ORDINANCE NO. 22-513

AN ORDINANCE OF THE CITY OF DENTON, TEXAS, ADOPTING THE UPDATE TO THE CITY OF DENTON'S 2022 MOBILITY PLAN; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, on January 5, 2016, the City of Denton adopted the 2015 Mobility Plan; and

WHEREAS, on May 7, 2019, Walter P. Moore was hired to provide professional services for the preparation of the Mobility Plan document and to update the Mobility Plan; and

WHEREAS, the City Council received a presentation regarding the 2022 Mobility Plan date on multiple dates (five Work Sessions held December 2019 through March 2020 and then one additional Work Session held September 28, 2021); and

WHEREAS, the 2022 Mobility Plan builds upon the foundation established by the 2015 Mobility Plan, and during the plan development an assessment of the Mobility Plan was conducted, and public engagement methods conducted in order to receive community feedback regarding future growth and development of the city; and

WHEREAS, the 2022 Mobility Plan sets forth goals, policies, and actions to make safety the number one priority while aligning growth, multi-modal travel while and improving quality of life for the decades to come; and

WHEREAS, the Planning and Zoning Commission held two work sessions (January 12, 2022, and February 9, 2022) to review recommendations for the Mobility Plan update; and

WHEREAS, the City Council held two work sessions (January 25, 2022 and February 8, 2022) to review recommendations for the Mobility Plan update; and

WHEREAS, the City Council and Planning and Zoning Commission held a joint work session February 14, 2022 to review recommendations for the Mobility Plan update and directed the item to move forward to a public hearing; and

WHEREAS, on March 9, 2022, the Planning and Zoning Commission conducted a public hearing as required by law, and recommended approval of an update to the City of Denton's Mobility Plan; and

WHEREAS, the City Council at its meeting on March 22, 2022 finds that the Mobility Plan is in the best interests of the health, safety and general welfare of the citizens of the City of Denton, Texas; NOW, THEREFORE,

THE CITY COUNCIL OF THE CITY OF DENTON, TEXAS HEREBY RESOLVES:

SECTION 1. The findings and recitations contained in the preamble of this ordinance are incorporated herein by reference as true.

SECTION 2. The Denton 2022 Mobility Plan sets a framework for future planning and

decision making for the entire City of Denton.

SECTION 3. The 2022 Mobility Plan affects all operations and activities of the City of Denton.

SECTION 4. The Denton City Council adopts the 2022 Mobility Plan and its recommendations and implementation actions, as presented in Exhibit A.

SECTION 5. If any provision of this ordinance or the application thereof to any person or circumstance is held invalid by any court, such invalidity shall not affect the validity of the provisions or applications, and to this end the provisions of this ordinance are severable.

SECTION 6. This ordinance shall become effective immediately upon its passage and approval.

The motion to approve this ordinance was made by Paul Meltzer and seconded by Alison Maguire, the ordinance was passed and approved by the following vote [7 - 0]:

	Aye	Nay	Abstain	Absent
Gerard Hudspeth, Mayor:	✓			
Vicki Byrd, District 1:	✓			
Brian Beck, District 2:	✓			
Jesse Davis, District 3:	✓			
Alison Maguire, District 4:	✓			
Deb Armintor, At Large Place 5:	✓			
Paul Meltzer, At Large Place 6:	✓			

PASSED AND APPROVED this the 22nd day of March, 2022.

GERARD HUDSPETH, MAYOR

ATTEST:
ROSA RIOS, CITY SECRETARY

BY: _____

APPROVED AS TO LEGAL FORM:
MACK REINWAND, CITY ATTORNEY

BY: _____ Hilary Negron 2022.03.15 16:04:36 -05'00'

EXHIBIT A

2022 Mobility Plan

DENTON 2022 MOBILITY PLAN

DENTON 2022 MOBILITY PLAN

Approved by City Council on Date

Denton City Council

Mayor Gerard Hudspeth
Vicki Byrd, District 1
Brian Beck, District 2
Jesse Davis, District 3
Alison Maguire, District 4
Deb Armintor, At Large Place 5
Paul Meltzer, Mayor Pro Tem

Technical Advisory Committee

Paul Andress, Denton ISD
Travis Campbell, TxDOT
Daryn Briggs, City of Denton
Rebecca Diviney, City of Denton
Tina Firgens, City of Denton
Nathaniel George, City of Denton
Julie Wyatt, City of Denton
Haley Zagurski, City of Denton
Pritam Deshmukh, City of Denton
Jerry Fielder, City of Denton
Scott Gray, City of Denton
Drew Huffman, City of Denton
Bradley Lahart, City of Denton
Scott McDonald, City of Denton
Ron Menguita, City of Denton
Haywood Morgan, City of Denton
Gary Packan, City of Denton
John Polster, ITS Inc.
Gary Ryan, Denton ISD
Deborah Viera, City of Denton

Partner Agencies

Denton County
Denton County Transit Authority (DCTA)
Denton Independent School District
Texas Woman's University (TWU)
TxDOT
University of North Texas (UNT)

Other Committees and Councils

Mobility Committee
Committee on Persons with Disabilities
Traffic Safety Commission
Planning and Zoning Commission

Cover Photo Credit:
Suzanne Rumohr

City Staff and Departments

Airport
Capital Projects / Engineering
Fire
Planning
Parks & Recreation
Police
Sustainability
Traffic Operations
Development Services
Public Works
Transportation Planning

Consultant Team

Walter P Moore
Kimley-Horn

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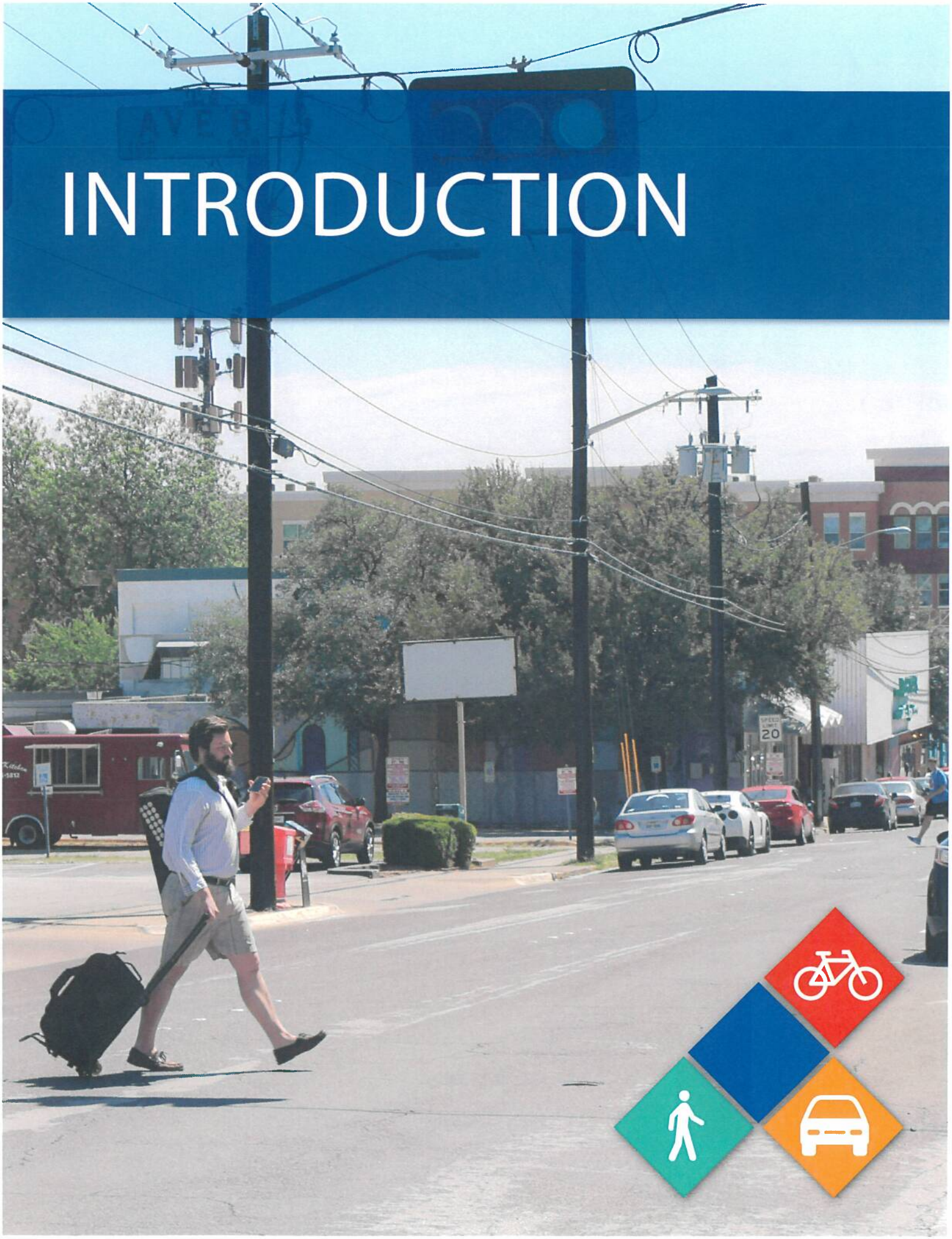


The Denton Mobility Plan is a comprehensive plan to integrate multi-modal transportation projects in the next 30 years. It combines the efforts of past mobility plans such as the Denton Thoroughfare Plan and the Bicycle and Pedestrian Linkage Component into one guiding document for all mobility efforts in the City of Denton.

MOBILITY PLAN BACKGROUND

The Mobility Plan is a long-range plan that identifies the location and type of roadway facilities, bicycle facilities, and pedestrian facilities that are needed to meet long-term growth within the City of Denton. The Mobility Plan has three major elements: it determines roadway alignments, it determines the needed right-of-way (ROW), and it develops the roadway design standards. Included in this Mobility Plan are the priority projects that need to be constructed.

Purpose of the Denton Mobility Plan

Coordinated Planning Effort

The Mobility Plan combines the City of Denton planning documents such as the Thoroughfare Plan and the Bicycle and Pedestrian Linkage Component into one plan. This coordinated effort is implemented by various departments in the City and is used as a guide as new development is built or as infrastructure is maintained. The development of other master plans in the city such as the Parks and Trails Master Plan, Forestry Plan, and the Denton 2040 Comprehensive Plan and the Sustainability Plan were also consulted throughout the Mobility Plan process.

Proactive Response to Growth

According to the U.S. Census, Denton County has seen a 30% increase in population growth since 2010. It is the 19th fastest growing county in the nation. Although this growth is positive for the City and the region, this increase in population growth has a direct impact on transportation and mobility for the City of Denton. The growth in the last 10 years has resulted in an additional 600,000 vehicle trips being produced every day. The growth between 2020 and 2050 is expected to be just as dramatic and therefore it is important that the City develop this mobility plan that is proactive to the growth that is coming.

Guide to Mobility Decision-Making

The adopted Mobility Plan is a clear guide for the Denton City Council, city staff, developers, and residents regarding the future of mobility in the City of Denton. Future decisions that are made regarding mobility corridors or development changes need to use the Mobility Plan as a guiding document.

Implementation of Transportation Projects

From a mobility perspective the most important challenges to handle this growth is related in the cost of new infrastructure, the cost of maintaining existing infrastructure, providing important connections, and providing additional mobility options. The Mobility Plan prioritizes the future mobility improvements that the City of Denton should consider both short-term (less than 10 years) and long-term (10-30 years).

Hickory Street

Mobility Plan Process

The Denton Mobility Plan began development in the summer of 2019. The Mobility Plan review and approval process extended through 2022, in order to have consistency and align with the Denton 2040 Plan update. Three primary elements were included in the development of the Mobility Plan: Stakeholder Engagement, Technical Analysis, and Implementation.

Stakeholder Engagement

The stakeholder engagement element of the plan occurred throughout the project development process. The Mobility Plan consisted of the following stakeholders: residents, business owners, city staff, Denton City Council, and technical stakeholders such as Texas Department of Transportation (TxDOT), Denton County Transit Authority (DCTA), Denton Independent School District (Denton ISD), and Denton County.

During the Mobility Plan and approval process , the project team held 7 public meetings, participated in 7 City Council and Planning and Zoning work sessions, 1 bicycle focus group meeting, 4 city staff meetings, and multiple technical committee meetings. During each of the meetings the goals of the Mobility Plan were discussed, and feedback was given to the project team regarding the future of mobility in the City of Denton. The feedback received was used in the development of the Mobility Plan recommendations.

In addition to the meetings that were held, a Mobility Plan survey was conducted from August 13, 2019 to October 11, 2019 and over 380 responses were collected. The questions and responses can be found in the appendix. Figure 1 shows the home ZIP code of survey respondents.

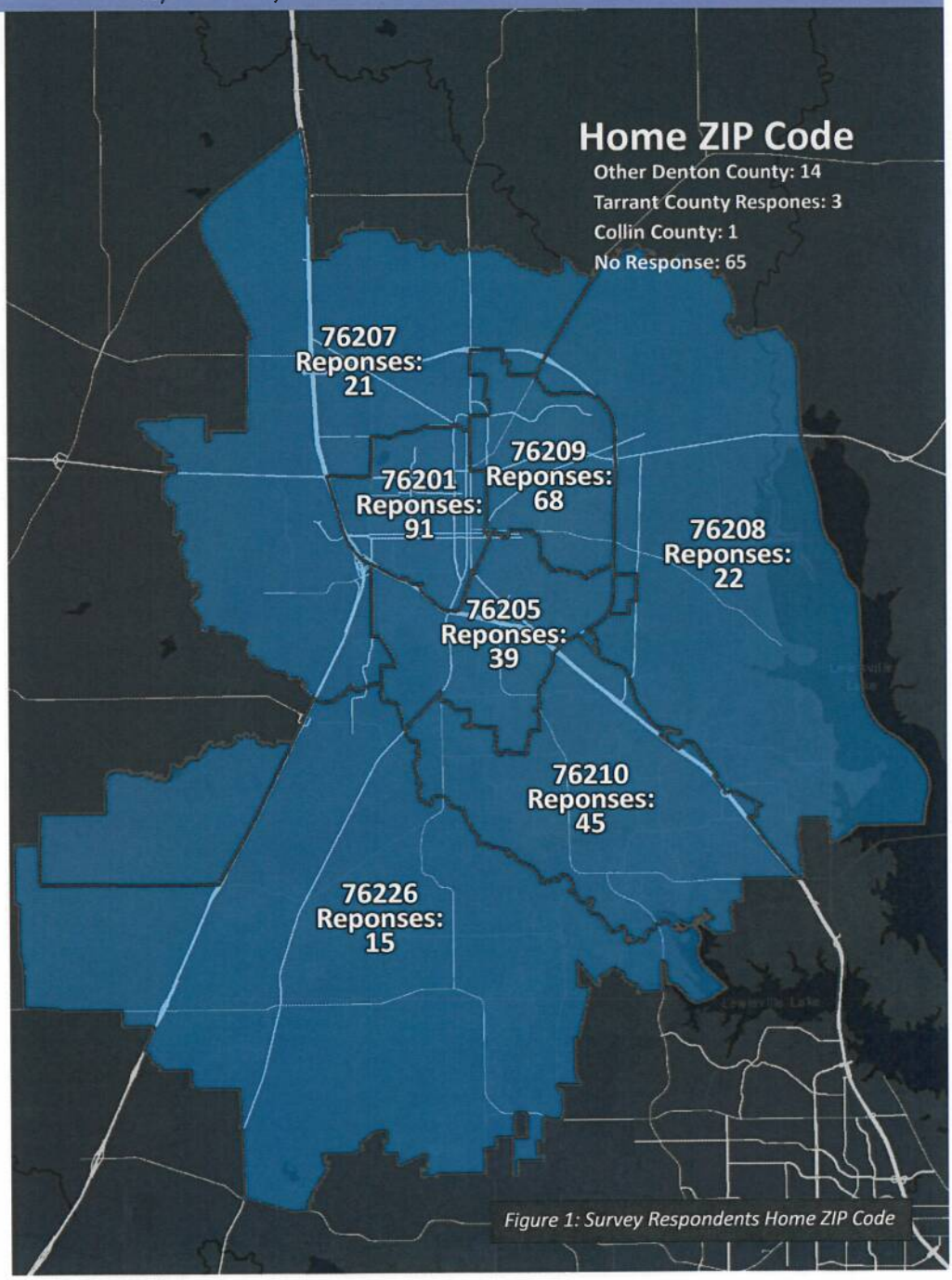


Figure 1: Survey Respondents Home ZIP Code

Technical Analysis

The technical analysis portion of the plan looks at ways to improve mobility in the City using existing data and future forecasting practices. The City of Denton has an extensive amount of geographic data that holds information about roadways, sidewalks, and bicycle facilities. This data was used to understand the current conditions of the mobility system.

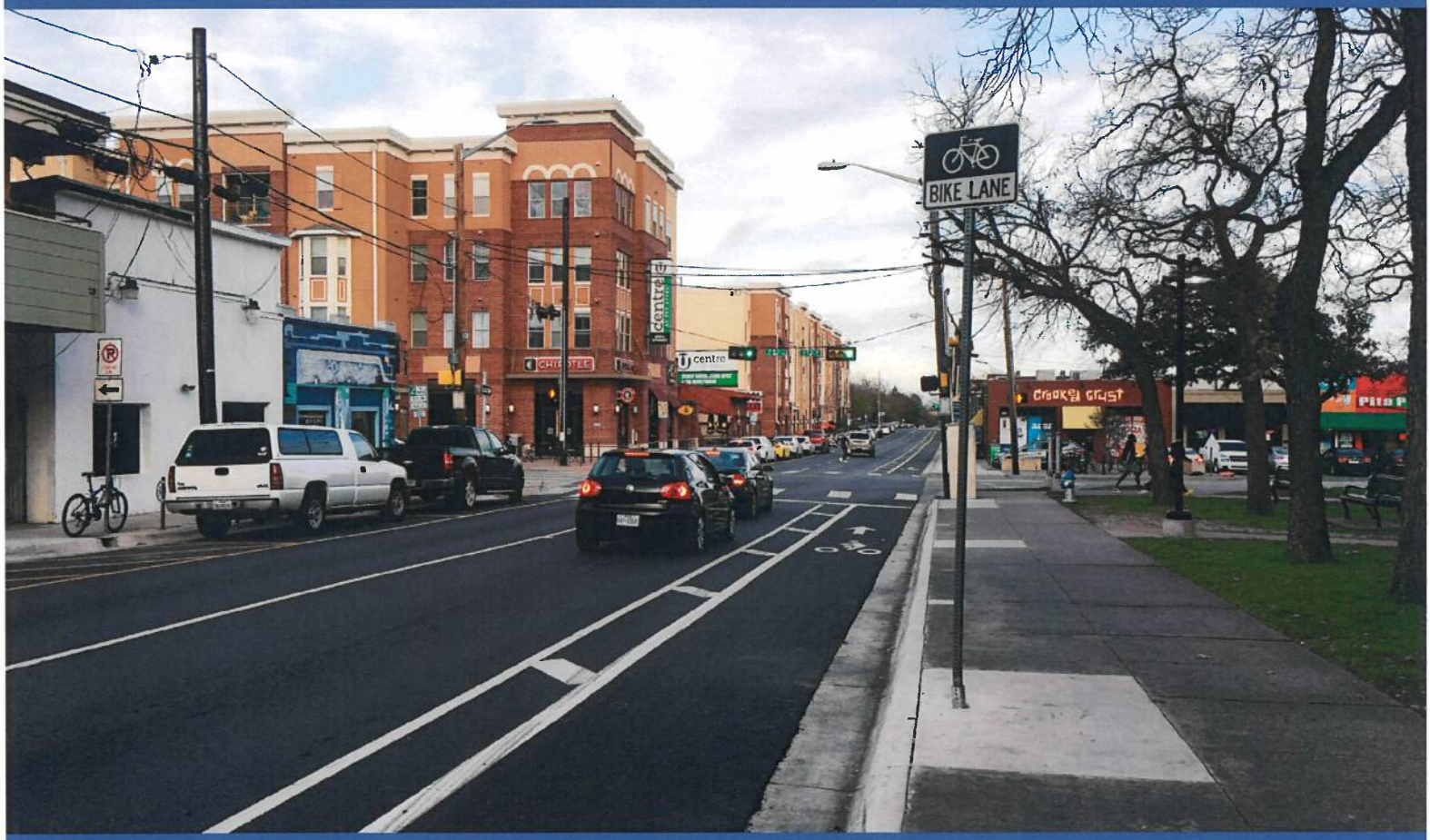
In addition to the existing geographic data that was used, a travel demand model was developed specifically for the plan to understand the effects of population and employment growth in the City and the impact that growth has on the transportation system. Travel demand models are the primary tool used to perform these mobility assessments.

