DIRECTIONS 2050
LAWTON MTP

November 2024 | FINAL

Adoption resolution to be inserted.

Acknowledgements

The City of Lawton thanks the many participants who offered their time and perspectives in the development of the **Directions 2050 Metropolitan Transportation Plan (MTP)**. The input received, coupled with the technical aspects of the planning process, has set forth a vision for a safe, connected, and multimodal transportation system to serve the people of Lawton and the surrounding area. The Directions 2050 MTP reflects the collaborative efforts of the public, stakeholders, local staff and officials, the Oklahoma Department of Transportation, and the Federal Highway Administration (FHWA). The efforts of everyone are greatly appreciated.

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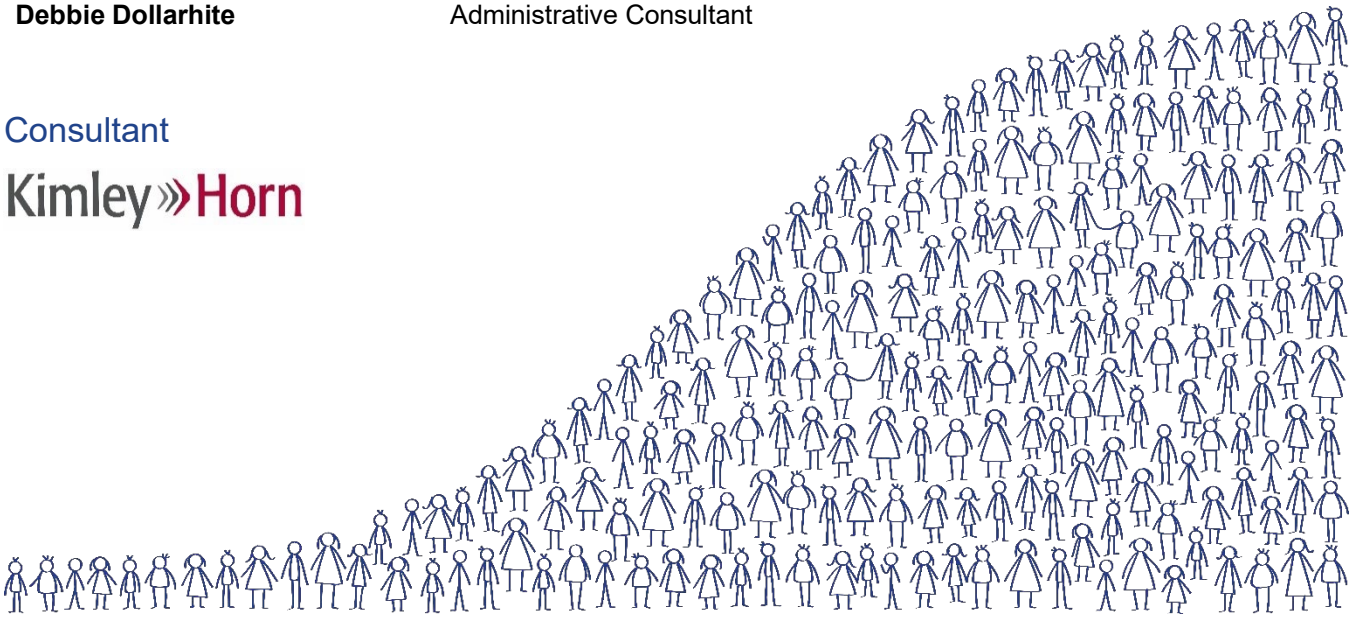

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Chapter 6: Public Engagement

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Title VI

It is the policy of the Lawton Metropolitan Planning Organization, under Title VI of the Civil Rights Act of 1964; Title VII of the Civil Rights Act of 1968; Section 504 of the Rehabilitation Act of 1973; Age Discrimination Act of 1975; Section 324 of the Federal-aid Highway Act of 1973; Civil Rights Restoration Act of 1987; and other related authorities and regulations, that no person in the United States shall, on the basis of race, color, or national origin be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination or retaliation under any federally or non-federally funded program or activity administered by the Lawton Metropolitan Planning Organization or its sub-recipients.

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CHAPTER 1

Planning Framework

Addressing the challenge of planning, designing, and constructing transportation projects requires foresight and the ability to apply available funding to priority improvements. Making it safer and easier to travel begins by understanding potential future growth and development, determining current and future transportation needs, and aligning recommendations with community priorities.

The Lawton MPO

A Metropolitan Planning Organization (MPO) is a federally mandated regional agency charged with carrying out a region's transportation planning processes. MPOs are required in all urbanized areas with populations over 50,000. The Lawton MPO was created to ensure federal transportation dollars are spent based on a comprehensive, cooperative, and continuing process. MPO administration is carried out by the City of Lawton's Planning Division, which provides staff, technical, and clerical support. The Transportation Policy Board is the final approval authority for transportation planning documents. The Transportation Technical Committee serves as an advisory committee to the Transportation Policy Board and provides technical expertise related to review of transportation issues and development of MPO documents.

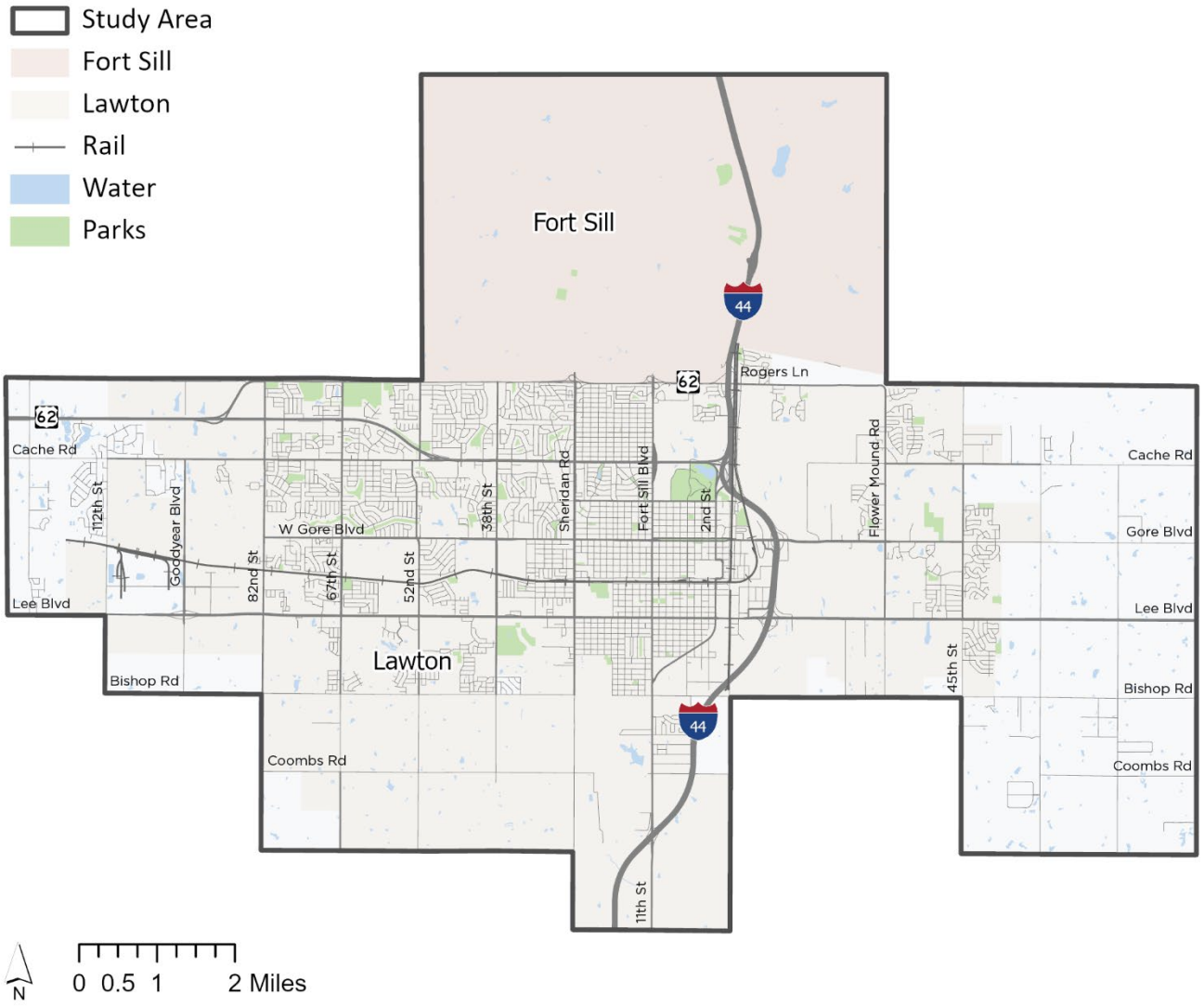
Lawton Metropolitan Area Transportation Study (LMATS) Area

The Lawton Metropolitan Area Transportation Study (LMATS) area is the geographic area in which the metropolitan transportation planning process required by 23 CFR Part 450 and 49 CFR Part 613 must be carried out. The LMATS area is located along I-44 in southwest Oklahoma approximately 80 miles south of Oklahoma City and approximately 40 miles north of Wichita Falls, Texas.

Figure 1.1 – Context Map

LMATS Area. The LMATS area was last amended in 2024 to add 4.5 square miles in the southwest portion of the study area. The LMATS area is bounded to the north by Rogers Lane/US 62, to the east by 90th Street, to the south by Woodlawn Road and to the west by Deyo Mission Road. The map below shows the study area boundary, which changed slightly following the 2020 Census in anticipation of future growth.

Figure 1.2 – Lawton Metropolitan Area Transportation Study (LMATS) Area

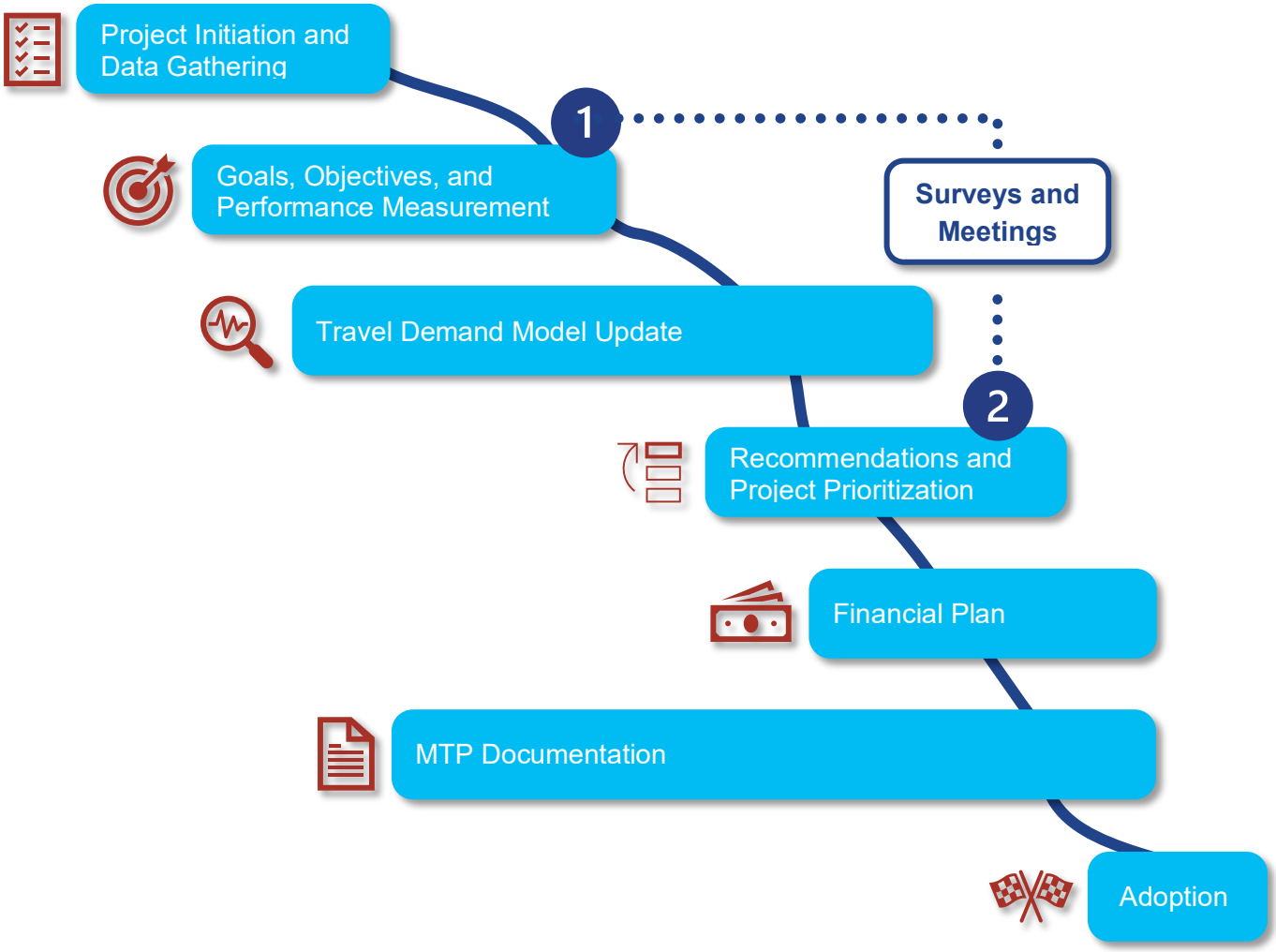


The Directions 2050 MTP

The **Directions 2050 Metropolitan Transportation Plan (MTP)** looks at the LMATS area's transportation needs through the year 2050. As one of the Lawton MPO's most important documents, it revisits and updates the 2045 MTP that was approved in December 2019. The **Directions 2050 MTP** considers all modes of transportation, including motorized vehicles, public transportation, bicycles, walking, freight and goods movement, and air travel.

Process and Outcomes

The **Directions 2050 MTP** will analyze the transportation system to determine the LMATS area's transportation needs. Those needs will then be matched with recommended transportation projects, which will be prioritized for funding. The result will be a comprehensive blueprint for effective transportation decision-making and investment choices.



Report Overview

The report is designed to be a brief summary that communicates the process and outcomes of the **Directions 2050 MTP**. It includes the following chapters:

- **Chapter 1 (Planning Framework)** provides an overview of the plan and introduces the Goals and Objectives.
- **Chapter 2 (Existing and Projected Conditions)** presents a review of existing conditions including an inventory of demographics and existing transportation assets.
- **Chapter 4 (Multimodal Recommendations)** describes recommendations for all travel modes (roadways; bicycle and pedestrian; transit; freight, rail, and aviation) and transportation technology.
- **Chapter 4 (Financial Plan)** reviews the estimate of future revenues and reveals the financially constrained project list based on planning-level cost opinions and the prioritization of projects.
- **Chapter 5 (System Performance)** describes the MPO's adopted performance measures along with the baseline conditions that align with those measures.
- **Chapter 6 (Public Engagement)** summarizes the engagement activities that occurred throughout the planning process. recommendations.

How the MTP will be Used. The **Directions 2050 MTP** will serve as a blueprint for directing federal, state, and local dollars toward projects that the community needs and values. It also supports adopted safety targets and system performance measures. On a broader level, the MTP is governed by the Infrastructure Investment and Jobs Act (IIJA), transportation legislation that ensures that the plan meets federal requirements to: strengthen America's highways, establish a performance-based program, create jobs and supporting economic growth, support the United States Department of Transportation's (USDOT) aggressive safety agenda, streamline Federal Highway Administration (FHWA) transportation programs, accelerate project delivery, and promote innovation.

How the MTP will be Implemented. Completing the **Directions 2050 MTP** is the next step toward implementing a more comprehensive transportation system in the LMATS area. Implementation will occur over time, taking into consideration local priorities and funding availability.

When the MTP will be Updated. While some projects identified in the **Directions 2050 MTP** will be constructed in the next few years, a long-term approach is necessary to address unexpected changes in transportation needs and available funds. For this reason, federal regulations require the plan be updated every five years.

Public Engagement Overview

Public involvement—direct and indirect contact with citizens, stakeholders, elected officials, and other community representatives—is an important part of any successful planning processes. Fully understanding the Lawton community's vision and the dynamics involved in achieving it requires a collaborative approach. As a result, local staff and the project team reached out to citizens, stakeholders, elected officials, and other Lawton area representatives throughout the planning process. More than 600 people were engaged as part of the **Directions 2050 MTP**.

Engagement Objectives

Public engagement for the **Directions 2050 MTP** focused on the following objectives:

Educate and Empower

- Increase familiarity with the MPO process, including the MTP
- Provide the opportunity for people to identify issues and needs, express their vision and goals, and weigh in on recommendations and priorities

Participate and Collaborate

- Interact with and gather input and options from those who live, work, play, study, invest, and pray in the LMATS area
- Engage a Steering Committee to help reach underserved populations

Monitor and Communicate

- Track whether feedback received during engagement is representative of the LMATS area
- Communicate to participants how their input is incorporated and the influence this input will have on decision making

Targeted Outreach

The engagement process included targeted outreach to residents, stakeholders, and the LMPO Transportation Policy Board and Transportation Technical Committee. The understanding of trends within the LMATS area relied on the specialized knowledge and experiences of these groups. Key interests that were invited to participate in outreach activities included the following:

- General public
- Disadvantaged populations
- Public transportation employees and users
- Pedestrians and bicyclists
- Community, civic, and business groups
- Major employers
- Regional, state, and federal agencies/organizations

Engagement Activities

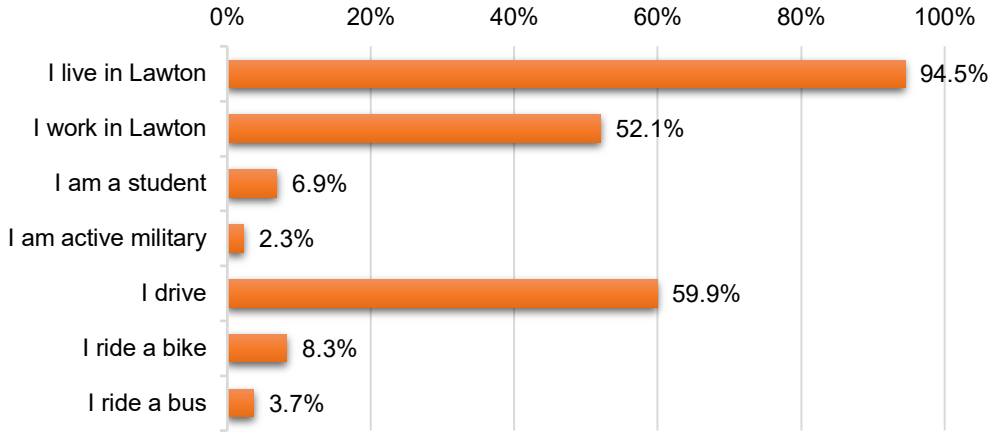
The Lawton community offered input at key points during the **Directions 2050 MTP** process. Engagement activities included the following:

- Project website
- Online surveys
- Community workshops
- Pop-up events
- Transportation Technical Committee meetings
- Transportation Policy Board meetings

The following pages describe the participant profile for those who provided demographic information during an engagement activity.

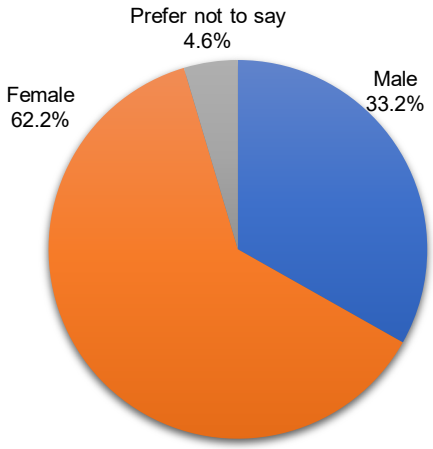
Chapter 6 provides a detailed overview of input received throughout the **Directions 2050 MTP** process.

Participant Profile

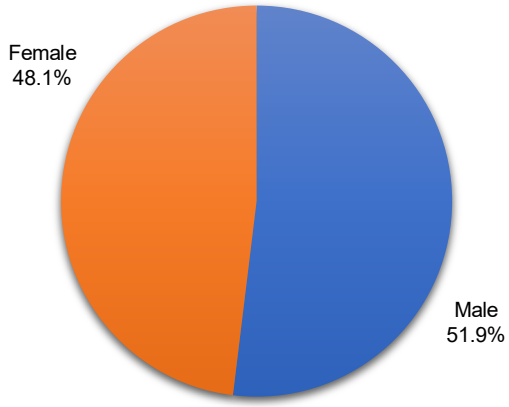


Gender

Participants in the Directions 2050 MTP Process



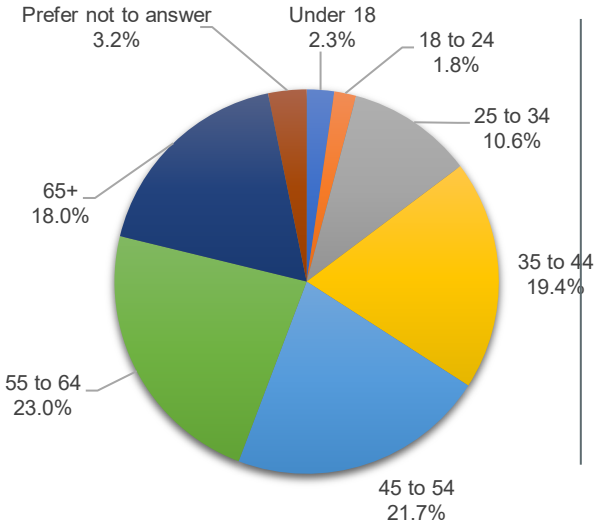
2022 ACS 5-Year Estimate (U.S. Census Bureau)



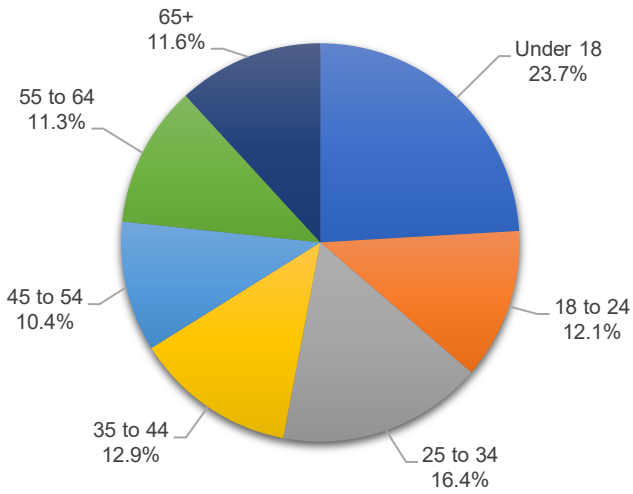
The percentage of female participants in the **Directions 2050 MTP** was higher than the population as a whole, which is more evenly split between females and males.

Age

Participants in the Directions 2050 MTP Process



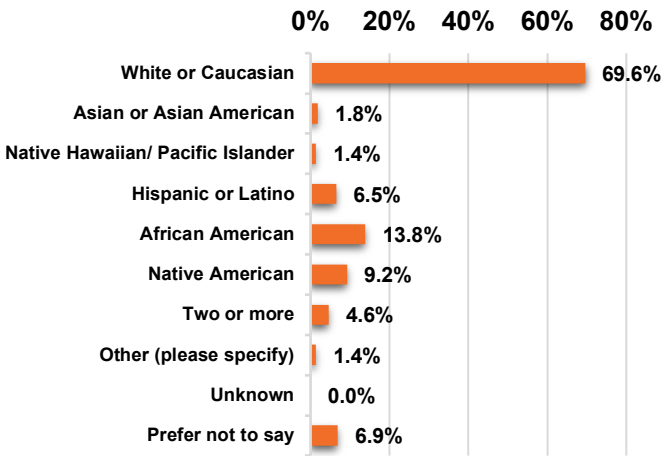
2022 ACS 5-Year Estimate (U.S. Census Bureau)



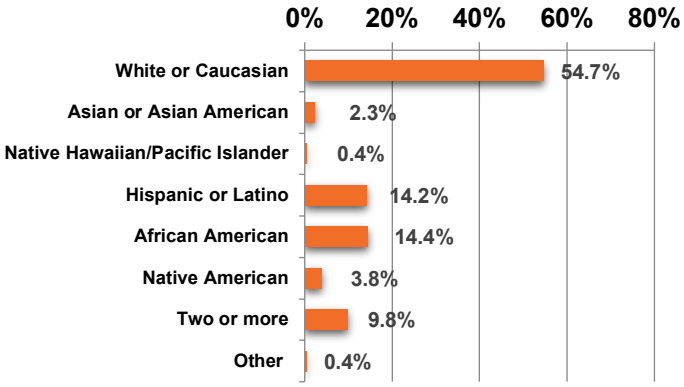
Participants in the **Directions 2050 MTP** process tended to be older compared to the population. This is mainly because persons under the age of 18 population were not targeted to participate in the planning process. However, the participant profile matched the area's demographic profile for persons 65 or older.

Ethnicity

Participants in the Directions 2050 MTP Process[1]



2022 ACS 5-Year Estimate (U.S. Census Bureau)

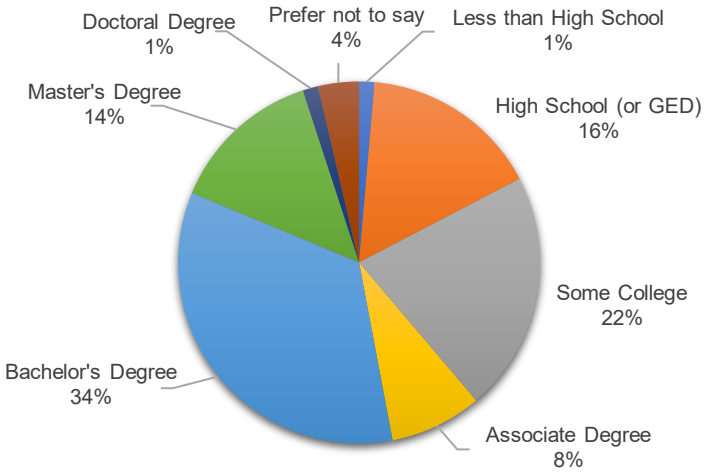


Participants in the **Directions 2050 MTP** process tended to be slightly less diverse. The ACS reports the population as 54.7% White and 14.4% Black or African American. Notably, the 8.0% of participants that identified as Native American exceeded the percentage of the population as documented by the U.S. Census Bureau.

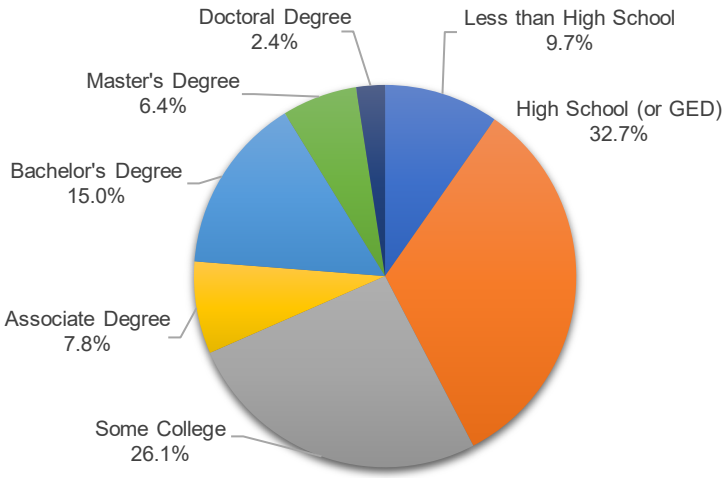
1. *Participants in the Directions 2050 MTP process were allowed to select more than one answer.*

Education

Participants in the Directions 2050 MTP Process



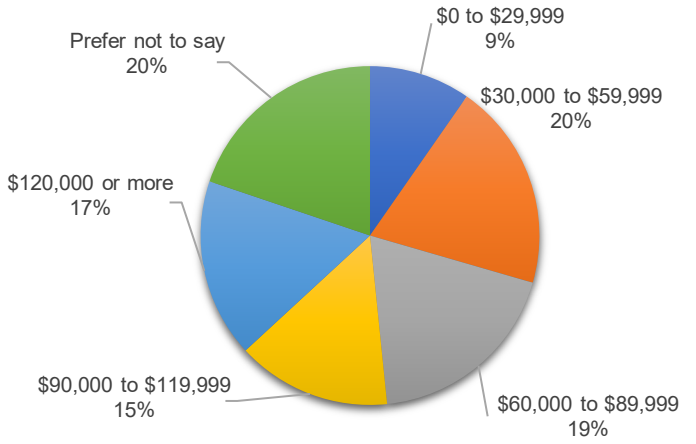
2022 ACS 5-Year Estimate (U.S. Census Bureau)



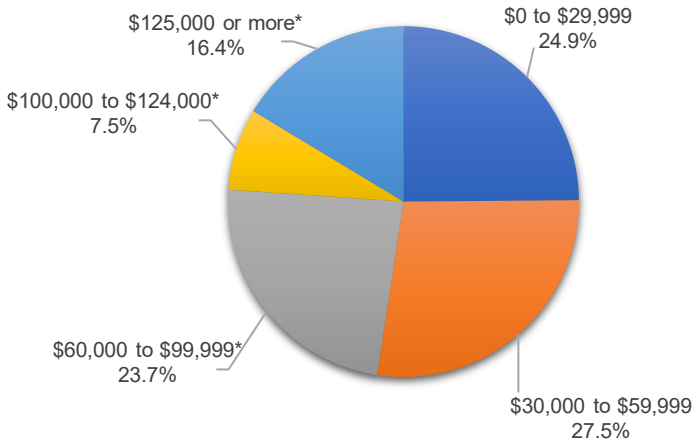
Participants in the **Directions 2050 MTP** process tended to be slightly more educated compared to the area's demographic profile. The ACS reports 15.0% of the population 25 years or older have a bachelor's degree and 10.8% have a graduate or professional degree.

Household Income

Participants in the Directions 2050 MTP Process



2022 ACS 5-Year Estimate (U.S. Census Bureau)



** The U.S. Census Bureau organizes income data differently than the income data captured as part of the Directions 2050 MTP engagement process.*

Participants in the **Directions 2050 MTP** process came from slightly more affluent households than the population as a whole. The Census reports the County median income as $57,150. However, the planning process captured input from persons across the socioeconomic spectrum.

Goals and Objectives

The seven goals identified in the **Directions 2050 MTP** help guide decisions surrounding the LMATS area's transportation system while also reflecting the federal planning factors from the Fixing America's Surface Transportation (FAST) Act and IIJA. Throughout the plan's development, the goals and objectives will influence the development of recommendations, priorities, and funding choices. The goals are presented in alphabetical order.

GOAL 1 | Accessibility & Mobility

Make it accessible and convenient for all modes of transportation to move within and through the LMATS (Lawton Metropolitan Area Transportation Study) area.

Objectives

- **1.A** Support an integrated freight transportation system that facilitates the movement of goods with access and connectivity to major freight, commercial, and industrial activity centers.
- **1.B** Develop and maintain a multimodal transportation system that includes appropriate facilities for public transit, bicyclists, and pedestrians.
- **1.C** Require multimodal connectivity among new and existing developments to promote a reduction in average trip length.
- **1.D** Support project development to promote network redundancy and reduce impacts to the transportation network from non-recurring congestion.
- **1.E** Develop a multimodal transportation system that strives to minimize delay and increase travel time reliability.

Goal 2 | Economic Vitality

Enhance the Lawton area's economy by optimizing transportation for efficient movement of people and goods.

Objectives

- **2.A** Improve access to key employment centers and areas of planned development.
- **2.B** Promote multimodal access to encourage economic growth in areas of need.
- **2.C** Support transportation investments and policies that work to create jobs and improve access to people, places, and goods.

Goal 3 | Environmental Stewardship

Protect the environment, including our natural, agricultural, scenic, and historic resources.

Objectives

- **3.A** Consider and mitigate the impacts of transportation recommendations and prioritization on the natural environment and historic resources.
- **3.B** Discourage disruption to cohesive neighborhoods.
- **3.C** Maintain an open transportation planning process that encourages involvement and participation from all communities, businesses, individuals, and stakeholders.
- **3.D** Support transportation projects that do not create disproportionately negative effects on disadvantaged communities as identified by FHWA and leverage state and federal tools to identify these communities.

Goal 4 | Land Use & Transportation Integration

Integrate transportation investments with land use and economic development decisions.

Objectives

4.A Ensure transportation decisions are consistent with and support the goals of local Land Use Plans.

4.B Encourage design features that are consistent with the existing and planned future land uses.

4.C Promote connectivity by supporting the development of an interconnected network of low-speed and low-volume multimodal streets.

4.D Increase transportation network connectivity by minimizing barriers, completing links between nodes, and improving access to and increasing multimodal density at activity/employment centers.

Goal 5 | Livability

Provide a transportation system that promotes safe, healthy, and accessible places.

Objectives

5.A Plan transportation facilities and support context sensitive design standards to promote a transportation system that is compatible with community needs and the natural and built environment.

5.B Foster the development of transportation facilities that minimize neighborhood impacts and support housing choice, active living, and healthy communities.

Goal 6 | Safety & Security

Promote a transportation system with fewer crashes, predictable travel times, and faster emergency response.

Objectives

6.A Encourage design features that are intended to minimize crash potential, severity, and frequency and support efforts to eliminate transportation-related fatalities and serious injuries.

6.B Minimize intersection conflicts and enhance safety by refining access management policies.

6.C Support project development and public awareness programs that promote safety for bicyclists, pedestrians, and other vulnerable road users.

6.D Design transportation facilities in compliance with the Americans with Disabilities Act and foster a safe environment for individuals with disabilities and/or restrictions to mobility.

Goal 7 | System Preservation & Preparedness

Create a resilient and future ready transportation system with a focus on maintenance and operational efficiency.

Objectives

7.A Promote a cost-effective transportation network that prolongs the life of existing assets and advances high-priority projects for funding and implementation.

7.B Preserve corridors for future planned transportation improvements.

7.C Promote long-term resiliency of the transportation network to prevent interruptions, endure damages, and quickly recover from disturbances.

7.D Provide a cost-effective transportation system where the public and private sectors contribute to the system's cost proportionally to their demands on the system.

Correlation to Federal Planning Factors

Because the **Directions 2050 MTP** is a federally required plan, a direct link is needed between the plan's goals and federal planning factors carried forward in the Infrastructure Investment and Jobs Act (IIJA), the most recent federal transportation planning legislation. The following table illustrates how each **Directions 2050 MTP** goal addresses one or more of the federal planning factors (presented alphabetically).

Federal Planning Factors		Directions 2050 MTP Goals						
		Accessibility & Mobility	Economic Vitality	Environmental Stewardship	Land Use & Transportation Integration	Livability	Safety & Security	System Preservation & Preparedness
Accessibility	Increase accessibility and mobility of people and freight.	☑	☑		☑	☑		
Connectivity	Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.	☑	☑		☑	☑		
Economic Vitality	Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.	☑	☑	☑		☑	☑	
Efficient Management	Promote efficient system management and operation.	☑		☑	☑	☑	☑	☑
Enhance Travel	Enhance travel and tourism.	☑	☑			☑		
Environment	Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns.			☑			☑	
Preservation	Emphasize the preservation of the existing transportation system.			☑				☑
Resiliency	Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.	☑		☑				
Safety	Increase the safety of the transportation system for motorized and non-motorized users.	☑					☑	☑
Security	Increase the security of the transportation system for motorized and non-motorized users.	☑					☑	☑

CHAPTER 2

Existing Conditions

Introduction

Creating a list of multimodal transportation recommendations for the LMATS area requires an understanding of the current and projected transportation conditions in the region. This includes demographic information such as population, employment, and key destinations along with transportation data related to congestion and safety. These elements create the foundation of future planning efforts. In addition to the data presented here, the recommendations in Chapter 3 are based on previous planning efforts and input provided from the public and stakeholders.

Building Blocks

Numerous meaningful planning efforts have been undertaken to guide transportation decisions in the LMATS area. The **Directions 2050 MTP** builds on the work of the previous plans and policies completed in the region. The following section provides a brief overview of several relevant planning documents and highlights recommendations that are notable for this planning process.

2045 Lawton MTP	The Metropolitan Transportation Plan (MTP) is the primary long term transportation planning document for the region and is federally mandated. This plan's transportation projects for the region through 2045
Oklahoma DOT STIP	The Oklahoma State Transportation Improvement Plan is a document which outlines the future projects that will be completed on state roads. Lawton has two projects planned, a new interchange at Goodyear Blvd and US 62, and highway maintenance in the LMATS area.
Lawton Bicycle and Pedestrian Plan	This plan, created in 2008, is the primary planning document for new bicycle and pedestrian facilities in the City of Lawton.
LATS Transit Master Plan (2024)	The City of Lawton and Lawton Area Transit System (LATS) developed a Transit Master Plan to identify the current and future needs of public transportation services in and around the region over the next five years.
Oklahoma Freight Transportation Plan	Statewide plan for improving freight traffic on all modes including water, rail, and highway. US 62 from the west to SH 7 in the east is considered a critical rural freight corridor by the plan. Projects in the STIP have some roots in this plan.
SORTPO Regional Transportation Plan	The Southwest Oklahoma Regional Transportation Planning Organization (SORTPO) Regional Transportation Plan establishes the goals, objectives, and transportation strategies for addressing the region’s transportation needs.
FY2023 Oklahoma Highway Safety Plan	The Oklahoma Highway Safety Office (OHSO) produces a strategic, statewide Highway Safety Plan (HSP) annually as part of its work for the national Highway Safety Improvement Program (HSIP). This coordinated plan provides a comprehensive framework for reducing highway fatalities and serious injuries on public roads.

Relationship Between Land Use and Transportation

The LMATS area includes most of the City of Lawton, the populated area of the Fort Sill military installation, and a portion of Comanche County. Land use development patterns and the transportation system have a direct influence on each other and how people and goods move safely and efficiently. Therefore, the understanding of future transportation needs requires a focus on the relationship between economic activity, demographic trends, land use patterns, and travel behavior. Much of the data presented in this chapter is organized around traffic analysis zones (TAZs) from the travel demand model (TDM), which is the MPOs best tool for forecasting future travel demand based on trends related to the growth and development.

Tribal Lands

Approximately 1,700 acres of Native American Indian tribal lands are located within the municipal limits of Lawton. Tribal lands are protected by the sovereign nation policy. Consequently, the City of Lawton exercises no jurisdiction over development of these lands and defers to the autonomy to the tribal governing bodies. Because the existing and future use of these lands affects the City's transportation network, the City includes representatives from the Comanche, Apache, and Kiowa Tribes as non-voting members of the Lawton MPO Transportation Technical Committee.

Travel Demand Model

One aspect of the travel demand model that is updated every cycle is the socioeconomic (SE) data. The travel demand model updates the future population and employment projections in each Traffic Analysis Zone (TAZ). The characteristics of the TAZ are used to estimate the number of trips that start and end in the zone, for a base year, and for specific forecast years.

For the **Directions 2050 MTP**, the forecast year is 2050. Each TAZ has relatively similar characteristics within its boundaries. The Lawton MPO uses information from the travel demand model to make informed decisions about transportation planning.

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People

Population

Population growth plays a significant role in understanding travel patterns. Analyzing population growth can help determine where improvements in the transportation system may be needed.

Figure 2.1 – 2022 Population by TAZ

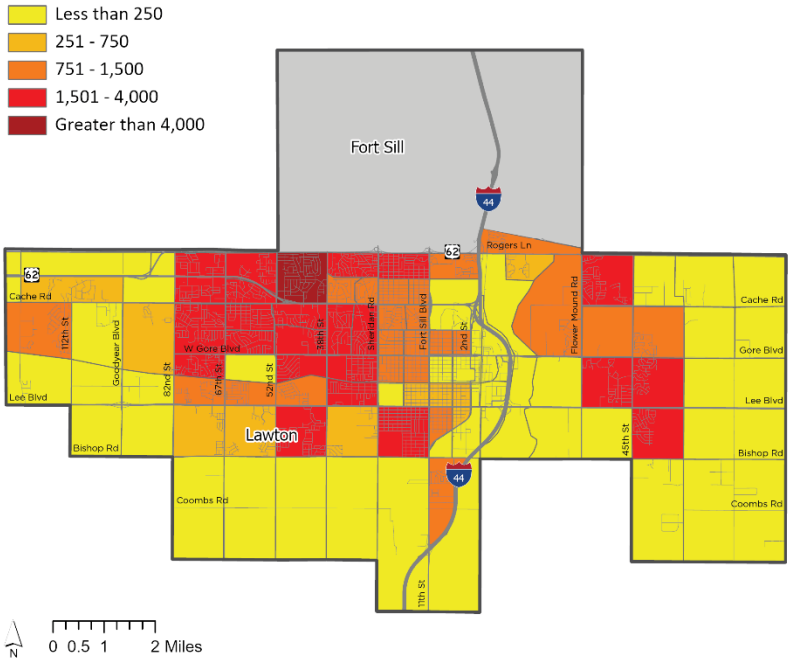
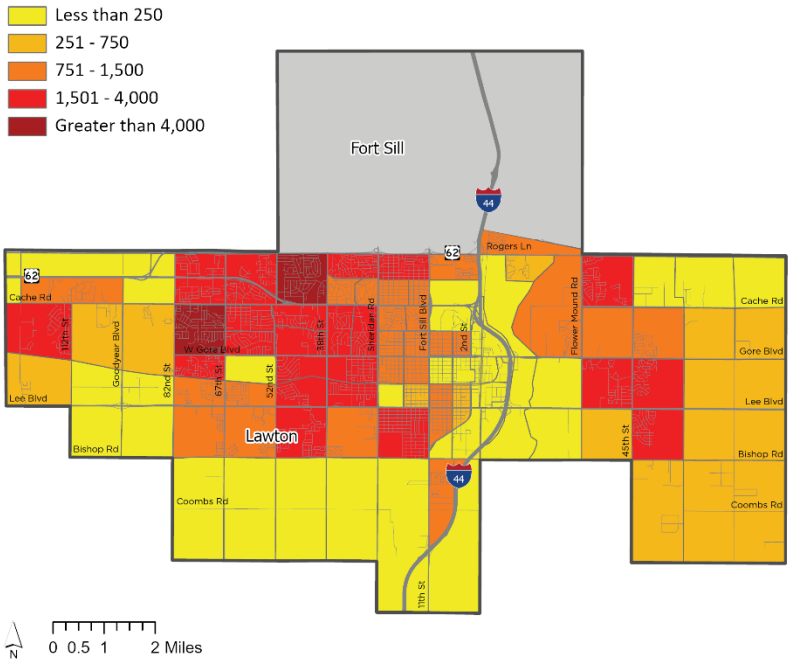


Figure 2.2 – 2050 Population by TAZ



Current Population. Population estimates in the LMATS area is based on a variety of factors, including trends pulled from U.S. Census data. This information is factored into the travel demand model. The most populated portion of the LMATS area is bordered by Rogers Lane, NW Sheridan Road, W Gore Boulevard, and NW 82nd Street. Several additional population clusters exist east of I-44.

Data Variation. Statistics related to current and projected population in the LMATS area vary due to differences in data sources and reporting geography. The travel demand model estimates the 2022 population to be 85,249, which excludes Fort Sill. Meanwhile, the U.S. Census estimated the 2023 daytime population of the LMATS area to be 99,866.

Population Projections. Population is expected to remain centered on the west-central portion of the LMATS area.

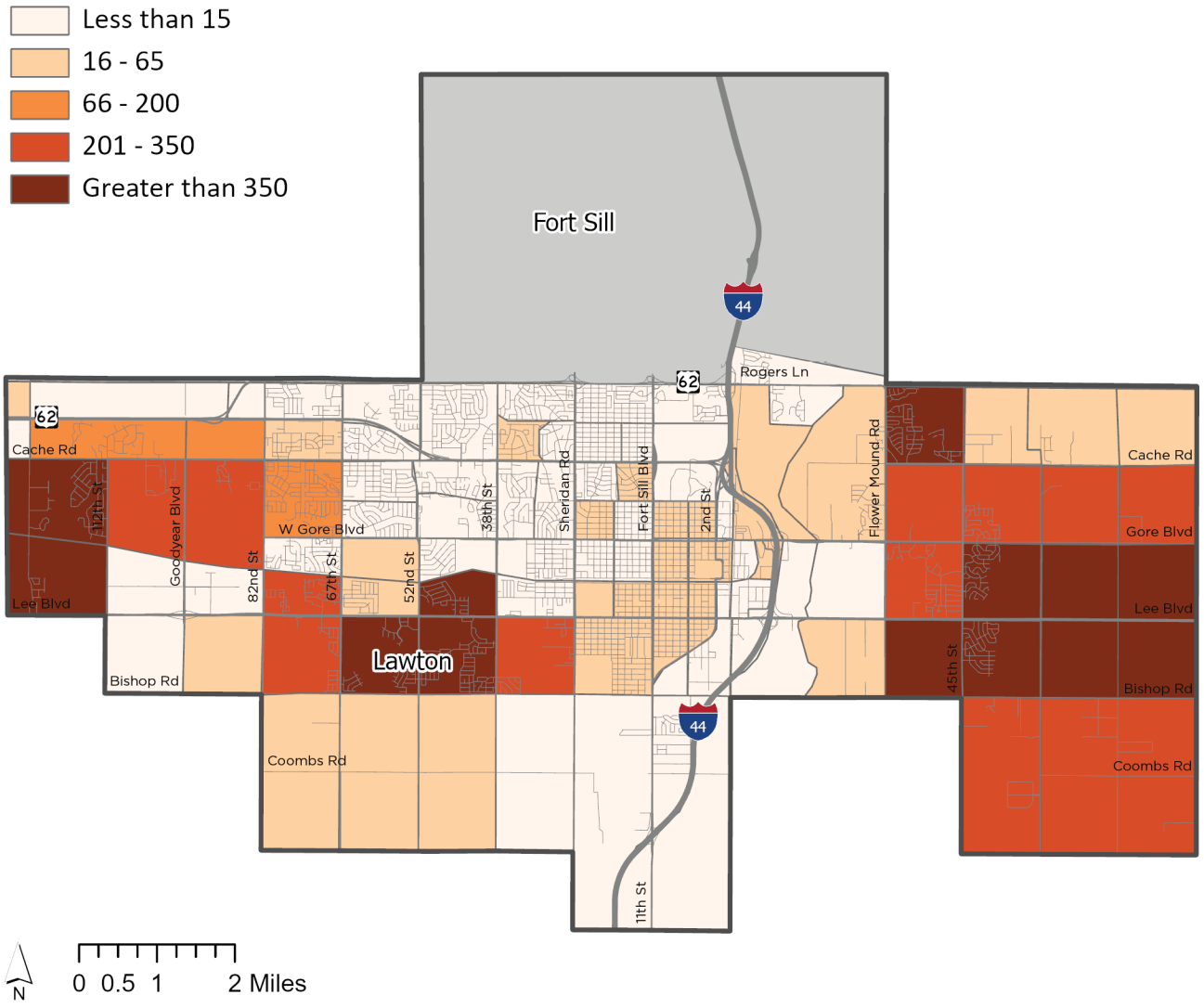
Population Growth

The population has remained steady in the LMATS area, though in some reporting cycles the population rate has trended down. Future population growth is expected to occur east of I-44 with additional population growth surrounding the industrial park in the western portion of the LMATS area.

