AA's, will determine the technology which best meets the needs of the community. Each technology demonstrates unique advantages to solve transportation issues in a range of environments. Figure 6.3 and Figure 6.4 summarize several basic differences between operating environments of each technology option.

Figure 6.3 : Transit Technology & Land Use Density

Figure 6.4 : Technology Alternative Options

LOCAL BUS, STREETCAR	FREQUENT BUS	BUS RAPID TRANSIT, LIGHT RAIL
• Less capacity	→	• More capacity
• Streetscape serves as station	→	• High investment in stations
• Supports linear development	→	• Supports nodal development
• Lower capital investment cost	→	• Higher capital investment cost
• Short trip length	→	• Long trip length
• Slower speed	→	• Higher speed
• Frequent stops	→	• Less-frequent stops



Implementation Program

Implementation Program

Phased System Plan

The adopted 2035 RTSP will be reviewed with the Federal Transit Administration (FTA), congressional and state legislators, the Oklahoma Department of Transportation (ODOT) and other local and regional agencies. Establishing relationships and coordination among multiple agencies will be critical as individual projects are developed. Implementation of successful transit projects often requires policy coordination with other regional institutions to establish transit supportive policies regarding parking, bicycle and pedestrian infrastructure and land use. Coordination with municipal jurisdictions is important to establish supportive land use in areas of future transit investment.

The RTSP, designed to serve various travel markets throughout the region, contains corridors with a range of patron demand. The needs of each corridor identified in the RTSP are unique to the communities which it serves. In order to implement the RTSP, the region must determine the appropriate solutions for each corridor.

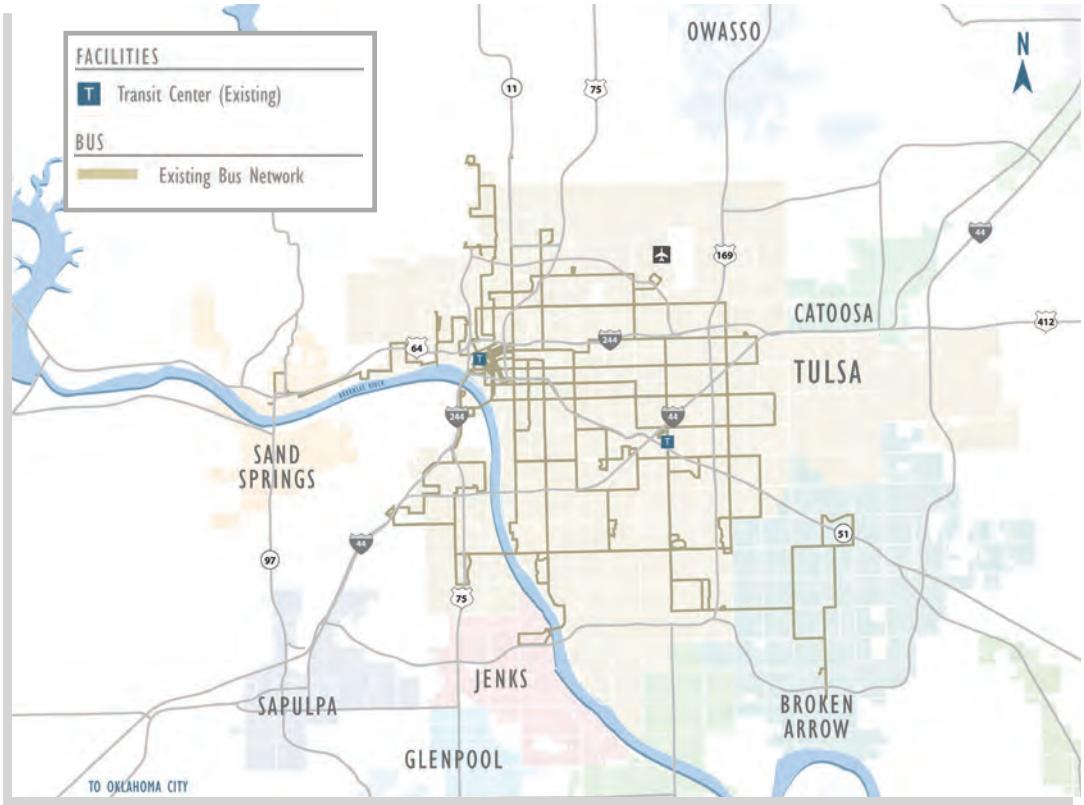
In order to complete the entire RTSP, corridors will be developed individually. The near term, mid-term and long term strategies identified by the RTSP process are found below.

Near Term

Near term recommendations of the RTSP include development of a regional priority corridor and implementation of bus improvement strategies. The bus improvement strategies are important to provide the foundation network of the entire RTSP system. An efficient network of bus service will provide a critical role when implementing future service. The Bus Improvement Plan, a subsequent initiative, will outline detailed near term, mid-term and long term bus improvement strategies.

As the community ensures its commitment to improving the existing transit system, the region will choose a priority corridor to continue through advanced planning. The chosen corridor will be one with the highest probability of successfully supporting high capacity transit service. It will be selected from corridors identified within the RTSP Foundation Network. As shown on Figure 7.2, development timelines fluctuate depending on the total length of the corridor, the mode and the funding sources. It should be noted that all proposed Circulator corridors will be included in the Foundation Network improvements of the RTSP due to catalytic potential and development opportunities within the greater Downtown Tulsa area. There was an insignificant statistical difference in performance of these corridors based on the needs assessment evaluation. Commuter and Urban corridor needs assessment evaluation results showed a clear delineation in the most likely corridors to support implementation of high capacity transit services.

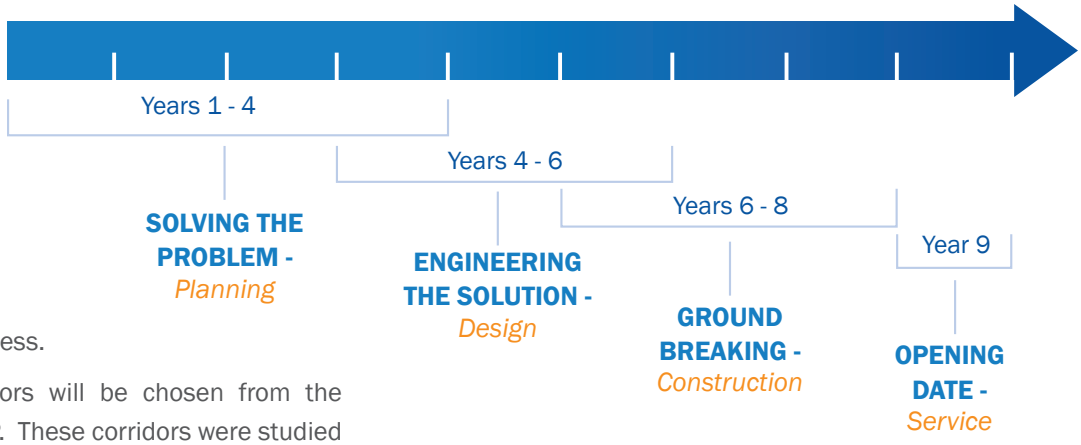
Figure 7.1 : Existing Tulsa Transit Bus System



Mid-Term

After the regional bus service is adequately supported and performs at levels sufficient to meet the transit demands of the community, the RTSP recommends advancing additional high capacity corridors through the Federal Transit Administration (FTA) process.

Figure 7.2 : Example High Capacity Transit Development Timeline



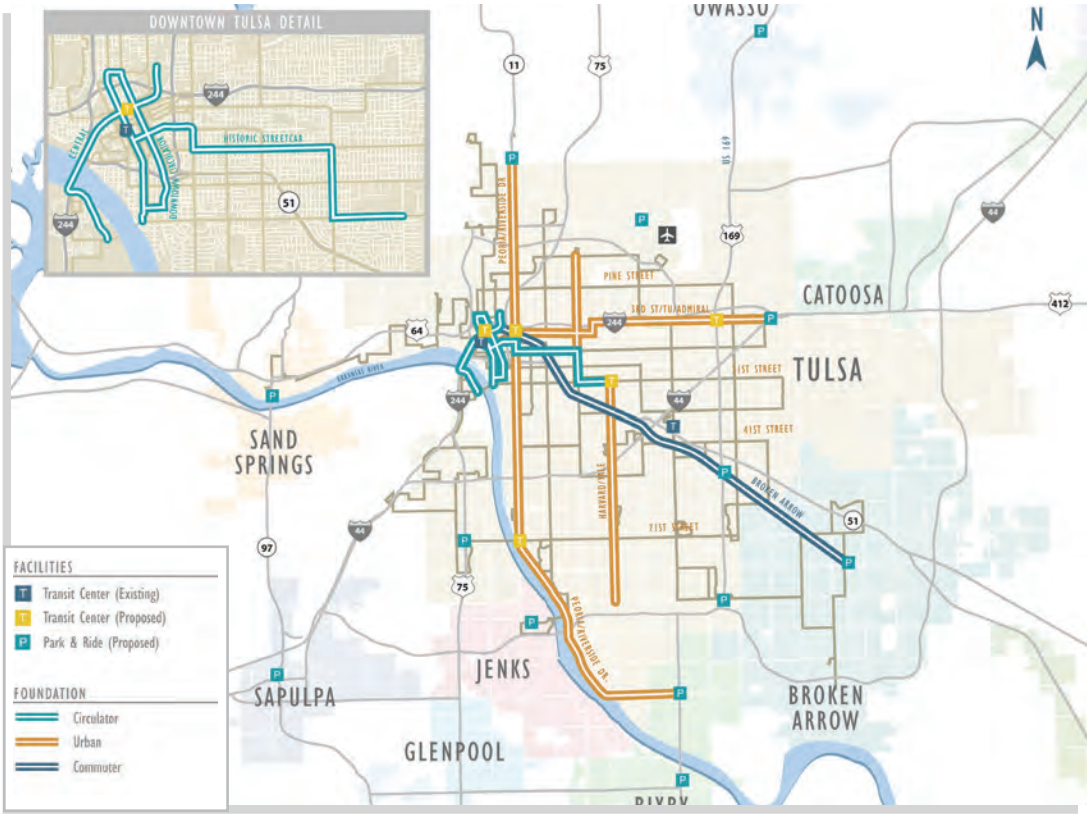
Additional high capacity corridors will be chosen from the Foundation Network of the RTSP. These corridors were studied and demonstrate transportation needs adequately addressed by implementing a high capacity transit technology. As such, an Alternatives Analysis (AA) is the most appropriate planning process to determine what type of technology best resolves the corridor's needs. High capacity technologies include commuter rail, light rail, streetcar rail and bus rapid transit with supportive infrastructure such as enhanced station areas, regional transfer centers as well as fixed guideway construction. These higher investment improvements may be used in conjunction with or in lieu of improvements identified for potential deployment within Enhanced or Extended Network corridors. An AA tests these options using a variety of criteria including capital costs, operating and maintenance costs, local financial commitment, economic development effects, service levels, user benefits, etc. and is typically completed within a one to two year timeframe. Figure 7.3 depicts potential high capacity corridors identified by the RTSP process.

Long Term

The long term approach of the RTSP is to fully develop a comprehensive transportation network comprised of high capacity corridors and complementary bus service. Figure 7.4 depicts corridors identified throughout the planning process as potential high capacity corridors and future extensions. The RTSP Bus Improvement Plan, a subsequent report, will identify a series of bus improvement strategies based on multiple funding scenarios. The long term approach will provide a strategy of regional bus service to support high capacity service and extend the reach of the high capacity corridors to outlying areas.

