

Georgetown Bicycle Master Plan (2019)

BIKE
GEORGETOWN



The University of Texas at Austin
School of Architecture

City of Georgetown

Bicycle Master Plan

(2019)



Acknowledgements

Georgetown's residents have offered incredible insight and local knowledge that proved invaluable in this plan's creation, and the project team would like to extend its gratitude to each individual who participated in helping to produce a bicycle network that will serve the City for years to come.

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Executive Summary

EXECUTIVE SUMMARY

In 2018, the City of Georgetown began updating its 2030 Comprehensive Plan. A component of this update is the Bicycle Master Plan (the Plan), a joint effort between City staff and a project team from the University of Texas at Austin (UT Austin). An initial study of bicycling conditions in Georgetown was conducted in fall 2016 by the UT project team. This study provided a baseline for the formal planning process that began in fall 2018. To inform the plan-making, the project team engaged with the Georgetown community extensively through public workshops, online surveys, and neighborhood intercept surveys; led stakeholder meetings with City and County staff and representatives of regional and state agencies; and administered site visits across the city. In addition, the project team assembled 12 case studies of best practices from around the country and completed 11 topical reports on technical components of bicycle planning, including but not limited to crash analyses, cost estimates, and design considerations.

VISION, GOALS AND OBJECTIVES

The vision statement of the Georgetown Bicycle Master Plan describes the bicycling environment that the Plan aims to offer to Georgetown's residents and visitors. The goals and objectives specify strategies, actions, and paths toward the realization of that vision.

Executive Summary

VISION STATEMENT

Georgetown will have a safe, well-connected bicycle network that is accessible to all ages, abilities, and backgrounds; supports the local economy; and improves the experience of everyone biking in the community.

Goals	Objectives
<i>Promote safety</i> for cycling on- and off-road	<ul style="list-style-type: none">Prioritize bike paths that minimize conflicts with vehicle traffic.Design intersections that prioritize protected bicycle and pedestrian crossings.Increase awareness of and respect for bicycle riders through education and enforcement.
<i>Develop connectivity</i> across the city to provide access to popular destinations	<ul style="list-style-type: none">Design and build bicycle corridors that connect residential areas with the city center and major destinations.Integrate with regional trails and bicycle networks.Overcome barriers at critical crossing points to provide east-west and north-south connectivity across the city.
<i>Enhance equity</i> in bike access	<ul style="list-style-type: none">Balance the needs and interests of cycling groups and the general public.Improve bicycle and pedestrian access around schools.Build flat paths where possible to accommodate users of all abilities.Expand transportation choices in underserved areas through bicycle infrastructure and connections to public transportation through first and last mile bicycle connections.
<i>Support the economy</i> through bicycling	<ul style="list-style-type: none">Implement bike and pedestrian-oriented urban design to increase transportation options to downtown businesses.Promote bicycle tourism by fostering partnership between public agencies, private business, and non-profit organizations.Ensure that commercial destinations have adequate bicycle parking.Attract bicycle-oriented business.
<i>Foster a bicycle friendly culture</i>	<ul style="list-style-type: none">Educate residents about proper bicycling behaviors for bicyclists, drivers, and pedestrians.Provide bicycle network maps and install wayfinding signage.Pursue a Bicycle Friendly Community Designation.Promote cycling as an easy, inexpensive way to enhance public health.

Executive Summary

SWOT HIGHLIGHTS

A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was conducted based on information gathered from public engagements and field investigations. *Safety, connectivity, equity, economy, and culture* are key themes that emerged from the SWOT analysis. These themes have become key attributes of the vision and directed the formulation of goals and objectives of the Plan.

Strengths

- Bicycling for recreation is already very popular within the community.
- Recreational trails are utilized and enjoyed by residents and visitors.
- The Georgetown Public Library and the Sheraton Hotel both manage well-used public bike sharing services, and Southwestern University provides its students with on-campus bike sharing.
- Residents expressed support for additional bicycling facilities.

Weaknesses

- The lack of bike lanes and bike facilities makes some residents feel unsafe while riding bikes.
- Drivers and bike riders lack knowledge and experience comfortably sharing the road.
- Most bicycle trips are recreational rather than for commuting or running errands. This is potentially due to Georgetown's proximity to a large city, its extensive parks with existing trails, and lack of bicycle infrastructure connecting popular destinations.

Opportunities

- Survey respondents stated that expansion of off-street trails would encourage bicycle use.
- Projects and infrastructure improvements that overlap with planned or proposed projects in other departments (e.g. Streets) can be prioritized for their low cost and high reward.
- There exist roads that can be utilized as a secondary low stress network to guide bikes away from major roadways.

Threats

- Rapid development outside of Downtown does not lend itself to biking due to long distances between destinations.
- Improvements made to major arterials without incorporated bicycle infrastructure will fortify existing barriers to bike connectivity and likely create new threats.
- Lack of coordination among public agencies and private developers or advocates concerned with biking might delay or deter the implementation of City-wide bicycle system integration and infrastructure improvement.

Executive Summary

PROPOSED BICYCLE SYSTEM

Planning and design of the bicycle network are guided by the Plan Vision, Goals, and Objectives. The essential elements of the proposed system can be characterized using the “**5-4-3-2-1**” framework below. A map of the proposed 100-mile system is shown in Figure 1.

5 types of bicycle infrastructure	<p>It is not feasible nor economical to provide bicycle treatment on all streets, roadways, and intersections. The Plan proposes five types of common bicycle treatments: Sharrow, Bike lane (<i>Striped</i>), Buffered bike lane, Physically protected bike lane, and Off-street path / Bike trail. Application of each type should be based on the assessment of system needs and local conditions.</p>
4 sets of critical connections	<p>The Plan proposes improvement to four sets of critical connections in order to overcome the identified bicycling barriers. The first set includes four bicycle crossing points along I-35 to improve east-west biking connectivity. The second set includes three crossing points along San Gabriel River to improve north-south connectivity in northern Georgetown. The third set includes three crossing points along University Ave. The fourth set connects Sun City to Overlook Park and Downtown while minimizing conflicts with Williams Dr.</p>
3 closed bicycle loops	<p>Upon completion of the four sets of critical connections, the Plan presents three closed bicycle loops to serve the whole of Georgetown.</p> <ul style="list-style-type: none">• Loop 1: Central Georgetown components San Gabriel bike trail to the north and west, Maple St. and Holly St. to the east, 15th and 16th St. to the south• Loop 2: Southern Georgetown components San Gabriel bike trail to the north, Inner Loop to the east and south, Southwest Bypass to the southwest, and proposed bike trail to the west of D B Wood• Loop 3: Northern Georgetown components San Gabriel bike trail network to the west and south, trails in Berry Springs Park to the east, Shell Rd. to the north
2 corridors in central Georgetown	<p>Two corridors connect the three bicycle loops described above. They form a secondary low stress network that minimizes conflicts with Austin Ave. and 7th St., which carry large volumes of vehicular traffic. The north-south corridor follows Main St. and the east-west corridor is along 8th St. They intersect at the Square, Georgetown’s historic center.</p>
1 central core	<p>The Square is the vibrant, people-centered focal point of Georgetown. The Plan aims to enhance connectivity between the Square and the rest of the city, building off of existing roads and integrating with park paths.</p>

Executive Summary

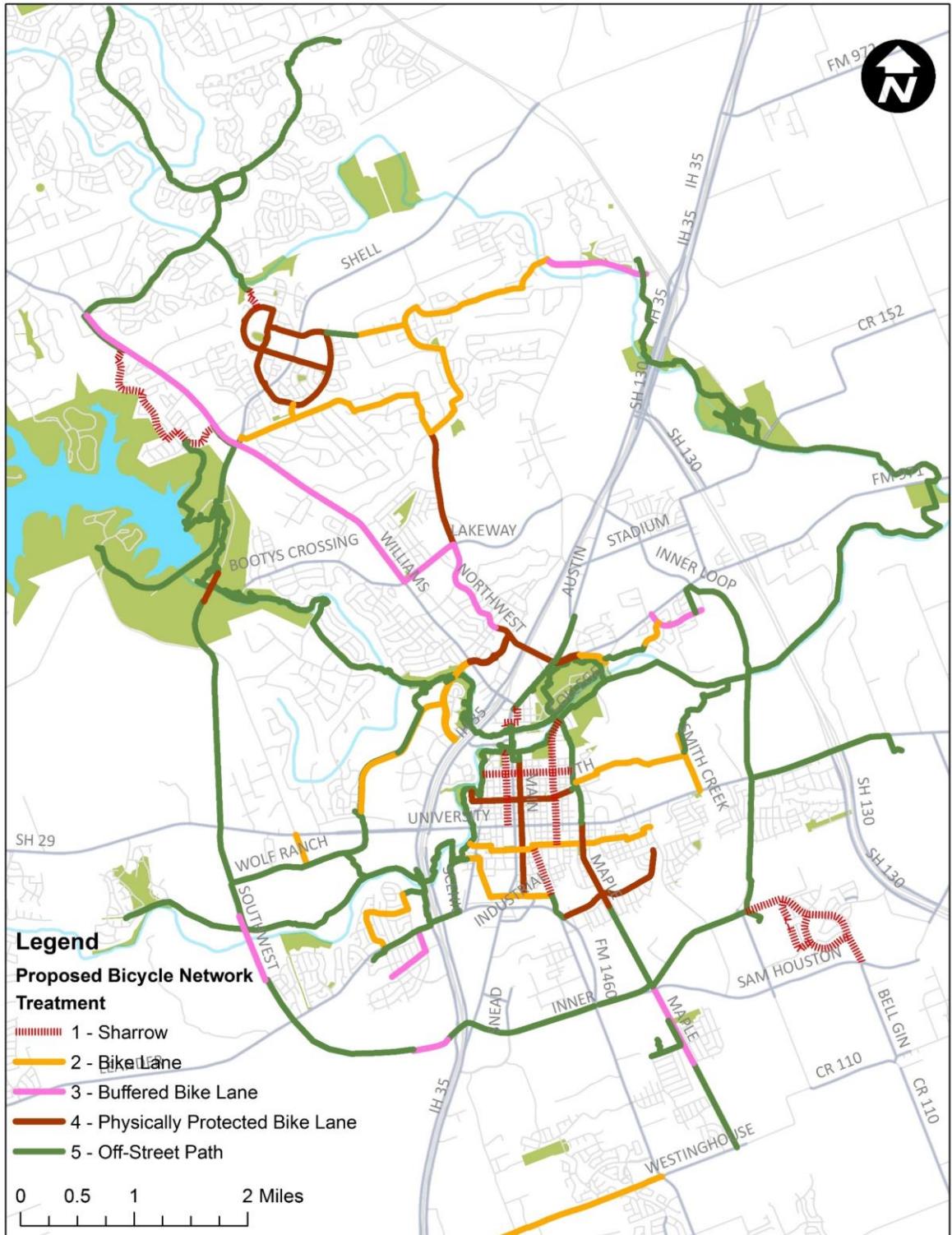


Figure 1. Proposed Bike Network

*for descriptions of the types of bike infrastructure shown in Figure 1, see page 44

Executive Summary

ENGINEERING, EDUCATION, ENCOURAGEMENT, ENFORCEMENT, AND EVALUATION PLAN

Engineering, Education, Encouragement, Enforcement, and Evaluation make up the “5E’s” framework, the industry standard for implementing bicycle or pedestrian improvements. The City already possesses an extensive network of off-street cycling trails, which are popular among local bike riders and visitors and stimulate economic development for local businesses. The citizens of Georgetown have expressed interest in connecting the off-street trails and other key areas of the city via on-street facilities. To fulfill these requests, this plan utilizes the 5E’s framework. High level recommendations for each E are as follows:

Engineering

- Strengthen the City’s Complete Streets policy
- Adopt NACTO guidelines in all design manuals

Education

- Expand the Safe Routes to School program
- Train City engineers in bicycle facility design
- Partner with local bicycle advocacy groups to provide educational classes for adults and students

Encouragement

- Create a bicycle advisory committee
- Implement bicycle encouragement programs
- Work toward recognition as a Bicycle Friendly Community

Enforcement

- Work with the Georgetown Police Department to refresh officers on bicycle safety
- Enhance local laws and regulations to improve safety for bicyclists and all

Evaluation

- Create a bicycle and pedestrian counting program
- Implement a set of system performance measures

Chapter 1: Introduction

1.1 PLANNING PURPOSES

The purpose of the Georgetown Bicycle Master Plan is to fulfill the goals established by the Overall Transportation Plan (OTP) and to advance the City's 2030 Comprehensive Plan vision. Each iteration of the Plan will recommend actions that City staff take to best fulfill those objectives.

The City's need for a Bicycle Master Plan has been addressed in a number of existing plans and policy documents, including the 2030 Comprehensive Plan, the Overall Transportation Plan, the Sidewalks Master Plan, the Downtown Master Plan, the Overall Transportation Plan, and the Parks and Recreation Plan. The Bicycle Master Plan's goals have been developed to align with and build upon the vision of the 2030 Comprehensive Plan.

These existing plans focus on improving conditions for cycling in the City of Georgetown and enhancing connectivity through on- and off-street facilities. The Overall Transportation Plan references the presently limited state of bicycle accommodations, as well as limited availability of right of way on city streets to install them. The OTP also recommends amendments to the Unified Development Code (UDC) to include more considerations for bikes.

The 2030 Comprehensive Plan identifies a lack of roadway connectivity, including bicycle connectivity, and outlines the need to build key transportation linkages. The Downtown Master Plan similarly references lack of bike route continuity in terms of access from outlying areas to Downtown. It recommends strengthening these linkages and improving signage to key destinations. Proposed improvements can be aligned with and connected to existing planned projects in the Sidewalks Master Plan and Parks and Recreation Plan to fully integrate cycling facilities into the city.

These documents were vital in shaping the goals and objectives of the Bicycle Master Plan. As City staff are currently in the process of updating the 2030 Comprehensive Plan, this iteration of the Bicycle Master Plan may not reflect the adjusted document.

Introduction

1.2 PLANNING PROCESS

The project team from UT Austin conducted an initial study of bicycling conditions in Georgetown in fall 2016. Findings from the 2016 study provided a strong starting point for the formal planning process in fall 2018.

The 2018 planning process consisted of eight main activities:

1. Kickoff meeting with City staff
2. Community workshops open to the general public
3. Round-table discussions with key stakeholders and representatives of related agencies
4. Online surveys
5. Neighborhood intercept surveys
6. Field investigations of existing roads, intersections, and trails
7. Peer city case study reviews
8. Topical research reports

1.2.1 PUBLIC INVOLVEMENT

Georgetown community members participated in the public involvement process through a series of activities co-organized by the project team and City staff. This process included community workshops, stakeholder meetings, presentations to the Advisory Committee and City agencies, a number of online engagement opportunities. The project team gathered additional information through multiple field investigation trips, which included conducting intercept surveys.

Community and stakeholder meetings were held in the fall of 2018, including one kickoff meeting to discuss preliminary scoping for the Bicycle Master Plan, two community workshops, and two stakeholder meetings. The community workshops cumulatively attracted over 60 attendees and a total of 72 comments were submitted as a result. Workshop attendees expressed various concerns regarding bicycling conditions in Georgetown and offered experience-based assessments of cycling strengths and opportunities throughout the city. They shared their ‘secret cycling paths’, favorite cycling spots, and desired destinations; this provided the project team with valuable feedback on the draft plan and proposed design improvements. In the stakeholder meetings, a group of local officials and professionals provided their perspective on biking challenges and potentials in Georgetown. They identified tasks for the bike plan to tackle, discussed community outreach efforts, identified gaps in the City’s current bicycle facilities, reviewed and commented on the draft plan, and suggested tools for plan implementation.

With assistance from the City’s Communications Office, the proposed improvements were also displayed online to allow those who could not attend the workshops to view and comment¹. Community workshop and stakeholder meeting details are available in Appendix 1: Review of Community Engagement.

1 - <https://transportation.georgetown.org/bike-plan>

Introduction

1.2.2 ONLINE AND ON-SITE INTERCEPT SURVEYS

The project team developed a 28-question survey to solicit information about Georgetown residents' and visitors' current cycling and travel activities, their preferences for and attitudes towards cycling, and their opinions on and suggestions for investing in cycling infrastructure improvements. The survey was implemented through SurveyMonkey and publicized through the City's internal mailing lists and social media accounts (e.g. Facebook). The online survey was first administered in 2016 and then reopened in 2018. Over each period the online survey was open for one month and was hosted in both English and Spanish in order to solicit input from minority and non-English speaking community members. The online survey generated a total of 1,172 valid responses after duplicate responses from both years were excluded.

To reach residents with limited access to the internet-based survey, the project team developed a complementary, on-site intercept survey. The intercept survey contained fewer questions than the online version and was administered using the following steps.

