planitulsa

transportation

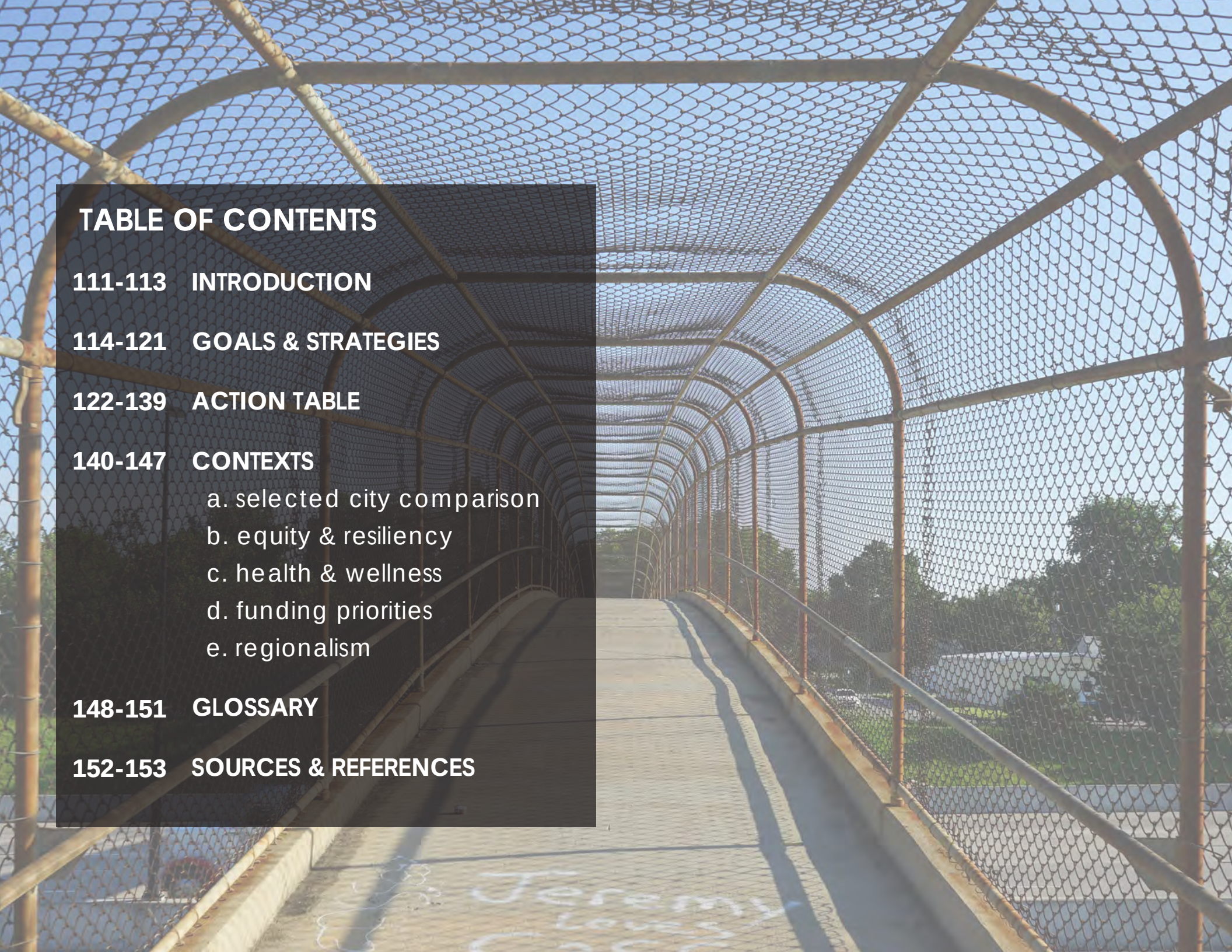


TABLE OF CONTENTS

chapter 3 transportation

INTRODUCTION

Cities across the United States have made significant progress in diversifying the transportation options available to residents. In recent years, many have begun to recognize the deficiencies in our transportation systems as well as the negative externalities associated with high levels of automobile use. Things such as poor air quality, lack of physical activity, automobile congestion, and high rates of collision fatalities are all by-products of an overly auto-dependent urban environment.

The City of Tulsa has recognized these issues, as well as the inequality this system presents for those who do not have access to a motor vehicle. In response to these concerns, several transportation plans have been developed and adopted over the past 10 years.

Tulsa's This Machine bike share program is one of many options residents have for getting around town.

Public Transit

In 2013 the Fast Forward Transit Plan was adopted as an update of the public transit system managed by the Metropolitan Tulsa Transit Authority (MTTA or Tulsa Transit). This plan laid the groundwork for initiatives to improve transit system efficiency through modifications to transit routes and investment in enhanced public transit services such as bus rapid transit (BRT). In 2018, Tulsa Transit completed the Comprehensive System Analysis (CSA) that changed most alignments of existing transit routes. This was done to alter the "hub and spoke" layout that required most transit trips to include a transfer at the Denver Avenue transit center. The updated transit system now has five "sub-hubs" where transfers can occur outside of the downtown area. These changes, along with the completion of Tulsa's first bus rapid transit project, the Aero route on Peoria Ave., have transformed public transit in our community. New bus stop shelters have been deployed across the city, and more will be built through the upcoming years. These changes make transit a more viable option for many more Tulsa residents, and make the experience of using transit more safe, enjoyable, and dignified.

Pedestrian Infrastructure

With the adoption of the GO Plan in 2015, Tulsa has a blueprint for the future of active transportation investment. For pedestrians, the plan focuses on filling in gaps in the sidewalk network, particularly along major arterial streets. To date, funding for sidewalk improvements has been primarily limited to an accessory to street enhancement projects, or small projects responding to resident complaints. In order to realize the vision of the GO Plan and to ensure the sidewalk network is fully built, dedicated funding for pedestrian improvements should be allocated.

Bicycle Infrastructure

The 2015 GO Plan also identified which streets in Tulsa are suitable for on-street bicycle infrastructure and which facility type is most appropriate based on site characteristics.

In contrast to the limited improvements for pedestrian facilities in Tulsa, bicycle infrastructure is of the highest quality in all of Oklahoma. Through strong planning, persistent advocacy, and cooperative relationships between engineers, planners, and the Tulsa Bicycle and Pedestrian Advisory Committee (BPAC), more bike lanes have been funded and completed in Tulsa than any other community in the state. These projects have created the first components of a full network of safe bicycle facilities.

However, while there have been substantial successes in the implementation of bicycle infrastructure in Tulsa, there have been instances where newly-installed infrastructure was removed after public outcry. These removals signal that the process by which bicycle infrastructure is planned and implemented in Tulsa still has room for improvement. More direct communication with residents and users of the proposed facility is needed, and alternative routes should be evaluated to determine what is the best use of available funding. Additionally, the City's use of the Multi-Modal Level of Service (MMLOS) analysis can help to ensure the correct project is selected for the correct place with regard to the design of the bicycle infrastructure.

Automobile Infrastructure

For decades, Tulsa's streets fell further and further into disrepair. Maintenance funding rarely materialized as other priorities, were funded. This changed in recent years as the bulk of capital improvement package funding (such as Improve Our Tulsa and Fix Our Streets) went toward the repair and rehabilitation of existing roads, as well as widening roads where traffic congestion warranted increased capacity. These efforts are data-driven, using Pavement Condition Index (PCI) and traffic data to prioritize improvements in the areas where there both high usage and maintenance needs.

The Route 66 highway alignment in Tulsa is an example of historic infrastructure being adapted with new accommodation for non-automobile trips with major investments in bicycle and public transit facilities.

The Major Street and Highway Plan for Tulsa identifies all of the streets that are eligible for federal funding and organizes them into a "functional classification" system. These classifications inform future enhancement projects with regard to the required right-of-way needed and to what degree transportation modes other than automobiles need to be accommodated. The guidance from the Major Street and Highway Plan is intended to accommodate economic growth and the corresponding traffic that is generated.

Transit-Oriented Development

In order for development that surrounds transit facilities to change in ways that make it "transit-oriented", it is essential that the land use planning for these areas reflect this desired outcome. In 2018, in preparation for the implementation of the Peoria Aero BRT, a Land Use Framework was prepared that identified properties along the BRT alignment that were suitable for rezoning to "Mixed Use" zoning classifications. Those properties that were identified were incentivized by a fee waiver by City Council for a potential rezoning application. This approach has been replicated along the upcoming Route 66 BRT alignment, and new guidance for the type of development that is desirable in these areas is reflected in the Transit-Oriented Development section of the planitulsa Development Review Guide.

In addition to fee waivers for rezoning applicants, other incentive opportunities will be available to property owners along the BRT

route. These incentives will assist with the funding of building revitalization and streetscape improvements to make the corridor more suitable for bus rapid transit service.

Transportation Innovation

Across the world new transportation innovations are emerging both in terms of new vehicles as well as new transportation systems. The City of Tulsa has commissioned a Mobility Innovation Strategy to identify policy and regulatory approaches to best position Tulsa to be at the forefront of this wave of innovation. This includes ensuring that both private and public initiatives lead to more equitable outcomes with regard to mobility. Electric vehicles, autonomous vehicles, micromobility options, and improved systems technology will become more commonplace in the future, and it is important that the City of Tulsa is ready to accommodate these changes in ways that improve the quality of life for all residents.

KEY IDEAS

Subject Matter Experts

The Tulsa Planning Office team coordinated with the professionals that were involved in the development of the numerous transportation plans that were completed in the past decade. These plans serve as the foundation for this comprehensive plan chapter and are enhanced by engagement with the broader community of Tulsa residents. These plans and policy guides include:

- Mobility Innovation Strategy (2022)
- Tulsa Regional Coordinated Public Transit-Human Services Transportation Plan (2020)
- Connecting Progress – Transit Plan (2018)
- Connected 2045 – Regional Transportation Plan (2017)
- GO Plan - Bicycle and Pedestrian Master Plan (2015)
- Complete Streets Procedural Manual (2013)
- ADA Transition Plan (2012)
- Fast Forward Regional Transit Plan (2011)
- Major Street & Highway Plan (1968 - revised 2018)

Community Members

Through numerous public engagement efforts, residents of Tulsa provided a great deal of input, which helped to build off of the recommendations of the eight adopted plans listed above. Key ideas heard through community engagement include:

- Transit commute times and wait times should be reasonable.
- Management of infrastructure projects and private utilities should be improved to lessen adverse impacts on traffic congestion.
- Employment and education access should be prioritized in transportation planning.
- Drivers should be educated about bike lanes and other bike infrastructure.
- Public engagement should be increased when bicycle infrastructure projects are being planned and implemented.
- Public transit should have a regional approach to connect Tulsa with surrounding suburbs.
- All pedestrian infrastructure and bus stops should be ADA accessible.
- Traffic calming is needed in certain neighborhoods and areas of the city.
- Business access is a concern when bicycle lanes are added to a commercial corridor.
- The timing of signals in the city should minimize wait times at intersections.`

[THIS PAGE INTENTIONALLY LEFT BLANK]

Goal 1

Tulsa's transportation networks and services are safe and accessible for everyone.

Transportation-related injuries and fatalities can be an avoidable phenomenon with research of root causes, design, adequate alternatives, enforcement, and consistent educational messaging. All efforts should be taken to ensure that residents have a safe experience when getting around in Tulsa.

Strategy 1.1
Work to incorporate the unique needs and safety considerations of Tulsa's most vulnerable users across the transportation system.

Strategy 1.2
Prioritize transit improvements in geographic areas with existing ridership and areas with the vulnerable populations.

Strategy 1.3
Address affordability for transit riders by exploring funding opportunities and implementing pricing programs.

Strategy 1.4
Create and promote inclusive and accessible education outreach programs that encourage safe multi-modal transportation.

Strategy 1.5
Continue to ensure that transportation facilities comply with the Americans with Disabilities Act and the latest design guidelines.