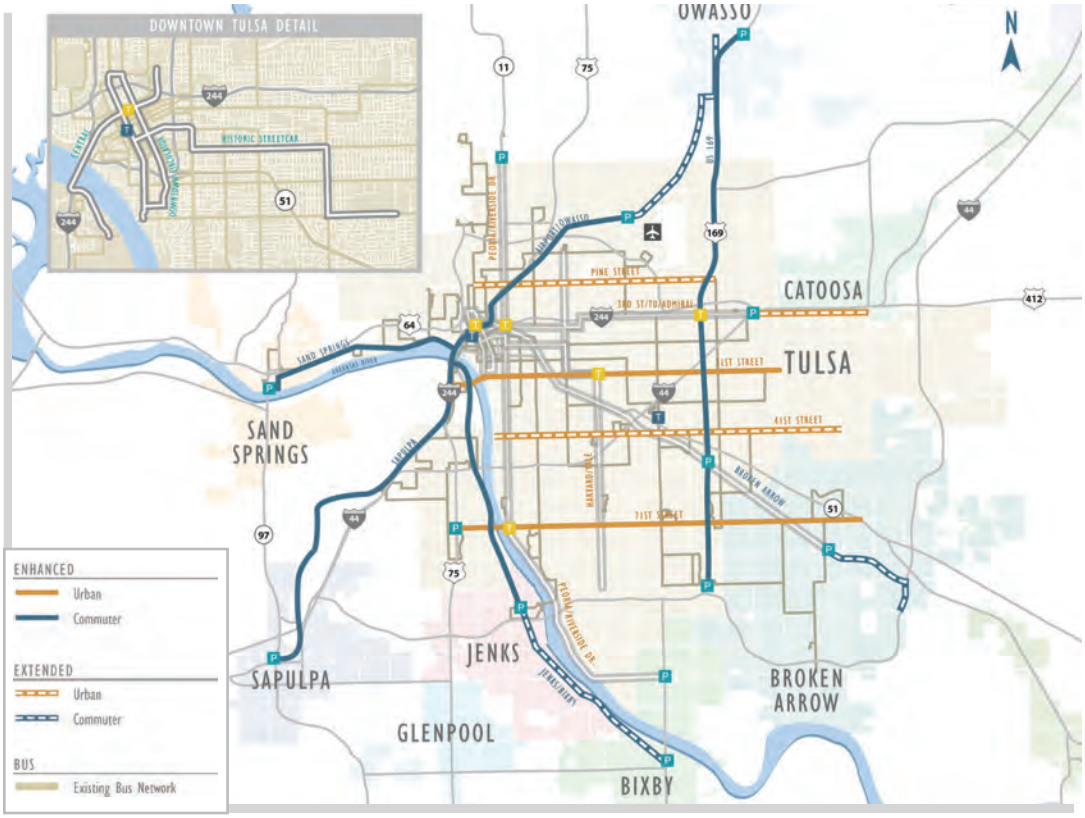
The needs identified for the Enhanced and Extended Network corridors may be addressed by implementing a variety of transit and roadway improvements. As such, regional or local planning processes or special studies are the most appropriate planning methods to determine what set of alternatives best resolves the corridor's needs. High capacity technologies include commuter rail, light-rail, streetcar rail and bus rapid transit. Other transit and

Figure 7.3 : RTSP Foundation Network



roadway alternatives include express bus, local bus, extended fixed route service areas and hours of operation, improved service frequencies, ITS deployment, transit facility construction, high-occupancy vehicle (HOV) lanes, ramp metering, signal optimization, etc. These improvements may be tested and compared using a variety of criteria including capital costs, operating and maintenance costs, levels of service (LOS), measures of effectiveness (MOE), etc. with a recommendation determined within a three to six month timeframe.

Figure 7.4 : RTSP Enhanced and Extended Network



Cost Estimates

As the region begins to look to implement high capacity transit improvements along its priority corridors, this study has identified the Alternatives Analysis, or similar, evaluation process as a logical and responsible method for determining the transit technology mode, alignment and operating parameters that will best serve transit corridors.

As part of the detailed evaluation of alternatives, engineering and design, conceptual capital cost estimates are developed to guide local decision makers in selecting the most cost effective method of transit to implement. The locally preferred mode selected will have significant bearing on the potential costs of construction and operations. Potential high capacity transit modes identified for deployment of enhanced transit services on study area corridors include:

- Bus Rapid Transit (BRT)
- Modern Streetcar
- Light Rail Transit (LRT)
- Commuter Rail

Table 7.1 : Transit Technology Costs Per Mile

Mode	Capital Cost Range
Bus Rapid Transit (BRT) – mixed traffic	$2 M - $5 M
Bus Rapid Transit (BRT) – dedicated busway*	$10 M - $20 M
Modern Streetcar	$20 M - $30 M
Commuter Rail*	$15 M - $30 M
Light Rail Transit (LRT)*	$40 M - $80 M

* Excluding right of way

In order to adopt proposed transit improvements into the fiscally constrained Long Range 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. Table 7.1 identifies the proposed high capacity transit modes and potential capital costs of implementation per mile. Transit technology modes and service operating characteristics are discussed in greater detail within Chapter 6.

Funding Sources and Options

This portion of the implementation plan addresses potential sources and options for funding the phased system plan. The analysis looks at existing sources of funds for the Tulsa transit system and selected peer cities. Sources of funds are, in turn, evaluated as it relates to input from the key stakeholders and the national experience in local dedicated funding sources.

The analysis focuses on a local dedicated sales tax is that is the predominant national source of funds (73%), as well as the predominant funding source for the peer cities. It is recognized that at this time local stakeholders, while generally in favor of a dedicated local sales tax (41% believe it probably or definitely should be utilized) an equal percentage believe it "may be" utilized. Only 9% believe it definitely or probably should not be utilized. Approximately 48% of the stakeholders believe that other dedicated funding sources should definitely or probably utilized, 26% believe other sources "maybe" utilized in only 11% believe it definitely or probably should not be utilized. It appears that additional analysis of a dedicated sales tax needs to be undertaken and a broad range of other dedicated local funding sources explored before a definitive local funding source is delineated.

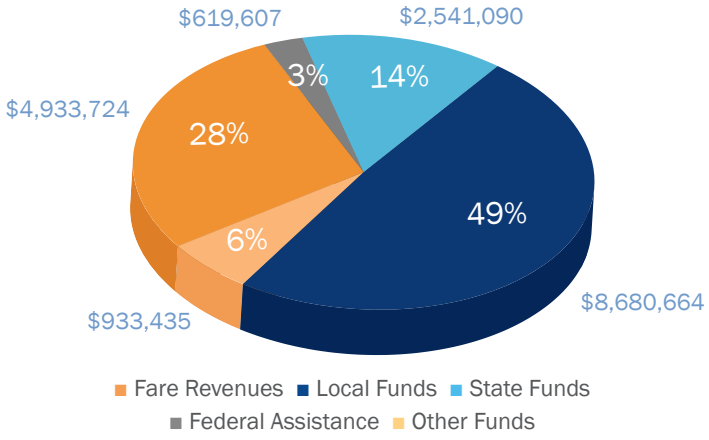
A relative large proportion believe that public / private sector funding sources including a variety of value capture mechanisms should be explored. Public-private techniques utilized include special assessment districts, tax increment financing and development impacts these as well as public-private joint development.

A brief overview is presented of potential funding sources, with a focus on the revenue potential from a regional sales tax, which could be balanced by a variety of other dedicated local funding sources. An initial funding overview and recommendations is presented all related to the near-, mid-, and long term action plan.

Existing Funding

Providing bus service to the City of Tulsa and surrounding areas, with approximately 10,000 passenger trips a day, the Tulsa Transit's operating expenses total approximately $17,768,520 in 2009. Of these operating expenses, Tulsa is predominately dependent upon local funds representing 49% ($8,680,664) of total funding, which is in turn dependent upon annual appropriations. The remaining sources of funds are provided by various other sources which include federal assistance ($4,933,724, 28%), fare revenues ($2,541,090, 14%), state funds ($993,435, 6%), and other funds ($619,607, 3%).

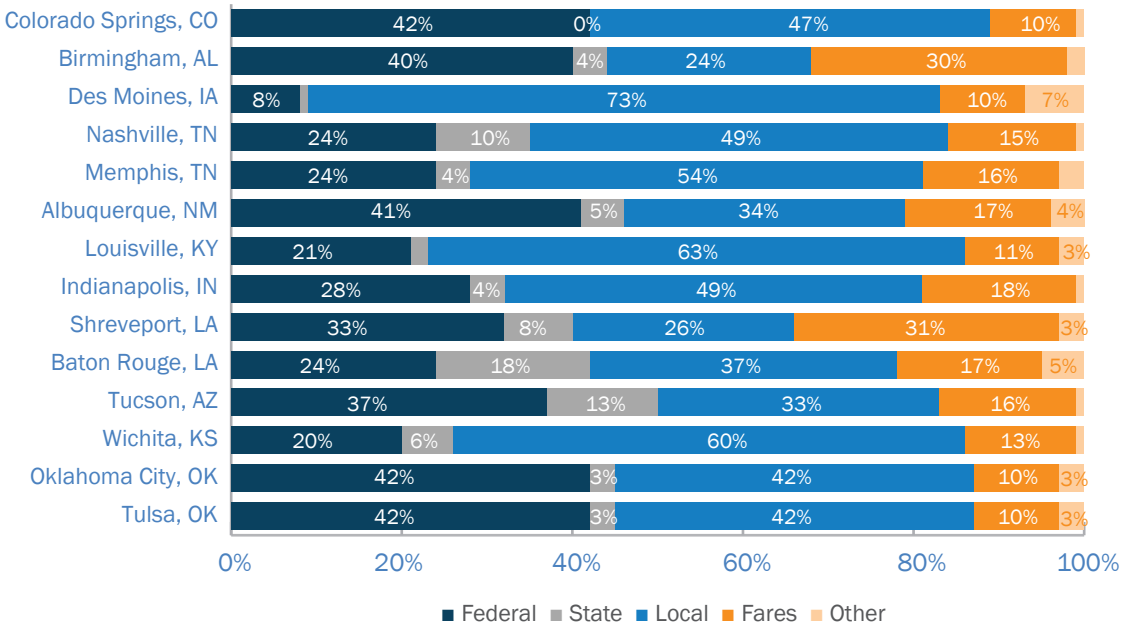
Figure 7.5 : Tulsa Transit Sources of Operating Funds Expended (2009)



When comparing funding sources of peer cities without a local dedicated funding source, as is Tulsa, local funds account for 24 to 73% of funds, with an average of 45%

- Federal: Ranges from 8 to 42% with an average of 30%
- State: Ranges from 2 to 18% with an average of 6%

Figure 7.6 : Funding Sources of Peer Cities Without Dedicated Funding Sources

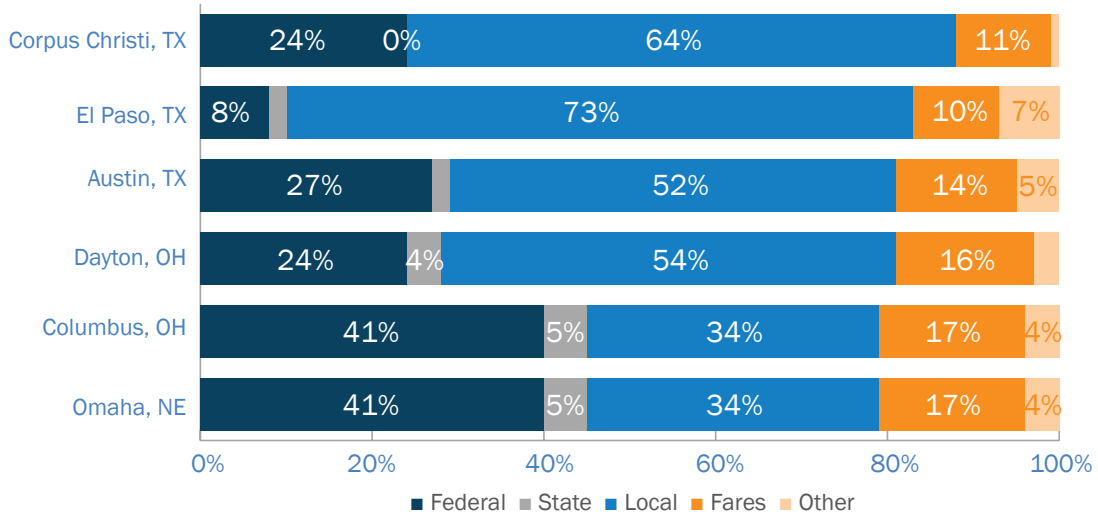


- Fares: Ranges from 10 to 31% with an average of 16%
- Other: Ranges from 1 to 7% with an average of 3%

Conversely, peer cities with a local dedicated funding source, local funds account for 34 to 73% of funds, with an average of 52%

- Federal: Ranges from 8 to 41% with an average of 28%
- State: Ranges from 0 to 5% with an average of 3%
- Fares: Ranges from 10 to 17% with an average of 14%
- Other: Ranges from 2 to 7% with an average of 4%

Figure 7.7 : Funding Sources of Peer Cities With Dedicated Funding Sources



Over the years, operating assistance provided by the City of Tulsa has been volatile with recent fluctuation. Most recently in fiscal year 2010, local funding has decreased significantly by approximately 34% to $5.748 million. Despite the decrease of local funding, federal funding increased to make up the difference as the overall Tulsa Transit operating budget in 2010 was $17,961,130. In 2011, local funding increased slightly to $5.775 million, while local funds requested for fiscal year 2012 is approximately $1 million more, at a reported $6.796 million.