In each of the specific planning chapters, details of the technical analysis are included.

Implementation

Implementation is an essential element of an effective mobility plan. This portion of the planning process describes how the recommendations will be built in the coming years. For each of the modal types, the prioritization of future infrastructure into short-term and long-term improvements is a key aspect of the plan. Other items involved in the implementation process are the cost of new infrastructure and how future infrastructure needs will be funded.

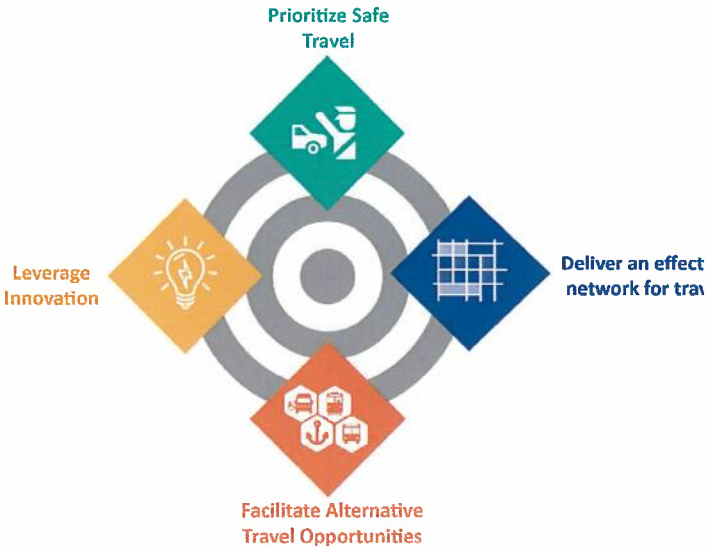
In addition, implementation looks at overall mobility strategies and tools for the City to use and develop in the coming years as development continues to expand. These tools will be available for staff and council to apply to future transportation projects as necessary.



Hickory Street
Photo Credit: Suzanne Rumohr

Denton Mobility Plan Goals

The goals of the Mobility Plan defines the mobility priorities for the City of Denton. The goals were developed through the planning process based on discussions with city staff, public meetings and the survey, and feedback from City Council. Within each of the goals are identified specific strategies or action items that result from the mobility plan goals. Below is a brief description of the four themes based on which the nine goals have been developed .



Prioritize Safe Travel	Deliver an effective network for travel	Facilitate Alternative Travel Opportunities	Leverage Innovation
• Establish a Vision Zero Action Plan**(Goal 1)**	• Identify transportation needs that are supportive of existing and future land use **(Goal 5)**	• Prioritize travel needs of pedestrians, cyclists and transit users in every project**(Goal 8 & 9)**	• Improve operations using Innovative Transportation Solutions**(Goal 2)**
• Utilize "Complete Streets" approach when improving Denton Streets**(Goal 7)**	• Prioritize Transit and transportation alternatives to reduce demand for existing transportation resources**(Goal 4)**	• Provide comfortable and low-stress opportunities to walk and bike	• Utilize Transportation Demand Management Strategies to reduce demand for existing transportation resources**(Goal 4)**
• Acknowledge vulnerability	• Encourage development of regional transportation network that addresses regional mobility needs for all modes of travel **(Goal 3)**		
	• Maintain a State of Good Repair on Denton Streets**(Goal 2)**		
	• Fund critical transportation infrastructure**(Goal 6)**		
1	2	3	4

Figure 2: Mobility Plan Goals

1 Safety first : Develop and Implement Vision Zero Plan for Denton

Objective 1A: Safety is the number one priority for the planning, design and maintenance of all transportation infrastructure.

Strategy 1.1: Denton's highest priority is protection of human life over other aspects involved in the planning, design and operation of Denton's Transportation Network
Strategy 1.2: Design, evaluate, operate and enforce for safe speeds
Strategy 1.3: Institutionalize a culture that prioritizes safety for all modes of transportation within the City of Denton
Strategy 1.4: Acknowledge vulnerability of non-auto users and enhance safety through planning, design, evaluation and operation of all transportation infrastructure
Strategy 1.5: Minimize the potential for conflicts into the built environment
Strategy 1.6: Integrate safe design principles into the built environment
Strategy 1.7: Improve the ability of all transportation users to see and be seen
Strategy 1.8: Minimize the safety risks of highways and arterials by managing speed

Objective 1B: Promote safe behaviors

Strategy 1.9: Strategically implement education and enforcement initiatives around the top contributing factors of serious injury and fatal crashes

Objective 1C: Prioritize funding for safety improvements

Strategy 1.10: Identify and allocate annual funding for safety improvements within the City
Strategy 1.11: Pursue and secure local, state and federal funding for implementing safety improvements at intersections and corridors throughout the City
Strategy 1.12: Prioritize funding for capital improvement projects that include safety improvements

Effectively Manage and Improve the Roadway System

Develop and maintain a robust and efficient vehicular circulation network.

2

Objective 2A: Implement policies that encourage and accommodate all users while maintaining the efficiency of the circulation system.

Strategy 2.1: Establish a citywide crosswalk Strategy to address installation, maintenance, removal, and enhancements of crosswalks at intersections and mid-block locations. Crosswalk locations and treatment will be based on criteria including, but not limited to safety, traffic volume, and concentration of pedestrian activity. Potential enhancements may include leading pedestrian intervals at signalized intersections, bulb-outs, and median refuges to reduce crossing distances.

Strategy 2.2: Avoid allowing multiple driveways for new development access in active pedestrian areas that create conflict points between pedestrians and vehicles.

Strategy 2.3: Require commercial property owners to use shared driveway access, provide cross-access, and use interconnected roads within blocks. Require driveway access closures or consolidations, or both as well as provide cross-access when a site is remodeled or redeveloped.

Strategy 2.4: Collaborate with law enforcement and public safety organizations to coordinate policies and programs that would reduce injuries and deaths on the roadways.

Strategy 2.5: Designate routes for truck traffic to minimize potential conflicts between trucks and cars, pedestrians, bicycles, transit, and vehicle access and circulation. Establish by ordinance a truck map that depicts allowable truck routes within the City.

Strategy 2.6: Periodically review and update traffic signal timing at all signalized intersections to maintain traffic signal coordination and to accommodate bicycle and pedestrian needs.

Strategy 2.7: Implement a Level of Service "D" as the threshold for meeting the City's significance criteria.

Strategy 2.8: Implement two points of access for all future developments and/or redevelopment sites, including access to median openings for sites that are adjacent to divided roadways.

Strategy 2.9: Implement the use of collector streets within new residential neighborhoods for access to adjacent/nearby arterial roadways. Extend streets to adjacent properties in order to promote adequate and coordinated access for adjacent properties.

Objective 2B: Construct street improvements and apply congestion management tools to obtain efficient performance of the transportation system.

Strategy 2.10: Incorporate the street system improvements identified in the Mobility Plan and Roadway Impact Fee into the Capital Improvement Program.

Strategy 2.11: Continue to deploy intelligent transportation systems (ITS) strategies—such as adaptive signal controls, fiber optic communication equipment, closed circuit television cameras, to reduce traffic delays, lower greenhouse gas emissions, improve travel times, and enhance safety for drivers, pedestrians, and cyclists.

Strategy 2.12: Investigate all operational measures, to improve traffic circulation and to minimize congestion for all travel modes.

Strategy 2.13: Investigate and utilize state-of-the-art transportation system management technology and industry practices to address recurring and non-recurring traffic events (i.e., special events, incident/emergency management).

Strategy 2.14: Continue to evaluate and pursue design and operational improvements (medians, driveway closures, signal synchronization or phasing, parking or turn restrictions, etc.) to improve the efficiency of intersections.

3 Enhance Regional Mobility and Coordination

Encourage development of a regional transportation network that addresses regional mobility needs for all modes of travel.

Objective 3A: Promote development of transportation projects along regional corridors.

Strategy 3.1: Maintain compliance with Denton County Thoroughfare Plan requirements, including consistency with street classifications and capacities, roadway design standards, analysis of impacts of Countywide land use decisions on the circulation system, and adoption and implementation of planned transportation improvements in the County.
Strategy 3.2: Support the goals and objectives of the Texas Department of Transportation (TxDOT) Long Range Transportation Plan, including expansion of transportation system, improvement of transportation system performance, and improving transportation infrastructure safety and security.
Strategy 3.3: Support the goals and objectives of the North Central Texas Council of Government's (NCTCOG) Metropolitan Transportation Plan (MTP) 2045, including Transportation Improvement Program (TIP), 10-year plan, transportation conformity plan and congestion management strategies.
Strategy 3.4: Support and implement NCTCOG's Transportation System Management strategies such as signal timing coordination on all major arterials with a Citywide signal synchronization program.
Strategy 3.5: Ensure City of Denton's input, participation, and discretionary review of applicable region-wide transportation system policies, programs, and construction.
Strategy 3.6: Coordinate short-term and long-term improvements to TxDOT facilities in coordination with Denton County to address regional mobility needs.

Objective 3B: Coordinate and partner with local and regional agencies to promote projects and polices that improve regional mobility.

Strategy 3.7: Coordinate with adjacent jurisdictions to maintain or improve mobility within the City to achieve a standard Level of Service no worse than "D" at all intersections under State control.
Strategy 3.8: Consult with TxDOT and Denton County regarding the proposed widening projects along state facilities (I-35, I-35E, I-35W, FM1515, US380, Loop 288, etc.) to minimize adverse impacts to Denton's neighborhoods, businesses, and streets.
Strategy 3.9: Coordinate with TxDOT to work on developing a plan for the transition of ownership of certain state-owned facilities to the City of Denton.
Strategy 3.10: Collaborate with TxDOT to improve signal timing and coordination along major arterials controlled by the state.
Strategy 3.11: Work closely with other government agencies to control traffic–related impacts of uses on the agency-owned land (i.e., University of North Texas, Texas Woman's University, etc.).
Strategy 3.12: Coordinate with other responsible agencies the planning, funding, prioritization, and implementation of bicycle, pedestrian, and transit programs and supporting infrastructure.
Strategy 3.13: Coordinate with TxDOT to implement improved pedestrian and bicycle connectivity along roadways intersecting with TxDOT facilities, including prioritizing pedestrian and bicycle improvements ahead of vehicle mobility.

Promote Transportation Demand Management, Transit and Efficiency

Utilize Transportation Demand Management strategies to manage demand and maximize available capacity.

4

GOALS

Objective 4A: Encourage greater utilization of Transportation Demand Management (TDM) strategies to reduce dependence on single-occupancy vehicles.

Strategy 4.1: Support NCTCOG trip reduction programs, including park and ride, transit subsidies, carpool and vanpool programs, flexible working hours, bicycle facilities, and other traffic reduction strategies.
Strategy 4.2: Support local and multi-jurisdictional (regional) car-sharing and bike-sharing programs.
Strategy 4.3: Consider implementing park-once approaches for multiuse districts and regional destinations areas.
Strategy 4.4: Encourage and provide incentives for commercial, office, and industrial development to provide preferred parking for carpools, vanpools, electric vehicles, and flex cars.
Strategy 4.5: Encourage and support programs that increase vehicle occupancy, including the provision of traveler information, shuttles, preferential parking for carpools/vanpools, transit pass subsidies, and other methods.
Strategy 4.6: Promote the combination of TDM measures as much more effective than any single measure.
Strategy 4.7: Require discussion of transportation system management (TSM) and TDM measures in all major projects.
Strategy 4.8: Encourage the integration of compatible land uses and housing into major development projects to reduce vehicle use.
Strategy 4.9: Allow the application of transportation management rideshare programs, integration of complementary land uses, and other methods to reduce project related average daily and peak hour vehicle trips.

Objective 4B: Promote regional and local transit services as an alternative to automobile travel.

Strategy 4.10: Ensure that roadways designated as transit routes can accommodate transit vehicle circulation and convenient pedestrian and bicycle access to and from transit stops.
Strategy 4.11: Review all capital improvement projects to ensure improvements located on existing and planned transit routes include modification of street, curb, and sidewalk configurations to allow for easier and more efficient transit operations and improved passenger access.
Strategy 4.12: Provide transit stop amenities that facilitate access to and from transit stops and transfer locations. These may include pedestrian pathways approaching stops, high-quality benches and shelters, traveler information systems (real-time transit arrival information), and bike storage and bicycle connections. Bus stops should accommodate timed transfers between buses and other transit services where necessary.
Strategy 4.13: Encourage new development along major transit corridors to provide efficient and safe access to transit stops and public sidewalks.
Strategy 4.14: Consult with DCTA for transit services, such as changes to bus routes, bus stops, and hours of operation. Additionally, coordinate with DCTA for changes to transit services provided for seniors, persons with disabilities, and transit dependent populations.
Strategy 4.15: Encourage new local transit programs in coordination with DCTA, consisting of shuttle services to local and regional destinations.

5 Ensure Coordination between the Land Use and Circulation Systems

Facilitate close coordination between development of land use and circulation system.

Objective 5A: Coordinate land use policies and development activities that support a sustainable transportation system.

Strategy 5.1: Ensure that new development projects are consistent with the adopted land use and zoning plans.
Strategy 5.2: Require that developments and redevelopments provide short-term and long-term vehicular traffic impact studies.
Strategy 5.3: Encourage land uses which generate high traffic volumes to be located near major transit and transportation corridors to minimize vehicle use, congestion, and delay.
Strategy 5.4: Maintain balance between land use and circulation systems by phasing new developments to levels that can be accommodated by roadways existing or planned to exist at the time of completion of each phase of the project.
Strategy 5.5: Promote development of mixed-use projects to reduce number of vehicle trips.
Strategy 5.6: Coordinate the design and improvement of pedestrian and bicycle ways in major residential, shopping and employment centers, parks, schools, other public facilities, public transportation facilities, and regional bicycle networks.
Strategy 5.7: Require dedication of right-of-way, in an equitable manner, for all development
Strategy 5.8: Allow for construction of circulation improvements for a phased development project to be constructed commensurate with the project construction, based upon the findings of a traffic study approved by the City of Denton.

Objective 5B: Establish strategies and processes that allow large developments to analyze and mitigate traffic impacts and infrastructure needs.

Strategy 5.9: Require that new development projects improve access to and accommodations for multimodal transportation.
Strategy 5.10: Require developers of new building and redevelopment/reuse projects that are located along bus routes of providing improved bus stop facilities and related street furniture or, where appropriate, dedicate land for improved bus stop facilities.
Strategy 5.11: Consider the needs of the transportation and infrastructure system early for large developments and coordinate with developers to design projects that minimize traffic impacts and infrastructure demands and implement complete streets wherever feasible. Alternatively, address transportation and infrastructure system impacts through the implementation of development agreements.

Fund and Evaluate the City's Transportation Network

Explore opportunities to secure funding for enhancing the circulation system.

6

GOALS

Objective 6A: Pursue funding sources to maintain and enhance the transportation and infrastructure system.

Strategy 6.1: Evaluate traffic collision data regularly, and identify top collision locations for automobiles, bicycles, pedestrians, transit in Denton. Develop appropriate countermeasures and pursue funding from all available sources to implement them.
Strategy 6.2: Continue to develop and maintain long-range capital improvement programs consistent with the Mobility Plan and other regional/state funding eligibility requirements.
Strategy 6.3: Continue to regularly update the roadway Impact fee program to guarantee that new development pays for its fair share toward improvements resulting in reductions in traffic impacts generated by the development.
Strategy 6.4: Actively pursue local, State, and federal funding to implement, maintain, and evaluate the transportation and infrastructure system.
Strategy 6.5: Supplement funding from impact fees or assessments on existing and new development with grants and other nonlocal sources.
Strategy 6.6: Amend the Mobility Plan, if necessary, to be responsive to evolving funding requirements and to comply with State and federal regulations affecting the City's goals and policies.
Strategy 6.7: Coordinate with NCTCOG and TxDOT to seek funding and implementation solutions to improve freeways and state highways in Denton to relieve congestion from regional traffic.
Strategy 6.8: Review the City's roadway impact fee program on a regular basis, and adjust fees as needed to ensure that funding is available for planned transportation improvements that will benefit all travel modes.
Strategy 6.9: Prioritize funding and timing for implementing transportation improvements. Consider prioritizing multimodal projects that provide the most benefit to all users.
Strategy 6.10: Require that every new development project pay its share of costs associated with the mitigation of project generated impacts.
Strategy 6.11: Develop and adopt a five-year capital improvement program for the City's transportation system.

Objective 6B: Evaluate the transportation system to ensure that it meets the City's circulation goals.

Strategy 6.12: Conduct an annual assessment of Capital Improvement Program
Strategy 6.13: Provide annual public review of implementation status reports of goals, policies, and objectives stated in the Mobility Plan.
Strategy 6.14: Adopt and seek out methods and processes that provide appropriate and accurate data for evaluating the performance of the transportation and infrastructure system.

7 Implement "Complete Streets" Strategies on Roadways in Denton

Plan, develop, and implement a comprehensive transportation system that serves all users and modes of travel.

Objective 7A: Create a transportation network that meets the mobility needs of all Denton residents, businesses, and visitors

Strategy 7.1: Update the City's engineering standards for public and private streets to provide for safe, comfortable, and attractive access and travel for pedestrians, bicyclists, motorists, and transit users of all ages, abilities, and modes of travel.
Strategy 7.2: Allow for flexible use of public rights-of-way to accommodate all users of the street system while maintaining safety standards.
Strategy 7.3: Complete and maintain a needs assessment for traffic service levels and traffic safety. Develop and annually update a priority list of improvement projects, with priorities based on: 1) correcting identified hazards; 2) accommodating multimodal trips; 3) improving and/or maintaining peak-hour traffic volumes at critical intersections; 4) improving efficiency of existing infrastructure utilization; and 5) intergovernmental coordination.
Strategy 7.4: Pursue downgrade of arterials that no longer have the demand requiring their buildout to planned capacity.
Strategy 7.5: Implement alternate roadway cross-sections on street segments with excess capacity to enhance bicycle and pedestrian facilities.
Strategy 7.6: Encourage the conversion of excess on-street parking spaces for expanded sidewalks, gathering places and/or landscaping.
Strategy 7.7: Encourage community participation in City processes and programs focused on improving mobility and transportation facilities.

Objective 7B: Preserve the character of our residential neighborhoods

Strategy 7.9: Implement traffic calming measures that discourage speeding and cut-through traffic on residential streets.
Strategy 7.10: Encourage non-motorized transportation in residential areas by providing sidewalks and implementing bicycle friendly design of local streets.
Strategy 7.11: Reduce or eliminate where possible intrusion of traffic related to non-residential development on local streets in residential neighborhoods.
Strategy 7.12: Prioritize intersection improvements which improve through traffic flow on Major, Primary, and Secondary Arterials, and reduce impacts on local neighborhood streets with emphasis on pedestrian and bicycle safety.
Strategy 7.13: Promote engineering improvements such as physical measures constructed to lower speeds, improve safety, and otherwise reduce the impacts of motor vehicles.
Strategy 7.14: Design and Implement implement transportation projects to meet local and regional system capacity needs in accordance with the Mobility Plan.
Strategy 7.15: Implement neighborhood approved traffic-calming measures in residential neighborhoods and appropriate commercial areas, such as street narrowing, curb extensions, roundabouts, landscaped medians, and radar speed feedback signs.
Strategy 7.16: Establish priority-ranking system to evaluate traffic-calming requests for implementation throughout the City.