Strategy 1.6
Identify research-based improvements to significantly address the root causes of traffic-related fatalities and injuries.

Strategy 1.7
Promote a pedestrian-friendly and bicycle-friendly culture through infrastructure, community and neighborhood development, and employment benefits.

Goal 2

Tulsa has a wide range of reliable transportation options that are properly planned, funded, and coordinated.

Every Tulsan should have a reliable way to get to the places they need to go, whether that is for work, education, shopping, medical visits, or any other opportunity afforded by any mode of the transportation system. More effective transportation choices will lead to greater efficiency of the whole transportation system.

Strategy 2.1

Implement the recommendations of transportation plans and policy guides including, but not limited to:

- Mobility Innovation Strategy (2022)
- Tulsa Regional Coordinated Public Transit-Human Services Transportation Plan (2020)
- Connecting Progress (2018) - Transit Plan
- Connected 2045 Regional Transportation Plan (2017)
- GO Plan (2015) - Bicycle and Pedestrian Plan
- Complete Streets Procedural Manual (2013)
- ADA Transition Plan (2012)
- Fast Forward Regional Transit System Plan (2011)
- Major Street and Highway Plan (1968 - revised 2018)

Strategy 2.2

Continue to ensure a high degree of coordination between all entities associated with transportation and infrastructure projects prior to the establishment of a project budget.

Strategy 2.3

Ensure adequate funding for the implementation of transportation plan recommendations.

Goal 3

Existing transportation infrastructure is well maintained through strategic investments.

Tulsa's significant transportation networks require a great deal of ongoing maintenance in order to facilitate safe, accessible, and efficient travel. When funding becomes available it is critical that it is spent repairing and enhancing infrastructure that benefits the most residents and those residents experiencing transportation insecurity. Quantitative and qualitative analysis can inform what locations are priorities for investment and increases the transparency and accountability of fiscal management.

Strategy 3.1

Optimize maintenance and repair of existing infrastructure to adequately meet the needs of the current and projected population.

Strategy 3.2

Use monitoring and data collection to maintain and optimize current transportation systems.

Strategy 3.3

Use data-driven approaches to optimize maintenance investments where needed, and explore alternative funding options.

Goal 4

New transportation infrastructure increases efficiency and equity, and is well-integrated into existing networks.

As new infrastructure is needed and funded, it is imperative that it is implemented in ways that enhance the overall transportation system. Connecting to existing networks ensures that new infrastructure benefits everyone that has access to the network. This applies to transportation infrastructure constructed publicly and infrastructure funded privately as a part of new subdivisions or other development activity.

Strategy 4.1
Ensure that the City's transportation systems are integrated, efficiently planned, and coordinated with relevant stakeholders.

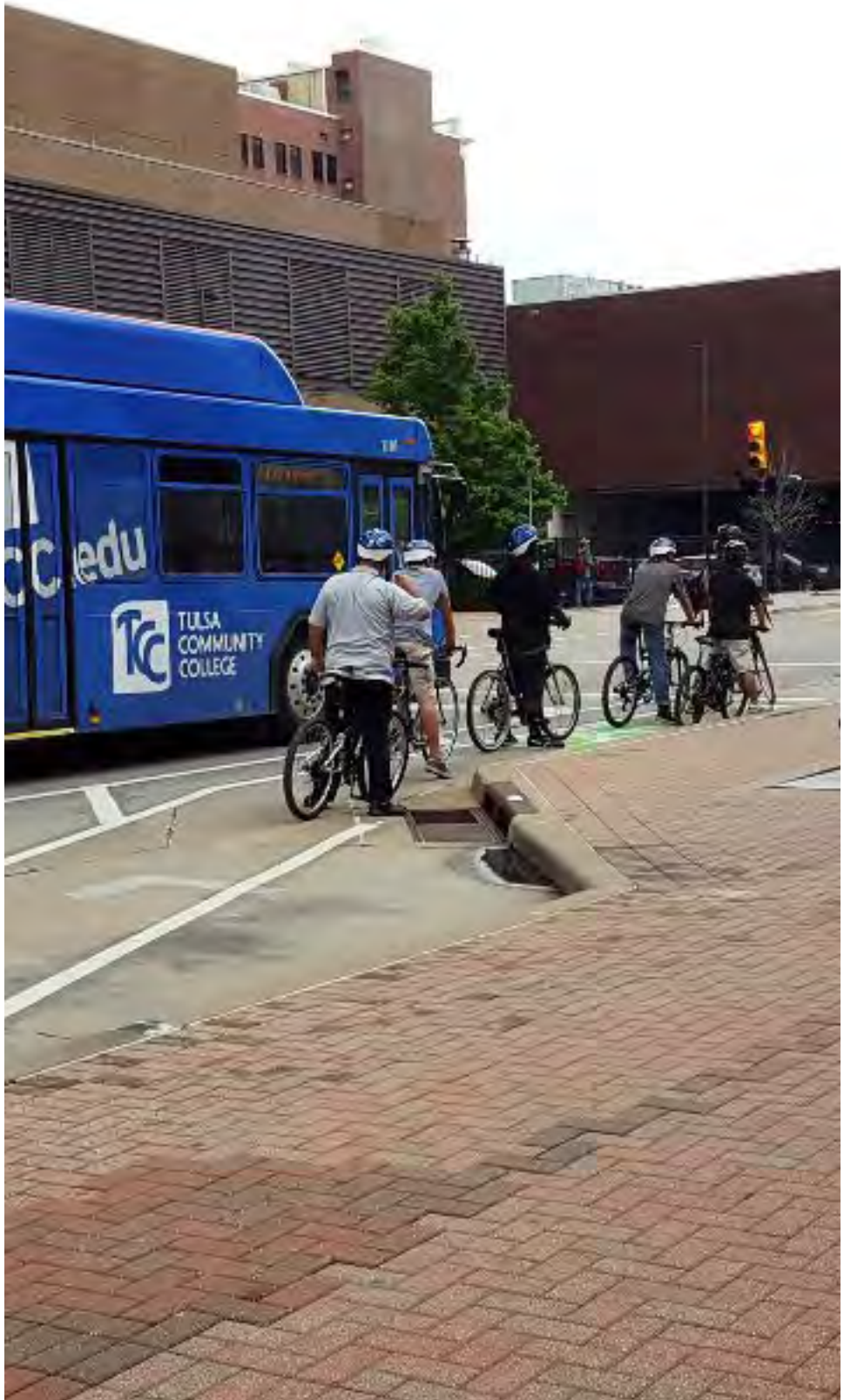
Strategy 4.2
Continue to update existing transportation plans periodically to align policies and project implementation.

Strategy 4.3
Prioritize the implementation of an accessible well-connected bicycle and pedestrian system throughout the city.

Strategy 4.4
Develop a high-quality, multi-modal intercity freight system, while fostering partnerships and coordination with the appropriate authorities.

Strategy 4.5
Promote street system patterns that improve connectivity, expand alternative modes of transportation, and reduce traffic demand on arterial streets.

Strategy 4.6
Evaluate the incorporation of traffic calming treatments into transportation projects and the design of new subdivisions.



Goal 5

Transportation investments support the land uses they serve and increase access to places that Tulsans need to visit.

Land use decisions drive the need for transportation infrastructure. Property owners expect accessibility from the street network, public transit service, and adequate parking for their employees and customers. These and other transportation options should be designed in ways that conveniently facilitate access to destinations. Conversely, where significant transportation investments have occurred or will occur, such as the bus rapid transit (BRT) routes on Peoria Ave. and 11th St., land use planning should be responsive and maximize access to and from the existing service route.

Strategy 5.1
Establish Transit-Oriented Development (TOD) areas where high levels of transit service exist or are planned.

Strategy 5.2
Ensure land use decisions are consistent with the transportation infrastructure context.

Strategy 5.3
Establish standards for streetscaping projects that enhance safety, aesthetics, and promote placemaking.

Strategy 5.4
Ensure that parking enhances the use of a site or corridor while considering the needs of people using other forms of transportation.

Strategy 5.5
Ensure a high degree of connectivity in new development, and seek to restore connectivity when possible throughout the city.

Goal 6

Transportation solutions in Tulsa promote environmental sustainability.

In recent decades new forms of more sustainable transportation have begun to change the way people get around. Enhanced walkability, bikeability, and innovations like electric vehicles have positive impacts on individual and public health through more active lifestyles and reductions in harmful pollution. Support from the City for changes like these will improve quality of life for Tulsa residents, and more benefit will be gained by prioritizing improvements for those who are presently most negatively affected by polluting transportation systems.

Strategy 6.1

Improve air quality by supporting related programs and investing in the expansion of alternative modes of transportation.

Strategy 6.2

Encourage Transportation Demand Management programs to maximize use of alternative modes of transportation and to increase multi-occupancy vehicle trips.

Strategy 6.3

Consider environmental justice issues when developing and implementing transportation plans.

Goal 7

The best new forms of mobility are embraced and integrated into existing transportation systems.

New technologies are developed to enhance mobility every year. Cities that are prepared and dynamic with the integration of new technologies will be best-suited for enhancing residents' quality of life by reducing the time, cost, and stress of transportation. Tulsa should be prepared for emerging technologies like autonomous vehicles and electric vehicles, as well as micro-mobility options in addition to electric scooters.

Strategy 7.1
Increase City staff knowledge of transportation best practices, and provide and encourage training about transportation innovations.

Strategy 7.2
Proactively work with private transportation companies to bring innovations to Tulsa.

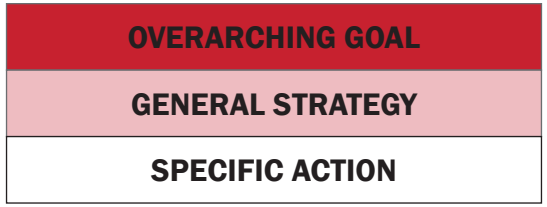
Strategy 7.3
Improve transit services by incorporating technological innovations.

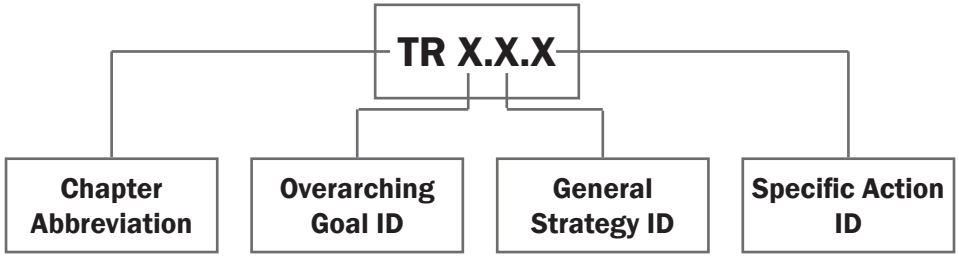
Strategy 7.4
Encourage the use of electric vehicles and other clean fuel technologies.

Strategy 7.5
Seek new revenue approaches that better match the actual maintenance and operational costs of the transportation system.

ACTION TABLE

This table includes the goals and strategies outlined in the previous pages with specific actions that will help to achieve the intent of the goals and strategies. Each specific action includes what type of action it is and what parties should be involved in order to implement the action. All of these goals, strategies, and actions are derived from engagement with the Tulsa community and subject matter experts, past planning efforts conducted by the City of Tulsa and partner agencies, best practices from cities across the United States, and research and data analysis conducted by Tulsa Planning Office staff. Any action taken to implement a specific strategy or action included in this table or a policy recommended elsewhere in this chapter will be in accord with Oklahoma law.