Population Trends. Based on the projections from the travel demand model, the population is anticipated to increase 10.8% between 2022 and 2050 (from 85,249 to 94,450).

+10.8%
Population Growth by 2050

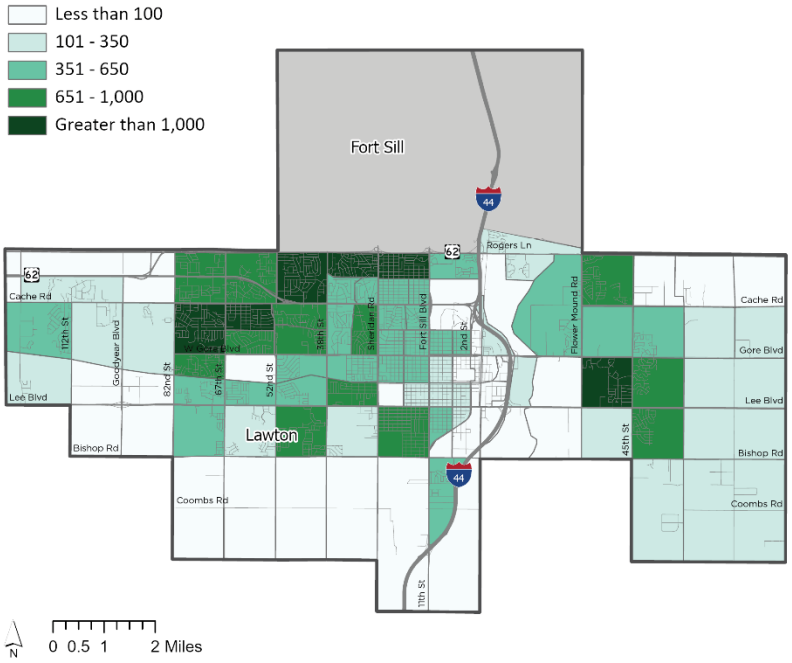
Figure 2.3 – 2022 to 2050 Population Growth by TAZ



Households

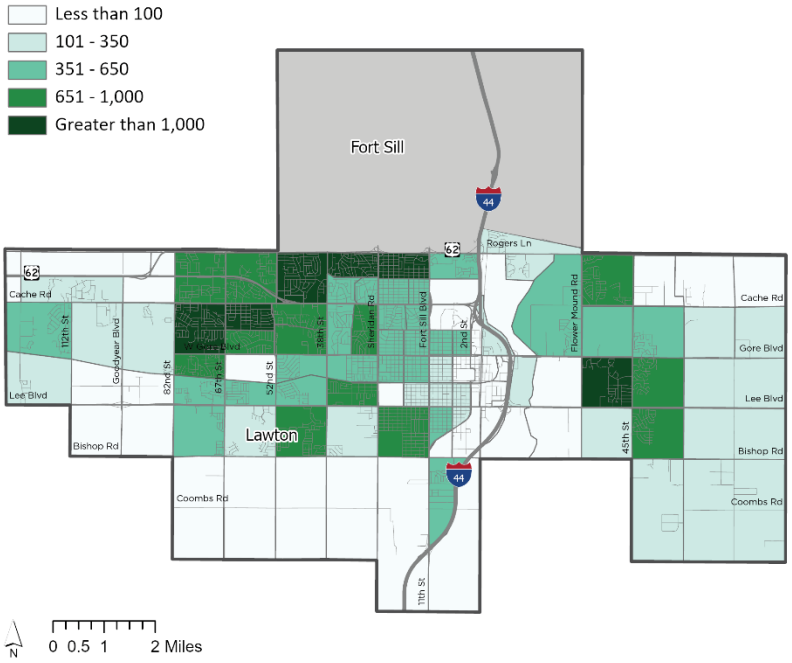
Like population, the location of and growth trends associated with households play a significant role in how people travel around the LMATS area.

Figure 2.4 – 2022 Number of Households by TAZ



Current Households. As could be expected, the TAZs with the most households mirror those that have the highest population. Households are scattered across the LMATS area with the highest number of households near Fort Sill and west of I-44.

Figure 2.5 – 2050 Number of Households by TAZ



Household Projections. The distribution of households in the base and future years of the travel demand model are similar, meaning the distribution of households is expected to stay the same while the average household size is anticipated to grow.

Household Trends. According to the U.S. Census, the number of households in the LMATS area has increased even as the population has slightly declined. This reflects the trend of shrinking household size in the area. Meanwhile, only 39.3% of households were owner occupied in 2020, a decline of 5.1% since 2010 and well below the state average of 65.4% owner occupancy.

Employment

Changes in employment patterns will impact traffic patterns in the LMATS area. To help determine where improvements in the transportation system may be needed, it is imperative to indicate where and how employment is growing or shifting.

Figure 2.6 – 2022 Number of Employees by TAZ

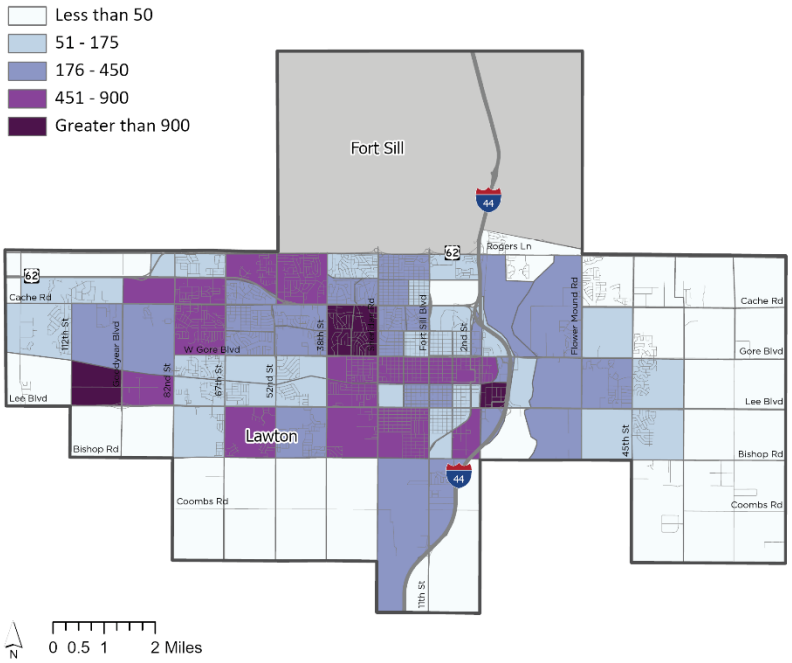
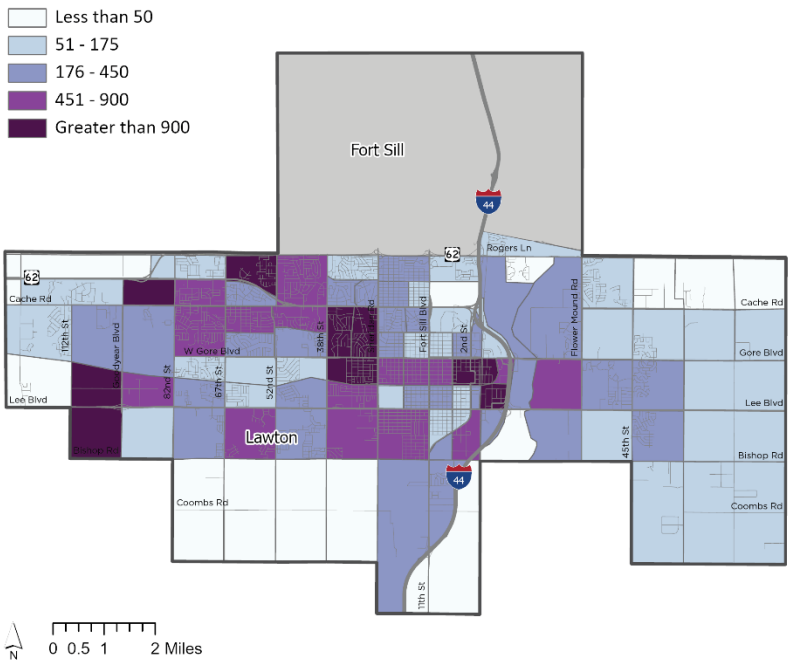


Figure 2.7 – 2050 Number of Employees by TAZ



Current Employment. Pockets of higher employment density exist throughout the LMATS area with the largest employment center located in the industrial park in western Lawton. Other higher employment centers exist around retail centers and the light industrial zone near the interchange of I-44 and Lee Boulevard.

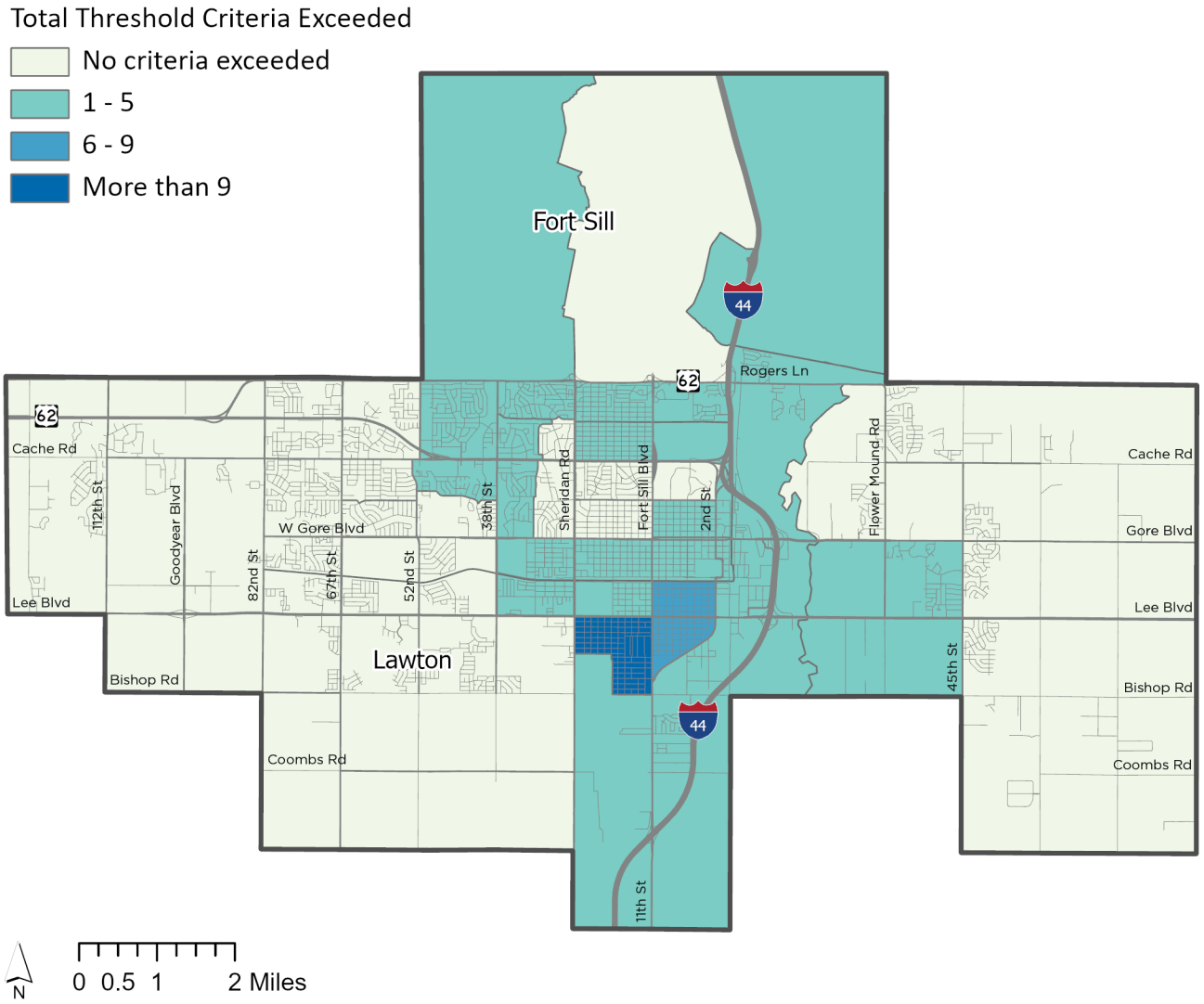
Employment Projections. Based on the projections from the regional model, employment growth is mostly anticipated to occur in the west of the LMATS area.

Employment Trends. Within the LMATS area, more than half (58.2%) of the employed population 16 years or older works in a White Collar occupation such as management, professional, sales, and administrative support. That percentage is well above the 22.0% that work in Services and 19.8% that work a Blue Collar job.

Environmental Justice

The Climate and Economic Justice Screening Tool (CEJST) was created by the Council on Environmental Quality to identify communities that are overburdened and undeserved in relation to climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. Figure 2.8 shows the total threshold criteria exceeded for each block group in the LMATS area. This indicates that which block groups are greater than or equal to the 90th percentile for any given criteria.

Figure 2.8 – Disadvantaged Tracts



Commuting Patterns

Commute times vary across the greater region, but for those who live within the LMATS area, the average commute time is 13 minutes. Figure 2.9 shows the share of workers whose commutes are over 30 minutes.

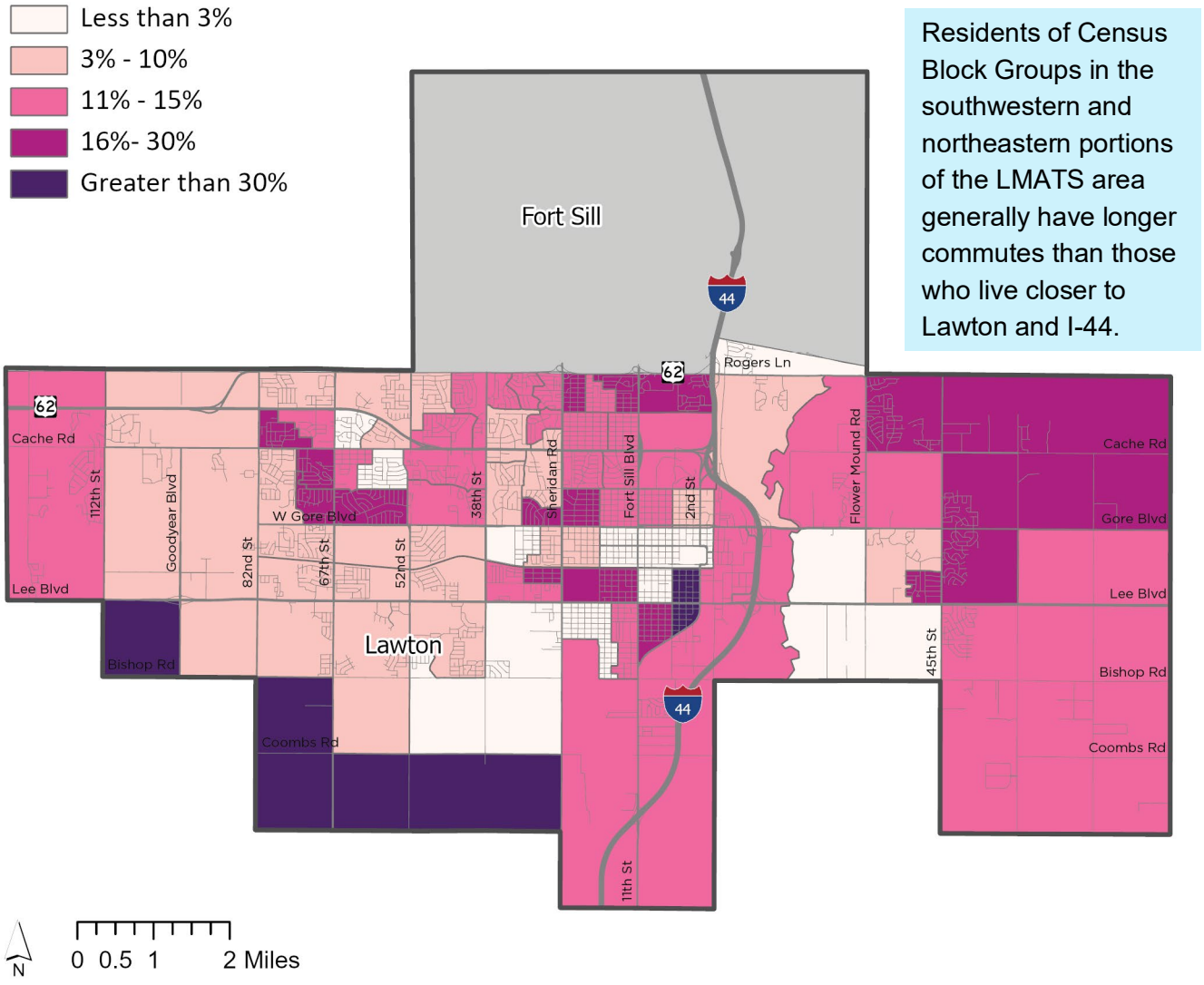
Commute In Flow and Out Flow. In 2021, commute patterns in the LMATS area were balanced based on data provided by the U.S. Census. In the region, 16,872 workers stay in the Lawton area, 14,805 come into the area for work and 12,431 leave the area for work. These numbers account for public and private-sector jobs. For employees with multiple jobs, the information reflects the highest paying job for an individual worker.

In Flow and Out Flow Commute Patterns

14,805	16,872	12,431
commute INTO the LMATS area for work	live and work in the LMATS area	commute OUT OF the LMATS area for work

Note: Commute data does not reflect Fort Sill, which includes roughly 20,000 military and civilian personnel (Military OneSource).

Figure 2.9 – Percent of Commuters Who Live within the LMATS Study Area and Travel More Than 30 Minutes to Work



Residents of Census Block Groups in the southwestern and northeastern portions of the LMATS area generally have longer commutes than those who live closer to Lawton and I-44.

Places

Natural Features

The major waterways in the region include East Cache Creek that runs parallel to I-44 through the study area and Wolf Creek that traverses western Lawton and flows into East Cache Creek. Flood prone land covers a significant portion of eastern Lawton. More information is provided in Appendix D.

Flood Prone Areas. I-44 separates downtown Lawton from the floodway to the east, shown here between E Gore Boulevard and SE Lee Boulevard using the FEMA Flood Hazard and Risk Data Viewer.

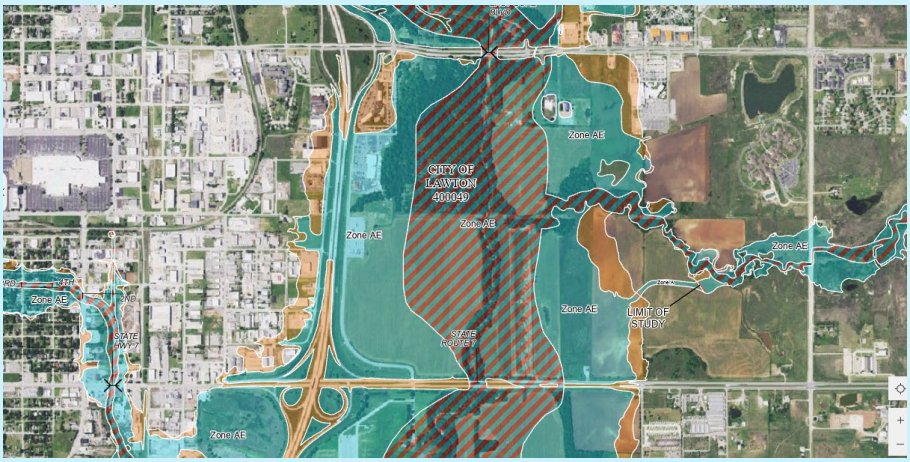
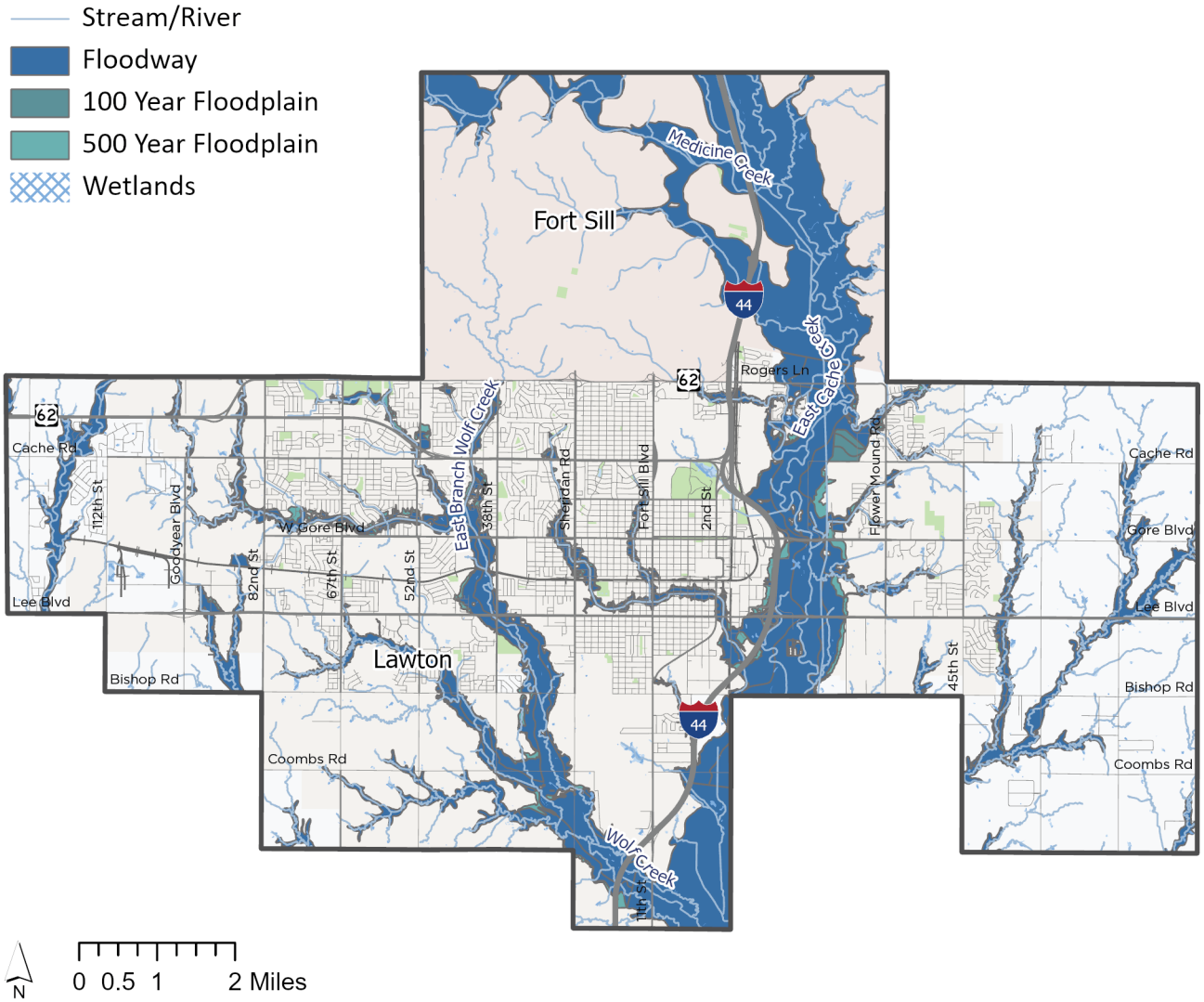


Figure 2.10 – Flood Prone Areas

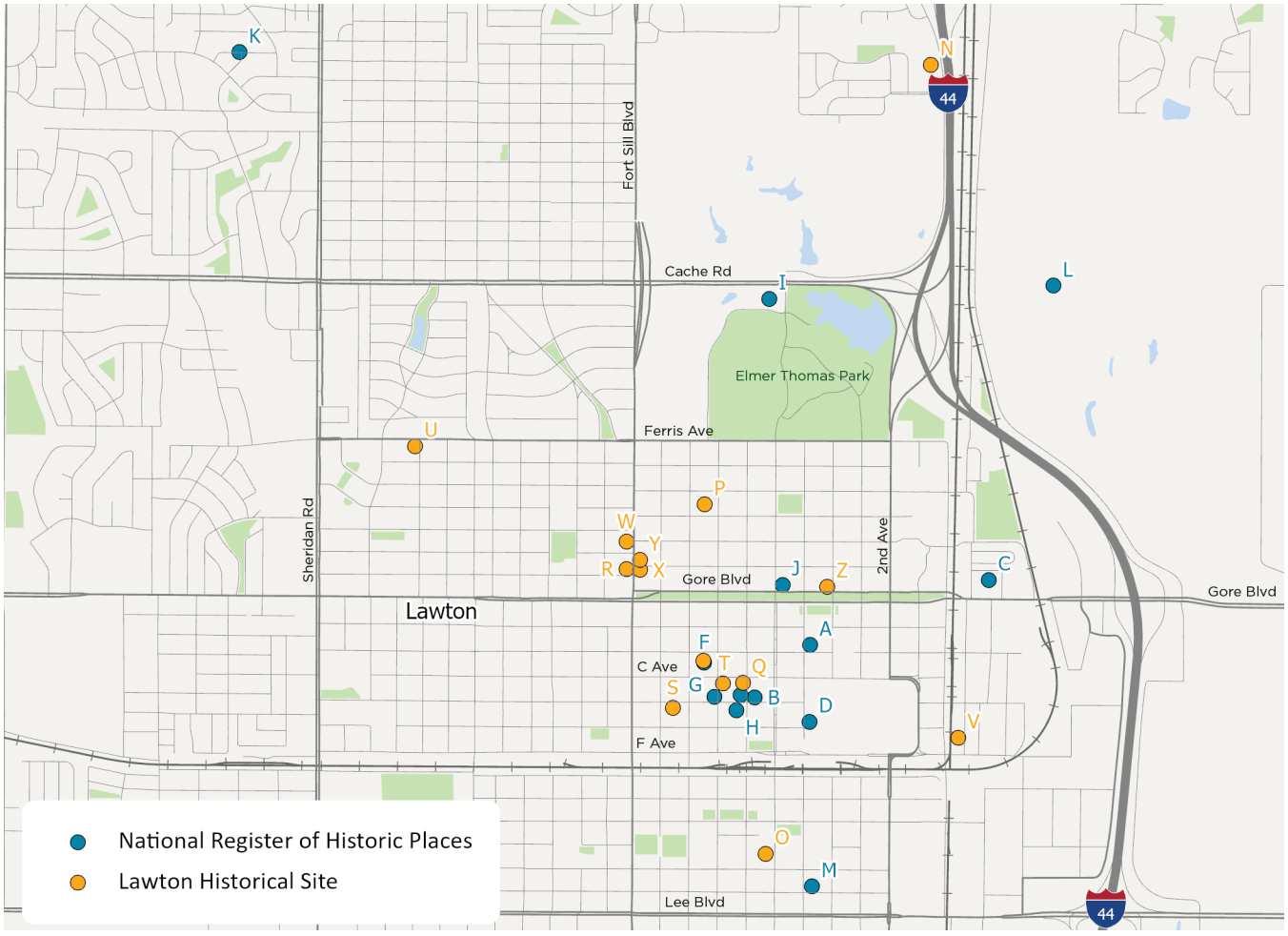


Historic Features

The LMATS area is home to 26 historic sites, including nine locations that are listed on the National Register of Historic Places. Most of these sites are in or near downtown Lawton. The historic sites shown in Figure 2.11 include the following:

A) Carnegie Library
B) Central Fire Station
C) Douglass School
D) Federal Building and U.S. Courthouse
E) First Christian Church
F) Lawton High School
G) First Presbyterian Church of Lawton
H) Methodist Episcopal Church
I) Lawton National Guard Armory
J) Mahoney-Clark House
K) Sunset-Vogue-Blue Ribbon Apartments
L) Fort Sill Indian School
M) Mattie Beal Home
N) Comanche Reformed Church
O) Lincoln School
P) Washington Elementary School
Q) The First Congregational Church
R) The Quinette House
S) The Joan Crawford Childhood Home
T) McMahon Home
U) Vaska Theater
V) The Old Fairmont Creamery
W) William Shanklin House
X) The Johnson House
Y) The Moses House
Z) The Keegan House

Figure 2.11 – Historic Sites



Key Destinations

The City of Lawton is home to many destinations that provide essential services to the greater region. Fort Sill also provides its own services and education facilities. The LMATS area has 31 schools and two colleges—Cameron University and the Great Plains Technology Center. Additionally, the region hosts the primary medical centers for Southwestern Oklahoma with Southwestern Medical Center, Comanche County Medical Center, and the Lawton Indian Hospital.

Community Assets. A healthy, thriving community has a variety of destinations to support the education, health, and growth of the people that work, play, and live in the area.

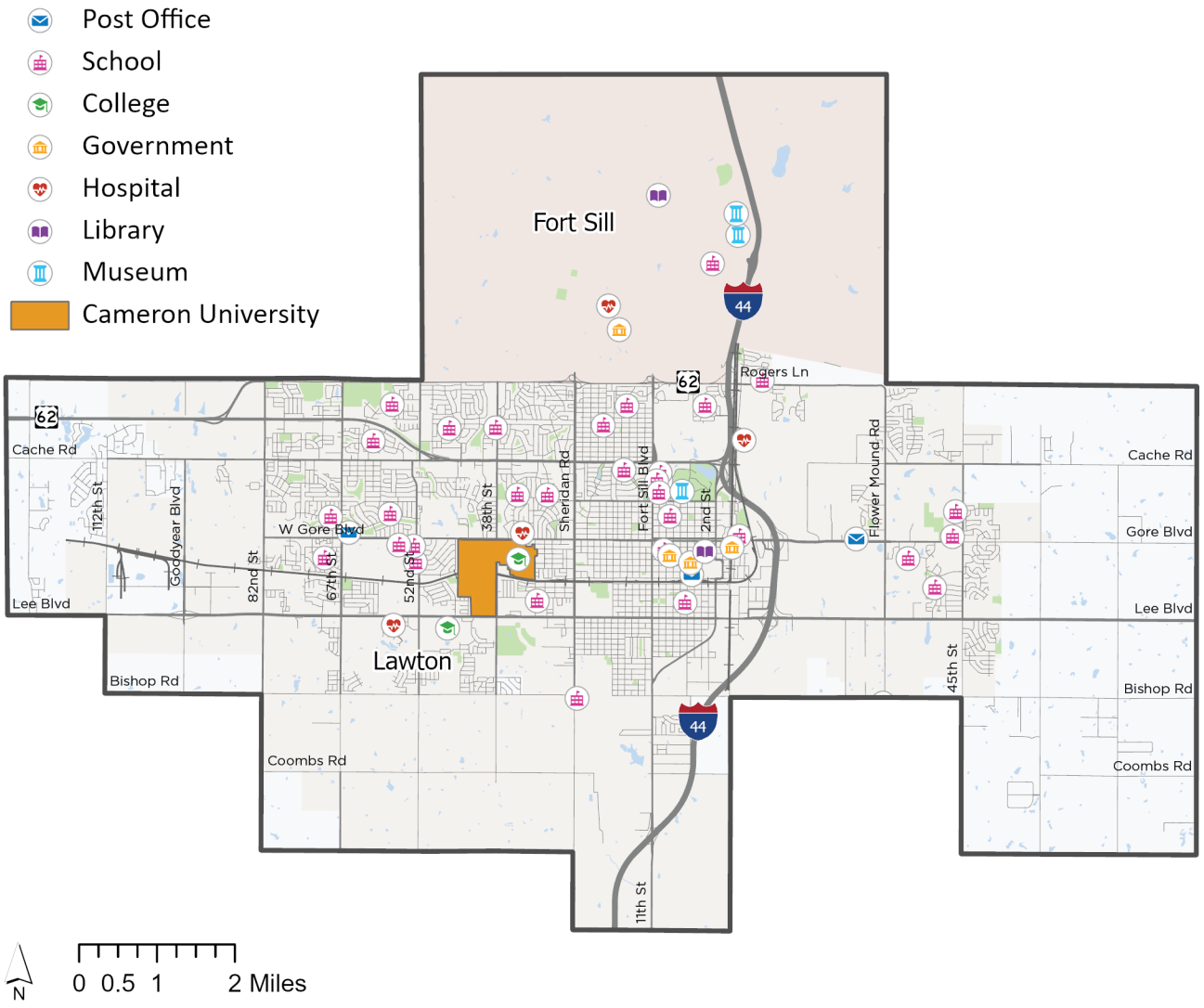
3 *Museums*

4 *Medical Centers*

33 *Schools (31) & Universities (2)*

2 *Libraries*

Figure 2.12 – Key Destinations

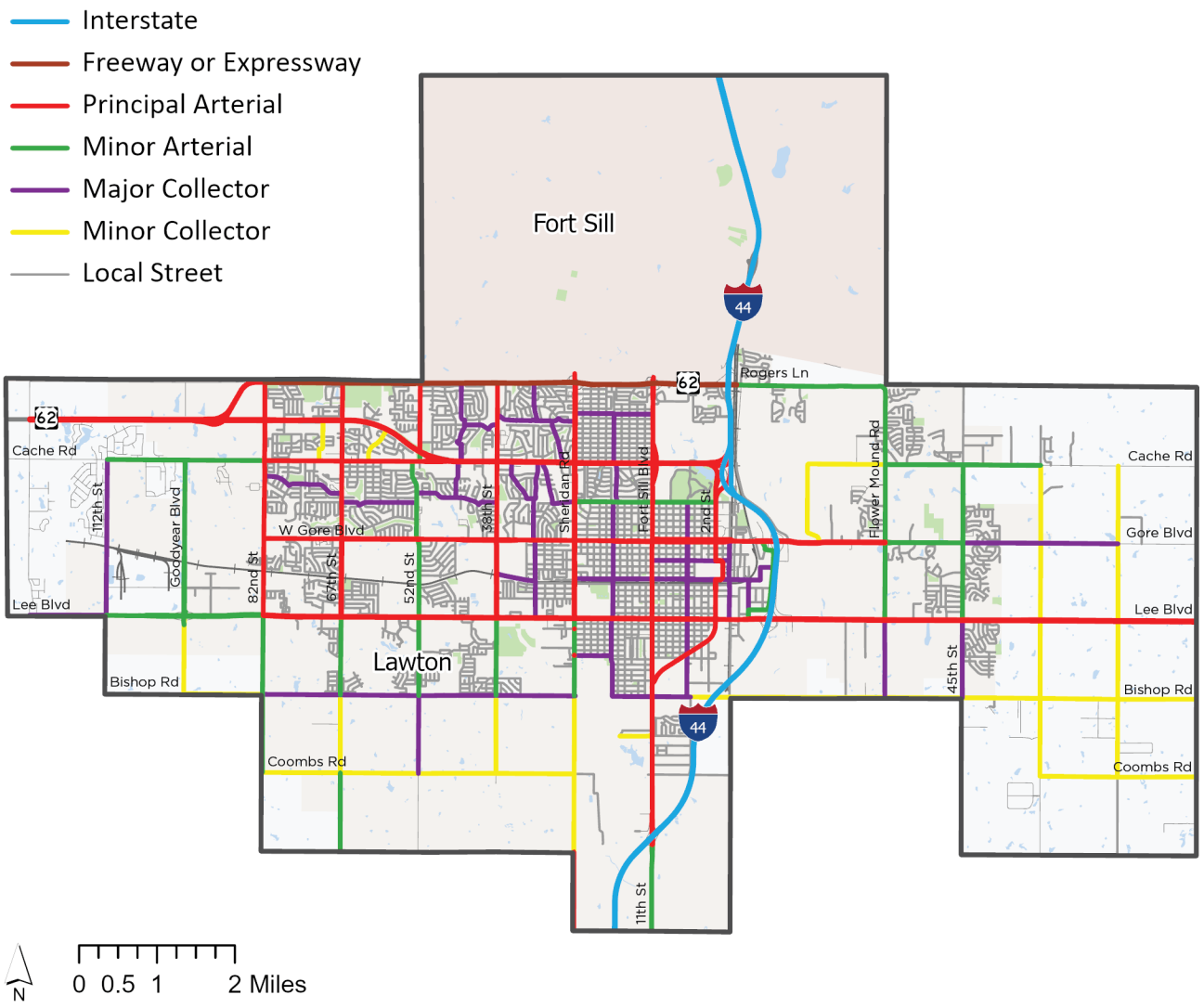


Transportation

Functional Classification

The functional classification system is used to designate characteristics of the roadways into general hierarchies that describe the relationship between mobility and accessibility. Understanding the various roles that roadways play is crucial when considering ways to improve the movement of people and goods within and through the LMATS area.

Figure 2.13 – Functional Classification



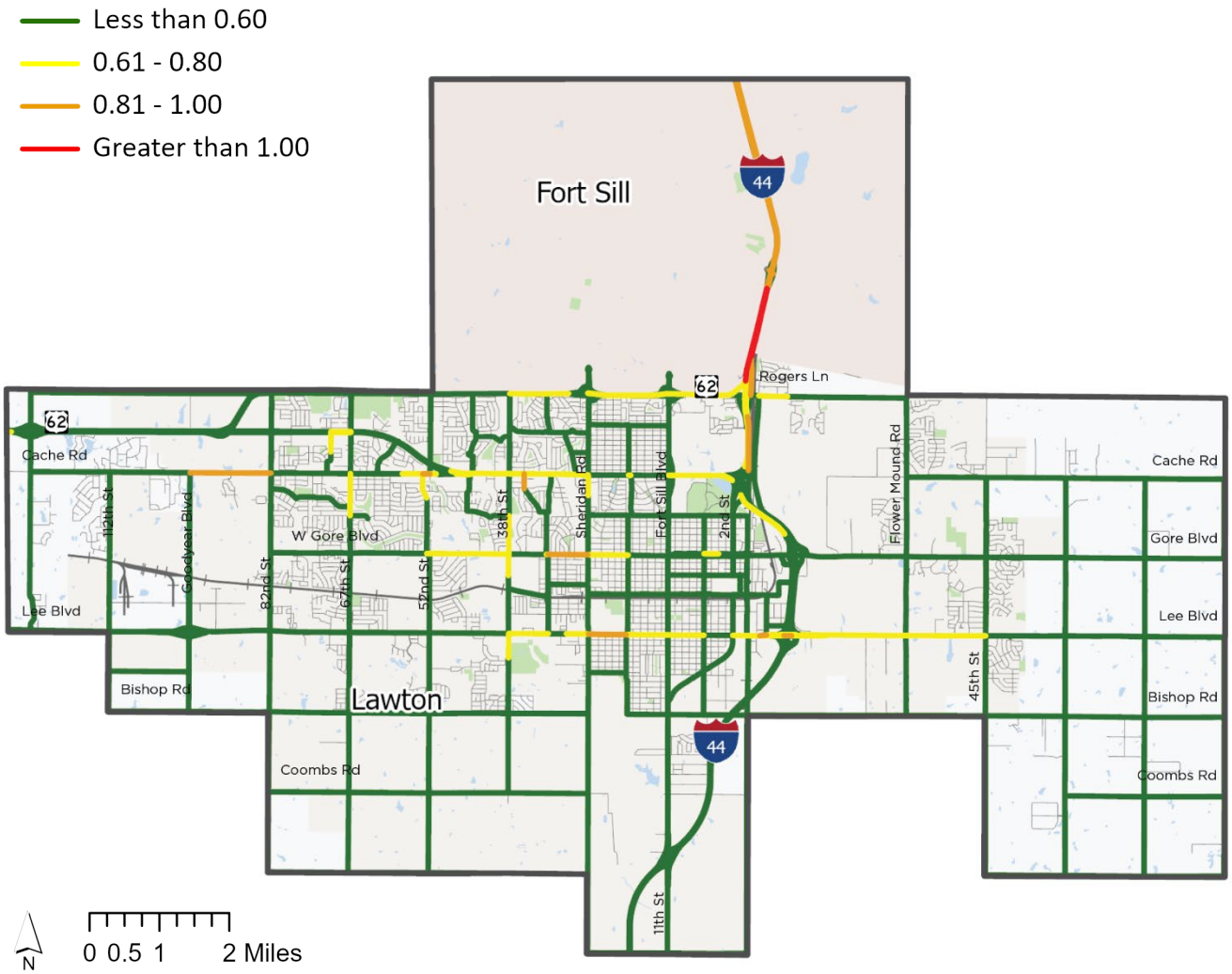
Congested Corridors

Current congested corridors in the LMATS area are determined using the travel demand model. The information is shown using a volume over capacity (V/C) ratio. Figure 2.14 shows the relative congestion of a roadway in the following categories: less than 0.6 (well below capacity), 0.6 to 0.8 = (below capacity), 0.81 to 1.0 = (at capacity), 1.0 to 1.2 = (above capacity), and more than 1.2 = (well above capacity)

Volume and Capacity Ratio. The V/C ratio is calculated by dividing the traffic volume of a roadway segment by the capacity of the roadway. The standardized traffic measure provides context across distinct types of roads. Understanding the base year congestion provides a foundation for determining the current needs and identifying future improvements.

The most congested roadways in the region are I-44 in Fort Sill and small segments of Lee Boulevard, Gore Boulevard, and Cache Road. Some areas experience congestion at certain times of the day but are not reflected in the travel demand model (e.g., Rogers Lane at 38th Street, Gore Boulevard at Cache Road).

Figure 2.14 – Existing Roadway Congestion (PM Peak Hour, 2022)



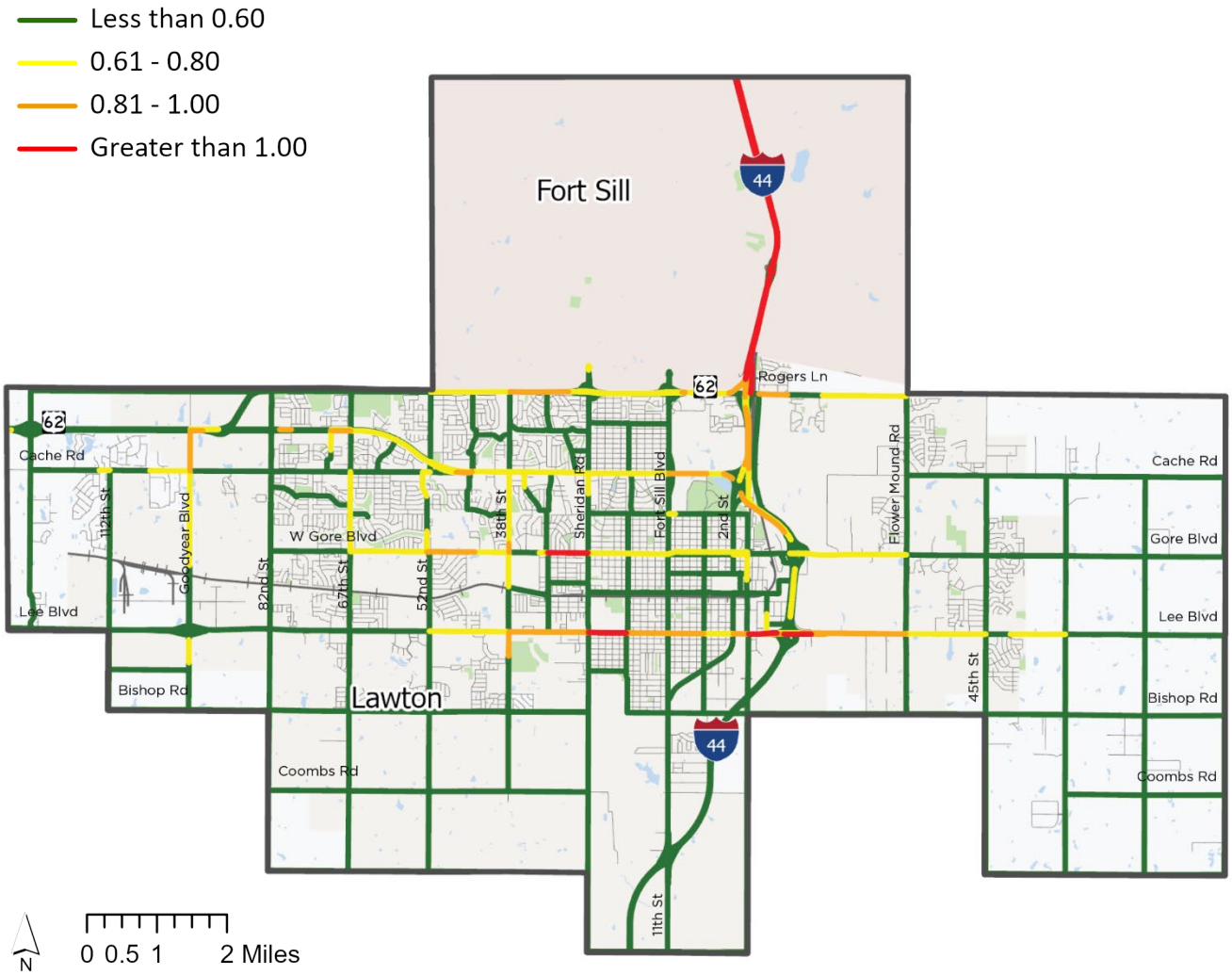
Future Congestion

Future congestion is determined by the travel demand model. The existing plus committed (E+C) network includes all the projects that are currently funded and anticipated to be complete by the plan's horizon year. Notably, there appears to be more congestion in 2050 than in the base year (2022). Corridors that are over capacity in 2050 include portions of I-44, NW Cache Road, SW Lee Boulevard, SE Lee Boulevard, and W Gore Boulevard. The future extension of Goodyear Boulevard is shown as congested in 2050 most likely due to common limitations of travel demand models. However, if congestion proves likely along this roadway during future more detailed study, widening should be considered.