1. The project team designed two versions of the survey questionnaires, one targeting cyclists and the other non-cyclists.
2. The team used a spatial sampling approach to select intercept sites to ensure that neighborhoods and important destinations were well covered. Areas like Downtown and the Southwestern University campus were intentionally over-sampled because of the concentration of activities. Minority neighborhoods in southeast Georgetown were also over-sampled due to the relatively low response rate to the online survey.
3. The project team dispatched two-person groups to the selected sites and conducted on-site intercept surveys during peak- and non-peak hours.

The intercept surveys generated 307 responses. *Figure 2* below shows the locations of the on-site intercept surveys administered in 2016 and 2018.

Appendix 5: Survey Prompts provides detailed analyses and reports on the responses from both online and intercept surveys.

Introduction

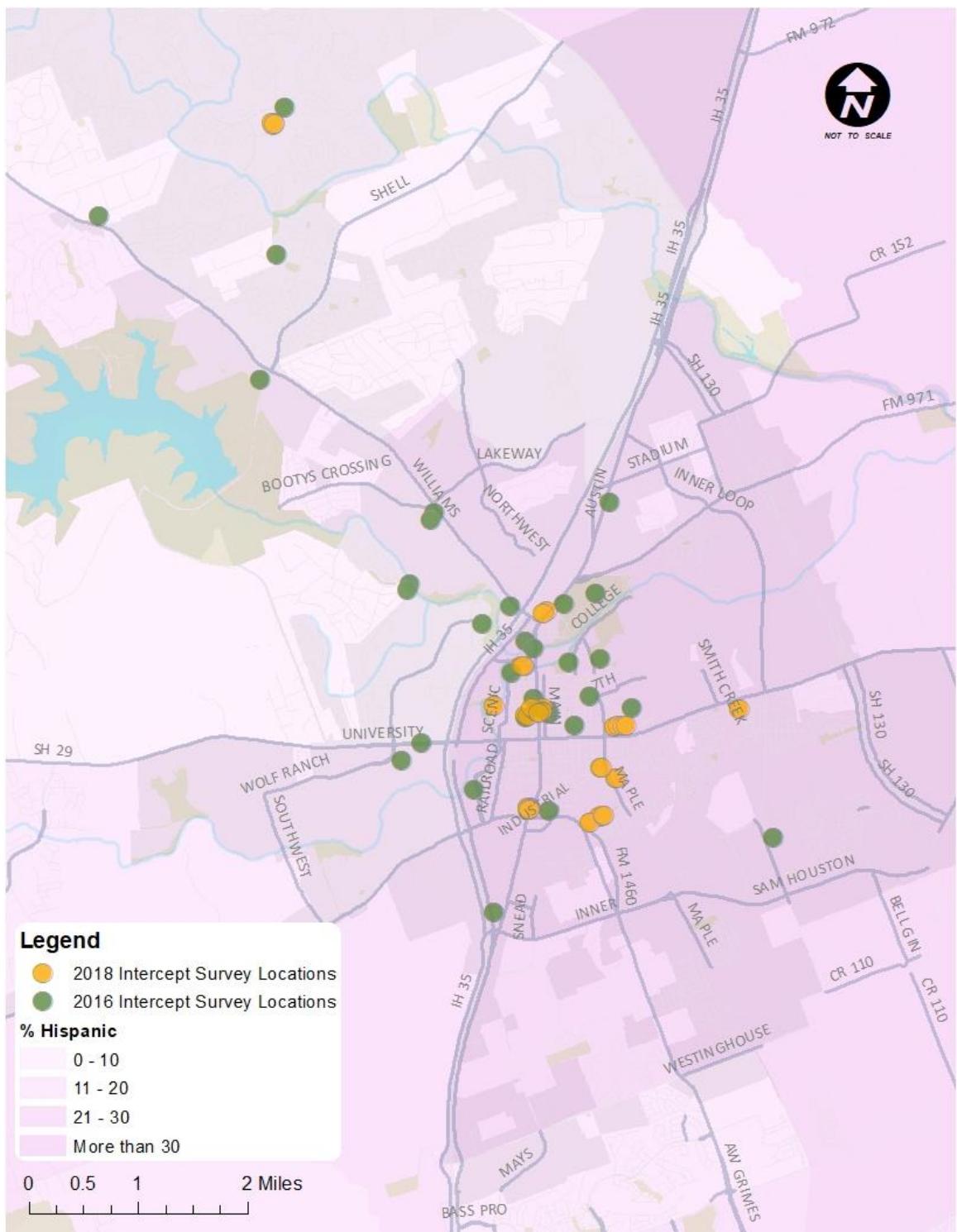


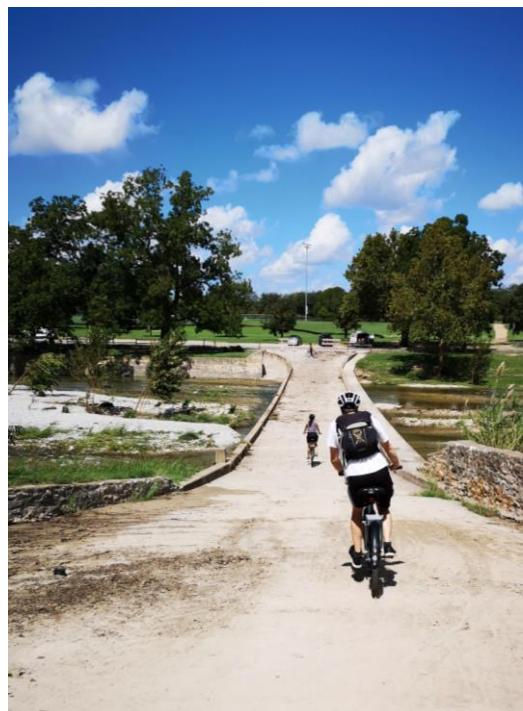
Figure 2: Intercept Survey Locations

Introduction

1.2.3 FIELD INVESTIGATION AND EXPERT CONSULTATION

The project team took multiple trips around the City to conduct field investigations. They applied a smartphone app, MapMyRide, to record more than 100 site visits. For each site visited, the team completed environmental audits to assess the existing conditions of the cycling environment and verify the on-the-ground accuracy of Geographic Information Systems (GIS) data compiled from a variety of sources.

The knowledge of outside planning professionals with various expertise was leveraged throughout the planning process. Through case studies of best practices and targeted research, the project team ensured best practices were being followed. These consultations are outlined in **Appendix 1: Review of Community Engagement** and **Appendix 9: Case Study Reviews**.



Use smartphone app MapMyRide to record field data from site visits

Chapter 2: Current Conditions

2.1 STUDY AREA

Georgetown, a historic city located in Central Texas, is the county seat of Williamson County. It is home to more than 70,000 residents as reported by the 2018 US Census. The City has experienced fast population growth in recent years; the 2018 US Census estimated Georgetown to be the nation's sixth fastest-growing city in 2016-17.

The Capital Area Metropolitan Planning Organization (CAMPO) projects in its 2040 Regional Transportation Plan that Williamson County will more than double in population to 956,459 people between 2010 and 2030. Georgetown is likely to experience a similar growth trend, and CAMPO projections report a population of over 225,000 within Georgetown's legal jurisdictional boundaries by 2035. The city's rapid growth can be attributed to many factors, including its proximity to major employment centers such as Austin, access to highway networks, high-quality public services, and natural beauty.

The project team created a set of Geographic Information Systems (GIS) maps to document and visualize the City's natural, physical, and socioeconomic and demographic characteristics.

Data was compiled from the U.S. Census Bureau, the Federal Emergency Management Agency (FEMA), the State of Texas, CAMPO, the City of Georgetown, and a variety of other sources. A complete collection of these maps can be found in **Appendix 2: Current Conditions Analysis Supporting Maps**.

Current Conditions

2.1.1 GEOGRAPHIC FACTORS

Natural geographic factors are fundamental to bike network planning and design. Floodplain areas offer both opportunities and threats to off-street bicycle trails; while FEMA-designated floodplains are not suitable for development, alongside scenic rivers and streams they are prime locations for bicycle trail corridors. However, these areas are often inaccessible during flood events, which can significantly diminish the connectivity of bike networks.

Georgetown currently offers ample bicycle trails in its park and recreational areas; some of which are within floodplains.

Most bicyclists prefer flat paths; therefore, special attention should be paid to slope conditions when designing cycling routes. The steepest slopes in Georgetown exist along portions of the San Gabriel River banks.

2.1.2 MAJOR BARRIERS

The City of Georgetown possesses a number of manmade and natural barriers to bicycling. Major roadway barriers include IH-35, University Avenue (SR-29), Williams Drive, and Austin Avenue. The San Gabriel River and its creek system offer natural contours for bicycle routes but restrict cross-river bicycle flows. Major roadway barriers, displayed in Figure 3 below, inhibit safe bike access to Downtown Georgetown and the existing parks and trails network. Specific intersections that were reported as feeling unsafe are shown in Figure 4 below.

IH-35

IH-35 divides east and west Georgetown. At this time there is one safe path across IH-35 for bikes: a trail bridge along the San Gabriel River built and maintained by the Parks and Recreation Department. This single access point is insufficient for all residents on the west side of the City to reach Downtown Georgetown by bike, creating the need for additional crossing points.

Williams Drive

This high-speed and high-volume roadway is the primary arterial road in northwest Georgetown. It is the most direct path for cyclists from Sun City and other northwestern neighborhoods to central Georgetown. The river and winding street network both prevent bike riders from taking neighborhood streets eastward toward Downtown. Parts of Williams Dr. have a wide bikeable shoulder, but in many places this additional space is used for center turn lanes. Similarly, a portion of Williams Dr. has a sidewalk that some bicyclists utilize as an alternative to the high-speed road, but ultimately riding on the road is unavoidable. There are multiple reportedly intimidating intersections on Williams Dr., including D.B Wood/Shell Rd. and Del Webb Blvd., which must be crossed to access the trails that connect to Downtown.

University Avenue (SR-29)

University Ave. separates residents in southwestern Georgetown from an existing trail network that begins at Booty's Park. As University Ave. is a

Current Conditions

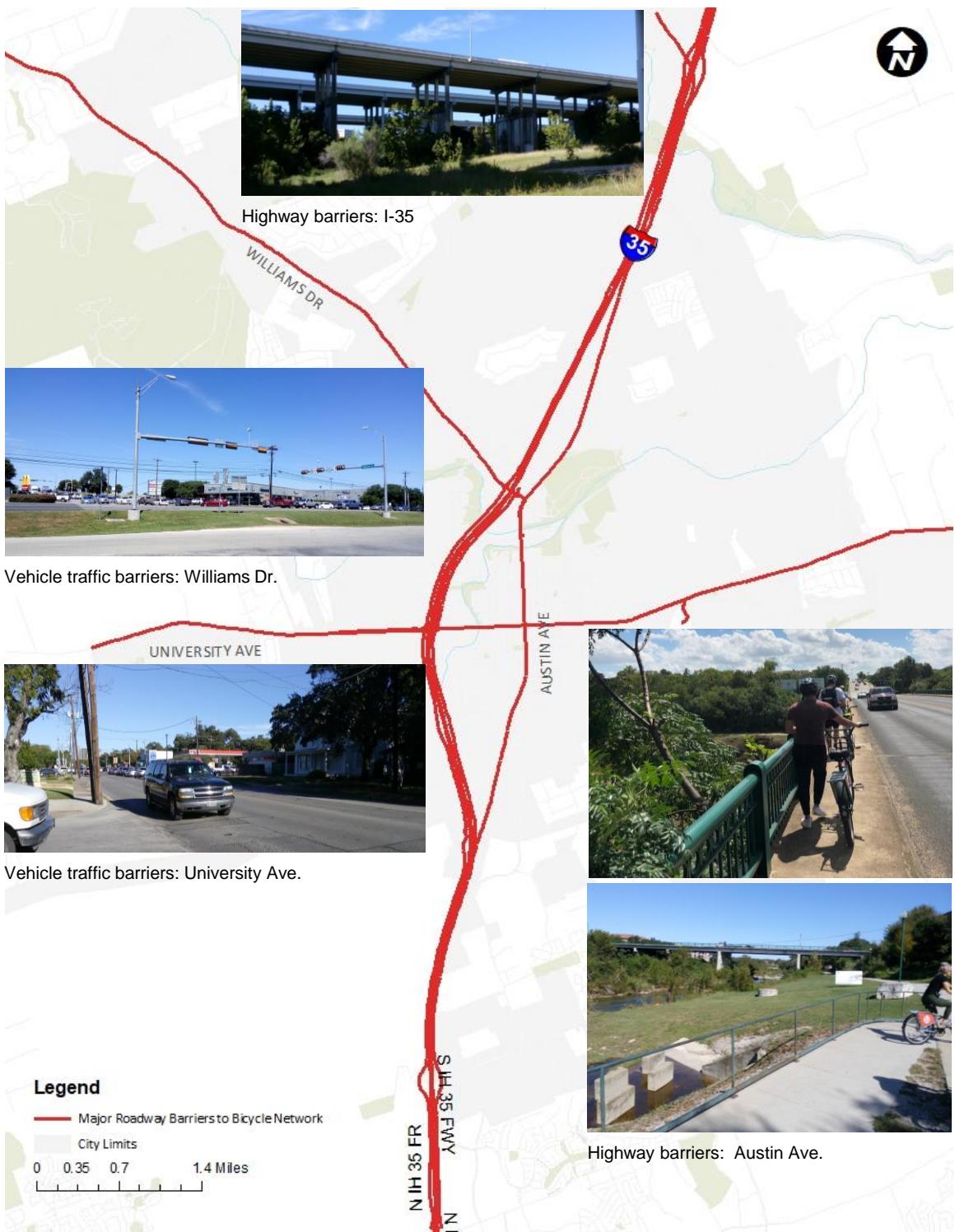


Figure 3: Major Bicycling Barriers

Current Conditions

high-volume roadway, it is unsafe for bikes to share the road with vehicles. There are sidewalks wide enough to accommodate bicyclists along parts of this road, but these are discontinuous and require riders to integrate with traffic at various points. East of IH-35, University Ave. prevents residents in southern Georgetown from safely accessing Downtown Georgetown and Southwestern University, and is an unsafe route for students accessing East View High School. This east-west barrier bisects many areas that community residents could bike to, such as parks, commercial shopping centers, and the Downtown Square. The intimidation of riding along and crossing University Ave. typically encourages potential bikers to drive instead.

Austin Avenue

Austin Ave. bisects Georgetown, running parallel to IH-35 and intersecting with it to the north and to the south of Downtown. The high speeds and volumes on sections of

Austin Ave. create very dangerous conditions for bicycle users. Austin Ave. also serves as a barrier for east-west travel, where it intersects with University Ave., Williams Dr., and 8th St.

The San Gabriel River

Along stretches of the riverbank runs an existing hike and bike trail. While the system is highly popular among both residents and visitors, it also acts as a barrier, separating the neighborhoods in the northern and western parts of the City from central Georgetown. Rain events frequently make existing low-water crossings along the river impassable, and past severe events have completely washed them out. Since the river runs through all of Georgetown (with the exception of the southeastern region) it is taken into consideration when planning for much of the community. The new bicycle network should optimize the river network as an amenity for bike riders instead of a barrier.