ID	Action Required	Action Type	Involved Parties
TR 1	**Tulsa's transportation networks and services are safe and accessible for everyone.**		
TR 1.1	Work to incorporate the unique needs and safety considerations of Tulsa's most vulnerable users across the transportation system.	Strategy	Multiple
TR 1.1.1	Incorporate vulnerable populations into transportation planning and implementation.	Policy	Tulsa Planning Office Public Works Tulsa Transit INCOG Transportation
TR 1.1.2	Use local indices on equity and resiliency to evaluate the impact and effectiveness of policies and recommendations for transportation plan creation, implementation, and updates.	Policy	Tulsa Planning Office Office of Resilience & Equity
TR 1.2	Prioritize transit improvements in geographic areas with existing ridership and areas with the vulnerable populations.	Strategy	Multiple
TR 1.2.1	Expand transit service in areas with high concentrations of poverty and historically under-served and under-represented communities.	Capital	Tulsa Transit

ID	Action Required	Action Type	Involved Parties
TR 1.2.2	Identify the highest-use transit stops and implement comfortability improvements and weatherization where lacking.	Capital	Tulsa Transit Tulsa Planning Office
TR 1.2.3	Conduct and incorporate public engagement into transit planning for expansions and alterations.	Engagement	Tulsa Transit Tulsa Planning Office INCOG Transportation
TR 1.2.4	Conduct targeted feedback opportunities with immigrant, refugee, and Limited English Proficiency (LEP) populations to understand the potential for increased ridership and the need for unique service supports and improvements.	Engagement	Tulsa Transit INCOG Transportation Office of Resilience & Equity
TR 1.2.5	Invest in transportation and mobility options that target food access for vulnerable populations.	Policy	City of Tulsa
TR 1.3	Address affordability for transit riders by exploring funding opportunities and implementing pricing programs.	Strategy	Multiple
TR 1.3.1	Extend the tiered transit fare system to correspond to the unique financial needs of vulnerable populations including older adults, school-age children, low-income households, and people with disabilities.	Policy	Tulsa Transit
TR 1.3.2	Encourage employers to provide transit passes and explore employer-transit discount options and bulk rates.	Incentives	Tulsa Transit TAEO
TR 1.3.3	Evaluate the feasibility of a fare-free transit system.	Analysis	Tulsa Transit
TR 1.3.4	Expand fare payment technologies to enable more equitable fees to be implemented.	Technology	Tulsa Transit

ID	Action Required	Action Type	Involved Parties
TR 1.4	Create and promote inclusive and accessible education outreach programs that encourage safe multi-modal transportation.	Strategy	Multiple
TR 1.4.1	Work with local schools and non-profits to spread educational campaigns on safe transportation, including bicycle safety, scooter safety, pedestrian safety, and tips for safe transit use.	Engagement	Public Works Tulsa Transit INCOG Transportation Area School Districts
TR 1.4.2	Evaluate assigning matching funds to maximize the attainable amount of grant funding from state and federal transportation safety programs.	Capital	Public Works Finance
TR 1.4.3	Expand the Walk Bike Tulsa campaign into an information/education program to encourage the use of the active transportation system and promote safe riding.	Engagement	INCOG Transportation
TR 1.4.4	Utilize buses and bus stops as information kiosks to distribute educational materials related to transportation options and the ways to use transportation facilities.	Engagement	Tulsa Transit
TR 1.5	Continue to ensure that transportation facilities comply with the Americans with Disabilities Act and the latest design guidelines.	Strategy	Multiple
TR 1.5.1	Update the ADA Self Evaluation and Transition Plan and solicit inter-departmental collaboration as well as significant public and community involvement.	Planning	Public Works
TR 1.5.2	Complete the implementation of ADA-accessible transit stops as identified in the ADA Self Evaluation and Transition Plan.	Capital	Tulsa Transit Public Works
TR 1.5.3	Encourage vendors to have ADA training by identifying it as a desirable skill for awarding infrastructure contracts.	Policy	Public Works
TR 1.5.4	Explore opportunities to expand paratransit services to facilitate trips for disabled and older residents.	Capital	Tulsa Transit INCOG Transportation

ID	Action Required	Action Type	Involved Parties
TR 1.5.5	Support mobile grocery distribution services, particularly to serve older adults and Tulsans with mobility limitations.	Program	Office of Resilience & Equity INCOG Transportation
TR 1.5.6	Ensure that ADA compliance is applied in the development review process for transit facilities as well as other pedestrian facilities.	Policy	Development Services
TR 1.6	Identify research-based improvements to significantly address the root causes of traffic-related fatalities and injuries.	Strategy	Multiple
TR 1.6.1	Establish and monitor a local action plan to reduce traffic fatalities and enhance safety.	Policy	Public Works INCOG Transportation Tulsa Police Dept. Tulsa Fire Dept. EMSA
TR 1.6.2	Monitor and address the city's highest injury intersections and identify timely interventions including striping, flashing and signaled crossings, and road diets.	Analysis	Public Works Tulsa Police Dept. Tulsa Planning Office INCOG Transportation
TR 1.6.3	Evaluate where speeds should be reduced through signage and traffic calming measures.	Program	Public Works Tulsa Police Dept. Tulsa Planning Office
TR 1.6.4	Evaluate where Leading Pedestrian Intervals can be implemented to reduce the risk of collisions between pedestrians and automobiles.	Analysis	Public Works Tulsa Planning Office
TR 1.6.5	Evaluate the Safe System Approach recommended by the National Transportation Safety Board and adopted by the Federal Highway Administration.	Policy	Public Works
TR 1.6.6	Where conditions are suitable, evaluate the feasibility of roundabouts as an alternative to signalized intersections.	Policy	Public Works

ID	Action Required	Action Type	Involved Parties
TR 1.7	Promote a pedestrian-friendly and bicycle-friendly culture through infrastructure, community and neighborhood development, and employment benefits.	Strategy	Multiple
TR 1.7.1	Promote bicycle-oriented tourism events and destinations.	Engagement	Communications INCOG Transportation
TR 1.7.2	Work with the Tulsa Bicycle Pedestrian Advisory Committee (BPAC) to promote a bicycle-friendly culture in the Tulsa region.	Partnership	Public Works INCOG Transportation
TR 1.7.3	Update the City of Tulsa's Bicycle Friendly Community certification on a regular basis.	Policy	Tulsa Planning Office INCOG Transportation
TR 1.7.4	Pursue Walk Friendly Community status.	Policy	Tulsa Planning Office INCOG Transportation
TR 1.7.5	Promote the Bicycle Friendly Business certification through the League of American Cyclists to local businesses, and recognize those businesses for their efforts.	Policy	INCOG Transportation Tulsa Planning Office
TR 1.7.6	Apply to host national and statewide conferences and summits associated with bicycling, and foster the development of local events.	Engagement	Tulsa Planning Office INCOG Transportation
TR 1.7.7	Include building elements in the design of public facilities that make active transportation options more viable, including showers, lockers, and bicycle parking.	Policy	City of Tulsa
TR 1.7.8	Encourage ODOT to increase the percentage of Transportation Alternatives Program (TAP) funds on active transportation projects.	Advocacy	City of Tulsa

ID	Action Required	Action Type	Involved Parties
TR 2	**Tulsa has a wide range of reliable transportation options that are properly planned, funded, and coordinated.**		
TR 2.1	Implement the recommendations of transportation plans and policy guides including, but not limited to: • Mobility Innovation Strategy (2022) • Tulsa Regional Coordinated Public Transit-Human Services Transportation Plan (2020) • Connecting Progress (2018) - transit plan • Connected 2045 Regional Transportation Plan (2017) • GO Plan (2015) - bicycle and pedestrian plan • Complete Streets Procedural Manual (2013) • ADA Transition Plan (2012) • Fast Forward Regional Transit System Plan (2011) • Major Street and Highway Plan (1968 - revised 2018)	Strategy	City of Tulsa INCOG
TR 2.1.1	Continue to develop performance measure reports to evaluate progress implementing recommendations from existing transportation plans, and keep databases updated and open to the public.	Planning	Tulsa Planning Office Finance Public Works
TR 2.2	Continue to ensure a high degree of coordination between all entities associated with transportation projects prior to the establishment of a project budget.	Strategy	City of Tulsa FHWA ODOT INCOG Transportation Tulsa Transit Tribal Governments Counties, Towns
TR 2.2.1	Continue to work with partner agencies to maintain and/or expand the transportation system in ways that are plan-driven and fiscally sustainable.	Partnership	City of Tulsa FHWA ODOT INCOG Transportation Tulsa Transit Tribal Governments Counties, Towns

ID	Action Required	Action Type	Involved Parties
TR 2.3	Ensure adequate funding for the implementation of transportation plan recommendations.	Strategy	Multiple
TR 2.3.1	Include specific and dedicated funding for all modes of transportation in capital improvement plans and funding packages.	Policy	Public Works Mayor's Office Tulsa Planning Office
TR 2.3.2	Continue to seek and utilize federal and state transportation grant funds to supplement local implementation funds.	Capital	Public Works Tulsa Planning Office INCOG Transportation
TR 2.3.3	Establish a position focused on bicycle and pedestrian coordination to identify and pursue funding and be the primary point of contact for these initiatives.	Personnel	Public Works
TR 3	**Existing transportation infrastructure is well maintained through strategic investments.**		
TR 3.1	Optimize maintenance and repair of existing infrastructure to adequately meet the needs of the current and projected population.	Strategy	Multiple
TR 3.1.1	Continue to regularly analyze bridges to determine if they should be repaired or replaced.	Analysis	Public Works
TR 3.1.2	Incorporate the Tulsa Planning Office's Strategic Planning approach into the maintenance programs of all transportation modes.	Analysis	Tulsa Planning Office Public Works
TR 3.2	Use monitoring and data collection to maintain and optimize current transportation systems.	Strategy	Multiple
TR 3.2.1	Continue to use Pavement Condition Index (PCI) data and traffic data among the data used to prioritize street projects.	Analysis	Public Works INCOG Transportation
TR 3.2.2	Continue to include data related to the usage and condition of roadways, transit routes, bicycle and pedestrian infrastructure in level of service (LOS) analyses.	Policy	Public Works Tulsa Planning Office Tulsa Transit INCOG Transportation

ID	Action Required	Action Type	Involved Parties
TR 3.2.3	Monitor project implementation using data-driven approaches.	Policy	Tulsa Planning Office Public Works
TR 3.2.4	Utilize regional travel demand modeling that includes transit and land use considerations.	Program	Public Works INCOG Transportation
TR 3.2.5	In coordination with INCOG, calibrate the region-wide travel demand model with a periodic travel survey that provides detailed travel information for motorists, transit users, pedestrians, and cyclists.	Program	INCOG Transportation
TR 3.2.6	Set mode share goals and track progress toward meeting those goals.	Policy	Tulsa Planning Office INCOG Transportation
TR 3.2.7	Promote traffic studies for greenfield, subdivision, or other significant development projects.	Policy	Tulsa Planning Office Public Works Development Services TAEO
TR 3.3	Use data-driven approaches to optimize maintenance investments where needed, and explore alternative funding options.	Strategy	Multiple
TR 3.3.1	Continue to use a comprehensive strategic funding approach that explores local, private, state, and federal funding sources to implement transportation projects.	Policy	INCOG Transportation Tulsa Planning Office Public Works Tulsa Transit
TR 3.3.2	Explore alternative transportation funding sources, such as user fees, development impact fees, and public-private partnerships. Specific programs may include implementation of parking districts and demand-responsive parking pricing.	Policy	INCOG Transportation Tulsa Planning Office DTP Asset Management
TR 3.3.3	Develop and institute a process for identifying and repairing broken and uneven sidewalks in conjunction with the responsible adjacent landowner.	Program	Public Works Tulsa Planning Office Neighborhood Inspections