Committed Projects. The existing plus committed projects include the following projects that have been funded:

- **W Gore Boulevard**: widen to five lanes from 67th Street to 82nd Street
- **Goodyear Boulevard Extension**: new location and interchange between Cache Road and US 62
- **NE Rogers Lane**: widen to three lanes from I-44 to Village Drive

Figure 2.15 – Future Roadway Congestion (PM Peak Hour, 2050)



Safety

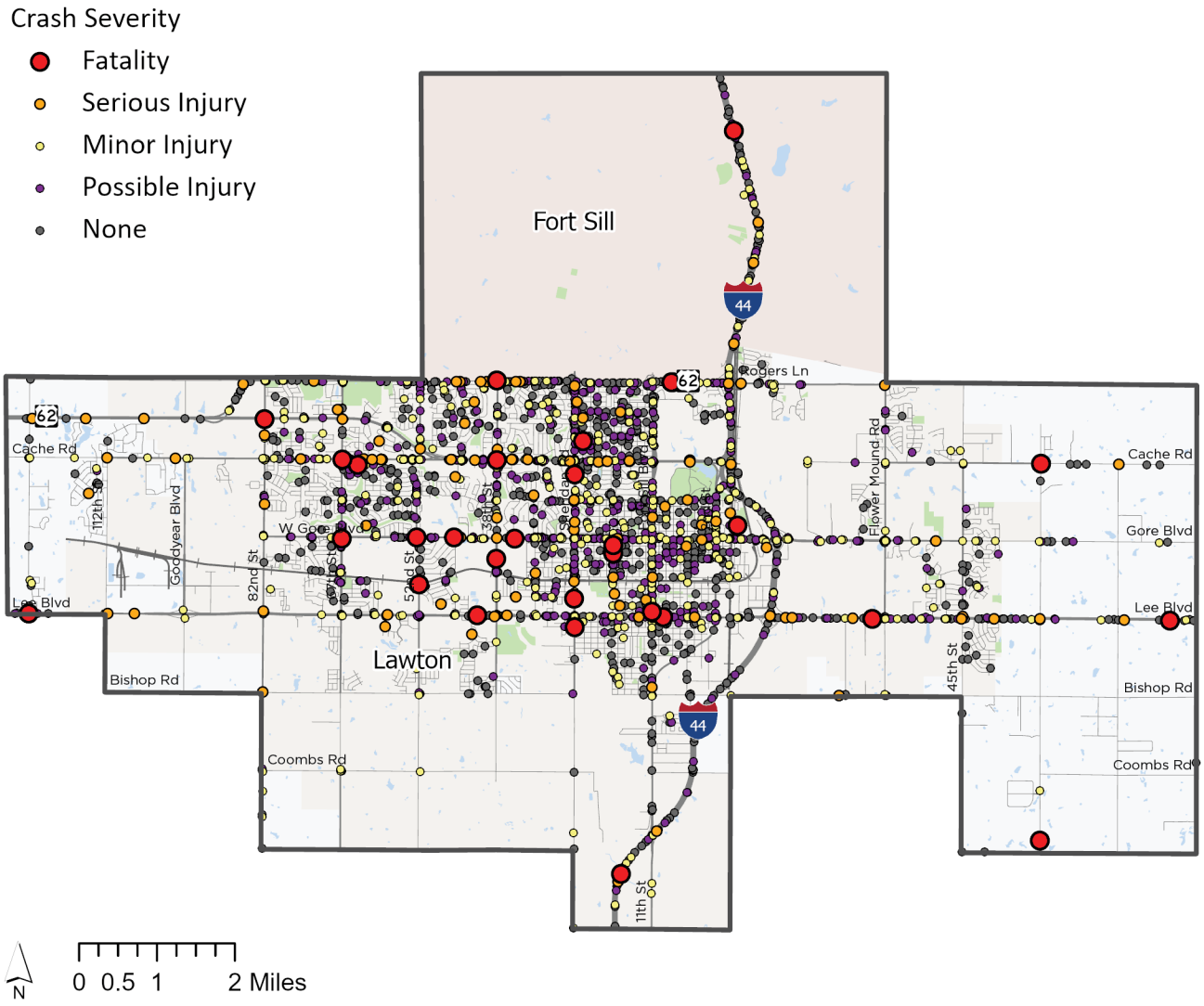
Reducing the number of crashes is a key priority for the Lawton MPO. Figure 2.16 shows the density of crashes across the LMATS area categorized by severity. The red dots represent fatal crashes. The highest density of crashes is at NW Sheridan Road and NW Cache Road. High crash corridors include Cache Road, Sheridan Road, and Gore Boulevard east of 38th Street.

Crash Severity. In the LMATS area, a total of 4,740 crashes were reported between January 2017 and January 2022. The breakdown of crashes by severity include:

Fatal—**30** | Serious Injury—**124**
Minor Injury—**556** | Possible Injury—**1,312**
No Injury—**2,718**

The data below shows the number of crashes between 2017 and 2021. In 2021, 605 crashes were reported, a 61.9% decrease from 2017 (1,590 reported crashes). However, during the same period the number of fatal crashes increased from 4 to 11.

Figure 2.16 – Crash Density and Fatal Crashes (2017 to 2021)



Source: Oklahoma Highway Safety Office Oklahoma Department of Public Safety

Active Transportation

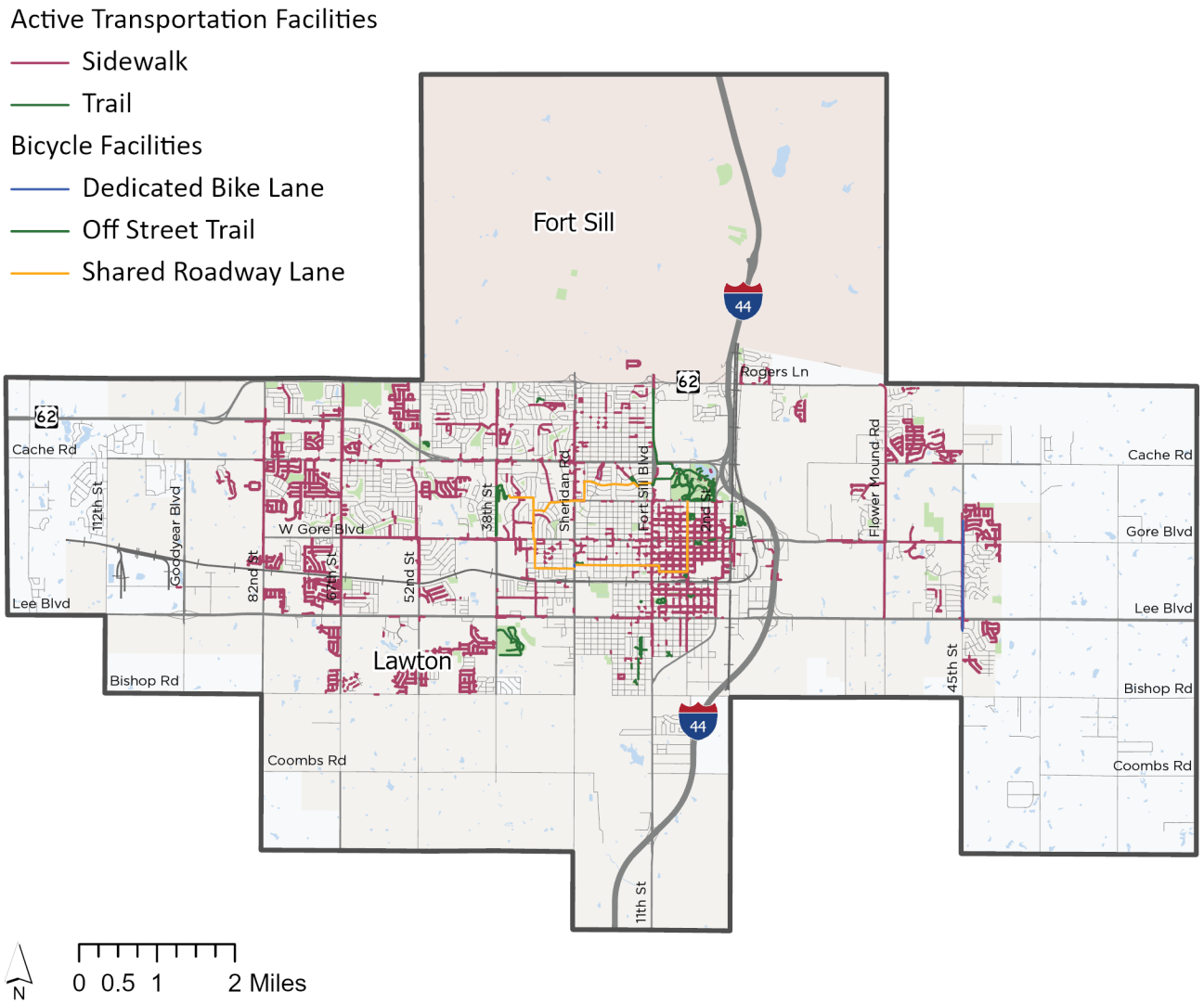
The active transportation network in the LMATS area is made up of sidewalks, trails, and bicycle facilities. Clusters of sidewalks occur in the LMATS area, and the most complete sidewalk grid is located in downtown Lawton. Outside of these pockets, existing sidewalks are concentrated in residential communities. Bikeways and trails are prevalent in central Lawton.

By the Numbers. Active transportation choices allow people to determine which mode of transportation to take. The following summary includes the number of linear miles by facility type:

24.8 *Miles of Bicycle Trails and Shared Roadway Lanes*

391.1 *Miles of Sidewalk Facilities*

Figure 2.17 – Active Transportation



Transit Service

The Lawton Area Transit System (LATS) is the public transportation system with service limited to the City Limits. The existing routes (Figure 2.18) include five fixed routes that connect the region by bus. Paratransit service is also available to provide specialized service for those with disabilities. Transit service is particularly important of the transit-dependent households that lack access to a personal automobile (Figure 2.19).

Public Transportation in Lawton.
LATS operates a fixed route bus system every day except Sunday. The buses in Lawton move in clockwise and counter clock-wise direction along the routes with a 15-minute separation between the directions of movement. LATS also operates a shuttle service to Fort Sill.

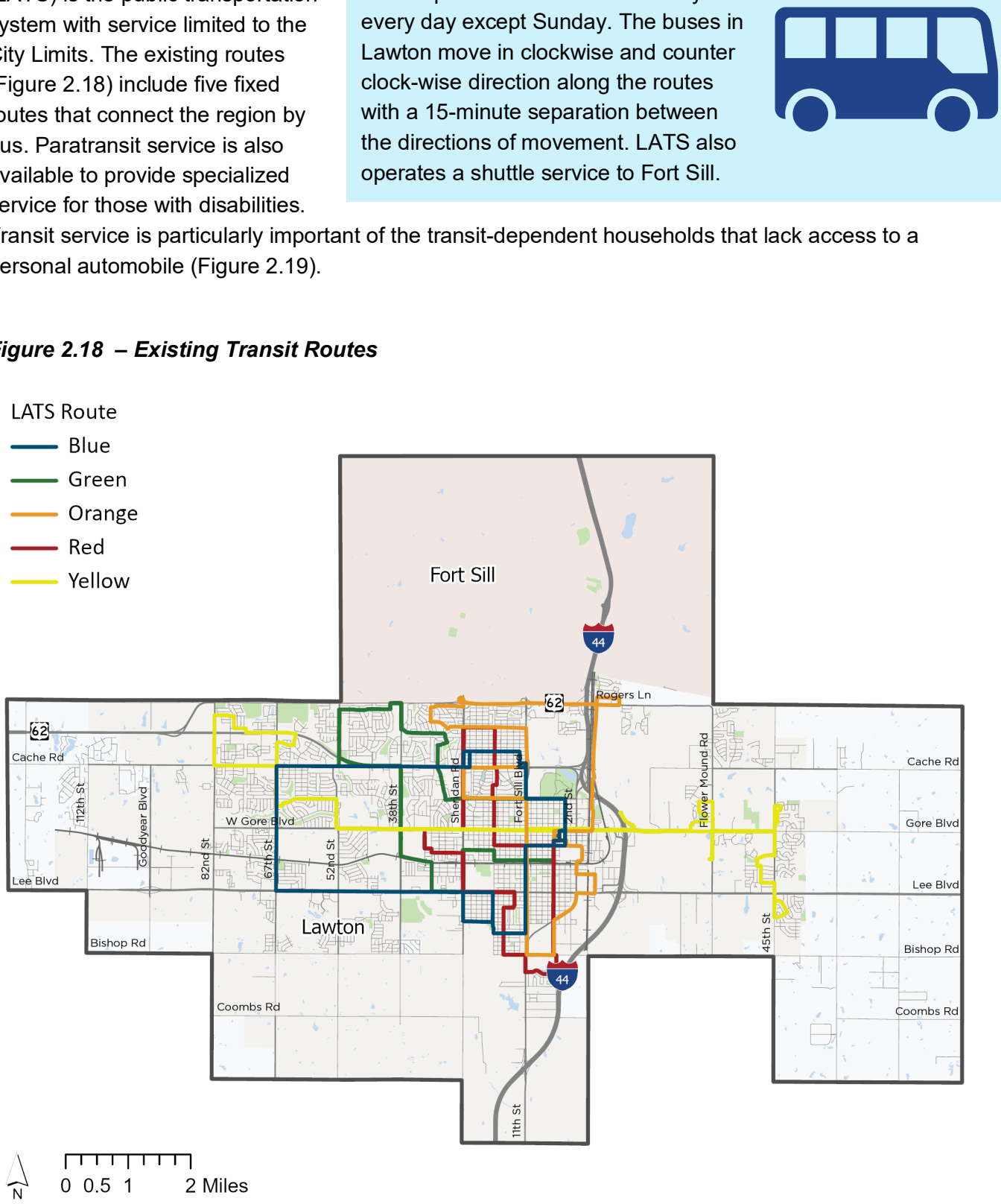
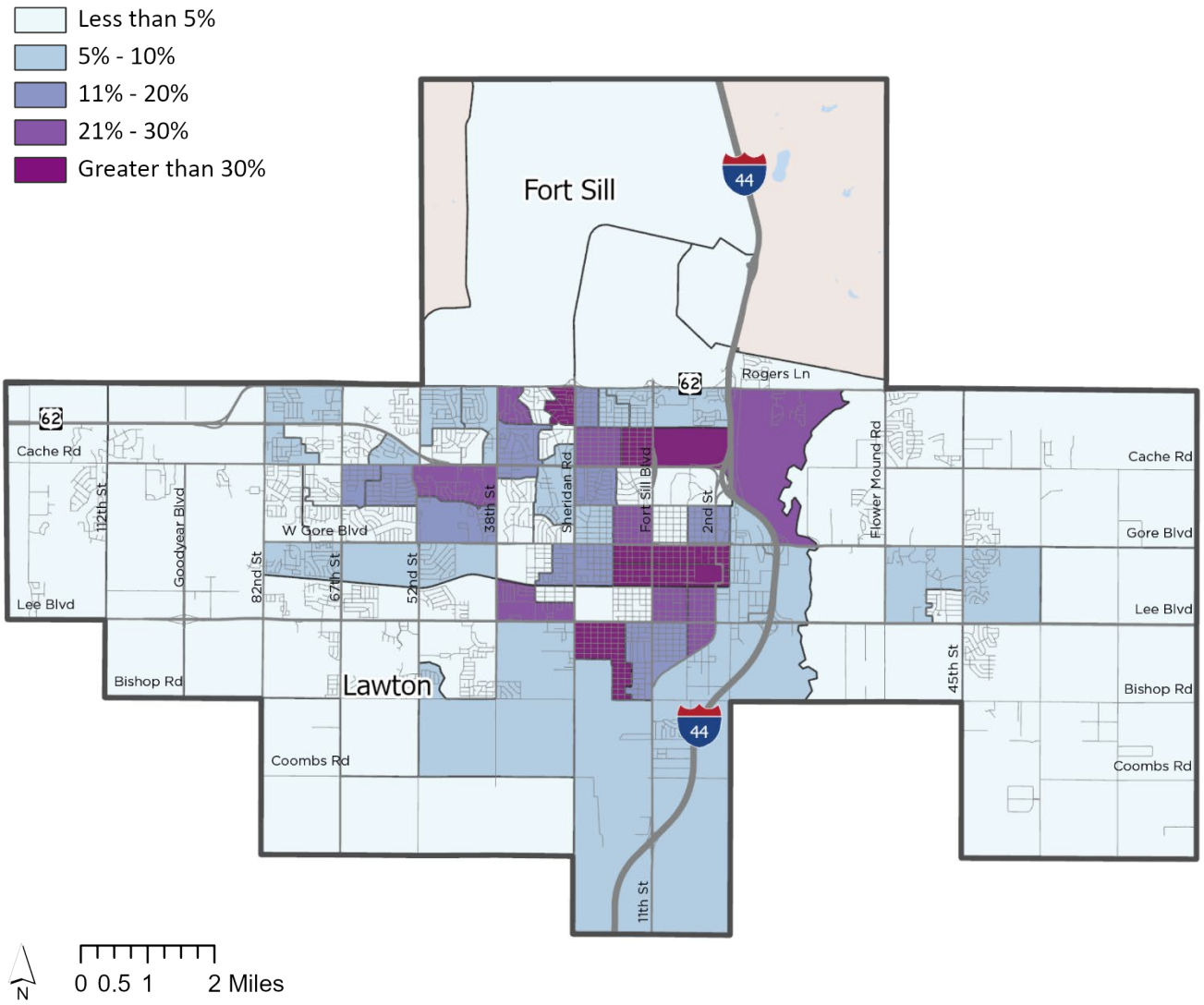


Figure 2.18 – Existing Transit Routes

Figure 2.19 – Transit-Dependent Households (2022)

(Percent Households Without Access to a Vehicle by Census Block Group)

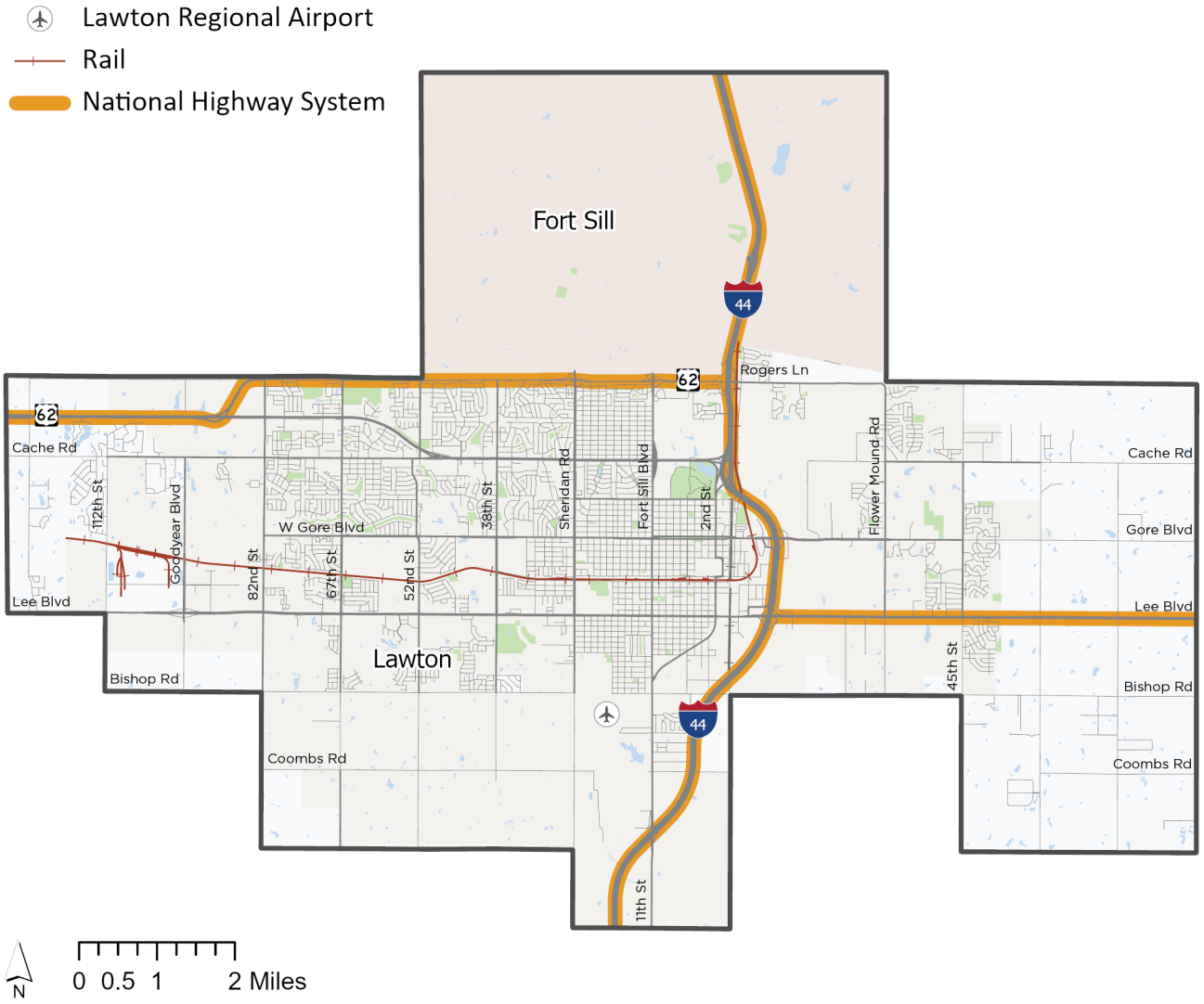


Freight, Rail, and Aviation

Freight movement is a critical part of the LMATS area's economy given the presence of Fort Sill and industrial anchors such as the West Lawton Industrial Park located at the intersection of Goodyear Boulevard and SW Lee Boulevard.

- I-44, US 62, and State Highway 7 are part of the National Highway System (NHS) and serve as the primary routes in and out of the region.
- Lawton-Fort Sill Regional Airport (LAW) offers four daily round trips to Dallas-Fort Worth (DFW) and serves as the region's general aviation airport.
- Freight rail is served by the Stillwater Central Railroad, a short line railway that connects Lawton to Oklahoma City.

Figure 2.20 – Freight, Rail, and Aviation



Transportation Technology

The Infrastructure Investment and Jobs Act (IIJA) introduced new or reinforced areas of focus for metropolitan transportation plans, including transportation technology.

Electric Vehicles

An emerging emphasis area in transportation technology is electric vehicles or EVs. Through IIJA, the National Electric Vehicle Infrastructure (NEVI) Program provides almost $5 billion to help states create a network of electric vehicle charging stations along designated corridors. The program provides Oklahoma more than $66 million in federal funding for EV charging infrastructure over the next five years, with these funds requiring a match with state, local, and/or private funding. The state's NEVI program, EVOK, sets forth a vision to enhance the existing EV charging network through partnerships with local stakeholders and the private sector, which will build, maintain and operate these stations. Within the LMATS area, I-44 is identified as a Ready EV Corridor and US 62 as a Pending EV Corridor.

ACES

Incorporating technology considerations into long-range transportation planning is more vital than ever given emerging technologies that have the potential to completely transform prevailing transportation practices. Yet there is great uncertainty, with outcomes depending on a variety of factors such as the types and rate of technology adoption and market penetration. Emerging transportation technologies in Oklahoma are grouped under the term Automated, Connected, Electric, and Shared-Use (ACES).

ITS Solutions

Outside of committing funding to infrastructure, other cost-efficient measures can be undertaken to increase the safety and efficiency of the transportation network. Those include Intelligent Transportation Systems (ITS), which makes the existing transportation system more efficient by increasing the efficient of the transportation system using a variety of tools. In the LMATS area, an important ITS solution is improvements to signalization. Traffic signal retiming is one of the most cost-effective ways to help traffic move and is one of the most basic strategies to help mitigate congestion. The goal of the traffic control system is to develop a network that operates in real time, by adjusting signal timing to accommodate changing traffic patterns. The Lawton MPO receives Congestion Mitigation and Air Quality (CMAQ) funds that are available for air quality awareness campaigns and projects that help air quality. Past projects have included the construction and signing of bicycle routes, and the replacement of timed traffic signals with video actuated signals. In future, CMAQ funds should be used for ITS purposes, including traffic signal updates and synchronization.

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CHAPTER 3

Multimodal Framework

Introduction

A safe and convenient transportation system is an essential element of a community. A well-planned system connects people to shops, jobs, and recreational activities while minimizing congestion and travel delays and promoting healthy lifestyles. The transportation strategy featured in this chapter was designed to respond to and help fulfill the goals and objectives shown in Chapter 1. The **Directions 2050 MTP** transportation strategy includes a multimodal framework that focuses on mobility, safety, economic vitality, and quality of life.

Transportation Planning Process

The **Directions 2050 MTP** must clearly communicate its vision, process, recommendations, and outcomes. Therefore, the multimodal framework leans on the plan's goals and objectives as well as key takeaways from the review of existing conditions and public input provided throughout the process. Typically, the creation of balanced recommendations follows these four steps:

1	**Existing Conditions**	**Document the existing conditions for all modes of transportation and the socioeconomic factors that impact them**
2	**Universe of Projects**	**Inventory a universe of projects from previous planning efforts to act as the framework for developing new recommendations**
3	**Needs Assessment**	**Determine transportation needs based on technical analysis and public feedback**
4	**Recommendations Development**	**Create a set of integrated and coordinated multimodal recommendations**

The **Directions 2050 MTP** must include a financially constrained list of roadway projects that consider transportation needs, transportation priorities, and a reasonable assumption of future dollars available for transportation investments. Therefore, the roadway element requires two additional steps.

5	**Prioritization**	**Prioritize comprehensive, multimodal transportation solutions and policies to receive investment**
6	**Financial Constraint**	**Develop a financially constrained plan that identifies funding sources and tiers**

Multimodal Recommendations. The coordinated recommendations for the **Directions 2050 MTP** are presented in a series of visuals and maps for the different modes of transportation: Street Network (Roadway Recommendations); Bicycle and Pedestrian; Transit; and Freight, Rail, and Aviation. While presented as individual pieces, thoughtful consideration is necessary during planning and design to make sure the recommendations coordinate among different travel modes and align with the greater vision of the region.

Street Network

To create a balanced and efficient transportation network, transportation recommendations must blend connectivity and access with safety improvements. This balance is illustrated in the roadway recommendations and safety improvements as indicated on the pages that follow.

Roadway Needs Assessment

The needs assessment was an important step in developing the recommendations for the street network. The needs were determined based on a review of existing and projected conditions as described in Chapter 2. This review included outputs from the travel demand model, including 2050 projections for population, households, and employment. Other outputs from the travel demand model such as existing and future congestion also was informative. The understanding of existing and projected conditions was coupled with the community input as summarized in Chapter 6.

Roadway Recommendation Types

The following improvement types are the categories that the **Directions 2050 MTP** roadway recommendations are organized within.

Build New refers to the construction of a new roadway to provide drivers with increased options and to distribute vehicular traffic on alternative routes.

Widen refers to the addition of at least one travel lane in each direction or constructing a center turn lane to address congestion concerns.

Modernize refers to a variety of ways to enhance mobility and extend the longevity of the road without building new travel lanes. Safety benefits are often associated with modernization efforts. These improvements include:

- *Access Management*—restricting some turning movements, consolidating driveways, and adding medians to enhance mobility and safety along a corridor
- *Operational Improvement*—upgrading traffic signals or timing to enhance mobility along a corridor
- *Intersection Realignment*—shifting or relocating intersections to increase safety or simplify vehicular movements

Complete Streets. Elements of complete streets are assumed to be a part of all types of recommended improvements in which it is reasonable for them to apply. The approach to complete streets, which varies based on the roadway and its surrounding land use context, includes elements such as sidewalks, bicycle lanes, crossing opportunities, curb extensions, accessible pedestrian signals, and more. The cost estimates applied to the projects within the financial plan (Chapter 4) factors in bicycle and pedestrian improvements.

Roadway Recommendations

The roadway recommendations provide a baseline for advancing complete street concepts by incorporating pedestrian and bicycle facilities where feasible. These improvements further enhance access to and the efficiency of public transportation in the LMATS area. Using the previous planning efforts as a starting point, the needs and opportunities for future roadway improvements were further refined based on public engagement and a needs assessment. Recommendations include the funded extension of Goodyear Boulevard with a new interchange at US-62. Other recommendations include widening existing roads and modernizing roadways by adding shoulders and installing turn lanes. The types of improvements. Only a portion of these projects can be funded, but the projects can be reconsidered as new funding and priorities change. The results of the project prioritization process are explored in Chapter 4.

Figure 3.1 – Roadway Recommendations

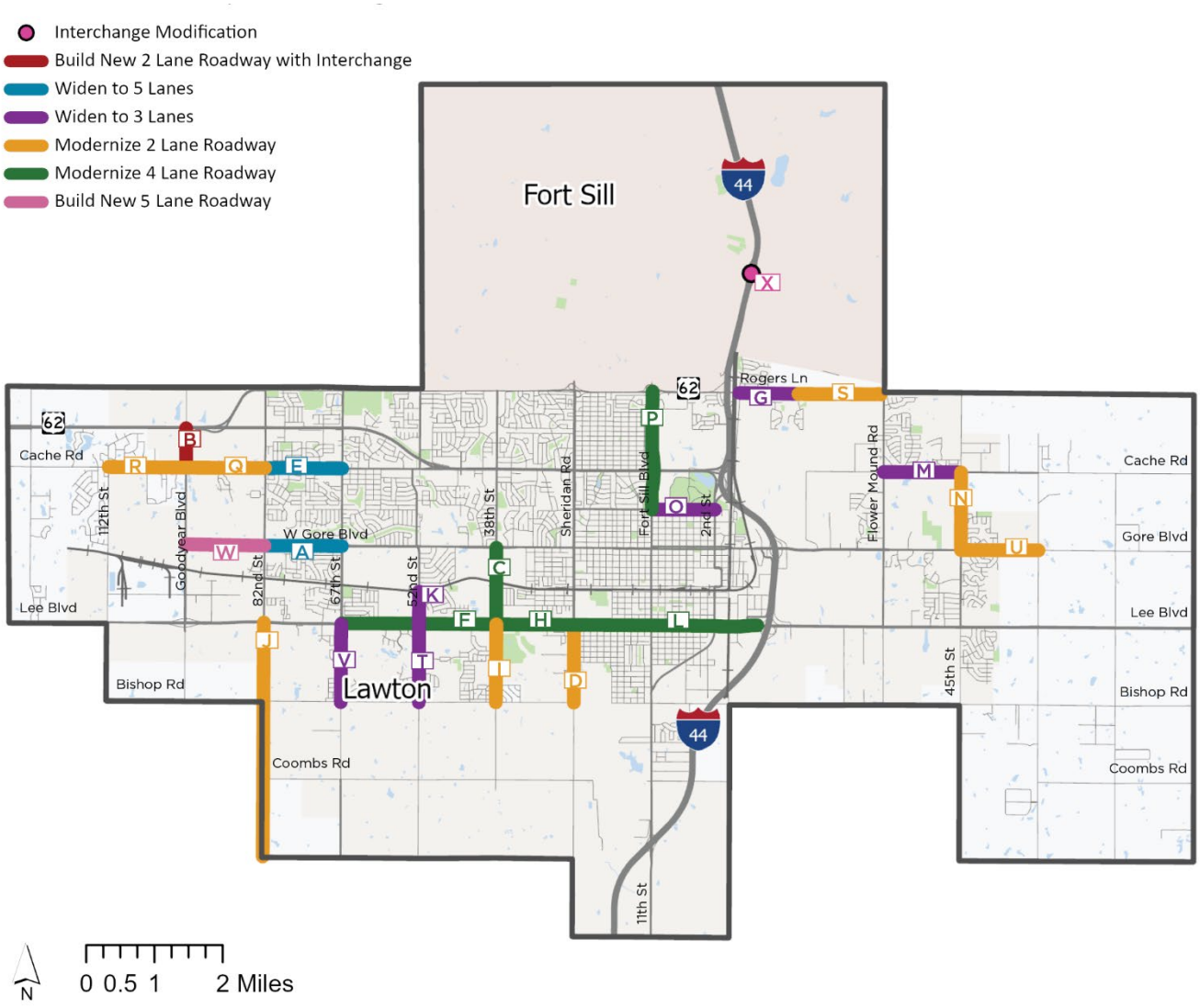


Table 3.1 – Roadway Recommendations

Map ID	Project Corridor	From	To	Description
Funded Projects				
A	W Gore Blvd	67th St	82nd St	**Widen** to 5 lanes
B	Goodyear Blvd Ext	Cache Rd	US 62	**Build new** 2-lane roadway and interchange
G	NE Rogers Ln	I-44	Village Dr	**Widen** to 3 lanes
MTP Recommendations				
C	SW 38th St	Gore Blvd	Lee Blvd	**Modernize** 4-lane roadway with wider shoulders and turn lanes
D	SW Sheridan Rd	Lee Blvd	Bishop Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements
E	NW Cache Rd	67th St	82nd St	**Widen** to 5 lanes
F	Lee Blvd	67th St	38th St	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements
H	Lee Blvd	38th St	Sheridan Rd	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements
I	SW 38th St	Lee Blvd	Bishop Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements
J	SW 82nd St	Lee Blvd	Woodlawn Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements
K	SW 52nd St	Lee Blvd	Railroad Crossing	**Widen** to 3 lanes
L	Lee Blvd	Sheridan Rd	I-44	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements
M	NE Cache Rd	Flower Mound Rd	NE 45th St	**Widen** to 3 lanes
N	NE 45th St	Cache Rd	Arlington Ave	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements
O	NW Ferris Ave	Fort Sill Blvd	2nd St	**Widen** to 3 lanes
P	NW Fort Sill Blvd	Ferris Ave	Rogers Ln	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements
Q	NW Cache Rd	82nd St	Goodyear Blvd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements
R	NW Cache Rd	Goodyear Blvd	112th St	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements
S	NE Rogers Lane	Village Dr	Flower Mound Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements
T	SW 52nd St	Lee Blvd	Bishop Rd	**Widen** to 3 lanes
U	E Gore Blvd	45th St	60th St	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements
V	SW 67th St	Lee Blvd	Bishop Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements
W	W Gore Blvd Ext	82nd St	Goodyear Blvd	**Build new** 5-lane roadway
X	I-44	at Key Gate Interchange		**Modify Interchange**

Environmental Overlay

In Figure 3.2, the roadway recommendations are overlaid on the LMAT area's environmentally sensitive areas. Table 3.2 provides additional information about the environmental conditions that could impact each of the roadway recommendations. These environmental conditions will be assessed as each project progresses through the phases of implementation. Mitigating the impacts of these environmental considerations will enhance the resilience of the overall transportation network.

Figure 3.2 – Roadway Recommendations Environmental Overlay

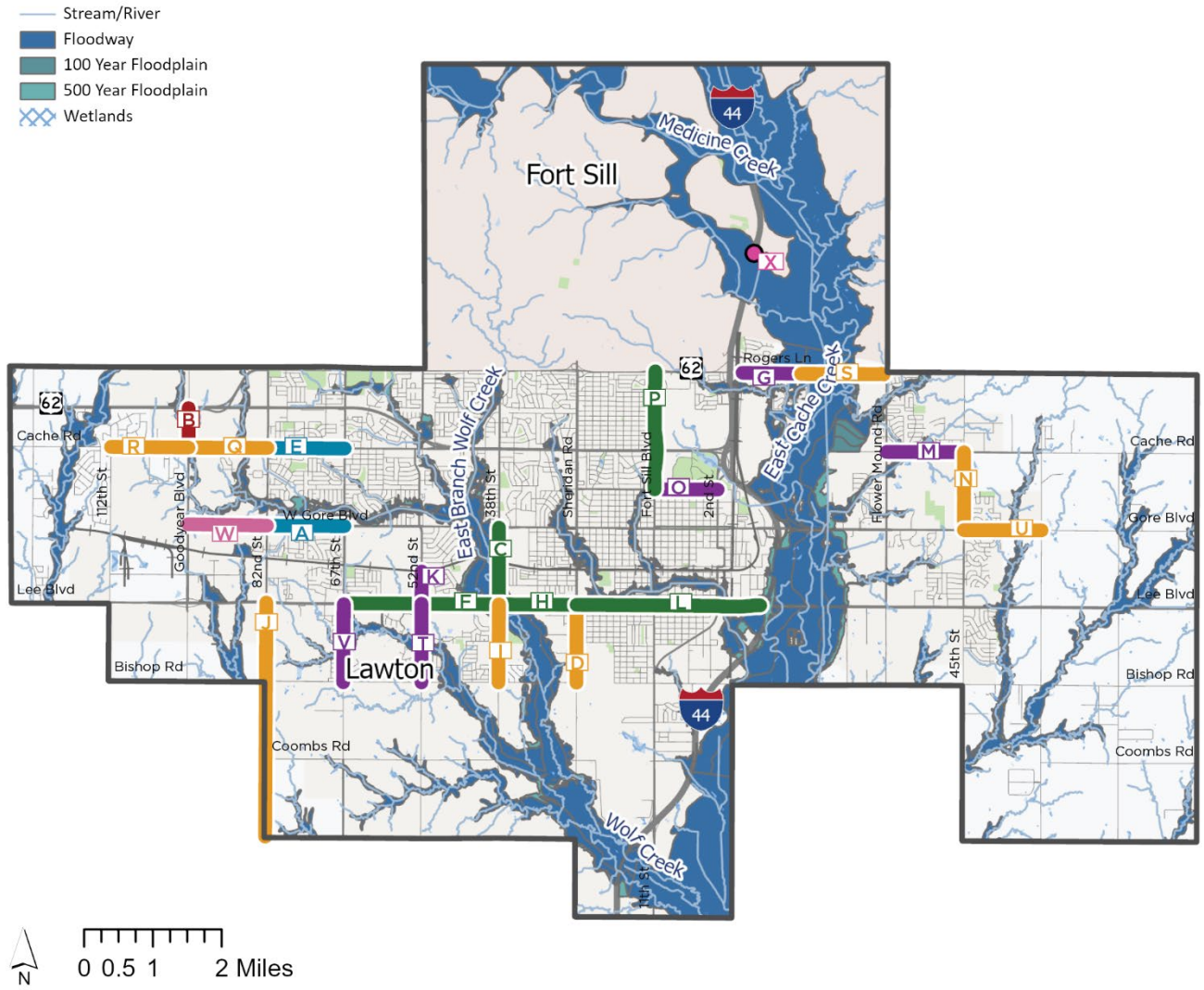


Table 3.2 – Roadway Recommendations Environmental Mitigation Considerations

Map ID	Project Corridor	From	To	Environmental Mitigation Considerations
Funded Projects				
A	W Gore Blvd	67th St	82nd St	Stream/River
B	Goodyear Blvd Ext	Cache Rd	US 62	Stream/River; Floodway
G	NE Rogers Ln	I-44	Village Dr	Stream/River; Floodway
MTP Recommendations				
C	SW 38th St	Gore Blvd	Lee Blvd	Stream/River; Floodway
D	SW Sheridan Rd	Lee Blvd	Bishop Rd	-
E	NW Cache Rd	67th St	82nd St	-
F	Lee Blvd	67th St	38th St	Stream/River; Floodway
H	Lee Blvd	38th St	Sheridan Rd	Stream/River; Floodway
I	SW 38th St	Lee Blvd	Bishop Rd	Stream/River; Floodway
J	SW 82nd St	Lee Blvd	Woodlawn Rd	-
K	SW 52nd St	Lee Blvd	Railroad Crossing	Stream/River
L	Lee Blvd	Sheridan Rd	I-44	Stream/River; Floodway
M	NE Cache Rd	Flower Mound Rd	NE 45th St	Stream/River
N	NE 45th St	Cache Rd	Arlington Ave	Stream/River
O	NW Ferris Ave	Fort Sill Blvd	2nd St	-
P	NW Fort Sill Blvd	Ferris Ave	Rogers Ln	-
Q	NW Cache Rd	82nd St	Goodyear Blvd	Stream/River; Floodway
R	NW Cache Rd	Goodyear Blvd	112th St	-
S	NE Rogers Lane	Village Dr	Flower Mound Rd	Stream/River; Floodway
T	SW 52nd St	Lee Blvd	Bishop Rd	Stream/River; Floodway
U	E Gore Blvd	45th St	60th St	Stream/River; Floodway
V	SW 67th St	Lee Blvd	Bishop Rd	Stream/River; Floodway
W	W Gore Blvd Ext	82nd St	Goodyear Blvd	Stream/River
X	I-44	at Key Gate Interchange		Floodway

Safety

Improving the safety of the transportation system is important to the health and wellbeing of all travelers in the LMATS area. As a federally required component of the metropolitan transportation planning process, safety issues were analyzed during the assessment of existing conditions and vetted through input from the public. Figure 2.16 in Chapter 2 shows the location of all fatal crashes from 2017 to 2022.

Oklahoma Strategic Highway Safety Plan (SHSP)

The **Directions 2050 MTP** leans on guidance provided by the Oklahoma Strategic Highway Safety Plan (SHSP), which was completed in October 2023. The Oklahoma SHSP identifies safety strategies to address areas of greatest need. The vision of the plan is to provide and promote the safest roadway transportation system for all travelers – zero deaths, zero serious injuries. The mission of the Oklahoma SHSP is to develop, implement, and evaluate a data-driven, multidisciplinary process to maximize road safety through widespread collaboration. The goal is to reduce fatalities and serious injuries as it seeks zero deaths and serious injuries.

The Oklahoma SHSP organizes implementation strategies around eight priority emphasis areas: Lane Departures, Impaired Driving, Occupant Protection, Unsafe Speed, Intersections, Commercial Motor Vehicle Crashes and Work Zones, Motorcycle Crashes and All-Terrain Vehicles, and Vulnerable Road Users.

Vulnerable Road Users. A Vulnerable Road User (VRU) is defined as a person walking, bicycling, or rolling; someone using a mobility assistance device; or a roadway worker or first responder on foot. The Oklahoma SHSP identified the LMATS area as high-risk area for VRUs. This assessment was based on VRU fatalities and serious injuries per 100,000 residents. The Oklahoma SHSP recommends additional analysis, consultation, and resources to improve pedestrian and bicycle safety.

Safety Countermeasures

The Oklahoma SHSP outlines various countermeasures as part of the action plan strategies for the eight emphasis areas. These countermeasures include a mix of programs, policies, and physical projects. Many of the physical countermeasures from the Oklahoma SHSP align with the safety countermeasures outlined in FHWA's Proven Safety Countermeasures initiative. Both the ODOT and FHWA countermeasures consider all road users and are applicable on a variety of road types. These following safety measures, adapted from ODOT and FHWA, area referenced in the corridor and intersection safety hotspot locations in the pages that follow.

- Crosswalk improvements (e.g., high visibility crosswalks, pedestrian signal improvements)
- Striping improvements
- Turn lane improvements
- Intersection geometric improvements
- Speed reduction
- Signal improvements
- Wider edge lines/shoulders
- Enhanced lighting
- Access management

Safety Hot Spots

The roadway recommendations presented earlier in this chapter will have a positive contribution to the safety of the traveling public. Additional safety improvements are recommended here to complement other roadway projects. Figure 3.3 and Tables 3.3 and 3.4 show the location and briefly describe the safety recommendations. These locations should be further evaluated, and more hot spots should be added as needed as part of the future Safety Action Plan. Finally, these locations are a starting point for consideration should specific safety funds become available.

Safety Action Plan. Additional analysis on causational factors and safety improvements would be helpful in the LMATS area. Many communities are developing Safety Action Plans that use the Safe Systems Approach developed by the Federal Highway Administration (FHWA). This approach is based on the understanding that no roadway deaths and serious injuries are acceptable, and that a safety program must consider infrastructure, human behavior, emergency response, and the overall effectiveness of a transportation system.

Further analysis would be particularly beneficial given the Oklahoma SHSP identified the LMATS area as a high-risk area for Vulnerable Road Users.