Promote a Friendly Active Transportation System in Denton

Create a bicycle and pedestrian friendly environment throughout Denton for all types of users and all trip purposes in accordance with the five **"Es:" Education, Encouragement, Enforcement, Engineering, and Evaluation.**

8

GOALS

Bikeways and Pedestrian Paths

Objective 8A: Expand, enhance, and protect the existing bicycle and pedestrian network to provide a comprehensive system of facilities, including a spectrum of shared streets, separated lanes, and off-street multi-use trails, to increase connectivity between homes, jobs, schools transit, and recreational resources in Denton.

Strategy 8.1: Develop an extensive bicycle and pedestrian backbone network through the use of standard and appropriate innovative treatments.
Strategy 8.2: Plan and install new bicycle facilities on major arterials, where feasible and appropriate.
Strategy 8.3: Plan and install shared lane markings ("sharrows") and signage on appropriate existing and planned bicycle routes where bicycle lane implementation is demonstrated to be infeasible.
Strategy 8.4: Where feasible, Class I shared-use paths should be a priority for future developments.
Strategy 8.5: Plan and install new shared-use paths in utility corridors, transit (commuter rail) corridors and/or along flood control channels and extend existing bicycle and shared-use paths.
Strategy 8.6: When feasible, implement the completion through regional coordination of the City's regional bicycle backbone network.
Strategy 8.7: Encourage reallocation of roadway rights-of-way where appropriate to accommodate shared-use path and bicycle facilities, while preserving and respecting the character of each adjacent neighborhood.
Strategy 8.8: Support bicycle improvement projects that close gaps in the regional bicycle network either by implementing specific projects recommended in the Plan or through other treatments.
Strategy 8.9: Encourage bicycle projects that connect local facilities and neighborhoods to major bicycle corridors.
Strategy 8.10: Work cooperatively with local/regional agencies to coordinate bicycle planning, and implementation activities. Where required, develop consistent active transportation plans and policies with regional agencies.
Strategy 8.11: Prioritize safe access to major regional trails such as the shared use path along the DCTA commuter rail between Denton and Lewisville. Where feasible, plan and provide a continuous low-stress Class I facility from east to west across the city between this regional facility.
Strategy 8.12: Consider every street in Denton as a street that cyclists could use.
Strategy 8.13: Link on-road and off-road bicycle and pedestrian facilities to existing and planned facilities throughout Denton.
Strategy 8.14: Low-stress design techniques should be considered where necessary to attract a wide variety of users.
Strategy 8.15: Develop and adopt safe routes to school plan that designates safe routes to schools for biking and walking.
Strategy 8.16: Designate walkable districts in the City.

8 Promote a Friendly Active Transportation System in Denton

Create a bicycle and pedestrian friendly environment throughout Denton for all types of users and all trip purposes in accordance with the five "Es:" **Education, Encouragement, Enforcement, Engineering, and Evaluation.**

Bike and Pedestrian Facilities

Objective 8B: Provide end-of-trip facilities that support the bicycle network.

Strategy 8.17: Provide bike parking and bike-related amenities at public facilities and along public rights-of-way.
Strategy 8.18: Pursue public-private partnerships to furnish local businesses with secure bike parking and other related amenities.
Strategy 8.19: Develop and adopt bicycle parking equipment standards for bicycle parking to be installed within the public right-of-way and post on the City website.
Strategy 8.20: Work with local schools and colleges to provide ample and secure bike parking and other related amenities for students and employees.
Strategy 8.21: Prioritize the installation of bicycle-scale and/or pedestrian-scale lighting.
Strategy 8.22: Prioritize schools with the highest auto traffic volume during peak hours and insufficient parking for staff and parents to promote usage of bike transportation.

"First and Last Mile" Programs

Objective 8C: Encourage sustainable modes of transportation to fill gaps between the first and last miles of trips (walking, biking, ride sharing, transit, taxi, Uber/Lyft and car-sharing).

Strategy 8.23: Identify citywide infrastructure needed to create the interconnected multi-trail system.
Strategy 8.24: Improve the quality, aesthetics, and safety of high-use pedestrian and bicycle corridors.
Strategy 8.25: Establish a goal for all trips of less than three miles to be by bicycle, and establish a goal of less than 1 mile to be by walking.

Create a Safer Place to Walk and Ride a Bicycle

Provide a safe, convenient, and attractive bicycling and pedestrian environment. Apply design standards, enforcement of traffic laws, maintenance practices, and safety awareness campaigns to encourage and incorporate the use of bicycle and pedestrian facilities.

9

GOALS

Design and Way-finding

Objective 9A: Develop bicycle and pedestrian facilities with approved uniform design standards, and implementation of way-finding signage providing information on various destinations.

Strategy 9.1: Require that all facilities be designed in accordance with the latest federal, state, and local standards.
Strategy 9.2: Provide and maintain bicycle and pedestrian signal detectors, informational signage, and lighting, along City bikeways.
Strategy 9.3: Develop, install and maintain a bicycle and pedestrian way-finding signage program to indicate route turns, the presence of intersecting bikeways, streets and distances to nearby local and major destinations.
Strategy 9.4: Utilize Complete Streets elements as demonstrated in most recent versions of National Association of City Transportation Officials (NACTO) Urban Street Design Guide and Bikeway Design Guide.
Strategy 9.5: Crosswalks will include high visibility crossing treatments.
Strategy 9.6: Paint direction arrows on all bike lanes and bike paths to reduce the risk of collisions.

Safety Enforcement and Reporting

Objective 9B: Continue and expand enforcement activities that enhance safety of bicyclists on bike paths and roadways.

Strategy 9.7: Enforce laws that reduce bicycle/pedestrian/motor vehicle incidents and conflicts.
Strategy 9.8: Train police officers on bicyclists' rights and responsibilities and bicycle/pedestrian/-vehicle collision evaluation.
Strategy 9.9: Utilize the City's bicycle-mounted patrol officer program to educate and enforce pedestrian and bicycle user violations not necessarily to punish, but to correct.
Strategy 9.10: Promote efficient reporting mechanisms for behaviors that endanger cyclists and pedestrians.
Strategy 9.11: Develop a partnership with the school district and the universities to establish and update suggested routes to schools for biking and walking.

9 Create a Safer Place to Walk and Ride a Bicycle

Provide a safe, convenient, and attractive bicycling and pedestrian environment. Apply design standards, enforcement of traffic laws, maintenance practices, and safety awareness campaigns to encourage and incorporate the use of bicycle and pedestrian facilities.

Safe Roadway Conditions

Objective 9C: Maintain bicycle and pedestrian facilities that are clear of debris and provide safe conditions for all users.

Strategy 9.12: Establish routine maintenance schedule/standards for bicycle and pedestrian facilities such as pavement maintenance sweeping, litter removal, landscaping, repainting of striping, signage, and signal actuation devices.
Strategy 9.13: Encourage and empower citizens to report maintenance issues that impact bicyclist and pedestrian safety including, but not limited to, potholes, sidewalk lifting, and overgrown vegetation.
Strategy 9.14: Where feasible, reduce or eliminate conflict points such as driveways that cross the sidewalk.

Safety Education

Objective 9D: Increase education of bicycle and pedestrian safety through programs and training of school children and the public.

Strategy 9.15: Create, fund, and implement bicycle-safety curricula and provide to the public, tourists, various ethnic groups, diverse ages and disadvantaged communities.
Strategy 9.16: Provide multilingual bicycle-safety maps and brochures (print and electronic versions) in languages that are widely used in Denton.
Strategy 9.17: Encourage schools to develop and provide bicycle-safety curricula for use in elementary, middle, and high schools, such as the Bicycle Rodeo events.
Strategy 9.18: Support marketing and public awareness campaigns aimed at improving bicycle and pedestrian safety.
Strategy 9.19: Provide a user education program developed and promoted to encourage proper trail use and etiquette.
Strategy 9.20: Work with local bicycle advocacy organizations to develop, promote and support a series of bicycle education classes. Include information on bicycle safety, maintenance, and security.
Strategy 9.21: Develop and distribute education material regarding bicycle and pedestrian responsibilities and laws.

THOROUGHFARE PLAN

THOROUGHFARE PLAN

The Thoroughfare Plan is the first of 3 components of the Mobility Plan. The Thoroughfare Plan is primarily focused on new roadway construction and the design of current roads if required to be rebuilt.

Purpose of the Thoroughfare Plan

A Thoroughfare Plan is a long-range plan for major transportation facilities in the city. It is intended to plan for the future build-out as identified in the city's Comprehensive Plan; or for the City of Denton.

The Thoroughfare Plan is codified in state law in the Local Government Code. In Chapter 212 of the Local Government Code a municipality can require that development plans and subdivision plats conform to the "... general plan for the extension of the municipality and its roads, streets, and public highways within the municipalities and in its extraterritorial jurisdictions..."

The Thoroughfare Plan has three primary purposes:

Determine Alignment

One of the primary roles of the Thoroughfare Plan is to determine the alignment of future roadways. As growth continues to occur in Denton, future roadways will be needed. The location and alignment of the future roadways is defined through the Thoroughfare Plan. Future roadway alignments need to consider the location of existing roadways, property boundaries, and environmental features such as slope and floodways. As a roadway is planned and constructed, the alignment can vary slightly, but the general location is maintained.

Determine Required or Prescribed Right-of-Way

Another primary role of the Thoroughfare Plan is to determine the appropriate future right-of-way (ROW) that is required on existing and future roadways. The Texas Local Government Code gives cities the authority to plan for future roadway needs by determining ROW along freeways, major roadways, minor roadways, and collectors within the city boundary and also the extraterritorial jurisdiction (ETJ). The amount of ROW that is needed is determined by the street type and other design standards that are found in the City's Transportation Design Criteria Manual.

Coordinate Design Standards

The Thoroughfare Plan works in concert with the Transportation Design Criteria Manual which guides the design and development of transportation infrastructure in the City of Denton. Design element recommendations developed through the Thoroughfare Plan process will be integrated into the design criteria manual to be used in the design and construction of future roadways in the City of Denton. The Thoroughfare Plan design standards will include recommendations for street design including the incorporation of bicycle and pedestrian infrastructure.

Journey-to-work Characteristics

Daily travel to employment opportunities is an important trip purpose for the City of Denton residents and visitors. It is critical to understand journey-to-work trip characteristics to best plan for future mobility needs in the City of Denton. There are 56,812 workers over the age of 16 in the City of Denton and its ETJ, as reported in the 2013 – 2017 U.S. Census American Community Survey (ACS). The modal split for these trips reveals just under 80% of commuter trips occur in in a single-occupant vehicle. Multi-occupant vehicles comprise the second highest modal category with just over 10% of all trips. Figure 2 identifies the modal shares for journey-to-work trips.

DCTA provides public transportation service connecting to the region via integration with Dallas Area Rapid Transit system service. This is an important service connection for the City of Denton journey-to-work trips and offers the most potential to reduce the single occupant vehicle mode share dominance. The opportunity to utilize regional public transportation service is available for all City of Denton residents and visitors traveling to and from work.

According to the U.S. Census 2015 origin-destination (O-D) Employment Statistics, there are

- **15,965** employees living and working in the City of Denton;
- **40,847** employees living in Denton but working in areas outside of Denton, and
- **36,354** employees living outside of Denton and working in the City of Denton.

Figure 3 demonstrates these unique travel patterns for the City of Denton.

The travel time to work for employees in the City of Denton is less than the average for the state at 23.8 minutes compared to 26.4 minutes for the state, as seen in **Figure 4**.

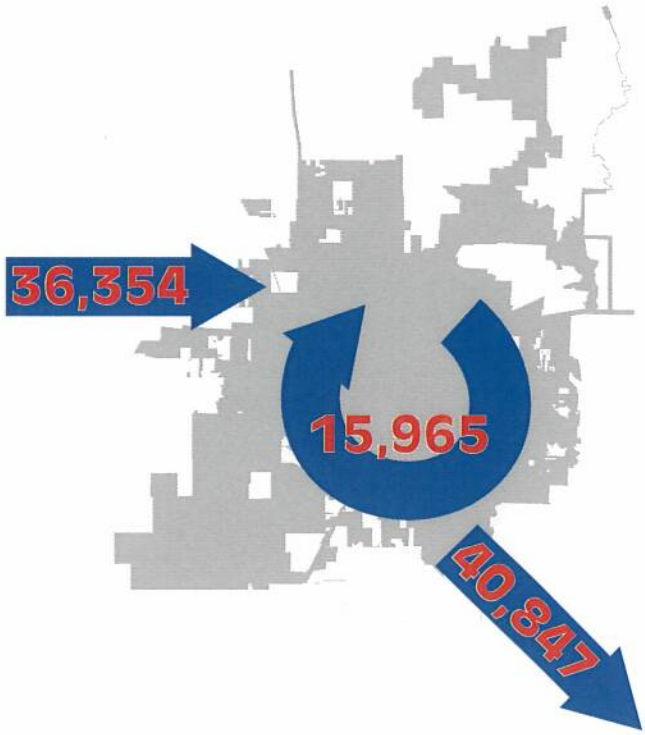


Figure 3: Commuting Patterns

Figure 4: Travel Time to Work

Roadway Data

In the City of Denton, there are just over 736 centerline miles of roadways including residential, collectors, arterials, and freeways. Within the ETJ, there are currently 334 centerline miles of roadways. These public roadways are maintained by the City of Denton, TxDOT, or Denton County. Figure 5 shows the distribution of center lane miles and lanes miles in the City and ETJ. Centerline miles measure the length of the roadway and lane miles measure the length of the roadways including the number of lanes.

Local roadways or residential streets have the greatest number of miles within the City, followed by secondary arterials, primary arterials, collectors, and freeways. Although the local roadways have the most centerline miles in the City, they also carry the least amount of traffic.

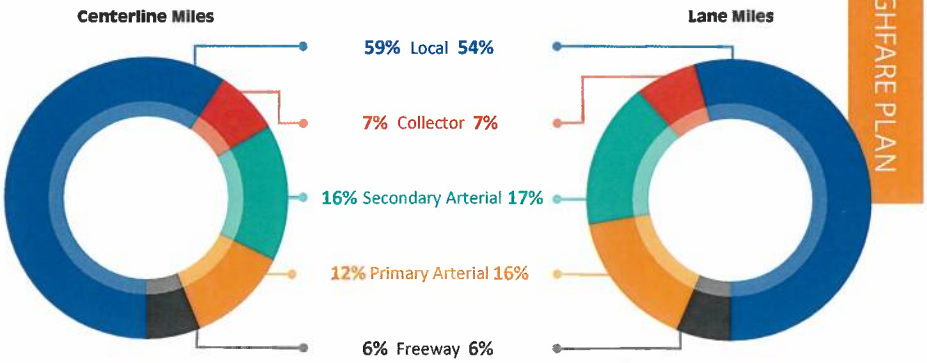


Figure 5: Roadway Miles

FREEWAYS

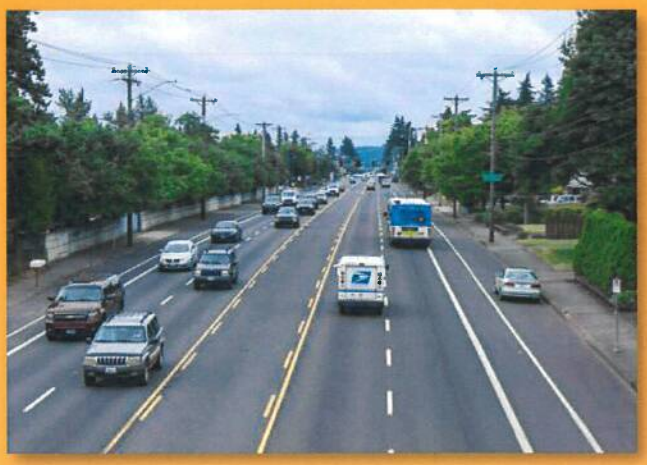
Freeways in the region typically have high design speeds and have on- and off-ramps to control access. In urban areas, these freeways have adjacent frontage roads that provide access to adjacent business that may front onto the corridor.

PRIMARY ARTERIALS

Primary arterials provide regional connectivity between different areas of Denton County and the DFW region. The design of arterial can vary depending on the surrounding land use and development. In urban areas, arterials may have wider sidewalks with smaller building setbacks, while suburban areas may have limited sidewalks with a larger buffer between the edge of the street and the building fronts.

SECONDARY ARTERIALS

Secondary arterials provide shorter connections and carry less traffic. Secondary arterials are still significant to vehicular travel as they serve trips of moderate length and provide more land access.



COLLECTORS

Collectors in the City of Denton provide local land access and traffic circulation from residential neighborhoods to arterials. They typically experience lower traffic volumes and have lower design speeds.

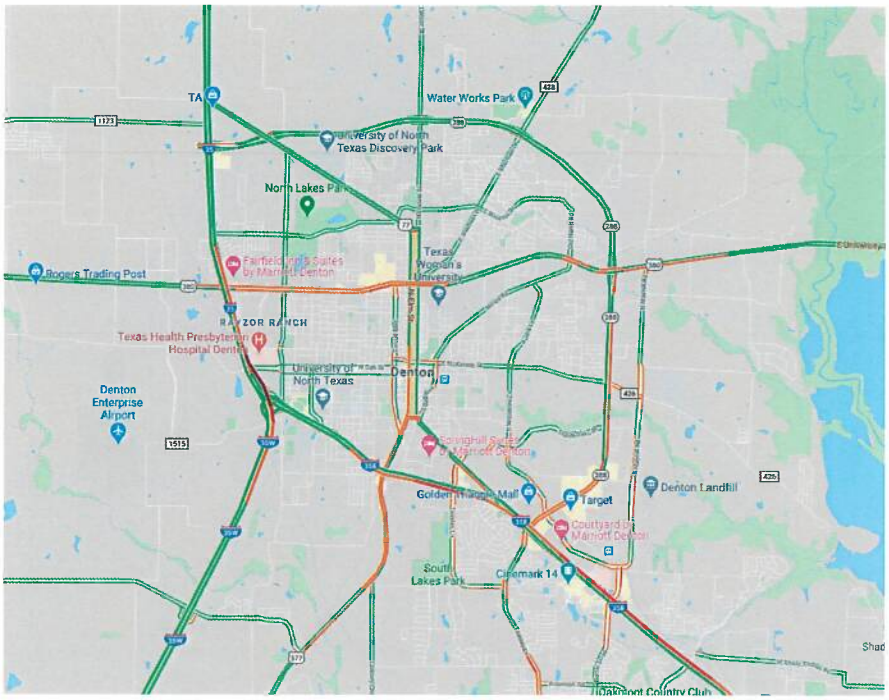
LOCAL ROADWAYS/ RESIDENTIAL STREETS

A local street is a public street that is associated with residential development within the City. These streets have low speeds and low volumes associated with them.