ID	Action Required	Action Type	Involved Parties
TR 4	**New transportation infrastructure increases efficiency and equity, and is well-integrated into existing networks.**		
TR 4.1	Ensure that the City's transportation systems are integrated, efficiently planned, and coordinated with relevant stakeholders.	Strategy	Multiple
TR 4.1.1	Continuously review and implement transportation plans, and prioritize projects from these plans using data-driven approaches.	Policy	Tulsa Planning Office Public Works
TR 4.1.2	Continue to review candidate projects for consistency with existing plans prior to approval and funding.	Policy	Tulsa Planning Office Finance Public Works INCOG Transportation
TR 4.1.3	Continue to coordinate planning and implementation of projects between staff from Tulsa Planning Office, Public Works, Tulsa Transit, and other pertinent departments and organizations.	Policy	Tulsa Planning Office Public Works Tulsa Transit
TR 4.1.4	Continue to encourage community involvement in the planning, design, construction, and maintenance of improvement projects.	Policy	Tulsa Planning Office Public Works Tulsa Transit
TR 4.1.5	Accommodate emergency services when planning for street system design.	Policy	Public Works Tulsa Planning Office Tulsa Fire Dept. Tulsa Police Dept. EMSA
TR 4.2	Continue to update existing transportation plans periodically to align policies and project implementation.	Strategy	Multiple
TR 4.2.1	Review and update the Major Street and Highway Plan to adjust planned right-of-way widths of major roadways considering their expected function for all modes of transportation.	Planning	Tulsa Planning Office INCOG Transportation Public Works
TR 4.2.2	Continue to evaluate the inclusion bicycle and pedestrian facilities identified in the GO Plan in street projects.	Policy	Tulsa Planning Office INCOG Transportation Public Works

ID	Action Required	Action Type	Involved Parties
TR 4.2.3	Ensure that street projects consider future transit facilities if they are identified in the Fast Forward Regional Transit Plan or Connecting Progress transit plan.	Policy	Tulsa Planning Office INCOG Transportation Tulsa Transit Public Works
TR 4.3	Prioritize the implementation of an accessible well-connected bicycle and pedestrian system throughout the city.	Strategy	Multiple
TR 4.3.1	Continue to incorporate the implementation of bicycle and pedestrian infrastructure in the Capital Improvement Program (CIP).	Capital	City Council Public Works Tulsa Planning Office
TR 4.3.2	Continue to connect destinations and encourage walking by adding ADA accessible-sidewalk connections and restoring damaged sidewalks.	Capital	Public Works
TR 4.3.3	Continue to require sidewalks as part of development approvals.	Policy	Tulsa Planning Office Development Services
TR 4.3.4	Conduct walkability audits as a part of community development and strategic planning.	Planning	Community Development Tulsa Planning Office Public Works
TR 4.3.5	Utilize best practices as identified by Federal Highway Administration for design standards for on-street bicycle infrastructure, with an emphasis on safe separation from automobiles.	Standards	Tulsa Planning Office INCOG Transportation Public Works
TR 4.3.6	Continue to expand the This Machine bike share system throughout Tulsa.	Program	This Machine INCOG Transportation
TR 4.3.7	Develop a unified wayfinding signage system for both on-street and multi-use trail bicycle facilities.	Program	River Parks Authority Tulsa Parks Public Works INCOG Transportation
TR 4.3.8	Enforce bicycle parking requirements for new development projects.	Policy	Tulsa Planning Office Development Services

ID	Action Required	Action Type	Involved Parties
TR 4.3.9	Work with volunteer organizations to conduct short-term experiments to improve transportation safety and comfort.	Policy	Public Works Community Development Tulsa Parks
TR 4.4	Develop a high-quality, multi-modal intercity freight system, while fostering partnerships and coordination with the appropriate authorities.	Strategy	Multiple
TR 4.4.1	Work with INCOG to coordinate the implementation of adequate freight infrastructure.	Partnership	TAEO Public Works INCOG Transportation
TR 4.4.2	Maintain coordinated freight and transportation planning efforts between INCOG, the City of Tulsa, and the Tulsa Ports.	Partnership	TAEO Public Works INCOG Transportation
TR 4.4.3	Support infrastructure improvements and the use of emerging technologies that facilitate truck, rail, and air transportation modes.	Policy	TAEO Tulsa Planning Office Public Works INCOG Transportation
TR 4.4.4	Prioritize freight mobility and access in industrial and employment areas.	Policy	TAEO Tulsa Planning Office Public Works INCOG Transportation
TR 4.4.5	Promote the safe and efficient movement of truck traffic in and around the City through designated truck routes and alternate routes for heavily traveled corridors.	Policy	Public Works INCOG Transportation
TR 4.5	Promote street system patterns that improve connectivity, expand alternative modes of transportation, and reduce traffic demand on arterial streets.	Strategy	Multiple
TR 4.5.1	Include local streets in new residential developments that encourage pedestrian and bicycle travel. Minimize the number of dead-end streets and cul-de-sacs.	Policy	Tulsa Planning Office Development Services

ID	Action Required	Action Type	Involved Parties
TR 4.5.2	Evaluate the conversion of one-way streets to two-way streets where feasible.	Policy	Public Works DTP
TR 4.6	Evaluate the incorporation of traffic calming treatments into transportation projects and the design of new subdivisions.	Strategy	Multiple
TR 4.6.1	Continue to encourage on-street and reverse angle parking to provide traffic calming and enhanced pedestrian and cyclist safety in downtown and areas with high pedestrian activity.	Policy	Public Works Tulsa Planning Office DTP
TR 4.6.2	Expand traffic calming options that can be installed to control traffic speeds in neighborhoods.	Policy	Public Works Tulsa Planning Office
TR 4.6.3	Target areas around schools, recreation centers, libraries, trails/trail crossings, and parks for traffic calming.	Planning	Community Development Tulsa Planning Office Public Works INCOG Transportation
TR 4.6.4	Perform parking studies as needed to determine if parking facilities (off-site lots, structured parking, joint-use agreements, etc.) on certain streets can replace or supplement on-street parking and make the street more walkable, bikeable, and commercially successful.	Analysis	Public Works Tulsa Planning Office DTP
TR 5	**Transportation investments support the land uses they serve and increase access to places that Tulsans need to visit.**		
TR 5.1	Establish Transit-Oriented Development (TOD) areas where high levels of transit service exist or are planned.	Strategy	Multiple
TR 5.1.1	Incentivize mixed-use zoning and land uses along bus rapid transit routes.	Incentives	City Council TAEO Tulsa Planning Office
TR 5.1.2	Enhance building and site design standards that promote walkability that can be applied in TOD areas.	Policy	Tulsa Planning Office Development Services

ID	Action Required	Action Type	Involved Parties
TR 5.1.3	Prioritize pedestrian, bicycle, and streetscape improvements in TOD areas to increase safe access to transit stops and stations.	Planning	Tulsa Planning Office TAEO INCOG Transportation Public Works
TR 5.1.4	Increase residential and commercial density in TOD areas while maintaining housing affordability.	Planning	City of Tulsa
TR 5.2	Ensure land use decisions are reflective of and responsive to the transportation infrastructure context.	Strategy	Multiple
TR 5.2.1	Encourage compact and infill development to optimize the use of existing infrastructure.	Policy	Tulsa Planning Office
TR 5.2.2	Encourage mixed-use developments and housing near employment areas to decrease long vehicle trips.	Policy	Tulsa Planning Office
TR 5.2.3	Ensure that new development adjacent to trails provides access to and from the trail.	Policy	Tulsa Planning Office Development Services
TR 5.2.4	Promote joint access and circulation across land uses.	Policy	Tulsa Planning Office Development Services
TR 5.2.5	When redesigning streets in Local Centers, prioritize multimodal travel to reduce vehicle speeds and support surrounding land uses.	Policy	Tulsa Planning Office Public Works
TR 5.3	Establish standards for streetscaping projects that enhance safety, aesthetics, and promote placemaking.	Strategy	Multiple
TR 5.3.1	Develop standards for curbside drop-off zones, and ensure safe interactions with bicycle lanes and transit stops.	Standards	Tulsa Planning Office INCOG Transportation Public Works
TR 5.3.2	Minimize curb cuts along major streets to improve safety and efficiency for all modes of transportation.	Policy	Public Works Development Services

ID	Action Required	Action Type	Involved Parties
TR 5.3.3	Enhance neighborhood and city identity through gateways using public art, landscaping, and signage.	Capital	Tulsa Planning Office Public Works Community Development
TR 5.3.4	Incorporate wayfinding into commercial district streetscapes.	Capital	Community Development
TR 5.3.5	Develop urban design guidelines for streetscapes that integrate components into the budgeting process.	Standards	Tulsa Planning Office Public Works
TR 5.3.6	Ensure sidewalks remain functional for pedestrians, and are not obstructed by utility poles, hydrants, traffic control devices, and other items.	Policy	Public Works
TR 5.4	Ensure that parking enhances the use of a site or corridor while considering the needs of people using other forms of transportation.	Strategy	Multiple
TR 5.4.1	Evaluate opportunities to reduce parking requirements where appropriate after considerate analysis.	Code Changes	Tulsa Planning Office
TR 5.4.2	Discourage parking between buildings and the sidewalk in areas that have or are planned to have significant pedestrian traffic.	Code Changes	Tulsa Planning Office
TR 5.4.3	Encourage development of properties currently occupied by surface parking lots, particularly in the downtown area. Evaluate if structured parking is needed to replace the surface parking.	Policy	TAEO DTP
TR 5.5	Achieve a high degree of connectivity in new development, and seek to restore connectivity when possible throughout the city.	Strategy	Multiple
TR 5.5.1	Identify locations where connectivity can be restored, and develop capital projects to reconnect alternative routes.	Planning	Tulsa Planning Office Public Works
TR 5.5.2	Develop street connectivity standards in the City of Tulsa Subdivision Regulations to be used in the development review process.	Policy	Tulsa Planning Office Public Works

ID	Action Required	Action Type	Involved Parties
TR 6	**Transportation solutions in Tulsa promote environmental sustainability.**		
TR 6.1	Improve air quality by supporting related programs and investing in the expansion of alternative modes of transportation.	Strategy	Multiple
TR 6.1.1	Replace aging public transit vehicles with carbon-neutral or low-emission buses.	Capital	Tulsa Transit INCOG Environment
TR 6.1.2	Conduct an analysis of City fleet vehicles and usage patterns, and establish targets for the proportion of the fleet comprised of electric vehicles.	Capital	Asset Management
TR 6.1.3	Advocate for re-instituting a state or local vehicle inspection fee to bring vehicles with emission problems up to current standards and to help pay for alternative transportation options.	Advocacy	INCOG Environment
TR 6.1.4	Continue to work with Oklahoma Department of Environmental Quality to monitor air pollutant levels.	Partnership	INCOG Environment
TR 6.1.5	Maintain national ambient air quality standards by continuing to support Clean City program efforts and educating the public on alternative modes of transportation.	Partnership	City of Tulsa INCOG Environment
TR 6.1.6	Increase tree canopy along transportation corridors to mitigate urban heat island effect and assist in improving air quality.	Policy	Public Works Tulsa Planning Office
TR 6.2	Encourage Transportation Demand Management programs to maximize use of alternative modes of transportation and to increase multi-occupancy vehicle trips.	Strategy	Multiple
TR 6.2.1	Create incentives, such as reduced parking requirements when Transportation Demand Management techniques are implemented.	Incentives	Tulsa Planning Office TAEO
TR 6.2.2	Encourage programs that implement employer-option transportation control measures that reduce peak-hour vehicle use, such as flexible work hours, teleworking, employer-based carpooling, and compressed work weeks.	Policy	TAEO