Initial Stakeholder Findings

After polling funders at the Fast Forward Stakeholders Retreat, a survey was conducted regarding to governance and funding options and concluded that:

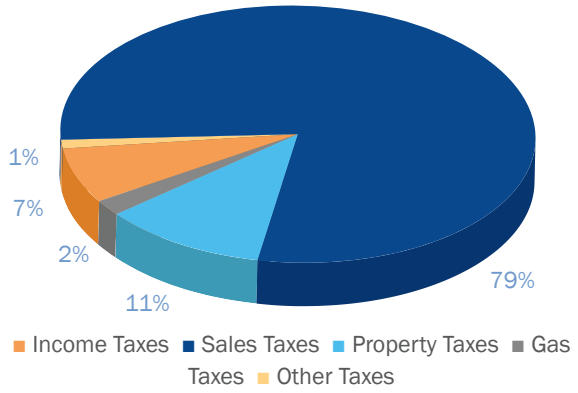
- 68% disagree / strongly disagree that Tulsa Transit's existing budget ($8.7 M in 2009) is enough to provide the level of service that is necessary
- 48% feel $20 (peer city average) is a reasonable amount per person to pay each year (locally) for fixed route service, while 28% believe $50 (high-performing peers) is reasonable. This would amount to local funding of $7,838,120, based on the City of Tulsa population (391,906) and $12,068,060 based on Tulsa County population (603,403).
- 33% feel the existing governance structure (continue the existing City of Tulsa municipal trust) should probably not be continued for the transit system's future, while 30% feel it should definitely not
- 46% feel that creating a transportation authority probably should be established for the transit system's future governance structure, while 42% feel it definitely should
- 70% believe that the transportation authority should definitely not just include the City of Tulsa, while 30% feel it probably should not
- 37% believe that the transportation authority should definitely include a group of cities (Tulsa and others), while 33% feel it probably should
- 35% believe that the transportation authority should probably include Tulsa County, while 31% feel it maybe should, and 27% feel it should definitely
- 30% believe that the transportation authority should probably include multiple counties, while 30% believe it maybe should, and 26% believe it definitely should
- 27% believe that general fund appropriations should definitely not be utilized as the financing source for the transit systems future, 23 believe it probably should, 19% believe it may should, and 19% believe probably not
- 19% believe that a dedicated sales tax definitely should be utilized as the financing source for the transit systems future, 22% believe it probably should, and 41% believe it could be
- 22% believe that other dedicated local funding sources definitely should be utilized as the financing source for the transit systems future, 41% believe it probably should, and 26% believe it maybe should

National Sources of Local Funds

Of the nationwide totals, representing 73%, sales taxes are the primary source of local dedicated funding for operations. Other sources (12%), along with property taxes (11%), gasoline taxes (3%) and income taxes (1%) are also preferred alternative local dedicated funding sources.

As shown in Figure 7.8, sales taxes is the preferred type of local dedicated funding source typically utilized for operations, nationwide.

Figure 7.8 : Nationwide: Local Dedicated Funding Sources for Operations (2009)



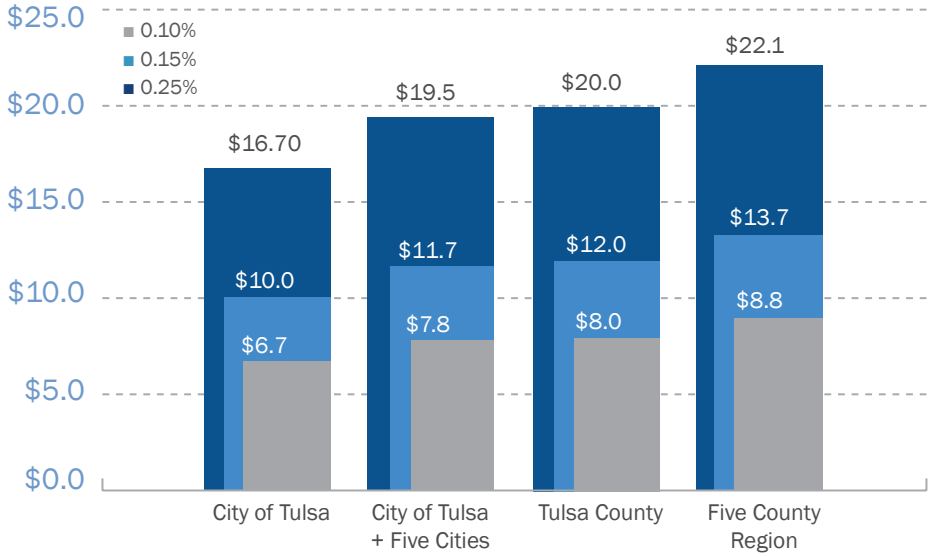
Source: National Transit Database 2009

Potential Local Dedicated Sales Tax Revenue

The Tulsa region has a range of funding mechanisms to help fund operations and capital expenses, however, a local dedicated sales tax can increase transit funding substantially. Currently, local Tulsa City transit funding is approximately $8.7 million. If a local dedicated sales tax was implemented, the following revenue could be generated:

- If Tulsa City implemented a local dedicated funding source of a 0.25% sales tax, an additional $16.7 million would be generated, almost doubling transit funding (1.9 times)
- If Tulsa City, along with the five cities of Sand Springs, Broken Arrow, Jenks, Bixby, and Owasso, implemented a local dedicated funding source of a 0.25% sales tax, an additional $19.4 million would be generated, increasing transit funding almost 2.2 times
- If Tulsa County (county-wide) implemented a local dedicated funding source of 0.25%, an additional $19.9 million would be generated, increasing transit funding almost 2.32 times
- If a five county-wide region, including Tulsa, Wagoner, Creek, Osage, and Rogers Counties, implemented a local dedicated sales tax of 0.25%, an additional $22.1 would be generated, increasing transit funding 2.5 times

Figure 7.9 : Potential Sales Tax Revenue



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

As shown in Figure 7.9, a range of potential sales tax revenue could be made available depending on the size and scope of governance of any future agency.

Other Potential Funding Sources

In addition to a local dedicated sales tax, other potential funding sources may be utilized such as general revenue, property tax, contract / purchase-of-service revenue, advertising revenue, vehicle fees, special assessment districts, parking fees, and donations. Table 7.2 illustrates the performance of the alternative local and regional public transportation funding sources.

In addition, the strategic use of value capture can support future operating and capital deficits. Many state and local governments seek to supplement transit system funding with value capture strategies, including joint development, special assessment districts, tax increment financing, and development impact fees, capital and operating cost sharing, advertising, transportation utility fees, and negotiated exactions. The purpose of all of these value capture strategies is to dedicate a portion of increased revenues (whether incremental tax revenues, additional assessment revenue, or new fees) generated as a result of transit back to transit.

Table 7.2 : Performance of Alternative Local and Regional Public Transportation Funding Sources

Sources	Ease of Implementation		Ease of Operations	Equity	Economic Efficiency	Legal Constraints	Acceptability
	Adequacy	Stability					
General Revenue	O	L	H	L	O	H	O
Dedicated Sources							
Sales Tax	H	O	H	L	O	O	O
Property Tax	O	H	H	L	O	L	L
Contract/Purchase-of-Service Revenue	L	O	O	O	O	H	O
Advertising Revenue	L	O	L	H	H	H	H
Vehicle Fees	L	H	O	O	O	L	L
Special Assessment Districts	L	H	O	O	O	L	O
Parking Fees	L	O	O	O	O	L	L
Donations	L	L	O	H	H	O	H
Utility Fees	O	H	O	L	O	L	L
Gas Tax	O	O	O	O	O	L	O

H High O Medium L Low

In July 2010, the United States Government Accountability Office (GAO) completed a study, "Federal Role in Value Capture Strategies for Transit is Limited, but Additional Guidance Could Help Clarify Policies." The report surveyed transit agencies and found that:

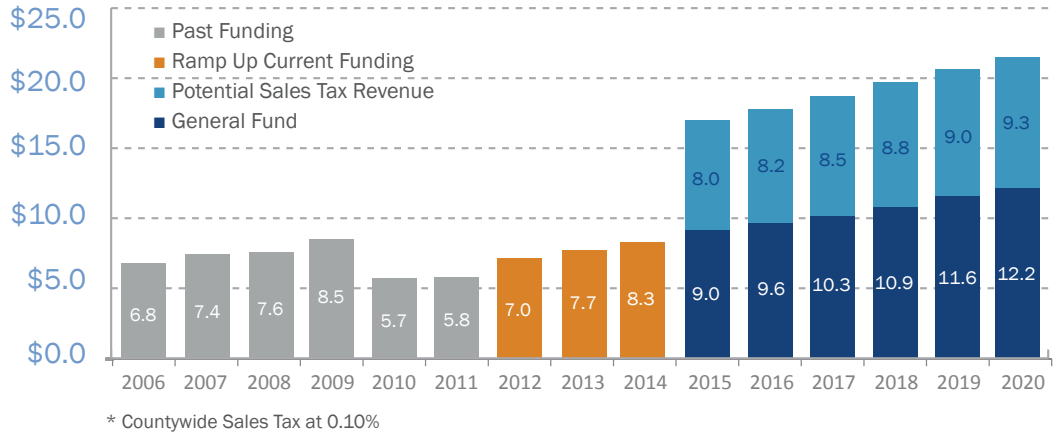
- 32 of 55 used joint development as a source of funding for transit
- 19 of 55 used at least one of the following techniques to fund transit: special assessment districts, tax increment financing, and development impact fees. However, most transit agencies only used one of the strategies as a funding source; only 5 reported using two or more value capture strategies
- Public entities are more familiar with using special assessment districts, tax increment financing, and development impact fees to fund public infrastructure improvements such as water and sewer systems, roads, schools and parks rather than transit projects.
- Agencies using joint development typically have formal joint development policies and real estate experts on staff
- Revenue generated from joint development typically comprises a small portion of overall annual operating expenses; for Los Angeles Metro, Washington Metro, and Metropolitan Atlanta Rapid Transit, the three transit agencies with the longest standing joint development programs, overall revenues from joint development comprised $184,000 to $8.8 million representing no more than 1% of annual operating expenses.
- Value capture revenues for selected major transit infrastructure projects nationwide have generated between $20 million to $1.7 billion representing 4% to 61% of infrastructure project costs. Selected examples include (but are not limited to): the San Francisco Transbay Transit Center, where $1.4 billion in tax increment financing and special assessment district revenues will fund 33% of project costs; Washington Metro's NY Avenue Station, where $25 million in special assessment district revenues funded 23% of project costs; and the Dulles Corridor extension, where $730 million in special assessment district revenues will fund 14% of project costs.
- Value capture revenues have in part funded transit oriented development infrastructure improvements. Several examples come from Maryland. For example, the MDOT State Center transit oriented development is using tax increment financing (backed by a special assessment district) to generate $100 million to support structure parking, station amenities, affordable housing, and other infrastructure improvements. The MDOT Owing Mills transit oriented development is using tax increment financing and a special assessment district to generate $60 million in funds to pay for two state-owned parking garages (TIF supported) and for the operation of state-owned garages, roads and other improvements (special assessment supported). The MDOT Savage transit-oriented development is using tax increment financing (backed by a special assessment district to generate $14 million in revenue to fund a new structured parking garage.
- Land use zoning to allow for high-density development is a tool to be used in concert with value capture strategies to enhance the amount of revenue generated.