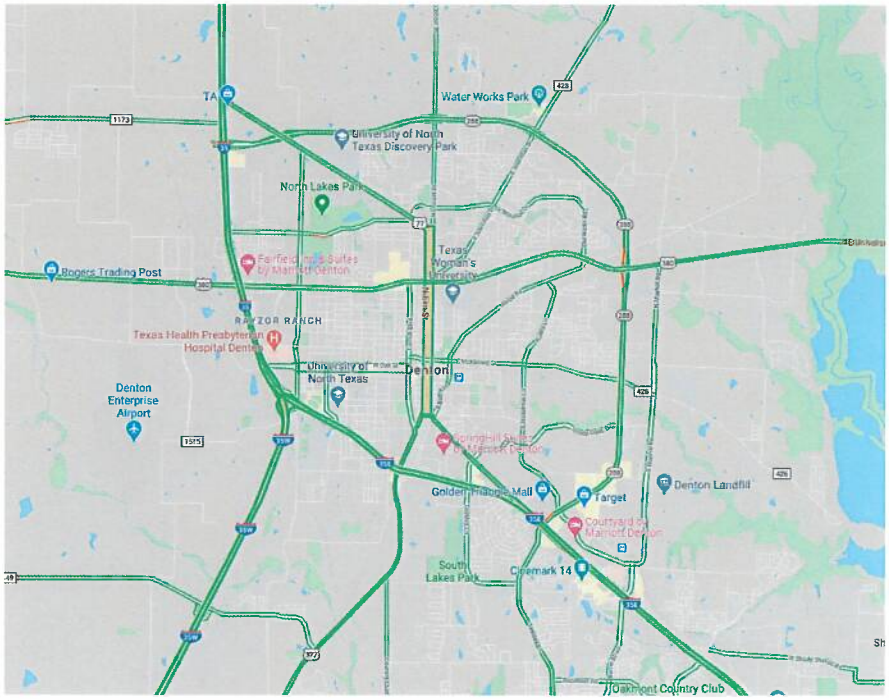
Traffic Congestion

Traffic congestion or traffic delay is the increase of traffic along a corridor or at a specific intersection that results in slower travel speeds and increased vehicle queuing. Congestion occurs most frequently in the City of Denton in the morning commute between 7am and 9am and in the evening between 5pm and 7pm. During these times the increased traffic results in slower speeds and longer travel times. Shown on the right is an example of traffic congestion in the City of Denton in the off-peak compared to the peak travel times. The darker red and orange areas experience more congestion.

According to Google Maps 2019 data, the City of Denton has over 130 lane miles of congested roadways with the potential for this to increase to over 230 lane miles in 2040 if improvements are not made to the existing system.



Congestion During Peak Travel Time (2019 Google Maps)



Congestion During Off-Peak Travel Time (2019 Google Maps)

Figure 6: Congested Lane Miles

Motorist Safety

Safety is recommended to be proactively addressed in the design phase of the project through strategies such as access management and designing cross sections that promote safety for all modes. Creating a plan that prioritizes safe travel for all users is an essential to the success of mobility in Denton. Denton is not removed from the impact of vehicle crashes daily. Figure 7 below shows the density of crashes from 2017-2021.

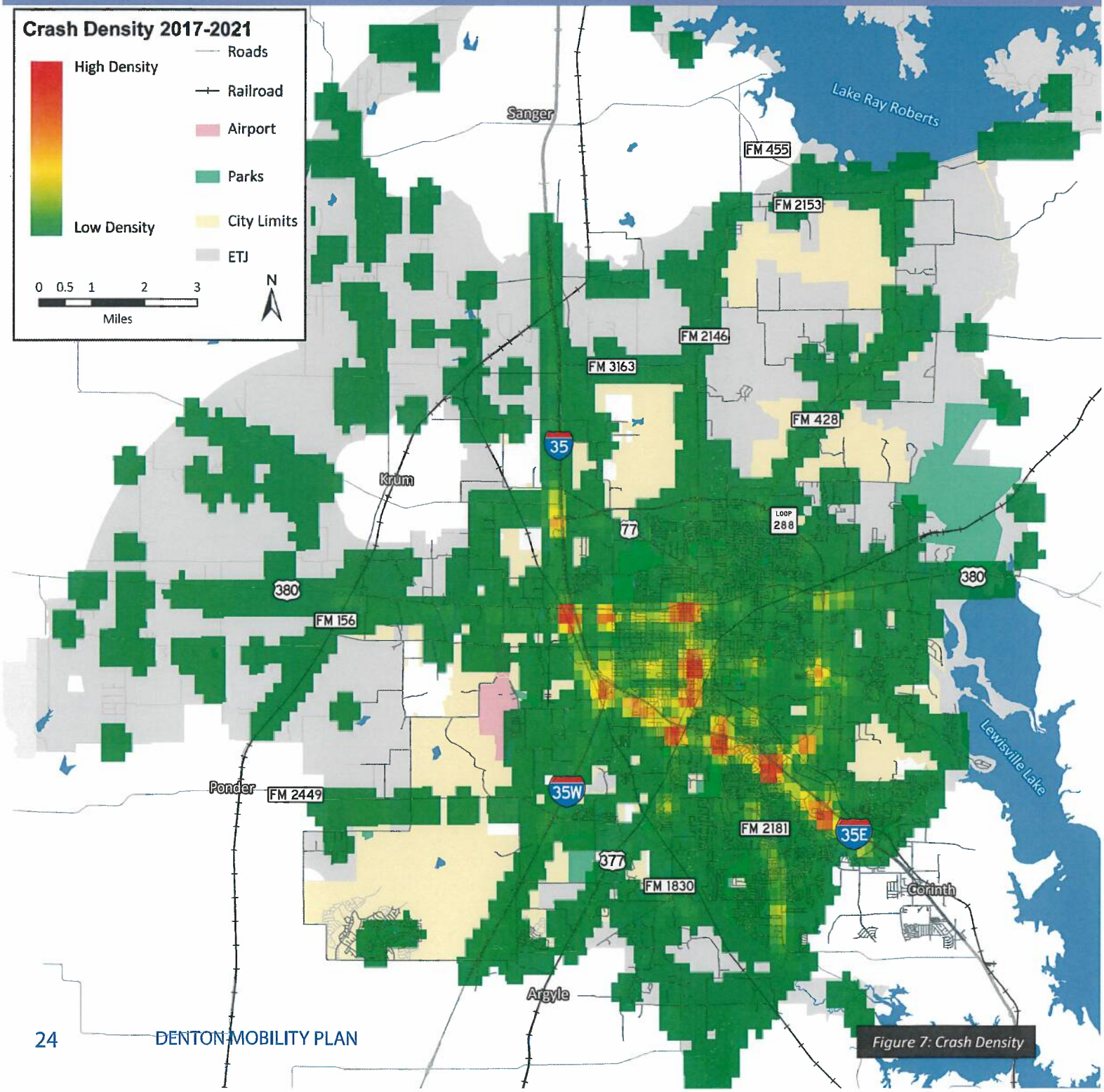


Figure 7: Crash Density

In the years 2017-2021, there were a total of 15,899 recorded crashes within the City of Denton. Of those crashes 67 were fatality crashes in which at least one person involved in the crash was killed and 24.6 percent of the total crashes were injury related. Many of the roadways in the City of Denton have a crash rate above the statewide average with some sections having a crash rate that is 6 to 7 times greater than the statewide average.

Within the City of Denton, Primary Arterials have the highest percentage of crashes at 44%. This is a result of high speeds and volumes and increased conflict points such as intersections, driveways, lack of medians, and appropriate cross access. The next highest is freeways with 30% of the crashes (including frontage roads) and then Secondary Arterials. 65% of the fatality crashes that occurred in the City of Denton happened on Primary Arterials.

Figure 8: Safety and Fatalities

RECOMMENDED IMPROVEMENTS

The 2022 recommended improvements for the Thoroughfare Plan are substantial in promoting the goals of increased connectivity, safety, and improving mobility choices. For increased connectivity, the updated Thoroughfare Plan focused on expanding east/west and north/south connectivity throughout the city limits and ETJ. For increased safety, the plan focuses on analyzing historic crash data for prioritization of improvements. These changes will increase the capacity and improve safety of the roadway network as growth occurs in Denton and will improve traffic congestion on some of the existing corridors in Denton.

As for mobility choices, each of the proposed new thoroughfares have improved infrastructure elements for both bicyclists and pedestrians. Majority of proposed primary arterial or secondary arterial has a recommended on-street or off-street bicycle facility.

The Thoroughfare Plan recommendations are displayed in two different formats. The Thoroughfare Plan map displays the roadway alignment by roadway classification and the Transportation Design Criteria Manual displays the typical cross section for each roadway class type and address safety by access management and target speed.

Proposed Roadway Classifications

The following roadway classifications have been developed in this mobility plan update to incorporate multi-modal improvements. As this plan is adopted these cross sections will need to be codified in the transportation design manual. Cross section for freeways are not included because they are managed by the state and cross sections for residential streets are not included because they are not identified in this plan.

The standard proposed cross section is intended to apply to any new roadway that is built or reconstructed that has no ROW limitations. This is mostly applicable in areas with new development.

At the end of this section the roadway classification definitions are included in Table 2. For each street class the table includes the right-of-way, number of lanes, target speed, and volume capacity. The target speed is the speed at which vehicle should operate in a specific context.

The standard cross-sections are reflected in the city of Denton Transportation Design Criteria Manual and the City Standard Details for the roadway classification. The city will evaluate variations to the typical cross sections during design of roadway.

Roadway Classification Definitions

*Table 1: Roadway Classification Definitions**

Street Class	Definition	Context	ROW	Lanes	Target Speed	Volume Capacity
Freeway	• Owned and maintained by TxDOT • Grade separated traffic • Moves traffic through City	-	Varies	Varies	greater than 55 mph	Varies
Primary Arterial	• Owned by City or TxDOT • At grade traffic controlled by traffic signals • Regional connections • Capable of high traffic volumes	Standard	135'	6	40 - 45 mph	45,000
Secondary Arterial	• Primarily owned by City • Serves citywide traffic • Moderate levels of traffic • Incorporates other modes of travel	Standard	110'	4	35 - 40 mph	29,000
Collector	• Owned and maintained by City • Serves neighborhood traffic • Low levels of traffic	Standard	65'	2	30 - 35 mph	11,500
Residential Street	• Streets within neighborhoods	-	55'	2	25 - 30 mph	<5,000

* Roadway Classification Definition are to be used as Engineering design guide in alignment with the Transportation Criteria Manual and the Standard Details. Actual design speeds and lanes for each roadway cross section will be evaluated at the time of design.

2022 THOROUGHFARE PLAN MAP

The map below shows the improvements to be implemented in the 2022 Thoroughfare Plan. Table 2 shows the existing miles of roadway in Denton, the proposed new miles, and the new total miles if the plan is built out.

Table 2: 2022 Thoroughfare Plan Mileage

	Existing Miles	Proposed Miles	Total Miles
Freeway	32.86	40.00	72.86
Primary Arterial	91.98	62.20	154.18
Secondary Arterial	98.18	115.74	213.92
Collector	80.78	39.14	119.92

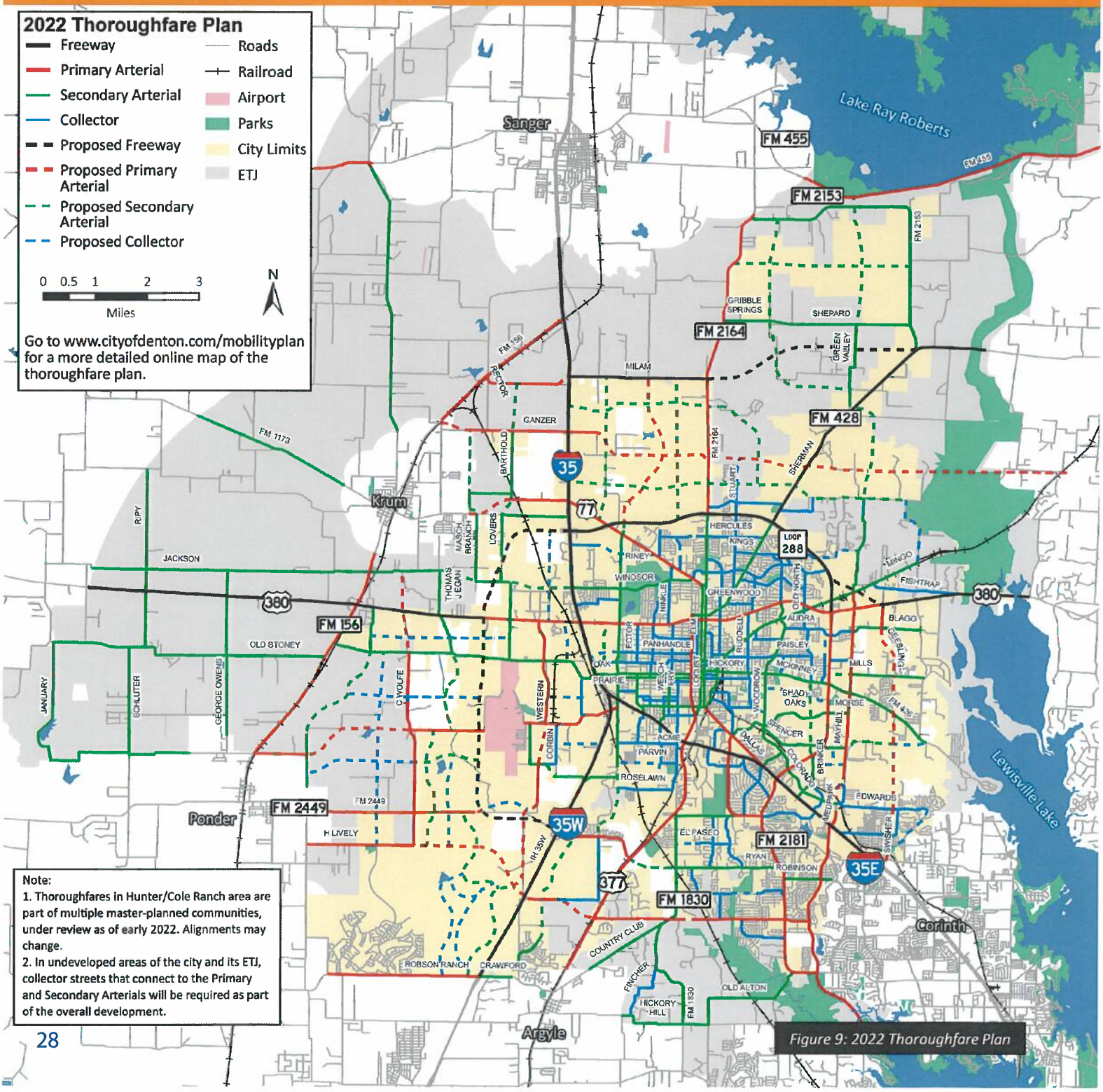


Figure 9: 2022 Thoroughfare Plan

Transit Considerations

In 2001, The Denton County Transportation Authority (DCTA) was created to provide transit service of which the City of Denton is an original member.

On November 5, 2002, the voters in Denton County approved the formation of DCTA by 73 percent. The DCTA Board of Directors is governed by a 5 voting-member board appointed by respective entities from Denton County (Denton County has two board representatives) and the DCTA member cities including Denton, Highland Village, and Lewisville serving two-year terms.

Although the City of Denton does not manage transit service, it is important for the roadways and associated bicycle and pedestrian infrastructure to be designed in a way to encourage safe transit operation.

DCTA operates fixed-route bus service on various thoroughfares throughout the City. Starting in 2021, DCTA also operates on-demand service in addition to fixed route service.

As bus stop and on-demand pickup locations are planned, it is important to coordinate best locations especially in proximity to signalized intersections. Near-side or far-side stop locations each have their own advantages and disadvantages.

The location for bus routes and service area for on-demand transportation in Denton is determined by DCTA. The roadway classifications in the City of Denton vary in their ability to facilitate transit service.

Freeways: Transit service can operate on Freeways but cannot provide stops due to no pedestrian access. Transit service on freeways is done when connecting locations across large distances. Bus stops on these routes will be located on non-freeway streets at the origin and the destination, but not along the route.

Primary Arterials: Transit service in urban areas is often located along primary arterials. The outside lane or curb lane is where the bus travels and provides stops along the corridor. These corridors provide a lot of potential roadway capacity and high speeds to make transit service more efficient. The downside of transit service along primary arterials is the conflict of traffic speed with pedestrian access and surrounding vehicle traffic. When buses make

UNT Bus

regular stops along primary arterials, it can present safety issues for the bus service and the other vehicles along the corridor.

Secondary Arterials: These corridors are the best roadways for transit service. It balances the need to promote efficient transit service on higher-speed roadways with safe vehicle operation. Transit vehicles on secondary arterials use the curb lane to provide access to transit riders.

Collectors: Collectors are often used as transit corridors but do not have the city-wide connectivity that is seen on arterials. They provide safe boarding and alighting for transit riders. Collectors in the City of Denton are often only 2-lanes, so when buses make stops they often stop the progression of other vehicles along the corridor. In some cases, collectors in the City are not designed for larger vehicles such as buses and can make it difficult to navigate along collectors.

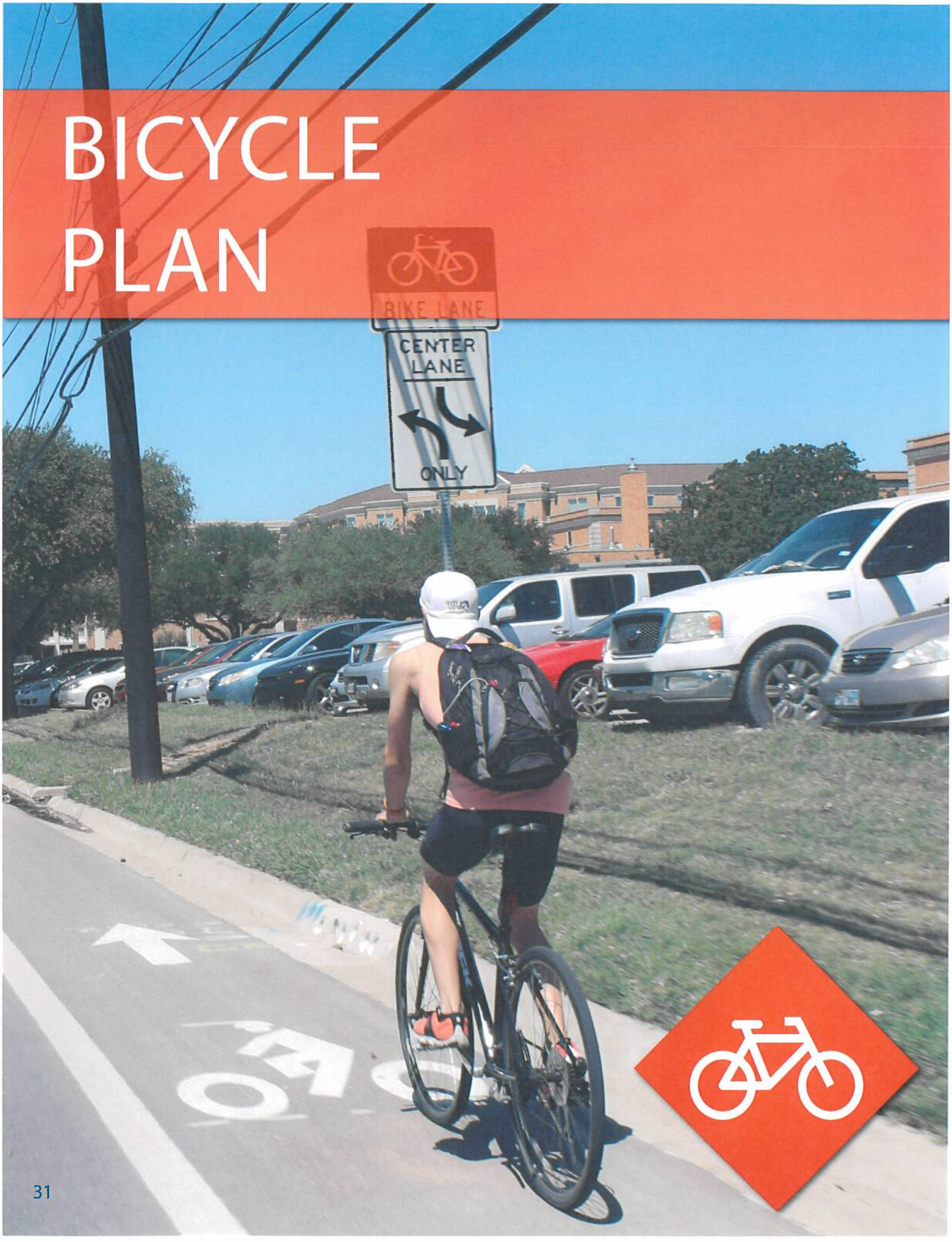
Implementation

The implementation of the Thoroughfare Plan involves coordination between multiple departments at the City. Departments such as Traffic Operations, Capital Projects/ Engineering, Development Services, Streets, Planning, Economic Development, and Public Safety Departments such as Police and Fire/Rescue were all involved in the development of the Thoroughfare Plan.