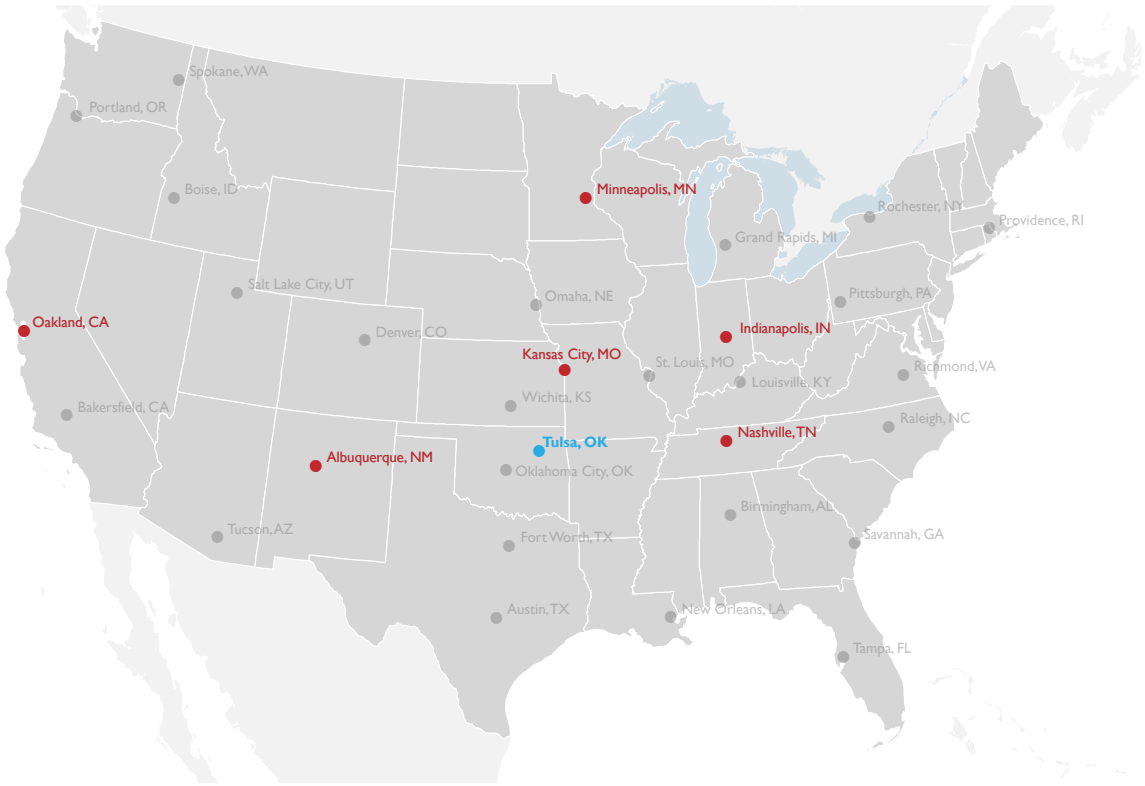
ID	Action Required	Action Type	Involved Parties
TR 6.2.3	Encourage employers to incentivize employees who choose to commute by active transportation modes and carpooling.	Policy	City of Tulsa
TR 6.3	Consider environmental justice issues when developing and implementing transportation plans.	Strategy	Multiple
TR 6.3.1	Reference the Tulsa Health Department's Community Health Improvement Plan (CHIP) to identify key health factors for concern when implementing projects.	Planning	Public Works Tulsa Planning Office
TR 6.3.2	Seek mitigation of ozone and particulate matter proliferation from highways that impacts sensitive land uses such as residential neighborhoods, schools, and parks.	Policy	Tulsa Planning Office INCOG Environment ODOT
TR 7	**The best new forms of mobility are embraced and integrated into existing transportation systems.**		
TR 7.1	Increase City staff knowledge of transportation best practices, and provide and encourage training about transportation innovations.	Strategy	Multiple
TR 7.1.1	Organize peer city tours and trainings for City staff to learn about model transportation systems across the country and abroad.	Engagement	Public Works INCOG Transportation Tulsa Transit
TR 7.1.2	Support engineering and planning trainings from national urban transportation research and peer group organizations (NACTO, TRB, ITE, America Walks, etc.).	Personnel	Public Works Tulsa Planning Office INCOG Transportation Development Services
TR 7.2	Proactively work with private transportation companies to bring innovations to Tulsa.	Strategy	Multiple
TR 7.2.1	Plan for shared vehicle fleets, car-sharing, bikeshare, scooters, and other transportation innovations.	Planning	Mayor's Office INCOG Transportation Tulsa Planning Office

ID	Action Required	Action Type	Involved Parties
TR 7.2.2	Work with private transportation companies to share data with local and regional governments.	Policy	Mayor's Office INCOG Transportation
TR 7.2.3	Proactively plan for drones and other mobility concepts as components of our freight system.	Planning	Mayor's Office INCOG Transportation Tulsa Planning Office
TR 7.2.4	Promote the city as a place to test new transportation and infrastructure technology including autonomous vehicles.	Policy	Mayor's Office TAEO INCOG Transportation
TR 7.2.5	Evaluate opportunities for public-private partnerships to jump-start environmental sustainable transportation options.	Policy	City of Tulsa
TR 7.3	Improve transit services by incorporating technological innovations.	Strategy	Multiple
TR 7.3.1	Establish signal prioritization along transit corridors.	Policy	Tulsa Transit Public Works
TR 7.3.2	Develop methods for pre-boarding fare systems to increase efficiency of transit boardings.	Policy	Tulsa Transit
TR 7.3.3	Acquire and install Automatic Passenger Count technology to all MTTA buses.	Capital	Tulsa Transit
TR 7.3.4	Explore the development of microtransit services to provide transit services in areas with low ridership.	Policy	Tulsa Transit
TR 7.4	Encourage the use of electric vehicles and other clean fuel technologies.	Strategy	Multiple
TR 7.4.1	Seek capital funding and grants to increase the number of electric vehicle charging stations.	Capital	INCOG Environment Asset Management
TR 7.4.2	Locate slower charging stations in parking lots and garages and rapid charging stations adjacent to highways, but not in the public right-of-way.	Policy	Asset Management

ID	Action Required	Action Type	Involved Parties
TR 7.5	Seek new revenue approaches that better match the actual maintenance and operational costs of the transportation system.	Strategy	Multiple
TR 7.5.1	Support approaches that lead to additional revenue for transportation projects based on weight, vehicle-miles traveled, or other metrics that aren't tied to specific fuel types.	Policy	City of Tulsa
TR 7.5.2	Explore the development of an impact fee system that funds infrastructure improvements commensurate with the impact new developments have on existing systems.	Program	Tulsa Planning Office City of Tulsa

SELECTED CITY COMPARISON

Tulsa Planning Office staff selected this set of 6 cities from the review of more than 30 comprehensive plans from across the United States. These cities range from the West Coast, the Southwest, the Midwest, and the South, with varying degrees of similarity to Tulsa. The metrics chosen reflect a cross-section of multi-modal transportation usage in each city, covering driving and active transportation options. Tulsa performs well overall for residents with access to a motor vehicle, with shorter commutes than all of the selected cities. Bicycle infrastructure is lagging in Tulsa when compared to the selected cities, by minimal margins with Indianapolis and Kansas City, and much more significant margins compared to Oakland or Albuquerque.

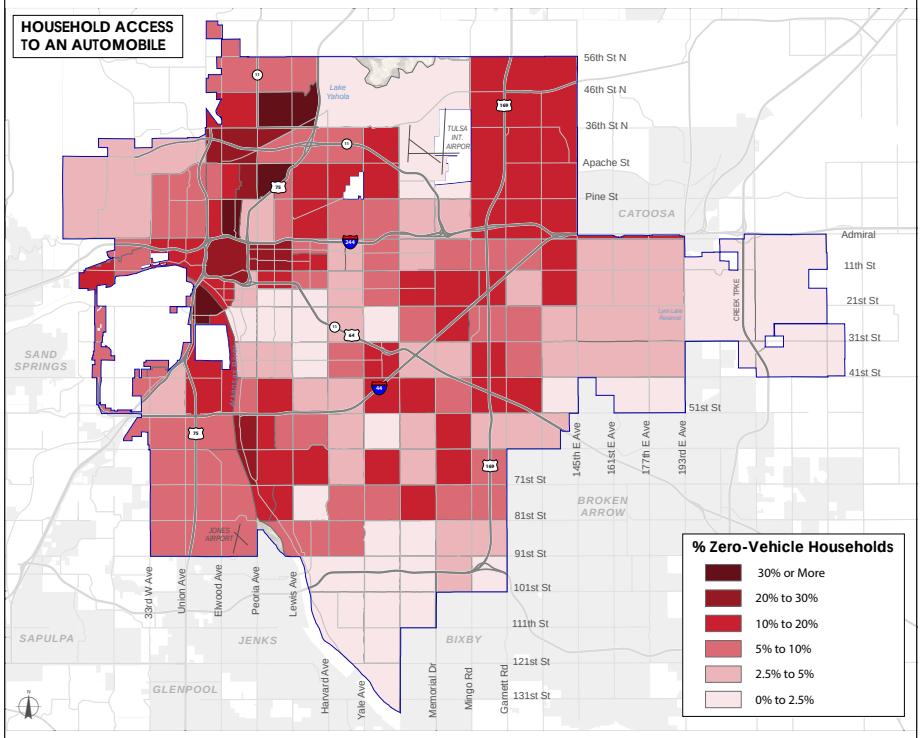


Most Favorable Least Favorable

Metric	Units	Tulsa, OK	Oakland, CA	Albuquerque, NM	Kansas City, MO	Minneapolis, MN	Nashville, TN	Indianapolis, IN
Access to a Motor Vehicle	%	91.7%	85.1%	92.4%	89.9%	85.1%	93.4%	91.4%
Access to Public Transit	%	78.7%	99.0%	90.3%	74.1%	100%	70.1%	65.6%
Access to Bike Infrastructure	%	4%	47%	33.5%	6%	17.5%	13%	5%
Average Commute Time	Min.	18.6	34.4	22.5	22.2	24.1	25.1	24.1

FEATURED METRIC

Access to a Motor Vehicle



Tulsa has one of the highest percentages for access to a motor vehicle among the selected cities. An estimated 91.7% of Tulsans have access to a vehicle. Tulsa is a very auto-dependent city, and it can be very difficult to get around without a vehicle. Increasing access to multi-modal transportation options will allow Tulsans to travel with ease. Decreasing dependency on independently owned vehicles will also lessen the city's carbon footprint. Presently, fewer residents of North Tulsa have access to an automobile than other parts of the city, with some Census tracts having nearly 40% of households without a motor vehicle. This emphasizes the importance of public transit service and accessible pedestrian infrastructure in order to ensure residents without access to a motor vehicle are able to enjoy the quality of life afforded to households that do have access to automobiles.

Access to Public Transit

Among the selected cities, Tulsa ranks in the middle for access to public transit. It is estimated that 78.7% of Tulsans live within a 1/2 mile of a bus stop. The introduction of Bus Rapid Transit (BRT) has provided efficient transit service along Peoria Ave., and BRT will soon be accessible along the Historic Route 66. For a city that is heavily dependent on vehicles, Tulsa is making intentional and significant improvements with regard to public transit access.

Access to Bicycle Infrastructure

Tulsa has the lowest population with easy access to bicycle infrastructure when compared to the selected cities. Percentages were calculated based on the amount of bicycle infrastructure compared to the total road network mileage, with special consideration given to high-stress corridors. The City has completed several new facilities in the past several years, and there have been a few instances of lanes being removed after public outcry. Improved engagement is needed for Tulsa to become competitive with peer cities along this metric.

Average Commute Time

Tulsa has the lowest average commute time among the selected cities. Tulsa's average commute time is 18.6 minutes. Tulsans are not spending as much time in rush hour traffic as residents from cities, and this makes driving a car even more attractive. Encouraging residents of Tulsa of the benefits of choosing to use multimodal transportation is a challenge; however, as options become available and improvements are made, Tulsans will be more apt to make different transportation decisions.