River/weather barriers: Bike path crossing the San Gabriel River before and after flooding

Current Conditions

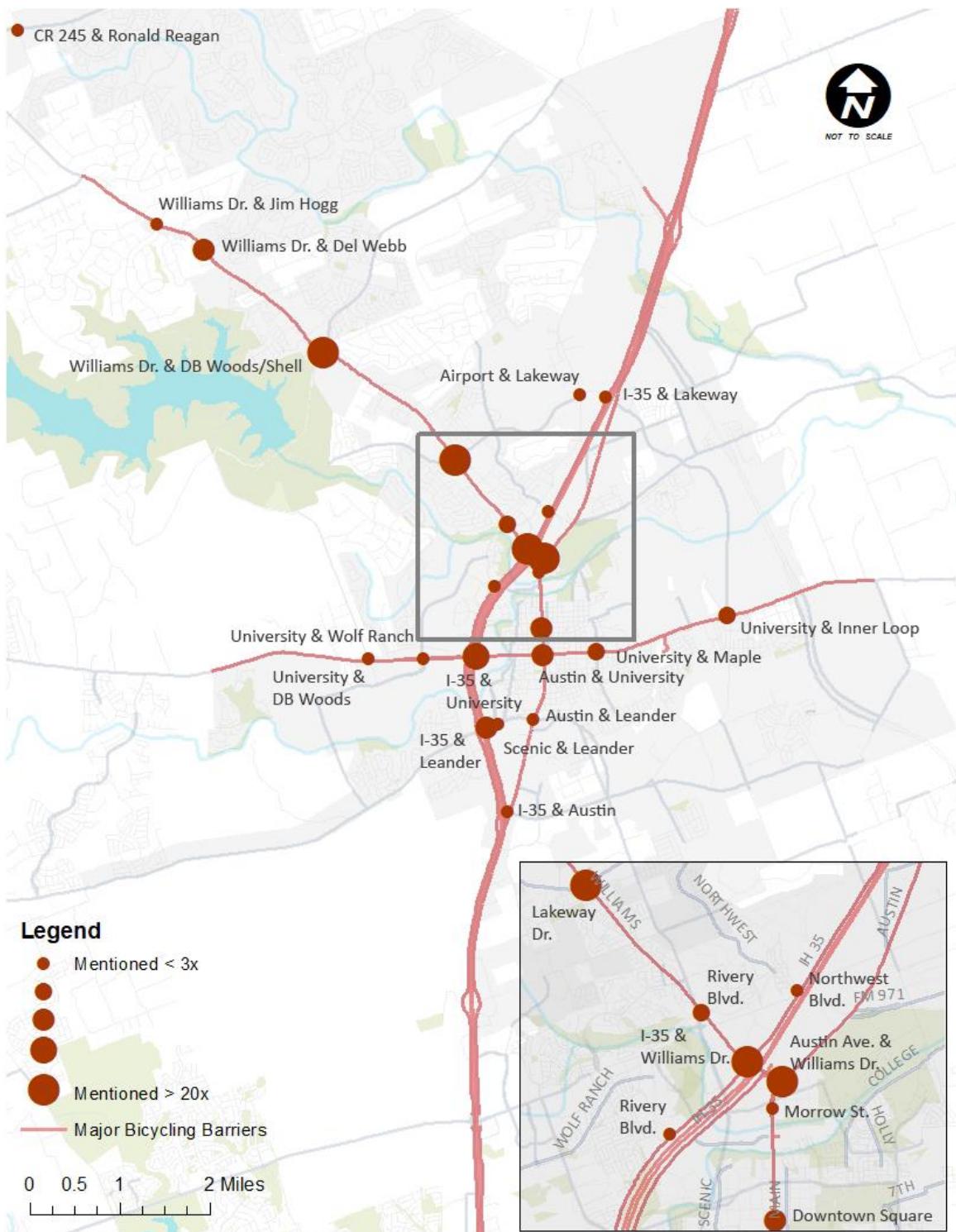


Figure 4. Most Unsafe Intersections in Georgetown (Source: Online Survey Responses, 2018)

Current Conditions

2.1.3 DEMOGRAPHIC FACTORS

Demographic factors such as age, gender, ethnicity, household income, and employment can all influence a person's likelihood to utilize a bicycle. Of Georgetown's 70,000 residents, 73.7% of the current population identifies as White and non-Hispanic. The next largest demographic group is Hispanic or Latino (of any race), who make up 21.3% of the population².

Fifty-two percent of Georgetown's population is over 45 years old, and only 15% of the population is made up of school-age children between five and 17. The median age is relatively high at 47, and is trending upward. In 2010, 23.7% of the population was under 18 and the median age was 40.9. If these trends hold, the

population in Georgetown will continue to skew older which will affect cycling initiatives. The city's age profile may impact the overall demand for and usage of the bike infrastructure, although the City is currently home to many bike riders over the age of 55. See Figure 5 for the age distribution in Georgetown.

Georgetown Population 2016

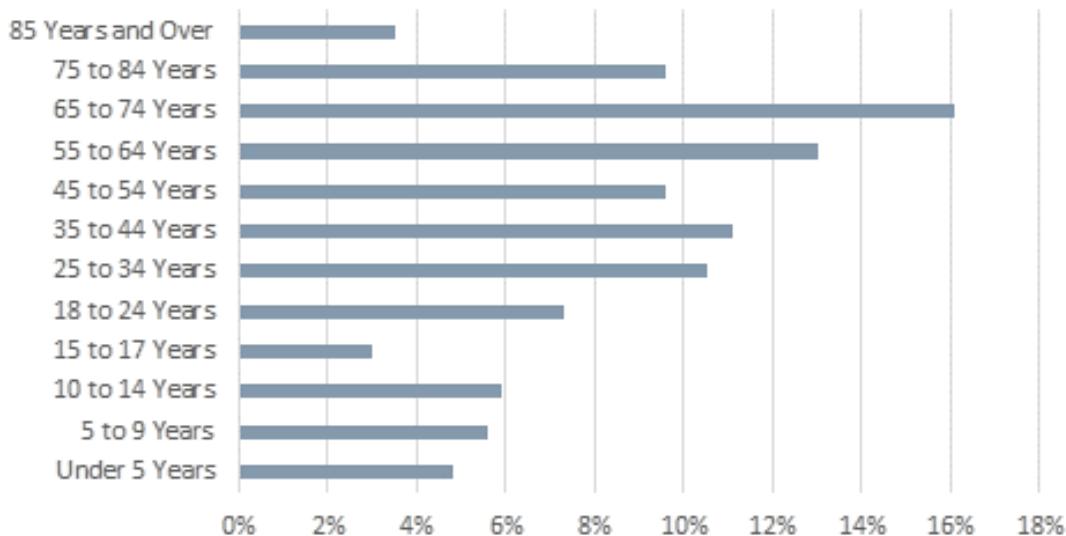


Figure 5: Georgetown Population, 2016 (Source: American Community Survey)

2 - Sallis, James F., Terry L. Conway, Lianne I. Dillon, Lawrence D. Frank, Marc A. Adams, Kelli L. Cain, and Brian E. Saelens. "Environmental and Demographic Correlates of Bicycling." *Preventive Medicine* 57, no. 5 (2013): 456-60. doi:10.1016/j.ypmed.2013.06.014.

Current Conditions

Driving is the primary mode of transportation in and around the city. According to American Community Survey Census data, 89% of the current population drives to work, while only 0.03% bike to work. Thirty-nine percent of Georgetown commutes 30 minutes or longer, with an average commute of 27 minutes. An aging population and a long commute out of the city, mostly to Austin, explain the current lack of biking infrastructure and bicyclists.

More than 11% of residents in Georgetown do not have access to a vehicle. Since residents most commonly travel by car and much of the city's transportation infrastructure focuses on vehicles, those without a car may feel isolated without a variety of options. These residents could be vulnerable to unemployment without reliable transportation to jobs, and implementing bike infrastructure

could benefit this segment of the population by connecting them to employment. Biking could also offer a more affordable and equitable means of transportation for the 7.1% of Georgetown residents who are living with an income below the poverty line.

The final demographic consideration is that Georgetown's population is 52.5% female and 47.5% male. Research has shown that women are more likely to perceive greater threats to their personal safety when cycling and feel more comfortable with completely separated bicycle facilities³. This is consistent with the public's response to bicycling barriers, which revolved around perceptions of safety, particularly at intersections. Demographic GIS maps can be found in **Appendix 2: Current Conditions Analysis Supporting Maps**.

³ - Loukaitou-Sideris, Anastasia. "Women's Issues in Transportation: Summary of the 4th International Conference, Volume 1: Conference Overview and Plenary Papers." 2011.

2.2 BICYCLE DEMAND ASSESSMENT

Bicycle demand was determined using four primary public outreach and involvement methods: community workshops, stakeholder meetings, online surveys, and individual intercept surveys. Key findings from the four public participation activities were developed based on a qualitative and quantitative review of all feedback received, and were subsequently used to inform route and intersection choices in Chapter 3.

2.2.1 KEY TAKEAWAYS FROM COMMUNITY WORKSHOPS AND STAKEHOLDER MEETINGS

Georgetown residents were actively engaged during the public involvement process. The following emerged across all meetings:

- Most workshop and meeting attendees felt that real and perceived personal safety while cycling is a major concern for current and future bicycle riders.
- High-priority bicycle infrastructure projects should provide east-west connections across IH-35 and connections between residential neighborhoods and Downtown.
- Bicycle infrastructure should be located away from high-traffic, high-volume roadways and provide safe access to schools and parks.
- Bicycling has community support from an economic standpoint, particularly as a way to attract visitors to Downtown.
- Georgetown residents and decision makers are largely supportive of bicycle planning and investment, and feel there is great potential to build a bikeable city.

2.2.2 KEY TAKEAWAYS FROM ONLINE AND INTERCEPT SURVEYS

In an effort to better understand residents' travel behaviors and their feelings towards bicycling, residents were invited to participate in online and in-person surveys. The 1,172 survey responses submitted during the public involvement process contained valuable input on various issues, needs, challenges, and opportunities that exist across the city. A heat map of survey respondents can be found in **Appendix 2: Current Conditions Analysis Supporting Maps**, and a full analysis of the online and intercept survey responses can be found in **Appendix 6: Survey Report – Analysis of Survey Results**. The principal remarks that recurred across the intercept surveys can be summarized as follows:

Current Conditions

- 56% of Georgetown respondents do not bike in Georgetown because they do not feel safe.
 - More than 85% report that roadway safety affects their decision to bike.
 - There are many interested and enthusiastic bicyclists in Georgetown, but people show concern about crossing IH-35 and Williams Dr, which limits their access to significant sections of the city.
 - The majority of residents believe biking is a valuable transportation option for everyone, especially school-aged children and low-income households.
 - Over 70% of survey respondents agree biking can support tourism and economic development in Georgetown.
 - Most households in Georgetown own bicycles and bike along the existing trail network for recreation and/or exercise.

All public comments and suggestions were compiled to better visualize the identified interests and concerns of Georgetown residents. The following word cloud is made up of 90 words pulled from more than 500 suggestions and comments.

access add along areas around austin ave awareness become better
bicycle bike bikers build busy cars change city clean
community connect continue create cross cycling
cyclists dangerous debris dedicated developments
downtown drive drivers education encourage enforcement
friendly georgetown going help hike improve increase keep
lanes laws loop love major motor motorists needed
neighborhoods park paths paved people places plan please
provide public ride riders roads routes safe safer safety
school share shopping shoulders sidewalks signage signs
speed stop streets sun system town traffic trails vehicle west
wide wider williams work

Current Conditions

2.3 BICYCLE INFRASTRUCTURE ASSESSMENT

Georgetown is home to an extensive off-street hike and bike trail network, maintained by the Parks and Recreation Department. This section addresses current bicycle infrastructure and overall infrastructure factors, including schools, transit routes, and commercial areas. Current zoning regulations and Georgetown's Future Land Use Map were also evaluated. A complete Geographic Information Systems assessment was conducted, and can be reviewed in **Appendix 2: Current Conditions Analysis Supporting Maps.**

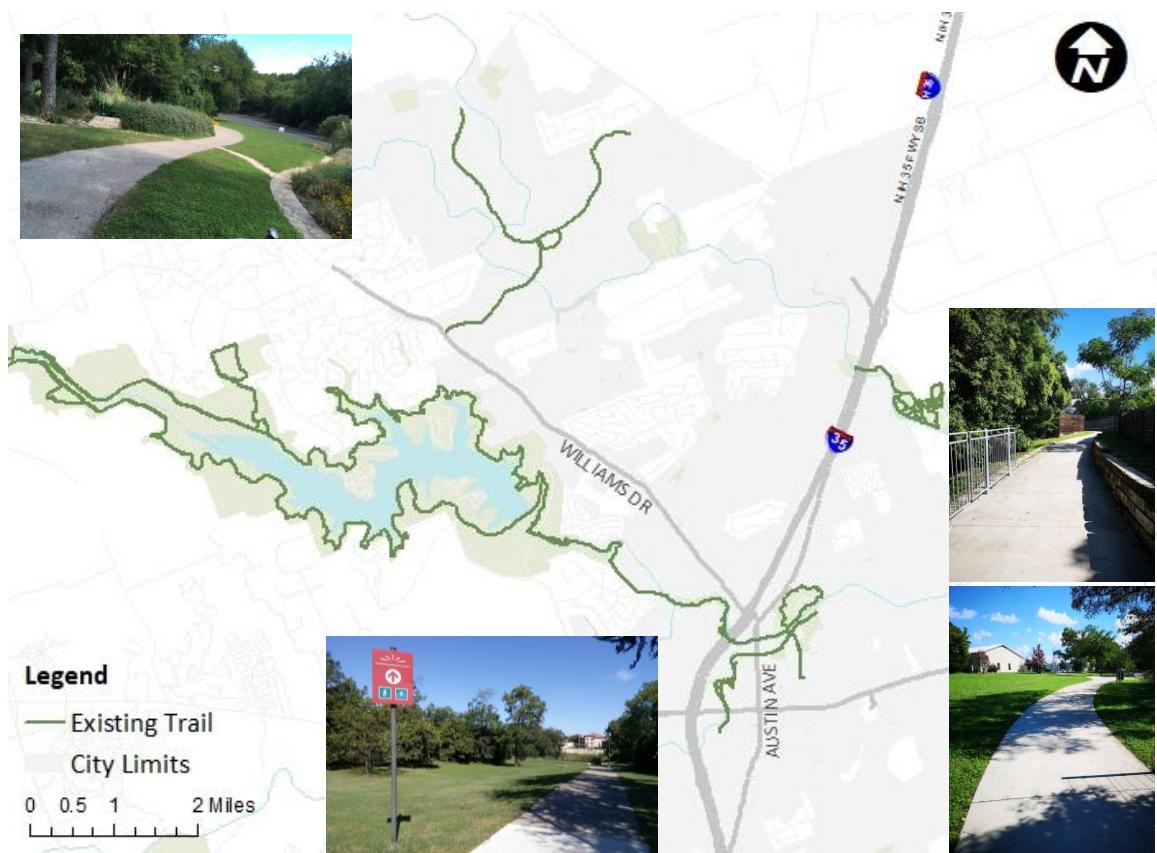


Figure 6. Existing Off-street Trail System in Georgetown

Current Conditions

2.3.1 EXISTING BICYCLE FACILITIES

Figure 6 depicts current bicycle infrastructure in Georgetown. As reflected on the map, the current network consists of off-street paths and serves a primarily recreational purpose.

2.3.2 EXISTING INFRASTRUCTURE FACTORS

Schools

Schools are important points of connectivity in a bicycle network that is accessible to all ages and abilities. Designing safe facilities that enable students, teachers, and staff to commute by bicycle provides benefits for public health and community interaction. Additionally, those who regularly commute by bike are more likely to ride recreationally or for other purposes. An assessment of present connections between schools in Georgetown and existing sidewalk and off-street trail networks can be found in Appendix 2: Current Conditions Analysis Supporting Maps.

The Georgetown Independent School District has observed that there are already a number of students who bike to school, despite the lack of bike lanes in many areas. Georgetown ISD expressed interest in stakeholder meetings that these areas should be considered for biking safety improvements.

Since students are already using these areas with no formal facilities, Georgetown ISD is confident that if safer facilities are provided, more students will choose biking. Identified locations include:

- E. State Hwy. 29 from Eastview High School to the Indian Springs and Churchill Farms subdivisions
- Mitchell Elementary School and Wagner Middle School to Saddle Creek
- Maple St. to Purl Elementary to connect the established school walk zone on Quail Valley Dr.
- Stadium Dr. from Georgetown High School to Crystal Knoll subdivision
- Northwest Blvd. from Serenada subdivision and the Georgetown Tennis Center to Benold Middle School
- Northwest Blvd. from the Riverbend area and the Cypress Creek apartments
- Ford Elementary to new neighborhoods under development
- Wolf Ranch and Rockride Elementary into the surrounding neighborhoods

Current Conditions

Railroads

The existing railroad rights-of-way in Georgetown occupy important pieces of terrain that could be leveraged through partnerships in the creation of a rails-to-trails project. According to community feedback, the railway is seldom used and held by a private corporation for freight transport of limestone. While the periodic use of the railway may inhibit the option to completely convert Georgetown's railway to a new trail, there is a possibility of adding a trail alongside the existing rail track right-of-way. Utilizing this strategic swath of right-of-way would connect parts of Southern Georgetown with the Southwestern University campus, eastern Downtown and even as far north as Charles Forbes Middle School and Berry Springs. Numerous cities and regions in the United States and abroad have gone through the process of converting old and underutilized freight railways to community amenities in the form of multi-use trails. The Rails to Trails Conservancy (RTC), a non-profit organization, assists local municipalities with creating multi-use trails along existing and operating rail lines through a program called Rails-with-Trails.

RTC's latest Rails-with-Trails report cites 1,397 total miles of trails, of which 555 miles were trail segments along existing rail tracks⁴. A map of current railroad infrastructure can be found in **Appendix 2: Current Conditions Analysis Supporting Maps**.

Transit

Georgetown has four GoGeo public transit routes which currently operate once hourly, but future growth will likely warrant increased frequency. Bicycles extend the potential radius of transit access beyond the one quarter mile walking threshold of the average individual, encouraging more users to consider transit. The public transit system should complement the proposed bicycle network to provide a safe, interconnected, and accessible multimodal transport network.