Figure 3.3 – Safety Hot Spots

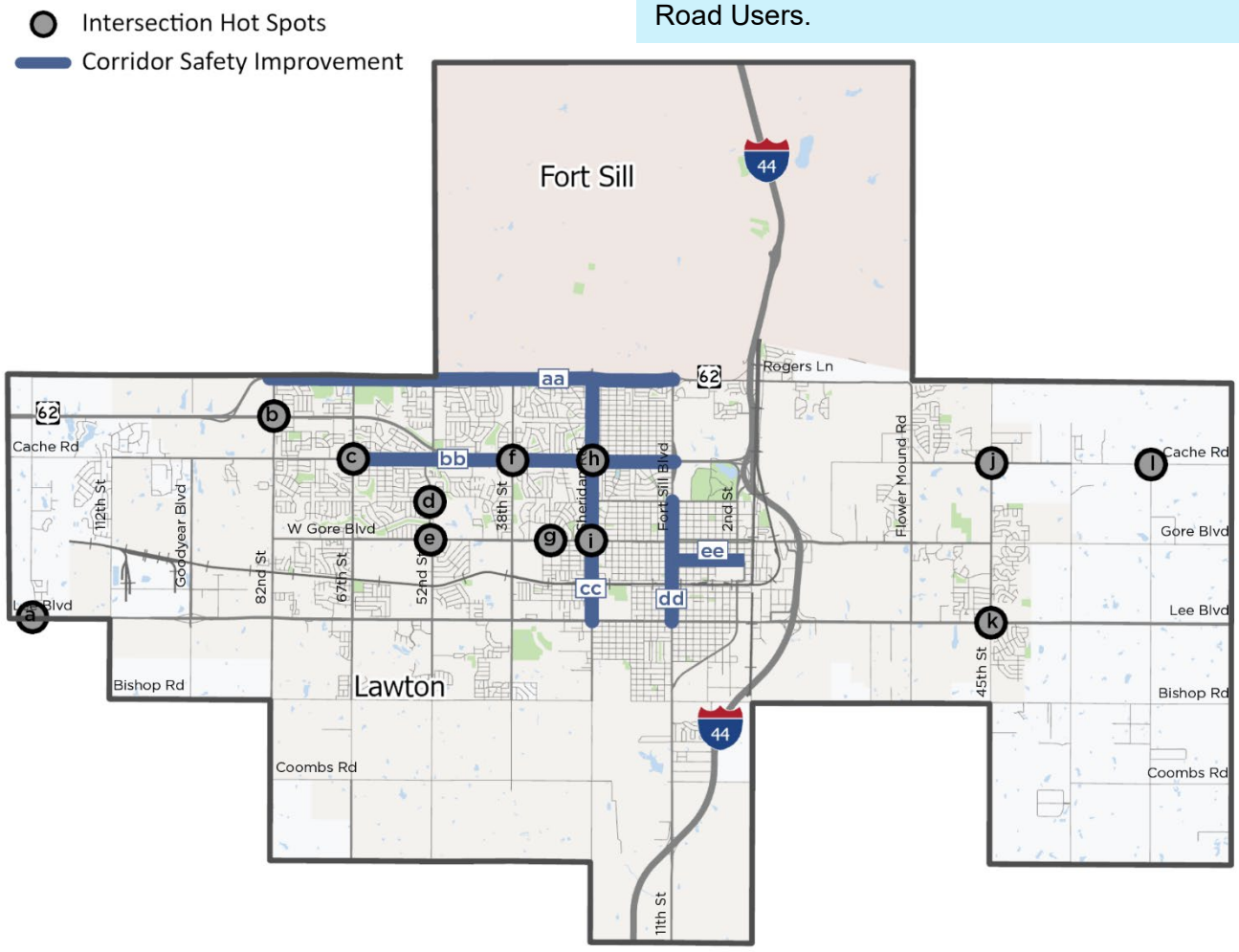


Table 3.3 – Safety Corridors

Map ID	Corridor	From	To	Potential Countermeasure
aa	NW Rogers Ln	NW 82nd St	NW Fort Sill Blvd	Turn lane improvements; Speed reduction; Wider edge lines/shoulders
bb	NW Cache Rd	NW 67th St	NW Fort Sill Blvd	Crosswalk improvements; Turn lane improvements; Intersection geometric improvements; Speed reduction; Signal improvements; Wider edge lines/shoulders; Enhanced lighting
cc	Sheridan Rd	NW Rogers Ln	SW Lee Blvd	Crosswalk improvements; Turn lane improvements; Intersection geometric improvements; Speed reduction; Signal improvements; Wider edge lines/shoulders; Enhanced lighting
dd	SW Fort Sill Blvd	NW Ferris Ave	SW Lee Blvd	Crosswalk improvements; Turn lane improvements; Speed reduction; Signal improvements; Wider edge lines/shoulders
ee	SW C Ave	SW 11th St	SW 1st St	Pedestrian safety enhancements

Table 3.4 – Safety Intersections

Map ID	Intersecting Street 1	Intersecting Street 2	Potential Countermeasure
a	SW Lee Blvd	SW Deyo Mission Rd	Turn lane improvements
b	NW Quanah Parker Trlwy	NW 82nd St	Crosswalk improvements; Striping improvements; Turn lane improvements; Signal improvements; Enhanced lighting
c	NW Cache Rd	NW 67th St	Crosswalk improvements; Turn lane improvements; Signal improvements; Enhanced lighting; Access management
d	NW Euclid Ave	NW 52nd St	Speed reduction; Enhanced lighting
e	W Gore Blvd	NW 52nd St	Crosswalk improvements; Intersection geometric improvements
f	NW Cache Rd	NW 38th St	Turn lane improvements; Signal improvements
g	W Gore Blvd	NW 31st St/SW 27th St	Intersection geometric improvements
h	NW Sheridan Rd	NW Cache Rd	Crosswalk improvements; Striping improvements; Turn lane improvements; Signal improvements; Access management
i	Sheridan Rd	W Gore Blvd	Crosswalk improvements; Striping improvements; Turn lane improvements; Signal improvements; Access management
j	NE Cache Rd	NE 45th St	Turn lane improvements; Enhanced lighting
k	SE Lee Blvd	SE 45th St	Striping improvement; Turn lane improvements; Access management
l	NE Cache Rd	NE 75th St	Turn lane improvements; Enhanced lighting

Bicycle and Pedestrian

The transportation system in a community has a strong influence on the quality of a person's life; transportation systems that limit choice can negatively impact health by limiting opportunities for exercise, increasing stress, and decreasing air quality. Creating an active transportation network has the potential to lower the negative health impacts of the transportation systems that are dominated by automobile-centric designs, especially for populations that are disproportionately impacted by them.

Planning for Active Transportation

A complete active transportation network needs sidewalks, trails, complete streets, and transit service. These active modes must be strategically placed and designed with safety in mind to be viable forms of transportation. Equal in importance are good design principals that encourage trips for any reason and accommodate a variety of user types.

Trip Purpose

- **Utilitarian.** Non-discretionary trips to work, school, the grocery store, or home.
- **Recreational.** Trips made to maintain an active, healthy lifestyle or for social engagement.

User Types

- **Highly Confident (4 to 7% of the total population).** Comfortable riding with traffic, will use roads without bike lanes.
- **Somewhat Confident (5 to 9% of the total population).** Generally prefer more separated facilities, but are comfortable riding in bicycle lanes or on paved shoulders if need be.
- **Interested, but Concerned (51 to 56% of the total population).** Often comfortable with bike lanes, may bike on sidewalks even if bike lanes are provided; prefer off-street or separated bicycle facilities or quiet or traffic calmed residential roads. May not bike at all if facilities do not meet needs for perceived comfort.

The E's of Bike Planning. Creating a safe and convenient active transportation network requires a variety of factors be considered:

Economics. Bicycling and walking are good for the economy. Investments in these modes and the associated infrastructure have led to tangible economic growth.

Education. Education is important. Proper education of bicyclists, pedestrians, and drivers promotes safety for all users and boosts confidence.

Encouragement. A community can embrace active transportation by building comfortable and accessible infrastructure and launching promotional programs and events.

Enforcement. Enforcing traffic violations such as speeding, red light running, and improper passing can greatly increase the safety of bicyclists and pedestrians.

Engineering. Bicycle and pedestrian infrastructure must be designed to be safe, comfortable, and connected, giving all users appropriate options for traveling.

Equity. Equity ensures fairness in decision-making to ensure the needs of all community members are met, particularly populations that are traditionally underserved.

Evaluation. The best practices associated with bicycle infrastructure design continues to evolve. Evaluation allows the MPO to adapt and monitor the success of implemented projects.

Bicycle and Pedestrian Barriers and Needs

The 2008 Lawton Metropolitan Planning Area Bicycle and Pedestrian Plan continues to provide guidance for bicycle and pedestrian needs in the City. This plan was followed in 2010 by the Lawton Bike Plan route analysis and feasibility study to examine proposed routes and provide conceptual design. The assessment of bicycle and pedestrian barriers and needs considers information from these sources as well as the 2045 MTP and Southwest Oklahoma Regional Transportation Planning Organization (SORTPO) Regional Transportation Plan. Additional analysis and input were collected as part of the **Directions 2050 MTP** process. The barriers and needs include but are not limited to:

- **Network Continuity.** Numerous gaps in sidewalks along major north-south and east-west arterials and limited bicycle facilities in general.
- **Unsafe Pedestrian Crossings.** Long crossing distances (i.e. wide roads) and a lack of signalized pedestrian crossings (or existing signalized crossings that lack pedestrian activation).
- **ADA Accessibility.** Lack of curb ramps (especially within median and concrete islands), curb ramps without a level landing, and crossings without tactile or audible cues.
- **Development Characteristics.** Low density residential development separated from employment and shopping by long distances and/or limited active transportation facilities.

Bicycle and Pedestrian Recommendations

Bicycle and Pedestrian Plan Update. In recognition of the need for a more detailed review of active transportation needs and a fresh set of prioritized projects and policies, the Lawton MPO has set aside to funds to update the existing Bicycle and Pedestrian Plan in Fiscal Year 2025.

Public input encouraged more bicycle and pedestrian improvements in the LMATS area. The influence of this input is evident in the multimodal provisions in the roadway recommendations. But more improvements are needed. The **Directions 2050 MTP** comes in the months prior to initiating an update to the current Bicycle and Pedestrian Plan. The Lawton MPO should continue to partner with the City and other agencies to implement the Lawton Bike Plan and other guiding documents in the interim and follow the implementation guidelines provided in the new Bicycle and Pedestrian Plan once adopted. As recommendations are refined within the upcoming Bicycle and Pedestrian Plan, the following considerations should be emphasized:

- Including bicycle and pedestrian improvements with new roadway projects to encourage the development of complete streets.
- Closing gaps throughout the bicycle and pedestrian network to promote connectivity and better utilization of the existing network.
- Providing bicycle and pedestrian access to and from activity centers, lakes, recreation centers, community resources, and other key destinations.
- Performing maintenance on existing bicycle and pedestrian facilities to improve safety and accessibility for users and to protect infrastructure investments.
- Encouraging context-sensitive designs such as installing wider sidewalks near schools, transit stops, and other locations with higher concentrations of pedestrians.
- Accommodating existing and emerging technologies, such as e-bike charging stations.

Transit

Public transportation must be reliable and convenient with the goal of providing service that gets people where they need or want to go, as well as when they need or want to get there. In Lawton, the challenge comes with trying to maximize ridership as well as geographic coverage in a lower density built environment. By focusing on making transit both useful and convenient, it will better accommodate all users—captive, choice, and all others.

- **Captive riders** do not have access to or are unable to use a personal vehicle. They are dependent on walking, biking, and the transit system to travel. Figure 2.19 in Chapter 2 shows where in the LMATS area higher concentrations of transit-dependent households exist. LATS service is currently limited to within the Lawton City Limits.
- **Choice riders** have the means to drive themselves but choose instead to use transit. Reasons choice riders use transit include saving money, convenience, comfort, or environmental principles.

Housing and Transportation. The relationship between housing and transportation shapes a persons' everyday experience and livelihood. The increasing disconnect between available housing and job location places a greater, potentially adverse demand on the transportation network. Consequently, people spend most of their income on housing and transportation. The synergies between housing and transportation can improve affordability, accessibility, and availability.

Understanding the various ways in which people choose to live and travel can help inform important planning decisions. Expensive housing can relocate or push people further away from employment, education, and healthcare opportunities. To create healthy, vibrant communities, the intentional and collaborative coordination of housing and transportation decision making is essential.

Image Source: Lawton Area Transit Service

LATS Transit Master Plan. The Lawton Area Transit System (LATS) is the public transportation system that has served the residents of Lawton for nearly two decades by providing fixed route and paratransit service. At the request of the Lawton MPO, a transit master plan was developed to identify and plan for the current and future needs of public transportation services in and around the Lawton community. The LATS Transit Master Plan was adopted in June 2024 with public input from stakeholders and the community and coordination with transit agency staff and City officials. The plan serves several purposes:

- Educate decision-makers on more effective ways to address public transportation needs
- Identify a preferred concept for the downtown transfer center
- Guide transit service improvements over the next five years

Transit Needs

As part of the LATS Transit Master Plan, transit needs were identified based on the analysis of existing conditions and input collected through stakeholder meetings, virtual surveys, community surveys, and community meetings. LATS placed these needs into several categories as shown in Table 3.5.

Table 3.5 – Summary of Future Transit Needs

Category	Future Transit Needs
Capital Needs	• Relocate/construct new transfer center • Relocate/construct new operations and maintenance (O&M) facility • On-site fueling and charging stations • Replacement of vehicles past their useful life benchmark (ULB) • Upgrade bus stop amenities
Transit Operation	• Extend operating hours into the evening • Provide additional service on Saturday • Provide service on Sunday • Improve route schedules and serve additional locations • Provide service to transit markets difficult to reach with fixed route system • Shorter route times • Identify areas for Micotransit service
Administration	• Improve community image of transit service • Increase maintenance training for staff - hybrid buses
Technology	• Implement real-time tracking application • Implement real-time notifications for smartphones

Source: LATS Transit Master Plan

Transit Recommendations

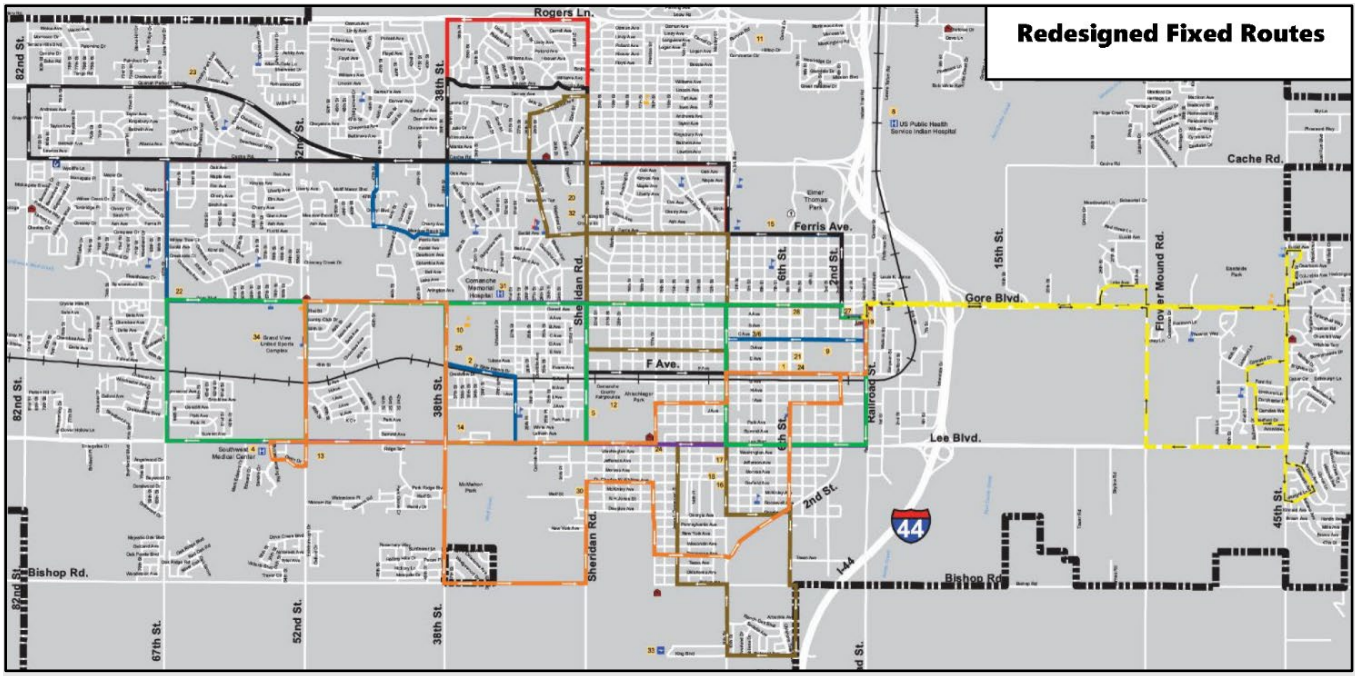
Operational recommendations from the LATS Master Plan build around the construction of a new downtown transfer center, operations, and maintenance facility at a six-acre site along SW Railroad Street near SE B Avenue. From here, LATS is proposing changes to its fixed route network to address unmet rider needs identified based on public input and a comprehensive review of the existing system. The LATS Master Plan identifies these changes as:

1) Revamped routes to encourage more riders.
2) Routes that stayed on the main arterial roads that have access to sidewalks.
3) Limiting travel through neighborhood streets to improve reliability.
4) Further improved access for the public schools and businesses.
5) Create a route system that won't be disrupted by adverse weather conditions.
6) Create simple options for the Night and Sunday service.

The objective of the fixed route system redesign is to improve routes and provide a foundation for future expansion. The recommended route network improves access to places riders want to go such as grocery stores, shopping centers, and recreation centers by streamlining routes and reducing inconvenient loops.

The recommended route network redesign does not require any additional buses, however, an increase of 4,500 annual service hours is required to extend service hours and operate all eight routes on Saturday and four routes on Sunday.

Figure 3.4 – Recommended Fixed Route System



Source: LATS Transit Master Plan

Freight, Rail, and Aviation

As the Lawton area's economy grows and evolves, higher demands will be placed on the highway and rail freight networks with more emphasis needed on the condition and efficiency of freight movement into, out of, and through the region. Meanwhile, the Lawton-Fort Sill Regional Airport continues to invest in its future as it nears completion on a multi-phase effort to modernize and expand operations.

Freight and Rail

Many local and regional plans touch on the critical role the movement of goods by road or rail plays in a healthy regional economy. As part of the Comanche County Long Range Transportation Plan, completed by SORTPO in 2019, the SORTPO Policy Board identified several corridors in the LMATS area as significant statewide and regional highway freight corridors. These routes included I-44, US 62, SH 7, SH 36, and SW 82nd Street. These corridors connect commercial and economic hubs to locations within the LMATS area and to other places in southwest Oklahoma and beyond.

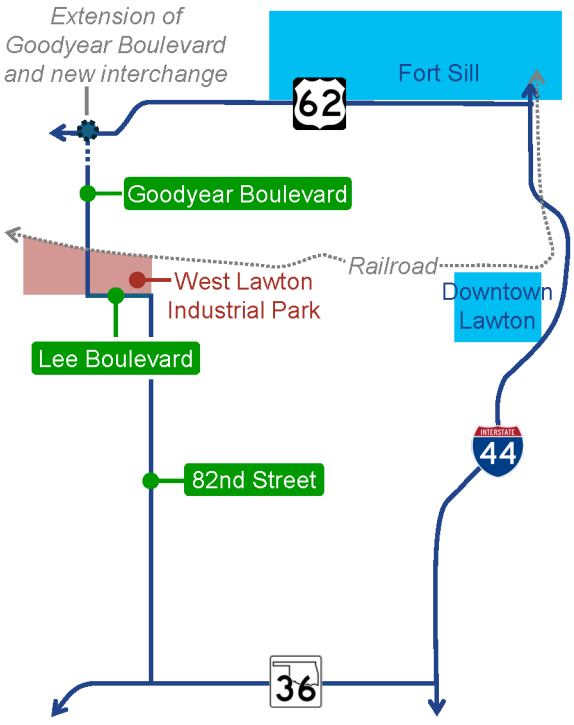
Separately, the Oklahoma Freight Transportation Plan 2023-2030 assesses current conditions and challenges for moving freight across the state. The plan notes that Fort Sill is the largest military base in the state and due to its focus in artillery training, large amounts of ammunition are delivered and stored at the base. It also references the need for better connectivity in the vicinity of the West Lawton Industrial Park by recognizing the extension of Goodyear Boulevard and new interchange at US 62 as a freight investment plan project. Notably, the SORTPO Policy Board also spotlighted the area surrounding the West Lawton Industrial Park and several nearby corridors that serve the site. The 19.5 miles of rail in the LMATS area primarily serves the industrial park and downtown industrial area.

Recommendations and Considerations

Successful freight movement planning efforts incorporate roadway recommendations that increase capacity along select routes. The **Directions 2050 MTP** places an emphasis on the freight routes that serve the West Lawton Industrial Park. The MTP emphasizes the importance of this recommendation by giving added weight to projects that exist on the freight loop. In addition, the Lawton MPO and its partners should continue to plan for future freight needs by:

- Monitoring increases in freight activity to ensure infrastructure is in place to efficiently move goods,
- Monitoring the impact of growth and development on the movement of freight,
- Coordinating with regional, state, and federal planning agencies on freight efforts, and
- Continuing to prioritize roadway projects that serve the freight network.

Figure 3.5 – Lawton Freight Loop



Air

The Lawton-Fort Sill Regional Airport located in the south-central portion of the LMATS area is classified by the Oklahoma Airport System Plan as a Regional Business Airport (RBA) based on the population of Lawton and Comanche County, the airport's service to major employers, and the size of the local economy. The Federal Aviation Administration (FAA) classifies the airport as a "Commercial Airport." American Eagle Airlines offers passenger service via four daily round trip flights to Dallas/Fort Worth International Airport. The Oklahoma Department of Aerospace and Aeronautics estimated the airport has $55.2 million in annual economic impact.

Lawton-Fort Sill Regional Airport, 2024

The airport also offers general aviation services and operates as an intermodal (Ground Air) facility for the LMATS area's freight. The Oklahoma Freight Transportation Plan 2023-2030 found no obvious bottlenecks close to Lawton-Fort Sill Regional Airport.

Intelligent Transportation Systems

As mentioned in Chapter 2, Intelligent Transportation Systems (ITS) improves transportation safety and mobility, air quality, and fuel economy by moving people and goods more efficiently through the transportation network. Investments in ITS are intended to save lives, reduce congestion, and make communities more livable. In the LMATS area, traffic signal retiming has been identified as a cost-effective way to relieve congestion and make travel times more predictable. The Lawton MPO intends to allocate Congestion Mitigation and Air Quality (CMAQ) funds for ITS purposes, including traffic signal updates and synchronization.

Environmental Justice

The **Directions 2050 MTP** considers the effects upon and benefits to marginalized populations in the LMATS area. This important part of the planning process is in regard to Environmental Justice, which the United States Environmental Protection Agency EPA defines as "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. More information is available at www.epa.gov/environmentaljustice.

Within the context of the **Directions 2050 MTP**, Environmental Justice means that no population is forced to bear a disproportionate burden of the negative human health and environmental impacts, including social and economic effects, resulting from transportation decisions, programs and policies made in areas home to minority racial and ethnic groups, persons with disabilities, and households below the poverty threshold. As an update to the 2045 MTP, the Lawton MPO analyzed accessibility for those marginalized groups to selected target facilities such as: institutions of higher education, hospitals, major employment centers, and heavily trafficked shopping areas. The purpose of this analysis was to ensure the Lawton MPO continues to create long range plans that are inclusive of groups that have historically been harmed or ignored through transportation planning processes.

This evaluation confirmed that projects identified in the **Directions 2050 MTP**:

- Will not result in an adverse impact to areas with the highest percentages of marginalized populations;
- Will not minimize or block access to the transportation system in areas with the highest percentages of marginalized populations; and,
- Will not neglect the transportation system in areas with the highest percentages of marginalized populations.

The Lawton MPO's analysis groups are specifically: minorities, persons of Hispanic or Latino origin, persons with disabilities, persons in poverty, and households without access to automobiles. Geospatial data for each of these groups was acquired through the United States Census Bureau American Community Survey (ACS) 5-Year Estimates (2022). Each of these population groups were normalized as a percentage of the total applicable population for each Census Block Group. These groups were illustrated in the maps that follow.

- **Figure 3.6 – Minority Population**: Persons who classified themselves as "non-white"
- **Figure 3.7 – Hispanic and Latino Population**: Persons who classified themselves as being of Hispanic and/or Latino origin regardless of race
- **Figure 3.8 – Disabled Population**: Persons 16 to 64 years old who self-identified as being disabled (e.g., a mobility limitation, self-care limitation, or work disability)
- **Figure 3.9 – Persons in Poverty**: Households with income below the poverty level based on household size and composition
- **Figure 3.10 – Elderly Population**: Persons 65 years of age or older
- **Figure 3.11 – Vehicle Ownership**: Households without access to a personal vehicle

Figure 3.6 – Roadway Recommendations with Non-White Population

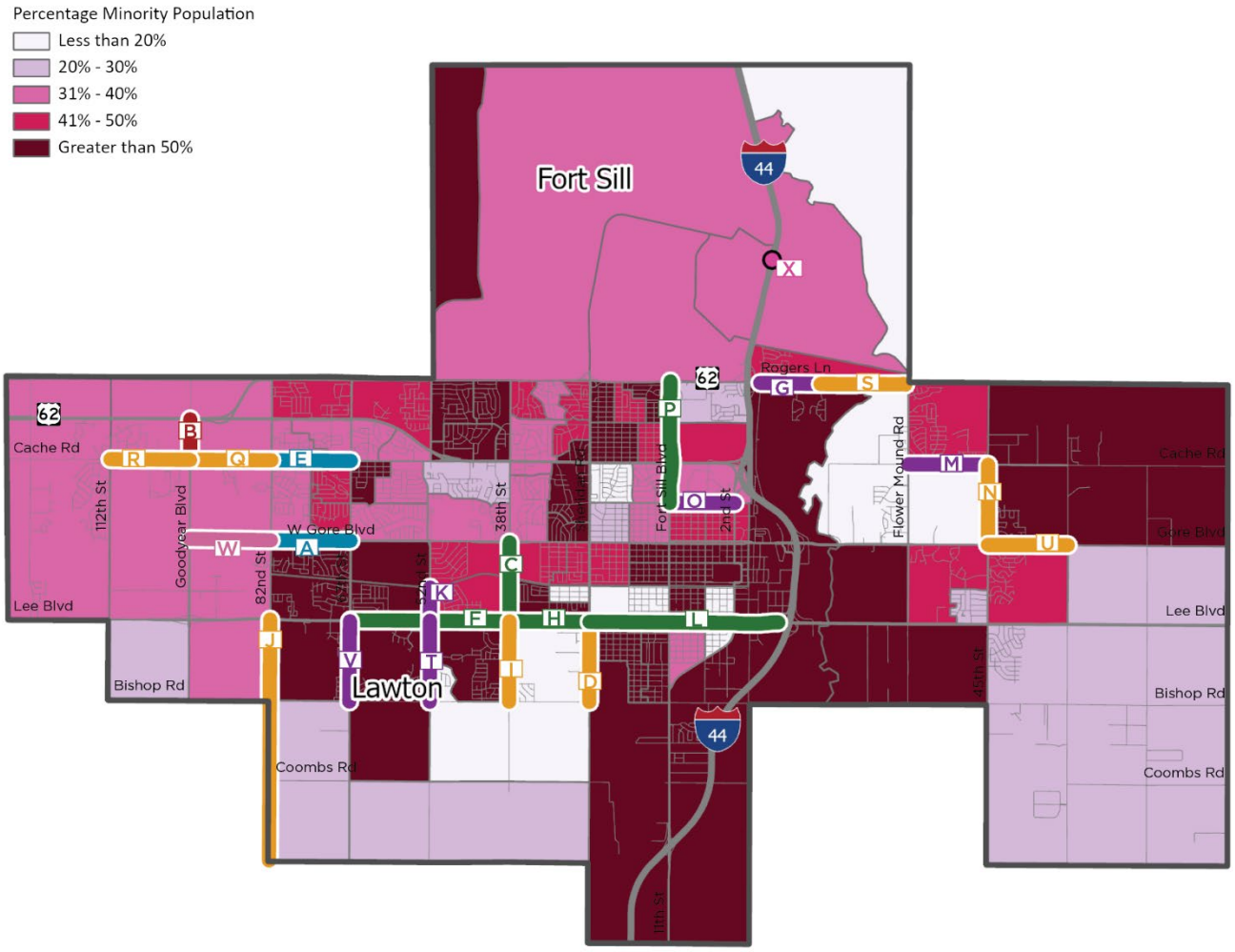


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Figure 3.7 – Roadway Recommendations with Hispanic Population

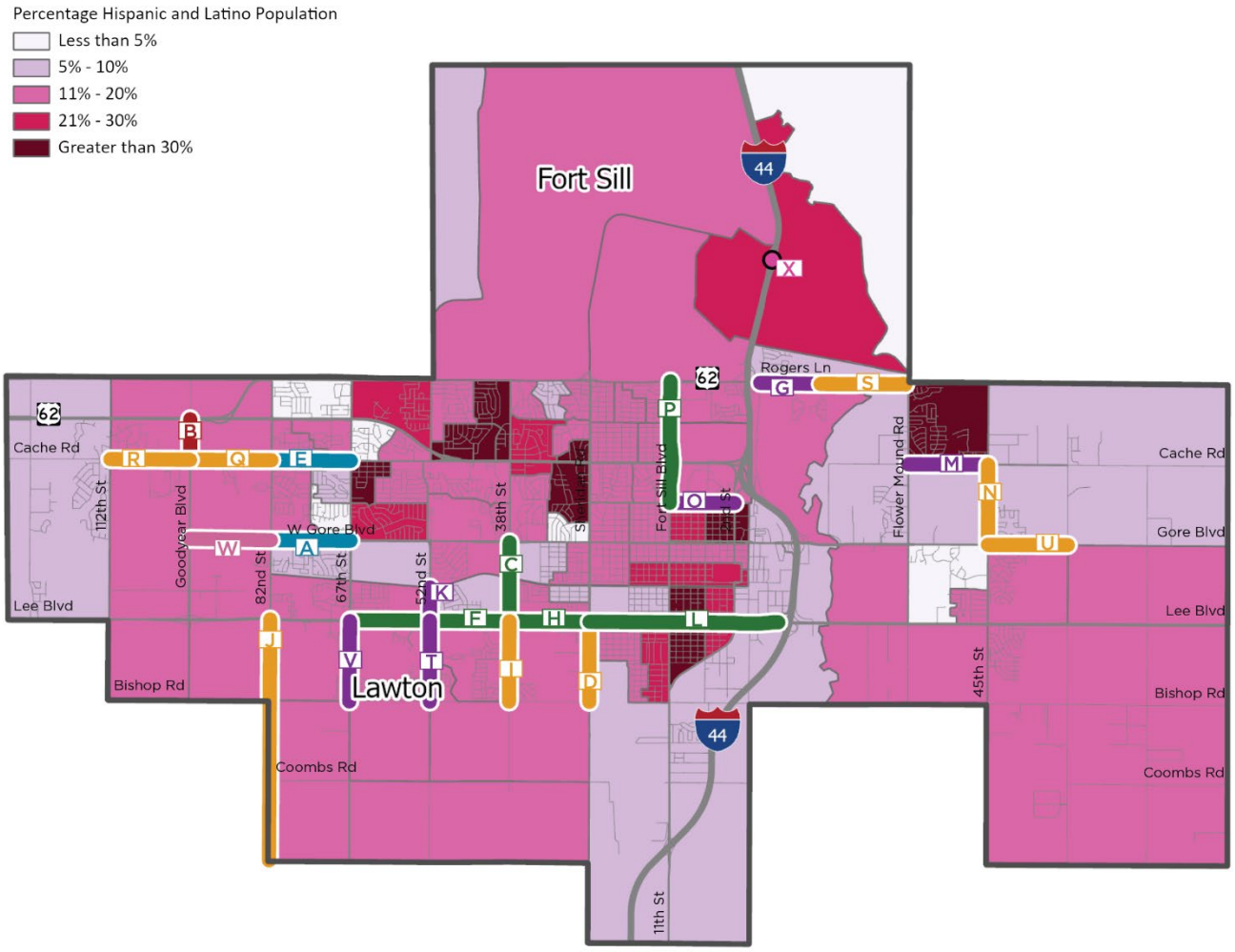

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Figure 3.8 – Roadway Recommendations with Disabled Population

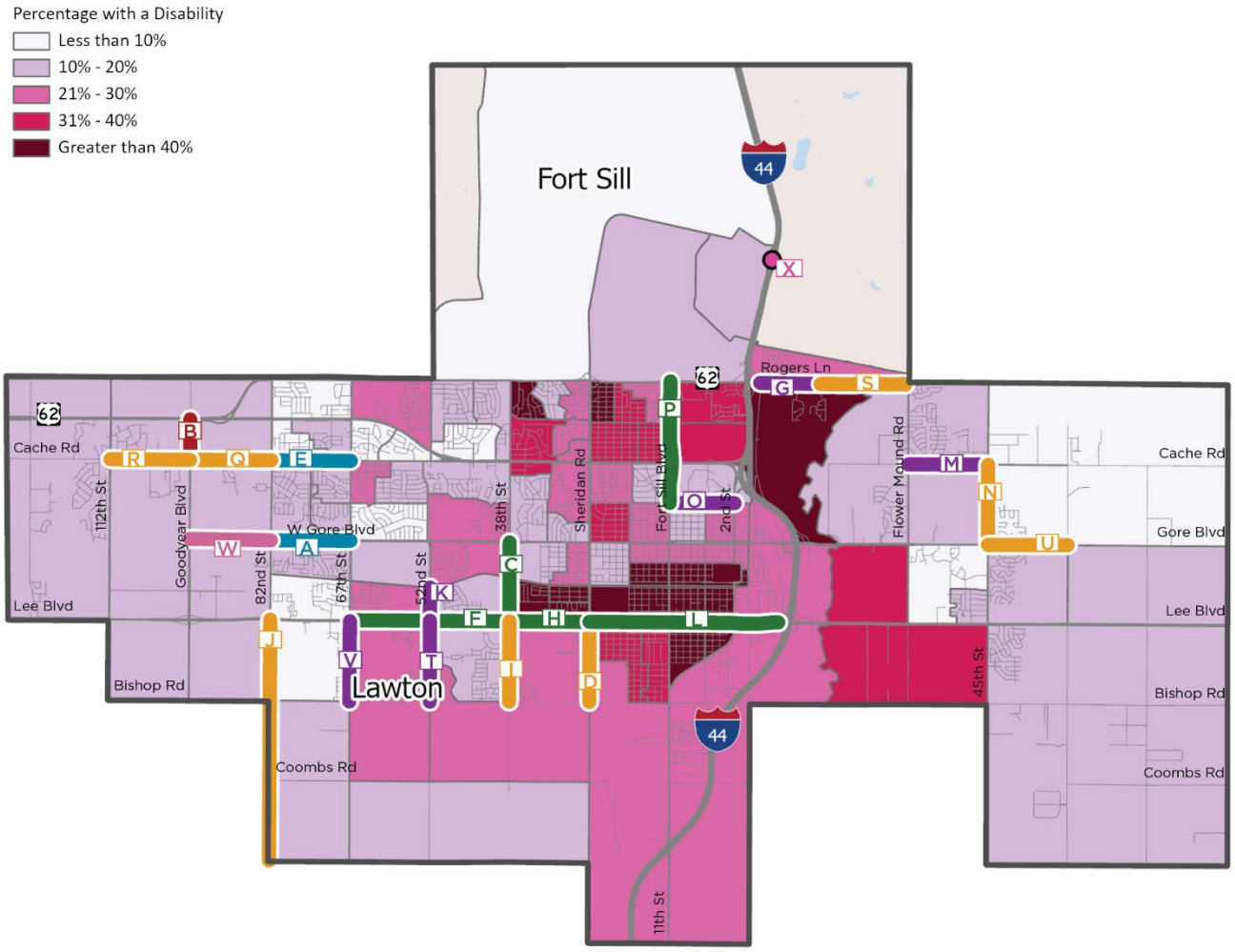

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Figure 3.9 – Roadway Recommendations with Poverty Status

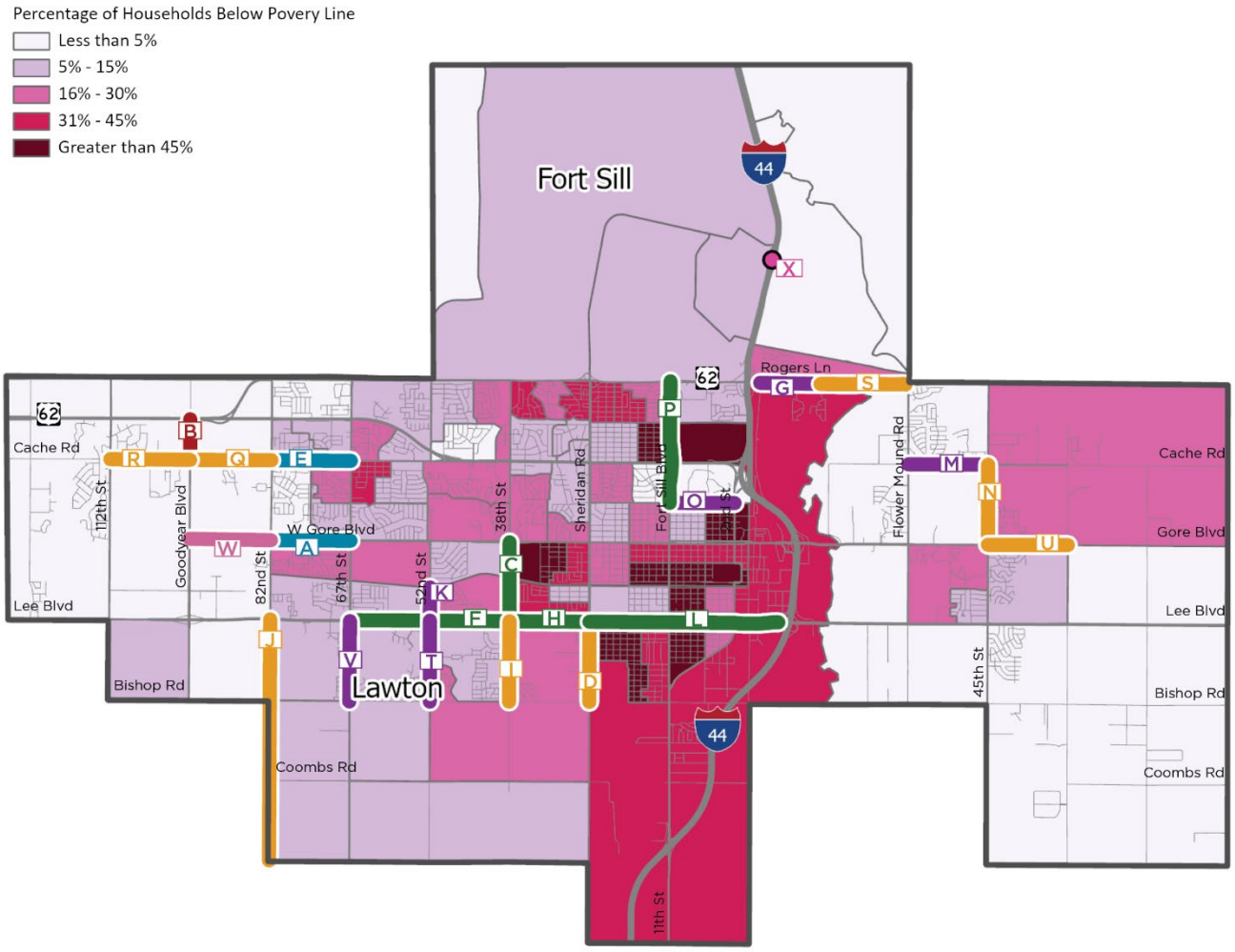

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Figure 3.10 – Roadway Recommendations with Elderly Population

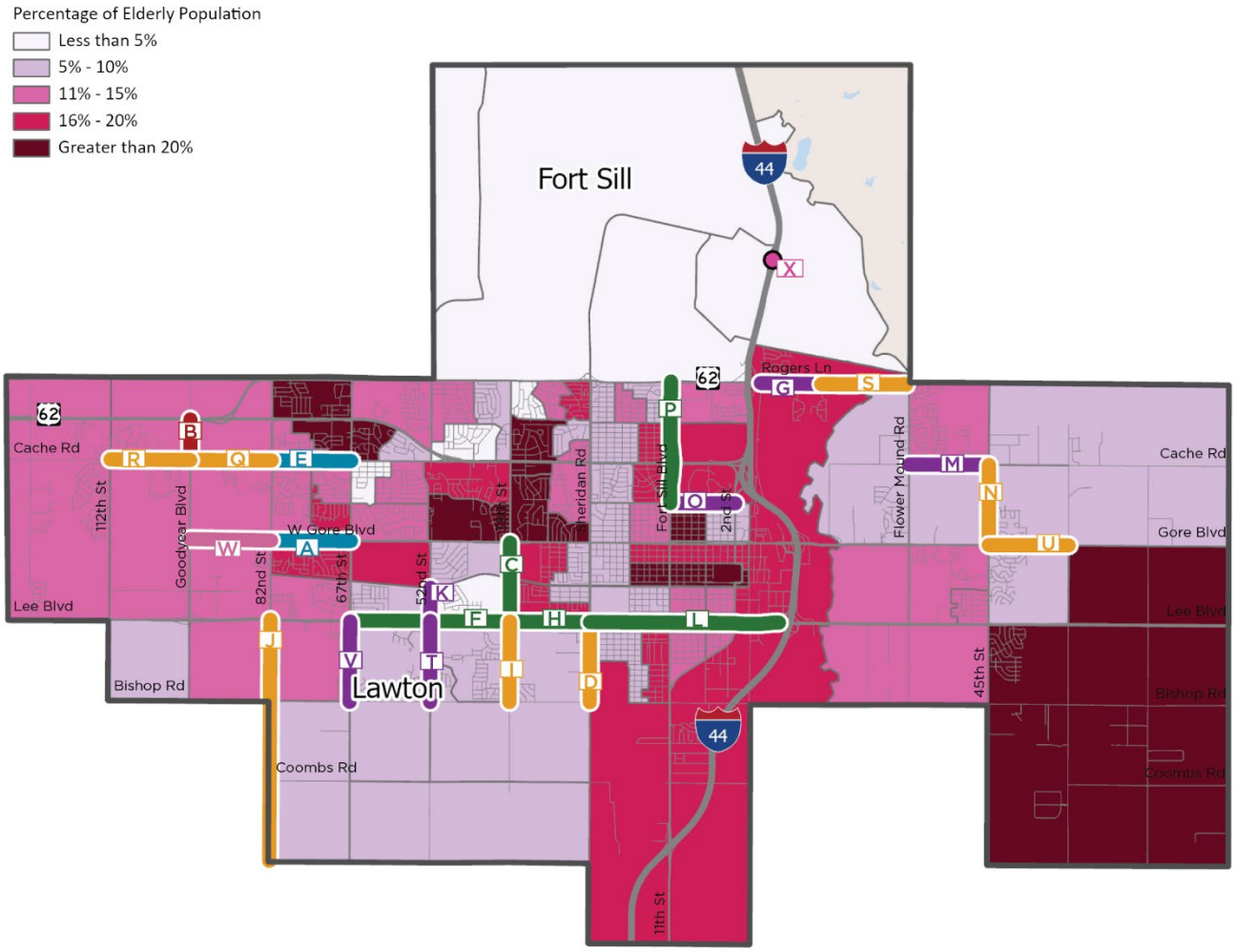

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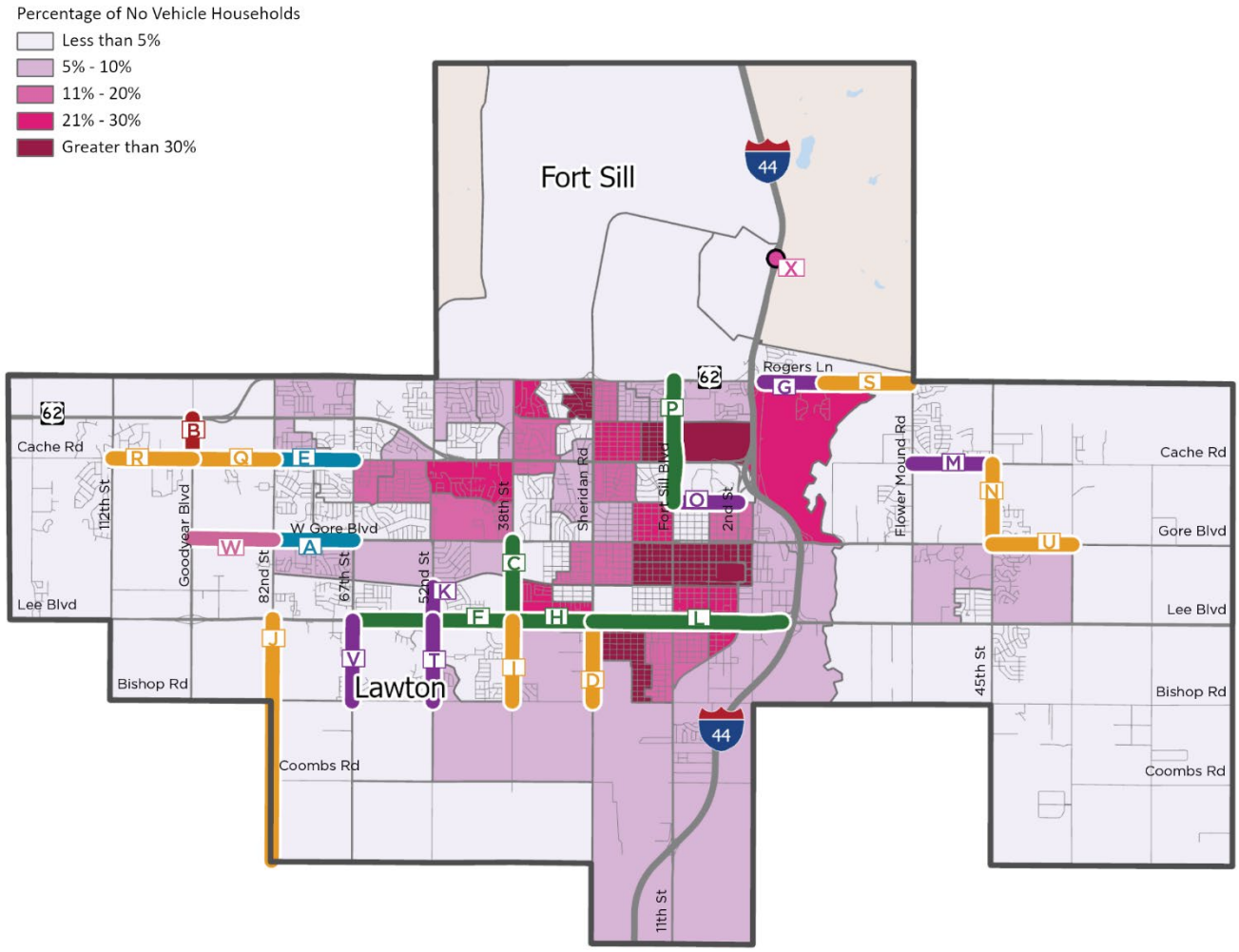
Figure 3.11 – Roadway Recommendations with Vehicle Ownership



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CHAPTER 4

Financial Plan

Introduction

Historically, transportation planning has attempted to balance technical aspects with public engagement. This can make it challenging to evaluate how well the transportation system addresses the community's needs and how well future transportation projects will improve quality of life. The **Directions 2050 MTP** bridges this disconnect by developing a long-range transportation strategy that combines technical data with engagement results in a quantifiable prioritized process.