Table 7.3 : Performance of Optional Governance Mechanisms

	Sources	Ease of Implementation	Ease of Operations	Equity	Legal Authority	Acceptability
1	Continue as City of Tulsa Municipal Trust	High	High	Medium	High	Medium
2	Create a City of Tulsa Municipal Department	Medium	High	Medium	Medium	Medium
3	Create Transportation Authority					
	A. Combination of Cities/Towns	Medium	High	High	High	Medium
	B. Tulsa County	Medium	High	High	High	Medium
	C. Multi-County	Low	High	Medium	High	Low

High Medium Low

Figure 7.10 : Prior and Proposed Local Funding (Millions)



* Countywide Sales Tax at 0.10%

- Private sector support from developers and property owners is critical for the success of value capture strategies. Developers must be interested in joint development for that strategy to come into play, and private property owners must be on board with special assessment districts to be enacted.
- Transit agencies put joint development revenues either in set-aside joint development funds or into the general fund. Placing revenues in the general fund allows agencies to use revenues for operations and maintenance and capital projects, while placing revenues in set-aside funds allows targeting of funds to specific purposes, such as operations and maintenance. Another way set-aside funds have been used is in phased joint developments, where revenues generated from one phase funds a later phase of that same joint development. MDOT used the transfer of 10.2 acres of state-owned land, valued at $3.3 million, to a developer as credit for the developer to construct a commuter parking garage at the TOD site.
- Use of value capture strategies can be hindered by unfavorable economic conditions. For instance, tax increment financing can be hindered by difficulty in selling tax increment bonds in a weak local economy. Development impact fee revenue is tied to new development projects, so development impact fees may result in small amounts of revenue in an economic downturn. Special assessment districts may suffer in a weak economy when property owners experience declines in property values, and collection of special assessments become more difficult to collect.

Recommendations

The RTSP recommends regional action on critical issues pertaining to governance and finance of the transit system, including both high capacity and fixed route bus services. Below are recommendations established throughout the technical process in consultation with input from regional stakeholders.

- Create a Regional Transit Authority based on options presented in Table 7.3 as allowed by Oklahoma enabling legislation and consensus among regional stakeholders.
- Establish necessary interim steps to move forward with the recommended governance mechanism. These steps would likely include:
  - Create a broad and diverse regional task force to address governance structure and membership options for a regional transit authority
  - Generate additional funds to maintain and improve existing transit service, as recommended by Figure 7.10
  - 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

- Explore 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

Fiscal History and Timeline

There is a need to maintain momentum for costs neutral transportation / bus enhancements prior to the availability of dedicated regional tax revenues. Below is a fiscal year timeline of potential local funding.

There was a significant increase in local funding provided by the City of Tulsa which occurred between FY 2006 and FY 2009, from $6.8 M to $8.5 M.

- FY 2006: $6.8 M
- FY 2007: $7.4 M
- FY 2008: $7.6 M
- FY 2009: $8.5 M

However, a decrease in City generated funds occurred between FY 2009 and FY 2010, decreasing from $8.5 M to $5.7 M, with funding remaining relatively low at $5.8 M in FY 2011.

- FY 2009: $8.5 M
- FY 2010: $5.7 M
- FY 2011: $5.8 M

For FY2012 Tulsa Transit obtained an 18% increase over their 2011 general fund allocation from the City of Tulsa. Due to increases in fuel costs, much of this increase was consumed by fuel. Tulsa Transit was able to add additional service on three routes.

- FY 2012: $7.0M (Requested)

It is suggested that there be a 'ramp up' with in local funding from the City of Tulsa, other neighboring jurisdictions and the County, and aggressively seek federal funding. It is suggested local funding be increased to $8.3 M by FY 2014.

- FY 2013: Estimated $7.7 M
- FY 2014: Estimated $8.3 M

Funding Opportunities

Pursuing all federal funding sources is highly recommended. Any local commitment of resources toward capital and operations can be successfully leveraged and complimented with all federal avenues for funding of capital projects. In addition to future potential capital intensive projects, it is recommended that various categories of funding be pursued including:

- The State of Good Repair Initiative, which will finance capital projects to replace, rehabilitate, and purchase buses and related equipment and to construct/rehabilitate bus-related facilities
- The Livability Expansion Initiative, which includes two programs:
  - The Alternatives Analysis program, which can assist potential sponsors of New Starts and Small Starts projects in the evaluation of all reasonable modal and multimodal alternatives and general alignments options to address transportation needs in a defined travel corridor
  - Bus and Bus Facilities, which can fund the purchase or rehabilitation of buses and vans, bus-related equipment (including ITS, fare equipment, communication devices), construction and rehabilitation of bus-related facilities (including administrative, maintenance, transfer, and intermodal facilities)
- The Sustainability Initiative, which includes two programs:
  - The Clean Fuels Program, which can fund the 1) Purchasing or leasing clean fuel buses, including buses that employ a lightweight composite primary structure and vans for use in revenue service; 2) Constructing or leasing clean fuel bus facilities or electrical recharging facilities and related equipment; and 3) Projects relating to clean fuel, biodiesel, hybrid electric, or zero emissions technology buses that exhibit equivalent or superior emissions reductions to existing clean fuel or hybrid electric technologies
  - The Transit Investment in Greenhouse Gases and Energy Reduction (TIGGER) III Program, which can assist in the reduction of the energy consumption of a public transportation system and/or the reduction of greenhouse gas emissions of a public transportation system

Transit Supportive Policies

Supportive plans, policies and procedures are necessary for successful implementation of the RTSP. Specific regional policies can help the community capture the full benefit of transit investments. Transit investments have an ability to help regions achieve diverse community goals in way in which other transportation improvements cannot. Effective transit implementation requires both supportive policies and agencies. To successfully embrace multimodal transit, the region must address policy recommendations related to active transportation infrastructure, urban design, land use and affordable housing.

A diverse set of transit supportive policies and tools have the ability to accommodate community values, reinvestment agendas and economic revival. As the capability of addressing congestion through continued expansion of roadways has become constrained by funding limitations, lack of right of way, federal mandates and growing opposition from citizens' groups, certain transit supportive policy approaches have been developed and utilized across the US. These policy approaches include:

- Improving the quantity of and quality of infrastructure that serves pedestrians, bicyclists and high-occupancy vehicles
- Increasing the price of auto travel relative to other modes of travel
- Limiting urban sprawl
- Encouraging or requiring suburban development at higher densities
- Creating nodes of new high intensity development

The purpose of this section is to present an overview of possible transit supportive policies and identify additional policies that could be implemented by jurisdictions within the Tulsa TMA.

Supportive Policy Approach

The Tulsa region, as many other major regions in the country, faces a range of environmental and urban problems including, growing traffic congestion; increasing air pollution; residential areas without adequate neighborhood retail services; lack of pedestrian amenities; lack of connectivity between commercial, retail and residential developments, and transit service and facilities; and decline in older neighborhoods and retail areas. While no single policy tool will suffice to mitigate the effects of decades of policies and funding priorities that have favored single occupant travel and low density, single-use development, many communities are finding successful solutions to help induce efficient travel.

Multimodal Transportation Accommodation

Integration of cyclists and pedestrians into the regional RTSP system is essential to its success. Improvements in both bicycle and pedestrian infrastructure provide a safer, more accessible and healthier system for all users. Transit patrons are generally willing to walk up to one-quarter of a mile for bus transit and one-half mile for rail transit, as long as reasonable walking conditions are provided. Other cities have successfully implemented "Complete Street" policies to ensure that all roadways consider multiple users, including motorists, transit patrons, cyclists and pedestrians. Complete street recommendations vary by roadway design, but often include such features as user-friendly sidewalks, bike lanes, dedicated bus lanes, accessible transit stops, properly marked crosswalks and accessible pedestrian signals. These improvements allow for safe access for all users, regardless of travel mode, ability or age.

Pedestrian facilities and amenities can improve transit-oriented design to ensure accessible, safe and well-designed streets for transit patrons. Design standards can help even relatively low intensity development more pedestrian and transit friendly. Improvements to the pedestrian environment are relatively low cost and increase the probability of pedestrian travel. Numerous strategies can aid in the development of accessible pedestrian environments including bus shelters, landscaping, street furniture, walkways, public art, and access to parks. Pedestrian-friendly station areas typically have land uses which include medium- to high-density mixed uses, utilizing street-oriented architecture. With easy, adjacent transit access,

pedestrians require safe crossings, adequate buffering from traffic, continuous and ample sidewalks and safe waiting areas. Closely spaced trees providing shade, traffic calming techniques, and short block lengths also encourage pedestrian activity in transit-rich areas. Many different approaches can be addressed to encourage safe routes to and from transit stops and stations.

Parking

Parking policies have a fundamental impact on transit operations and ridership. Parking facilities can play an important role in providing intermodal accessibility and encourage transit usage in outlying communities at park and ride facilities. However, abundant, free parking coupled with the absence of facilities for other forms of transportation, provides an undeniable incentive to choose the car over other transportation alternatives. Poorly designed parking lots throughout the system can also create a barrier that discourages pedestrian travel and transit use.

Employment centers can support transit goals by reducing allowable parking below demand levels. Measures that reduce the supply of free parking can be among the most effective tools for motivating a change from single occupancy driving to ridesharing or transit use. Municipalities can require better parking design by restricting parking between buildings and the street and reducing parking lot size by requiring interior landscaping, perimeter landscaping and screening. Ground floor retail for parking garages can also support regional transit initiatives. Municipal code can be designed to allow for shared parking arrangements or parking requirement reductions for mixed-use developments. Reducing existing parking requirements to better match demand can serve as a tool to help encourage mass transit.

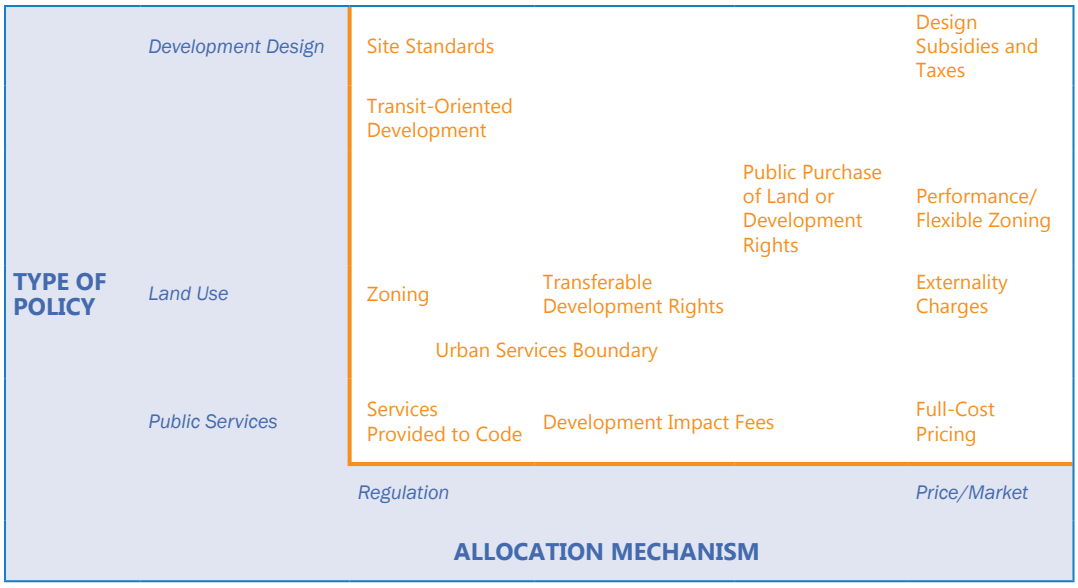
Land Use and Transportation Coordination Policy

Land use, specifically density and pedestrian accessibility, are critical factors affecting the productivity of transit services. Increasing pedestrian access, transit, and bicycle use has been a recurring goal of many local and regional plans in the

Tulsa TMA region. Neighborhoods and government agencies have begun to recognize the important linkage between land use and the manner in which people commute to jobs and other activities.