A map of current GoGeo transit routes can be found in **Appendix 2: Current Conditions Analysis Supporting Maps**.



⁴ - Rails-to-Trails Conservancy. "America's Rails-with-Trails." Rails-to-Trails Conservancy, www.railstotrails.org/resource/library/resources/americas-rails-with-trails/.

Current Conditions

2.3.3 PLANNING & ZONING FACTORS

The zoning map shown in Figure 7 below indicates that single family housing is the predominant land use in the City of Georgetown.

Commercial and public facilities are located along IH-35 and major roadways, while parks and green spaces are scattered at the edge of the city boundary. Survey responses reflected that parks and green spaces are major attractors for residents, as is the Downtown area for entertainment.

This plan proposes Lake Georgetown and the San Gabriel river trails as major parks which should be connected to the bike system. These same park trails will also be connected to Downtown and major commercial facilities by a low-stress bicycle network.

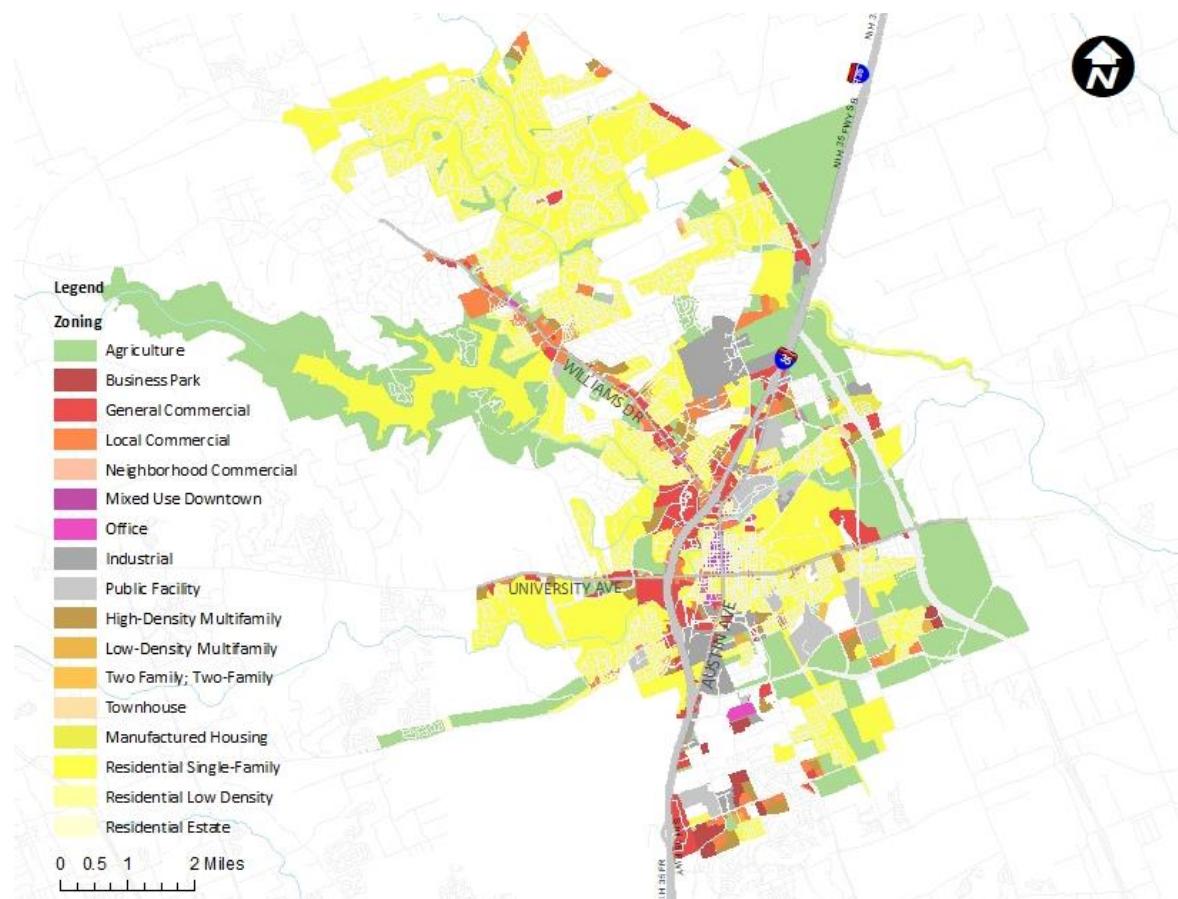


Figure 7. Existing Zoning Classifications

Current Conditions

Recommendations in this plan were reviewed in accordance with the future land use general plan, shown in Figure 8.

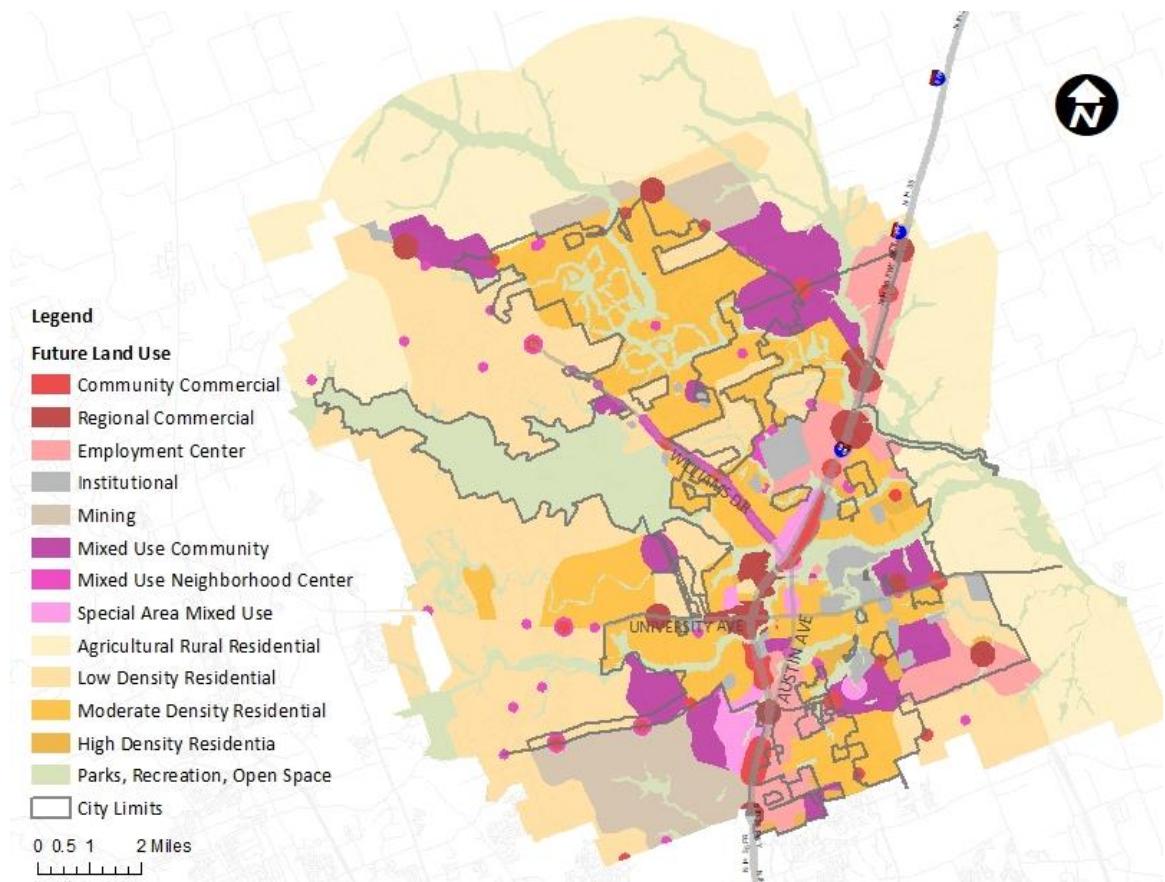


Figure 8. Future Land Use - General Plan

2.4 CONNECTIVITY ASSESSMENT

A connectivity analysis was conducted to evaluate residents' abilities to access areas of interest within Georgetown. In community meetings, residents expressed the desire to access the existing parks and trail system, Downtown Georgetown, Southwestern University, and commercial areas by bicycle.

Section 2.4 in Appendix 2: Current Conditions Analysis Supporting Maps identifies areas that residents can travel to on current bikeable routes, and well as high-impact connections that could enable residents to reach the desired points of interest mentioned above.

Barriers and potential connections shown in Figure 9 below are the result of direct community feedback through in-person meetings, online surveys, and site assessments.

The proposed connections serve as major links in a new bicycle network that will enable residents to safely cross barriers in Georgetown to access Downtown and the existing parks and trails system. Major barriers to connectivity include rivers and creeks, flooded low-water crossings, University Ave., IH-35, Austin Ave., and Williams Dr. Appropriate facility types for each proposed connection and project feasibility are explored in **Section 3.3 Proposed Plans for Focal Areas**.

Current Conditions



Figure 9. Segments Identified as Primary Connectivity Concerns

2.5 BICYCLE LEVEL OF TRAVEL STRESS ANALYSIS

Bicycle Level of Traffic Stress (BLTS) is an objective, data-driven way to evaluate the traffic stress imposed on bicycle riders, developed by researchers at the Mineta Transportation Institute and later adopted by governments and nonprofits⁵. Multiple cities and counties in the U.S. have conducted BLTS analyses, including several here in Texas such as the City of Lubbock, City of El Paso, and City of Austin.

Based on the scale from Dr. Peter G. Furth at the College of Engineering at Northeastern University, level of traffic stress ranges from 1 to 4. Higher stress bike lanes indicate that fewer people are willing to use them. Average Daily Traffic (AADT) volume measures were available on approximately 40 roadway segments of the thousands present in the Georgetown road network, and as a result the analysis was conducted using other available data to represent traffic flow. A detailed BLTS analysis is located in **Appendix 2: Current Conditions Analysis Supporting Maps**.

There are currently very limited on-street facilities for bicycles in Georgetown, and those existing facilities that can be used for cycling, such as shoulders and emergency lanes do not have signage to indicate bikes may be present. However, shoulders that are wider than five feet — wide enough to be considered a feasible cycling facility — provide more comfort than riding directly in mixed traffic.

In an effort to assign the classifications developed by Fruth to Georgetown streets, the following matrix was created to rate BLTS by street segment, shown below in Table 1.

Overall, the BLTS map in Figure 10 reveals that there are a number of streets with low BLTS scores of 1 and 2. These are shown in green, and are suitable for all ages and abilities to use. However, most of these areas eventually face connection barriers, either geographically (e.g. the river), by property (e.g. private property and/or fencing), or by major roadways. IH-35 is the most visible and prominent of these dividers. Downtown is generally highly comfortable to bike around, but crossings on along Austin Ave. and University Ave. break that level of comfort in several places. For the large number of residents who are interested in cycling but concerned with safety, these breaks in comfort can discourage biking.

5 - Furth, P. (2012). Level of Traffic Stress. Retrieved from <http://www.northeastern.edu/peter.furth/criteria-for-level-of-traffic-stress/>.

Current Conditions

Table 1. BLTS Ratings Utilized to Grade Georgetown, TX

BLTS Ratings	Undivided		2-3 lanes		4-5 lanes		6+ lanes	
	Bikeable Shoulder?	Yes	No	Yes	No	Yes	No	Yes
Up to 25mph	1	1	1	2	3	3	3	4
30 mph	1	2	2	3	3	4	4	4
35 mph	3	4	3	4	3	4	4	4
40+ mph	n/a	n/a	4	4	4	4	4	4

Key: Very High Comfort High Comfort Medium Comfort Low Comfort



Figure 10. Final BLTS Rating Map by Street Segment

Current Conditions

2.6 CRASH ANALYSIS

A crash analysis was conducted based on pedestrian crash data collected during the creation of the Georgetown Sidewalk Master Plan. Anecdotal data garnered from residents was also taken into consideration.

Available pedestrian crash data, provided by the Georgetown Police Department, identify crashes that occurred between 2011 and 2014, while locations of bicycle crashes were identified in October 2018 without a constrained time of occurrence. This data is consistent with safety concerns noted at the community workshop, with 25% of pedestrian crashes having occurred on University Ave., and 9% having occurred on Williams Dr⁶.

Many primary areas of safety concern have been identified for sidewalk improvements in the Georgetown Sidewalk Master Plan, and have been identified in this plan as critical locations for safe bicycling infrastructure.

Limitations of the data used include the fact that pedestrian crash data does not self-compile frequency of crash occurrences at a particular site, and it also does not include information regarding severity or causes of incidents. It is best practice to use police records or records from local hospitals that identify causes, severity, and the type of crash incident in crash analyses. To augment the bike crash data collected through public comment, Figure 11 displays the locations of crash incidents related to posted speed limits of roadways. Appendix 2 zooms in to northwest and central Georgetown to evaluate locations of crash incidents in more detail. These two areas were chosen based on a concentrated amount of crash occurrences.

6 - "City of Georgetown Sidewalk Master Plan." City of Georgetown Sidewalk Masterplan ArcGIS Map Journal, City of Georgetown, georgetowntx.maps.arcgis.com/apps/MapJournal/index.html?appid=f8ab659f07944842b3919fde32023c7f

Current Conditions

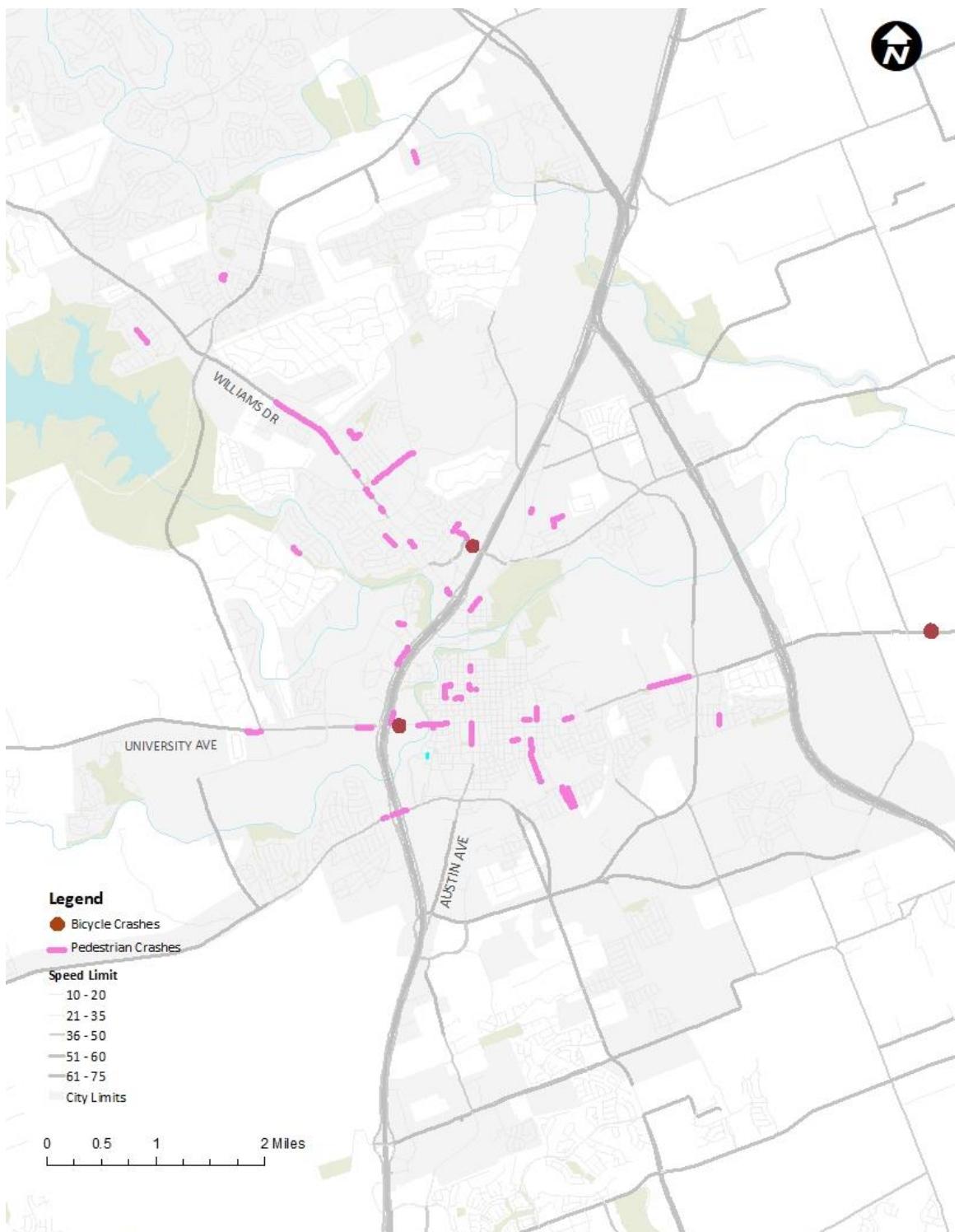


Figure 11. Bicycle and Pedestrian Crashes in Georgetown

Current Conditions

2.7 SWOT ANALYSIS

Environmental audits and GIS mapping, combined with public feedback revealed many positive aspects about cycling in Georgetown, as well as a number of concerns and opportunities for improvement. To better examine the existing biking conditions, Georgetown's strengths, weaknesses, opportunities and threats to cycling were compiled to create a SWOT analysis. The items in this SWOT analysis were informed through a number of activities and resources noted below.