In accordance with state and federal requirements, the **Directions 2050 MTP** is financially constrained. This process demonstrates how the prioritized list of recommended projects can realistically be funded during the life of the plan. Due to limited transportation funding, measures must be taken to make sure appropriate projects and programs are prioritized and eventually implemented.

To do this, the Lawton MPO must demonstrate a reasonable expectation of future funding levels and estimate the cost for roadway projects. The financially constrained plan allows the Lawton MPO and supporting agencies to focus on near-term opportunities and identify strategies for implementation. The inherent flexibility of the long-range transportation plan process ensures that priorities can be reassessed, and the plan can be amended if necessary.

This chapter discusses the process used to determine financial constraints, including project prioritization, and estimated revenues. Since this is a planning level funding exercise, all funding programs, projects, and assumptions will have to be reevaluated in subsequent plan updates and as the projects progress into design and subsequent implementation phases.

Roadway Corridor Prioritization

Like other MPOs, the Lawton MPO has limited resources to fund transportation improvements and currently lacks the necessary funds to implement everything in the roadway recommendations list. Therefore, it is important to have a clear project prioritization process that reflects the goals of the plan. Roadway projects were prioritized by a set of 12 criteria that were weighted to create an even split between **Stakeholder and Community Input** and **Data and Analysis**. These two broad categories were further subdivided as shown below. The prioritized list of projects is shown in Table 4.1.

Stakeholder and Community Input	**50%**	Stakeholder Priorities	30%		
		Public Input	20%		
Data and Analysis	**50%**	Congestion and Safety	20%	*Existing Congestion*	*5%*
				Future Congestion	*5%*
				Crash Frequency	*5%*
				Fatal Crashes	*5%*
		Network Connectivity	20%	*Continuity of Cross Section*	*5%*
				Transit	*5%*
				Freight	*5%*
				Key Destinations	*5%*
		Population and Employment	10%	*Population Growth*	*5%*
				Employment	*5%*

Table 4.1 – Roadway Corridor Priorities

ID	Project Corridor	From	To	Description	Project Score & Ranking	
C	SW 38th St	Gore Blvd	Lee Blvd	**Modernize** 4-lane roadway with wider shoulders and turn lanes	86.3	1
F	Lee Blvd	67th St	38th St	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements	83.1	2
D	SW Sheridan Rd	Lee Blvd	Bishop Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	80.0	3
E	NW Cache Rd	67th St	82nd St	**Widen** to 5 lanes	77.5	4
H	Lee Blvd	38th St	Sheridan Rd	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements	77.5	4
K	SW 52nd St	Lee Blvd	Railroad Crossing	**Widen** to 3 lanes	71.9	6
G	NE Rogers Ln	I-44	Village Dr	**Widen** to 3 lanes	60.0	7
I	SW 38th St	Lee Blvd	Bishop Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	53.8	8
J	SW 82nd St	Lee Blvd	Woodlawn Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	53.7	9
L	Lee Blvd	Sheridan Rd	I-44	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements	50.5	10
P	NW Fort Sill Blvd	Ferris Ave	Rogers Ln	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements	41.1	11
O	NW Ferris Ave	Fort Sill Blvd	2nd St	**Widen** to 3 lanes	38.8	12
M	NE Cache Rd	Flower Mound Rd	NE 45th St	**Widen** to 3 lanes	37.5	13
N	NE 45th St	Cache Rd	Arlington Ave	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	35.0	14
Q	NW Cache Rd	82nd St	Goodyear Blvd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	33.8	15
R	NW Cache Rd	Goodyear Blvd	112th St	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	27.5	16
T	SW 52nd St	Lee Blvd	Bishop Rd	**Widen** to 3 lanes	22.5	17
S	NE Rogers Lane	Village Dr	Flower Mound Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	16.3	18
V	SW 67th St	Lee Blvd	Bishop Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	15.0	19
W	W Gore Blvd Ext	82nd St	Goodyear Blvd	**Build new** 5-lane roadway	13.8	20
U	E Gore Blvd	45th St	60th St	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	6.3	21

NOTE: Based on input received during the process, Project X (modification of the I-44 interchange at the Key Gate) was not prioritized using the corridor prioritization process as it is expected to be unfunded through the year 2050 within the financially constrained MTP.

Revenue Forecasts

The financially constrained plan, required for MTPs by the IIJA, shows proposed investments that are realistically based on future funding availability during the life of the plan and a series of funding periods. Meeting this test is referred to as "financial constraint." The first funding period identified for the **Directions 2050 MTP** is 2024 to 2030, which includes the 2024-2027 Transportation Improvement Program (TIP) funding years as well as three years beyond the TIP. Two additional cost bands are provided: 2031 to 2040 and 2041 to 2050. For illustrative purposes, the **Directions 2050 MTP** includes additional projects that would be included in the adopted plan if additional resources beyond those identified in the financial plan were to become available. These projects are referred to as Illustrative Projects.

Roadway Capital

Revenue forecasts were developed after a review of previous state and local expenditures, current funding trends, and likely funding levels. All dollar figures discussed in this chapter were initially analyzed in 2024 dollars and then inflated to reflect the midpoint of the projected opportunity band. An annual inflation rate of 1% was used to forecast revenues. FHWA guidance recommends an annual inflation rate of 4% to forecast costs. These differing projections suggest that costs will increase at a greater rate than available revenues.

Table 4.2 – Roadway Capital Revenues

	2024-2030	2031-2040	2041-2050	Total by Source
Federal Funds[1]	$60,112,950	$96,689,053	$106,804,867	$263,606,869
State Funds[2]	$7,865,434	$14,104,997	$15,580,692	$37,551,123
Local Funds[3]	$15,005,649	$26,581,893	$29,362,948	$70,950,490
Total by Funding Period	$82,984,033	$137,375,943	$151,748,506	$372,108,482

1. Federal-Aid Funds: IM, NHS, STP, STP Enhancement and CMAQ, matching funds
2. State Funds: State Highway Maintenance Taxes and Fees
3. Local Funds: General Fund, developer contributions, bonds, sales taxes

Roadway Operations and Maintenance

Although the **Directions 2050 MTP** is primarily focused on capital improvements to the multimodal system, operations and maintenance funding also needs to be considered. Maintenance funding in the Lawton region is applied to roadway maintenance, bridge replacements, and bicycle and pedestrian infrastructure. Maintenance is funded either by state and federal sources or by local sources, often depending on the ownership of the facility being considered. The proposed PROPEL 2040 CIP outlines set-asides for roadway operations and maintenance, including $18 million for improvements to arterial streets; $10 million for maintenance and preventative maintenance of streets (sealing cracks, filling potholes, striping of streets); and one-quarter of one percent of the permanent one percent tax to maintenance on City streets, roads, and bridges. It is reasonable to assume that all maintenance funding that is made available within the LMATS area will be fully utilized.

In addition to roadway maintenance funds, roadway operations funds can support the more efficient operations of the roadway network. PROPEL 2040 has identified $10 million to implement and install an automated traffic control system for the City of Lawton, including but not limited to poles, lighting, and other necessary equipment.

Bicycle and Pedestrian Revenues

Future funding for bicycle and pedestrian projects is based on a projection of historical funding levels from the current TIP (2024-2027) and previous TIP (2022-2025). Funding from 2022 to 2027 were projected into the future using a 1% annual inflation rate to determine the anticipated funding levels. The expenditure of these funds should be determined as part of the update to the Bicycle and Pedestrian Plan that is expected to be completed in Fiscal Year 2025.

Table 4.3 – Bicycle and Pedestrian Revenues

	2024-2030	2031-2040	2041-2050	Total by Source
Federal Funds[1]	$2,614,257	$3,571,340	$3,944,982	$10,130,579
State Funds[2]	$1,309,972	$1,605,334	$1,773,287	$4,688,594
Local Funds[3]	$268,243	$420,634	$464,642	$1,153,518
PROPEL2040	$3,750,000	$6,250,000	$ -	$10,000,000
Total by Funding Period	**$7,942,472**	**$11,847,308**	**$6,182,910**	**$25,972,690**

1. Federal-Aid Funds: IM, NHS, STP, STP Enhancement and CMAQ, matching funds
2. State Funds: State Highway Maintenance Taxes and Fees
3. Local Funds: General Fund, developer contributions, bonds, sales taxes

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Transit

Future funding for transit is based on a projection of historical funding levels from the current TIP (2024-2027) and previous TIP (2022-2025). Funding from 2022 to 2027 were projected into the future using a 1% annual inflation rate to determine the anticipated funding levels. The expenditure of these funds should be determined based on the Transit Master Plan adopted in 2024.

Table 4.4 – Transit Revenues

	2024-2030	2031-2040	2041-2050	Total by Source
FTA 5303 Planning	$178,828	$280,423	$309,761	**$769,012**
FTA 5307 Urbanized Area Formula	$15,884,751	$23,985,838	$26,495,287	**$66,365,876**
FTA 5339 Buses and Bus Facilities Program	$15,320,790	$19,284,992	$21,302,629	**$55,908,412**
Other Federal Funds	$376,576	$628,147	$693,865	**$1,698,587**
Local Funds	$1,588,990	$4,536,435	$5,011,047	**$11,136,472**
Fares	$1,356,921	$2,222,602	$2,455,136	**$6,034,659**
Local Income	$8,508,349	$10,736,174	$11,859,415	**$31,103,938**
State Funds	$1,920,537	$2,881,652	$3,183,136	**$7,985,325**
PROPEL2040	$2,062,500	$3,437,500	$ -	**$5,500,000**
Total by Funding Period	**$47,198,242**	**$67,993,763**	**$71,310,276**	**$186,502,281**

Aviation

Aviation projects are funded using a blend of state and federal funding. The 2024-2027 TIP does not include any aviation projects. However, aviation projects are often funded through the FAA, and as such are not always included with the TIP. The PROPEL 2040 CIP identifies two set-asides for aviation funding, including:

- Renovation and remodeling of the Lawton Airport and facilities ($14 million in funding from the FAA and $2 million in local funds)
- $3 million for continuation of the renovation, improving, remodeling, and equipping of the Lawton Airport and facilities and acquisition of first responder vehicles

The Lawton-Fort Sill Regional Airport prepares its own financial assessments and identifies capital and operating expenses planned for the airport.

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Financially Constrained Project List

Figure 4.1 and Table 4.5 present the projects in 2024-2030, 2031-2040, 2041-2050, and Vision (Unfunded) bands. Project cost estimates are inflated to the midpoint year of the opportunity band. Each of these project lists is constrained based on the amount of revenue projected to be available during the opportunity band time period. Unfunded Vision projects, while not projected to receive funding as a part of this plan, are still considered viable recommendations.

Financially Constraining the Projects.
Projects were financially constrained in priority order as much as possible. Slight deviations from the priority order were made to expend all available funds as completely as possible. Funds not spent fully during the first cost band were carried over to the subsequent cost band. Figure 4.1 does not show projects with funding committed, but these projects are shown in Table 4.5 [Project IDs: 34249(04), 19144(04), 35730(04), and 30274(04)].

Figure 4.1 – Financially Constrained Project List by Horizon Year

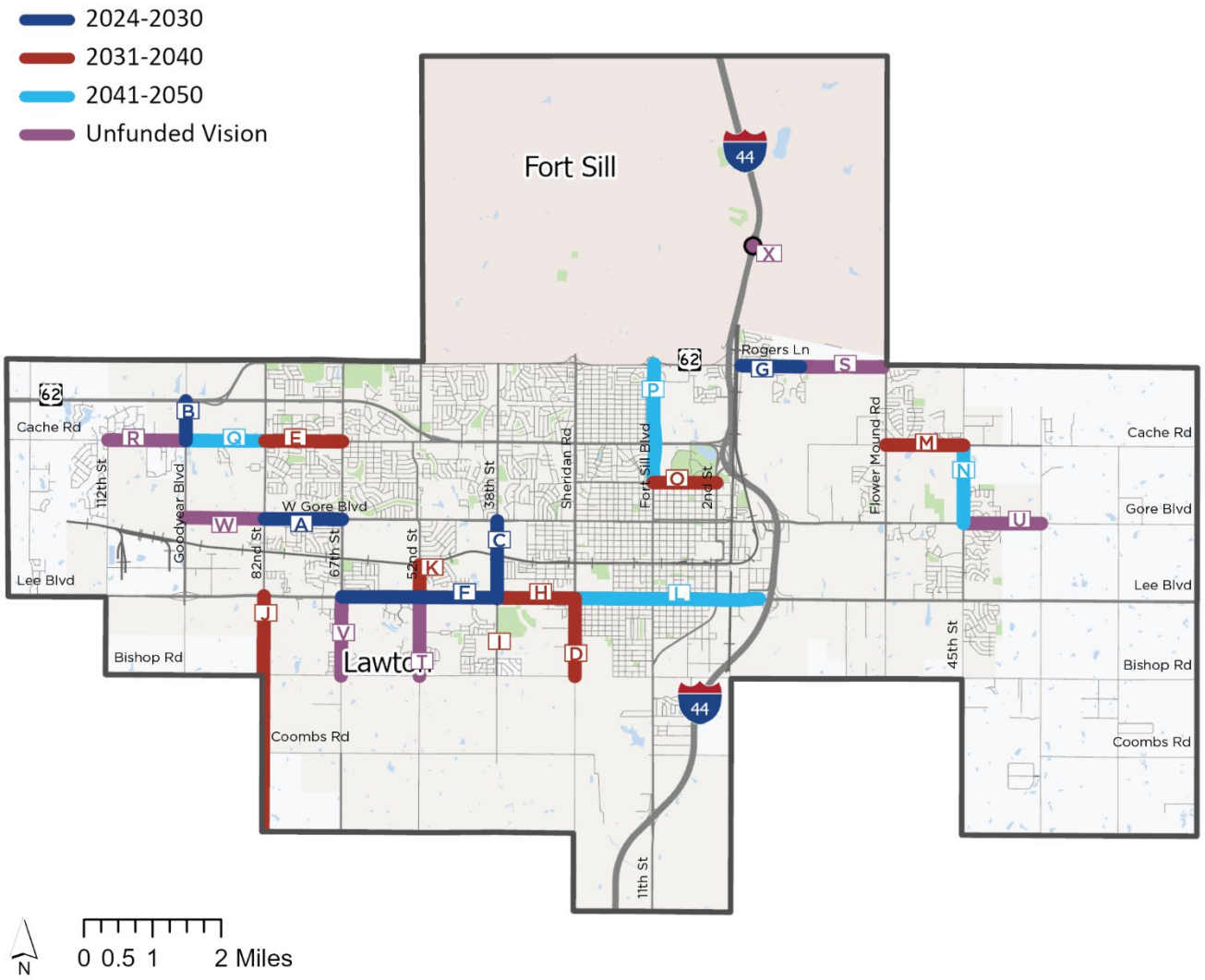

Table 4.5 – Financially Constrained Project List by Horizon Year

ID	Project Corridor	From	To	Type[1]	Project Cost (Year of Expenditure)[2]
2024 to 2030					
34249(04)	US-62	NW 82nd St	I-44	Safety Improvement	$3,502,211
A [19144(04)]	W Gore Blvd	NW 67th St	82nd St	**Widen** to 5 lanes	$11,531,359
B [35730(04)]	Goodyear Blvd Ext	NW Cache Rd	US-62	**Build new** 2-lane roadway and interchange	$21,333,333
G [30274(04)]	NE Rogers Ln	I-44	Village Dr	**Widen** to 3 lanes	$8,000,000
C	SW 38th St	Gore Blvd	Lee Blvd	**Modernize** 4-lane roadway with wider shoulders and turn lanes	$12,204,774
F	Lee Blvd	67th St	38th St	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements	$24,409,549
2031 to 2040					
D	SW Sheridan Rd	Lee Blvd	Bishop Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	$12,776,237
E	NW Cache Rd	67th St	82nd St	**Widen** to 5 lanes	$18,171,716
H	Lee Blvd	38th St	Sheridan Rd	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements	$17,371,200
K	SW 52nd St	Lee Blvd	Railroad Crossing	**Widen** to 3 lanes	$5,443,510
I	SW 38th St	Lee Blvd	Bishop Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	$12,776,237
J	SW 82nd St	Lee Blvd	Woodlawn Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	$38,312,701
O	NW Ferris Ave	Fort Sill Blvd	2nd St	**Widen** to 3 lanes	$15,978,302
M	NE Cache Rd	Flower Mound Rd	NE 45th St	**Widen** to 3 lanes	$13,576,753
2041 to 2050					
L	Lee Blvd	Sheridan Rd	I-44	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements	$64,272,198
P	NW Fort Sill Blvd	Ferris Ave	Rogers Ln	**Modernize** 4-lane roadway with access management, wider shoulders, turn lanes, intersection improvements	$48,772,929
N	NE 45th St	Cache Rd	Arlington Ave	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	$18,911,952
Q	NW Cache Rd	82nd St	Goodyear Blvd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	$18,911,952

Table 4.5 – Financially Constrained Project List by Horizon Year (continued)

ID	Project Corridor	From	To	Type[1]	Project Cost (Year of Expenditure)[2]
Illustrative (Unfunded Vision) Projects					
R	NW Cache Rd	Goodyear Blvd	112th St	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	$23,009,281
T	SW 52nd St	Lee Blvd	Bishop Rd	**Widen** to 3 lanes	$24,450,966
S	NE Rogers Lane	Village Dr	Flower Mound Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	$23,009,281
V	SW 67th St	Lee Blvd	Bishop Rd	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	$23,009,281
U	E Gore Blvd	45th St	60th St	**Modernize** 2-lane roadway with wider shoulders, turn lanes, and intersection improvements	$23,009,281
W	W Gore Blvd Ext	82nd St	Goodyear Blvd	**Build new 5-lane roadway**	$33,020,000
X	I-44	at Key Gate Interchange		**Modify Interchange**	$36,780,000[3]

1. *As described on page 3-2, **modernize** refers to enhancing mobility and extending the longevity of a road without building new travel lanes using strategies such as access management, operational improvements, and intersection realignment.*
2. *Project costs are shown as year of expenditure. The cost inflation rate (4%) was applied to each cost band, assuming a midpoint year. 2027 was assumed as a midpoint between 2024 and 2030, 2036 was assumed as a midpoint between 2031 and 2040, and 2046 was assumed as a midpoint between 2041 and 2050. Illustrative projects were inflated to the year 2051.*
3. *This cost estimates assumes the lengthening of ramps but not a complete interchange redesign.*

Table 4.6 – Demonstration of Fiscal Constraint

	2024-2030	2031-2040	2041-2050	Total (2024-2050)	Illustrative Projects
Available Revenue	$82,984,033	$137,375,943	$151,748,506	$372,108,482	n/a
Total Project Expenditures	$80,981,226	$134,406,655	$150,869,030	$366,256,911	$186,288,090
Balance	**$2,002,806**	**$2,969,288**	**$879,476**	**$5,851,570**	**n/a**

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CHAPTER 5

System Performance

Introduction

The system performance chapter is an important component of the Transportation Performance Management (TPM) approach set forth by FHWA and FTA. Maintaining a systematic and representative performance management approach allows the Lawton MPO to evaluate how well its transportation system addresses current needs and prepares itself to meet future opportunities and challenges. Since funding for transportation projects is limited, it is important that the right projects and programs are being implemented to address the current and projected needs of the region.

System Performance

The Infrastructure Investment and Jobs Act (IIJA) requires that state DOTs, MPOs, and transit planning agencies conduct performance-based planning and programming. The objective is to invest resources in projects that will collectively progress toward the achievement of national goals. A performance-based approach is intended to ensure the most efficient use of transportation funds, improved investment decision-making, and increase accountability and transparency.

Projects identified in the **Directions 2050 MTP** and the Transportation Improvement Program (TIP) are based on a performance-based planning and programming approach. Achieving performance measure goals is prioritized when selecting projects to be included MTP and carried forward into the TIP. Given that a key goal of the **Directions 2050 MTP** is Safety and Security in the LMATS area, the Lawton MPO prioritizes safety in its project selection process. Recommended projects work toward achieving adopted performance measures by enhancing safety and security while also improving system conditions and travel time reliability.

The approach to LMPO's performance-based planning effort is rooted in the national goal areas:

- Safety
- Infrastructure condition
- Congestion reduction
- System reliability
- Freight movement and economic vitality
- Environmental sustainability
- Reduced project delivery delays

ODOT is required to set performance targets, and the Lawton MPO has the option to adopt ODOT's performance targets or establish its own targets. The Lawton MPO opted to support ODOT's Safety Performance Measures and ODOT's performance targets for Pavement, Bridges, and System categories.

Tables 5.1 and 5.2 describe the performance measures. It is notable that number of fatalities in the LMATS area are several hundred below the target based on 2022 crash data.

Table 5.1 – 2024 Safety Performance Measures and Targets

Safety Performance Measures	ODOT (State Targets)
Number of Fatalities	755
Fatality Rate (per hundred million vehicle miles traveled)	1.69
Number of Serious Injuries	2,011
Serious Injury Rate (per hundred million vehicle miles traveled)	4.79
Number of Non-Motorized Fatalities	121
Number of Non-Motorized Serious Injuries	176
Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries	297

Table 5.2 – Pavement, Bridge, and System Performance Targets

Performance Measure	Baseline	2-Year Target	4-Year Target
Percentage of Pavements of the Interstate System in Good Condition	68.7%	59.0%	56.0%
Percentage of Pavements of the Interstate System in Poor Condition	1.1%	3.0%	4.0%
Percentage of Pavements of the Non-Interstate NHS in Good Condition	43.4%	41.0%	40.0%
Percentage of Pavements of the Non-Interstate NHS in Poor Condition	2.7%	5.0%	6.0%
Percentage of NHS Bridges Classified as in Good Condition	48.2%	43.0%	40.0%
Percentage of NHS Bridges Classified as in Poor Condition	0.8%	3.0%	5.0%
Percent of the Person-Miles Traveled on the Interstate That Are Reliable	94.8%	90.0%	90.0%
Percent of the Person-Miles Traveled on the Non-Interstate NHS That Are Reliable	97.5%	90.0%	90.0%
Truck Travel Time Reliability (TTTR) Index	1.24	1.33	1.33

Transit providers that receive FTA funding are also required to incorporate performance measurement into their planning and programming process. On April 9, 2019, the Lawton MPO voted to support the performance targets as set in the Transit Asset Management Plan for the Lawton Area Transit System. These performance targets are as follows:

1. Decrease the number of at fault accidents by 10% each year.
2. No vehicles shall be out of service for more than 30 days in a row.
3. No more than five missed runs (due to breakdowns) in a 30-day period.
4. Continue process of replacing vehicles that are past their useful life.

The Transit Asset Management Plan was updated in 2024 without changes to the performance targets.

The Lawton MPO cannot influence the future-year targets because they are the responsibility of ODOT. The adoption of these measures by the Lawton MPO shows support to ODOT to assist where applicable and to comply with federal requirements for target setting.

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CHAPTER 6

Public Engagement

Introduction

The Lawton MPO is committed to meaningful and ongoing civic engagement that guides transportation investments. The goal of the public engagement effort as part of the **Directions 2050 MTP** was to leverage the planning process to draw new voices into the conversations surrounding the future of how people and goods move within and through the LMATS area.

As described in Chapter 1, public engagement for the **Directions 2050 MTP** focused on three objectives:

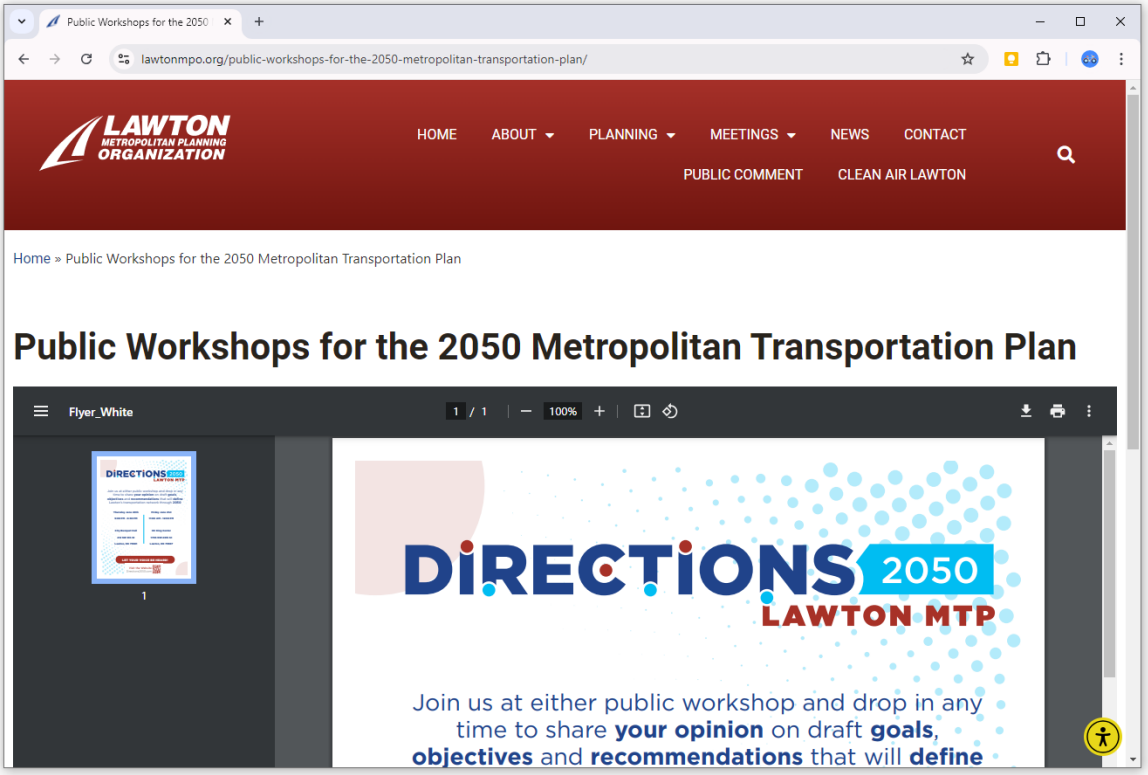
- Educate and Empower
- Participate and Collaborate
- Monitor and Communicate

The **Directions 2050 MTP** engagement process is described in detail in the pages that follow.

Promoting the Plan

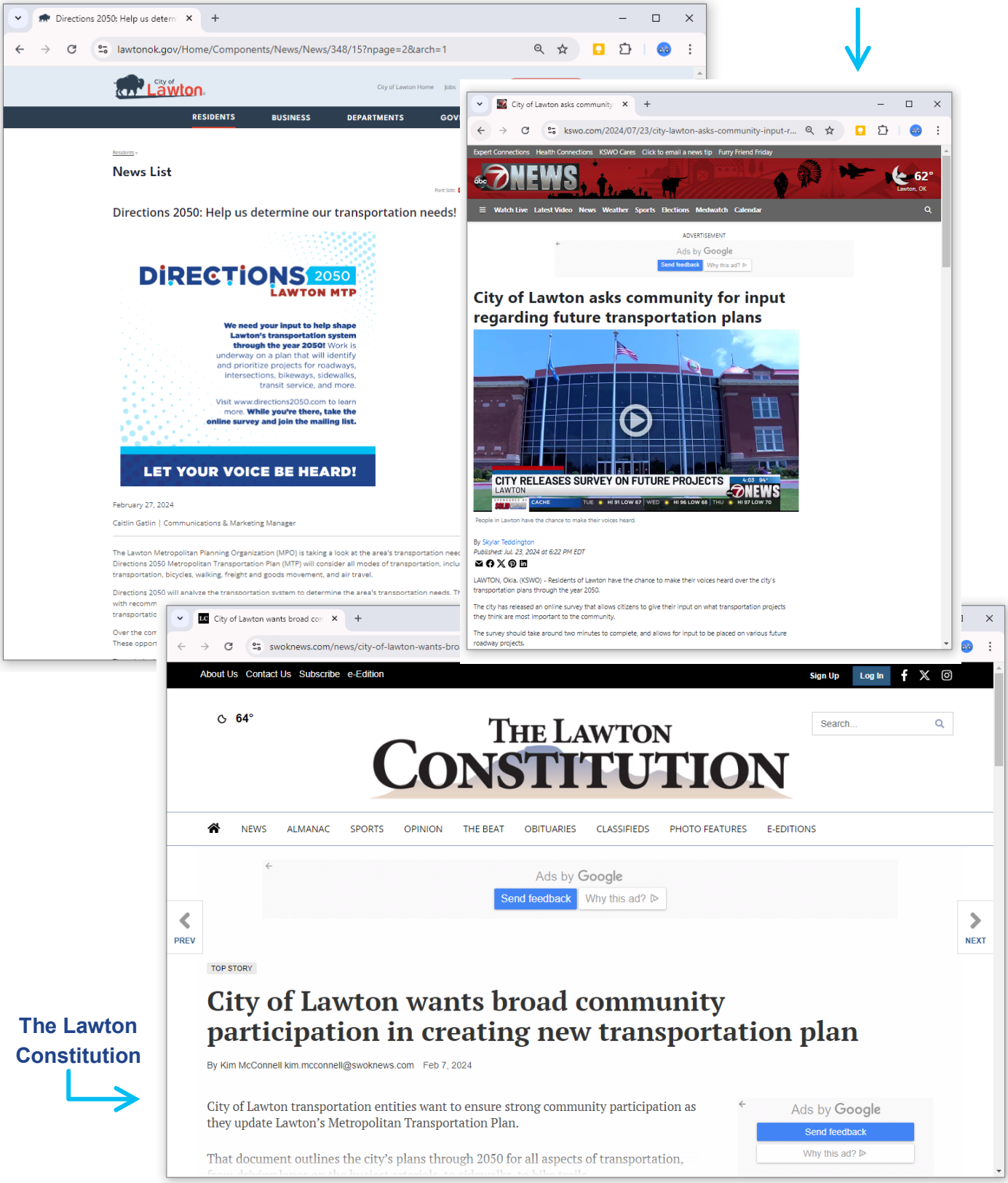
The engagement objectives were achieved through an inclusive process that invited residents, stakeholders, and the Lawton MPO Transportation Policy Board and Transportation Technical Committee to engage in the planning process through a variety of engagement activities. Promoting the plan occurred through traditional outreach channels from the Lawton MPO, the City of Lawton, and local print and digital media companies.

Lawton MPO



City of Lawton

KSWO-TV 7 News



The Lawton Constitution

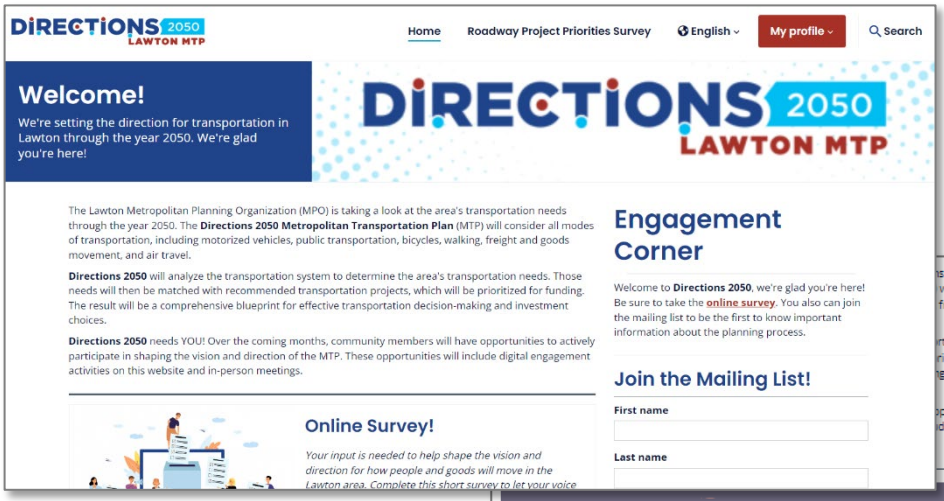
Engagement Activities

Project Website

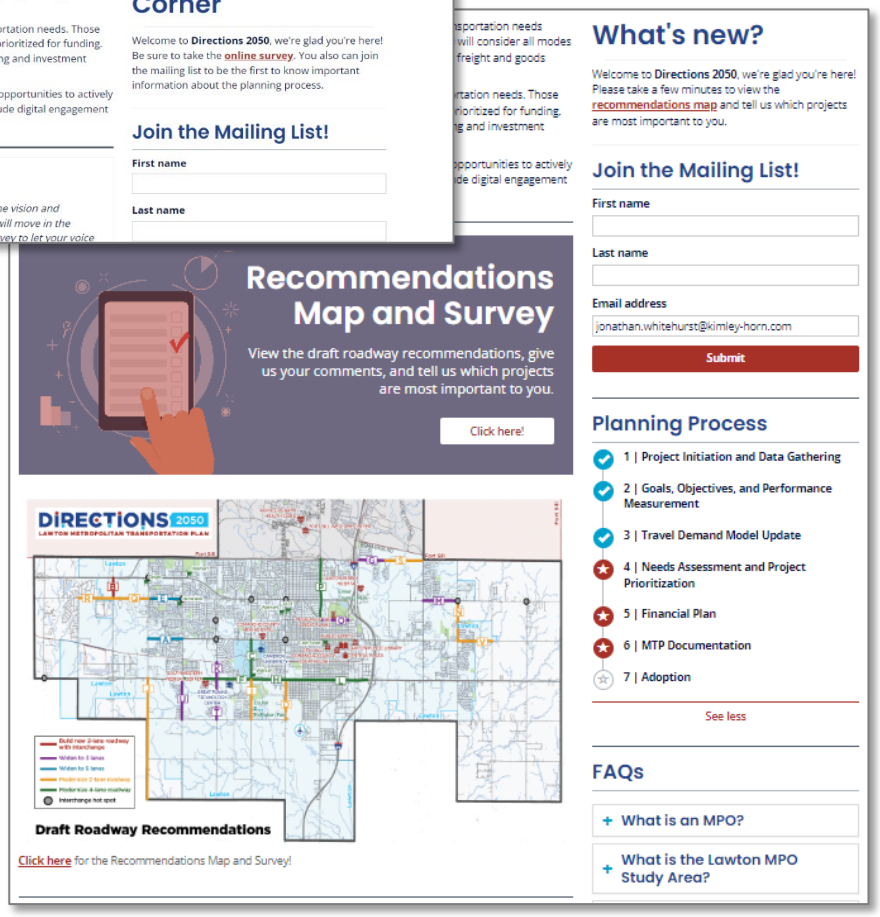
A project website was maintained throughout the planning process. The website, built on the Social Pinpoint platform, served as a one-stop digital engagement hub with an overview of the planning process, FAQs, MTP documents and resources, and an up-to-date project status. The website was used to promote outreach events and to launch digital engagement tools such as surveys, interactive maps, and digital comment forms. The engagement collected through the website is detailed on the pages that follow.

Project Website – Mobile Phone Version

Project Website at Launch



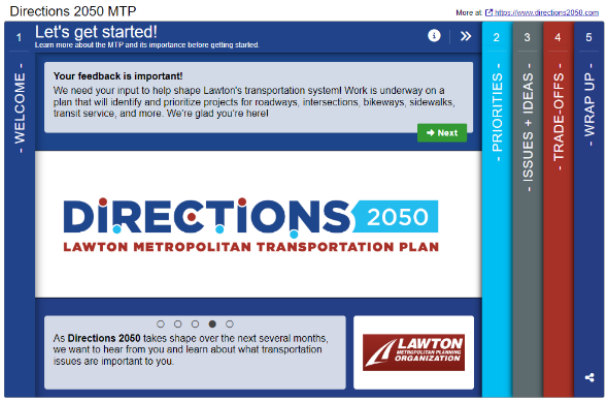
Project Website – Promoting the Recommendations Map and Survey



Website Activity. The project website launched on February 2, 2024. Over the course of the planning process, the site was viewed a total of **2,407** times by **1,495** unique visitors.

Online Survey #1

An online survey using the MetroQuest platform was designed to educate the public about the project and collect feedback using five interactive and visual screens. Participants were asked to prioritize eight transportation goals, identify project ideas on a map, and evaluate funding trade-offs among different types of projects. The survey was live from February 26, 2024 to March 25, 2024.



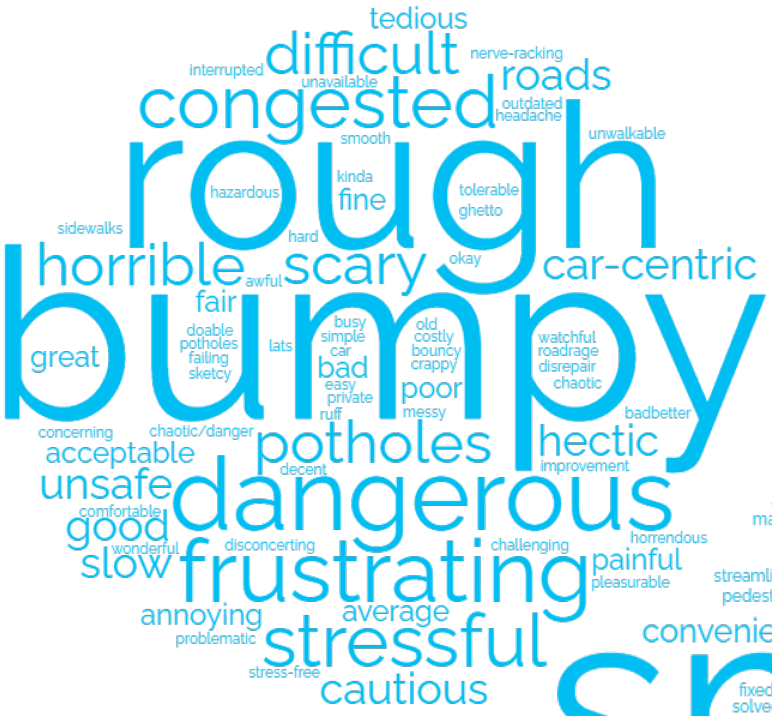
358 *participants*

6,094 *individual data points*

1,145 *written comments*

In one word…

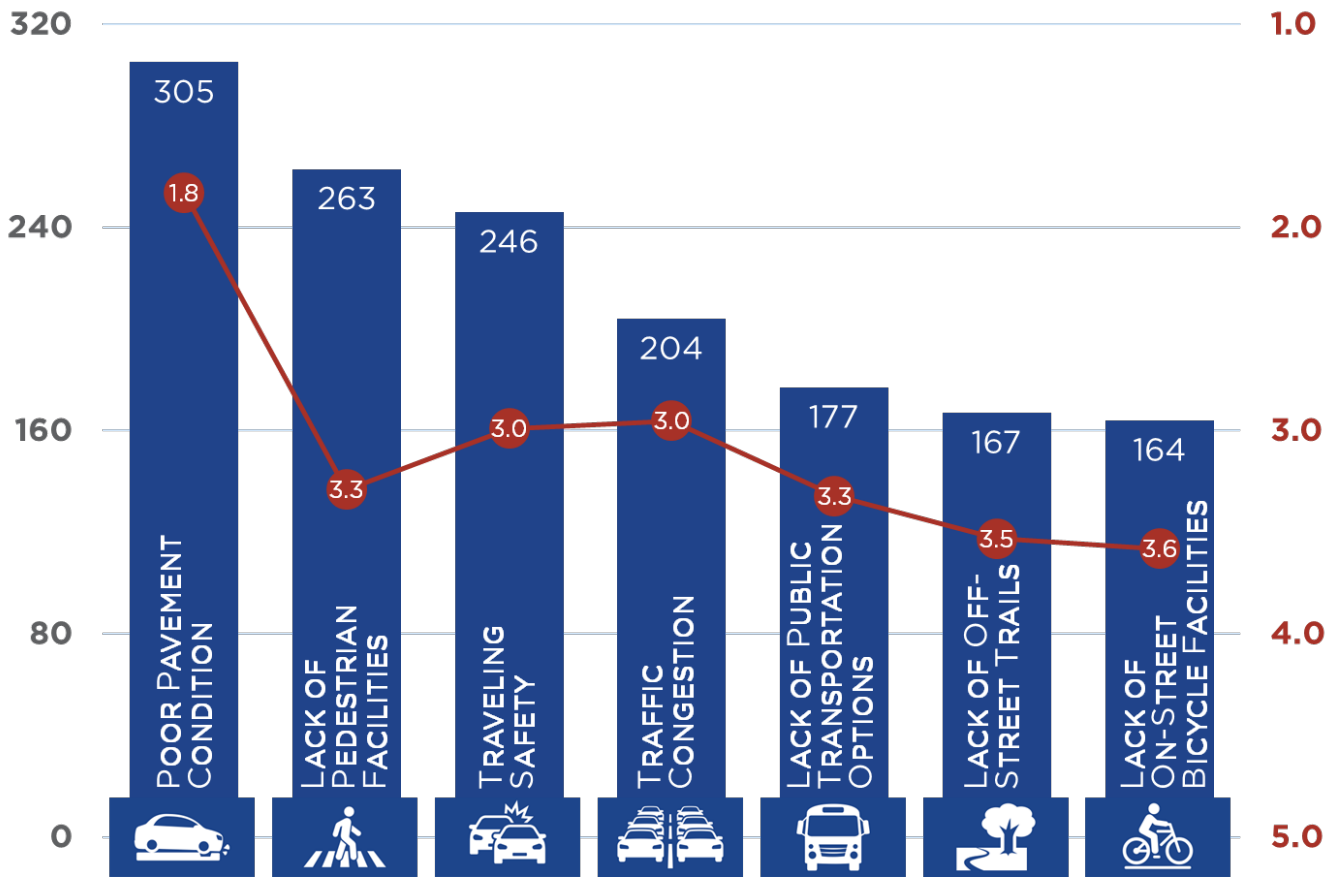
…describe traveling in Lawton TODAY.



…describe your vision for traveling in Lawton IN THE FUTURE.

Participants ranked five of the seven transportation concerns in order of importance (with one being the most important concern).

Pavement condition, lack of pedestrian facilities, and traveling safety were clear priorities for participants. While the lack of pedestrian facilities was ranked in the top five the second most times, those that ranked it tended to rank it lower among their five biggest concerns.



FREQUENCY refers to how often a goal was ranked in the top five. It is shown in the **BLUE** bar chart.

INTENSITY is the average ranking when ranked in the top five. It is shown in the **RED** line chart.

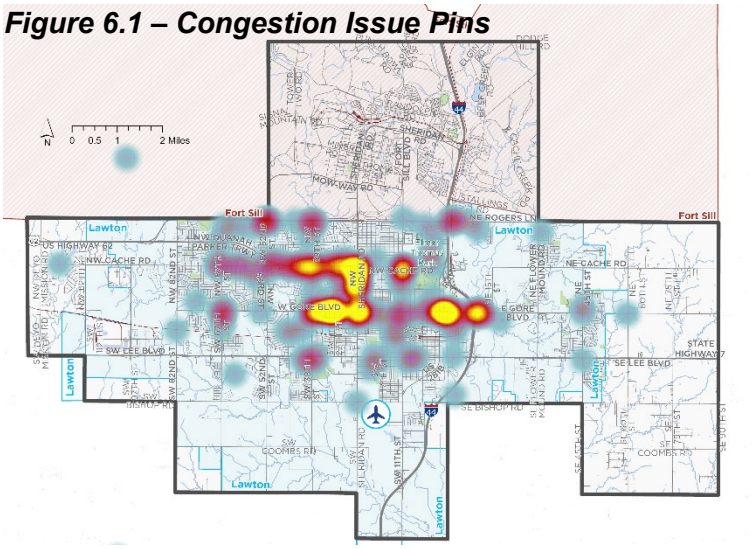
Participants identified project issues and ideas by dropping pins on a map.

In total, participants, dropped 987 pins on the interactive map.

Congestion Issue | 219 pins dropped

Figure 6.1 shows where participants dropped pins to indicate a **Congestion Issue**. Pins were most densely located along NW Cache Road and W Gore Boulevard between 38th Street and Sheridan Road. Other hotspots were located on W Gore Boulevard between 2nd Street and I-44, the intersection of NW Cache Boulevard and NW Fort Sill Boulevard, and the I-44 interchange at Rogers Lane.