EQUITY & RESILIENCE CONSIDERATIONS

INFRASTRUCTURE ACCESS

Transportation systems provide people a means by which to accomplish their daily needs, pursue economic mobility, and decrease social isolation. The most common transportation option used by Tulsa residents is full reliance on automobile travel. While this lifestyle is an aspiration of many people, ensuring sufficient alternative transportation options creates a more equitable and resilient community. Public transportation, bicycle infrastructure, and pedestrian infrastructure all play a role in the diversification of our transportation systems to make sure everyone has access to the places they need to go and the people they need to visit.

Recommendations

TR.ER.1 Utilize data-driven approaches to prioritize street improvement projects, public transit, bicycle infrastructure, and pedestrian infrastructure in areas with geographic disparities.

TR.ER.2 Ensure the boards and authorities that approve transportation infrastructure projects include representation from vulnerable communities and residents of areas with geographic disparities.

TRAFFIC COLLISIONS

The average motor vehicle has increased in size over the past 20 years, as mid-size SUVs and large pick-up trucks have replaced sedans and smaller pick-up trucks. Often these larger vehicles are marketed for their safety features, and indeed individual vehicles are safer to drive for their owners. Conversely, this increase in vehicle size and weight has led to more severe collisions with pedestrians and bicyclists. This manifests in part because of the increased momentum of vehicles, but also due to the taller geometry of vehicles which causes pedestrians or cyclists to be pushed under a colliding vehicle rather than going over the vehicle. Where safe pedestrian and bicycle infrastructure is missing, people are more vulnerable than ever to debilitating or fatal collisions. People of color, especially Black or African American and American Indian or Alaska Native people, are struck by vehicles at higher rates compared to White, Non-Hispanic, and Asian or Pacific Islander people. This corresponds with the higher rates of poverty and therefore lower access to an automobile that minority groups have in Tulsa.

Recommendations

TR.ER.3 Prioritize pedestrian and bicycle safety improvements in areas with high rates of collisions.

TR.ER.4 Expand transportation safety campaign efforts in partnership with the INCOG Transportation division. Target these efforts to vulnerable populations and geographies using multi-lingual and accessible methods.

TR.ER.5 Evaluate the root causes for accidents in an area, and approach the solutions holistically, beyond traditional transportation planning efforts.

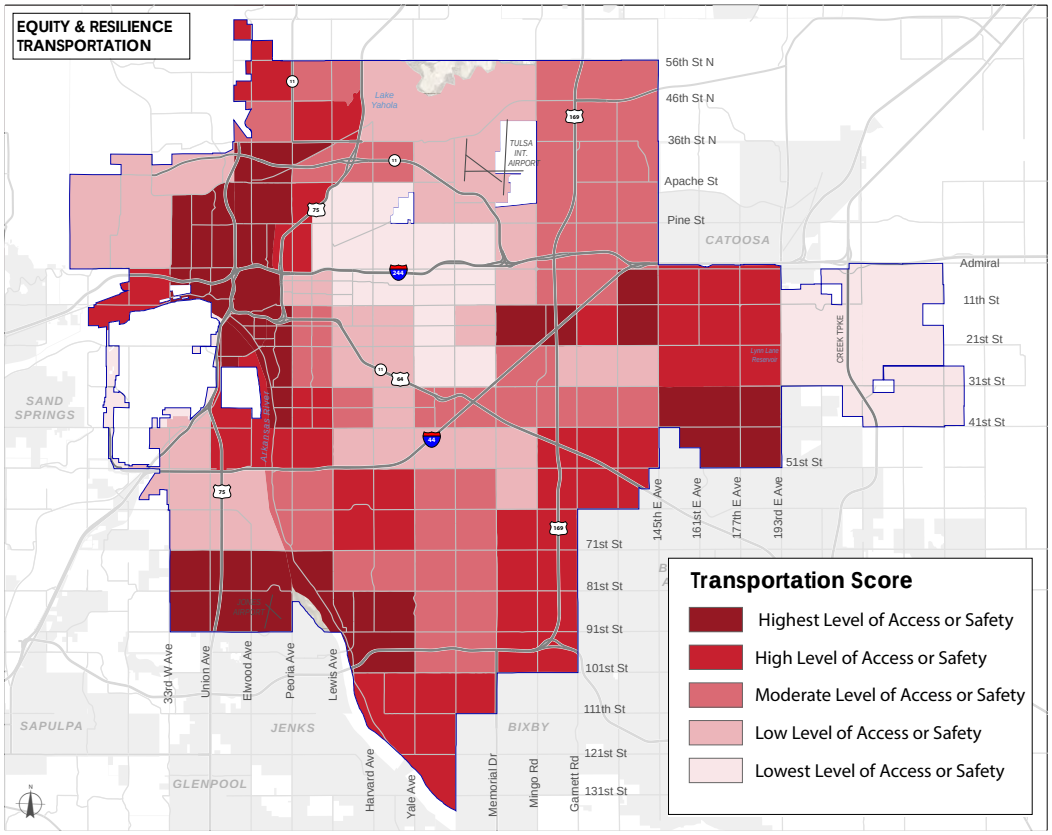
TRANSPORTATION COSTS

Owning and operating a motor vehicle can cost many thousands of dollars each year. Between monthly loan repayment, insurance costs, maintenance costs, fuel costs, licensing and registration costs, and even depreciation value, the convenience of automobile travel can come with a significant cost. Homebuyers and renters frequently trade off less expensive housing for a longer commute, and then find themselves trapped into spending more hours behind the wheel and more money on gas and vehicle maintenance. In 2016, in the US, the lowest earning 20% of the population earned an average of $11,933, and spent an average of $3497 (29%) on transportation costs. Additionally, among persons with a household income of $25,000+, minorities were generally more likely to report concern about having alternative transportation options to driving, whereas concern was consistently high among all racial/ethnic groups for those earning less than $25,000 annually.

Recommendations

TR.ER.6 Increase the amount of affordable housing in areas served by public transit.

TR.ER.7 Increase public transit service by adding new lines, new BRT routes, lower headways, and more protective transit stops.



This map is generated using data from the Tulsa Planning Office's Neighborhood Conditions Index (NCI).

GEOGRAPHIC DISPARITIES

The above map identifies where residents have access to sidewalks, trails, on street bicycle infrastructure, various levels of public transit service, the rate of injury causing collisions, and pavement conditions. Downtown and the neighborhoods to the north and south have high levels of access and few injury collisions, while areas surrounding the I-244 corridor and parts of Midtown do not have as many transportation options, are at a higher risk of injury causing collisions, or have poor pavement conditions.

INDICATORS USED IN MAP

- Access to Sidewalks
- Access to Trails
- Access to Bike Infrastructure
- Access to Public Transit
- Access to a Motor Vehicle
- Streetlights
- Automobile on Automobile Injury Collisions
- Automobile on Cyclist Injury Collisions
- Automobile on Pedestrian Injury Collisions
- Arterial Streets Surface
- Neighborhood Streets Surface

RELEVANT EQUALITY INDICATORS*

- INDICATOR 52: Bus stop concentration by geography
- INDICATOR 53: Commute time by mode of transportation
- INDICATOR 54: Vehicle access by race

RELEVANT RESILIENT TULSA ACTIONS**

- ACTION 20: Utilize Emergency Mobility Plan Technology
- ACTION 35: Launch City-Hall-On-The-Go

VULNERABLE POPULATION GROUPS

- Households without access to an automobile
- Low-Income households
- Racial and ethnic minority populations
- Residents with limited English proficiency
- Older adults
- Youth
- Persons with physical and/or cognitive disabilities

*Equality Indicator reports are issued annually by the City of Tulsa.
**Resilient Tulsa Strategy was adopted by the City of Tulsa in 2018.

Pedestrian Infrastructure

Health Impact	Associated Health Outcome
Higher levels of physical activity associated with walking	Reduction in obesity, cancer, diabetes, and cardiovascular disease
Lower levels of social isolation	Decrease in anxiety and depressive disorders
Reduction in pedestrian/ automobile collisions	Reduction in pedestrian injuries and fatalities

Tulsa Context

Tulsa, like many cities in the US, has an inconsistent sidewalk network. Areas of the city that developed prior to the proliferation of automobiles have a robust sidewalk network, with most streets having sidewalks on both sides. More modern development is required to construct sidewalks, and therefore Tulsa has a gap between the inner city and suburban areas where sidewalks are not commonplace. While some of these neighborhoods that do not have sidewalks are filled with affluent residents who rely on automobile travel, many of these areas are populated by lower income families, for whom automobile reliance may be cost-prohibitive. Tulsa has sidewalks along the majority of its arterial streets, which helps to facilitate the use of public transit, but obstructions are commonplace, and without connections from the surrounding neighborhoods, accessibility for people with physical disabilities is compromised.

Policy Recommendations

TR.HW.1 Ensure that there is dedicated funding specifically for sidewalks and other pedestrian improvements.

TR.HW.2 Incorporate the principles in the Complete Streets Procedural Manual into project identification and implementation.

Safe Crossings and Pedestrian/Automobile Collisions

Health Impact	Associated Health Outcome
Reduction in pedestrian/ automobile collisions	Reduction in pedestrian injuries and fatalities
Increase in perceived level of safety for pedestrians	Higher levels of physical activity associated with more pedestrians

Tulsa Context

In 2017 (the latest figures available), there were a total of 147 crashes involving pedestrians in INCOG's Transportation Management Area, which includes Tulsa and surrounding areas. Of those collisions, 104 resulted in injuries and 13 were fatalities. In Tulsa there are substantial gaps between safe crossings for pedestrians on arterial streets. On average there is a gap of 1,552 feet between intersections where automobiles must come to a stop. 16% of the arterial street network is at least 1 mile from a safe crossing, while a full two-thirds of the arterial street network is more than 1/4-mile for a safe crossing.

Policy Recommendations

TR.HW.3 Prioritize safe crossings in areas with pedestrian collisions.

TR.HW.4 Determine best practices for distances between safe crossings.

TR.HW.5 Ensure adequate lighting, especially at high-crash locations.

Transportation Costs

Health Impact	Associated Health Outcome
Lower levels of physical activity associated with less free time due to commuting	Increase in obesity, cancer, diabetes, and cardiovascular disease
Less disposable income for health-improving choices	Obesity, malnutrition

Tulsa Context

The cost of owning a motor vehicle in the United States for vehicles driven 15,000 miles per year is close to $8,500. This includes a car payment, insurance, gas, maintenance and repairs, as well as registration, taxes, and fees. 18% of Tulsa's households live in poverty, and the cost of owning a car places a heavy burden on their ability to access their daily needs. Poverty rates among Black Tulsans are even higher, at 29%, as well as for Hispanic Tulsans, at 23%. For unemployed Tulsans, this figure jumps up to over 45%. In order for economic mobility to be available to these groups, physical mobility is critical. Despite these poverty figures, 96% of commute trips are made by automobile, and only 8% of households do not have access to a motor vehicle.

Policy Recommendations

TR.HW.6 Extend the tiered transit fare system to correspond to the unique financial needs of vulnerable populations including older adults, school-age children, and low-income households.

TR.HW.7 Utilize the Tulsa Planning Office's Strategic Planning approach to prioritize public transit investments in areas with higher populations of low-income residents.

Access to Public Transportation

Health Impact	Associated Health Outcome
Increased access to healthcare and healthy foods	Decrease in obesity, cancer, diabetes, and cardiovascular disease
Improved air quality from less automobile usage	Decrease in asthma and other respiratory or cardiovascular diseases.

Tulsa Context

In Tulsa 44% of residents live within a 1/4-mile walk of transit stop, while 75% of residents are within a 1/2-mile walk. With transit headways predominantly between 30 and 60 minutes, transit service is limited, which requires significant trip planning for transit riders. If a rider misses a bus, then they could very well be late for whatever they were traveling to. Because of this insecurity, many would-be transit riders will choose to drive. Moreover, the sidewalk networks around transit stops are inconsistent, and are not always accessible for those with physical disabilities.

Policy Recommendations

TR.HW.8 Regularly evaluate route alignments for improvements.

TR.HW.9 Seek to increase service frequency.