Current Conditions

SWOT SOURCE KEY:

Online survey	●
Intercept surveys	▲
Stakeholder meetings with city and county staff (2)	■
Community meeting	◆
Site visits/environmental audits	❖
Background research and analysis	◀

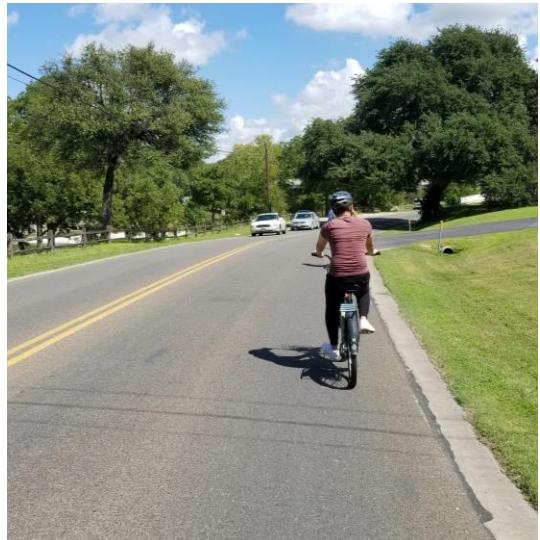
2.7.1 STRENGTHS

- Bicycling for recreation and/or exercise is very popular already, with nearly 87% of survey respondents indicating that they bike for these purposes. ●▲
- Active bike-share programs are present at the library, with 10 shared bikes, and Southwestern University, with roughly 100. ▲ ■ ◆ ❖ ◀
- The Downtown Historic District's grid street system enables connectivity within and around Downtown. ▲ ■ ◆ ❖ ◀
- An expansive recreational trail network already exists, which over 90% of survey respondents reporting use of. ●▲
- Relatively flat geography provides easy biking for many Georgetown residents, and only 2% of respondents identified that hills are a barrier to biking. ●▲
- An overwhelming majority of Georgetown residents understand the need for bicycle planning and infrastructure investment, and generally support initiatives to increase biking in Georgetown. ●▲◆
- There is a large population of potential bicycle users in Georgetown — 55% of residents self-identify as biking enthusiasts, and 30% self-identify as interested but concerned. ●▲◆

Current Conditions

2.7.2 WEAKNESSES

- Georgetown residents have noted many perceived threats to personal safety that either prevent or reduce cycling. ●▲◆■◀
- Most bike trips in Georgetown are not utilitarian — only 8% of people who do ride a bike in Georgetown bike to work — and there is not substantial opportunity to increase commuter bicycle trips as many Georgetown residents don't live very close to work. 91% of survey respondents live within the City of Georgetown while only 26% work in the City.
●▲◆■◀
- Lack of infrastructure, such as bike lanes, prevents many current residents from biking — 80% of survey respondents claimed that lack of bicycle lanes is a barrier to biking; 77% of survey respondents stated that dedicated bicycle lanes would encourage them to bike more.
●▲◆■❖◀
- Lack of wayfinding signage means vehicles are less aware of bicyclists on the road, and can make navigating the City on a bike difficult for out of town visitors. ●▲◆❖◀



Current Conditions

2.7.3 OPPORTUNITIES

- There is potential to increase the number of residents bicycling if bike routes become safer and better connected. ■ ♦ ♧ ◀
- Nearly 60% of survey respondents would be encouraged to cycle more with off-street bicycle trails. ● ▲ ♦
- Bike-share programs are currently utilized, and could be expanded to enable more residents to travel by bicycle. ■ ◀
- Many tourists visiting the City of Georgetown indicate that they enjoy bicycling on Georgetown's trails. The Sheraton Hotel offers bike rentals to their guests, and programs like this could be expanded. ■ ♧ ◀
- New residential developments around southeastern Georgetown provide a great opportunity to promote bicycle infrastructure and Safe Routes to School programming. ● ▲ ♦ ■ ♧ ◀
- Small infrastructure improvements will help tremendously, including informational signage such as "share the road," "cyclists here," etc. ♦ ♧ ◀
- Safe Routes to School (SRTS) initiatives are actively pursued by the City of Georgetown. ▲ ♦
- Parallel roadways create potential for a "shadow", or secondary low stress, bicycle network, which could provide safer options for residents to use. Examples include using Serenada Dr., which runs parallel to Northwest Blvd., and E. Esparada Dr. in lieu of busy Williams Dr. ▲ ■ ♦ ♧ ◀

Current Conditions

2.7.4 THREATS

- The rapid development pattern outside of Downtown does not lend itself to using bicycles for commuting purposes. ♦ ◀
- Many of Georgetown residents commute to other cities for work and do not have the option of biking to employment. ● ▲ ♦ ■ ◀
- There is potential of resistance to remove on-street parking to make room for bike lanes. ♦
- River crossings are expensive to build and are frequently affected by rain events. ■ ♦
- Many residents living west of IH-35 noted they cannot easily gain access to the east side of IH-35 by bicycle, and the proposed expansion of IH-35 could exacerbate this issue. ● ▲ ♦ ■ ♦ ◀

Overall Plan Goals

Derived from Public Input from Georgetown Residents

Safety: Many residents identified personal safety as a major threat to biking in Georgetown. More people would be willing to bike if there were bike facilities that would offer protection from cars on the road. Residents were also concerned about lack of proper lighting, lack of signage, debris in bicycle lanes, lack of maintenance and vehicle speed limits being too high.

Connectivity: A lack of connections was identified as a major deterrent from biking. This includes major barriers such as IH-35 and busy corridors like Williams Dr. Some residents mentioned that missing connections between trails and streets creates the need to first drive to the trails in order to bike on them.

Equity: Residents expressed their interest in and support for increasing bicycling infrastructure around schools to encourage kids to bike to school. Residents also indicated that increased bicycling access would be a positive public health initiative for senior residents. Many residents expressed concerns regarding lack of neighborhood access to the trail system.

Economy: Economic development was a common topic in stakeholder meetings. Hotels in Georgetown stated that they provide bicycle rentals, which customers enjoy. Bicycling has the potential to become a tourist attractor for Georgetown that could bring new visitors to local businesses. Improved bicycle connectivity between Southwestern University and Downtown Georgetown would benefit both the students and staff and Downtown stores.

Culture: Residents of Georgetown are interested in creating a biking culture within the community by educating and supporting bicycling as a way of traveling.

2.8 POLICY ENVIRONMENT ASSESSMENT

This chapter includes an assessment of Georgetown's current bicycle safety policy environment, evaluated through the lens of the "5Es" of traffic safety: engineering, encouragement, enforcement, education, and evaluation. Funding options for the proposed bicycle projects, shown in Chapter 3, are also identified.

2.8.1 CURRENT "5ES" PRACTICES

Engineering

According to Georgetown's Unified Development Code, "Bicycle facilities are required along Major Collectors and Arterials."⁷ New roadway improvement projects are required to allocate space for bikes in the form of a widened shoulder. This code assists in naturally building a more extensive bicycle network.

Education

Currently, there are no educational outreach efforts in the City of Georgetown. A Safe Routes to School grant was won in 2009; however, these funds were used for school zone safety engineering improvements rather than educational efforts.

Encouragement

Bicycles are available for rent at the Visitor Center and the Public Library. By providing access to bikes for those who may not own one personally, this type of program encourages and enables everyday citizens to explore the city by bike.



Figure 12. Georgetown Bike Share Bicycles

Southwestern University has a program called Pirate Bike, which provides shared bikes for students to use on campus, and it even received an award in 2009 for its Pirate Bike Appreciation Week⁸. Additionally, some local hotels rent out bikes for their guests, enabling tourists to explore the city by bicycle. Expanding programs like these can help encourage cycling across Georgetown.

⁷ - Georgetown's Unified Development Code, Section 12.07 – Pedestrian and Bicycle Mobility, C. On-Street Bicycle Lanes.

⁸ - <https://www.southwestern.edu/live/news/2462-pirate-bike-appreciation-week-garners-award/live/calendar>

Current Conditions

Enforcement

Currently the operation of bicycles in Georgetown is primarily regulated under Section 10.04.045 of the Georgetown Municipal Code. An extensive discussion of the Municipal Code is beyond the scope of this plan, however, the following sections of the code are notable:

- *"It shall be unlawful for a person to operate a golf cart, neighborhood electric vehicle, pocket bike or mini motorbike, or moped on a path designated for the exclusive operation of bicycles"*

This section does not prohibit the operation of an electric bicycle, motor assisted scooter, or personal assistive mobility devices on a path designated for the exclusive operation of bicycles.

- *"Additional rules applicable to operation by a child. It shall be unlawful for a child to operate a moped, electric bicycle, or neighborhood electric vehicle on any public street or highway as follows: After daytime hours; or At any time where the posted speed limit is more than 30 miles per hour."*
- *"It shall be unlawful for any child to operate or ride a moped, electric bicycle, or neighborhood electric vehicle on a public street or highway at any time unless the child is wearing a helmet...It shall be unlawful for a parent to knowingly or unknowingly allow or permit a child to operate or ride a moped, electric bicycle, or neighborhood electric vehicle on a public street or highway at any time unless the child is wearing a helmet."*

- *"It shall be unlawful for any person to violate any provision of this Section, and any person violating or failing to comply with any provision of this ordinance shall be fined, upon conviction, not less than \$1.00 nor more than \$500.00, and a separate offense shall be deemed committed upon each day during or on which a violation occurs or continue."*

Bicycling law enforcement under Texas state law comes from the Texas Transportation Code. Notable excerpts are as follows:

- *"A person operating a bicycle has the rights and duties applicable to a driver operating a vehicle (551.101)."*
- *"A person operating a bicycle on a roadway who is moving slower than the other traffic on the roadway shall ride as near as practicable to the right curb or edge of the roadway (551.103)."*
- *"A person may not operate a bicycle unless the bicycle is equipped with a brake capable of making a braked wheel skid on dry, level, clean pavement."*
- *"A person may not operate a bicycle at nighttime unless the bicycle is equipped with: A lamp on the front of the bicycle that emits a white light visible from a distance of at least 500 feet in front of the bicycle; and On the rear of the bicycle: A red reflector."*

All of the above statutes could be acted upon by law enforcement today should they be violated. Changes concerning enforcement activities will be discussed in Chapter 4.

Current Conditions

Evaluation

The City of Georgetown does not currently evaluate its existing bicycle network. Evaluation mechanisms are necessary to implement a successful bicycle plan.

2.8.2 FUNDING CONSTRAINTS AND OPPORTUNITIES

Federal, state, and local programs cover many different road improvements targeted toward safety for bike riders and pedestrians. Funding programs provided through TxDOT, CAMPO, and bonding are options to help Georgetown expand its bike network. The cost of bike infrastructure may require Georgetown to seek out additional funding sources, such as the State of Texas Parks and Wildlife Department, and national organizations such as People for Bikes and the American League of Cyclists. These organizations can provide a diverse funding profile as the City works to find the financial support to implement each recommended bike project.

Federal Funding

Fast Act (Fixing America's Surface Transportation Act)

The FAST Act authorizes \$305 billion over fiscal years 2016 through 2020 for highway and motor vehicle safety, public transportation, motor carrier safety, hazardous materials safety, rail, and research, technology, and statistics programs⁹.

9 - <https://www.fhwa.dot.gov/fastact/funding.cfm>

10 - <https://www.transportation.gov/BUILDgrants>

Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grants Program

This program supports a variety of projects such as pedestrian and bicycling facilities. Congress has dedicated more than \$4.6 billion to the program. Projects funded must improve the quality of life, support economic development, and provide environmental benefits¹⁰.

State Funding

Transportation Alternatives (TA)

This program provides a flexible funding program that supports highway, bridge, transit, pedestrian, and bicycle infrastructure. These funds are available for a variety of smaller transportation projects such as:

- Pedestrian and bicycle facilities, recreational trails, and Safe Routes to School projects
- Trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation that can be on or off the road
- Sidewalks, pedestrian/bicycle signals, calming traffic techniques, lighting, and other safety-related infrastructure
- Rails-to-trails projects, and
- Planning and construction of boulevards within the right-of-way of former interstates or other divided highways¹¹.

11 - <https://www.txdot.gov/inside-txdot/division/public-transportation/bicycle-pedestrian.html>

Current Conditions

Regional Initiatives

CAMPO - Transportation Improvement Program

Through its 2045 Transportation Improvement Plan, Georgetown has been awarded funding to make improvements to major street sections, including bicycle facilities. This tool allows for non-federal sections of a project's cost to be met through a soft match. Transportation Development Credits create flexibility in state and local transit programs by providing the ability to shift funds to other transportation-related expenses¹².

Recreational Trails Program

This Texas Parks and Wildlife Department program funds projects that are recreational in nature. Funding can be used to build new trails on public or private lands, repair existing facilities and/or upgrade them to meet guidelines established by the Americans with Disabilities Act of 1990.

Funding can also help acquire easements or land for trails, install educational signage, construct trailside or trailhead facilities that include signage, parking areas, restrooms, benches, picnic tables, bicycle racks, and fencing¹³.

Highway Safety Improvement Program (HSIP)

The Texas HSIP identifies bicyclists and pedestrians as roadway system users that warrant special protection. Eligible improvements may include:

- Intersection improvements
- Shoulder widening
- Installation of rumble strips
- Improvements at railroad crossings
- Traffic calming techniques
- Improvements that increase the safety of pedestrians, bicyclists, and those with disabilities
- Comprehensive Safe Routes to School program¹⁴

12 - <https://www.camptexas.org/funding-opportunities/>

13 - <https://tpwd.texas.gov/business/grants/recreation-grants/recreational-trails-grants>

14 - <http://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/gov/shsp.pdf>

Current Conditions

Local-level Initiatives

Voters may authorize local governments (including school districts) to sell bonds to fund capital improvements, including pedestrian and bicycle facilities. Bonds are similar to loans and other financing mechanisms; local governments gradually pay investors back for the money borrowed. Developer-funded facilities can help local planning agencies by providing bike infrastructure. Volunteers are also a great way to maintain bike facilities, therefore lowering maintenance cost. Businesses may be encouraged to provide funding or volunteers to help support construction costs and maintenance efforts.

Unlike other states, such as California and Colorado, Texas has no dedicated funding for bike lanes. This lack of funding encourages cities to establish their own funding sources, or to go through a process in which they submit specific proposals to TxDOT. State-level funding will likely not cover the costs of the City of Georgetown's bike plan implementation, but the opportunities listed above are independent of state decisions and can be approved locally. Another local option is adding bike lane striping when streets are resurfaced – a low cost and effective way to implement facilities.

2.9 CURRENT CONDITIONS CONCLUSIONS AND RECOMMENDATIONS

It is recommended that the City of Georgetown Police Department begin recording information regarding crash severity and causes, as well as types of vehicles involved for future safety management and oversight during Bicycle Master Plan implementation.

Tracking this information for future crash analyses will help fine tune recommendations for specific improvement locations, and will increase the ability of Georgetown's Planning and Public Works Departments to report on impacts of new bike infrastructure over time.

Tracking this information for future crash analyses will help fine tune recommendations for specific improvement locations, and will increase the ability of Georgetown's Planning and Public Works Departments to report on impacts of new bike infrastructure over time.

The Georgetown City Council should prioritize alignment of policy and educational programs with infrastructure engineering and design in order to further emphasize safety in all initiatives, even beyond the Bicycle Master Plan.

Recommendations in the Bicycle Master Plan should be aligned with those from the Sidewalk Master Plan to encourage active transportation. There should be a critical focus on specific safety improvements during roadway design and intersection re-engineering to accommodate pedestrians and bicycle riders.

The City of Georgetown should initiate a joint database and reporting structure with Williamson County, Capital Area Metropolitan Planning Organization, and the Texas Department of Transportation for integrated crash data analysis.

Chapter 3: Recommendations

3.1 VISION, GOALS AND OBJECTIVES

Vision Statement

Georgetown will have a safe, well-connected bicycle network that is accessible to all ages, abilities, and backgrounds; supports the local economy; and improves the experience of everyone biking in the community.

This well-maintained bicycle infrastructure will enhance access to jobs, schools, shops, parks, and public services. The bicycle system will be fully integrated with transit and other modes of transportation, as well as regional and state trail networks. It will attract visitors to the historic and scenic Georgetown, supporting the local economy and enhancing the

vibrancy of Downtown.