Modern housing is a mass production market with supportive governmental and private institution policies encouraging suburban housing. In recent years, innovative programs have begun addressing the need to both improve urban quality of life and increase urban densities to meet regional mobility challenges. Many cities encourage growth through comprehensive plans and zoning ordinances. Higher urban densities offer many benefits to improved transit service. Dense environments allow for a greater number of transit routes at higher frequencies and allow agencies to significantly reduce the cost per rider of operating transit.

Figure 7.11 : Typical Policies for Influencing Land Use



Source: The Transportation/Land Use Connection, American Planning Association, Planners Advisory Service, Report No. 448/449.

Transit-Oriented Development (TOD) is one effective tool many communities have utilized to support transit operations and to develop nodes of high-intensity development. Most TODs are centered on rail transit stations, but several successful joint-development and transit-oriented projects can be found at bus transit centers as well. A rail transit investment may be a preferred but not required element of transit-oriented and joint development. Strong regional planning and inclusion of both citizens and developers in the planning process are necessary elements of successful TOD and joint development programs.

Although there are significant barriers to true integration of land use and transportation planning, there are numerous effective regulatory approaches to facilitate patterns of development that are not entirely auto dependent. Figure 7.11 depicts the range of policies for influencing land use.

The policies shown in Figure 7.11 represent a collection of regulatory to market mechanisms across the country effecting transit supportive development. Three types of land use policies are represented along the vertical axis: those that control the provisions of public services, those that control the type and density of land use and those that control the design of buildings and infrastructure. This range of policy approaches represents the variety of tools available for a community to guide supportive development. Each strategy has its advantages and disadvantages and may or may not prove useful in the overall regional approach. Presented below is a discussion of various issues related to the implementation of a few of these policies.

Regulatory Approaches to Land Development

Barriers to TOD are found in many municipal zoning codes. Most zoning codes do not allow the mix of uses and the density of development that would make TOD possible. Mixed-use zoning provides a tool to help revitalize and stabilize communities by promoting more neighborhood-oriented retail and commercial uses, reduce sprawl by encouraging higher density developments, improve transit ridership, encourage TOD and pedestrian oriented development around transit stops and along transit routes, and facilitate higher density, mixed use developments along principal and minor arterials and neighborhood collectors.

While transit oriented and pedestrian oriented projects are possible without the benefit of a transit supportive zoning code through special use permits or planned unit developments, these approaches involve more time and risk for the developer and are less attractive to developers than developing under an existing category in the municipal code. Higher density allowances and other incentives under transit oriented or pedestrian oriented zoning regulations can also provide incentives that make transit oriented projects more attractive to developers. Zoning can allow or prohibit successful transit-oriented development, but it is not able to generate demand. Strong market demand is a requirement for a successful joint development or TOD project. Market indicators include healthy housing, commercial, and retail markets. Cities able to develop strong station area master plans, along with public investment in infrastructure and appropriate zoning, have developed the most successful TODs.

Form-based zoning is an alternative to conventional zoning. Acting similarly to conventional zoning, form-based zoning regulates both land use and physical form. Form-based zoning is able to dictate the use of the building whether it is residential, manufacturing, office, or retail and also maintain control of the height, setback and property lines. This code is able to establish and maintain a common physical character to a district with flexibility in usage to be able to accommodate future needs of the district and changing market conditions.

In situations of station areas with limited adjacent tracts of land, particularly in areas with higher costs, redevelopment agencies or local jurisdictions may be required to assist in land-banking, project financing through tax exempt bonds, and land assembly. Other successful projects have involved lease of air rights over transit stations and redevelopment of park and ride lots into mixed use developments.

Major transit investments have the ability to spur increases in land values surrounding station areas. While many Americans and political leaders view transit as a service for the poor, transit-oriented development usually results in above market-rate housing, office, and retail projects. Maintaining affordable housing near TODs can be difficult if left to market conditions.

Many municipalities develop policies to maintain neighborhood character and composition by including affordable housing and inclusionary zoning requirements.

Market-Oriented Approaches to Land Development

An approach that avoids potential zoning restriction challenges is the purchase of land or its development rights. This process removes the land from the market, making the remaining developable land more valuable and more likely to be developed more intensively.

The transfer of development rights (TDR) is similar to purchasing of land or development rights by a local government, but without the government having to use tax revenues. The transfer of funds and development rights occur between landowners. TDRs allow the landowner seeking more intensive development to purchase the right from a landowner in an area with more restrictive zoning. The landowner in the area of more restrictive zoning is then compensated for the potential loss of development opportunity.

Performance or flexible zoning allows developers more freedom in the manner in which they meet planning and environmental objectives. Rather than prescribing the method to reach the objectives, performance zoning focuses on results. Flexible zoning allows a developer to negotiate with a neighborhood or community by offering improvements that benefit the entire neighborhood, such as a park, streetscaping in exchange for a higher density development or a new land use not currently found in the neighborhood.

Development impact fees provide disincentives to develop in certain areas by affecting its cost. While a system of impact fees can help to reduce the negative effects of growth, it will not necessarily efficiently allocate transportation resources.

Table 7.4 evaluates the transit supportiveness of a wide range of land uses.

Table 7.4 : Transit Supportive Land Use

Use Classification	Transit Supportive	Transit Supportive w/ Appropriate Standards	Not Transit Supportive
Residential Uses			
Single-family residential[1]		X	
Lots greater than 5,000 sq. ft.		X	
Lots 5,000 sq. ft. or less	X		
Multi-family residential	X		
Elderly residential	X		
Public and Semipublic			
Cemeteries			X
Clubs and lodges		X	
Convalescent facilities			X
Cultural institutions	X		
Day care general	X		
Government offices	X		
Hospitals medical offices	X		
Park and recreation facilties[2]		X	
Public safety facilities		X	
Residential care		X	
Schools and colleges		X	
Commercial Uses			
Ambulance services			X
Animal sales and services		X	
Animal boarding			X
Banks and savings and loans with drive-up service	X		

Building materials and services		X	
Commercial recreation and entertainment[3]		X	
Eating and drinking establishments	X		
Fast food or take-out with drive-through service		X	
Bar and tavern	X		
Food and beverage sales		X	
Funeral and internment services			X
Laboratories[4]		X	
Maintenance and repair services			X
Nurseries, commercial			X
Offices, business and professional[5]	X		
Personal improvement services		X	
Personal services	X		
Research and development services		X	
Retail services	X		
Volume discount retail		X	
Travel services	X		
Vehicle equipment sales and services[6]			X
Automobile rentals			X
Automobile washing			X
Commercial parking garage[7]			X
Commercial surface parking			X
Service stations		X	
Convenience retail			X
Vehicle equipment sales/rental			X
Vehicle storage			X
Visitor accommodations		X	
Hotels	X		
Bed and breakfast inns	X		
Motels	X		
Industrial Uses			
Includes truck stops, manufactured home sales, cold storage plants, junk yards, and solid waste transfer stations			X
Light industrial/employment		X	

Notes:

1. Small lots or attached single-family housing is transit supportive.
2. Small parks are transit supportive; large facilities, such as golf courses or multiple playing fields, are not.
3. Indoor uses such as cinemas and theaters are transit supportive.
4. Small-scale facilities, such as medical labs are transit supportive.
5. Neighborhood-oriented businesses are transit supportive.
6. Vehicle sales and services can be transit supportive if on-site storage of vehicles is limited.
7. Garages can be transit supportive if active, non-parking uses are located at street level.

Source: Adapted from Creating Transit-Supportive Land Use Regulations, APA, Planning Advisory Service 468

Barriers and Challenges

This section seeks to identify potential barriers to implementation of enhanced and high capacity transit services as well as the opportunities to set regional precedence and establish a foundation for improving regional mobility and prosperity through public transportation.

The Regional Transit System Plan identified in Chapter 6 is a long range plan. As such its duty is to project the future transportation needs of the study area and outline a path to implementation of RTSP recommendations. The planning horizon for this RTSP is approximately 25 years.

Although recent decades have shown a general decrease in the provision of transit services in the region, recent polling of RTSP study area residents revealed a strong support and desire for improved public transportation alternatives. The path to changing the culture surrounding and priority enhancement of public transportation in the Tulsa Metropolitan and northeastern Oklahoma areas is both dynamic and deliberate. The barriers to and opportunities for implementation of the proposed RTSP have been categorized into three areas of focus:

- Operational
- Institutional
- Financial

Due to the conceptual level of planning associated with the development of a long range transportation plan, all potential barriers and opportunities were not able to be identified within this document. Further analysis is required to develop a detailed implementation strategy.

Operational

Fixed Route Transit

One of the overlying conclusions of the needs analysis performed as part of this RTSP is the overall need to improve the performance and efficiency of the fixed route bus system in the region. As verified by comparative analysis with peer cities and by community feedback transit service levels of the RTSP study area measure below national and peer city averages in several funding and operational efficiency statistics. In May 2009 Tulsa Transit conducted a passenger survey to get feedback on the current system. One question asked on the survey was, "Which one improvement would you like to see?" The survey responses were as follows:

More frequency	36%	Fewer transfers	3%
Sunday service	29%	Other	3%
More evening service	13%	More express service	2%
More locations	7%	Cross-town service	2%
More Saturday service	6%	TOTAL	99%

The people surveyed want less wait time between buses, better evening service, and service on Sundays. Additionally, although the current system covers most geographical areas of Tulsa, there are still significant sections of town not served. As per the survey, 7% of respondents would like to see more locations served.

Recognizing the task of educating the public and demonstrating the regional benefits of improved public transportation, however, presents the local municipalities and public agencies with an opportunity to begin phased implementation of low-cost improvements to local bus routes and transit facilities. Financial and institutional ramifications are applicable to any proposed fixed route service enhancements. The barriers and opportunities of these topics are further discussed within this chapter.

This responsibility lies with the current transit operator, Tulsa Transit, to develop plans with public input as to the areas for immediate improvement of fixed route bus operations. Improvements may include, but are not limited to: expanded transit service area as well as increases in service frequency, hours of operation, facilities and amenities. The successful and efficient operation of future fixed route service also begins establishing regular commuter trip patterns which may be organized to create operating scenarios such as regional circulator systems that feed into high capacity "trunk lines" connecting regional activity centers and destinations.

Infrastructure Needs and Evaluation

Roadway

Proposed implementation of fixed guideway improvements in the existing roadways may cause capacity or traffic operations issues with the facilities. Any potential modifications to the future roadway configurations or operations must be analyzed in detail and coordinated with the local and state traffic professionals and Oklahoma Department of Transportation.

Forecast increases in traffic levels and travel demand throughout the region are not uniform. Enhanced or high capacity transit improvements implemented along roadway corridors may or may not require grade or barrier separated guideway improvements to allow efficient and expedient operation of transit vehicles. Low cost improvements may, instead, offer significant benefits

in customer service, system performance and efficiency with immediate public benefit. Rubber tire alternatives or those transportation improvements with minor impacts to traffic capacity and operations are more viable alternatives suited to deployment of study area roadways. A final implementation strategy must be formally adopted by the agency or entity facilitating deployment of RTSP enhancements.

Railroads

The participation of existing regional freight rail operators in the planning project development and implementation of new passenger transit services within their ROW will require significant resources for coordination, evaluation and analysis of the potential barriers to deployment. As identified within Chapter 4, any potential conflicts within, but not limited to, the following realms must be identified and mitigated to the satisfaction of the proprietary railway:

- Safety
- Service
- Liability
- Capacity
- Compensation

Despite the many challenges to introducing new passenger rail service, the advanced opportunity to begin discussion with local freight rail providers regarding potential implementation of enhanced transit services within their operating ROW was well received and informative. The early identification of potential fatal flaws, coordination and analysis needs is critical information to guide the decision making of regional policy makers, transportation agencies and the public to determine the most appropriate enhancements to make to the regional transit system. The long term benefits of establishing a well integrated and efficient public transportation system may open the region up to significant social benefit and economic growth opportunities.