The complete cost of constructing the Thoroughfare Plan may also be shared between TxDOT, Denton County, the City of Denton, and private development. Impact fees also contribute to the construction of new roadways throughout the City.

The implementation of roadway projects is divided into 2 categories: short- and long-term projects. While the Thoroughfare Plan guides the alignment of the future roadways there is flexibility with 1,000 foot potential adjustments when determining the actual alignments.

BICYCLE PLAN



BICYCLE PLAN

Purpose of the Bicycle Plan

Recent decades have seen strong growth within the City of Denton and the Dallas-Fort Worth metroplex. This growth has propelled Denton to become one of the fastest growing City in Texas. Denton also has a strong employment force anchored by the University of North Texas, Texas Woman's University, and the Central Business District.

As the Denton area has grown, the City has remained actively involved in striving to address the growing demand for multi-modal facilities. These efforts are reflected in previous Bicycle and Pedestrian plans that have been developed. The purpose of this section is to identify goals and priorities that elevate the importance of bicycle planning and design in the City of Denton.

The 2022 Bicycle Plan

The 2022 Bicycle Plan has been designed to build on the work accomplished in previous plans and to pair seamlessly with the 2022 Master Thoroughfare Plan for a complete multi-modal system.

Goals

The goals of the 2022 Bicycle Plan are integrated with the overall mobility plan goals:

Mobility Plan Goals	Bicycle Plan Goals
Prioritize Safe Travel	Create a bicycle and pedestrian friendly environment throughout Denton prioritizing safety, comfort and connectivity
Deliver an effective network for travel	Maximize the number of future bike routes which connect to existing bike routes
Facilitate Alternative Travel Opportunities	Increase mobility choices by planning for bicycle routes which connect commuters to high demand destinations
Leverage Innovation	Develop facilities in accordance with latest guidance such as FHWA's Bikeway Selection Guide and NACTO's Urban Bikeway Design Guide for safe, comfortable, and equitable facilities for all ages and abilities

Existing Conditions

Existing Facilities

The City of Denton's existing bicycle network includes approximately 90 miles of bike lanes, sidepaths, shared lanes, and urban shoulder lanes as shown in Figure 10. Additional planned routes are currently funded for near-term implementation. A majority of these routes are located within or near the University of North Texas, Texas Woman's University, the A-Train, Downtown Denton, and city parks. A few routes have been implemented in more residential areas north of US 380 and east of Downtown.

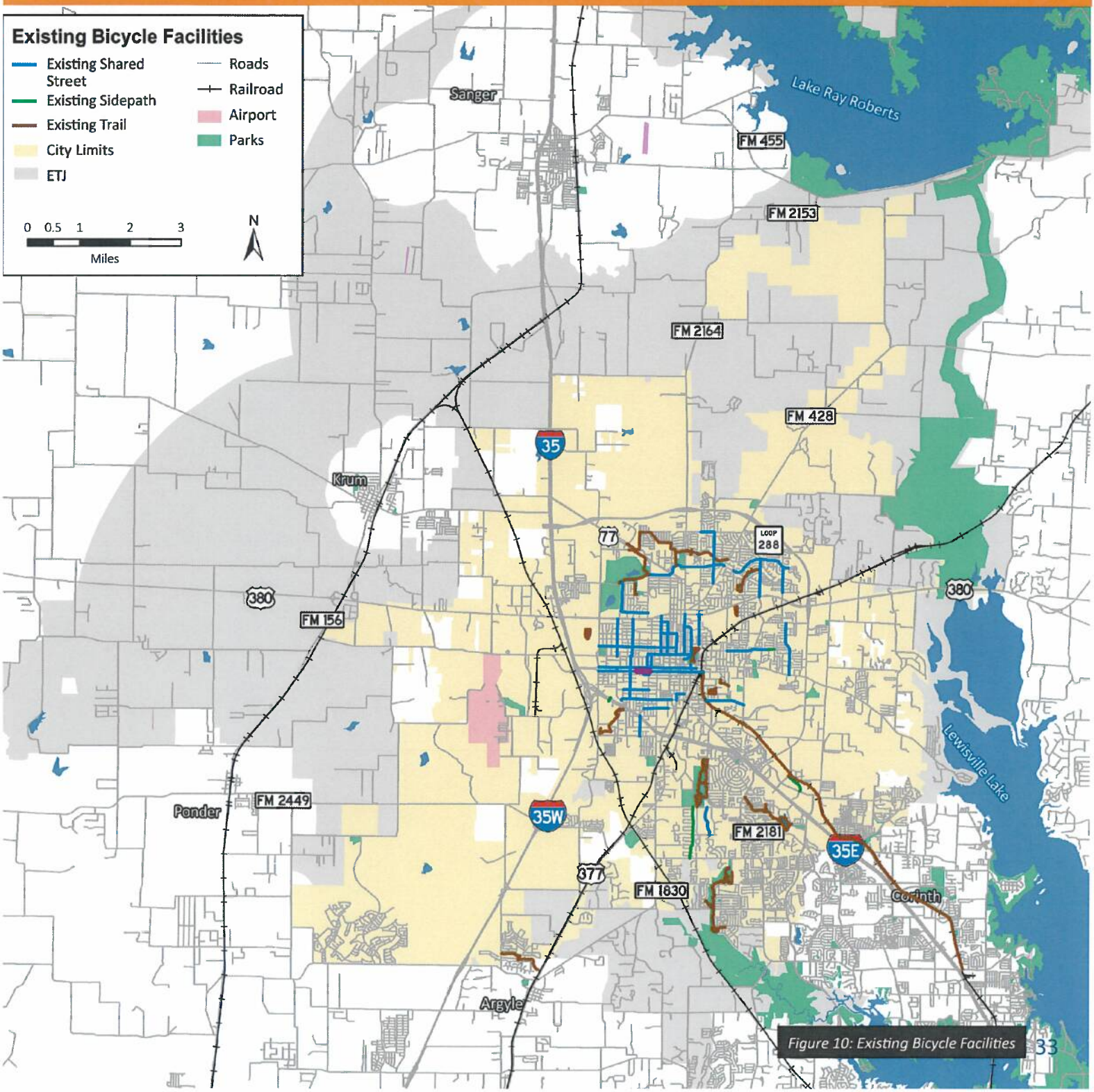


Figure 10: Existing Bicycle Facilities

Current User Data

Strava

Data from Strava was obtained to gain an understanding of the routes that bicyclists currently prefer to use in Denton. Strava is an app that bicyclists can use to track their bike rides. These data are valuable in showing the preference of bicyclists within the City of Denton.

The figure below shows that bicyclists are heavily using routes with bicycle lanes or separated facilities. These routes include:

- Windsor Drive
- Oak Street
- Hickory Street
- Eagle Drive
- Highland Drive
- Denton Katy Trail

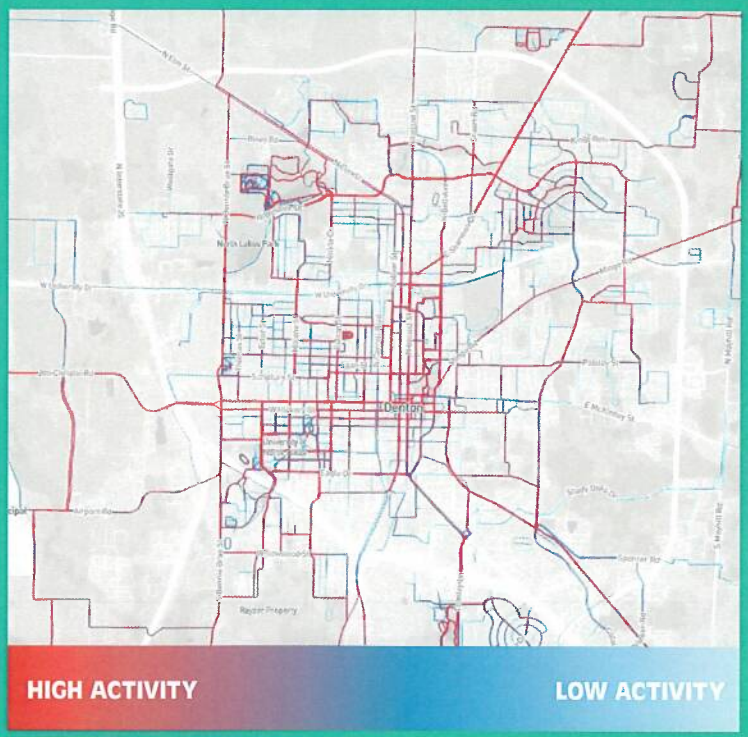


Figure 11: Bicycle Strava Data

Safety

Existing Barriers

One of the biggest challenges with expanding the current bicycle and pedestrian network is connecting routes across major barriers. These barriers include major roadways such as US 380, I-35, and Loop 288. Rail lines, streams, and floodplains can also create challenges in creating continuous routes. In developing areas, continuous collectors and local streets may not yet exist to allow for multimodal route choices.

Denton Katy Trail
Photo Credit: Suzanne Rumohr

Bicyclist Safety

Between 2017 and 2021, 120 bicyclist crashes occurred in the City of Denton, based on TxDOT crash data. 2 bicyclists died as a result of a motor vehicle crash during this time period. Crashes involving bicycles are presented on Figure 12.

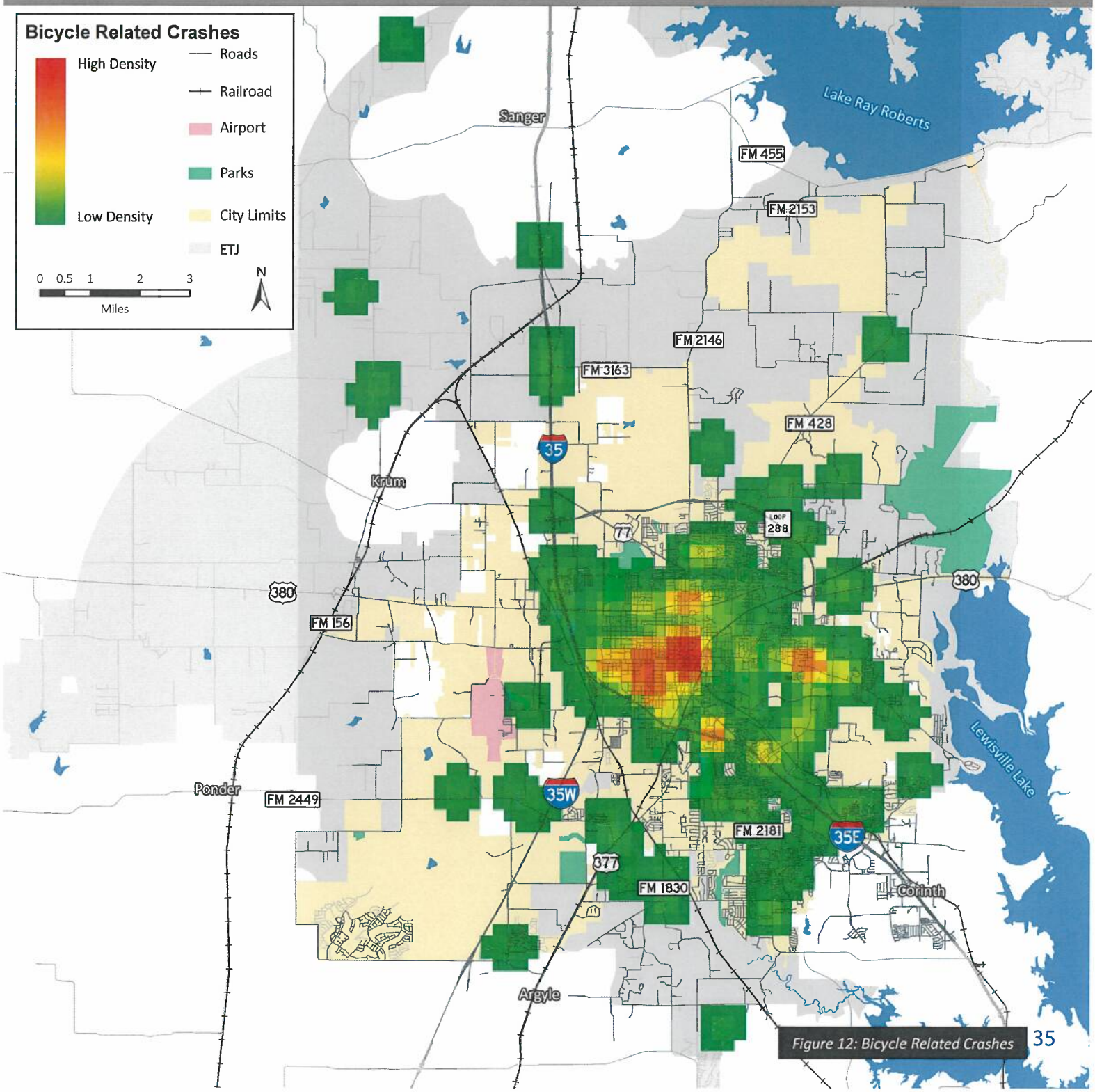


Figure 12: Bicycle Related Crashes

Public Input

The starting point for identifying the needed improvements to the bicycle network in Denton was to gain a better understanding of its current riders and what their preferences are. Multiple public involvement efforts were used in the bike planning process to gain public input. These formats included public meetings and an online survey.

Public Meetings

Public meetings were held on July 31st 2019, August 1st 2019, September 9th 2020, September 10th 2020, September 14th 2020, September 17th 2020, and September 24th 2020, and covered all topics related to the Mobility Plan. Specifically, a bicycle station was provided at the meetings to present the existing conditions of the bicycle network and receive feedback on preferred bicycle routes and facilities.

Priority Destinations and Connections

When asked where Denton residents prefer to bicycle most, the top answers included Parks and Recreation, Restaurant/Bar, and Library/Community Center. These answers are summarized in the graphic below.

In addition, a broader discussion was had on which connections were important to Denton residents. These connections are summarized as follows:

- Connect on-street bike network to the existing and planned trail system
- Universities
- Downtown
- Transit stations
- Connect across major barriers where possible – highways, major arterials, rail
- Increase access south of I-35E
- Consider converting vehicle lanes to bicycle lanes on some oversized roads

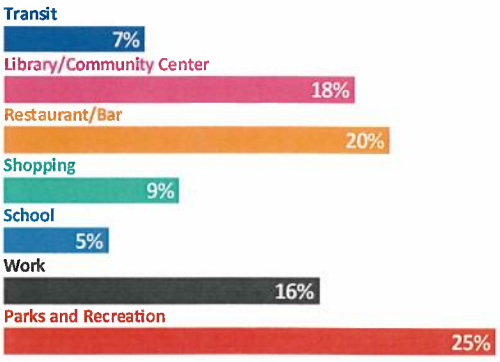


Figure 13: Preferred Cycling Destinations Results

Preferred Facilities

When asked what types of facilities Denton residents prefer to bicycle on, there was a consistent theme noted of separated facilities which offer some form of striped or physical buffer. Many commented that these types of facilities made them feel safer while biking. Their answers are summarized in the graphic below.

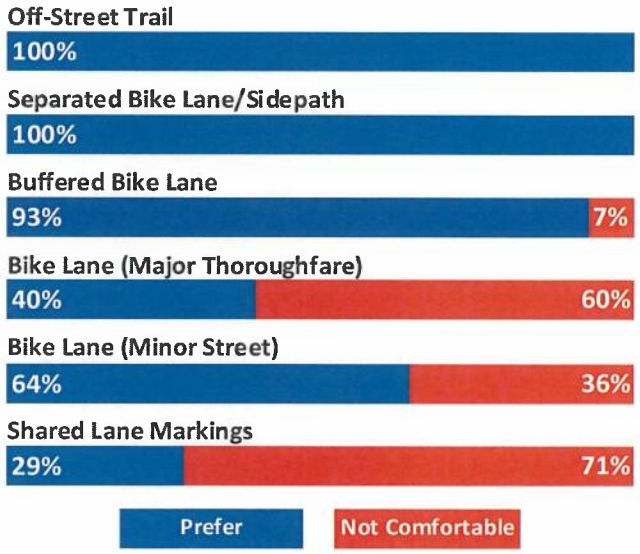


Figure 14: Preferred Cycling Facilities Results

Online Survey Results

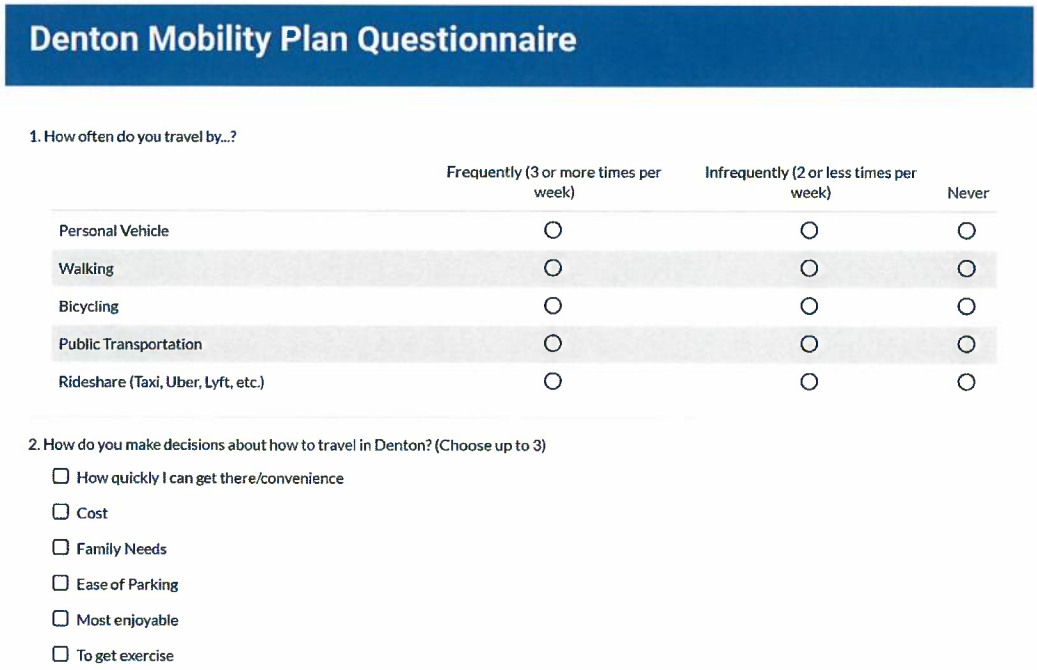
The online survey received 370 responses from residents about their frequency of traveling by bicycle. The results showed that 24.3 percent of respondents traveled by bicycle three or more times per week, and 21.6 percent of residents traveled by bicycle 2 or less times per week.

Of the respondents, over 50 percent reported that it was either difficult or very difficult to bicycle to destinations within Denton from where they live. When asked about the main reasons that prevented them from bicycling, most of the respondents said that there are not enough bikeways and that the bikeways do not feel safe or comfortable.

Many respondents also mentioned that crossing I-35E was a major hurdle for bicycling in Denton.

When it comes to the bicyclists in Denton, most of the respondents identified themselves as casual recreational cyclists, with the next largest group considering themselves commuter cyclists. The preference of the overwhelming majority of cyclists in Denton is to bicycle on protected bicycle lanes.

The online survey and responses are provided in the appendix.



Denton Mobility Plan Questionnaire

1. How often do you travel by...?

	Frequently (3 or more times per week)	Infrequently (2 or less times per week)	Never
Personal Vehicle	○	○	○
Walking	○	○	○
Bicycling	○	○	○
Public Transportation	○	○	○
Rideshare (Taxi, Uber, Lyft, etc.)	○	○	○

2. How do you make decisions about how to travel in Denton? (Choose up to 3)

- ☐ How quickly I can get there/convenience
- ☐ Cost
- ☐ Family Needs
- ☐ Ease of Parking
- ☐ Most enjoyable
- ☐ To get exercise

Figure 15: Sample Survey Questions

Recommended Bicycle Network

Development of the Bicycle Plan map started with a review of goals of the mobility plan and the public input received on preferred routes, connections, and facility types. During this period, TxDOT issued new bicycle accommodation design guidance on April 2, 2021, which emphasized design to accommodate the greatest number and type of bicyclists with the safest facility possible within local constraints.