By promoting bicycling as a form of transportation and educating bike riders, as well as drivers, on how to share the road safely, it will become an integral part of Georgetown's daily activities, enriching the quality of life for all citizens.



Georgetown residents in community workshop providing feedback to draft bicycle plan

Recommendations

Goals	Objectives
<i>Promote safety</i> for cycling on-and off-road	<ul style="list-style-type: none"> • Prioritize bike paths that minimize conflicts with vehicle traffic. • Design intersections that prioritize protected bicycle and pedestrian crossings. • Increase awareness of and respect for bicycle riders through education and enforcement.
<i>Develop connectivity</i> across the city to provide access to popular destinations	<ul style="list-style-type: none"> • Design and build bicycle corridors that connect residential areas with the city center and major destinations. • Integrate with regional trails and bicycle networks. • Overcome barriers at critical crossing points to provide east-west and north-south connectivity across the city.
<i>Enhance equity</i> in bike access	<ul style="list-style-type: none"> • Balance the needs and interests of cycling groups and the general public. • Improve bicycle and pedestrian access around schools. • Build flat paths where possible to accommodate users of all abilities. • Expand transportation choices in underserved areas through bicycle infrastructure and connections to public transportation through first and last mile bicycle connections.
<i>Support the economy</i> through bicycling	<ul style="list-style-type: none"> • Implement bike and pedestrian-oriented urban design to increase transportation options to downtown businesses. • Promote bicycle tourism by fostering partnership between public agencies, private business, and non-profit organizations. • Ensure that commercial destinations have adequate bicycle parking. • Attract bicycle-oriented business.
<i>Foster a bicycle friendly culture</i>	<ul style="list-style-type: none"> • Educate residents about proper bicycling behaviors for bicyclists, drivers, and pedestrians. • Provide bicycle network maps and install wayfinding signage. • Pursue a Bicycle Friendly Community Designation. • Promote cycling as an easy, inexpensive way to enhance public health.

Recommendations

3.2 PROPOSED BICYCLE SYSTEM

The Plan Vision, Goals, and Objectives guide the bicycle network planning and design. Figure 13 below illustrates the Plan's spatial concept. The heat map was generated from GIS analysis of spatial patterns of land use intensity and activity concentration. The planned bicycle system aims to best serve the residents by matching the bicycle network with the spatial activity pattern.

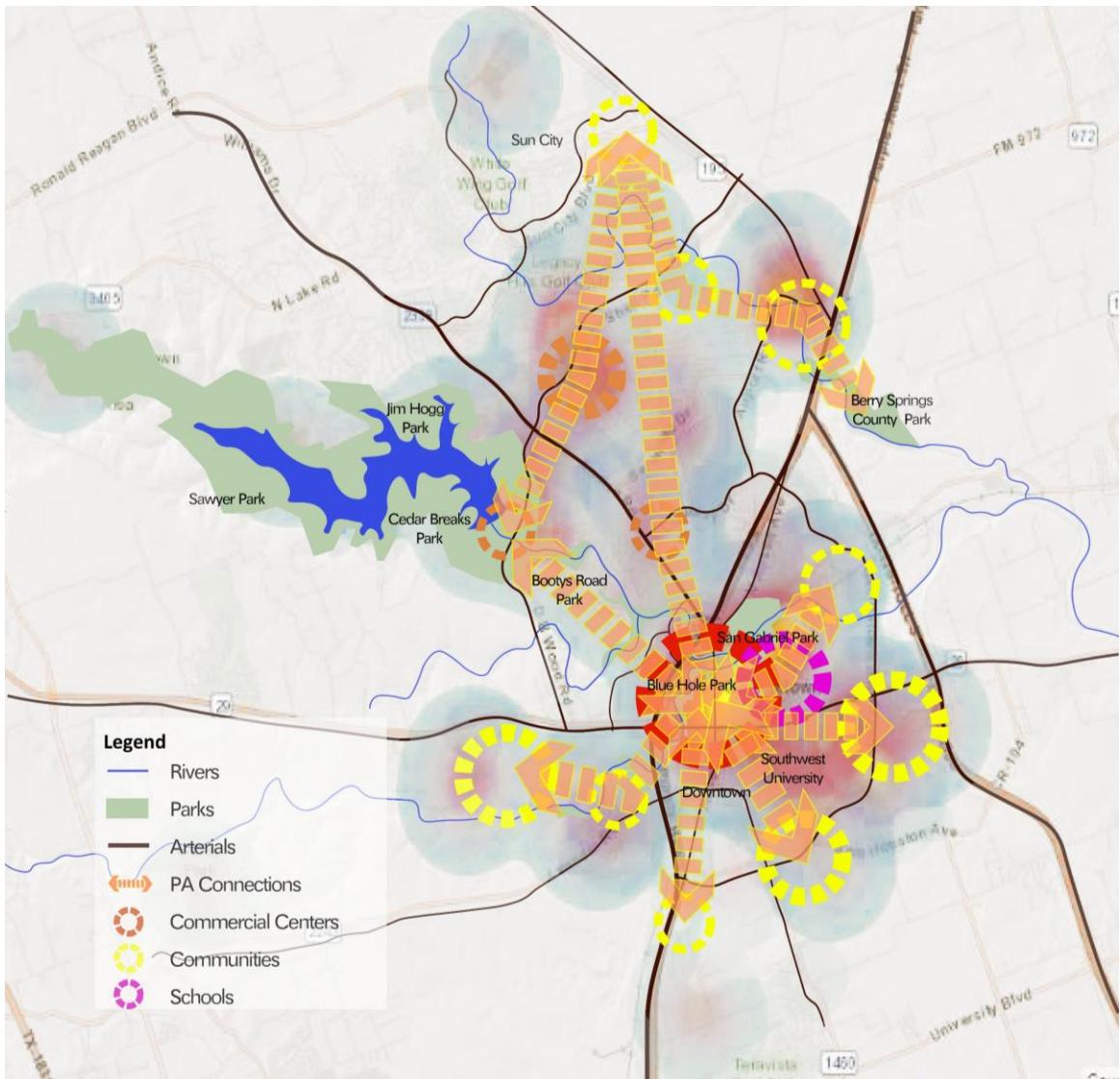


Figure 13. Proposed Network Concept Map

Recommendations

Figure 14 displays the proposed bicycle system for Georgetown. The essential elements of the proposed bicycle system can be characterized by the “**5-4-3-2-1**” framework:

5 types of bicycle infrastructure	<p>It is not feasible nor economical to provide bicycle treatment on all streets, roadways, and intersections. The Plan proposes five types of common bicycle treatments: Sharrow, Bike lane (Striped), Buffered bike lane, Physically protected bike lane, and Off-street path / Bike trail. Application of each type should be based on the assessment of system needs and local conditions.</p>
4 sets of critical connections	<p>The Plan proposes improvement to four sets of critical connections in order to overcome the identified bicycling barriers. The first set includes four bicycle crossing points along I-35 to improve east-west biking connectivity. The second set includes three crossing points along San Gabriel River to improve north-south connectivity in northern Georgetown. The third set includes three crossing points along University Ave. The fourth set connects Sun City to Overlook Park and Downtown while minimizing conflicts with Williams Dr.</p>
3 closed bicycle loops	<p>Upon completion of the four sets of critical connections, the Plan presents three closed bicycle loops to serve the whole of Georgetown.</p> <ul style="list-style-type: none">• Loop 1: Central Georgetown components San Gabriel bike trail to the north and west, Maple St. and Holly St. to the east, 15th and 16th St. to the south• Loop 2: Southern Georgetown components San Gabriel bike trail to the north, Inner Loop to the east and south, Southwest Bypass to the southwest, and proposed bike trail to the west of D B Wood• Loop 3: Northern Georgetown components San Gabriel bike trail network to the west and south, trails in Berry Springs Park to the east, Shell Rd. to the north
2 corridors in central Georgetown	<p>Two corridors connect the three bicycle loops described above. They form a secondary low stress network that minimizes conflicts with Austin Ave. and 7th St., which carry large volumes of vehicular traffic. The north-south corridor follows Main St. and the east-west corridor is along 8th St. They intersect at the Square, Georgetown’s historic center.</p>
1 central core	<p>The Square is the vibrant, people-centered focal point of Georgetown. The Plan aims to enhance connectivity between the Square and the rest of the city, building off of existing roads and integrating with park paths.</p>

Recommendations

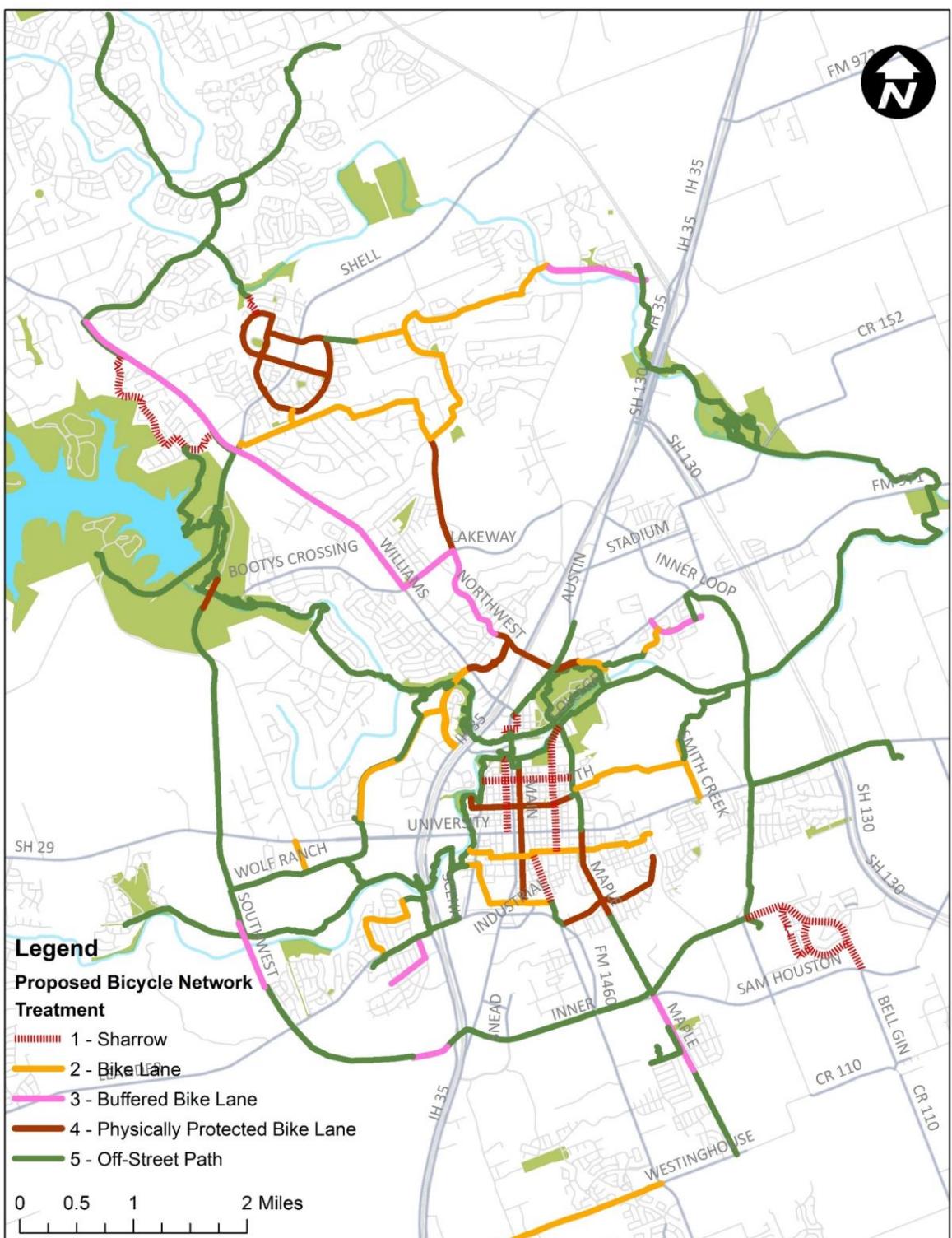


Figure 14. Proposed Bicycle Network

Recommendations

The proposed system network (Figure 14) displays connections and type of treatment. Different treatment types provide varying levels of infrastructure safety and bicyclist travel stress.

Green lines represent off-street paths, on which bikes have their own right-of-way constructed adjacent to or in parallel with the roadway, or along a trail system. Red, pink, and yellow solid lines represent the varying scales of bike lanes (conventional, buffered,

and physically protected), which will be described in detail in Section 3.5 Recommended Treatments for Various Street Types.

Finally, dashed red lines represent a “sharrow” treatment in which pavement markings and signage indicate that motor vehicles are to share the roadway with bicycles. Sharrows are only proposed along low-speed, residential roadways. Overall, the proposed system creates a cohesive network that can be traversed and utilized by residents and visitors of Georgetown of all ages and abilities.

Recommendations

Currently, the city features approximately 33 miles of off-street trails and just over three miles of conventional bike lanes along the newly paved configurations of Rivery Dr. and Wolf Ranch Pkwy. Over 64 miles of cycling facilities are proposed in this plan, amounting to a grand total of 100 miles of interconnected, high-comfort bikeways throughout the City of Georgetown. Treatment types and proposed lengths are outlined below.

Table 2. Mileage of Existing and Proposed Bicycle Facilities by Type

Treatment Type	Length (Miles)		
	Existing	Proposed	Total
Sharrows	0.00	7.66	7.66
Bike Lane	3.24	9.84	13.08
Buffered Bike Lane	0.00	9.13	9.13
Physically Protected Bike Lane	0.00	11.11	11.11
Off-Street Path / Bike Trail	32.70	26.44	59.14
Total:	35.94	64.18	100.11

Wayfinding signage is recommended along the full bicycle network to help bike riders locate the nearest cycling infrastructure. As mentioned previously, this plan recommends implementation of a secondary low stress network, with bike lanes running on streets parallel to high-speed roads. Bicyclists will need clear signage to direct them toward these intended routes, as they otherwise may

not realize bike lanes are available and will unknowingly choose a less comfortable path. Wayfinding signage should be installed per NACTO guidelines, with decision making signs directing users toward major destinations at key intersections, and signs confirming the biker is traveling the correct route every $\frac{1}{4}$ to $\frac{1}{2}$ mile¹⁵.

15 - <https://nacto.org/publication/urban-bikeway-design-guide/bikeway-signing-marking/bike-route-wayfinding-signage-and-markings-system/>

3.3 PROPOSED PLANS FOR FOCAL AREAS

Detailed examples for the highest priority nodal connections and detailed recommendations for selected sites, such as the Square and schools, are below. Larger maps of the proposed network and specific sections of the city can be found in **Appendix 10: Bicycle Network and Complete List of Improvement Projects.**

Connections to Downtown

Proposed improvements focus on enabling residents to comfortably access Downtown by bicycle from any neighborhood. Connections from the north end of Downtown across the San Gabriel River are critical — the planned Austin Ave. bicycle and pedestrian bridge will provide one such crossing, and two other areas with consistent flooding issues have been identified as highly important. Other proposed connection points to Downtown include the west San Gabriel River trail, and access from southeast Georgetown neighborhoods. Primary bicycle corridors identified in Downtown Georgetown include:

- Main St.
- Maple St.
- 8th St.
- 21st St.
- Quail Valley Dr.

Several secondary bicycle corridors have been identified to support the proposed primary corridors, including:

- 4th St.
- 15/16th St.
- College St.

The organization of Downtown bicycle corridors was developed with the goal of keeping bike riders off of high-speed and high-volume roads. The implementation of this secondary low stress network will allow bikers of all ages and abilities to access Downtown for recreation or for business.

Connections in Northwest Georgetown

Northwest Georgetown, particularly the Sun City area, has a heavily involved cycling community that has expressed interest in safe access to Overlook Park and Downtown. In response, a combination of off-street paths along arterial roadways, and bike lanes or sharrows along quieter neighborhood streets are proposed. This will help connect to the park system, schools off of Shell Rd., and Northwest Blvd. entering the Downtown core.

Recommendations

Connections in Northeast Georgetown

The Northeast quadrant of Georgetown features an off-street trail system within Berry Springs Park, which terminates shortly after crossing underneath IH-35 to the west. Based on community feedback, the extension of this off-street trail to the Berry Springs neighborhood along Airport Dr. is proposed. Additionally, the Parks Department has long-term plans to connect an existing trail in the river basin to an extension of the San Gabriel River trail system. Much of this loop is located outside of Georgetown city limits and will require coordination with Williamson County.

Connections to Southern Georgetown

East-west connections along 15th/16th Streets, 21st Street/Quail Valley Rd., and Inner Loop are recommended. Proposed north-south connections include Maple St., Main St. and Scenic Dr. Secondary north-south corridors will be along College Ave. and Church St. Many of these roadways are quiet, neighborhood streets where low bicycle stress levels can be achieved with implementation of conventional bike lanes. In other cases, some connections will require off-street paths.