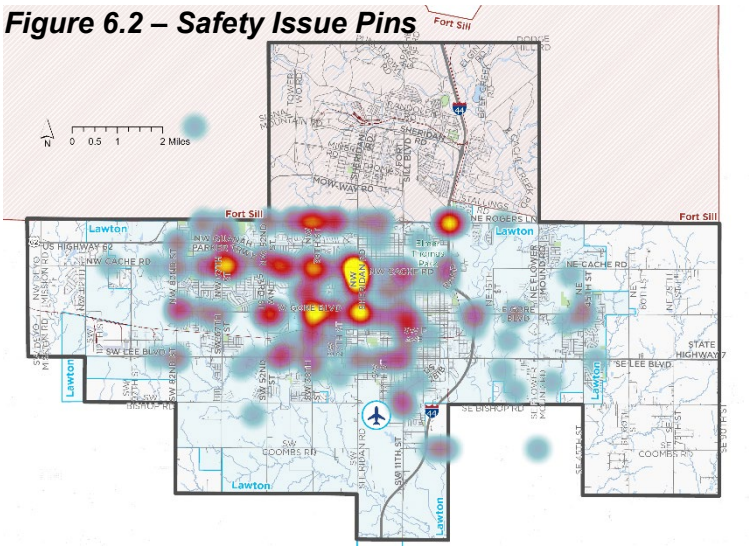
Figure 6.1 – Congestion Issue Pins



Safety Issue | 236 pins dropped

Figure 6.2 shows where participants dropped pins to indicate a **Safety Issue**. Pins were most densely located at major intersections along NW Rogers Lane, NW Cache Road, and W Gore Boulevard. Notable intersections included: Cache at Sheridan, Cache at 67th, Gore at 38th, Gore at Sheridan, and I-44 at Rogers (Exit 40).

Figure 6.2 – Safety Issue Pins



Roadway Idea | 224 pins dropped

Figure 6.3 shows where participants dropped pins to indicate a **Roadway Idea**. Pins were placed throughout the core of Lawton with segments of W Gore Boulevard, SW Lee Boulevard, NW Cache Road, and 38th Street receiving the most attention. The most notable segments included: Gore – 38th to Sheridan, Lee – 52nd to 38th, and Sheridan – Cache to Gore.

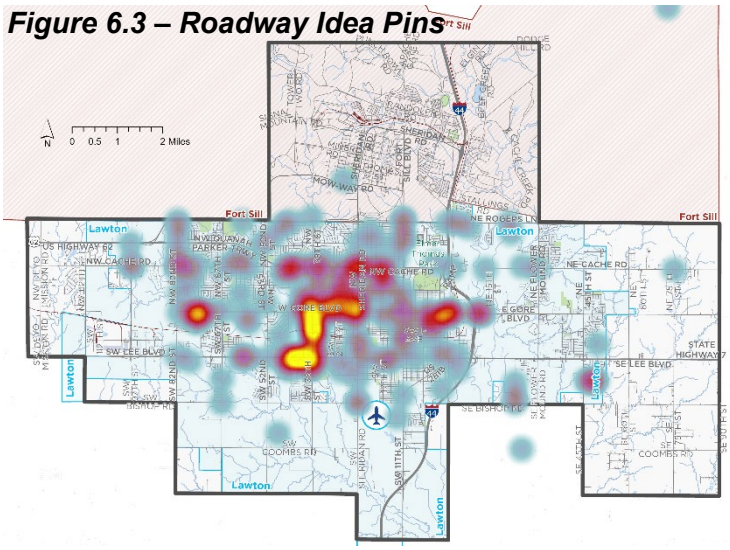


Figure 6.3 – Roadway Idea Pins

Bike/Ped Idea | 216 pins dropped

Figure 6.4 shows where participants dropped pins to indicate a **Bike/Ped Idea**. Pins were most densely located in central Lawton, with particular emphasis on the following: NW Cache Road between Sheridan Road and Ford Sill Boulevard, NW Sheridan Road between Cache Road and W Gore Boulevard, and areas surrounding the Central Plaza Mall and Lawton Public Library.

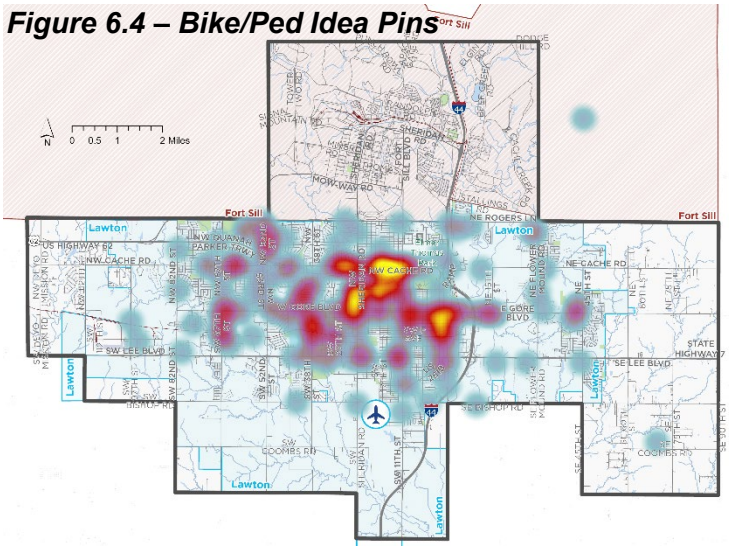


Figure 6.4 – Bike/Ped Idea Pins

Transit Idea | 92 pins dropped

Figure 6.5 shows where participants dropped pins to indicate a **Transit Idea**. Pins were dispersed throughout Lawton, with some additional focus on the following locations: Central Lawton, SW 97th Street near the Goodyear facility, Lawton-Fort Sill Regional Airport, and Fort Sill.

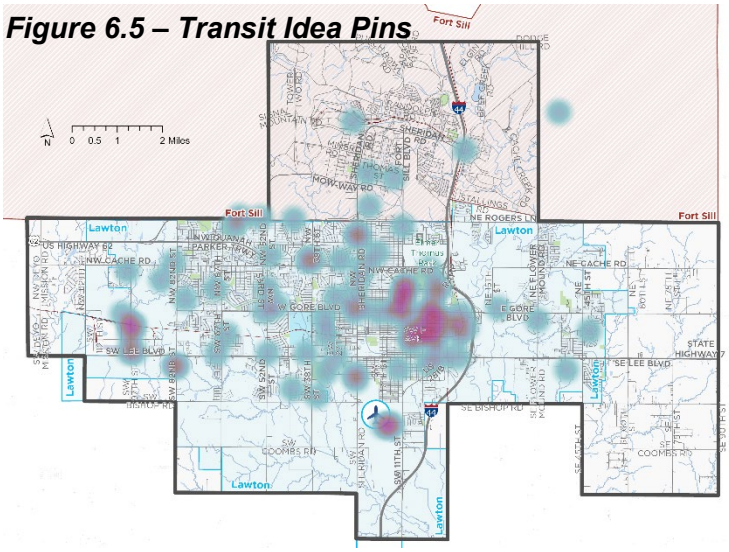
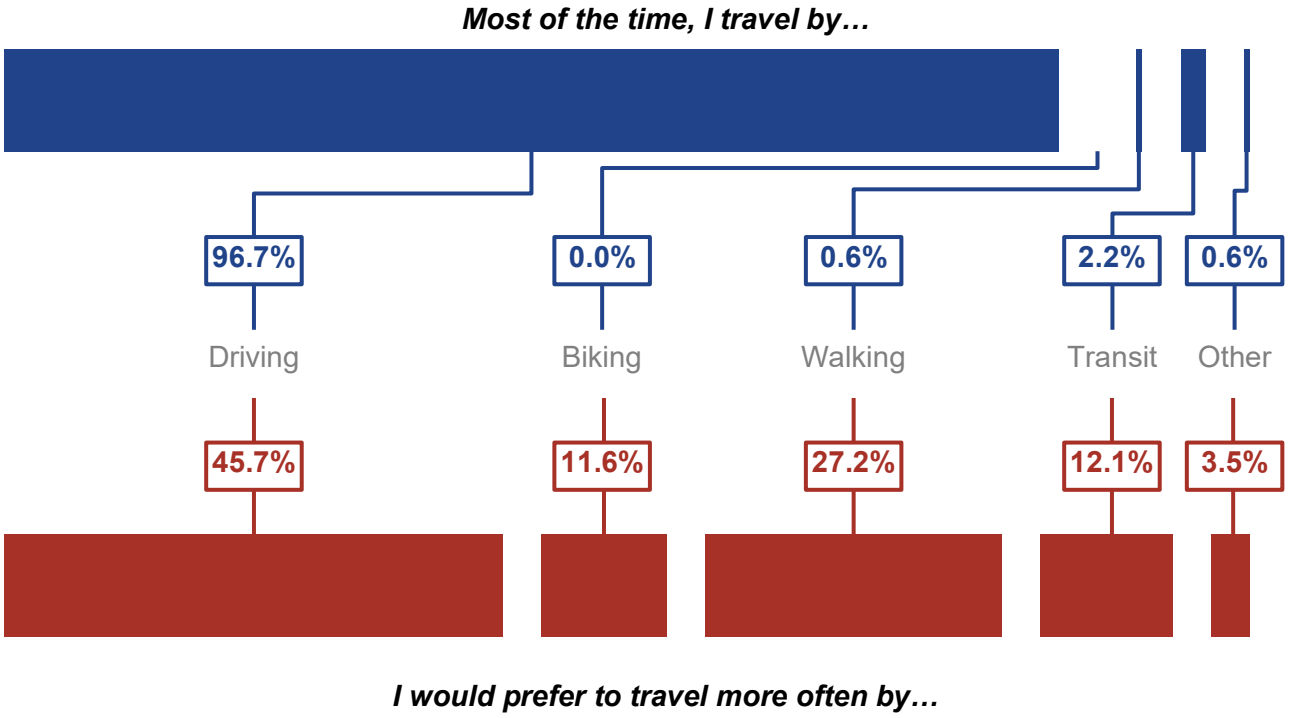


Figure 6.5 – Transit Idea Pins

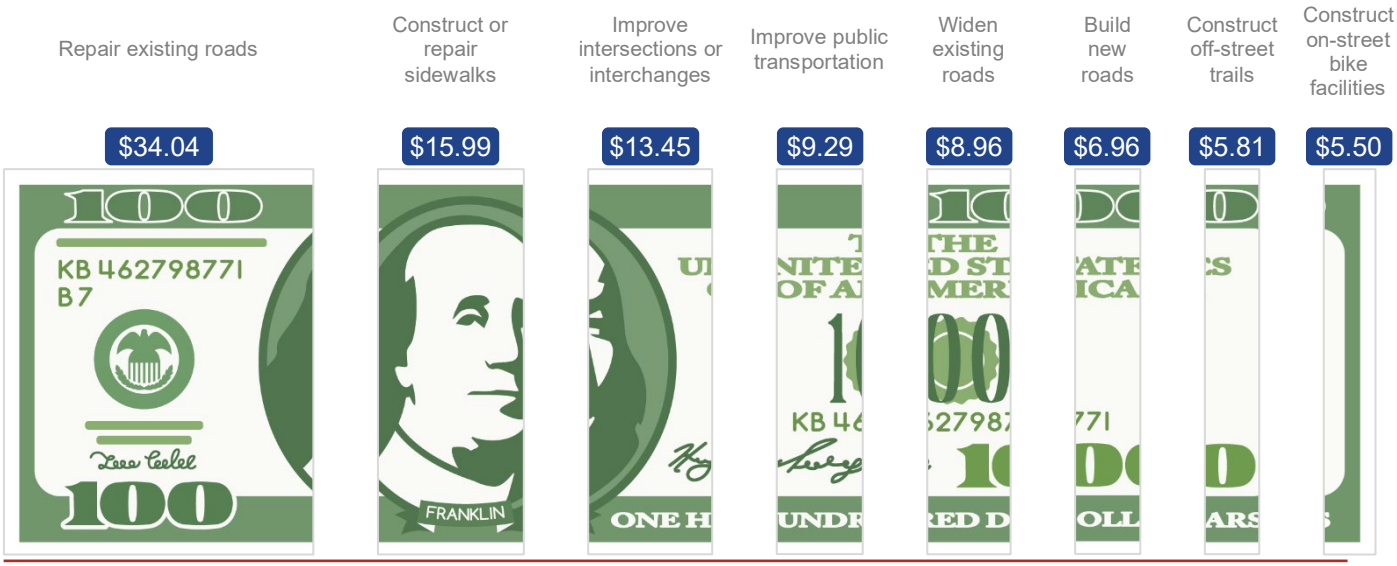
Participants indicated the ways they currently travel and how they would prefer to travel.

Participants indicated an interest in traveling more often by modes other than driving. Collectively, biking, walking, and transit increased from 2.8% to 50.9%.



Participants allocated $100 to different project types.

The results revealed the common theme for participants focusing on repair existing roads and improving pedestrian conditions.



Lawton-Fort Sill Open Streets

On June 8, 2024, the project team engaged with the community at the Lawton-Fort Sill Open Streets event. Open Streets was a community event that transformed a portion of SW C Avenue into a temporary public park with activities for the whole family. The project team spoke with dozens of people and received written comments from more than 50 individuals.

In one word…

…describe traveling in Lawton TODAY.

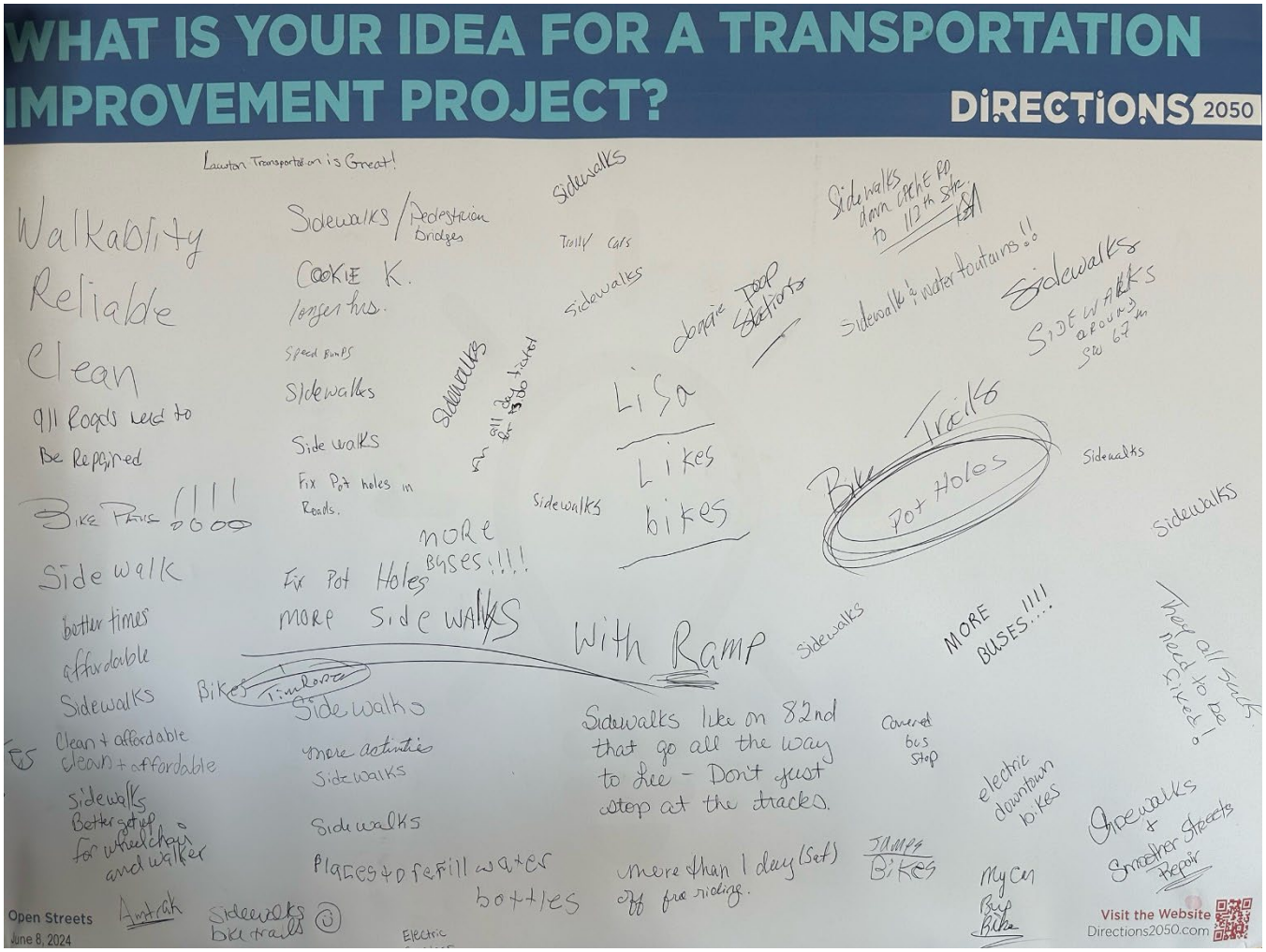
…describe your vision for traveling in Lawton IN THE FUTURE.

Open Streets participants described their role in the Lawton community and answered a variety of demographic questions.

- Participants were more likely to be female compared to the latest Census data (2022 ACS 5-Year Estimate).
- While representative of all age groups, participants were more likely to be older compared to the latest Census data.
- Participants were more diverse compared to the latest Census data with only 38.1% of participants identifying themselves as White or Caucasian.
- Participants represented the full spectrum of education status but tended to be more educated as compared to the latest Census data.

See Chapter 1 for a compilation of the demographic profile for participants across all engagement activities from the **Directions 2050 MTP**.

Participants offered their idea for a transportation improvement project.



Recommendations and Priorities

The draft recommendations were presented during a stakeholder meeting (June 20th), two community workshops (June 20th and 21st), and an online survey (live from July 23rd to August 5th) to introduce the roadway recommendations and better understand local priorities to help inform the prioritization process. Feedback received during the many conversations on the draft recommendations helped inform the recommendations introduced in this chapter. Additional input received is summarized below.

Stakeholders ranked the biggest transportation concerns in Lawton.

1. Poor pavement condition
2. Traveling safety
3. Lack of pedestrian facilities
4. Traffic congestion
5. Lack of bicycle facilities
6. Lack of public transportation options
7. Lack of off-street trails

Stakeholders divided $100 among various transportation improvements.

$24 – Construct or repair sidewalks
$21 – Repair existing roads
$14 – Build new roads
$13 – Improve intersections or interchanges
$11 – Improve public transportation
$10 – Construct on-street bike facilities
$6 – Widen existing roads
$1 – Construct off-street trails

Stakeholders and the public prioritized their top five roadway recommendations.

Participants ranked their top five roadway recommendations that are not already committed for funding. Shown here are how often a project was ranked in the top five and its average ranking when placed in the top five. This input was used to inform the prioritized list of projects.

				Stakeholders		Public	
				Percent Ranked	Average Ranking	Percent Ranked	Average Ranking
C	SW 38th St	Gore Blvd	Lee Blvd	50.0%	2.13	79.4%	2.00
D	SW Sheridan Rd	Lee Blvd	Bishop Rd	37.5%	2.67	27.5%	3.16
E	NW Cache Rd	67th St	82nd St	50.0%	2.88	31.9%	2.71
F	Lee Blvd	67th St	38th St	25.0%	3.00	70.0%	2.50
G	NE Rogers Ln	I-44	Village Dr	31.3%	2.80	20.6%	2.79
H	Lee Blvd	38th St	Sheridan Rd	12.5%	4.00	57.5%	3.10
I	SW 38th St	Lee Blvd	Bishop Rd	6.3%	5.00	21.3%	3.35
J	SW 82nd St	Lee Blvd	Woodlawn Rd	12.5%	4.50	11.9%	3.63
K	SW 52nd St	Lee Blvd	Railroad Crossing	18.8%	4.33	20.0%	3.69
L	Lee Blvd	Sheridan Rd	I-44	31.3%	2.20	35.6%	3.72
M	NE Cache Rd	Flower Mound Rd	NE 45th St	0.0%	0.00	9.4%	2.93
N	NE 45th St	Cache Rd	Arlington Ave	0.0%	0.00	11.3%	3.22
O	NW Ferris Ave	Fort Sill Blvd	2nd St	18.8%	3.33	23.1%	3.24
P	NW Fort Sill Blvd	Ferris Ave	Rogers Ln	50.0%	3.13	20.6%	3.27
Q	NW Cache Rd	82nd St	Goodyear Blvd	6.3%	5.00	15.0%	4.04
R	NW Cache Rd	Goodyear Blvd	112th St	6.3%	2.00	8.1%	4.00
S	NE Rogers Lane	Village Dr	Flower Mound Rd	6.3%	5.00	11.3%	3.22
T	SW 52nd St	Lee Blvd	Bishop Rd	6.3%	4.00	5.6%	4.11
U	E Gore Blvd	45th St	60th St	6.3%	5.00	8.1%	3.69
V	SW 67th St	Lee Blvd	Bishop Rd	6.3%	2.00	11.9%	4.05

Website visitors were asked to provide an idea for a transportation improvement project.

- Better sidewalks for wheelchairs, walkers
- Streets get rid of bumps in the road

Online survey participants were given the option to comment on the draft recommendations.

- A proper plan needs to be put in place. Timelines need to be held as best as possible. Don't be cheap about materials used so the improvements last longer than 2 years.
- I think we should focus on making sure all of the bridges are safe and able to handle the weight of school busses.
- So, modernize means to fix? Over the last 4 years, I've seen Lawton roads [get worse]. Instead of making new roads, fix the ones you have?
- When are you going to fix NW Carroll Avenue where the street is so broken down is making a V and probably gonna break the pipes under the street not to mention. I'm in a wheelchair and trying to get up down the street to go places is 99% impossible three or four of those streets are destroyed because of The earthquake and they've just been getting worse and worse and worse and nothing's been done
- All of the roads listed above do not benefit the low income taxpayers neighborhoods, I feel that no one speaks for them.
- I believe the entire Lee Blvd needs to be resurfaced. The dips that are on that road tear your tires and undercarriage up
- All listed need maintenance.
- Why widen Ferris from Fort Sill Blvd to 2nd Street when that area was recently redone and the section of Ferris between Fort Sill Blvd and Sheridan is a hot mess!!! Widening of that area should have been considered and done when you originally "fixed" that section.
- Quit making promises about roads then find other projects to play with. The city's primary purpose should be to maintain infrastructure and provide security.
- No new taxes. Stop the never-ending CIP scam the city keeps pulling. When a tax expires, stop tricking the low Intel voters to saying yes to a new round of b.s. tax
- Build bicycle lanes! Turn Ferris from 11th to Sheridan into a 2 lane with 3rd lane for turning and add bicycle lanes. Add roundabouts whenever possible!!!!
- The lack of information on the term "modernize" should be explained to fully understand the results of the proposed projects.
- Lee Blvd is an embarrassment. The entire road needs completed as a priority.
- Fix the roads driven on most compared to the ones that hardly see traffic.
- Yes properly fix the road but not put an overlay on top of the already messed up roads. And please do not do a pop shop because it does not last.
- 82nd from Lee Blvd to Woodlawn needs to be extended to Hwy 36.

Online survey participants were asked to list additional projects for consideration.

- NW Austin Drive from Santa Fe to Lindy Ave
- Put in an interchange at Rogers Lane and 38th St.
- Lee Blvd: 82nd to I-44 repair. 38th: Bishop to Gore repair. Gore Blvd: Flower Mound to 82nd St repair. Cache Rd: 2nd St to 82nd repair.
- 2100 block of NW Ozmun Ave has been waiting years for complete reconstruction.
- Fix potholes and bumpy roads in neighborhoods instead of poor patches that do not last or work.
- Quanah Parker from 82nd to just beyond the Roger's Lane Overpass. Overcoat, east bound lane very rough.
- NE 60th Street – entire road needs to be resurfaced
- Landscaping in all areas of Lawton, North and South side included and hopefully projects to work on sidewalks in all North and South side areas as well.
- I wish you would make all the traffic lights work on sensors rather than timers! It's incredibly frustrating when I'm the only car sitting at a stoplight and I have to wait 3-5 minutes to go.
- More sidewalks for all the walking traffic that has had numerous fatalities at the area of Cache Rd and 67th Street.
- The side roads south of Gore, between 11th Street to Sheridan are terrible.
- Redo NE Gore Blvd from I-44 to NE 45th St
- What about neighborhoods.
- 9th & I Ave - 11th St
- SW 78th St from Beta to Cherokee needs to be resurfaced
- The potholes are probably holding people's vehicles beneath the surface, they are so big and destructive.
- There are lots of potholes to be fixed. Lots of Lawton neighborhood streets are rough!
- Yes, my street go from Smith Avenue to Rogers Lane from Sheridan over to 22nd St.
- Widening Gore Blvd into more lanes
- Fixing the roads in the neighborhoods. They are horrible. And what about the inside the city, Cache Rd, Sheridan Rd, Gore Blvd and Lee Blvd. I seen a few roads that have been completed, sloppy, they just blacktop the road, and leave a mess in the neighborhood.
- ALL the residential roads with car eating craters!! And, for the Love of All things holy, please fix the drainage issues and the road on Southwest Jefferson! One should not drown trying to avoid potholes in a rainstorm. And, with all this construction nonsense caused by the Sonic right here, it's making the road even worse!! But all people on one project and get it done in record time! Why do you have five people looking at the one person doing the work? Lawton is highly inefficient!!

- Just hopefully all the neighborhood roads will be addressed as well in the future.
- Redo NW 46th from Santa Fe to NW Lindy Ave
- Ferris between Fort Sill Blvd to Sheridan is a mess and needs to be fixed. Huge cracks in sections of roadway where there is 1-2" drop also the cracks which are turning into gaps.
- Gore Blvd from Fort Sill Blvd to 17th Street
- The proposed projects listed above address capacity and "modernize". How will this MTP identify and identify projects that address safety such as intersection improvements, signalization upgrades, evaluation of corridors with collisions resulting in high fatalities and serious injuries?
- The three main roads, Lee Blvd, Cache, and Sheridan, need to be completely redone.
- What about all the neighborhood roads that are cracked, uneven, full of holes, and have water seeping up through the cracks for the last 3 plus years? It's a safety hazard for kids in the neighborhoods.
- Yes there's a whole bunch of side streets all over town that need repairs just as much as the main roads need repairs especially a lot of roads in Ward 7.
- Truck route to Goodyear
- Truck bypass from Goodyear to Hwy 62
- I believe a better route for trucks would be 97 south to Why 36. But if the plan is to use 82nd than modernize 97th south from Lee Blvd to SW Bishop Rd and SW Bishop Rd to 82nd. This allows truck traffic going south a route to avoid traffic and keeps them off the major roadways and traffic lights. This project should be completed prior to repairing Lee Blvd since it's the truck traffic that has caused the issue on Lee
- Really just more sidewalks, fewer potholes...

Participants during this round of engagement described their role in the Lawton community and answered a variety of demographic questions.

- Participants were representative of all age groups but tended to be older compared to the latest Census data (2022 ACS 5-Year Estimate).
- Participants were less diverse compared to the latest Census data with 67.9% of participants identifying themselves as White or Caucasian.
- Participants represented each education status but tended to be more educated as compared to the latest Census data.
- Household incomes were higher for participants compared to the latest Census data.

See Chapter 1 for a compilation of the demographic profile for participants across all engagement activities from the **Directions 2050 MTP**.

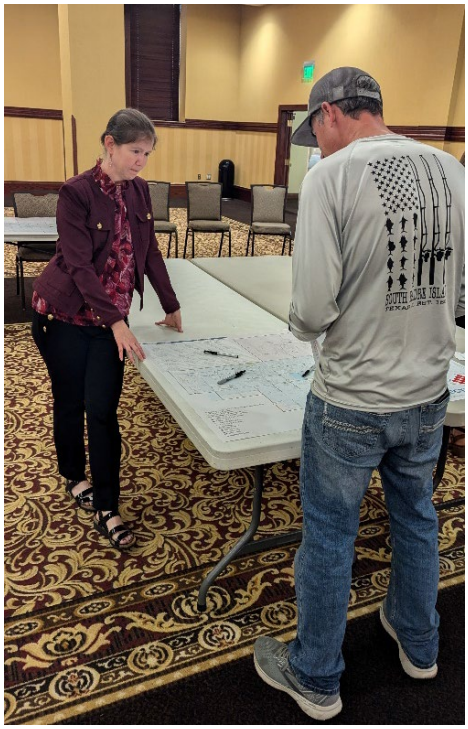
Public Review Period

The required public review period ended on November 1, 2024. Participants were able to attend one of three public meetings (September 30th at the Patterson Center, October 19th as part of the Open Streets event, and October 22nd at the Lawton Public Library). The draft report also was posted on the project website with an online comment form. Comments received included:

- You need to make buses available from Lawton to OKC hospitals. Bicycle paths and more walkways. Need LATS to run 24/7 for people t work night.
- I feel we need transportation after hours for those who work a night shift. I also feel that we need transportation for those who may have appointment in OKC and surrounding areas. Bicycle tracks would be beneficial due to people riding on streets and not using proper riding signals and almost getting hit by drivers who cannot see them
- The amount of data gathered is impressive but overwhelming to read. I think the project choices are good compared to the available financing. It's unfortunate that more can't be done because the roads in Lawton are a mess and don't give a good impression of our city and the good people that live here.
- Hello, I use to take the bus to post from the Walmart on 67th to the library, transferring to the line that takes you to post. I did that for six months before i got my license and I want to let you guys know how important a line like that is in times of crisis for federal workers. Thank you.
- Buses should never travel identical paths of previous busses. This is in regards to return route busses running the same path. Spread your services out and cover more ground.
- I believe that People would use the Buses more if they would have covered Bus Stops instead of having to stand in all types of weather without protection.
- It looks like a good step forward. There is so much that needs to be done because of lack of attention paid to the problems. Too much has been just patch worked throughout time. It shows throughout the city. I have been a resident for a while and retired here. Infrastructure has been neglected for to long.
- Please fix Taylor Avenue on the city bus route! It is awful! Taylor Avenue needs completely resurfaced from Fort sill Boulevard the whole way to 20th St. It is embarrassing and absolutely disgraceful that a city bus line road would be in such bad shape.
- This should be a top priority.
- "Transit Dependent" is the problem. There should be an additional study to determine those that are "Transit Preferred", not dependent. The accident map tells all. There is a danger to driving on the roads in Lawton Oklahoma. We need to grasp the notion that public transportation is the future not just the option of last resort for a fringe population cohort of "transit dependent". The plan has a section on livability yet going green, reducing the number of cars on the road by ramping up the quality of public transportation is nowhere to be found. Instead, a focus on the private sector to drive the plan. College educated woman informed much of this plan yet truly

proportionately representative Lawton is not reflected in the plan. Public transportation is not profitable for the private sector to take a serious look. Quality public transportation is a public endeavor which means doing due diligence at reaching the truly diverse population of Lawton which means a paradigm shift.

- We need some type of public transportation at night! Can LATS run busses 24 hours a day?



Conclusion

The **Directions 2050 MTP** envisions more equitable access to reliable transportation, a wider array of convenient travel options, and a transportation network that promotes a higher quality of life in Lawton. This plan is the latest effort to establish a guidebook for mobility that supports growth and economic development while complementing the natural and man-made qualities that make the Lawton area unique. The **Directions 2050 MTP** includes transportation strategies that consider the existing and future needs of residents, visitors, and employers. It also offers a financially constrained plan that identifies which projects can reasonably be funded and implemented during the life of the MTP. The priorities feeding the financially constrained plan were expressed throughout the public involvement process and collectively can positively influence the region's transportation planning decisions.

Directions 2050 MTP is more than a guidebook for funding transportation improvements. The plan empowers the people of the Lawton area to have a say in how transportation needs are accommodated in the coming decades. As projects advance closer to implementation or local circumstances change, the Lawton MPO will continue to partner with ODOT, FHWA, and FTA to determine how best to adjust priority improvements and advance recommended projects. Ultimately, continued collaboration between the state, local agencies, and the public will provide more opportunities to foster a safe and balanced multimodal transportation system that makes Lawton a great place to live, work, and recreate.

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Appendix A

Acronyms

AASHTO	American Association of State Highway Transportation Officials
ACS	American Community Survey
ACES	Automated, Connected, Electric, and Shared-Use (vehicles)
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
AQI	Air Quality Index
CBD	Central Business District
CEJST	Climate and Economic Justice Screening Tool
CIP	Capital Improvement Program
CMAQ	Congestion Mitigation and Air Quality
CSS	Context Sensitive Solutions
DOT	Department of Transportation
EPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
FAST	Fixing America's Surface Transportation (Act)
FEMA	Federal Emergency Management Agency
FFY	Federal Fiscal Year
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FY	Fiscal Year
IIJA	Infrastructure Investment and Jobs Act
IM	Interstate Maintenance
ITS	Intelligent Transportation System
LATS	Lawton Area Transit System
LMATS	Lawton Metropolitan Area Transportation Study (area)
LMPO	Lawton Metropolitan Planning Organization
LOS	Level of Service – performance measure
LRTP	Long Range Transportation Plan
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan

MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
NEVI	National Electric Vehicle Infrastructure
NHS	National Highway System
ODEQ	Oklahoma Department of Environmental Quality
ODOT	Oklahoma Department of Transportation
O&M	Operations and Maintenance
RBA	Regional Business Airport
SCS	Soil Conservation Service
SHSP	Strategic Highway Safety Plan
SORTPO	Southwest Oklahoma Regional Transportation Planning Organization
STIP	Statewide Transportation Improvement Program
STP	Surface Transportation Program
TAZ	Traffic Analysis Zone (used in modeling)
TIP	Transportation Improvement Program
TPB	Transportation Policy Board
TPM	Transportation Performance Management
TTC	Transportation Technical Committee
TTTR	Truck Travel Time Reliability (index)
ULB	Useful Life Benchmark
US DOT	United States Department of Transportation
VRU	Vulnerable Roadway User

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Appendix B

Glossary of Terms

A

Accessibility - The ability of vehicles or facilities to accommodate the disabled.

Accident Severity Index - A measure of the severity of collisions at a particular location, derived by assigning a numeric value according to the severity of each collision and totaling those numeric values.

Air Pollution - One or more air contaminants in such concentration and of such duration that they could cause injury; adversely affect human health or welfare, animal life, vegetation, or property; or interfere with the normal use and enjoyment of animal life, vegetation, or property.

Ambient Air - The outside air that we breathe at ground level.

Americans with Disabilities Act of 1990 (ADA) - Federal law which requires accessible public transportation services for persons with disabilities, including complementary or supplemental paratransit services in areas where fixed route transit service is operated. Expands definition of eligibility for accessible services to persons with mental disabilities, temporary disabilities, and the conditions related to substance abuse. The Act is an augmentation to, but does not supersede Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination on the basis of disability against otherwise qualified individuals in programs receiving federal assistance.

Attainment Area - A geographic area used by the US EPA in which levels of a criteria air pollutant meet the health-based primary standard (NAAQS) for the pollutant. It is important to note an attainment area may have acceptable levels of one air pollutant but unacceptable levels of others; an area can be in attainment and nonattainment simultaneously.

Attraction - The pull of attracting power of a zone normally measured as a function of employment activity. For non-homebased trips, attractions in a zone can be considered synonymous with trip destinations in that zone.

Average Daily Traffic (ADT) - The average number of vehicles passing a specified point during a 24-hour period.

B

Base Year - The lead-off year of data used in a study. It is often the year in which the U.S. Census was taken, such as 2010.

Block Groups - Combinations of census blocks within census tracts and block numbered areas.

Bus - A self-propelled rubber tired vehicle designed to carry a substantial number of passengers, commonly operated on streets and highways (also see para-transit vehicle).

Bus Stop - An authorized location for a bus to stop on a route. Marked with a sign and may include a shelter, bench, or trash can. See Flag Stop.

Bus Trip - A bus trip is defined as a one way trip by a bus while in revenue service, starting at one end of a route and ending at another end of a route. A round trip is counted as two separate bus trips.

C

Calibration - The process of developing the model parameters using observed transportation data.

Capacity - The maximum number of vehicles that can pass over a given section of a lane or roadway in one direction during a given time period under prevailing roadway and traffic conditions.

Capital Assistance - Financial assistance granted to an agency by the Federal Transit Administration for the purchase or construction of facilities, rolling stock or equipment required to provide public transportation services. In addition, maintenance, capital cost of contracting, and complementary service for persons with disabilities are eligible capital costs.

Capital Improvement Program (CIP) - An orderly plan for meeting the community's needs for physical infrastructure facilities such as streets, parks, water/sewer and public buildings. The CIP is a comprehensive schedule of capital improvements needed within the City and establishes a program to accomplish those needs within the City's ability to pay.

Car pool - Any vehicle (usually a car) or arrangement in which two or more occupants, including the driver, share the use or cost, in traveling between fixed points on a regular basis (also referred to as ridesharing).

Census Tracts - Small areas with generally stable boundaries, defined within counties and statistically equivalent entities, usually in metropolitan areas and other highly populated counties. They are designed to be relatively homogeneous with respect to population characteristics, economic status, and living conditions.

Census Transportation Planning Package - A special tabulation of transportation related data for transportation analysis zones and larger areas. It includes data by place of residence, by place of work, and from a cross tabulation of place of residence by place of work for use in studying commuting patterns.

Central Business District (CBD) - An area of intense commercial development in the center of the city.

Centroid - An assumed point in a zone that represents the origin or destination of all trips to and from the zone.

Centroid Connector - A transportation model network link that provides the linkage between the transportation system and the theoretical point of origin or destination of the trips to or from a particular traffic analysis zone.

Charter Service - Transportation by bus of persons who, pursuant to a common purpose and under a single contract, at a fixed charge for the vehicles or service, in accordance with the carrier’s tariff, have acquired the exclusive use of a bus to travel together with an itinerary, either agreed on in advance, or modified after having left the place of origin.

Clean Air Act - The original Clean Air Act was passed in 1963, but our national air pollution control program is actually based on the 1970 version of the law.

Clean Air Act Amendments of 1990 (CAAA) - The original Clean Air Act was passed in 1963, but the national air pollution control program is actually based on the 1970 version of the law. The 1990 Clean

Air Act Amendments are the most far-reaching revisions of the 1970 law. The 1990 Clean Air Act is the most recent version of the 1970 version of the law. The 1990 amendments made major changes in the Clean Air Act. A two-part act with goals that include greater integration of the transportation and air quality planning process. Its objective is to ensure transportation plans and projects contribute the attainment of National Ambient Air Quality Standards (NAAQS) set by the US Environmental Protection Agency (USEPA) and to reduce the growth of vehicle-miles-traveled in congested in areas that have not attained the NAAQS.

Collector Street - A class of street serving neighborhood circulation and providing a balance between accessibility to land and through movement of traffic.

Congestion - The level at which transportation system performance is no longer acceptable to the traveling public due to traffic interference.

Congestion Management - A systematic process that provides information on transportation System (CMS): system performance to decision makers for selecting and implementing cost-effective strategies to manage new and existing facilities so that traffic congestion is alleviated and the mobility of persons and goods is enhanced.

Congestion Mitigation & Air Quality Improvement Program (CMAQ) - Directs funds toward transportation projects in Clean Air non-attainment areas for ozone and carbon monoxide. These projects will contribute to meeting the attainment of the NAAQS.

Criteria Air Pollutants - The Clean Air Act of 1990 identifies six criteria, or common, pollutants regulated by the U.S. EPA on the basis of health and environmental effects. Lead, nitrogen oxide, sulphur dioxide, carbon monoxide and particulate matter have strong health and environmental affects nationwide.

> *Ozone (O_3)* is ground level and is formed by a process that results from photochemical reaction of sunlight and volatile organic carbons (VOCs) and oxides of nitrogen. Sources include gasoline vapors, and chemicals found in products including solvents, paints and hair sprays.
>
> *Carbon Monoxide (CO)* is colorless, odorless and poisonous gas produced by incomplete burning carbon-based fuels, including gasoline, oil and wood. Carbon monoxide is also produced from incomplete combustion of many natural and synthetic products, such as cigarettes.
>
> *Particulate Matter* includes dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including burning of diesel fuels, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steel making, mining operations, agriculture burning and operation of fireplaces and wood stoves.
>
> *Nitrogen Oxides (NOx)* are produced from burning fuels including gasoline and coal. NOx are smog-forming gases, which react with volatile organic compounds to form smog.
>
> *Sulphur Dioxide* is a gas produced by burning coal, most notably in power plants.

Crosswalk - A marked area for pedestrians crossing the street at an intersection or designated mid-block location.

D

Destinations - The zone in which a trip terminates.

E

Emission - The release of pollutants into the air from a source.

Employed - Includes all civilians 16 years old and over who were either (1) "at work" -- those who did any work at all during the reference week as paid employees, worked in their own business or profession, worked on their own farm, or worked 15 hours or more as unpaid workers on a family farm or in a family business; or (2) were "with a job but not at work" -- those who did not work during the reference week but had jobs or businesses from which they were temporarily absent due to illness, bad weather, industrial dispute, vacation, or other personal reasons. Excluded from the employed are people whose only activity consisted of work around the house or unpaid volunteer work for religious, charitable, and similar organizations; also excluded are people on active duty in the United States Armed Forces. The reference week is the calendar week preceding the date on which the respondents completed their questionnaires or were interviewed. This week may not be the same for all respondents.

Environmental Justice (EJ) - The fair treatment and meaningful involvement of all people regardless of race, color, national origin, culture, education, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. In transportation, this requires review of whether the benefits and burdens of transportation investments appear to be distributed evenly across the regional demographic profile and, if necessary, mitigation of such effects.

Environmental Protection Agency (EPA) - A Federal agency charged with protecting the natural resources on the nation.

Expressway - An expressway is a divided highway facility usually having two or more lanes for the exclusive use of traffic in each direction and control of access.

External Trip - A trip with one end inside a study area and the other end outside the study area.

F

Facilities - Transportation facilities may include roadway improvements, buses, sidewalks, bicycle/pedestrian paths, and signalization.

Federal Fiscal Year (FFY) - A twelve month period for which records are kept, federal fiscal year is from October 1st to September 30th.

Federal Highway Administration (FHWA) - The FHWA is part of the U.S. Department of Transportation and is responsible for administering all federal-aid public transportation funds and programs.

Federal Transit Administration (FTA) - The FTA is part of the U.S. Department of Transportation and is responsible for administering all federal-aid public transportation funds and programs.

Financially Constrained - A term used to describe the financial requirement stating all projects must have an identified funding source.

Fiscal Year (FY) - This a period of 12 consecutive months without regard to the calendar year. The fiscal year is designated by the calendar year in which it ends.

Fixed Route Service - A system in which vehicles follow a predefined route and schedule.

Functional Classification - Identification and categorization scheme describing streets according to the type of service they provide into one of four categories: principal arterials, minor arterials, collectors and local.

G

Grade - The slope (ratio of change in elevation to change in distance) of a roadway typically given in percent. For example, a 2% grade represents 2-feet of elevation change over a 100-foot distance.

Grade Separation - A vertical separation between intersecting roads or railroad tracks. One facility travels over the other via an overpass or other structure.

H

Headway - The time interval between successive transit vehicles moving in the same direction on a given route.

Home Based Work Trip - A trip for the purpose of one's employment with either trip end being one's home.

I

Impact Fees - Monetary charges imposed upon new development to defray the capital costs of infrastructure needed to serve that development.

Intelligent Transportation Systems (ITS) - The integration of transportation facilities and services with computers, communication and other electronic equipment to enhance the safety and efficiency of the transportation system. ITS uses equipment and procedures to monitor and manage the flow of people and goods. ITS gets the right emergency responders to the scene fast and gets information about delays to the users.

Intermodal System - A transportation network for moving people and goods using various combinations of transportation modes.

Interstate System - A system of interstate roads which are limited access arterial highways linking major population, industrial and defense centers.

J

Journey to work - Includes data on where people work, how they get to work, how long it takes to get from their home to their usual workplace, when they leave home to go to their usual workplace, and carpooling.

Self-Employed Workers - Includes people who worked for profit or fees in their own unincorporated business, profession, or trade, or who operated a farm.

Unpaid Family Workers - Includes people who worked 15 hours or more without pay in a business or on a farm operated by a relative.

Salaried/Self-Employed - In tabulations that categorize persons as either salaried or self-employed, the salaried category includes private and government wage and salary workers; self-employed includes self-employed people and unpaid family workers.

L

Land Use - The way specific portions of land or the structures on the land are currently used or planned for use.

Level of Service (LOS) - Refers to a standard measurement used by planners which reflects the relative ease of traffic flow on a scale of A to F with free-flow being rated LOS A and congested conditions rated as LOS F.

Link - A representation of a road segment on a transportation model network. One part of a chain of trips.

Linked Trip - An entire trip that is part of a chain of trips made for various purposes between the origin of the first trip and the destination of the last trip in the chain.

Long Range Transportation Plan - Every state and MPO must develop a long range transportation plan (LRTP) for transportation improvements, including a bicycle and pedestrian element. The LRTP looks 20 years ahead and is revised every five years.

M

Metropolitan Area - An area including the existing urbanized area, plus any contiguous area expected to become urbanized in the 20 year forecast period. The metropolitan area must include all areas of non-attainment for ozone and carbon monoxide pollutants.

Metropolitan Area Boundary - At a minimum, the existing urban area, non-attainment area and contiguous area expected to become urban in the next twenty years.

Metropolitan Planning Organization (MPO) - An association of local agencies established for mutual benefit and to help coordinate planning and development activities within a metropolitan region. Establishment of the MPO is required by law in urban areas of over 50,000 population if federal funds are to be used. The MPO is not a level of government. However, the MPO has "effective control" over transportation improvements within the area since a project must be a part of the MPO's adopted plan in order to receive federal funding.

Metropolitan Transportation Plan – Every state and MPO must develop a long range transportation plan (LRTP) for transportation improvements, including a bicycle and pedestrian element. The LRTP and the Metropolitan Transportation Plan (MTP) are interchangeable terms looks at least 20 years ahead and is revised every five years.

Mobility - The ease with which desired destinations can be reached. Greater mobility usually means higher speeds and less accessibility.

Mode - A particular form of travel (e.g. walking, bicycling, traveling by automobile, traveling by bus, or traveling by train).

Mode Choice - The form of travel (mode) chosen by individuals.

Mode Split - The proportion of total person-trips using various modes of transportation.

Model - A process to estimate the use of the transportation system under various scenarios, using specific computer software, combined with socioeconomic data, forecasts and the transportation system represented by a network of links and nodes.