The 2022 Bike Plan has been developed in alignment with TxDOT guidance and best practices in planning and design of bicycle facilities. These objectives include:

- Identifying and prioritizing implementation of a primary bike network of connected facilities
- Increasing bicyclist comfort and safety by providing greater separation from vehicular traffic
- Collaborating with stakeholders and neighboring jurisdictions to deliver complimentary bicycle facilities, with particular emphasis on City of Denton Park Trails that provide mutual recreation and mobility benefits

Implementation Considerations

This plan presents a vision for a complete network of bicycle facilities within the City of Denton. Delivering this plan will require balance and flexibility to achieve the goal of a safe network of facilities that appeal to a broad audience of potential bicyclists. The City will leverage guidance and best practices from TxDOT, AASHTO, the Federal Highway Administration, and NACTO to aid in facility selection, design and delivery of these improvements.

The culmination of these efforts is presented in Figure 16 on the following page. The map illustrates the existing and proposed/future bike facilities, with additional considerations highlighted that include:

- Primary Bike Network (per Transportation Criteria Manual, all collectors and arterials should either be separated bike lanes, or 10 ft sidepaths)
- Facility would terminate at a limited access road. Identify alternative termination point, or a destination the facility would terminate at (ie. Park, School, Business).
- Facility limits at the City of Denton jurisdictional boundary. Mobility Plan should note that facility types will require coordination with the adjacent jurisdiction.

UNT Pedestrian Bridge
Photo Credit: Suzanne Rumohr

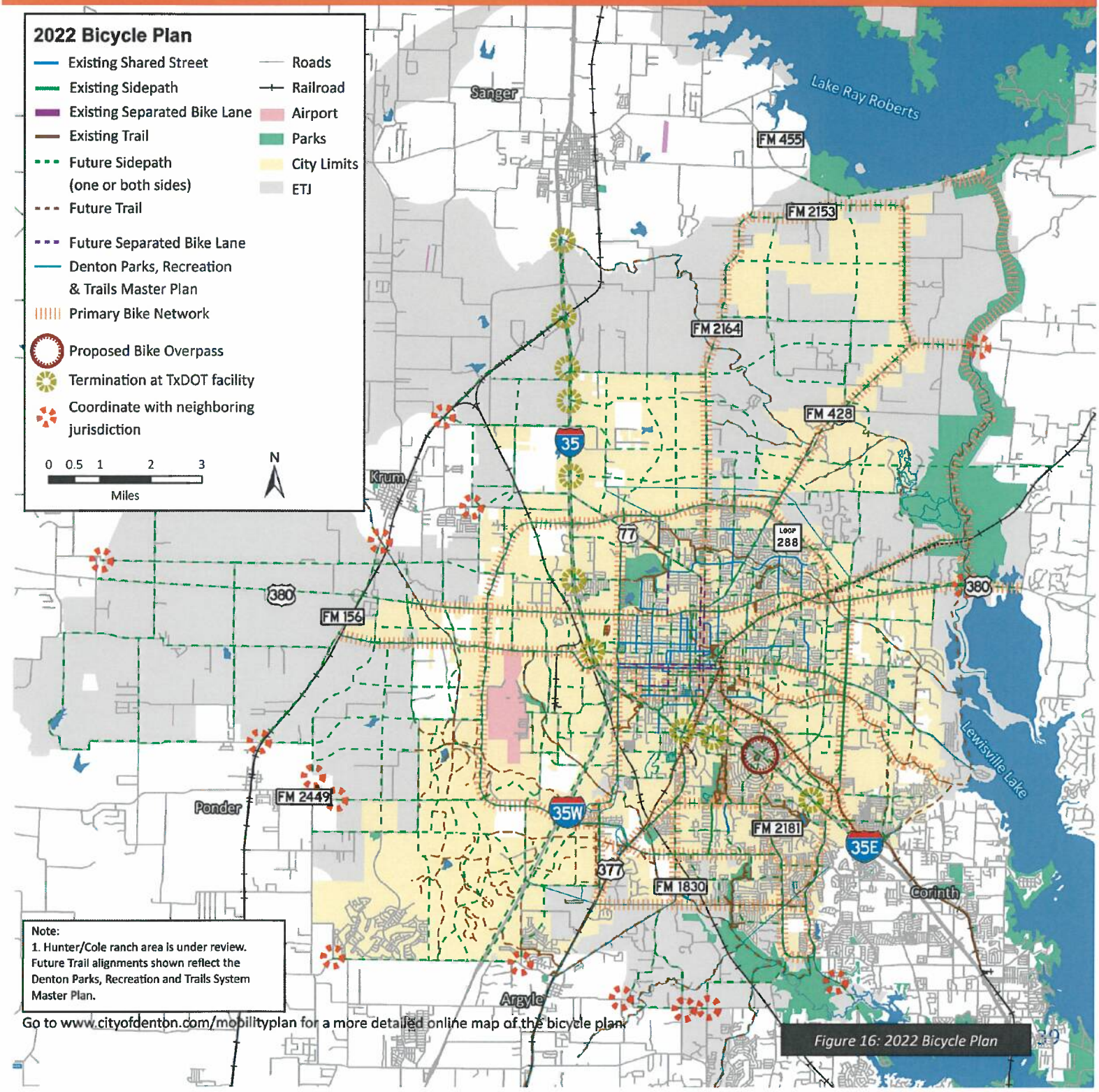
2022 BICYCLE PLAN MAP

Figure 16 presents the recommended bicycle network in the City of Denton. Facility types are discussed in the pages that follow.

*Includes the Denton Parks, Recreation and Trails Master Plan trails

Table 3: 2022 Bicycle Plan Mileage

	Existing Miles	Proposed Miles	Total Miles
Shared Street	31.83	-	31.83
Sidepath	2.01	553.53	555.54
Separated Bike Lane	0.28	11.68	11.96
Trail*	63.38	229.28	292.66



Note:
1. Hunter/Cole ranch area is under review. Future Trail alignments shown reflect the Denton Parks, Recreation and Trails System Master Plan.

Go to www.cityofdenton.com/mobilityplan for a more detailed online map of the bicycle plan.

Figure 16: 2022 Bicycle Plan

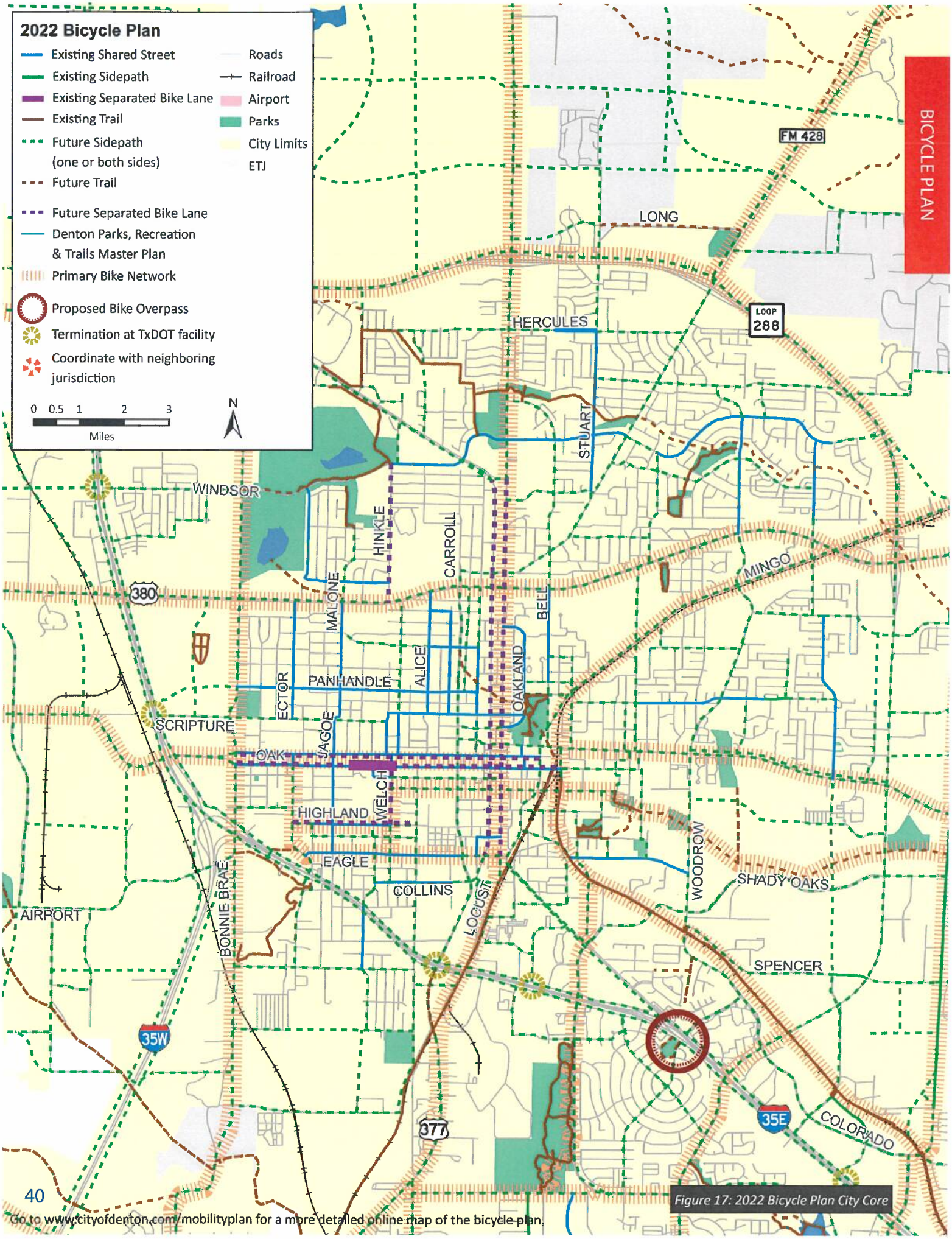


Figure 17: 2022 Bicycle Plan City Core

Go to www.cityofdenton.com/mobilityplan for a more detailed online map of the bicycle plan.

Bicycle Facility Types

The Denton Bicycle Plan was designed with flexibility in mind, knowing that multiple segments of the same roadway may all have different solutions most appropriate to the present conditions. The following sections discuss the Bicycle Facility Types presented in the Bicycle Plan and provide guidance for when and how to use them.

Bike Lane on Oak Street
Photo Credit: Suzanne Rumohr

On-Street Facilities

Bike Lanes

DESCRIPTION

Bike lanes are typically one-way facilities that carry bicycle traffic in the same direction as adjacent motor vehicle traffic. Contraflow lanes allow cyclists to travel in the opposite direction of vehicle traffic. Bike lanes are provided for the exclusive or preferential use of bicyclists on a roadway and are identified through signage, striping, or other pavement markings. These lanes allow bicyclists to ride at comfortable speeds and encourage a position within the roadway where they are more likely to be seen by motorists. Bike lanes are typically on the right side of the street, between the outside travel lane and curb, parking lane, or road edge. While the lane distinguishes predictable areas for bicyclist and automobile movement, bicyclists may leave the bike lane to pass other cyclists or avoid debris and conflicts with other street users.

TYPICAL USE

- On streets with moderate traffic volume (3,000-10,000 ADT)
- On streets with moderate travel speeds (25- 35 mph)
- Bicycle facilities with greater separation should be considered on higher speed (>35 mph) and higher volume roadways

FACILITY BENEFITS

- Bike lanes create a designated space for bicycle travel and increases separation from automobiles
- Positioning of bicyclists is more predictable than on roadways without bike lanes
- Bicyclists are able to continue riding at a comfortable speed even as vehicular traffic slows in the adjacent travel lanes

DESIGN GUIDELINES

- The desirable bike lane width adjacent to a curb face is 6 feet to allow bicyclists room to avoid potential conflicts such as wide gutters or parked cars. However, a minimum bike lane width of 5 feet is acceptable
- The maximum width should not exceed 7 feet so that lanes are not mistaken for automobile travel lanes or parking areas
- A solid white edge line should be placed between the bike lane and travel lane
- Standard Manual on Uniform Traffic Control Devices (MUTCD) bike lane symbols and arrows should be used to inform bicyclists and motorists of the restricted nature of the bike lane, and markings should be placed at periodic intervals to remind motorists of the presence of bicyclists
- Traffic control devices such as vertical flex posts, green pavement markings and wayfinding signage may be required to enhance the proposed bicycle facility in accordance with the City's Transprtation Design Criteria Manual

Seperated Bike Lanes

When sufficient roadway width is present, or if extra travel lanes are reduced, a buffer may be striped between a bike lane and travel lane to provide additional comfort for both bicyclists and motorists. This provides space for bicyclists to pass one another or ride side by side without encroaching into a motor vehicle travel lane. The buffer adds to the perception of safety and encourages greater use of the on-street bicycle network. Additional separation may be achieved with the use of vertical elements, including "armadillo" delineators, curbing (bolted plastic or permanent concrete), candlesticks, reflectors, or other elements. It appeals to a wider set of bicycle users by providing added separation between motorists and bicyclists that may be traveling at substantially different speeds.

TYPICAL USE

- Appropriate for use anywhere a standard bicycle lane is being considered assuming sufficient space is available for a buffer
- Beneficial on streets with higher travel speeds (> 35 mph), higher travel volumes (10,000+ ADT), and higher truck traffic
- The inclusion of buffered bike lanes is best accomplished as part of retrofits of existing roadways with more travel lanes than needed

FACILITY BENEFITS

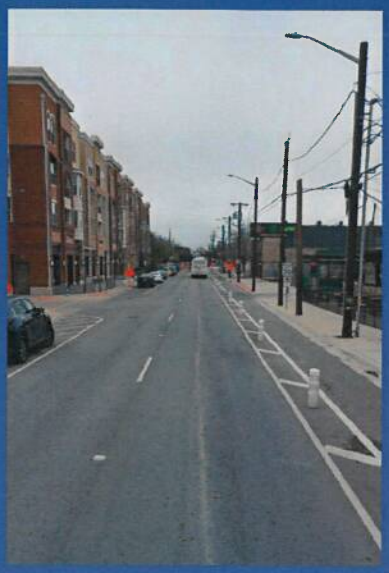
- Creates greater separation between bicyclists and motor vehicles
- Increases the perception of safety among bicyclists
- Encourages less-skilled riders to cycle on streets with higher travel speeds and higher travel volumes

DESIGN GUIDELINES

- Buffers should be delineated by two solid white lines and be at least 2 feet wide. If wider than 3 feet, chevron or diagonal hatching should also be marked
- A 5 foot minimum bike lane is recommended
- Bicycle markings and signage should be used the same as a conventional bike lane

Shared Streets

Shared lane routes or shared streets are not considered one of the primary bicycle facility types, since nearly any city street can be considered a shared facility that bicyclists use. The focus of the 2022 Bicycle Plan is to maximize rider comfort by shifting the focus away from shared lanes. However, all local streets are considered shared facilities as their low speeds and volumes allow for a reasonable level of comfort for bicyclists. Nevertheless, additional wayfinding, improved crossings of major streets, and other treatments suggested by FHWA, NACTO, and others, can increase the comfort and safety of bicyclists on shared facilities.



Buffered Bike Lane on Hickory Street
Photo Credit: Suzanne Rumohr

42

Off-Street Facilities

Shared-Use Sidepaths

Shared-use sidepaths function like most paved trails. They are physically separated from motorized vehicular traffic, either by a landscaped buffer or a barrier, but rather than having an independent alignment, they are designed to follow roadway corridors. These facilities are particularly useful when roadway width is limited and providing an on-street bike facility is not possible. These paths are designed for two-way travel, and in addition to bicyclists, path users may include inline skaters, skateboarders and pedestrians.

Shared-Use Sidepath

TYPICAL USE

- Connecting on-street bikeways to the off-street trail network
- Continuing the on-street bike network in areas with constrained pavement width or other physical constraints
- Along higher-speed roadways with wide parkways and limited driveway and street crossings
- Providing a two-way bike route near schools or other areas that attract younger bicyclists

FACILITY BENEFITS

- Sidepaths tend to attract a wider variety of bicycle rider skills and ages due to the increased separation from vehicle traffic
- Sidepaths can provide access to destinations along limited-access freeways where other bike facilities would not be appropriate

DESIGN GUIDELINES

- Sidepaths should avoid being built along roadways with frequent street or driveway crossings. At intersections, bicyclists will often be out of the line of sight of turning motorists
- Appropriate signage and markings should be included at each driveway and street intersection to alert motorists of bicycle travel
- Prohibiting right turns on red at sidepath crossings can reduce conflicts between drivers and bicyclists. Providing a leading pedestrian interval at crossings may be appropriate to accommodate higher levels of path use
- Each end of a sidepath should directly connect to an on-street bike facility, another trail or path, or to a bicycle-compatible local street
- The minimum paved width for a shared-use path is 10 feet
- In constrained areas or when low bicycle traffic is expected, a reduced width of 8 feet may be used
- The minimum recommended distance between a sidepath and adjacent roadway edge is 5 feet. A barrier should be provided where the separation is less than 5 feet

Trails

Trails consist of wide paved pathways which are built outside of the roadway Right-of-Way. Trails are typically designed with recreational use in mind for both bicyclists and pedestrians, though some trail alignments can also be ideal for bicycle commuters. Trails also serve to connect parks and open spaces, adding to the overall recreation amenities and quality of life within the City.

TYPICAL USE

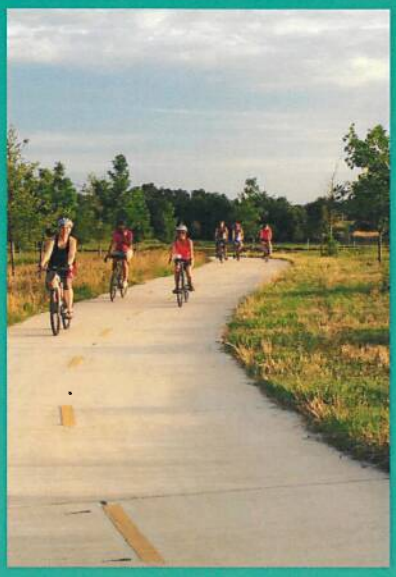
- Appropriate for implementing in currently underutilized spaces, such as:
  - Floodplains and streams
  - Utility Easements
  - Rail Corridors
  - Parks and Open Spaces
- Useful for making bicycle and pedestrian connections outside of the roadway network if improvements within the roadway network are difficult or unfeasible

FACILITY BENEFITS

- Provides the maximum separation between vehicular traffic and bicycle traffic
- Establish connections between recreational destinations such as parks
- Enhances the quality of life of the surrounding community

DESIGN GUIDELINES

- Trails should be designed to a minimum width of 10 feet, and ideally 12 feet for bicycle and pedestrian traffic
- Trails should be paved with concrete, asphalt, or stone dust/pea gravel where pervious or natural surfaces are needed
- Pavement markings should be installed on high-traffic trails to delineate directional traffic, or in some cases to delineate pedestrian vs bicycle traffic
- For more information and design guidance, see the City of Denton Parks, Recreation, and Trails System Master Plan. Hard surfaces are preferred, and all facilities must comply with the most current ADA and TAS standards.



Trail
Photo Credit: Suzanne Rumohr

What Type of Facility to Use?

Many factors go into what is the most appropriate bicycle treatment for a given roadway. These factors include functional class, number of travel lanes, pavement width, pavement conditions, available ROW, vehicular speed, and vehicular volumes. The 2022 Bicycle Plan was developed in conjunction with the 2022 Thoroughfare Plan, therefore the functional class of future roadways was considered in the bike planning process and bike facilities are incorporated into the proposed cross sections. For more information and design guidance , refer to the City's Transportation Criteria Manual.