Institutional

Public / Agency Consensus

The Metropolitan Tulsa Transit Authority (MTTA), or Tulsa Transit, currently provides intraregional bus and paratransit services within the cities of Tulsa, Jenks, Broken Arrow and Sand Springs as a municipal trust of the City of Tulsa. Current financing structures have the majority of operational funding coming from the City of Tulsa's general fund and minor contributions from other communities receiving transit service. Several RTSP communities are only elective participants in public transportation, currently operated by the City of Tulsa and Tulsa Transit. Any potential for regional participation in the successful deployment of new transit services will likely depend on the level of confidence that area residents have in the ability of transit service to provide tangible benefits.

The new services and operating parameters recommended within this RTSP and supporting documentation identify significant increases to the existing system over time. Establishing high capacity transit services within the corridors identified in this RTSP expands the transit service area and improves frequency of service to a point that significant financial contribution from regional communities will likely be required. The increased participation and financial investment of these communities may bring local policies, agencies and agendas into conflict when it comes to determinations on system-wide issues such as:

- Acceptance of the needs assessment and RTSP results – will potential partnering communities feel that the transit needs of their citizens has been accurately identified and can be addressed by the RTSP recommendations?
- Perceived community benefit – will contributing communities feel that the return on their investment (allocation of new services areas throughout the region) is worth participating?
- Determination of implementation schedule – which communities and corridors are the top priorities?

The answers to these questions and many others will require the continued coordination and possible expansion or incorporation of regional bodies such as the Regional Task Force (RTF) and Funders' Committee (FC). The formation of a Regional Mobility Authority (RMA) with the popular and financial support of study area communities partnering to facilitate continued analysis, coordination and implementation of regional transit improvements may be the most equitable and effective means of advancing the proposed RTSP. This may be accomplished by one of several possible methods, including:

- Continue as City of Tulsa Municipal Trust with an expanded regional role
- Create City of Tulsa Municipal Department with operational jurisdiction throughout the proposed service area
- Create a Transportation Authority to operate and oversee deployment of regional transit improvements

Local and state statutes regarding the formation of a Regional Mobility Authority, or similar multi-jurisdictional agency, must be adhered to. Interagency and multi-jurisdictional agreements

will also be needed to establish the structure of the Voting body of the RMA. Electoral decisions such as the number of voting members from participating communities (ie – 1 municipality = 1 vote or # votes = $$$ contribution to RMA).

The processes involved in selecting and implementing one of these scenarios, although potentially controversial, allows for an opportunity to establish clear roles, responsibilities and authorities for Administration, Operation and Finance of all regional transportation improvements through a central body composed of representatives from all of the affected areas.

Funding

With the introduction of major infrastructure improvements and capital programs, fiscal responsibility is critical in order to sustain growth and improve operating efficiency. Following the attacks of September 2001, City of Tulsa department budgets were cut and Tulsa Transit was hit hard. Bus service hours were cut 50% and a third of the workforce was laid off. Since 2002, Tulsa Transit has suffered additional budgetary cuts and has been struggling to gain back what was lost in the economic downturn. Total annual bus service hours, as of the spring of 2010, remain down 25% from their 2002 levels.

The deployment of new and enhanced passenger transit services within the RTSP study area may require variable degrees of capital expenditure and continued funding sources to sustain operations and maintenance. Those proposed transit system improvements which require greater capital investment or annual operations funding may be highly scrutinized. A detailed cost-benefit analysis may be required to substantiate and document the prioritization of regional transit and mobility improvements.

New services should be implemented in response to demand of regional growth and travel patterns. The prioritization of not only new high capacity, but existing fixed route transit improvements will be required for appropriate financial forecast development. The governing transit body responsible for coordinating must account for costs of escalation in the procurement and construction of facilities as well as in any potential costs of coordination/mitigation with freight rail operators. Additional financing questions that must be addressed to implement system improvements include:

- Will the operating agency/authority have the ability to collect taxes?
- Is there an opt in/out clause for municipalities and agencies?
- How can existing revenue sources be leveraged to support transit operations?

A positive side effect of the intensive planning processes undertaken by the City of Tulsa and other regional partners and municipalities has placed increased emphasis on the public transportation system. The local transportation agencies and public have also acknowledged and advocated the need for improvements to the point where significant annual funding increases are being proposed in legislation to counteract rising costs of operations and begin the restoration process to elevate service levels back to levels prior to the economic downtown.

Short term bus service improvement strategies recommended within this report are focused on maximizing the scarce resources currently available and are considered “cost neutral”. Underperforming service efficiency metrics of the current Tulsa Transit system do not mean that the system is not currently well-functioning. To the contrary, it means that Tulsa Transit provides transportation services to a far greater coverage area per capita than is provided by many peer cities with similar budgetary constraints.

A financially responsible implementation strategy and operating plan for expansion of fixed route and deployment of new services should be a top priority of the transportation governing body. If a regional consensus can be reached whereby a dedicated transportation and mass transit funding source is identified, a practical and fundable implementation strategy can be developed. Local economic devices and innovative financing strategies employed on a community basis may also be adopted on a regional level to raise additional capital. Greater local funding shares available for capital projects and continued operations also presents opportunity for application for Federal assistance via programs such as Section 5309 (New Starts/ Small Starts), TIGER, Livability and Sustainability Grants.

Actions and Responsibilities

Several stratagems and recommendations have been developed as part of this RTSP to guide further analysis and implementation of transit improvements throughout the Transportation Management Area (TMA). As a pragmatic approach, actions required for follow up to refine recommendations and service improvements for deployment must take place in a logical sequence and scheduled to allow proper time and resources for coordination, administrative and legislative processes and financial planning. Tasks identified may be performed by transportation authority staff or contracted through professional services. Proposed activities will require significant coordination of resources and time to include all participating parties.

This section outlines proposed actions and responsibilities needed to successfully implement recommendations of this system plan in near, mid- and long term time increments.

Near term (0 – 5 yrs)

1. Implement Bus Service Improvement Strategies recommended by the RTSP
   - » Budgetary increase to Tulsa Transit operating budget
     - » Develop reasonable budgetary increase proposal to maximize system performance
   - » Implement timed route transfers
   - » Restoration of removed service
     - » Expand service area with restoration of high performance routes
     - » Expand hours of operation
   - » First phase of transit facilities improvements
     - » Improved passenger information, shelters, branding
   - » Begin construction of Super Stops
2. Formation of RMA
   - » Determine legislative action required to form RMA
   - » Determine regional partners (opt in/out)
   - » Multiple use / inter-agency agreements
3. Conduct AA and environmental clearance on "best bet" RTSP Foundation Corridors
   - » Design & construction of signature, successful high capacity transit project
   - » 3rd party negotiation (includes railroads and ROW)
4. Conduct additional analysis on appropriate transit improvement modes and technologies to implement on RTSP corridors.
   - » Develop preliminary operating strategy and technology mode concepts for the remaining "Foundation and Enhanced Network" corridors.
   - » Develop preliminary implementation schedule for remaining "Foundation and Enhanced Network" corridors.
5. Financial planning
   - » Maintain State of good repair
     - » Maintain and replace existing fleet (annual cost: 2% - 2.5%)
   - » Determine cost impacts of fixed route / demand response service modifications
   - » Procure financial forecasting / long range financial strategy consultant services
     - » Develop preliminary cost estimates for viable transit improvement alternatives on RTSP corridors
     - » Develop potential funding sources based on technology mode scenario development
     - » Public discussion of dedicated funding source or innovative financing approaches

Mid-term (5 – 15 yrs)

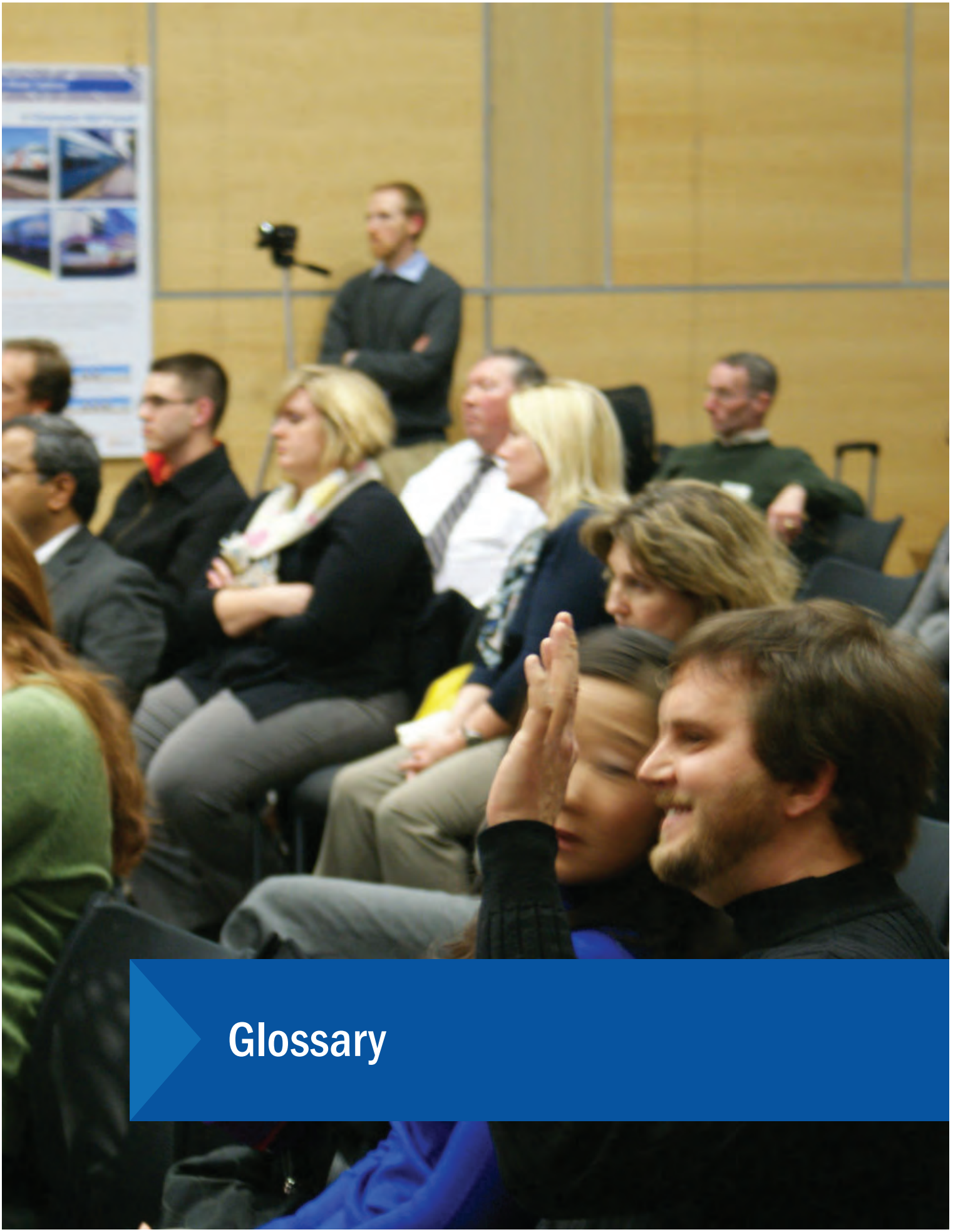
1. Conduct AA and environmental clearance on remaining RTSP Foundation Corridors
   - » Design & construction of high capacity transit projects
2. Revisit planning studies for "Extended & Enhanced Network" corridors to verify continued need and update recommendations
   - » Begin implementation of "Enhanced Network" corridors as demand dictates
3. Construction of additional transit facilities
   - » Super Stops and park-n-rides as dictated by demand

Long term (15 yrs +)

1. Complete implementation of "Enhanced Network" corridors as needed
2. Re-assess "Extended" network improvements and begin implementation of improvements

Near term, mid-term and long term actions can dictate the future success of the Tulsa TMA region. The success of an improved bus system and an initial small-scale, highly successful and visible capital projects involving federal funding and public-private partnerships including value capture mechanisms, could set the stage for increased dedicated local funding (either through a expanded sales tax or supplemental local dedicated funding sources). This near term and mid-term achievement can position the region for more opportunities to meet the multimodal transportation needs of the region.

In the long term, more projects can be implemented utilizing similar funding mechanisms creating a more robust transit system including capital investments in prioritized corridors, utilizing the increased local support, expanded local funding resources public/private sector value capture approaches, and federal capital funds.