Multimodal - The consideration of more than one mode to serve transportation needs in a given area. Refers to the diversity of options for the same trip; also, an approach to transportation planning or programming which acknowledges the existence of or need for transportation options.

N

National Ambient Air Quality Standards (NAAQS) - Standards established by the US Environmental Protection Agency limiting the maximum concentration of each of the criteria pollutants permitted in the atmosphere.

National Highway System (NHS) - A nation-wide system of approximately 155,000 miles of major roads. The entire Interstate System is a component of the National Highway System, and includes a large percentage of urban and rural principal arterials, the defense-strategic highway network and strategic highway connectors.

Network - A system of links describing a transportation system for analysis.

Node - A numbered point on a link representing an intersection or a zone centroid.

Nonattainment Area - A geographic area in which the level of a criteria air pollutant is more than the level allowed by federal standards. A single geographic area may have acceptable levels of one criteria air pollutant, but unacceptable levels of one or more other criteria air pollutant.

O

Operating Expense - The total of all operating costs incurred during the reporting period.

Origin - For transportation purposes, it is the location of the beginning of a trip or the zone in which the trip begins.

Overlay - The application of a layer of paving to an existing paved surface which adds structural capacity, rideability comfort and skid resistance.

P

Paratransit - Alternatively known as special transportation when applied to social services systems. Applies to a variety of smaller, often flexibly-scheduled and routed nonprofit oriented transportation services using low capacity vehicles, such as vans, to operate within normal urban transit corridors or rural areas. These services usually serve the needs of persons whom standard mass transit services would serve with difficulty, or not at all. Common patrons are the elderly and persons with disabilities.

Paratransit Service Area - The area within 3/4 mile of transit routes. Trips must be provided by specialized transportation within this area to people with disabilities who are unable to use the transit system.

Passenger Miles - The sum of the distance ridden by all passengers.

Peak Hour - That one-hour period during which the maximum amount of travel occurs. Generally, there is a morning peak and an afternoon peak and traffic assignments may be made for each period, if desired.

Person-Trip - Trip made by a person from one location to another whether as a driver, passenger, or pedestrian.

Pollution - Impurities in air, water, and land that create an unclean environment

R

Revenue Vehicle Hours - The sum of the number of hours each vehicle is scheduled to be in revenue service during the calendar year reporting period.

Revenue Miles - The miles the buses put in while in service. Does not include deadhead miles.

Right-of-Way - The rights, title, and interest in real property necessary for the construction and maintenance of the project.

S

Screen Line - An imaginary line bisecting an area. Traffic counts are taken at regular intervals at all streets intersecting the screen line. The line is associated, where possible, with physical barriers, such as rivers, or major highways with limited crossings. Counts taken along the screen line determine the

traffic moving between two areas. These counts are intended to detect long-range changes in volume and direction of traffic due to significant changes in land use and travel patterns.

Section 5307 - FTA's formula-based public transit grant subsidy program for urbanized areas (UZA's). Funds are allocated to each UZA. Section 5307 funds in small UZA's may be used for operating assistance (50% local match), or capital/planning projects (20% local match). Section 5307 funds in large UZA's may only be used for capital or planning projects (20% local match).

Section 5309 - An FTA discretionary transit capital grant program for vehicles and facilities. The federal share is 80%.

Section 5310 - Refers to funding made available under Section 5310 of the Federal Transit Act to assist public agencies, as well as non-profit corporations and associations, in meeting the specialized needs of elderly persons and persons with disabilities.

Sidewalks - Walkways intended predominantly for use by pedestrians.

Sight Distance - The length of roadway visible to a driver or pedestrian; the distance a person can see along an unobstructed line of sight.

Smart Growth - Mixing land uses with more sustainable compact, walkable, and transit-oriented development. It is also about directing development toward existing communities and redeveloping the older urban and close-in suburban areas. It is also about creating and preserving open space, protecting critical environmental areas, and promoting farmland preservation.

Special Trip Generators - Employers with unique characteristics that are especially large and therefore need to be handled outside of the normal trip generation approach.

Sprawl - The commercial and residential development of land away from urban communities into areas that have lower or no population that results in the increased need for roads, cars, infrastructures, and which could promote further segregation economically and racially, thereby isolating low income and people of color from economic and social opportunities.

Statewide Transportation Improvement Program (STIP) - A three-year program of highway and transit projects. The STIP must contain all projects in the state proposed for funding with Title 23 or Federal Transit Act funds, and must be consistent with the Long Range Transportation Plan.

Surface Transportation Program (STP) - A category of federal transportation funds administered by the Federal Highway Administration and allocated to states and metropolitan areas based on a prescribed formula. This category of funds can provide 80% of the cost to complete transportation improvement projects. These funds are flexible and can be used for planning design, land acquisition, and construction of highway improvement projects, the capital costs of transit system development, and up to two years of operating assistance for transit system development.

T

Traffic Analysis Zone - A subdivision of the metropolitan area used for transportation modeling. The characteristics of the traffic analysis zone are used to estimate the number of trips that start and end in

the zone, for a base year, and for specific forecast years. The study area is divided into 95 small areas. Each area has relatively similar characteristics within its boundaries.

Traffic Calming - Measures to reduce the negative effects of vehicles, and improve conditions for walking or bicycling. A familiar example is the orange barrels with the warning to stop for pedestrians.

Transportation Demand Management - A program which encourages people to travel at alternative times, or with fewer vehicles to reduce congestion.

Transportation Equity Act for the 21st Century (TEA21) - Federal legislation authorizing highway, highway safety, transit and other surface transportation programs from 1998 through 2003.

Transportation Forecasting - The process of estimating the number of vehicles or travelers that will use a specific transportation facility in the future. Traffic forecasts are used for several key purposes in transportation policy, planning, and engineering: to calculate the capacity of infrastructure

Transportation Improvement Program (TIP) - The TIP is a staged, four year prioritized program of transportation projects covering a metropolitan planning area which is consistent with the metropolitan transportation plan. This program is required for a locality to receive federal transit and highway grants. Regulations require the Metropolitan Planning Organization (MPO) and state and transit operators to cooperatively develop the TIP and make project selections within expected funding levels.

Transportation Network - The sum total of any mode or transportation facility, whether in part or in whole, whereby the movement of people, goods, services, or information occur.

Transportation Plan - A plan identifies facilities that should function as an integrated metropolitan transportation system. It gives emphasis to those facilities that serve important national and regional transportation functions, and includes a financial plan that demonstrates how the plan can be implemented.

Trip - A one-direction movement from an origin to a destination.

Trip Distribution - The modeling process used to estimate the origins and destinations of travelers.

Trip End - The origin or destination of a trip.

Trip Generation - The modeling process used to estimate the number and types of trips types taken by travelers (e.g. Home-to-work, non-work-to-home, etc.)

U

Urban Area - A city or group of cities with population in excess of 5,000. Boundaries are determined by local elected officials, but may not be less than urban area boundaries as defined by the U.S. Bureau of the Census.

Urbanized Area - An area containing a city or twin cities of 50,000 or more people surrounded by a closely settled incorporated area which also meets specified criteria of population and density.

V

Validation - The process of evaluating the accuracy of the transportation model.

Volume-to-Capacity Ratio (V/C) - A measurement of the quality of roadway travel. The ratio of the existing amount of vehicular travel for a roadway to the amount of designed capacity on the roadway. The capacity of the facility can be calculated using methods described in the Highway Capacity Manual. The v/c is the percentage of the capacity that is being consumed by traffic. A v/c ratio above 1.0 means that the volume of traffic exceeds capacity and the road segment or intersection is becoming deficient and congested.

Vulnerable Road User (VRU) - A person walking, bicycling, or rolling; someone using a mobility assistance device; or a roadway worker or first responder on foot.

Appendix C

Model Documentation

Introduction

This report documents the update and use of the Lawton Travel Demand Model (LTDM) and provides information on model validation. The LTDM has been updated in conjunction with the Directions 2050 Metropolitan Transportation Plan (MTP). The model reflects updates to the transportation network and socioeconomic data over the time since the last plan was completed in 2019. The LTDM is a four-step model developed with TransCAD software (TransCAD 10.0, Build 40565 64-bit).

The LTDM is a planning tool designed to forecast future demand on the transportation network within the LMATS area. The model utilizes data such as land use, socioeconomic data and roadway network information to estimate future travel demand. It follows the basic "four-step" travel demand forecasting process of trip generation, trip distribution, mode split, and trip assignment. Outputs from the model are used in the development of Directions 2050. Results from the model provide one piece of information to decision makers to help evaluate future transportation investment scenarios to meet the goals and objectives identified in the MTP.

The model has been updated to a base year of 2022 and a horizon year of 2050. The four basic steps of the model include:

1. **Trip generation** determines how many trips are made by residents and employees in each Traffic Analysis Zone (TAZ or zone) in the region. Trips are stratified into two types: productions and attractions. Trip productions are those trips generated by a zone and are generally associated with the resident population of the zone. Trip attractions are those trips that are attracted to the zone from another zone. They are generally associated with the employment in the zone.
2. **Trip distribution** is the process of connecting trip productions with trip attractions for each possible combination of zones. The trip distribution model uses the gravity model formulation. This formulation states that the number of trips between two zones is directly proportional to the number of trip productions in the production zone and trip attractions in the attraction zone, and inversely proportional to the separation between the zones.
3. **Mode split** is the third step in the four-step process. Here, the travel characteristics of the population are used to estimate the mode choice between auto and transit. Transit routes are coded and an estimation of transit ridership is calculated.
4. **Trip assignment** is the last step in the four-step process. Trip assignment determines which roadway path will be taken by auto travelers. Auto trips are assigned by time-of-day, using an equilibrium traffic assignment process. The equilibrium assignment process considers both free-flow travel time and the delay time due to traffic congestion. At equilibrium, no traveler can reduce his or her travel time on a trip by switching to an alternative route for that trip.

Previous Model

The previous Lawton travel demand model was developed as part of the previous plan update in 2019. The model had a base year of 2017 and a future year of 2045. The 2017 model was used as a base from which to update socioeconomic, network, and project inputs for use in Directions 2050 and subsequent Lawton MPO planning.

Overview of LTDM

This section documents the work performed to update the LTDM.

Data Sources

The primary source of data for the model update was visual inspection of aerial photography between 2017 and 2022. Household and employment growth were both estimated and checked against Census sources.

- Additional information was obtained as outlined below.
- MPO boundary information was updated based on input from the MPO staff
- Transit information was obtained from the Lawton Area Transit System (LATS) and used for route coding and ridership validation
- 2050 Model network projects were based on the 2045 plan and updated as part of the MTP
- AADT count shapefile (ODOT) was used in model validation

Model Interface

The LTDM has been designed to utilize TransCAD's native scripting language, Geographic Information System's Development Kit (GISDK), to provide an intuitive yet flexible interface. The model features an interface that can run different steps of the model individually or as a set. It also allows functionality in managing files, and scenarios. This setup allows for an optimal balance between efficiency and flexibility in using the model.

The interface also allows the user to view and adjust most settings in the model, and to easily switch between scenarios that contain different sets of data, such as an alternative network, a modified external trip forecast, or a land use scenario.

Highway Network and TAZ Structure

To simulate travel within the region, a digital network is developed that represents the roadway paths to be modeled. In TransCAD, the line layer is not the actual model network used by the travel demand modeling system. Rather, the model network is built from the line layer. This means that the model network is developed as a selection set from the line layer.

This setup allows the user the ability to easily add roads to the highway network, analyze street density within a TAZ, and identify potential network shortcuts that may affect assignment results.

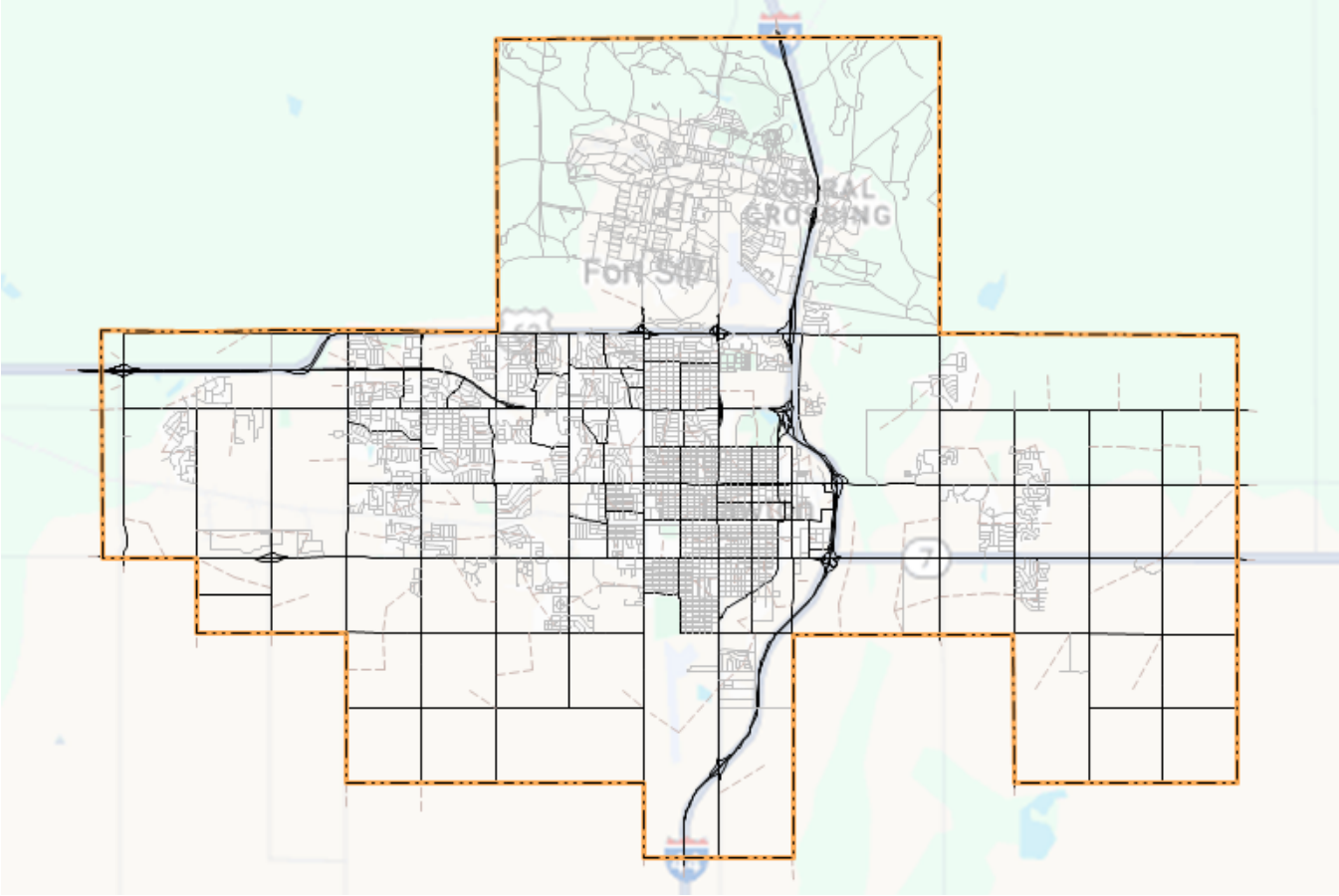
Highway Network Database

The highway network database contains attributes for each line in the line layer and includes all attributes needed to perform a traffic assignment.

Links that were developed for future year roads were drawn in the network database as new links. Future year attributes were input in a project file. The highway network database and project file were connected by giving each project a unique ID. The project file identifies attributes for the new facilities and indicates the years and scenarios in which the road is expected to be built. This same methodology

using the separate project file was also used for other types of roadway improvement projects, including roadway widening, roadway reconstruction, and median/turn-lane improvements. This methodology allows a single database plus the project file to handle all potential roadway improvements in the network in a compact format.

Figure C.1 – LTDM Network



Highway Capacities

Daily and hourly capacities were developed for the LTDM to utilize street data. This approach provides the most accurate representation in a model of actual capacity (levels of service (LOS) A through F) on an individual link. These capacities are implemented using an equation that considers facility type, speed limit, lanes, and median treatment. The capacity equations are built into the model process as an equation in the TransCAD script, so modifications to network attributes automatically update the capacity in subsequent runs. In the equation, hourly capacities are developed and then converted to peak period capacities by multiplying by peak factors.

The capacity setup for the LTDM has several benefits, including:

- Better representation of capacity based on roadway attributes
- Ability to easily recalculate capacities for future networks as improvements occur
- Ability to adjust capacity equations throughout the process

The equations were developed using the *Highway Capacity Manual* and analysis performed by the Indiana Department of Transportation in 1997 for the *Indiana State Highway Congestion Analysis Plan* [FHWA/IN/JHRP-96/8 Opsuth and Whitford]. The equations presented have been modified for the LTDM.

The general form of the equation is:

$SF = c * N * f_w * f_{HV} * F_p * FE * f_d * F_{CLT} * F_{Park} * (v/c)i$

Where:

SF	=	Maximum service flow for desired LOS
c	=	Capacity under ideal conditions (vehicles per hour per lane)
N	=	Number of lanes
fw	=	Factor due to lane width
fHV	=	Factor due to percent heavy vehicles
Fp	=	Factor due to driver population
FE	=	Factor due to driving environment
f_d	=	Factor due to directional distribution
FCLT	=	Factor for continuous left-turn lane (for undivided sections)
F_{Park}	=	Factor for on-street parking
(v/c)i	=	Rate of service flow for LOS A through E

All of these factors are not currently included in the LTDM but could be added later. The current Lawton model incorporates the following factors in the capacity equation:

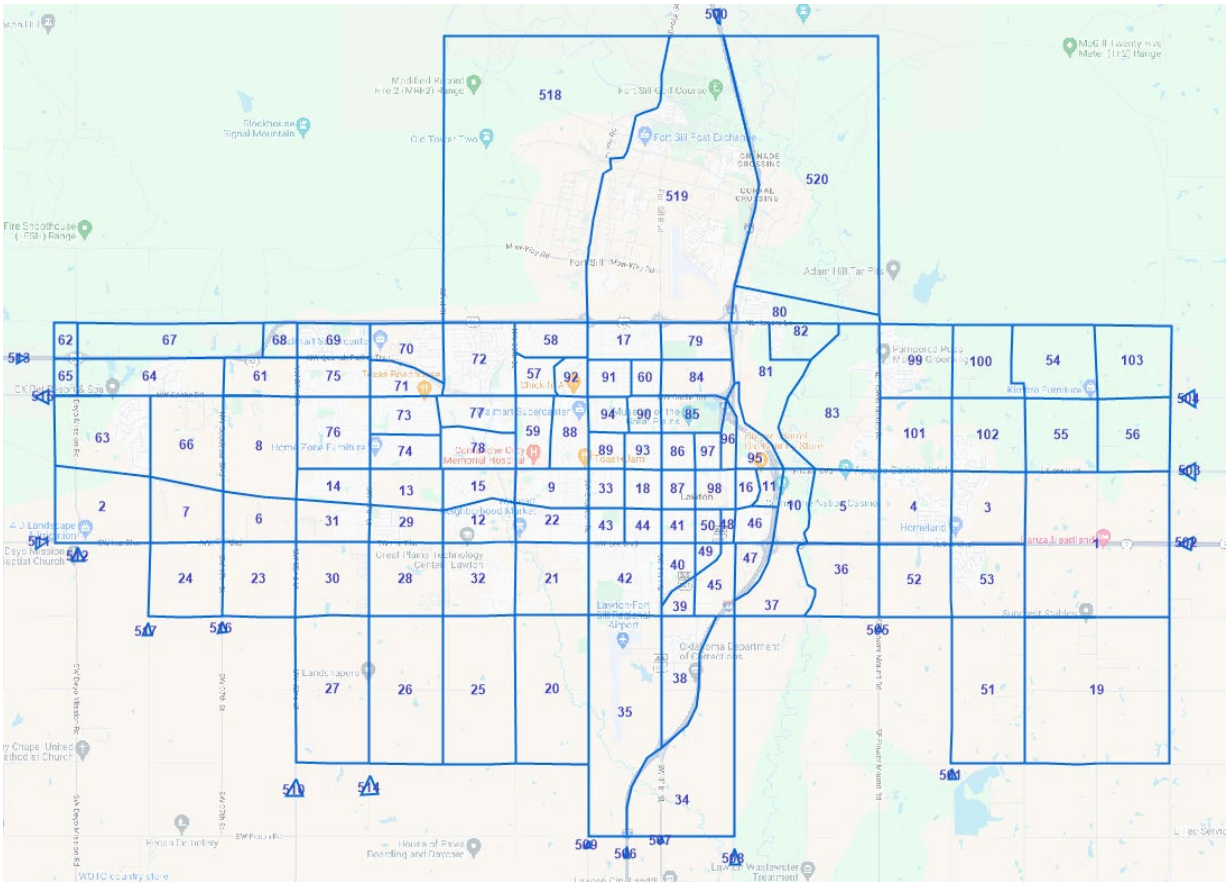
- F_w (Factor due to lane width/shoulder width) – incorporated for future improvements
- F_{CLT} (Factor due to median/center turn lane) – incorporated for existing facilities and future improvements

Traffic Analysis Zones

In the LTDM, the TAZ layer is stored as an area layer. Based on the TAZ ID number, a database is then associated with each TAZ. This database contains all the demographic and employment data needed for trip generation.

Creating unique sets of TAZ IDs for specific TAZ types can often speed external processing of trip table information and make data analysis and processing easier. In TransCAD, TAZ and network nodes are all part of a point layer. It is helpful to use ID numbers to differentiate between a point as a TAZ centroid and one that is a network node. The LTDM TAZ/point layer numbering scheme puts internal TAZs at the beginning of the numbering sequence, followed by external TAZs and then network nodes. Internal TAZ numbers begin with ID 1 (1-103); external TAZ numbers begin with ID 500 (500-520); and network node numbers start at 1000.

Figure C.2 – LTDM Traffic Analysis Zones



Zonal Data

The following socioeconomic data fields are used in the LTDM:

- Households
- Population
- Total Employment
- Industrial Employment
- Retail Employment
- Highway Retail Employment
- Office Employment
- Service Employment
- School Enrollment

Scenario Management

The future forecast year (2050) is treated as a scenario in the LTDM. The TransCAD network has been developed so that both the base and forecast year facilities are included in one model file and are managed by a Future Year Project Table. This allows for network editing on the base year data to automatically apply to the future year network(s) as well. When a scenario year and network is selected, the model implements changes to the roadway network to represent highway projects in the model. With this framework, any network edits or corrections made for one scenario are easily implemented for all subsequent years and scenarios. This methodology allows for easy management of roadway projects and a flexible environment for implementing several roadway improvements on a single corridor. The model interface includes a file setup for scenarios that can be saved and loaded later to simplify the model setup process and allow for quick transitions between different test alternatives.

Socioeconomic Data

Table C.1 – 2022 Base Year Socioeconomic Data by TAZ

TAZ	Population	Households	Employment					
			Total	Highway	Industry	Retail	Office	Employment
1	108	36	23	3	1	3	15	1
2	12	4	5	0	5	0	0	0
3	1669	591	149	20	11	87	7	24
4	2610	1144	249	5	4	28	52	160
5	84	35	355	0	19	9	218	109
6	0	0	617	26	456	86	35	14
7	0	0	1590	14	1500	47	21	8
8	421	187	248	17	145	55	23	8
9	1534	449	882	79	113	300	90	300
10	139	91	51	3	20	6	15	7
11	68	22	299	21	121	29	89	39
12	1230	392	97	8	2	0	7	80
13	4	1	117	0	0	1	5	111
14	2238	807	140	0	0	3	12	125
15	1621	649	65	0	3	6	8	48
16	0	0	453	32	182	44	136	59
17	2885	1190	313	31	52	70	10	150
18	1038	550	484	32	82	95	150	125
19	178	67	49	5	4	6	31	3
20	2	1	21	2	5	2	2	10
21	415	153	526	46	135	42	62	241
22	2308	929	531	17	123	106	135	150
23	5	3	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	4	2	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	44	14	0	0	0	0	0	0
28	441	161	622	8	9	4	25	576
29	1238	470	56	1	1	1	5	48
30	597	252	146	0	3	1	12	130
31	1015	376	94	0	4	1	14	75
32	2016	704	238	32	48	29	44	85
33	1320	632	512	136	86	117	81	92
34	14	7	15	1	5	2	4	3
35	3	2	235	16	95	23	70	31
36	149	57	210	0	20	10	120	60
37	3	2	0	0	0	0	0	0
38	1320	450	336	23	137	33	100	43
39	0	0	131	10	53	13	39	16
40	938	406	107	11	8	33	13	42
41	723	306	208	56	20	48	33	51
42	2095	864	727	70	80	63	337	177
43	3	1	95	7	24	16	32	16
44	540	253	270	26	82	54	55	53
45	3	2	571	39	231	56	171	74
46	4	2	1246	87	502	121	374	162
47	0	0	259	18	103	26	78	34
48	13	9	155	16	50	23	35	31
49	319	122	81	11	29	14	5	22

50	565	249	108	14	40	17	10	27
51	205	84	23	3	1	3	15	1
52	34	10	70	0	4	3	30	33
53	1792	632	81	8	7	8	53	5
54	28	10	0	0	0	0	0	0
55	18	9	4	0	0	0	3	1
56	64	24	3	0	0	5	2	1
57	976	421	303	75	10	97	62	59
58	2998	1156	115	19	11	35	33	17
59	1533	607	1576	100	16	78	44	1338
60	1068	452	143	3	6	23	32	79
61	2	1	885	64	200	500	87	34
62	0	0	0	0	0	0	0	0
63	1120	368	84	6	1	20	5	52
64	599	197	65	5	1	25	9	26
65	0	0	0	0	0	0	0	0
66	32	15	208	7	125	47	21	8
67	8	4	0	0	0	0	0	0
68	1	1	84	7	1	47	21	8
69	1881	783	53	4	0	0	11	38
70	2034	833	764	6	3	518	109	128
71	1894	782	273	60	3	75	80	55
72	4135	1537	500	70	40	195	45	150
73	2522	1038	395	75	9	136	50	125
74	2139	787	211	24	3	46	38	100
75	2137	928	744	92	9	167	53	423
76	3927	1620	601	157	125	163	76	80
77	1695	738	444	68	6	170	100	100
78	1886	913	236	3	3	12	95	123
79	976	378	121	3	8	5	15	90
80	884	339	47	1	1	0	0	45
81	125	50	228	0	0	0	12	216
82	691	284	0	0	0	0	0	0
83	1311	499	212	29	19	19	31	114
84	0	0	0	0	0	0	0	0
85	0	0	90	3	1	6	23	57
86	1031	474	127	1	10	1	11	104
87	208	136	569	12	55	131	200	171
88	1773	828	1263	177	27	554	257	248
89	978	395	177	16	7	29	70	55
90	948	388	314	15	12	30	112	145
91	1362	586	209	40	6	60	55	48
92	1036	392	303	55	11	141	36	60
93	1096	526	140	6	17	7	47	63
94	1076	459	322	42	13	70	150	47
95	213	91	91	6	37	9	27	12
96	7	4	226	0	5	174	21	26
97	871	350	161	0	2	125	16	18
98	200	65	876	33	85	200	300	258
99	1683	559	13	3	0	0	4	6
100	109	35	4	0	0	0	3	1
101	884	429	68	9	6	6	11	36
102	1070	397	5	0	1	0	3	1
103	53	21	5	0	0	0	0	5

Table C.2 – 2050 Future Year Socioeconomic Data by TAZ

TAZ	Population	Households	Employment					
			Total	Highway	Industry	Retail	Office	Employment
1	534	178	117	17	1	36	29	34
2	390	130	6	0	6	0	0	0
3	2035	721	259	33	12	129	26	59
4	2905	1273	369	17	4	64	75	209
5	84	35	531	6	21	25	261	218
6	0	0	740	29	562	95	39	15
7	0	0	1809	15	1710	52	23	9
8	741	329	364	30	160	94	38	42
9	1534	449	970	87	124	330	99	330
10	154	101	185	9	22	22	26	106
11	89	29	481	23	280	32	103	43
12	1636	521	205	23	2	33	26	121
13	31	8	154	6	0	8	11	129
14	2238	807	169	0	0	3	18	148
15	1621	649	87	0	3	7	14	63
16	0	0	1003	60	472	83	277	111
17	2885	1190	359	34	57	77	16	175
18	1038	550	562	35	90	104	186	147
19	522	196	152	20	4	40	52	36
20	15	8	47	8	5	9	7	18
21	766	282	680	68	149	79	86	298
22	2308	929	622	19	135	124	169	175
23	22	13	129	0	129	0	0	0
24	0	0	2127	0	2127	0	0	0
25	24	12	25	6	0	7	5	7
26	17	0	25	6	0	7	5	7
27	75	24	25	6	0	7	5	7
28	822	300	781	23	10	37	45	666
29	1282	487	87	7	1	8	11	60
30	904	382	258	14	3	34	31	176
31	1364	505	200	14	4	34	33	115
32	2418	844	360	49	53	65	66	127
33	1320	632	603	156	95	136	105	111
34	27	14	32	1	6	2	10	13
35	13	9	274	18	105	25	82	44
36	184	70	262	0	22	11	153	76
37	13	9	10	0	0	0	0	10
38	1320	450	400	25	151	36	131	57
39	0	0	288	11	187	14	48	28
40	977	423	132	12	9	36	19	56
41	762	323	229	62	20	48	38	61
42	2159	890	837	83	88	69	392	205
43	23	8	121	8	27	18	40	28
44	569	267	312	29	90	59	66	68
45	13	9	665	49	254	62	209	91
46	4	2	1533	96	681	140	428	188
47	0	0	447	20	242	36	102	47
48	22	15	186	18	55	25	44	44
49	354	135	103	12	32	15	10	34
50	595	262	123	14	40	17	15	37
51	513	210	119	14	1	36	34	34
52	463	136	171	11	4	36	51	69
53	2150	758	184	20	8	42	76	38

54	47	17	25	6	0	7	5	7
55	270	135	102	14	0	33	21	34
56	401	150	106	14	0	38	20	34
57	1038	448	355	82	11	114	73	75
58	2998	1156	149	21	12	46	41	29
59	1533	607	1622	110	18	93	53	1348
60	1068	452	165	3	6	30	37	89
61	135	68	1001	76	220	557	101	47
62	17	7	15	0	0	0	5	10
63	1504	494	107	7	1	22	10	67
64	801	263	89	6	1	28	15	39
65	13	5	15	0	0	0	5	10
66	301	141	323	22	138	85	36	42
67	21	11	0	0	0	0	0	0
68	8	8	107	8	1	51	28	19
69	1881	783	73	4	0	0	17	52
70	2034	833	1006	7	3	681	141	174
71	1894	782	327	72	3	89	93	70
72	4135	1537	579	83	44	222	55	175
73	2522	1038	464	89	10	157	60	148
74	2139	787	260	32	3	58	47	120
75	2160	938	846	107	10	191	63	475
76	4048	1670	689	179	137	186	89	98
77	1695	738	522	81	7	194	120	120
78	1886	913	275	3	3	13	110	146
79	976	378	147	3	9	5	21	109
80	884	339	67	1	1	0	5	60
81	150	60	266	0	0	0	18	248
82	691	284	15	0	0	0	5	10
83	1345	512	248	32	21	21	39	135
84	0	0	0	0	0	0	0	0
85	0	0	99	3	1	7	25	63
86	1067	491	142	1	10	1	16	114
87	229	150	607	12	55	138	221	181
88	1773	828	1434	201	30	616	304	283
89	1019	412	218	18	8	39	82	71
90	988	404	366	16	13	40	128	169
91	1362	586	275	50	7	73	82	63
92	1036	392	361	66	12	162	45	76
93	1096	526	170	7	19	8	57	79
94	1076	459	386	52	14	77	181	62
95	236	101	116	7	41	10	35	23
96	19	11	348	0	7	258	35	48
97	912	366	183	0	2	132	21	28
98	231	75	920	39	85	207	321	268
99	2106	700	106	17	0	33	17	39
100	130	42	32	6	0	7	11	8
101	1151	559	169	24	7	40	25	73
102	1419	526	99	14	1	33	17	34
103	70	28	34	6	0	7	8	13

Figure C.3 – 2022 Population by TAZ

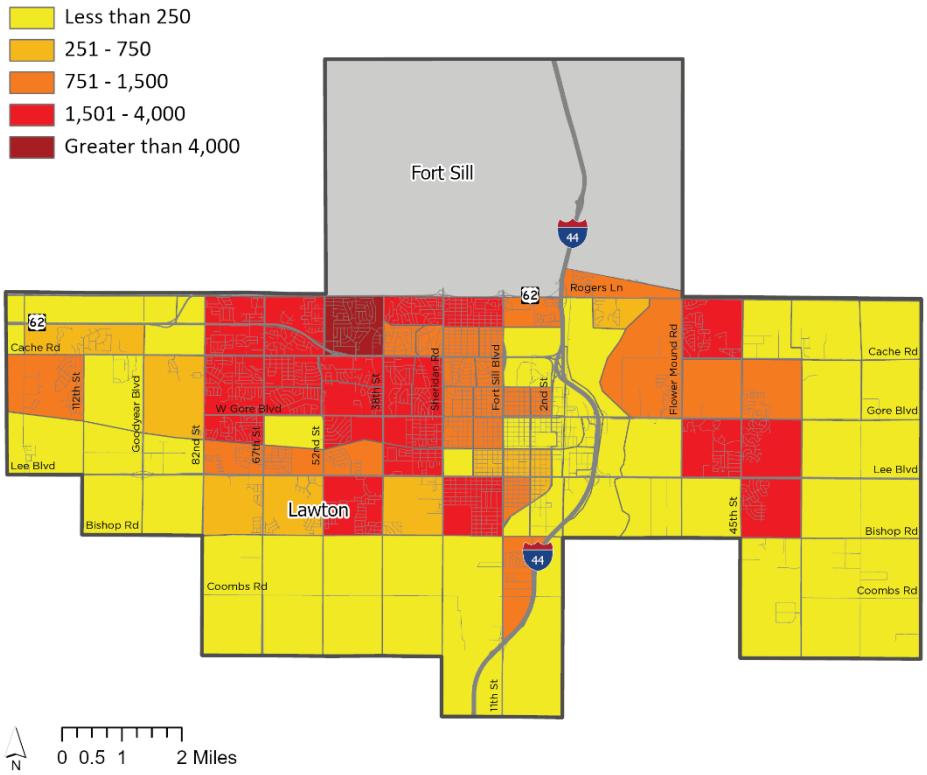


Figure C.4 – 2050 Population by TAZ

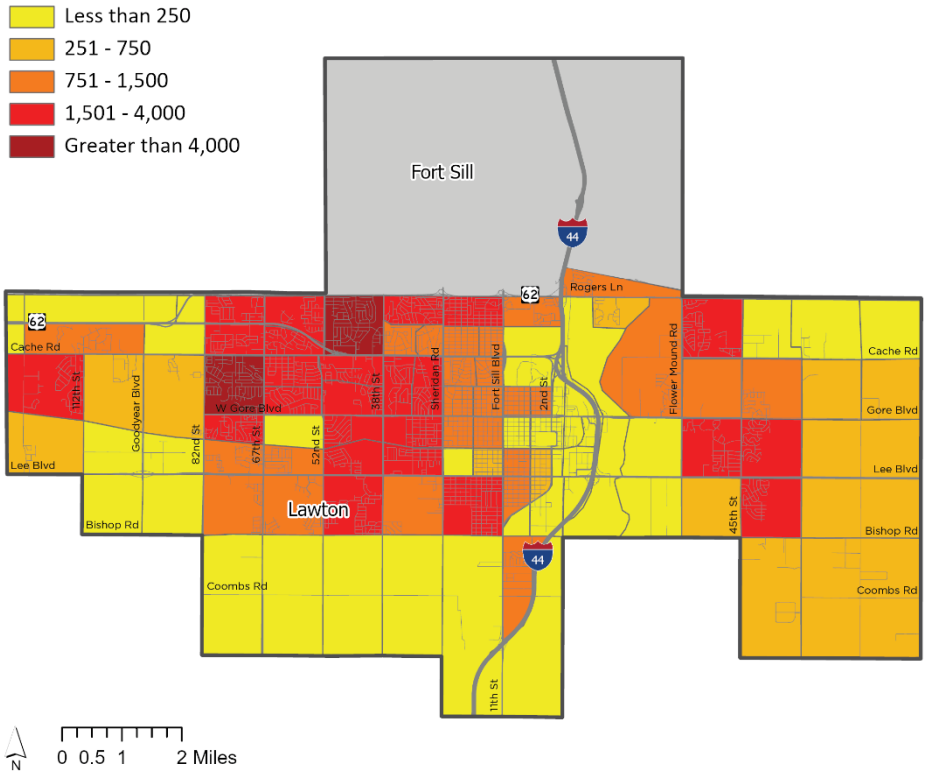


Figure C.5 – 2022 Number of Households by TAZ

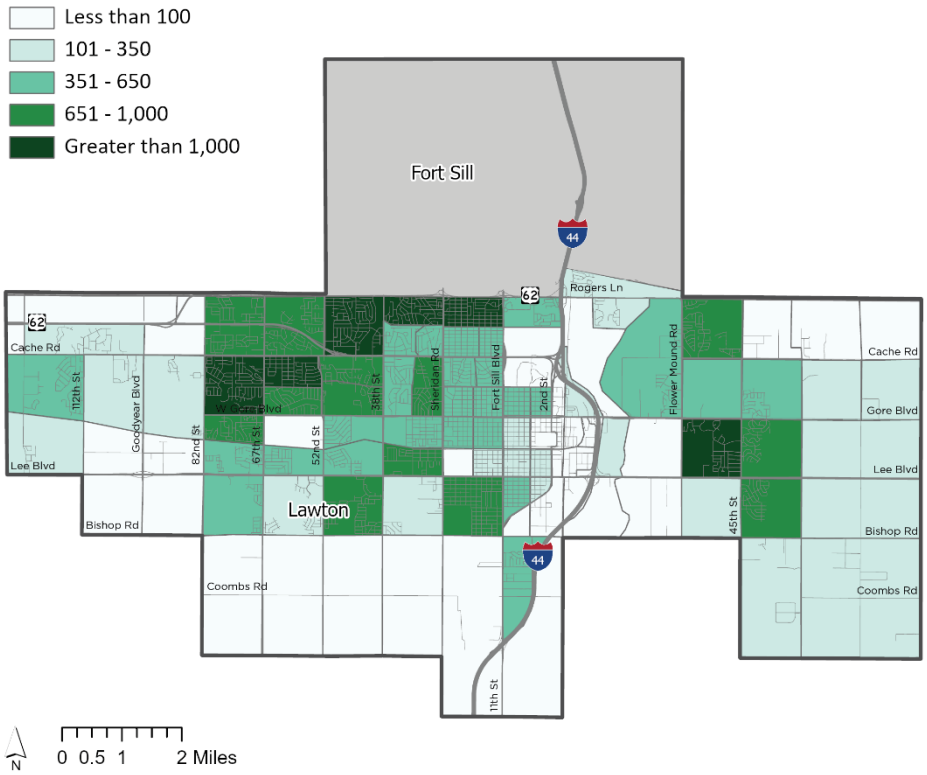


Figure C.6 – 2050 Number of Households by TAZ

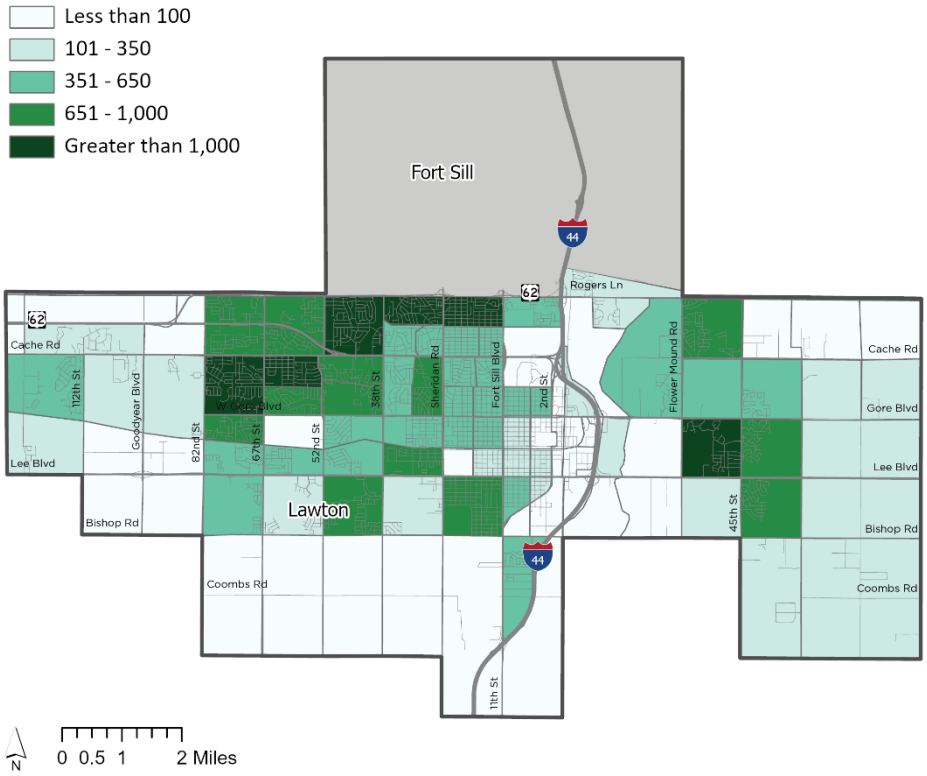


Figure C.7 – 2022 Number of Employees by TAZ

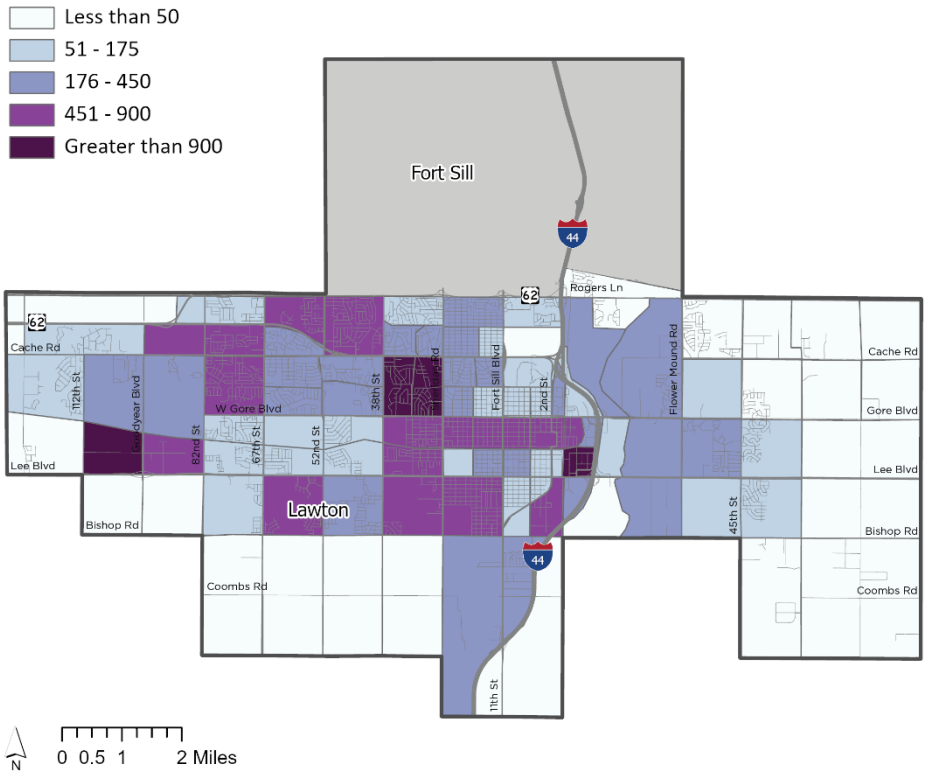
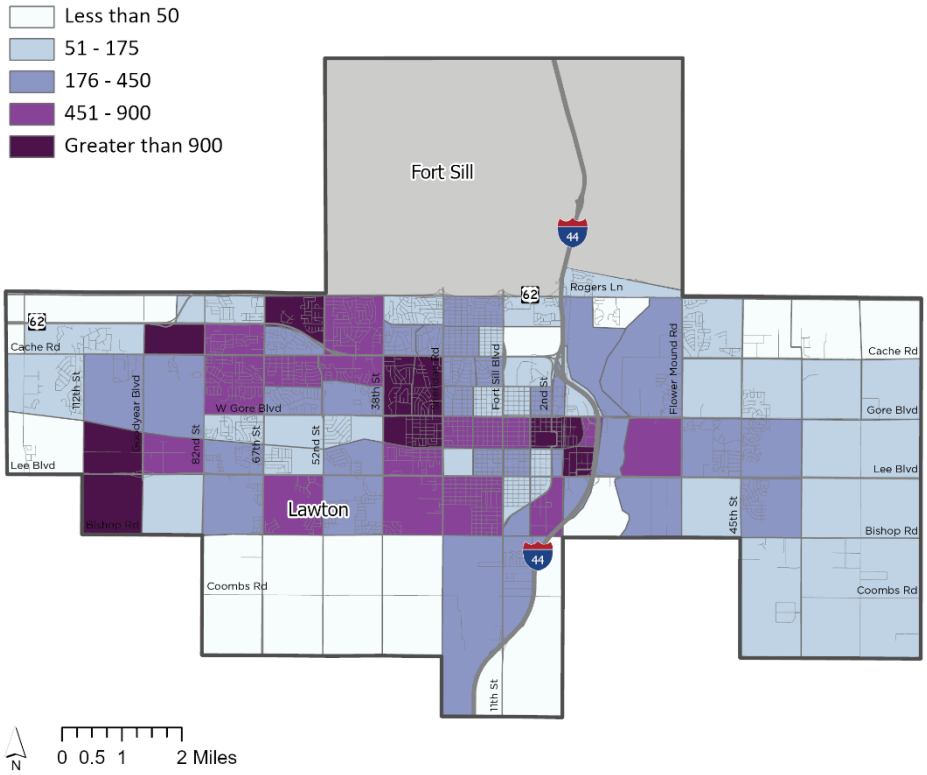


Figure C.8 – 2050 Number of Employees by TAZ



Model Steps and Parameters

Trip Generation

The first step in a traditional travel demand model is the generation of travel activity, referred to as trip generation. This step calculates trips being produced and attracted in each of the zones based on socioeconomic data. Trip ends generated on the home side are referred to as productions, and trips generated on the employment or school side are referred to as attractions. Characteristics about how many trips are being generated by purpose and amount is important for forecasting future demand on the transportation network. The generation of travel is categorized into trip purposes, including:

- Home-based work (HBW)
- Home based other (NBO)
- Home-based school (HBS)
- Non-Based Home (NHB)

Data from the CTPP was used to estimate the trip productions and attractions of a zone. With the absence of a trip generation rates from a trip survey, default trip generation rates were examined from a combination of sources including NCHRP and the Wichita Falls household travel survey. Rates from the Wichita Falls survey were used as the starting point because of its similar size and proximity to Lawton. Final trip generation rates were adjusted during model calibration.