TR.HW.10 Ensure transit stops are ADA-compliant and provide protection from environmental conditions.

TR.HW.11 Prioritize sidewalk projects that provide first/last mile connections to public transit, especially in areas of existing high transit usage and low-income households.

TR.HW.12 Ensure the Transit Advisory Committee and MTTA Board of Directors include transit system users.

Bicycle Infrastructure

Health Impact	Associated Health Outcome
Higher levels of physical activity associated with less driving	Reduction in obesity, cancer, diabetes, and cardiovascular disease
Improved air quality from less automobile usage	Decrease in asthma and other respiratory or cardiovascular diseases.

Tulsa Context

21.7% of Tulsa Households are within ¼ mile of on street bike facility (bike lanes, buffered bike lanes, bike routes). However, only 4.54% of Tulsa Households are within ¼ mile of a dedicated on street bicycle facility (bike lane, buffered bike lane). Where there are on-street bicycle lanes, maintenance of the roadway is a significant concern, where dirt and debris can cause bike lanes to be impassable for cyclists.

Policy Recommendations

TR.HW.13 Utilize the Tulsa Planning Office's Strategic Planning approach to prioritize bike and pedestrian infrastructure based on equity.

TR.HW.14 Engage with residents before, during, and after the implementation of bicycle projects to ensure community approval.

TR.HW.15 Prioritize investment in areas with collisions.

TR.HW.16 Identify tracking methods to better understand the demography of existing bicycle infrastructure user groups.

TR.HW.17 Have an emphasis on diversity and equity in the structure of the Bicycle and Pedestrian Advisory Committee (BPAC).

FUNDING PRIORITIES

Transportation is one of the most capital intensive pieces of municipal infrastructure and services. Streets, sidewalks, buses, and more all have substantial costs associated with them, not only in the up-front capital investment, but also with regard to long-term maintenance. Presently, the majority of funding for transportation goes toward street resurfacing and arterial widenings to address traffic congestion. Most of Tulsa's sidewalk funding is attached to street projects, so sidewalks are often built where street resurfacing is needed, not necessarily where the greatest needs for pedestrian improvements are located. In order to address this, transportation funding should be split into discrete buckets:

- Dedicated funding for automobile infrastructure
- Dedicated funding for pedestrian infrastructure
- Dedicated funding for bicycle infrastructure
- Dedicated funding for streetscapes (areas outside of the curbline)
- New funding for additional bus rapid transit routes

From an operational perspective, there is a need for a dedicated permanent funding source for Tulsa Transit operations. An additional operational need is for the maintenance and cleaning of existing bicycle lanes to ensure they are safe and usable.

Finally, from a personnel perspective, the Traffic Operations Division of the Public Works Department has lost staff through the years, and with the greater present need to evaluate the impact of new development on traffic congestion, and the potential impacts of new modes of transportation on existing traffic, the need for additional staff in that office is significant.

REGIONALISM CONSIDERATIONS

Residents of surrounding communities in the Tulsa Metropolitan Area commute in high numbers to Tulsa each day. For example, more than 50% of Broken Arrow workers commute into Tulsa utilizing highways and City streets. The transportation infrastructure that has been built throughout the past 50 years to accommodate suburban development patterns requires a great deal of funding to maintain, with road repairs accounting for 70% of the most recent Improve Our Tulsa package. This is on top of the $700M package "Improve Our Streets" in 2011. Despite this unprecedented fiscal focus on street repairs, satisfaction with city streets remains low. In order to relieve the City of Tulsa from sole responsibility for maintaining primary commuter corridors, funding partnerships should be sought with the surrounding communities whose residents benefit from the investments made by the City of Tulsa in years past. This can be achieved through local funding sources or by collaboration on state and federal transportation grant opportunities.

Public transit service by Tulsa Transit represents an existing model of regional transportation where multiple communities in the region contribute to the funding and management of the service. Public transit should continue to expand services both within the city limits of Tulsa and in contributing surrounding communities. Similarly, any future action related to rail transit should be a collaborative arrangement with surrounding municipalities and Tulsa County.

GLOSSARY OF TERMS

Americans with Disabilities Act (ADA) - A civil rights law that prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public.

ADA Accessible – ADA is short for the Americans with Disabilities Act Standards for Accessible Design. Accessibility refers to the design of products, devices, services, vehicles, or environments so as to be usable by people with disabilities.

ADA Self Evaluation and Transition Plan – An all-inclusive law that requires a municipality to review all aspects of its programs, services, and activities for compliance.

America Walks - A national non-profit organization that advances walkable, equitable, connected, and accessible places in every community across the U.S.

Autonomous Vehicles - Motor vehicles that uses artificial intelligence, sensors, and global positioning system coordinates to drive itself without the active intervention of a human operator.

Bicycle Facilities - A general term denoting improvements and provisions made to accommodate or encourage bicycling, including parking facilities, all bikeways, and shared roadways.

Bike Lane - A division of a road marked off with painted lines, for use by cyclists.

Capital Improvements Package - A List of capital projects that will be funding pending a vote of the community.

Capital Improvements Plan (CIP) - A community planning and fiscal management tool used to coordinate the location, timing, and financing of physical construction projects or permanent structural alterations or repairs to existing City assets.

Connectivity - The density of connections in path or road networks, and the directness of links. A well-connected network has many short links, numerous intersections, and minimal dead-ends.

Conversely - Introducing a statement or idea which reverses one that has just been made or referred to.

Demand-Responsive Parking Prices - An approach to achieve the right level of parking availability by periodically adjusting meter and garage pricing to match demand.

Diversify - Enlarge or vary a range of products or field of operation; make or become more diverse or varied.

Environmental Justice - The fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental Sustainability - Responsibly interacting with the planet to maintain natural resources and avoid jeopardizing the ability for future generations to meet their needs.

Equity - Just and fair inclusion into a society in which all can participate, prosper, and reach their full potential.

Functional Classification System - The federal system of classifying groups of highways according to the intended character of service.

Greenfield Sites – Land that has not previously been developed beyond an agricultural intensity.

Headway – The length of time between transit vehicles arriving at a given transit stop.

Hub and Spoke Layout - In public transit, when individual transit routes all come together at a centralized station hub and radiate to different parts of the city from the central location. This is in contrast to a grid-based system.

Impact Fees - Typically a one-time payment imposed by a local government on a property developer to offset the financial impact a new development places on public infrastructure, such as roads, water and sewer, parks, and other services.

Incentivize - To provide things that motivate or encourage one to do something; to provide with a payment or concession to stimulate greater output or investment.

Infrastructure - The basic physical and organizational structures and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise.

Intercity Freight System – A system of freight transportation (trucking, railroad, air, etc.) that connects cities to each other to facilitate commerce.

Infill Development – New construction in existing areas of the city, particularly older parts of the city.

Land Use Framework - A report that examines prevailing land use and real estate market trends, alongside anticipated changes to the transportation network, in order to develop policies and strategies that maximize return on public infrastructure investment.

Land Use Planning - The process by which community leaders establish a policy for the use of land to facilitate the best land development for the general welfare of the area's residents.

GLOSSARY OF TERMS

Level of Service (LOS) - A term used to qualitatively describe the operating conditions of a roadway based on factors such as speed, travel time, maneuverability, delay, and safety.

Limited English Proficiency (LEP) - A term that refers to a person who is not fluent in the English language, often because it is not their native language.

Local Streets – A street that is primarily used to gain access to the property bordering it; a local road that runs parallel to an expressway and allows local traffic to gain access to property.

Micro-mobility - Broad term for a growing category of transportation vehicles, including electric scooters and bicycles, that provide an alternative to traditional transportation (cars, trains, buses) in cities and communities. Micro-mobility services usually leverage GPS and cellular connectivity to track vehicle locations, and are designed to fulfill first mile/last mile needs.

Mixed-Use Zoning - Zoning that permits a kind of urban development that blends multiple uses, such as residential, commercial, cultural, institutional, or entertainment, into one space, where those functions are to some degree physically and functionally integrated.

Mobility - The ability to move freely.

Mode Share - The proportion of trips taken by various means of transportation.

Multimodal - For infrastructure, where more than one form of transportation is accommodated.

Multi-Occupancy Vehicle - Privately operated vehicle which has at least one occupant beside the driver.

Parking District – A system that allows all vehicle users within a geographic area to use a consolidated parking facility that serves a variety of sites and land uses.

Pavement Condition Index (PCI) - An evaluation metric for the pavement condition of a street, measured on a scale of 0 to 100 (where 100 means a newly paved road), that considers pavement age, climate and precipitation, traffic loads and available maintenance funding.

Placemaking - Transforming public spaces to strengthen the connections between people and place.

Public-Private Partnerships - An arrangement between two or more public and private entities of a long-term nature. Typically, this involves private capital financing government projects and services up-front, and then drawing profits from taxpayers and/or users over the course contract.

Quantitative - Relating to, measuring, or measured by the quantity of something rather than its quality.

Right-of-Way - Land dedicated or acquired for use as a public way, in which public infrastructure, utilities, and services are distributed.

Transit Route Alignments - The paths that transit vehicles traverse on a repeating and pre-scheduled basis.

Strategic Planning – Process used by organizations to identify their goals, the strategies necessary to accomplish those goals, and the internal performance management system used to monitor and evaluate progress.

Streetscape - The natural and built fabric of the street, or the design quality of the street and its visual effect.

Sub-Hub - For Tulsa Transit, where several transit routes converge, facilitating transfers to transit services that reach a variety of locations in the city.

Systemic - Relating to the intrinsic structure of a system, often with regard to how the design or implementation of a system self-perpetuates conditions.

Tiered Transit Fare System - A system that assigns a rate for transit fares depending on a person's income.

Traffic Calming - A range of methods to slow motor vehicles as they move through commercial and residential areas.

Transit-Oriented Development (TOD) - A type of urban development that maximizes the amount of residential, business, and leisure space within walking distance of public transport.

Transportation Demand Management (TDM) - The application of strategies and policies to reduce travel demand, or to redistribute this demand in space or in time.

Transportation Systems Technology - Technologies used in systems that control or enhance transportation movements, such as traffic signals, and innovations that increase efficiency or safety, such as signal priority for public transit or traffic signal synchronization.

User Fees - A fee paid to a facility owner or operator by a facility user as a necessary condition for using the facility.

Wayfinding - The process or activity of ascertaining one's position and planning and following a route, or the signage that facilitates a person's orientation in a place.

RELEVANT CITY DEPARTMENTS, PROGRAMS, PLANS, AND EXTERNAL ORGANIZATIONS

Asset Management Department - A department of the City of Tulsa that manages and maintains City-owned facilities, fleet, and equipment.

Bicycle and Pedestrian Advisory Committee (BPAC) - A committee administered through INCOG that provides guidance to government officials who are making decisions that impact bicycle and pedestrians and an ongoing process for resident input.

Communications Department - A department of the City of Tulsa that aims to facilitate open and accountable access to city government for the citizens of Tulsa and assist in communicating the prioritized initiatives set by the administration and all other City departments.

Community Development Division - A division of the Department of City Experience that administers community and economic development programs and initiatives, supporting residents in creating economically viable and sustainable communities through neighborhood partnerships, housing programs, and community development initiatives.

Community Health Improvement Plan (CHIP) - The Tulsa Health Department's (THD) long-term, systematic effort to address public health problems in a Tulsa based on the results of community health assessment activities.

Development Services Department - A report completed for the City of Tulsa in 2022 outlining strategies for transportation innovation readiness.

Downtown Tulsa Partnership (DTP) - A partnership of property and business representatives, and civic leaders to advocate and champion the continued improvement of Downtown Tulsa.

Emergency Medical Services Authority (EMSA) - A public trust of the Tulsa and Oklahoma City governments that ensures the highest quality of emergency medical service at the best possible price.

Federal Highway Administration (FHWA) - A division of the United States Department of Transportation that specializes in highway transportation.