Glossary

Glossary of Transit Terms

These terms are used throughout the Transit System Plan document and its appendices. These terms are commonly used within the transit industry.

A

Above Grade — The location of a structure or transit guideway above the surface of the ground (also known as elevated or aerial).

Accessible Service — Buses operating in regular service with wheelchair lifts, kneeling functions or other devices that permit disabled passengers to use the service.

Accessibility — (1) The extent to which facilities are barrier free and useable by disabled persons, including wheelchair users. (2) A measure of the ability or ease of all people to travel among various origins and destinations.

Activity Center — An area with high population and concentrated activities which generate a large number of trips (e.g., CBD, shopping centers, business or industrial parks, recreational facilities (also known as trip generator).

Alight — To get off a transit vehicle. Plural: "alightings".

Alignment — The horizontal and vertical ground plan of a roadway, railroad, transit route or other facility.

Allocation — An administrative distribution of funds, for example, federal funds among the states; used for funds that do not have legislatively mandated distribution formula.

Alternative Fuel — A liquid or gaseous nonpetroleum fuel, used to power transit vehicles. Usually refers to alcohol fuels, mineral fuels, natural gas, and hydrogen.

AM Peak — The morning commute period, about two hours, in which the greatest movement of passengers occurs, generally from home to work; the portion of the morning service period where the greatest level of ridership is experienced and service provided.

Synonyms: AM Rush, Early Peak, Morning Peak, Morning Rush, Morning Commission, Hour

AMTRAK (National Railroad Passenger Corporation) — A quasi-public corporation created by the federal Rail Passenger Service Act of 1970 to improve and develop intercity passenger rail service throughout the United States. Operates a depot in downtown Sacramento.

Americans with Disabilities Act of 1990 (ADA) — The law passed by Congress in 1990 which makes it illegal to discriminate against people with disabilities in employment, services provided by state and local governments, public and private transportation, public accommodations and telecommunications.

APP AR — An abbreviation for "approximate arrival" time point. RT's operating policy permits driver discretion to depart these time points up to three minutes earlier than specific time noted in the schedule.

Appropriation — An act of Congress that permits federal agencies to incur obligations and make payments for specific purposes.

Arterial Street — A major thoroughfare, used primarily for through traffic rather than for access to adjacent land, that is characterized by high vehicular capacity and continuity of movement.

At Grade — The location of a structure or transit guideway at the same level as the ground surface.

Authorization — Basic, substantive federal legislation that established or continues the legal operation of federal program agencies, either indefinitely or for a specific period of time.

Automatic Passenger Counts (APC) (predates "smart technology") — A technology installed on transit vehicles that counts the number of boarding and alighting passengers at each stop while also noting the time. Passengers are counted using either pulse beams or step treadles located at each door. Stop location is generally identified through use of either global positioning systems (GPS) or signpost transmitters in combination with vehicle odometers.

Synonyms: Smart Counters

Automatic Vehicle Location (AVL) — A system that senses, at intervals, the monitors the real-time location of transit vehicles carrying special electronic equipment that communicates a signal back to a central control facility, locating the vehicle and providing other information about its operations or about its mechanical condition.

B

Board — To go onto or into a transit vehicle. Plural: "Boardings".

Branch — One of multiple route segments served by a single route.

Bus — A rubber-tired road vehicle designed to carry a substantial number of passengers (i.e., 10 or more), commonly operated on streets and highways for public transportation service.

Bus Bay — Bus berthing area in a facility such as a transit center or rail station.

Bus Hours — The total hours of travel by bus, including both revenue service and deadhead travel.

Synonyms: Vehicle Hours

Bus Lane — A lane of roadway intended primarily for use by buses, either all day or during specified periods.

Synonyms: Transit Priority Lane

Bus Stop — A curbside place where passengers board or alight transit.

Bus Miles — The total miles of travel by bus, including both revenue and deadhead travel.

Synonyms: Vehicle Miles

Bus Shelter — A structure constructed near a bus stop to provide seating and protection from the weather for the convenience of waiting passengers.

Bus Turnout — Cutout in the roadside to permit a transit vehicle to dwell at a curb.

Busway — A special roadway designed for exclusive use by buses. It may be constructed at, above, or below grade and may be located in separate rights-of-way or within highway corridors.

C

Capital — Long-term assets, such as property, buildings, roads, rail lines, and vehicles.

Capital Costs — Costs of long-term assets of a public transit system such as property, buildings, vehicles, etc.

Capital Improvement Program — The list of capital projects for a five to seven year programming period.

Capital Project — Construction and/or procurement of district assets, such as transit centers, transit vehicles and track.

Car Pool — An arrangement where people share the use and cost of a privately owned automobile in traveling to and from pre-arranged destinations.

Central Business District (CBD) — An area of a city that contains the greatest concentration of commercial activity, the "Downtown". The traditional downtown retail, trade, and commercial area of a city or an area of very high land valuation, traffic flow, and concentration of retail business offices, theaters, hotels and services.

Commuter Rail — Local and regional passenger train service between a central city, its suburbs and/or another central city, operating primarily during commutes hours. Designed to transport passengers from their residences to their job sites. Differs from rail rapid transit in that the passenger cars generally are heavier, the average trip lengths are usually longer, and the operations are carried out over tracks that are part of the railroad system.

Corridor — A broad geographical band that follows a general directional flow or connects major sources of trips. It may contain a number of streets and highways and many transit lines and routes.

Crosstown Route — Non-radial bus service that normally does not enter the Central Business District (CBD).

Crush Load — The maximum passenger capacity of a vehicle, in which there is little or no space between passengers (i.e., the passengers are touching one another) and one more passenger cannot enter without causing serious discomfort to the others.

D

Deadhead — There are two types of deadhead or non-revenue bus travel time:

(1) Bus travel to or from the garage and a terminus point where revenue service begins or ends;

(2) A bus' travel between the end of service on one route to the beginning of another.

Synonyms: Non-Revenue Time

Deboard — To get on or into a transit vehicle.

Disabled — With respect to an individual, a physical or mental impairment that substantially limits one or more of the major life activities of such an individual; a record of such an impairment; or being regarded as having such an impairment.

Discretionary — Subject to the discretion of legislators or an administrator. The federal Section 5309 New Starts Program is an example of a discretionary program.

E

Express Service — Express service is deployed in one of two general configurations:

(1) A service generally connecting residential areas and activity centers via a high speed, non-stop connection, e.g., a freeway, or exclusive right-of-way such as a dedicated busway with limited stops at each end for collection and distribution. Residential collection can be exclusively or partially undertaken using park-and-ride facilities.

(2) Service operated non-stop over a portion of an arterial in conjunction with other local services. The need for such service arises where passenger demand between points on a corridor is high enough to separate demand and support dedicated express trips.

Synonyms: Rapids (1 or 2), Commuter Express (1), Flyers (1)

Exclusive Right-of-Way — A right-of-way that is fully grade separated or access controlled and is used exclusively by transit.

Extra Board — Operators who have no assigned run but are used to cover runs deliberately left open by the scheduling department (extra runs), or runs that are open because of the absence of regularly assigned operators.

F

Fare — Payment in the form of coins, bills, tickets and tokens collected for transit rides.

Fare Box — A device that accepts the coins, bills, tickets and tokens given by passengers as payment for rides.

Farebox Recovery Ratio — A measure of the proportion of transit operating expenses covered by passenger fares. It is calculated by dividing a transit operator's fare box revenue by its total operating expenses.

Synonyms: Fare Recovery Ratio

Farebox Revenue — The value of cash, tickets and pass receipts given by passengers as payment for public transit rides.

Fare Box Revenue — Total revenue derived from the payment of passenger fares.

Synonyms: Passenger Revenue

Fare Collection System — The method by which fares are collected and accounted for in a public transportation system.

Fare Elasticity — The extent to which ridership responds to fare increases or decreases.

Fare Structure — The system set up to determine how much is to be paid by various passengers using the system at any given time.

Federal Transit Administration (FTA, formerly UMTA, Urban Mass Transit Administration) — A part of the U.S. Department of Transportation (DOT) which administers the federal program of financial assistance to public transit.

Feeder Service — Service that picks up and delivers passengers to a regional mode at a rail station, express bus stop, transit center, terminal, Park-and-Ride, or other transfer facility.

Fixed Cost — An indirect cost that remains relatively constant irrespective of the level of operational activity.

Fixed-Guideway System — A system of vehicles that can operate only on its own guideway constructed for that purpose (e.g., rapid rail, light rail). Federal usage in funding legislation also includes exclusive right-of-way bus operations, trolley buses, and ferryboats as "fixed-guideway" transit.

Fixed Route — Transit service provided on a repetitive, fixed-schedule basis along a specific route, with vehicles stopping to pick up passengers at and deliver passengers to specific locations.

Frequency — The amount of time scheduled between consecutive buses or trains on a given route segment; in other words, how often the bus or train comes (also known as Headway).

Full Funding Grant Agreement (FFGA) — An agreement executed by the federal government with a public transit operator that assures the operator of the federal government's intention to fully fund the federal share of a New Starts project.

FY (Fiscal Year) — A yearly accounting period designated by the calendar year in which it ends (e.g. FY 2000). The fiscal year for the federal government runs from October 1 to September 30.

G

Garage — The place where revenue vehicles are stored and maintained and from where they are dispatched and recovered for the delivery of scheduled service.

Synonyms: Barn, Base, Depot, District, Division, O/M Facility (ops/maint), Yard

Grade Separated — A crossing of two forms of transportation paths (e.g., light rail tracks and a highway) at different levels to permit unconstrained operation.

H

Headway — The scheduled time interval between any two revenue vehicles operating in the same direction on a route. Headways may be LOAD driven, that is, developed on the basis of demand and loading standards or, POLICY based, i.e., dictated by policy decisions such as service every 30 minutes during the peak periods and every 60 minutes during the base period.

Synonyms: Frequency, Schedule, Vehicle Spacing

Heavy Rail — An electric railway with capacity for a "heavy volume" of traffic, and characterized by exclusive rights-of-way, high speed and rapid acceleration. Heavy rail is different from commuter rail and light rail.

Synonyms: Subway, elevated railway, rapid transit

High Occupancy Vehicle (HOV) — Vehicles that can carry more than two persons. Examples of high occupancy vehicles are a bus, vanpool and carpool.

HOV — See High Occupancy Vehicle.

HOV Lane — A traffic lane in a street or highway reserved for high occupancy vehicles, which may include two person vehicles in some applications.

I

Incident — Traffic or passenger accident that include collisions with other vehicles, pedestrians or fixed object, and passenger accidents while boarding, on-board, or disembarking the transit vehicle.

Indian Nation Council of Governments (INCOG) — A voluntary association of local and tribal governments in the Tulsa metropolitan area in northeast Oklahoma. Established in 1967, INCOG is one of 11 Councils of Governments in the State of Oklahoma, and one of several hundred regional planning organizations across the country. INCOG provides planning and coordination services to assist in creating solutions to local and regional challenges in such areas as land use, transportation, community and economic development, environmental quality, public safety, and services for older adults.

Intercity Rail — A long distance passenger rail transportation system between at least two central cities that traditionally has been provided by AMTRAK.

Interlining — Interlining is used in two ways: Interlining allows the use of the same revenue vehicle and/or operator on more than one route without going back to the garage. Interlining is often considered as a means to minimize vehicle requirements as well as a method to provide transfer enhancement for passengers. For interlining to be feasible, two (or more) routes must share a common terminus or be reasonably proximate to each other (see DEADHEAD).

Synonyms: Through Routes, Interlock Routes, Interlocking

Intermodal — Switching from one form of transportation to another.

Intermodal Facility — A building or site specifically designed to accommodate the meeting of two or more transit modes of travel.

J

Joint Development — Development of land or airspace by a public or private entity at publically owned property where there are excess property rights and the proposed development will not interfere with the existing or planned transit use of the property.

K

Kiss and Ride — A place where commuters are driven and left at a station to board a public transportation vehicle.

L

Layover — Layover time serves two major functions: recovery time for the schedule to ensure on-time departure for the next trip and, in some systems, operator rest or break time between trips. Layover time is often determined by labor agreement, requiring "off-duty" time after a certain amount of driving time.