Southwest Georgetown is currently disconnected from the rest of the city by natural or topographical features including the San Gabriel River Basin, and by man-made barriers such as the rock quarry and IH-35.

This plan proposes an off-street trail connection underneath IH-35 near St. David's Medical Center, which will connect the San Gabriel Overlook neighborhood to central Georgetown. Proposed routes also run across Leander Rd., connecting this neighborhood to Tippit Middle School and Pickett Elementary School

Connections to Schools

Extension of the existing Safe Routes to School off-street path which connects Wagner Middle School and Mitchell Elementary School to the Churchill Farms neighborhood is recommended. This route would extend to East View High School along the south side of SR-29, and north along NE Inner Loop to the future San Gabriel River trail. It would ultimately reach Forbes Middle School and Cooper Elementary School. Development is expanding along this stretch of roadway, and it is important to ensure that new off-street paths will provide a variety of safe and sustainable transportation options.

Connecting New Development

As neighborhoods and subdivisions continue to develop, the proposed system will enable bicyclists to cross the river and use off-street paths to access Downtown.

Recommendations

3.3.1 DETAILED RECOMMENDATIONS FOR CRITICAL NODES/INTERSECTIONS

In stakeholder meetings, officials from the Georgetown Independent School District (GISD) voiced concerns about school kids crossing the 130-toll road to get to East View High School. Field

studies determined that there are no sidewalks or bikeways on the Toll 130 overpass. Recommended off-street bike paths that will provide safe crossing are shown below in Figure 15.



Figure 15. East View High School Safe Crossing

Mitchell Elementary and George Wagner Middle School are located on Rockride Lane, a two-lane road with speed limit of 50mph, which is not suitable for on-street bike facilities. There are off-street bike lanes from the schools to SR 29 along SE Inner Loop.

Currently, the schools are separated from the nearby Saddle Creek neighborhood. Creating a passage between the schools and Saddle Creek Neighborhood is recommended as shown below in Figure 16.



Figure 16. Mitchell Elementary and George Wagner Middle School

Recommendations

In stakeholder meetings, officials from the Georgetown Independent School District (GISD) voiced concerns about school kids crossing the 130-toll road to get to East View High School. Field

studies determined that there are no sidewalks or bikeways on the Toll 130 overpass. Recommended off-street bike paths that will provide safe crossing are shown below in Figure 17.

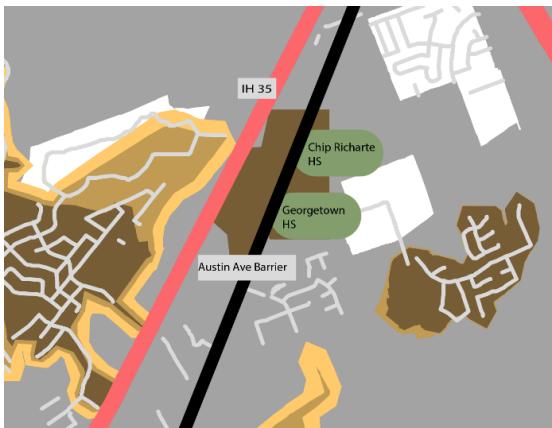


Figure 17. Georgetown and Chip Richarte High Schools

3.4 PHASING AND TIMELINE

This section contains recommended actions to implement the bicycle network in Georgetown. It serves as a guide to help City staff and City Council make decisions in prioritizing and implementing bike projects over the next five to 15 years, and should be evaluated on an annual basis to ensure the progression of this plan.

It is recommended that the bike master plan be implemented in two tiers. Tier 1 addresses “easy wins” — high impact projects with low capital requirements — including painting sharrows and posting wayfinding signs throughout the city. Tier 1 also includes the Top Ten projects identified in 3.4.1 Top 10 Priority Projects below.

Tier 2 includes striping conventional and buffered lanes on newly developed streets, and streets scheduled for upgrades in the future as identified by the Public Works Department. Tier 2 also incorporates large, high cost projects, such as significant intersection connections, bridge connections, and protected bicycle lanes.

The Top Ten recommendations for build-out over the next five to 10 years can be found in Table 3 below.

Bond issuance is the preferred funding method for the City of Georgetown, which will require City staff to strategically time the implementation tiers with the issuance of bond packages. Additional funding options are identified in **2.8.2 Funding Constraints and Opportunities** which may allow the City to implement the bicycle network at a faster pace.

3.4.1 TOP 10 PRIORITY PROJECTS

Figure 18 provides a visual representation of the geographic distribution of Tier 1 projects. A brief description of each of the Top 10 projects is described below in Table 3.

Estimated costs do not include removal of existing roadway striping, or extensive infrastructure improvements, such as bridges. They only include bicycle-specific materials and actions such as lane striping.

Recommendations

Table 3. Top 10 Priority Projects Descriptions

Rank	Project Name	Cost	Length (Miles)	Status	Description
1	Austin Ave. Bridge	\$\$\$\$	0.49	Planned (approved by Council)	Off-street path connecting across San Gabriel River that will enable bicyclists to safely travel north-south in central Georgetown and connect to the Northwest Blvd. Bridge project
2	8th St: Scenic Dr. trail Connection to Maple St.	\$\$\$\$	1.04	Proposed	Bicycle corridor along 8th St. through Downtown connecting the San Gabriel River Trail, Georgetown Library, City Hall, the Square, and Maple St.
3	Main St: Buffered bike lane from 2nd St. to 21st St.	\$\$\$\$	1.20	Proposed	Bicycle corridor connecting cyclists to central and southern Georgetown as part of the secondary low stress network recommendation to divert cyclists off of Austin Ave.
4	Holly Street Bridge	\$\$	0.14	Planned (unfunded)	Connection across San Gabriel River from Holly St. to the North San Gabriel River Trail providing a higher crossing for increased resilience in heavy storms
5	Maple St. Phase 1: 7th St. to Britannia Blvd.	\$\$\$\$	1.14	Proposed	North-south route through central Georgetown to Southwestern University that incorporates a combination of off-street paths and protected bicycle lanes, including a safe connection across University Blvd.
6	Northwest Blvd./ IH-35 Crossing Phase 1: Rivery Dr. to FM-971	\$\$\$\$	1.08	Planned and funded	Primary connection for cyclists across IH-35 which the City of Georgetown and TxDOT have existing plans for, including bike facilities
7	San Gabriel River Crossing at St. David's Hospital: Scenic Dr. to Wolf Ranch Town Center	\$\$\$\$	0.91	Proposed	Connection point across IH-35 allowing residents in south and southwest Georgetown to connect to the San Gabriel River Trail, Wolf Ranch Town Center, and the Square
8	Williams Dr: Del Webb Blvd. to Gatlin Creek	\$\$\$\$	0.45	Proposed	Off-street path providing safe cyclist access to commercial spaces in west, central and southern Georgetown through the existing parks and trails network
9	DB Wood Rd: Wildwood Dr. to Overlook Park along Williams Dr. & DB Wood Rd.	\$\$\$\$	0.74	Proposed	Critical connection from northwestern neighborhoods to the existing trail network providing an alternative to riding on arterials
10	SR-29 East View HS connection across SR 130: Reinhardt Blvd. to Eastview Dr.	\$\$\$\$	1.26	Proposed	Critical safety connection giving students and faculty access to East View High School across SR-29

KEY: \$ - Under 10k \$\$ - 10 to 50k \$\$\$ - 50 to 100k \$\$\$\$ - 100 to 500k \$\$\$\$\$ - Over 500k

Recommendations

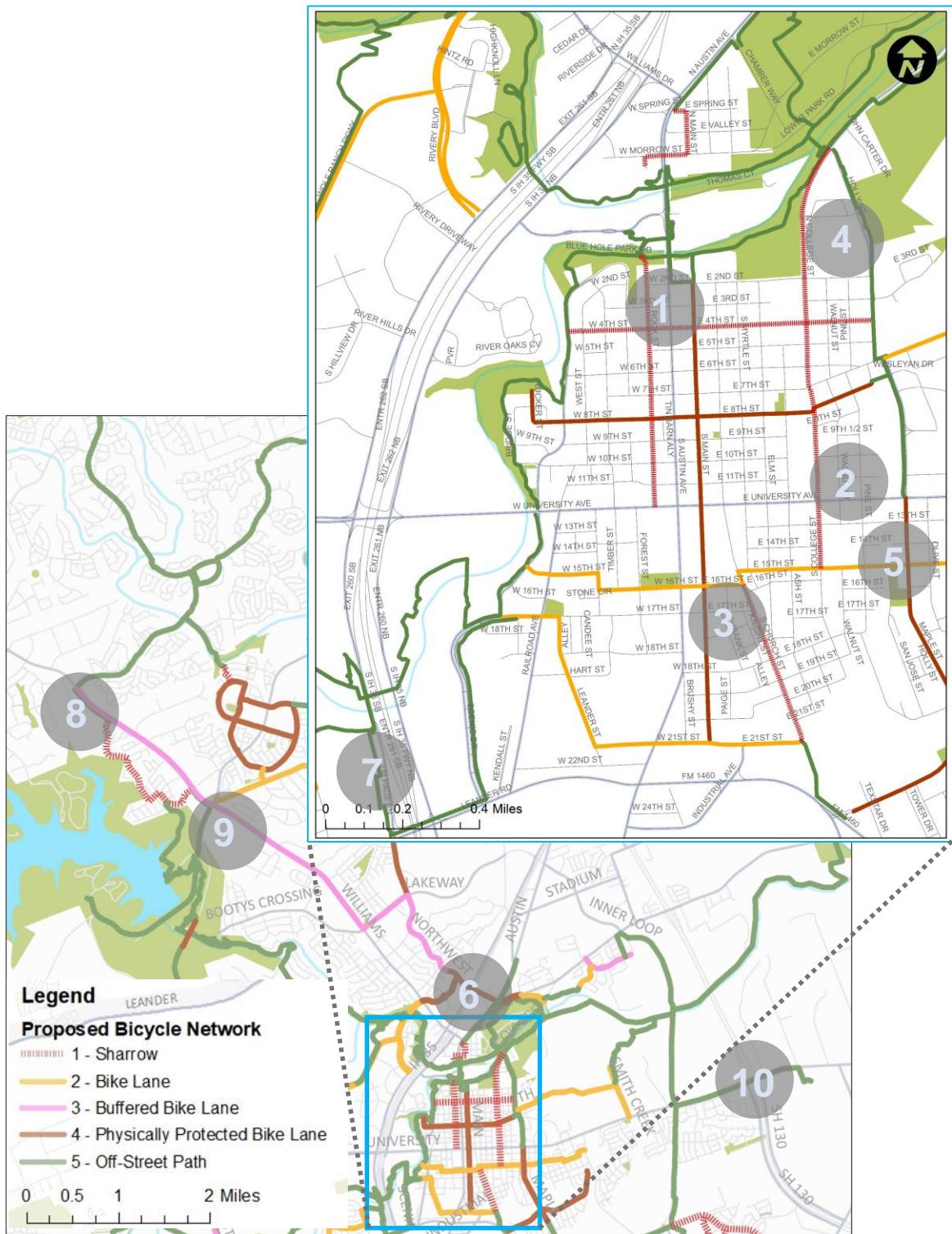


Figure 18. Top 10 Priority Projects

Recommendations

Project Prioritization and Timeline

Projects were prioritized based on two metrics: cost and benefits. In the chart below, low-cost high-benefit projects are in the top right quadrant, and the high-cost high-benefit projects are in the top left quadrant. Top 10 projects are located in the top half of the chart. Aside from cost and benefit concerns, safety was used as a vital indicator in choosing priority projects. The prioritized projects are mapped below in Figure 20.

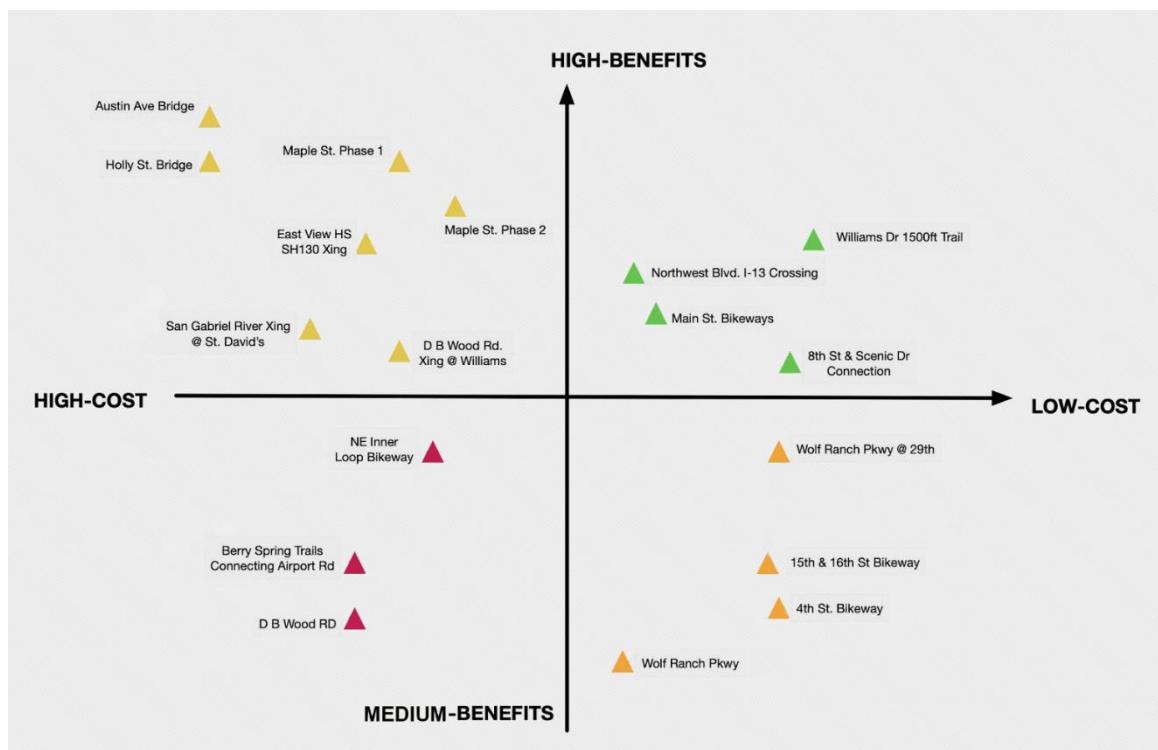


Figure 19: Project Prioritization

Recommendations

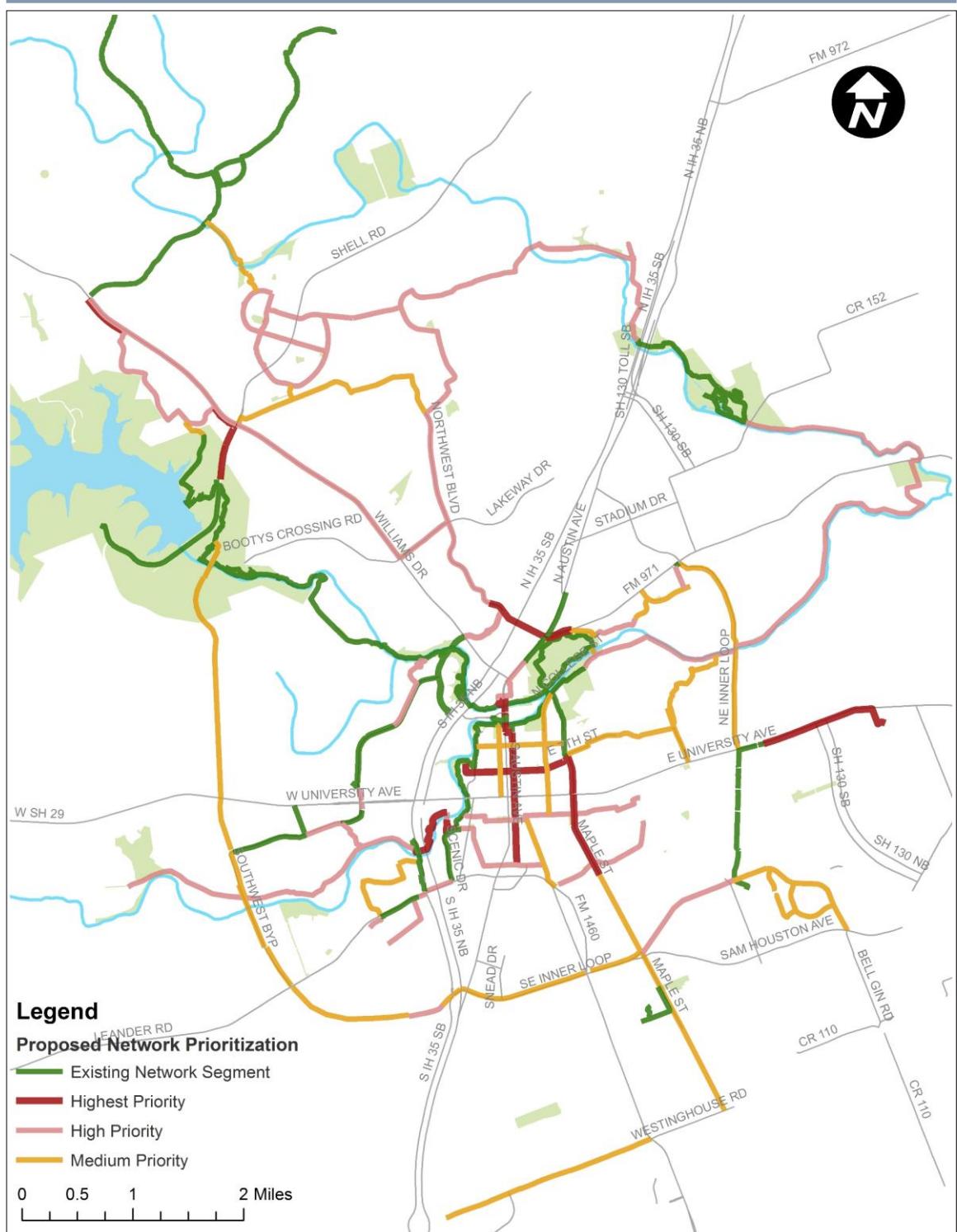


Figure 20. Phasing and Timeline

Recommendations

3.5 RECOMMENDED TREATMENTS FOR VARIOUS STREET TYPES

3.5.1 MAJOR ARTERIAL – INNER LOOP

Major arterials in Georgetown experience Average Daily Traffic counts of approximately 12,500 to 24,000 vehicles, and speed limits between 40 and 55mph. The treatment recommended for roads fitting these criteria is an off-street path, similar to the one present on a portion of Inner Loop (as pictured in Figure 21). This is in line with the Georgetown UDC, which also recommends off-street bike facilities for any new or resurfaced road with speeds over 40mph.