Speed and Volume as a Determining Factor

One Important factors when considering the safety of pedestrians and bicyclists traveling within or adjacent to a vehicular travelway is vehicular speed and volumes. As shown in the graphic below, the chance that a collision results in a fatality doubles from 40% to 80% when vehicle speeds increase from 30 mph to 40 mph. Therefore, facilities placed on roadways with speed limits over 30 mph should be preferentially considered for separation treatments. Higher-volume roadways may also warrant higher-type treatments, including greater separation, crossing improvements, bike-specific signal phases, and so on. All of these decisions should be made in consort with the Plan Goals as stated earlier in this document.

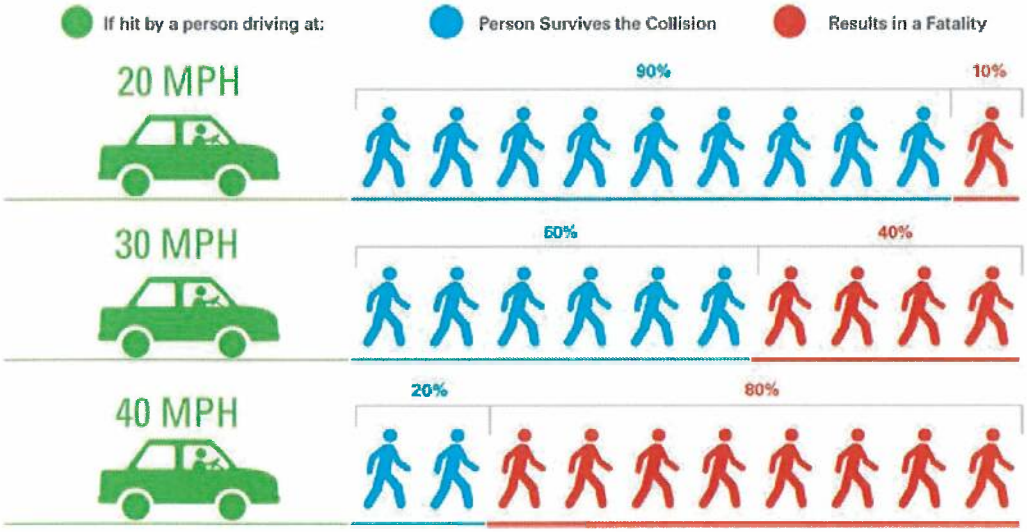


Figure 18: Speed
Image credit: San Francisco MTA Vision Zero Action Plan, February 2015: https://view.joomag.com/vision-zero-san-francisco/0685197001423594455?short

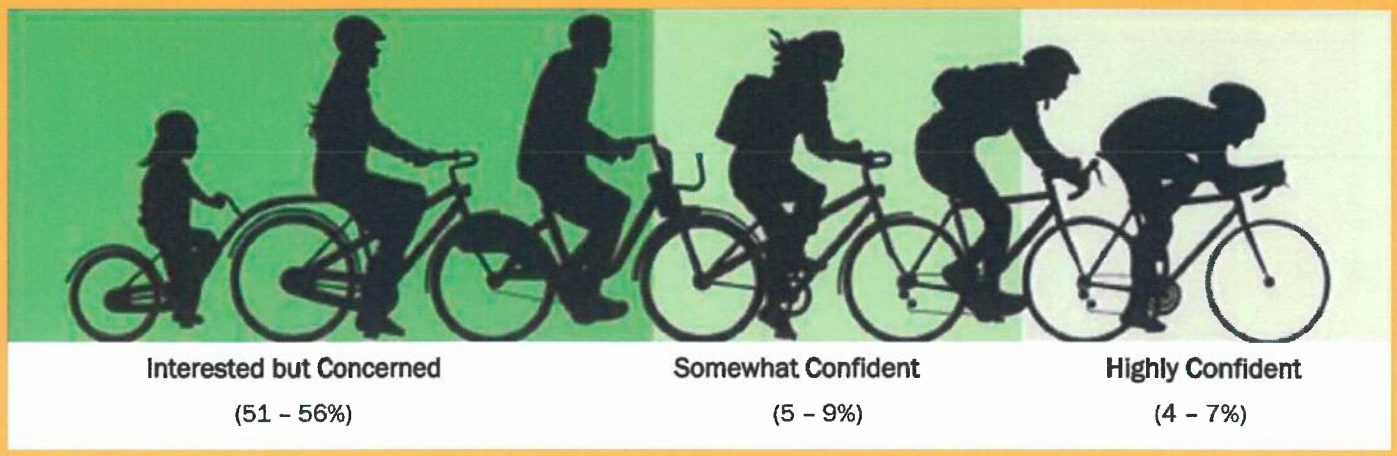


Figure 19: Types of Bicycle Facility Users as a Percentage of Total General Population
Image credit: Bicycle Accomodation Design Guidance Memo, April 2021:
https://ftp.txdot.gov/pub/txdot-info/ptn/bike-acco-design-guide.pdf

Facility Type Decision

TxDOT Bicycle Accommodation Design Guidance memo offers design considerations for accommodating the different facility types and types of construction. Different bicycle riders may have varying tolerances, **Figure 19** indicates the array of potential bicycle riders that should be considered when scoping and designing a roadway project. For construction of new or replacement facilities, the project should include the recommended accommodations as shown in **Figure 20**.

Decisions depend on the nature of a project and what infrastructure may be included. Further detailed information provided for specific roadways may result in an appropriate bicycle treatment which may defer.

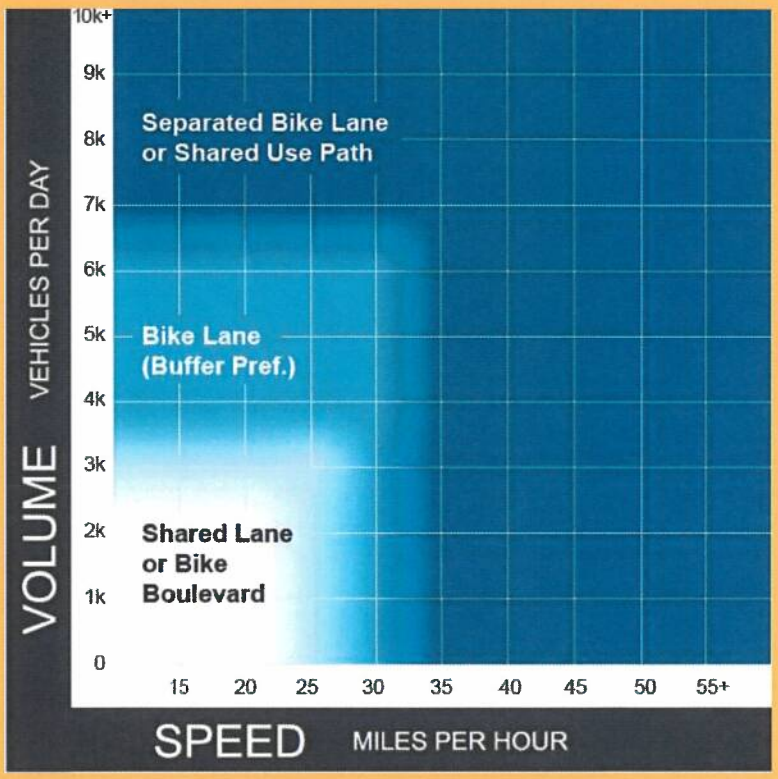
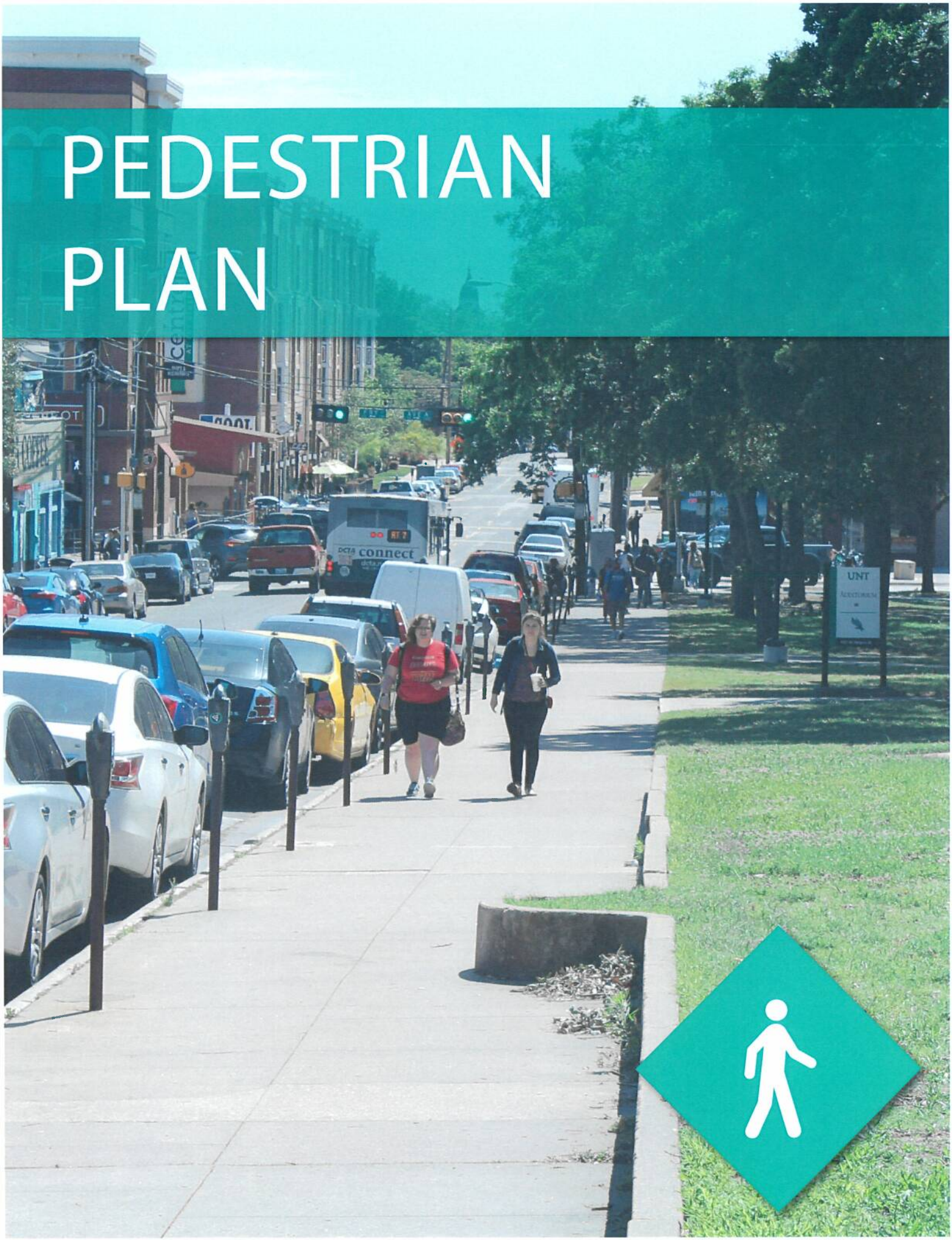


Figure 20: Recommended Bicycle Facility Selection for Urban, Urban Core, Suburban, and Rural Town Context
Image credit: Bicycle Accomodation Design Guidance Memo, April 2021:
https://ftp.txdot.gov/pub/txdot-info/ptn/bike-acco-design-guide.pdf

PEDESTRIAN PLAN



PEDESTRIAN PLAN

Purpose of the Pedestrian Plan

This Pedestrian Plan is intended to help the City of Denton prioritize walking investments in places where they will have the greatest impact on safety and equity for all residents and visitors. The Pedestrian Plan is a visionary document that provides a roadmap for Denton to become a more walkable, pedestrian friendly city. It will complement the Thoroughfare Plan and Bicycle Plan and provide a blueprint for future pedestrian improvements throughout the city.

As the City of Denton continues to increase in population growth and economic activity with more businesses, it will be important to address the needs of pedestrians as an alternative mode of transportation. This Pedestrian Plan seeks to coordinate with the ongoing ADA Transition Plan for the City of Denton that also identifies and prioritizes pedestrian infrastructure improvements.

UNT Campus

Existing Conditions

Sidewalk Data

There are approximately 469 centerline miles of sidewalk and 24.4 miles of trails currently constructed in Denton. Figure 20 represents the existing and missing sidewalk network in Denton. A majority of the existing sidewalk network is located in downtown Denton and in the surrounding neighborhoods. Areas around the University of North Texas and Texas Woman's University also have much of the City's existing sidewalk network.

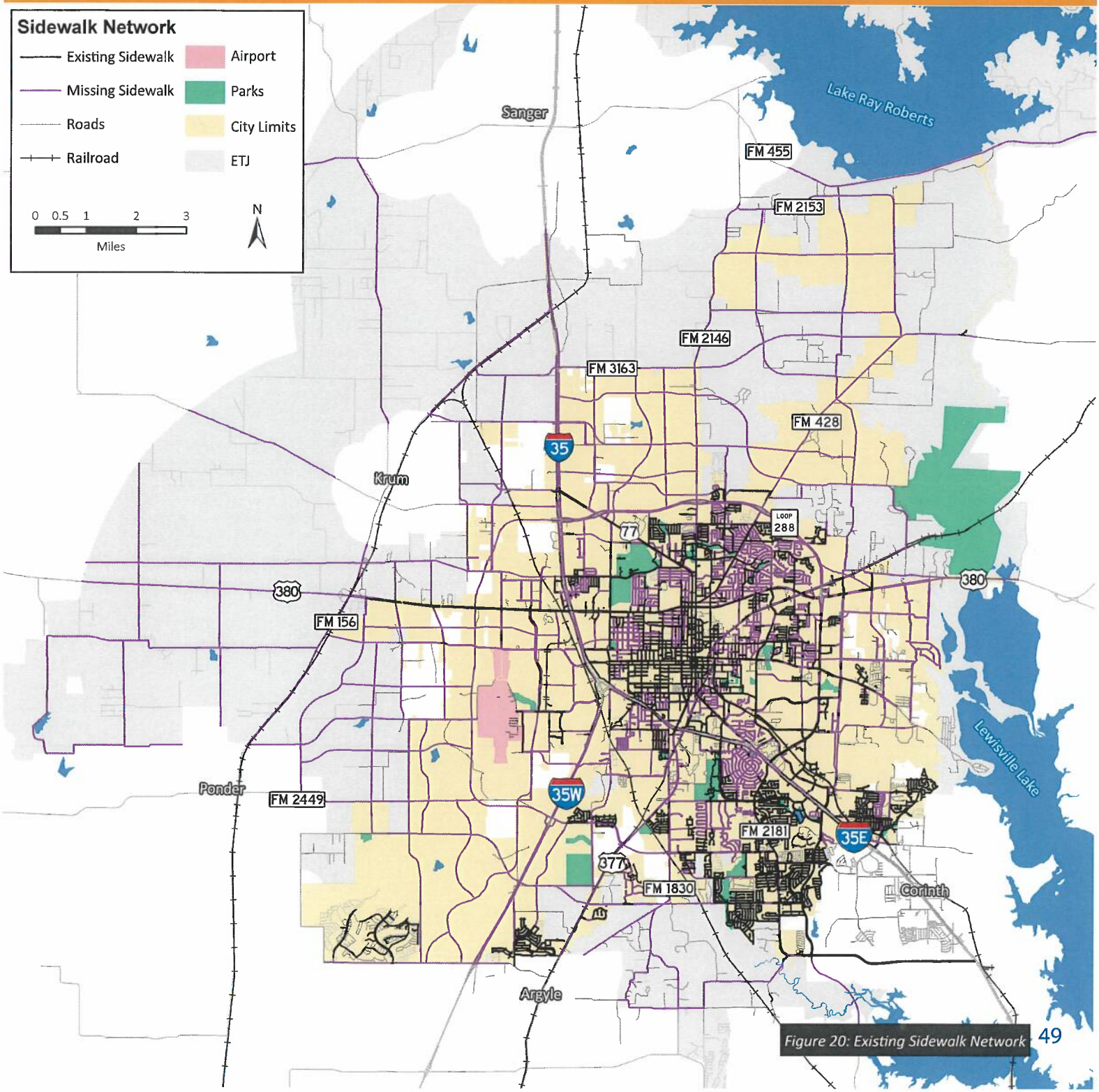


Figure 20: Existing Sidewalk Network

As represented in Figure 21, 21% of the roadways within the City of Denton have sidewalks located on both sides of the roadway versus 6% of roadways with sidewalks on one side of the street. 6% of the roadways within Denton have disconnected/partial sidewalks along one or both sides of the roadway, representing a barrier to accessibility and mobility to area residents.

According to the ADA Transition Plan (August 2019), many of the sidewalks in Denton are 5 feet or wider and constructed of concrete with brick insets in several areas. The area south of I-35, including Shadow Ranch, Summit Oaks, River Oaks, and Wheeler Ridge neighborhood associations, have sidewalks less than 5 feet in width. The Denton Transportation Criteria Manual recommends the following minimum sidewalk widths:

- Residential/Arterial: 5 feet minimum
- Collectors: 8 feet minimum
- Sidewalks along bridges and drainage crossings: 6 feet minimum

The ADA Transition Plan also completed a detailed inventory of sidewalks, ramps, and intersections conditions.

- 35% of the sidewalks were rated as Marginal, Poor, or Very Poor

According to Walk Score data, Denton has an average Walk Score of 33. Walk Score data measures walkability on a scale from 0-100 based on walking routes to destinations such as grocery stores, schools, parks, and retail. These metrics also include population density, average block length and intersection density to determine pedestrian friendliness.

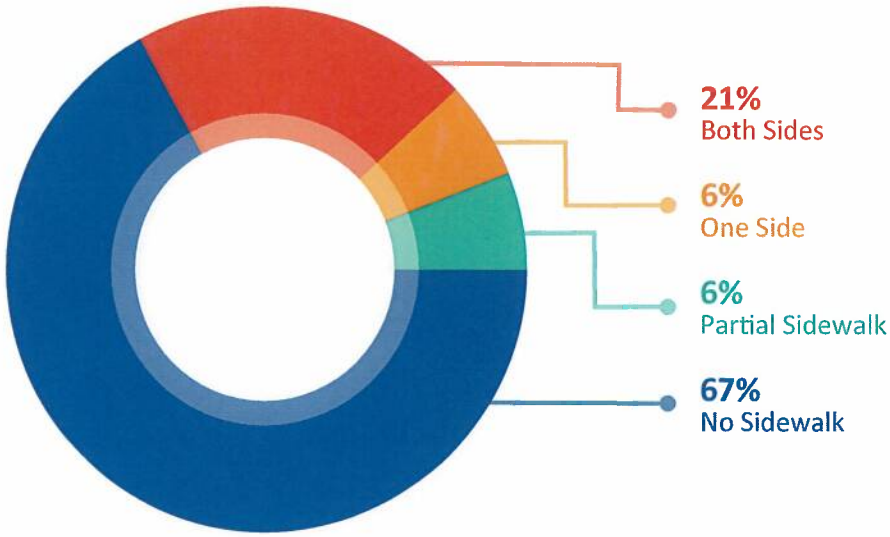


Figure 21: Location of Sidewalks Along Roadways

Current Users

In Denton, according to the U.S. Census Bureau, 3,000 residents walk to work daily. Providing safe and accessible pedestrian infrastructure for these residents as well as those commuting to parks, shopping centers and leisure activities is an important aspect to improve quality of life.

Pedestrian activity in Denton was viewed through Strava's Global Heat Map, which identifies roadways and trails that are utilized by those using smart phone crowd-sourcing. This analysis identified many different, heavily utilized routes located along many streets in Downtown Denton as well as Teasley Lane and E Windsor Drive. University facilities and the North Lakes Sports Complex are also highly used by pedestrians. Figure 22 represents the Strava crowd-sources pedestrian data in Denton.