Synonyms: Recovery

Light Rail Transit (LRT) — An electric railway with a "light volume" traffic capacity compared with heavy rail.

Synonyms: Streetcar, trolley car and tramway

Light Rail Vehicle (LRV) — Modern-day term for a streetcar type of transit vehicle, e.g., tram or trolley car.

Limited Service — Higher speed train or bus service where designated vehicles stop only at transfer points or major activity centers, usually about every 1/2 mile. Limited stop service is usually provided on major trunk lines operating during a certain part of the day or in a specified area in addition to local service that makes all stops. As opposed to express service, there is not usually a significant stretch of non-stop operation.

Linked Passenger Trips — A linked passenger trip is a trip from origin to destination on the transit system. Even if a passenger must make several transfers during a one way journey, the trip is counted as one linked trip on the system. Unlinked passenger trips count each boarding as a separate trip regardless of transfers.

Load Factor — The ratio of passengers actually carried versus the total passenger seating capacity of a vehicle. A load factor of greater than 1.0 indicates that there are standees on that vehicle.

Local Service — A type of operation that involves frequent stops and consequent low speeds, the purpose of which is to deliver and pick up transit passengers as close to their destinations or origins as possible.

M

Maximum Load Point — The location(s) along a route where the vehicle passenger load is the greatest. The maximum load point(s) generally differ by direction and may also be unique to each of the daily operating periods. Long or complex routes may have multiple maximum load points.

Minibus — A rubber-tired road vehicle designed to carry a small number of passengers (i.e., 12 or less), commonly operated on streets and highways for public transportation service.

Missed Trip — A schedule trip that did not operate for a variety of reasons including operator absence, vehicle failure, dispatch error, traffic, accident or other unforeseen reason.

Mode — A particular form of travel (e.g., bus commuter tail, train, bicycle, walking or automobile.

Mode Split — The proportion of people that use each of the various modes of transportation. Also describes the process of allocating the proportion of people using modes. Frequently used to describe the percentage of people using private automobiles as opposed to the percentage using public transportation.

Model — An analytical tool (often mathematical) used by transportation planners to assist in making forecasts of land use, economic activity, and travel activity.

Monthly Pass — A prepaid farecard or ticket, valid for unlimited riding within certain designated zones for one-month period.

Multidestinational Network — A bus route network that is designed to make it easy to travel by transit between any two points in the service area.

Multimodal — A form of travel which includes the transportation of goods or people that is performed with at least two different means of transport.

N

Network — The configuration of streets or transit routes and stops that constitutes the total system.

New Starts — Federal funding granted under Section 5309 (B) of the United States Code. These discretionary funds are made available for the construction of new fixed guideway systems or extensions of existing fixed guideway systems.

O

Off-Peak — Non-rush periods of the day when travel activity is generally lower and less transit service is scheduled.

Operating — Maintaining the ongoing functions of an agency or service. “Operating expenses” include wages, benefits, supplies, and services. “Operating assistance” is used to pay for the costs of providing public transit service.

Operating Cost — The total costs to operate and maintain a transit system including labor, fuel, maintenance, wages and salaries, employee benefits, taxes, etc.

Operating Expense — Monies paid in salaries and wages; settlement of claims, maintenance of equipment and buildings, and rentals of equipment and facilities.

Operating Ratio — A measure of transit system expense recovery obtained by dividing total operating revenues by total operating expenses.

Operating Revenue — Revenue derived from passenger fares. See also Farebox Revenue.

Operating Speed — The rate of speed at which a vehicle in safely operated under prevailing traffic and environmental conditions.

Operator — An employee of a transit system who spends his or her working day in the operation of a vehicle, e.g., bus driver, streetcar motorman, trolley coach operator, cablecar gripman, rapid transit train motorman, conductor, etc.

Origin — The location of the beginning of a trip or the zone in which a trip begins. Also known as a "Trip End".

Origin-Destination Study — A study of the origins and destinations of trips made by vehicles or passengers.

Owl — Service that operates during the late night/early morning hours or all night service, usually between 10:00 p.m. and 6:00 a.m.

Synonyms: Hawk

P

Paratransit — Transportation service required by ADA for individuals with disabilities who are unable to use fixed-route transit systems. The service must be comparable to the fixed-route service.

Park and Ride — A parking area for automobile drivers who then board vehicles, shuttles or carpools from these locations.

Pass — A means of transit prepayment, usually a card that carries some identification that is displayed to the driver or conductor in place of paying a cash fare.

Passenger — A person who rides a transportation vehicle, excluding the driver.

Passenger Check — A check (count) made of passengers arriving at, boarding and alighting, leaving from, or passing through one or more points on a route. Checks are conducted by riding (ridecheck) or at specific locations (point check). Passenger checks are conducted in order to obtain information on passenger riding that will assist in determining both appropriate directional headways on a route and the effectiveness of the route alignment. They are also undertaken to meet FTA Section 15 reporting requirements and to calibrate revenue-based ridership models.

Synonyms: Tally

Passenger Miles — A measure of service utilization which represents the cumulative sum of the distances ridden by each passenger. It is normally calculated by summation of the passenger load times the distance between individual bus stops. For example, ten passengers riding in a transit vehicle for two miles equals 20 passenger miles.

Passenger Revenue — Fares paid by passenger traveling aboard transit vehicles.

Synonyms: Farebox Revenue

Peak Hour/Peak Period — The period with the highest ridership during the entire service day, generally referring to either the peak hour or peak several hours (peak period).

Synonyms: Commission Hour

Pick — The selection process by which operators are allowed to select new work assignments, i.e., run or the Extra Board in the next (forthcoming) schedule.

Synonyms: Bid, Mark-up, Line-up, Shake-up, Sign-up

Program — (1) verb, to assign funds to a project; (2) noun, a system of funding for implementing transportation projects or policies.

Pull-In Time — The non-revenue time assigned for the movement of a revenue vehicle from its last scheduled terminus or stop to the garage.

Synonyms: Turn-In Time, Deadhead Time, Run-off Time

Pull-Out Time — The non-revenue time assigned for the movement of a revenue vehicle from the garage to its first scheduled terminus or stop.

Synonyms: Deadhead Time, Run-on Time

R

Radial Service — Local or express service designed primarily to connect the Central Business District with outlying areas.

Revenue — Receipts derived from or for the operation of transit service including farebox revenue, revenue from other commercial sources, and operating assistance from governments. Farebox revenue includes all fare, transfer charges, and zone charges paid by transit passengers.

Recovery Time — Recovery time is distinct from layover, although they are usually combined together. Recovery time is a planned time allowance between the arrival time of a just completed trip and the departure time of the next trip in order to allow the route to return to schedule if traffic, loading, or other conditions have made the trip arrive late. Recovery time is considered as reserve running time and typically, the operator will remain on duty during the recovery period.

Synonyms: Layover Time

Revenue Vehicle Hour — The measure of scheduled hours of service available to passengers for transport on the routes, equivalent to one transit vehicle traveling in one hour in revenue service, excluding deadhead hours but including recovery/ layover time. Calculated for each route.

Revenue Service — When a revenue vehicle is in operation over a route and is available to the public for transport.

Revenue Miles — Miles operated by vehicles available for passenger service.

Revenue Passenger — A passenger from whom a fare is collected.

Reverse Commute — Movement in a direction opposite to the main flow of travel, such as from the Central City to a suburb during the morning commute hour.

Ridesharing — A form of transportation, other than public transit, in which more than one person shares in the use of the vehicle, such as a van or car, to make a trip.

Ridership — The number of rides taken by people using a public transportation system in a given time period.

Right-of-Way (ROW, R/W) — The land over which a public road or rail line is built. An exclusive right-of-way is a road, lane, or other right-of-way designated exclusively for a specific purpose or for a particular group of users, such as light rail vehicles or buses.

Road Call — A mechanical failure of a bus in revenue service that causes a delay to service, and which necessitates removing the bus from service until repairs are made.

Road Supervisor — The individual who is responsible for keeping buses or trains on schedule.

Rolling Stock — The vehicles used in a transit system, including buses and rail cars.

Synonyms: Fleet

Route — A specified path taken by a transit vehicle usually designated by a number or a name, along which passengers are picked up or discharged.

Synonyms: Line

Route Miles — The total number of miles included in a fixed route transit system network.

Running Time — The time assigned for the movement of a revenue vehicle over a route, usually done on a [route] segment basis by various time of day.

Synonyms: Travel Time

S

Schedule — From the transit agency (not the public timetable), a document that, at a minimum, shows the time of each revenue trip through the designated time points. Many properties include additional information such as route descriptions, deadhead times and amounts, interline information, run numbers, block numbers, etc.

Synonyms: Headway, Master Schedule, Timetable, Operating Schedule, Recap/ Supervisor's Guide

Scheduling — The planning of vehicle arrivals and departures and the operators for these vehicles to meet consumer demand along specified routes.

Service Area — A geographic area which is provided with transit services. Service area is now defined consistent with ADA requirements.

Service Span — The span of hours over which service is operated, e.g., 6 a.m. to 10 p.m. or 24 hr (owl). Service span often varies by weekday, Saturday, or Sunday.

Synonyms: Span of Service, Service Day

Service Standards — A benchmark by which service operations performance is evaluated.

Subsidy — Funds granted by federal, state or local government.

T

Time Point — A designated location and time that a bus or light rail vehicle can arrive before – but not leave earlier than – the stated time as indicated in the route schedule.

Timed Transfer — A point or location where two or more routes come together at the same time to provide positive transfer connections. A short layover may be provided at the timed transfer point to enhance the connection. Timed transfers have had increasing application as service frequencies have been reduced below 15 to 20 minutes and hub-and-spoke network deployment has grown.

Synonyms: Pulse Transfer, Positive Transfer

Transfer — A slip of paper issued to a passenger that gives him or her the right to change from one transit vehicle to another according to specified limitations.

Transit Center — A fixed location where passengers transfer from one route to another.

Transit Corridor — A broad geographic band that follows a general route alignment such as a roadway of rail right-of-way and includes a service area within that band that would be accessible to the transit system.

Transfer Passenger — A passenger who transfers to a line after paying a fare on another line.

Transit Dependent — Someone who must use public transportation for his/her travel.

Transit Priority — A means by which transit vehicles are given an advantage over other traffic, e.g., preemption of traffic signals or transit priority lanes.

Transit Priority Lane — See Bus Lane

Transportation Equity Act for the 21st Century (TEA-21) — The 1998 law that reauthorizes federal surface transportation programs for six years (FY 1998 to FY 2003). TEA-21 preserves much of the basic programmatic structure of its predecessor, the Intermodal Surface Transportation Efficiency Act (ISTEA).

Travel Time — The time allows for an operator to travel between the garage and a remote relief point.

Synonyms: Relief Time, Travel Allowance

Trip — The one-way operation of a revenue vehicle between two terminal points on a route. Trips are generally noted as inbound, outbound, eastbound, westbound, etc. to identify directionality when being discussed or printed.

Synonyms: Journey, One-Way Trip

Total Miles — The total miles includes revenue, deadhead, and yard (maintenance and servicing) miles.

Tulsa Transit — A public trust of the City of Tulsa, established in 1968. Tulsa Transit's General Manager reports to a 7-member board of trustees appointed by the mayor. Tulsa Transit has approximately 170 employees including bus drivers, mechanics and administrative staff.

U

Unlinked Passenger Trips — The total number of passengers who board public transit vehicles. A passenger is counted each time he/she boards a revenue vehicle even though the boarding may be the result of a transfer from another route to complete the same one-way journey. Where linked or unlinked is not designated, unlinked is assumed.

Synonyms: Passengers, Passenger Trips

Unlinked Trip — A trip taken by an individual on one specific mode. A linked trip may involve two or more unlinked trips.

Urban Mass Transportation Administration — See Federal Transit Administration

V

Van — See Minibus.

Variable Cost — A cost that varies in relation to the level of operational activity.

Vehicle Miles — The number of miles traveled by a vehicle, and are usually calculated by mode.

W

Wheelchair Lift — A device used to raise and lower a platform in a transit vehicle for accessibility by handicapped individuals.

Y

Yard — An area in a system used for maintenance, storing or holding trains.