Table C.3 – Trip Production Variable By Purpose

Independent Variable	HBW	HBS	HBO	NHB
Number of workers per household	✓			
Household size by number of vehicles			✓	✓
Number of children present under 18		✓		

Trip Purposes

Home-Based Work. Workers per household is the strongest predictor of home-based work trips. Other variables, such as income, vehicles, and persons, share co-linearity's with workers per household, but are weaker predictors. Because of their interactions, combining these variables with workers per household does not substantially improve the explanatory power of the model.

Table C.4 – Household Trip Rates for HBW Trips

Workers/Household	Household Size 1	Household Size 2	Household Size 3	Household Size 4
0	0	0	0	0
1	1.0	1.0	1.0	1.0
2	0	1.65	1.65	1.65
3+	0	0	2.4	2.4

Home based other (HBO). This trip purpose represents on one trip end being Home and the other failing into a category not defined by the other trip purposes, such as shopping activities, recreation, as well as social activities. For this model, the combination of household size and available vehicles was determined to be the most predictive of Home-based other trips.

Table C.5 – Household Trip Rates for HBO Trips

Household Size	Vehicle 0	Vehicle 1	Vehicle 2	Vehicle 3
1	0.8	1.4	1.4	1.4
2	1.1	1.9	2.1	2.1
3	1.5	2.3	2.5	2.5
4	1.9	2.6	3.1	3.1

Home-Based School. These model trips represent trips between home and school. Data on number of children per household is used as the home-based school trip. It's assumed that children under the age of eighteen are making school trips using the transportation network.

Table C.6 – Household Trip Rates for HBS Trips

Household Size	0 Children	1 Children	2 Children
1	0	0	0
2	.059	1.192	0
3	.059	1.192	2.006
4	.059	1.192	2.006

Non-Based Home (NHB). These trips are classified as none of the trip ends being Home. An example being, a trip from the office to the grocery store. For this model, it was decided to use household size by vehicles available to determine NHB trips.

Table C.7 – Household Trip Rates for NHB Trips

Household Size	Vehicle 0	Vehicle 1	Vehicle 2	Vehicle 3
1	.30	.60	.60	.60
2	.50	1.2	1.2	1.2
3	0.8	1.5	1.5	1.5
4	1.3	1.7	2.2	2.2

Truck Trip Model

In the Lawton model, truck travel was estimated for three vehicle classification types: four-tire commercial vehicles (Light Truck), single unit trucks with six or more times (SU), and combination trucks (CU). Total truck trips using the highway network can be divided into three types: External-External (EE), External-Internal (EI), and Internal trips.

Internal truck trip generation is based on the linear regression models of various employment categories and number of households as defined in the Quick Response Freight Manual (QRFM) procedures. The default commercial vehicle trip rates in the QRFM were used as the starting points. Since a truck land use trip generation survey for the Lawton does not exist, common practice suggests that the QRFM rates should be coded and then adjusted during the calibration effort. Based on this, the trip generation rates shown in the table were developed as QRFM tailored rates specific to the Lawton model application.

Table C.8 – Commercial Vehicle Trip Generation Rates

Variable	Light Truck	SU Truck	CU Truck
Employment (Highway Retail)	.888	.065	.164
Employment (Industrial)	.938	.104	.157
Employment (Retail)	.78	.065	.164
Employment (Office)	.330	.009	.022
Employment (Service)	.467	.075	.305
Total Households	.251	.038	.050

Production and attractions for internal truck trips are 50/50 splits after the total demand is estimated. The SU and CU truck productions and attractions from the EI and internal truck trip generation step are added together and distributed using the gravity model. The productions and attractions for SU and CU trucks were balanced by holding the production end constant.

Internal Trip Attractions

Trip attraction rates are used to identify trip ends that occur at locations that are not the trip maker's home. For all home-based trips, the attraction end of the trip is defined as the non-home end. In the case of non-home-based trips, the trip attraction model provides both origin and destination information, since, by definition, these trips do not originate from the home.

Regression equations are widely used for estimating trip attractions in travel demand models. The general form of the regression equation uses several known independent variables to predict the dependent variable – trip attractions – for each trip purpose.

Like trip productions, trip attraction rates were borrowed from several different sources with similar characteristics as Lawton.

Table C.9 – Trip Attraction Rates

Purpose	Households	Employment	Industrial	HWY-Retail	Retail	Office	Service	School Enrollment
HBW	--	1.80	--	--	--	--	--	--
HBS	--	--	--	--	--	--	--	1.4
HBO	.900	--	.440	6.90	2.38	.440	2.20	--
NHB	.268	--	.440	5.00	2.21	.510	1.49	--
IE_AUTO	.570	.300	.400	3.90	3.30	.550	1.45	.250

Trip Distribution

Trip distribution, the second step in the traditional four-step modeling process, matches person trip-ends (trip productions and trip attractions) estimated in the trip generation process to produce production-attraction person trip tables by purpose. Trip distribution attempts to account for differences in attractiveness and accessibility of each possible zone-zone interchange in the model, reflecting each zone's land use and roadway network characteristics. The LTDM uses the most common type of trip distribution model, the gravity model.

The inputs for gravity model-based trip distribution models are productions and attractions for each zone and a matrix of interzonal and intrazonal travel impedances. Travel impedances for trip distribution are based on highway travel times.

The equation for the gravity model is defined as follows:

$$T_{ij} = P_i \left(\frac{A_j F_{ij} K_{ij}}{\sum_{k=1}^{zones} A_k F_{ik} K_{ik}} \right)$$

where:

T_{ij} = Number of trips from zone i to zone j

P_i = Number of trip productions in zone i

A_j = Number of trip attractions in zone j

F_{ij} = "Friction factor" relating the spatial separation between zone i and zone j

K_{ij} = Optional trip distribution adjustment factor for interchanges between zone i and zone j

The friction factors are inversely related to spatial separation of the zones—as the travel time increases, the friction factor decreases. The "gamma" function is used in the LTDM for friction factors as it produces a smooth, continuous curve. The gamma function can be stated as follows:

$$F_{ij} = a * t_{ij}^{b} * e^{c*t_{ij}}$$

where:

F_{ij}	=	Friction factor
a, **b**, and **c**	=	Model coefficients
t_{ij}	=	Travel time
e	=	Base of the natural logarithms

The gamma function settings for the Lawton TDM were developed using the NCHRP Report 716 Synthetic Friction Factors and adjusted to include an alpha coefficient and truck factors. Final coefficients for the gamma function are a combination of NCHRP 716 and factors borrowed from other small area MPO models, adjusted during final calibration.

Table C.10 – LTDM Gamma Function Settings

PURPOSE	a	b	c
HBW	28507	-0.265	-0.040
HBS	400000	-0.001	-0.200
HBO	139173	-1.017	-0.079
NHB	219113	-0.791	-0.200
IE_AUTO	28507	1.88	.330
LT_TRK	418908	0.010	.085
SU_TRK	418908	0.010	.050
CU_TRK	418908	0.010	.050

Travel Impedance

One of the major inputs to gravity model-based trip distribution models is the travel impedance matrix. For the LTDM trip distribution model, travel impedances are based on highway travel times. The highway travel times are based on shortest travel paths for each possible zonal interchange and are augmented with intrazonal times and terminal times prior to distribution.

Free-flow speeds are the speeds at which a vehicle can traverse the roadways without interference from other vehicles.

In the LTDM, the uncongested link travel speed is based on the posted speed limit for each facility. Link specific free-flow speeds, uncongested travel times, and estimated congested travel times, are determined for all links in the network except centroid connector links. Centroid connector travel speeds are set to 15 miles per hour. Once link-specific uncongested travel times have been estimated, shortest travel time paths can be built, and zone-to-zone travel times can be saved in matrices.

Terminal/Intrazonal Travel Times

The highway network is represented by roads classified as collectors, arterials and freeways with some local roads added for network connectivity. Household surveys, however, query people on their overall trip travel time. This travel time considers access and egress time at either trip end. Since the model will not simulate each individual household or business, the time needed to access a vehicle and travel to a road which is in the model must be considered. At the destination end, people must find parking and walk to their destination. Consequently, some compensation must account for travel time not occurring on the simulated model network. This accounting mechanism is referred to as terminal time.

Terminal times in the LTDM are based on the previous model and set at two minutes.

Trips that stay within a TAZ are referred to as intrazonal trips. Intrazonal trips are not assigned to the model network. To properly account for these trips in the distribution process, an intrazonal travel time must be computed. For the LTDM, intrazonal travel times are calculated by taking one half of an average travel time to three neighboring zones, along with the terminal time. This process accounts for variable zone sizes (larger zones at the model periphery and smaller zones in the core).

Mode Split

The mode split step determines the type of mode travelers will use to make their trip between the TAZs. Total person trips from the trip generation and trip distribution steps are split into trips by mode.

Time of Day

The results of the mode split process are person trip tables in production-attraction format for each of the internal trip purposes. Before the trips can be assigned to the highway network, two sets of factors must be applied.

First, auto occupancy factors are applied to convert the person trips into vehicle trips since ultimately it is the number of vehicles on the roadway system that is of concern. The LTDM uses simple occupancy factors applied by trip purpose that are derived from other similar models.

Second, time-of-day/direction split factors convert the vehicle trip tables from production-attraction format to origin-destination format. At the same time, daily trips are split into four time periods: morning (AM) peak, midday (MD), afternoon (PM) peak, and night (off peak). Trip assignment is normally performed by time-of-day to account for congestion effects and the subsequent diversion of trips caused by that congestion.

The Lawton model assumes the following peak periods:

- Morning (AM) peak from 06:01-09:00
- Midday (MD) peak from 09:01-16:00
- Afternoon (PM) peak from 16:01-18:00
- Night (OP) peak from 18:01-06:00

In a highway assignment, peak period trip tables representing more than one hour are normally assigned while link capacities are specified in vehicles per hour. As a result, factors specifying the percentage of trips that take place within the peak hour of the time period being assigned are used to relate the hourly capacities to multiple-hour trip tables.

Table C.11 – Time of Day/Capacity Factors

Purpose	AM	MD	PM	OP
HBW	31.40	29.20	18.40	21.00
HBS	48.49	3.21	45.83	2.47
HBO	12.20	36.10	27.70	24.40
NHB	14.20	52.20	17.20	16.40
Capacity Factor	1.80	2.50	2.10	3.60

Traffic Assignment

Traffic assignment models are used to estimate the flow of traffic on a network. These models take as input a matrix of flows that indicate the volume of traffic between origin and destination (O-D) pairs. The flows for each O-D pair are loaded onto the network based on the travel time or impedance of the alternative paths that could carry this traffic.

The LTDM uses a combination of a free-flow assignment and a user equilibrium assignment. In this model, the EE trips were pre-assigned to the network using a free-flow assignment. These travelers are generally less familiar with the local roadway network, so they tend to stay on major highways and do not often divert due to congestion, whereas local travelers will find alternate routes in the case of congestion on their preferred route.

User Equilibrium assignment updates travel times iteratively based on link performance functions, which are mathematical descriptions of the relationships between travel time and link volume. The Bureau of Public Roads (BPR) formulation is one of the most-commonly used link performance functions. The BPR function relates link travel times as a function of the volume/capacity ratio according to:

$$T_f = T_o * \left(1 + a * \left[\frac{V}{C} \right]^b \right)$$

where:

T_f = congested link travel time
T_o = link free-flow travel time
V = link volume
C = link capacity
a, b = calibration parameters

TransCAD's User Equilibrium trip assignment model uses the BPR function as its link performance function. For the LTDM, Alpha and Beta settings were set by link type.

Model Calibration/Validation Targets and Results

The following tables present calibration statistics for the LTDM based on targets established by the Federal Highway Administration (FHWA).

Model Validation Summary

Table C.12 – Assigned Volumes by Facility Classification

CATEGORY	OBSERVED	MODEL	+/- %	FHWA TARGET
FREEWAY	264,900	259,971	-1.9%	+/- 7%
MAJOR ARTERIAL	727,600	741,895	2.0%	+/- 10%
MINOR ARTERIAL	224,820	230,106	2.4%	+/- 15%
COLLECTOR/LOCAL	86,730	71,559	-17.5%	+/- 25%
TOTAL	**1,304,050**	**1,303,531**	**-0.0%**	**+/- 5%**

Table C.13 – Assigned Volumes by Volume Group

CATEGORY	OBSERVED	MODEL	% RMSE	FHWA TARGET
<500	1,440	1,355	82.5%	200%
500 - 1500	35,710	35,771	149.2%	100%
1500 - 2500	54,400	43,432	66.6%	62%
2500 - 3500	47,400	39,971	56.4%	54%
3500 - 4500	39,800	41,247	16.5%	48%
4500 - 5500	47,400	48,302	19.4%	45%
5500 - 7000	90,400	80,558	32.6%	42%
7000 - 8500	83,600	89,150	29.3%	39%
8500 - 10000	84,000	82,720	27.1%	36%
10000 - 12500	83,400	81,536	22.7%	34%
12500 - 15000	162,400	165,704	20.6%	31%
15000 - 17500	255,500	253,861	21.1%	30%
17500 - 20000	93,100	93,499	14.3%	28%
> 20000	225,500	246,429	12.0%	26%
Total	**1,304,050**	**1,303,535**	**29.7%**	**35%**

Table C.14 – Screenline Summary

CATEGORY	OBSERVED	MODEL	+/- %	FHWA TARGET
SCREENLINE 1	6,700	8,555	27.7%	+/- 10%
SCREENLINE 2	0	0	0.0%	+/- 10%
SCREENLINE 3	61,300	72,587	18.4%	+/- 10%
SCREENLINE 4	1,700	3,016	77.4%	+/- 10%

CATEGORY	MODEL	FHWA TARGET
RMSE	29.7%	< 35.0%
R2	.904	> 0.800
CATEGORY	MODEL	FHWA TARGET

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Operating the LTDM

The LTDM interface was developed using GISDK to develop a dialog box that steps through the entire model process. Using the interface, the user can complete an entire model run. This section documents how to operate the individual portions of the model process and how to use the modules contained within it.

NOTE: *Before launching the model interface, the street network and any other related model files must be closed. The interface will need exclusive access to these files. If network changes are needed, make the changes first, then close the network, and then launch the interface.*

NOTE: *All items mentioned here are in TransCAD Version 10.0 Build 40565 64-bit. Due to software differences between TransCAD versions, the model may not operate properly if a different version of TransCAD is used.*

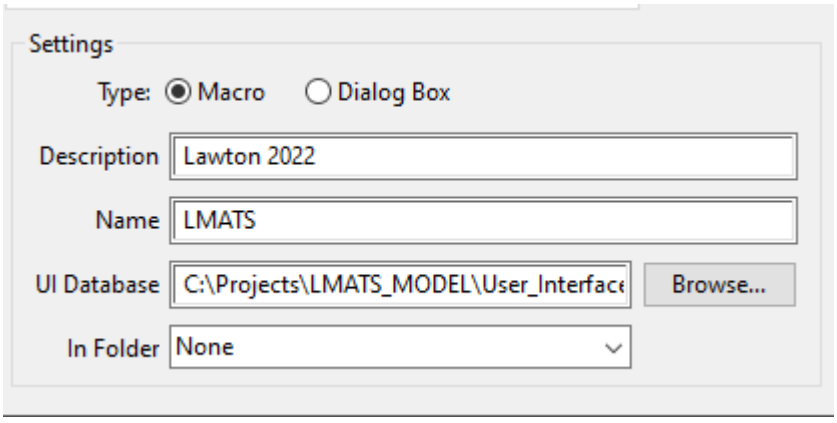
Installing the LTDM

The LTDM can be installed to run either on a server or a local hard drive.

Launching the Interface through the GISDK Menu

- To launch the LTDM interface, first make sure the network, TAZs, and other model files are closed.
- In TransCAD 10.0, go to the menu for “Tools”, “GIS Developers Kit” and select “Setup Add-ins.” A window like the figure below will appear.
- Select “Add” and fill in the information as shown below. Under “Settings,” click on “Macro,” type “Lawton 2022” in the *Description* field and “LMATS” in the *Name* field (everything is case sensitive in the *Name* field). Click on the “Browse” button and browse to the UI database in the User_Interface folder (lmats_model.dbd). Click “OK”.

GISDK Add-in Interface

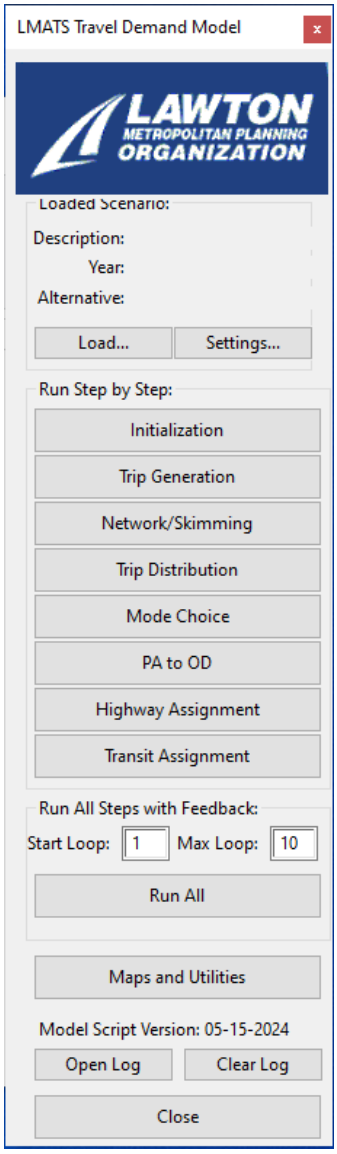


- You can now launch the Lawton interface anytime by clicking on “Tools -> GIS Developers Kit -> Add-ins -> “Lawton 2022”.

LTDM Interface

When the LTDM is initially launched, an interface like the one shown below is the typical result. To load a model scenario, click on the “Load …” button and browse to the location of the scenario you wish to open. The LTDM interface contains several buttons that serve different functions in the running and management of the model. These buttons can best be broken down into the following categories: scenario settings, Run Step by Step, Run Full Model, Maps and Utilities, and Logging.

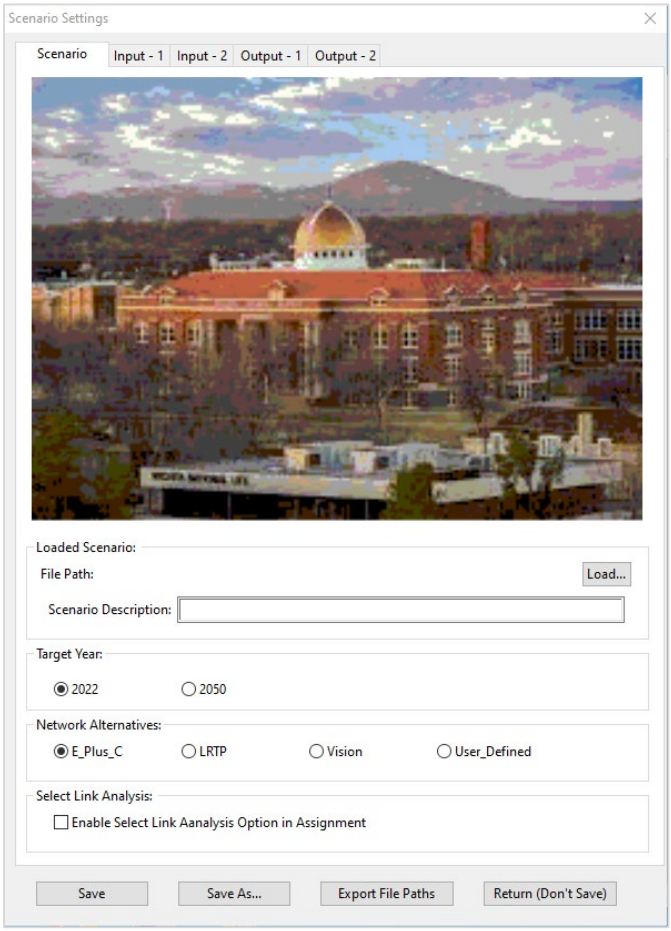
LTDM Interface



Scenario Settings

Model runs are managed by scenarios. These scenarios control which files and settings are used in the current application of the model. Scenarios are edited using the settings interface which can be accessed from the main menu by clicking on the “Settings” button. The figure below shows the scenario settings interface.

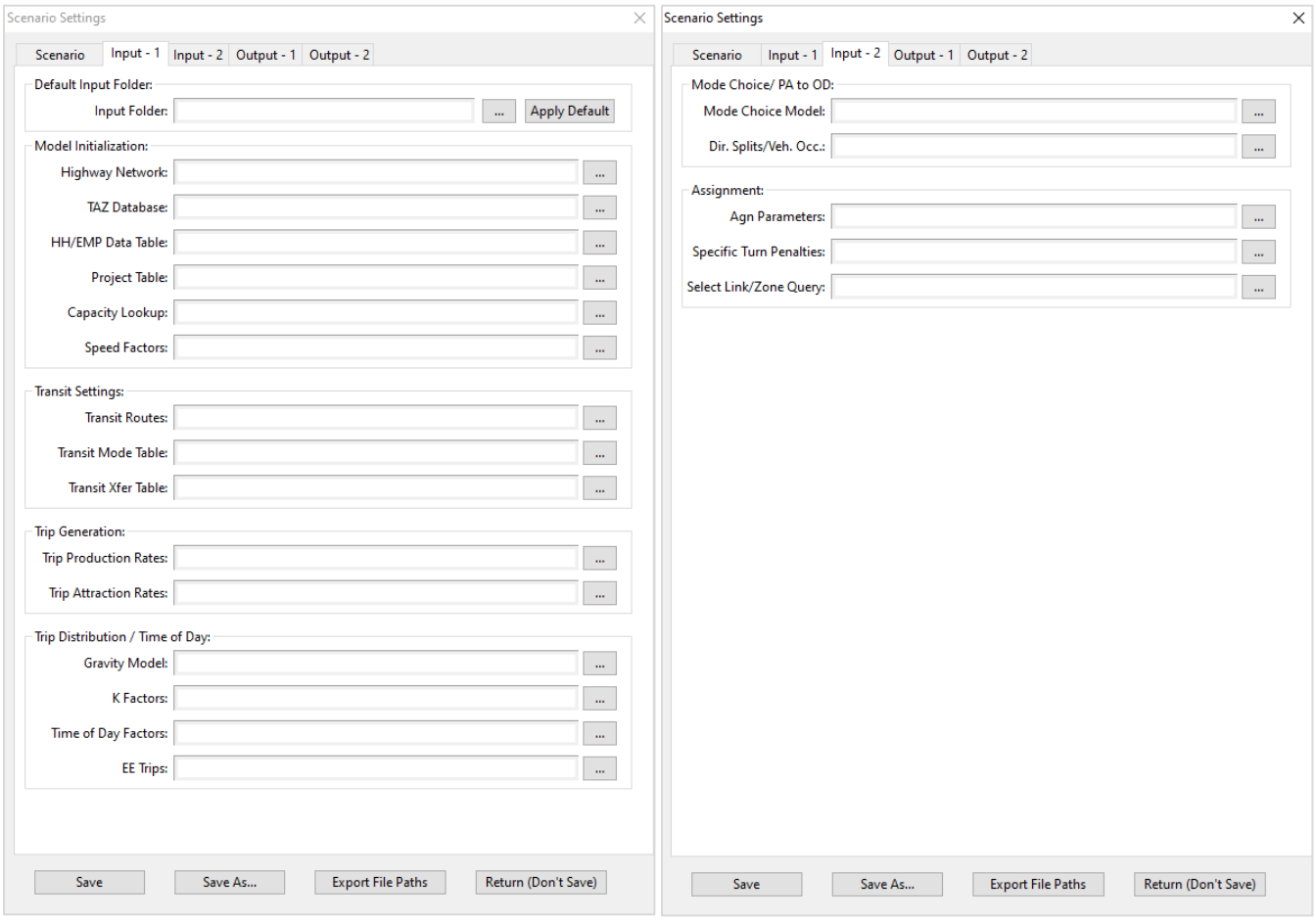
Scenario Settings Interface



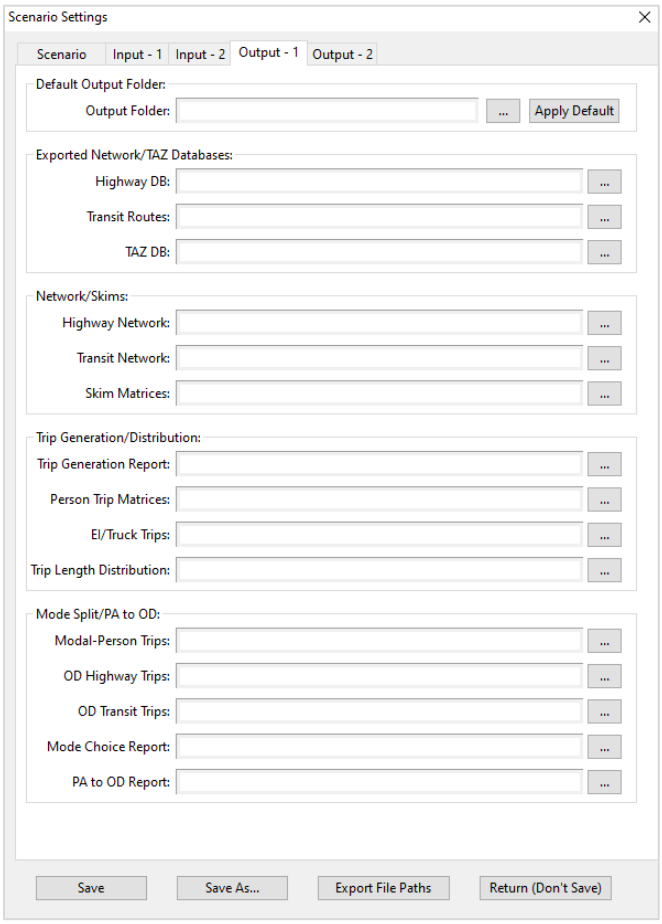
The scenario settings interface has two main sections (tabs): Scenario, Input (1 – 2), and Output (1 - 2).

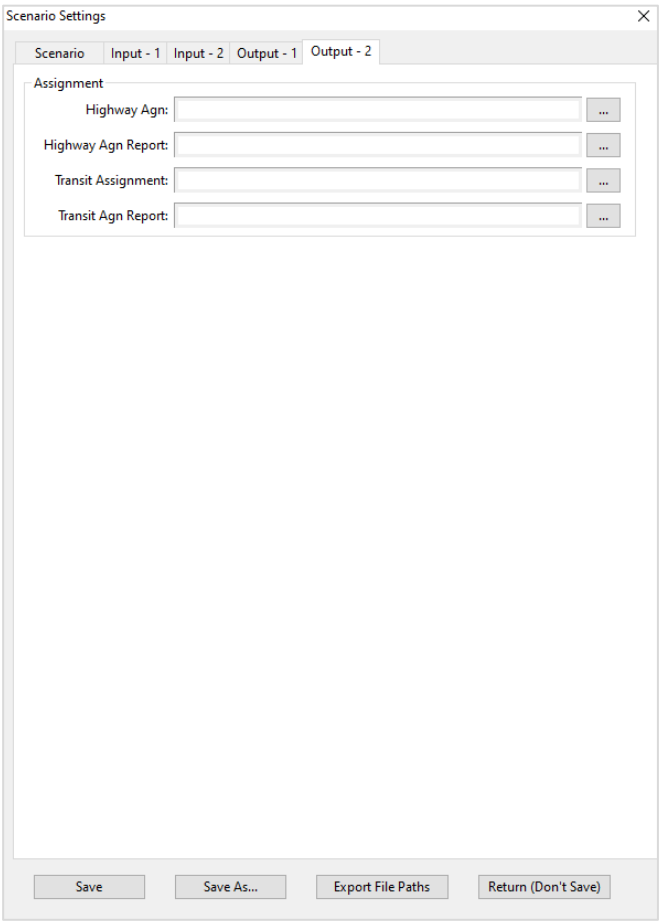
- The starting screen is the Scenario tab. On this screen you can load a scenario file, give that file a description name, pick the target year for which you’re running the model, and choose which network alternative you wish to use for the scenario.
- Select the year to be modeled under “Target Year.”
- Select the network to be modeled under “Network Alternatives.”
- The second and third tabs are the “Input” tabs. This is the location where you specify which files the model will refer to for the scenario you have set up. See below for the “Input” screens.
- The fourth and fifth tabs are the “Output” tabs. This is the location where you specify the filenames for the files the model creates during the run. See below for the “Output” screens.
- To change a file (on the “Input” or “Output” tabs), go to the appropriate tab and click on the button for the file you want to change (such as “Highway Network”). The file path next to each item name can be clicked and the user can direct the model to where the file is (“Input” tab) or where the file should be saved (“Output” tab).
- When you are done with the settings, you can save any changes to the same scenario by clicking the “Save” button. You can save the settings as a completely new scenario by clicking the “Save As” button, and you can go back to the main interface screen (without saving) by clicking the “Return (Don’t Save)” button.

Input Files Tabs



Output Files Tabs





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Appendix D

Environmental Mitigation

Introduction

Transportation is necessary to bringing people and goods together, thereby allowing them to contribute to our economy and society. The efficiency and convenience of the transportation system can significantly affect the quality of life within the community. It also can influence opportunities for attracting desirable new investment and development in the future. At the same time, this system must provide for logical development within the area, satisfy requirements for the safe and efficient movement of people and goods and be accomplished with them cost effective use of available resources. The Infrastructure Investment and Jobs Act (IIJA), like the federal transportation legislation that preceded it, requires federally funded transportation projects to be designed to minimize negative impacts on natural, scenic, cultural, and/or historic resources. Also required, however, are reasonable roadway widths, grades, sight distances, and other elements that influence the safety and general usability of the transportation network.

To adequately address these required components, the design of new transportation facilities in the LMATS area must consider user safety as relates to the physical elements of roadways; regional transportation policy; mobility and accessibility of roadways; the presence of historic and cultural sites or districts; and the presence of natural resources and environmental factors.

Natural Environment

Air Quality

The air of earth's atmosphere consists primarily of nitrogen and oxygen—with trace amounts of other gases including carbon dioxide, water vapor, and particulate matter. Air pollution is the presence in the air of substances in amounts that are harmful to the health and comfort of humans or animals, or that damages plants, environment, or materials. Air pollution has numerous negative impacts on the environment and public health. For example, ground level ozone can irritate a person's respiratory system and harm vegetation.

To address concerns regarding air quality, the federal government has established air quality standards that divide the nation into attainment and non-attainment areas. Non-attainment areas are locations where air pollution exceeds federally mandated limits. These areas require specific policies and actions to reduce pollution including but not limited to a potential loss of federal transportation funding, severe restrictions on industrial growth, and costly reformulated gasoline.

The LMATS area is currently designated as being in attainment and therefore in compliance with air pollution standards.

Under the Clean Air Act of 1970, which was amended in 1990, the United States Environmental Protection Agency (EPA) is required to study the effects of air pollution on human health and the environment, and to establish appropriate ambient air quality standards. These federal standards are known as the National Ambient Air Quality Standards (NAAQS) and are intended to protect public health and welfare. Based on these criteria, federal standards have been established for six "criteria air pollutants": ground level ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, particulate matter, and lead.

Ground Level Ozone

Ground level ozone in harmful concentrations is typically formed during periods of high solar radiation, low wind speeds, and elevated temperatures. Ground level ozone may also come down from the stratosphere. In addition, varying wind patterns and the time required for ground level ozone to form can cause exceedances of the ground level ozone standard at locations removed from the source.

Exposure to ground level ozone can cause or aggravate a variety of respiratory ailments and symptoms including decrease in lung capacity, asthmatic flare-ups, inflammation of lung tissue, and mucus secretion in the respiratory passages. These changes can lead to breathing difficulty and are associated with increased hospital admissions and emergency room visits. Additional impacts from ground level ozone exposure include diminished function of the human immune system, making individuals more susceptible to severe bouts of respiratory infections including colds, bronchitis, and pneumonia. Children, due to activity levels and smaller lung capacities, are at higher risk for chronic conditions due to poor air quality. Under the Clean Air Act, the EPA is required to establish a nationally uniform air quality index (AQI) for the reporting of air quality.

Table D.1 illustrates the AQI, which provides information on pollutant concentration for the six criteria air pollutants.

Table D.1 Air Quality Index (AQI)

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

Water

Roads and other impervious surfaces can have an impact on water quality by contributing to excessive and polluted runoff. This can be mitigated by proper road design and runoff control. To combat this, permeable pavement and green drainage infrastructure can be employed. Public education and awareness campaigns, such as the efforts conducted by the City of Lawton's Stormwater Division, can contribute to a reduction of harmful chemicals and trash being introduced to our local aquatic environments. The LMATS area and the immediate surroundings are susceptible to long-term drought cycles that make water in the region an even more precious commodity. Therefore, the Lawton MPO must continue to place high importance on the stewardship of our water resources.

Barriers to Road Development

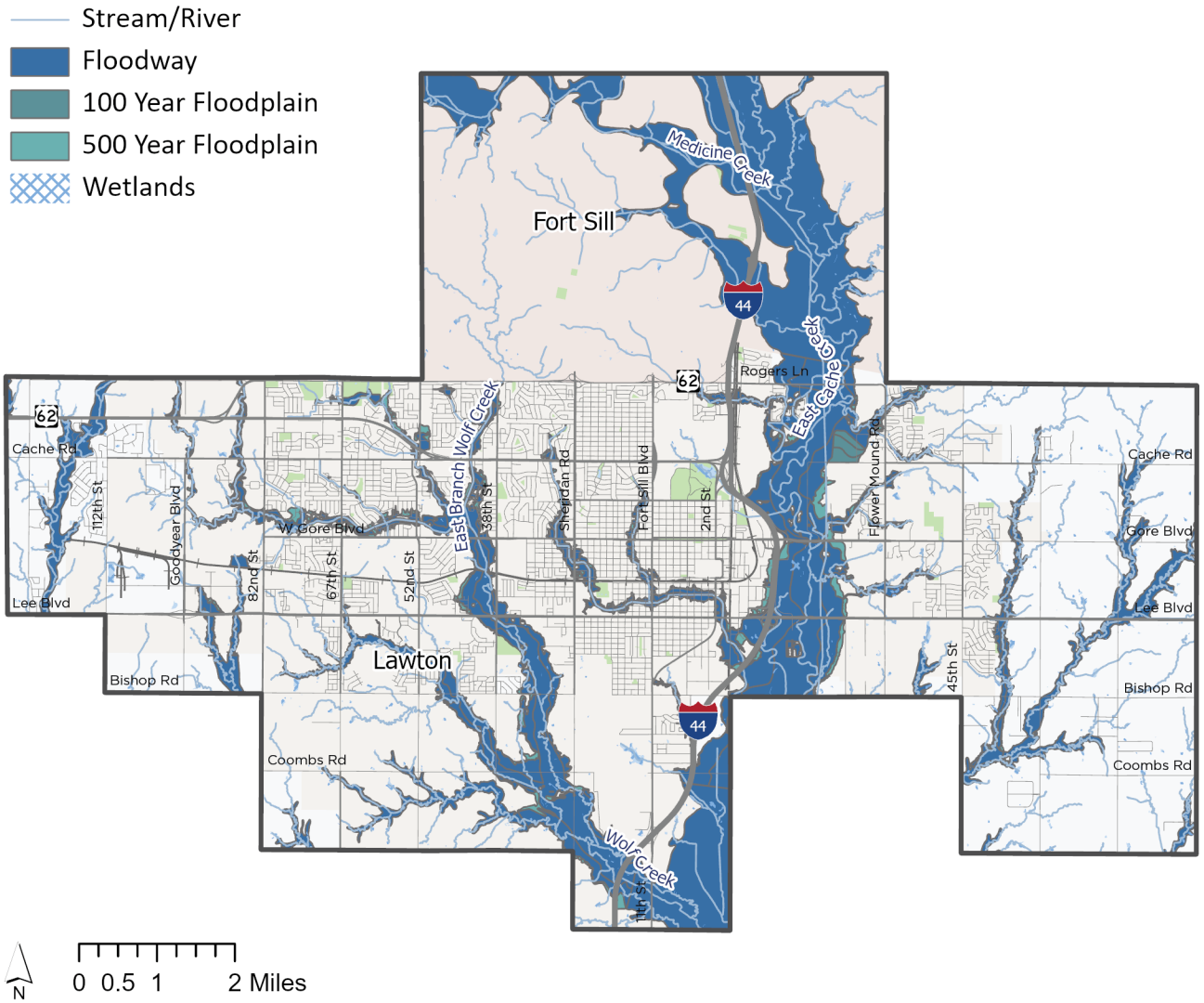
This section is not intended to imply that existing constraints prohibit the development of a desirable transportation system. Instead, the information is provided because existing constraints may affect the feasibility, location, and construction cost of transportation improvements, and these constraints should be considered in the planning and design of future facilities. The LMATS area has several natural and man-made barriers that were considered in the development of the **Directions 2050 MTP**. Major constraints influencing development of transportation infrastructure include existing development, floodplain, creeks, railroads, and Indian Trust/tribal owned land.

Floodplains

Floodplains in the LMATS area are located principally along the four creeks. The floodplain is a general term applied to all areas susceptible to flooding from any source of water. These areas contain both the floodway and flood fringe and are classified as being "100-year floodplain," which means that these are areas with a >1% risk of flooding per annum. The 100-year floodplain is delineated on the Flood Insurance Rate Map (FIRM) as prepared and created by the Federal Emergency Management Agency (FEMA) for inclusion in their flood insurance program. The City of Lawton and Comanche County are both participants in the National Flood Insurance Program which allows property owners to purchase flood insurance. The City of Lawton specifically has a Floodplain Ordinance that requires a flood hazard development permit to be acquired for any proposed development within the 100-year floodplain.

These floodplain areas serve many functions in a healthy built environment including storage for excess water from heavy rains and the minimization of downstream erosion and property inundation. These floodplain areas should be kept free from impervious materials such as rocks, concrete, etc. to allow for water to leech into the soil and to undergo a measure of filtration by vegetation prior to deposit in waterways and larger aqueous ecosystems.

Figure D.1 – Flood Prone Areas

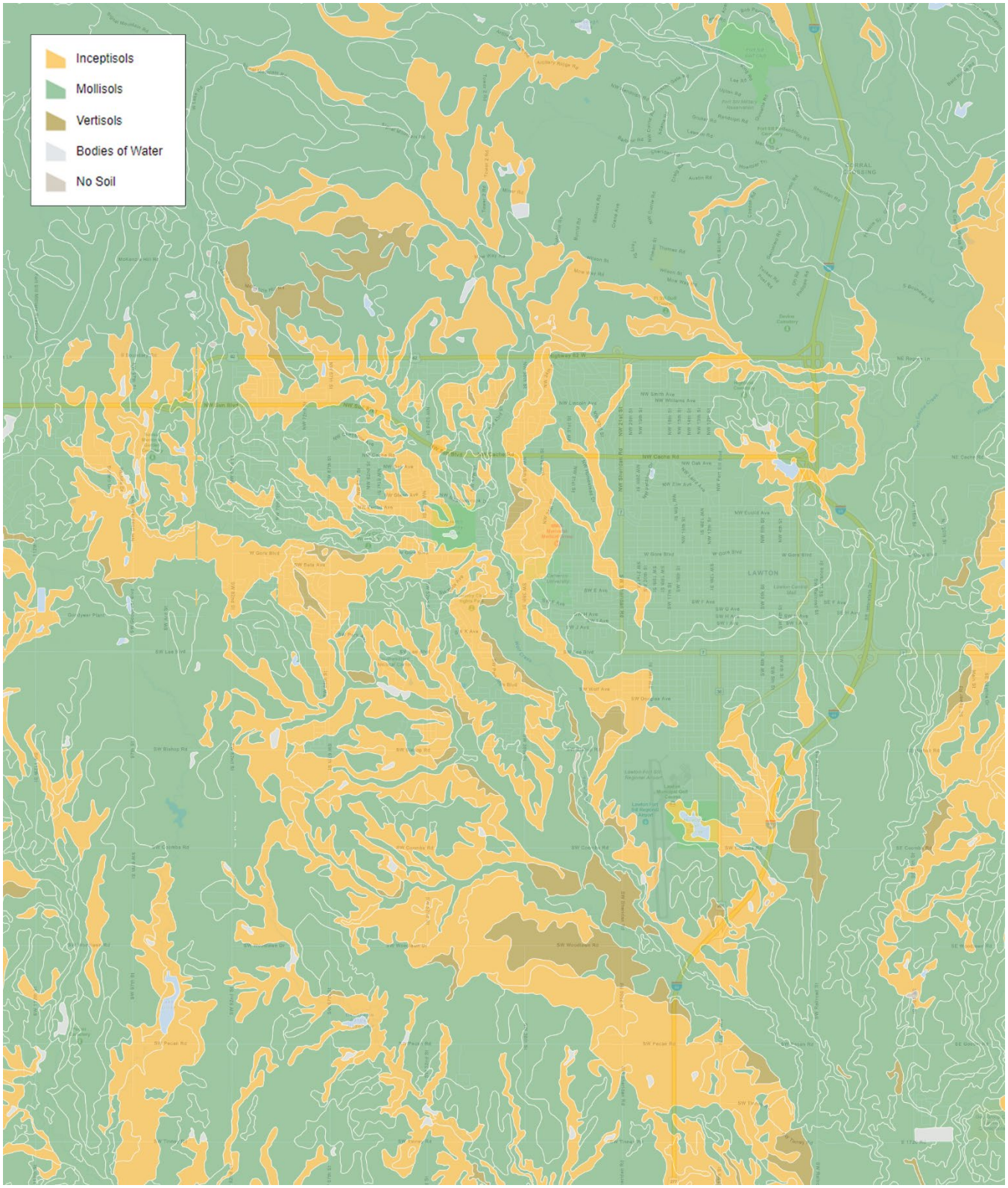


Soils

The Natural Resources Conservation Service (NRCS) analyzes and classifies the soils in the community based on their suitability for various uses. Figure D.2 illustrates the type of soil prevalent in the LMATS area, including Mollisols, Inceptisols, and Vertisols. The soils in the LMATS area tend to have a high clay content which influences their moisture retention. Soils shrink and swell depending on the moisture content factor, with a net result being the potential for shifting and/or cracking foundations or concrete/asphalt infrastructure. Because of the nature of clay soils and their susceptibility to significant fluctuations regarding swelling and shrinkage, differing types of foundations or extraordinary efforts in soil stabilization may need to be undertaken for building or roadway construction.

Soil mismanagement, particularly in new developments, can cause issues with excessive erosion. Excessive erosion results in a degradation in surface soil conditions, diminished stormwater runoff quality, and on steep slopes the possibility of mud slides. These problems can be mitigated through the strategic usage of sediment basins, diversions, and seeding.

Figure D.2 – Soil Survey Map



Source: Soil Survey Geographic (SSURGO), U.S. Department of Agriculture's Natural Resources Conservation Service

Tribal Lands

Approximately 1,700 acres of Native American Indian tribal lands are located within the municipal limits of Lawton. Tribal lands are protected by the sovereign nation policy. Consequently, the City of Lawton exercises no jurisdiction over development of these lands and defers to the autonomy to the tribal governing bodies. Because the development of these lands may have significant impact upon the City's infrastructure (e.g., the transportation network and surrounding properties), there is concern over the type and intensity of development that may be placed upon these lands.

Environmental Noise

Noise has been defined by the U.S. Environmental Protection Agency as "…any sound… that may produce an undesirable physiological or psychological effect in an individual." Advancements in technology have resulted in an increase in noise pollution. Like air and water pollution, most noise pollution is the result of lack of consideration for the noise-generating ramifications of decisions related to transportation and land use. To address these noise pollution issues, municipalities can require noise compatibility or physical construction methods to mitigate the impacts of potentially harmful or impactful sound.

Energy Conservation

Increased energy costs coupled with the impacts of anthropogenic climate change have led to a heightened interest in the planning and design of energy-efficient structures and developments. The overall concepts of energy-conscious planning and design include not only reliance on solar and wind power, but the use of basic design elements such as the placement of vegetation for wind diversion, the consideration of temperature variations caused by differing soil types, and a myriad of other similar guidelines.

Climate responsive design concepts to conserve energy have been used by humans throughout the ages. The goal of climate responsive design is to use and/or manipulate certain advantageous features of the natural environment to aid in the heating or cooling of a building. To accomplish this many factors must be considered, such as: building orientation, physical site characteristics, material choices, construction practices, and utilization of passive solar resources.

DIRECTIONS 2050

LAWTON METROPOLITAN TRANSPORTATION PLAN