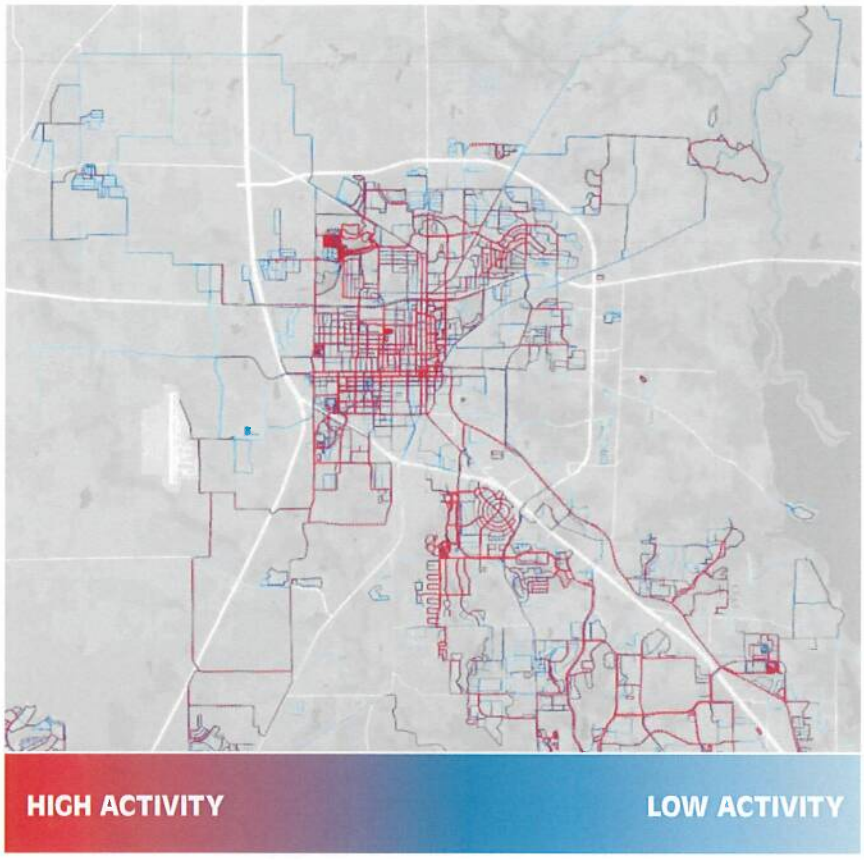


Figure 22: Pedestrian Strava Data

A Mobility Plan questionnaire was conducted as part of the study, which included questions related to walking in Denton. Survey data as well as responses from participants at two public meetings revealed the following:

- 59% of respondents think it is either Difficult or Very Difficult to walk to places in Denton
- 78% of respondents Strongly Agree or Agree that every street should have a sidewalk
- When asked "what are the things that prevent you from walking in Denton," respondents answered (respondents could choose up to 3):
  - 60% sidewalks are not connected
  - 53% destinations were too far
  - 32% sidewalks are in poor condition
  - 24% weather
- When asked "Which improvements would make you more likely to walk around the City," respondents answered (multiple):
  - 73% more sidewalks/better connectivity
  - 58% more landscaping, including trees for shade
  - 52% better lighting
  - 49% better sidewalk conditions

Further comments related to walking included the need for continuous sidewalks adjacent to schools, transit stops and parks to improve accessibility and mobility for all users. Several comments related to sidewalk closure during building construction were also raised as an impediment for pedestrians as it forced them into the street as their only option. Policy changes could occur related to construction that affects the pedestrian right-of-way and provide a safe, accessible alternative during construction period.

Denton Katy Trail Crossing at Brinker Road
Photo Credit: Suzanne Rumohr

Safety

Based on TxDOT Crash Records Information System, from 2017 to 2021, there have been 161 pedestrian-related crashes within the City of Denton. As shown in Figure 23, a majority of the pedestrian-related crashes occur in areas where there is a higher occurrence of pedestrians, adjacent to the UNT campus and Denton Square areas, but more deaths are reported along high speed roadways.

As shown in Table 4, there have been 11 fatal pedestrian-related crashes since 2014. 49% of the pedestrian-related crashes were either at a driveway, intersection, or intersection-related.

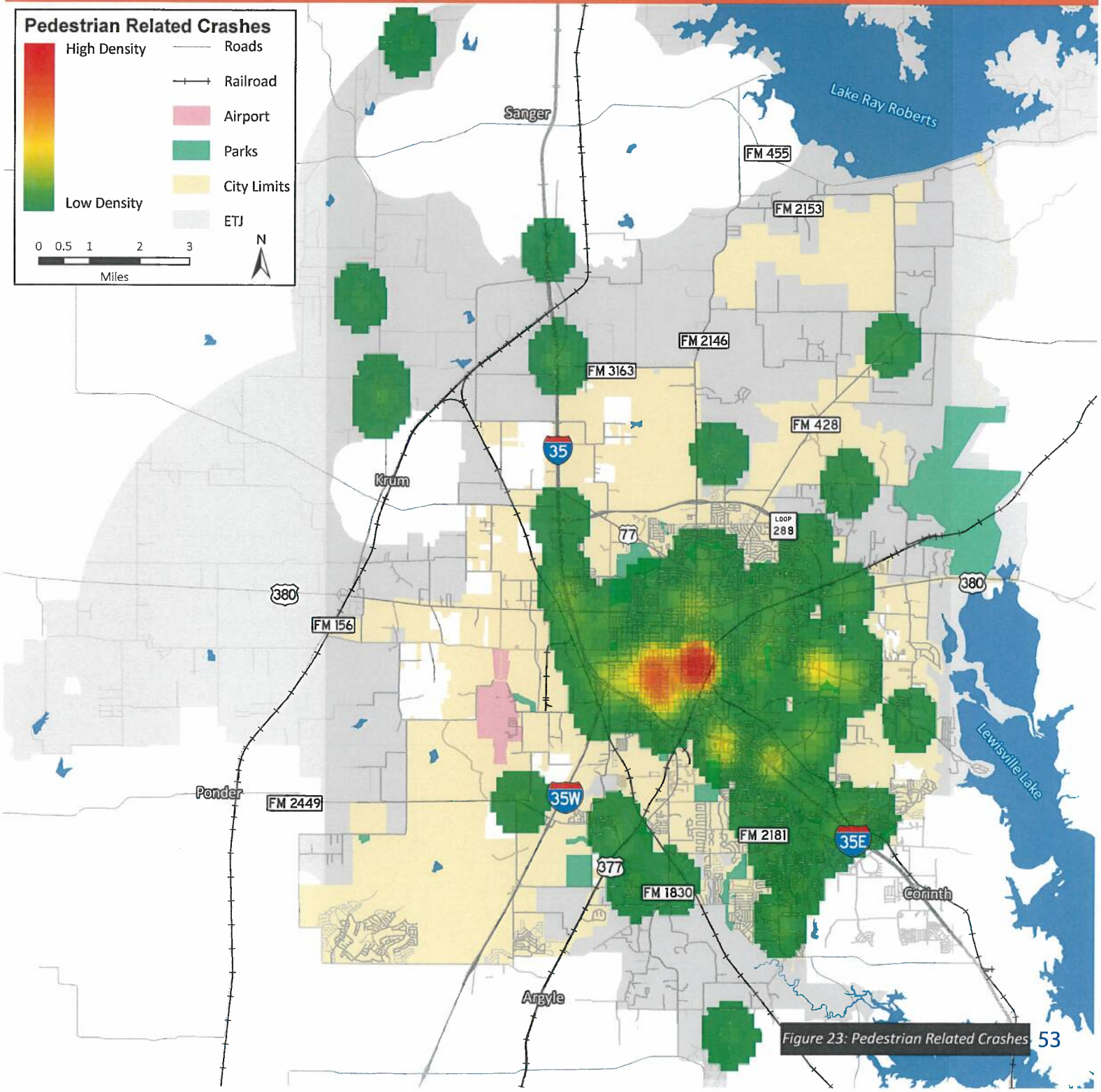


Figure 23: Pedestrian Related Crashes

Year	2014	2015	2016	2017	2018	2019	2020	2021	Total
Fatality	0	1	3	4	3	2	4	3	20
Suspected Serious Injury	6	8	8	5	9	8	4	6	54
Non-Incapacitating Injury	14	19	14	24	11	20	7	18	181
Possible Injury	6	6	3	1	7	14	6	7	50
Not Injured/ Unknown	2	0	1	4	2	6	3	2	20
Total	28	34	29	38	32	50	24	36	161

Table 4: Crash Severity

RECOMMENDED IMPROVEMENTS

Sidewalk Prioritization Process

The purpose of the Pedestrian Plan is to identify the missing sidewalk/pedestrian infrastructure throughout the City and provide a framework for implementation to improve accessibility and mobility. Special consideration was given to sidewalk improvements in downtown Denton and Safe Routes to School infrastructure that connects neighborhoods to schools.

The City has developed a sidewalk workplan that leverages additional data to establish a pedestrian potential index (PPI), which guides installation of new sidewalks, and repair to existing pedestrian facilities under the City's ADA Transition Plan. Additional details regarding this program are provided on the City of Denton's website, and the Discuss Denton City Sidewalks page.

2022 PEDESTRIAN PLAN MAP

The map below shows the improvements to be implemented in the 2022 Pedestrian Plan. Table 5 shows the existing miles of sidewalk in Denton, the proposed new miles, and the new total miles if the plan is built out. Figure 25 on the next page includes a more detailed view of the Pedestrian Plan within the city core.

Table 5: 2022 Pedestrian Plan Mileage

	Miles
Existing Sidewalks	469.37
Proposed Sidewalk Program	742.44
Gap Project Sidewalks	6.64
Total	1,218.34

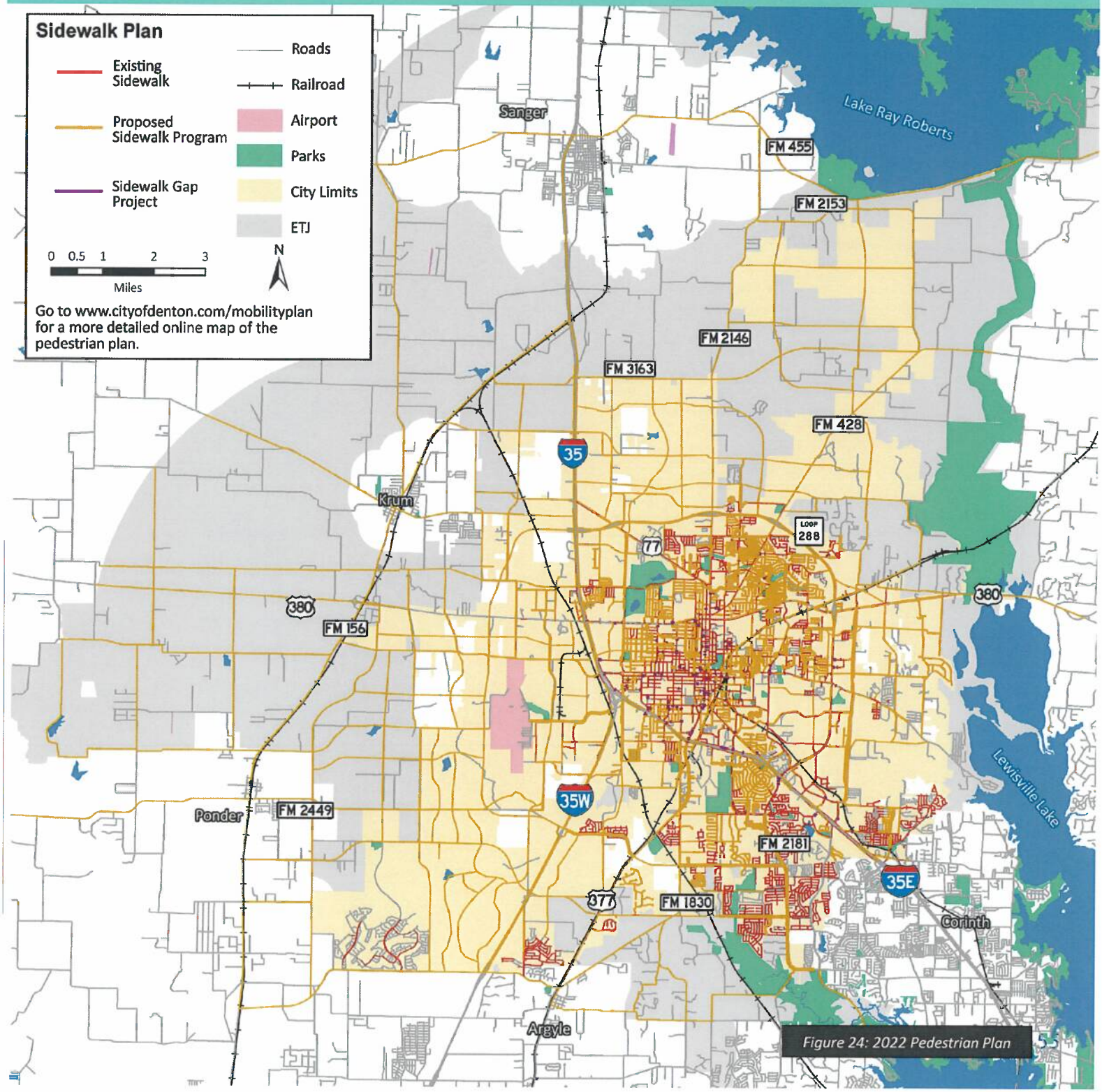


Figure 24: 2022 Pedestrian Plan

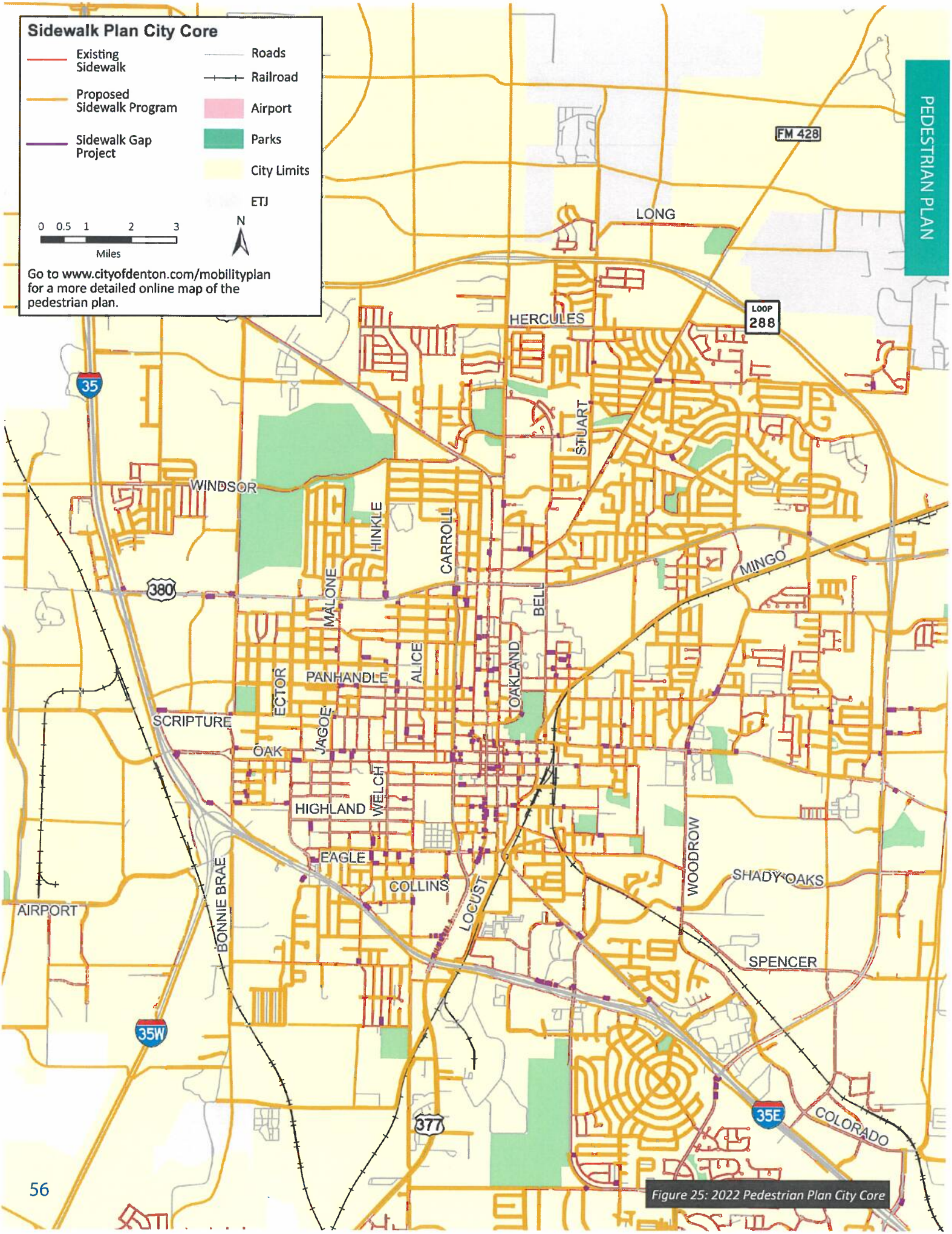


Figure 25: 2022 Pedestrian Plan City Core

Best Practices

This section presents the best practice design guidelines for pedestrian facilities to improve accessibility, mobility, and safety throughout Denton. These practices are not exclusive to sidewalks and crosswalks as they also include context-sensitive design solutions for a more complete streets approach.

These best practices are consistent with the City of Denton Transportation Design Criteria

Manual (2018), and draw on guiding documents from FHWA, AASHTO, and NACTO. Other organizations such as ITE, APA, the League of American Bicyclists, and other industry groups, should be looked to for up-to-date design guidance on multi-modal safety and access. All improvements must also adhere to the most current design standards from ADA (including the Public Right-of-Way Accessibility Guidelines currently under development) and TAS. This list is only a selection of potential improvements; other traffic and infrastructure improvements such as improved retro-reflectivity of striping, preferential traffic signal phasing (including leading pedestrian intervals), etc., may also be considered.

Sidewalk Width: recommended sidewalk minimum width is 5 feet (6 feet desired), which allows two people to pass comfortably or to walk side-by-side. Sidewalk widths should be 8-12 feet in commercial or downtown areas. A frontage zone or buffer zone can provide additional width and safety for pedestrians.

Sidewalk Clearance: sidewalks should be clear from obstructions of a height of at least 8 feet to ensure access for all sidewalk users.

Access Management: Crash rates have been shown to increase as driveway density increases. Limiting or consolidating vehicle access points reduces conflict points and improves traffic operations.

High Visibility Crosswalks: also known as ladder style markings are more visible to approaching vehicles and improve yielding behavior. Brick pavers, with retro-reflective pavement markings, can also be used to increase visibility.

Rectangular Rapid Flashing Beacon (RRFB): are effective devices at uncontrolled intersections for increasing motorist yielding rates and reducing pedestrian-vehicle crashes at crosswalk locations.

High Intensity Activated Crosswalk (HAWK): signal used where volumes of traffic or roadway width suggests that motor vehicles should be stopped when pedestrians cross roadway.

Crossing Islands: raised islands placed in the center of the street at intersections or midblock. Should be at least 6 feet wide but have a preferred width of 8-10 feet.

Sidewalk Access During Construction: any construction project that obstructs the sidewalk should be mitigated through the provision of a temporary sidewalk that affords a safe and convenient passage.

Curb Radii: minimizing the size of a corner radius is critical to creating compact intersections with safe turning speeds. Recommended curb radius for residential streets is 15 feet and local/collector streets is 20-30 feet depending on traffic volume.

Curb Extensions: visually and physically narrow the roadway, creating safer and shorter crossings for pedestrians while increasing the available space for street furniture, benches, plantings, street trees and parking.

Pedestrian Lighting: should be placed in advance of midblock and intersection crosswalks to make pedestrian more visible and increase comfort and safety.

East Hickory Street