Finance Department - A department of the City of Tulsa that maintains the finances of the City.

Fix Our Streets – A 2008 City of Tulsa voter-approved funding package, approving 137 projects to fix the streets with $451.6 million in funding through the Third Penny Sales Tax and a General Obligation Bond Issue.

GO Plan – The Tulsa region's first comprehensive bicycle and pedestrian master plan with the vision to make Tulsa a great place for walking and biking for everyone.

Improve Our Tulsa – A funding package for capital improvement projects approved by a vote of the people. These projects are focused on enhancing existing assets.

Indian Nations Council of Governments (INCOG) - The Indian Nations Council of Governments provides short and long range planning services for specific towns, counties and Tribal governments.

INCOG Environment - A department of INCOG that works with state and federal governmental agencies to implement clean water, air quality, and energy programs for the region.

INCOG Transportation - As a function of the Metropolitan Planning Organization (MPO) for the Tulsa area, INCOG Transportation facilitates a cooperative effort with federal, state, and local governments and other transportation agencies to assess the area's transportation requirements and to develop comprehensive, multi-modal plans and programs that address the needs and goals of the region.

Major Street and Highway Plan - The plan that identifies the major street and highway classifications and City of Tulsa street designations for purposes of right-of-way allocation, potential street design/layout, and eligibility for certain federal funds.

Mobility Innovation Framework - A report completed for the City of Tulsa in 2022 outlining strategies for transportation innovation readiness.

National Association of City Transportation Officials (NACTO) - A coalition of the Departments of Transportation in North American cities with the mission to build cities as places for people, with safe, sustainable, accessible, and equitable transportation choices that support a strong economy and vibrant quality of life.

Neighborhood Inspections - A division of the Department of City Experience that enforces regulations that are a part of the zoning code or nuisance ordinances.

Office of Resilience & Equity - An office within the Department of City Experience that works to achieve equality for all Tulsans through partnership building, education, cultural awareness, and advocacy.

Oklahoma Department of Transportation (ODOT) - A State of Oklahoma transportation department that seeks to provide safe, economical, and effective transportation networks for the people, commerce and communities in Oklahoma.

Public Works Department - A department of the City of Tulsa that is responsible for planning, directing and coordinating the construction and maintenance of streets and public facilities, managing all related

RELEVANT CITY DEPARTMENTS, PROGRAMS, PLANS, AND EXTERNAL ORGANIZATIONS

engineering services, and maintaining stormwater systems.

River Parks Authority - An organization that aims to enhance community life through stewardship of parks and public spaces along the Arkansas River.

This Machine - A nonprofit operated by Tulsa Bike Share that includes over 200 bikes and 45 stations, operating 365 days per year.

Transportation Research Board (TRB) - A type of urban development that maximizes the amount of residential, business, and leisure space within walking distance of public transport.

Tulsa Authority for Economic Opportunity (TAEO) - The merger of five public entities to create a single, independent organization to lead the City of Tulsa's community and economic development efforts.

Tulsa Fire Department (TFD) - A department of the City of Tulsa that provides fire safety and paramedic services to Tulsa residents.

Tulsa Parks - A department of the City of Tulsa that aims to create, provide, and preserve quality parks and recreation opportunities that meet community needs for the health and wellbeing and for all Tulsans.

Tulsa Planning Office - A division of the Department of City Experience that administers the zoning and planning process for the City of Tulsa.

Tulsa Police Department (TPD) - A department of the City of Tulsa that provides law enforcement and safety services to Tulsa residents.

Tulsa Transit (MTTA) - The public transit system operating buses and paratransit for Tulsa metropolitan area.

Walk Bike Tulsa - A transportation safety public service campaign administered by INCOG.

Working in Neighborhoods (WIN) Department - A department of the City of Tulsa that focuses on housing, neighborhood services, code enforcement and animal welfare.

SOURCES AND REFERENCES

Subject Matter Experts

City of Tulsa Streets and Stormwater Department

City of Tulsa Engineering Services Department

City of Tulsa Bicycle and Pedestrian Advisory Committee (BPAC)

INCOG Transportation

INCOG Clean Cities Program

Community Engagement Activities

All engagement activities that went into the development of the following plans:

- Mobility Innovation Strategy (2022)
- Tulsa Regional Coordinated Public Transit-Human Services Transportation Plan (2020)
- Connecting Progress (2018) - transit plan
- Connected 2045 Regional Transportation Plan (2017)
- GO Plan (2015) - bicycle and pedestrian plan
- Complete Streets Procedural Manual (2013)
- ADA Transition Plan (2012)
- Fast Forward Regional Transit System Plan (2011)
- Major Street and Highway Plan (1968 - revised 2018)

Resident Input Sessions

Resident Input Survey

Resident Input Emails and Phone Calls

Plans Reviewed and Incorporated

Mobility Innovation Strategy (2022)

Tulsa Regional Coordinated Public Transit-Human Services Transportation Plan (2020)

Connecting Progress (2018) - transit plan

Connected 2045 Regional Transportation Plan (2017)

GO Plan (2015) - bicycle and pedestrian plan

Complete Streets Procedural Manual (2013)

ADA Transition Plan (2012)

Fast Forward Regional Transit System Plan (2011)

Major Street and Highway Plan (1968 - revised 2018)

Selected City Metrics

https://www.census.gov/acs/www/about/why-we-ask-each-question/vehicles/

https://alltransit.cnt.org/metrics/#equity

Award Database | League of American Bicyclists (bikeleague.org)

https://data.census.gov/cedsci/table?q=Commuting&g=1600000US0653000,1836003,2743000,2938000,3502000,4075000,4752006&tid=ACSST1Y2019.S0801&hidePreview=false

Equity and Resilience Considerations & Health and Wellness Considerations

"Overview." MUTCD Overview - FHWA MUTCD, https://mutcd.fhwa.dot.gov/kno-overview.htm.

"Pedestrian Safety." Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 6 Mar. 2020, https://www.cdc.gov/transportationsafety/pedestrian_safety/index.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fmotorvehiclesafety%2Fpedestrian_safety%2Findex.html.

"Dangerous by Design." Smart Growth America, 2019. https://smartgrowthamerica.org/wp-content/uploads/2019/01/Dangerous-by-Design-2019-FINAL.pdf.

"2020-2045 Long Range Transportation Plan. Existing Inventory and Conditions Report." Oklahoma Department of Transportation, March 5, 2020.

Mistry, D, et al. "Statewide Personal Mobility Needs for Oklahoma 2018-2028." Small Urban and Rural Transit Center, Upper Great Plains Transportation Institute, North Dakota State University, Fargo, 2018. https://oklahoma.gov/content/dam/ok/en/odot/documents/2018-2028-ok-transit-mobility-needs.pdf.

"Healthy Places." Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, https://www.cdc.gov/healthyplaces/transportation/vmt_strategy.htm.

Rioux, Christine L et al. "Residential traffic exposure, pulse pressure, and C-reactive protein: consistency and contrast among exposure characterization methods." Environmental health perspectives vol. 118,6 (2010): 803-11. doi:10.1289/ehp.0901182

"VMT per Capita." U.S. Department of Transportation, https://www.transportation.gov/mission/health/vmt-capita.

"Ground-Level Ozone Basics." Environmental Protection Agency, https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics.

"Commute Time: National Equity Atlas." Commute Time | National Equity Atlas, https://nationalequityatlas.org/indicators/Commute_time#/.

"Mid-Block Crossings." Federal Highway Administration, https://safety.fhwa.dot.gov/PED_BIKE/univcourse/pdf/swless16.pdf

"Pedestrians," U.S. Department of Transportation, National Highway Traffic Safety Administration, https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812681

NACTO. *Urban Bikeway Design Guide*. Island Press, 2012. https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/buffered-bike-lanes/

Booth, G. L., et al. "Unwalkable Neighborhoods, Poverty, and the Risk of Diabetes among Recent Immigrants to Canada Compared with Long-Term Residents." Diabetes Care, vol. 36, no. 2, 2012, pp. 302–308., https://doi.org/10.2337/dc12-0777.

"Technical Air Pollution Resources." EPA, Environmental Protection Agency, https://www.epa.gov/technical-air-pollution-resources#tables.

"Ambient (Outdoor) Air Pollution." World Health Organization, World Health Organization, 2011, https://www.who.int/en/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health.

"Changing Your Habits for Better Health." National Institute of Diabetes and Digestive and Kidney Diseases, U.S. Department of Health and Human Services, 2008, https://www.niddk.nih.gov/health-information/diet-nutrition/changing-habits-better-health.

"Public Transportation System: Introduction or Expansion." Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 19 Oct. 2018, https://www.cdc.gov/policy/hst/hi5/publictransportation/index.html.

"Public Transportation Facts." American Public Transportation Association, 7 July 2021, https://www.apta.com/news-publications/public-transportation-facts/.

Metro First/Last Mile. (n.d.). Retrieved April 6, 2020, from https://www.metro.net/projects/first-last/.

Litman, T. "Evaluating Public Transportation Health Benefits", American Public Transportation Association, 2020, https://www.vtpi.org/tran_health.pdf.

"Physical Activity." World Health Organization, World Health Organization, 23 Feb. 2018, https://www.who.int/news-room/fact-sheets/detail/physical-activity.

"Health and Equity." U.S. Department of Transportation, 17 Dec. 2013, https://www.transportation.gov/mission/health/health-equity.

"The Hidden Health Costs of Transportation", American Public Health Association, 2010m, https://www.apha.org/~/media/files/pdf/factsheets/hidden_health_costs_transportation.ashx#:~:text=Traffic%20crashes%20cost%20us%20%24180,making%20process%20and%20policy%20framework.

Morency, Catherine, et al. "Walking to Transit: An Unexpected Source of Physical Activity." Transport Policy, vol. 18, no. 6, 2011, pp. 800–806., https://doi.org/10.1016/j.tranpol.2011.03.010.

Kotifani, Aislinn. "How Our Sidewalks, Cars, Trees, and Streets Affect Our Heart Health." Blue Zones, Blue Zones, 28 Apr. 2021, https://www.bluezones.com/2019/04/how-our-sidewalks-cars-trees-and-streets-affect-our-heart-health/.

Litman, Todd, et al. "Smart Growth Policies for Urban Affordability and Fertility." Planetizen Blogs, 10 Feb. 2016, https://www.planetizen.com/node/83847/smart-growth-policies-urban-affordability-and-fertility.

"The Congestion Con." Smart Growth America, 2020, http://t4america.org/wp-content/uploads/2020/03/Congestion-Report-2020-FINAL.pdf

"Addendum - Policy: Federal Highway Administration." U.S. Department of Transportation/Federal Highway Administration, 1997, https://www.fhwa.dot.gov/policy/hcas/addendum.cfm#footnotes.

"The High Cost of Transportation in the United States." Institute for Transportation and Development Policy, 4 Sept. 2019, https://www.itdp.org/2019/05/23/high-cost-transportation-united-states/.

Photos

Jeffries, Daniel. Pedestrian Bridge. Tulsa, OK. 2021. Page 2.

Jeffries, Daniel. Bike Share. Tulsa, OK. 2021. Page 3.

Tankard, John. 11th Street. Tulsa, OK. 2021. Page 4.

Jeffries, Daniel. Aero BRT. Tulsa, OK. 2021. Page 7.

Jeffries, Daniel. Street Maintenance. Tulsa, OK. 2021. Page 8.

Jeffries, Daniel. Transit Riders. Tulsa, OK. 2021. Page 9.

O'Connell, Alex. Multi-Modal. Tulsa, OK. 2021. Page 10.

Zeigler, Jane. Travel With Care. Tulsa, OK. 2021. Page 11.

Zeigler, Jane. Bike Lanes. Tulsa, OK. 2021. Page 12.

Zeigler, Jane. EV Charger. Tulsa, OK. 2021. Page 13.