Figure 21. Current Conditions on SE Inner Loop

3.5.2 MINOR ARTERIALS- NORTHWEST BOULEVARD

Minor arterials in Georgetown, such as Northwest Boulevard, have Average Daily Traffic counts of 12,000 to 24,000 cars, and speed limits of approximately 30 mph. Figure 22 shows Northwest Boulevard with various treatments added. The first image shows the current conditions of the road, the second depicts a buffered bike lane treatment, and the final image shows a conventional bike lane treatment.

For this type of road, buffered bike lanes are recommended in areas with a high volume of street parking. Buffered bike lanes allow cyclists to maneuver around parked vehicles without venturing into general purpose lanes. If street parking is not allowed or is rarely used, conventional bike striping on the existing road will suffice.

Specific requirements for buffered bike lanes and conventional bike lanes are as follows:

Conventional Bike Lanes

- Solid white lines should be 6 to 8 inches wide.
- Whenever possible, give more space to the bike rider and widen the bike lane.
- Bicycle symbols and markings are required by the Manual on Uniform Traffic Control Devices (MUTCD).
- Lane width should be 6 feet if next to a curbside and should not be less than 4 feet if adjacent to parking.

Buffered Bike Lanes

- The buffer should be marked with two solid white lines, 6 to 8 inches wide.
- Hatching between the two white lines is required if they are separated by 3 or more feet.
- Hatched lines should be painted at 30 to 45-degree angles and over an interval of 10 to 40 feet.
- The minimum width for buffered bike lanes is 7 feet.

Recommendations



Before treatment



After treatment (Option 1)



After treatment (Option 2)

Figure 22. Before and After Treatments on Northwest Boulevard

Recommendations



Before treatment



After treatment

Figure 23. Local Street Before and After Treatment

3.5.3 LOCAL STREET/COLLECTOR - 8TH STREET

Local streets in Georgetown are wide, low-speed roads that do not experience heavy traffic. Because of these conditions, these local roads can be treated with sharrows and bike signage. Sharrows and signs can cost between \$250 and \$400 apiece, and are

considered low-cost project that yield effective results. These treatments are recommended as a first step in this plan, in order to gain public support for larger projects that will require greater investments. Figure 23 above depicts a before and after treatment on 8th St. near the Georgetown Public Library.

Recommendations



Figure 24. Holly/College St. Crossing to Bridge and Trail

The transition from one type of bike treatment to another requires special consideration. The intersection of Holly St. and College St., for example, will require a transition from a local street sharrows to an arterial bike lane. Figure 24 shows that there should be a seamless transition for bicyclists.

Recommendations

3.5.4 8TH STREET PHYSICALLY PROTECTED BIKE LANE

Georgetown should work long-term projects into its bicycle plan. For example, a physically protected bike lane in Downtown could be added by removing parking on the outer side of the street. Figure 25 shows a before and after example of what this treatment. This project should be implemented in phases:

Phase 1: Remove right-side parking on one of the streets on the Square.

Phase 2: Fill in and expand the existing sidewalk, giving the space to pedestrians first.

Phase 3: Once foot traffic builds, repurpose the extra space from removed parking as a physically protected bike lane.

This is a project that Georgetown can strive toward in the next five to ten years. There is potential for public push back to the removal of parking spaces, however, because of the high volume of cars coming into Downtown, the City has already considered disincentivizing driving by removing parking on the Square. If public sentiment at the time of implementation is that the City should make room for pedestrians and bike riders while maintaining parking options, a parking garage could be constructed nearby.

Recommendations



Before treatment



After treatment

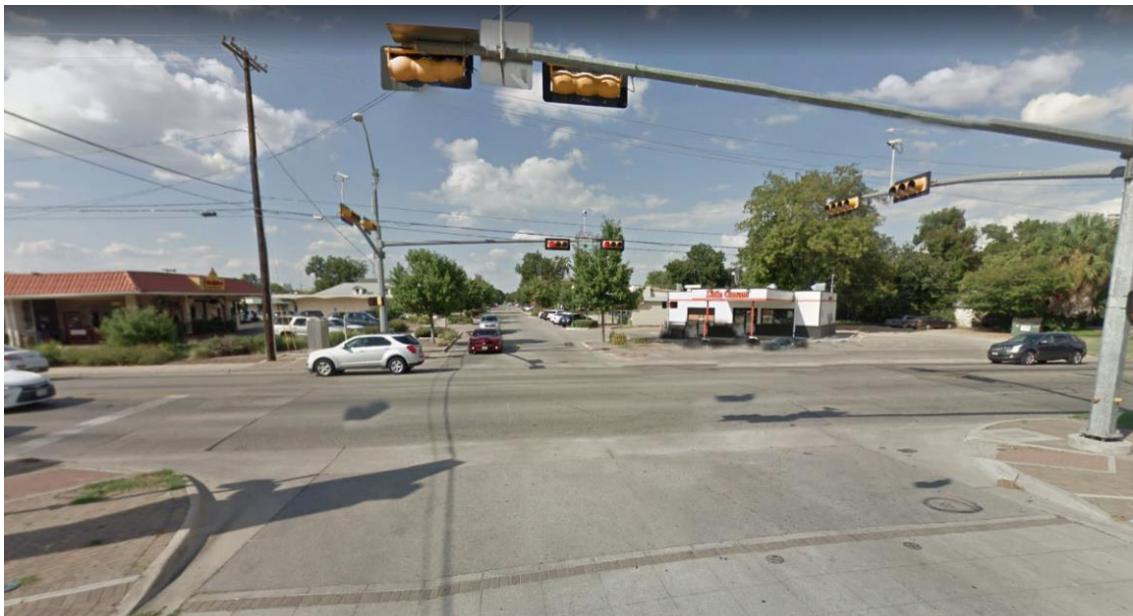
Figure 25. Current Conditions and Potential Physically Protected Bike Lane in Downtown Georgetown

Recommendations

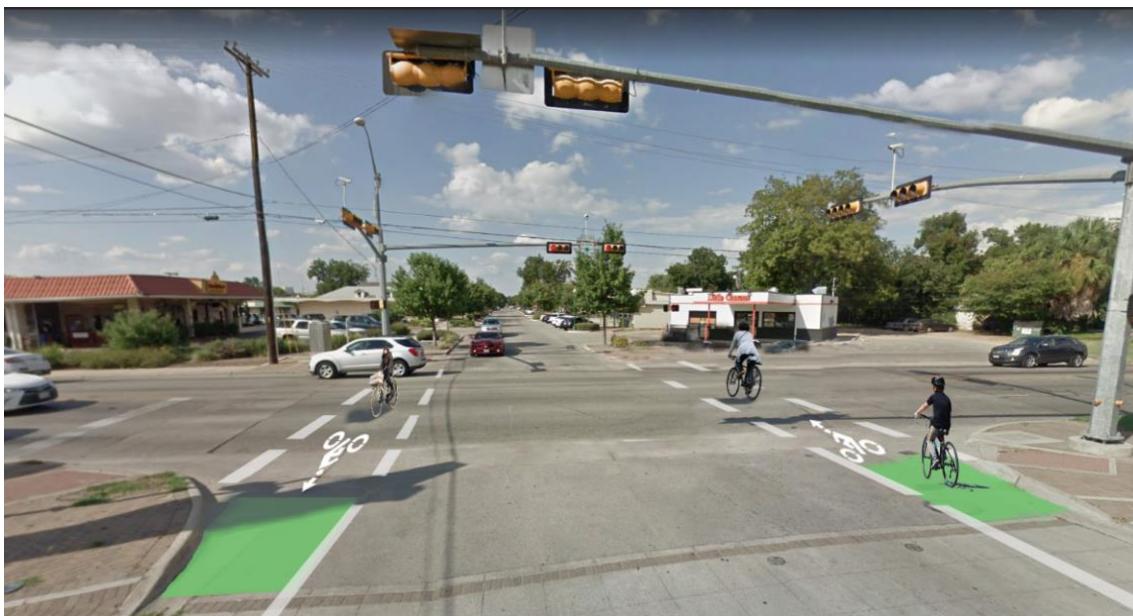
3.5.5 INTERSECTION TREATMENT - MAPLE AND UNIVERSITY

There are many different intersection treatment options for intersections in

the City of Georgetown. One simple solution is pictured below in Figure 26, marking clear paths for bicycles and using color to alert motorists.



Before treatment



After treatment

Figure 26. Before and After Intersection Treatment of Maple St. and University Ave.

3.6 BIKE PARKING AND BIKE SHARE RECOMMENDATIONS

The recommended expansion of bicycling infrastructure is expected to increase cycling in Georgetown overall, and therefore expand demand for secure bike parking.

In order to determine priority areas for installation of parking facilities, a full bicycle parking suitability analysis has been conducted (see **Appendix 12: Bicycle Parking Suitability Analysis** for details). The results of the analysis indicate that Southwestern University, commercial areas of Downtown, the library, the Square, Blue Hole Park, and the Sun City Texas Community Association should be top priority areas for additions (see Figure 27 and Figure 28 below).

Currently, the Georgetown Unified Development Code does not offer any requirements or guidance for the addition of off-street bicycle parking and should be amended to do so. For example, the City of Austin's Bicycle Advisory Council recently passed a recommendation that the City amend its land development code's bicycle

parking minimums to align with the goals set forth in the Imagine Austin Comprehensive Plan and the Austin Bicycle Master Plan. This requires all new developments to provide 5-15% of the building's maximum fire code person capacity in bicycle parking spaces¹⁶.

The City should pursue partnerships with existing business owners, Southwestern University and transit providers to expand bicycle parking facilities around Georgetown. Business owners would benefit from attraction of more regular, frequent customers and tourists, as well as from discouraging illegal parking practices such as chaining bikes to trees, street furniture or utility poles that can detract from the atmosphere of the business district.

16 - 5% represents the citywide mode choice goal and 15% represents the central city area mode choice goal for bicycling according to the Austin Bicycle Master Plan & Imagine Austin Comprehensive Plan.

17 - American Public Transit Association. (2018). *Bicycle and Transit Integration: A Practical Transit Agency Guide to Bicycle Integration and Equitable Mobility* (Recommended Practice No. SUDS-UD-RP-009-18). Washington, DC. Retrieved from <https://www.apta.com/resources/standards/Documents/APTA%20SUDS-UD-RP-009-18.pdf>

Recommendations

The University has a limited supply of car parking facilities, and could benefit by converting some car trips to campus to bike trips, reducing the need to expand vehicle parking. It is also a notable benefit that bike parking spaces cost much less than vehicle parking spots, and could provide a cost savings benefit. Bicycle parking facilities should be provided adjacent to bus stops to help accommodate first and last mile connections to transit, especially since each bus has space to carry only two bicycles.

Together, bicycling and transit can offer users more mobility options than either are able to individually, and according to the American Public Transit Association's Bicycle/Transit Integration Best Practices Guide, lack of secure parking at transit stops "will discourage and preclude potential riders."¹⁷ In order to determine how many bicycle parking spaces to provide at each stop, the City should set a quantitative threshold based on peak transit ridership.

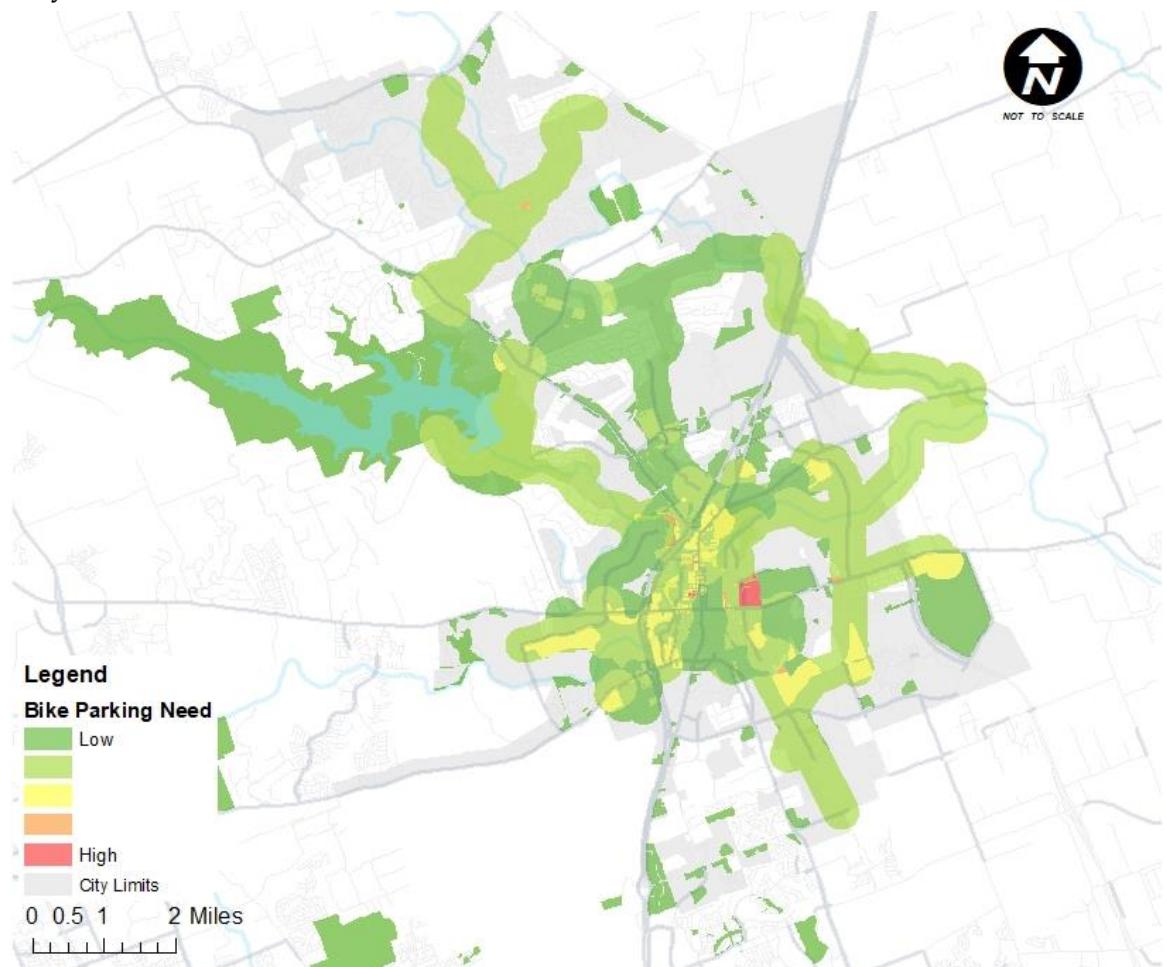


Figure 27. Weighted Suitability for Bicycle Parking Priority Areas

Recommendations

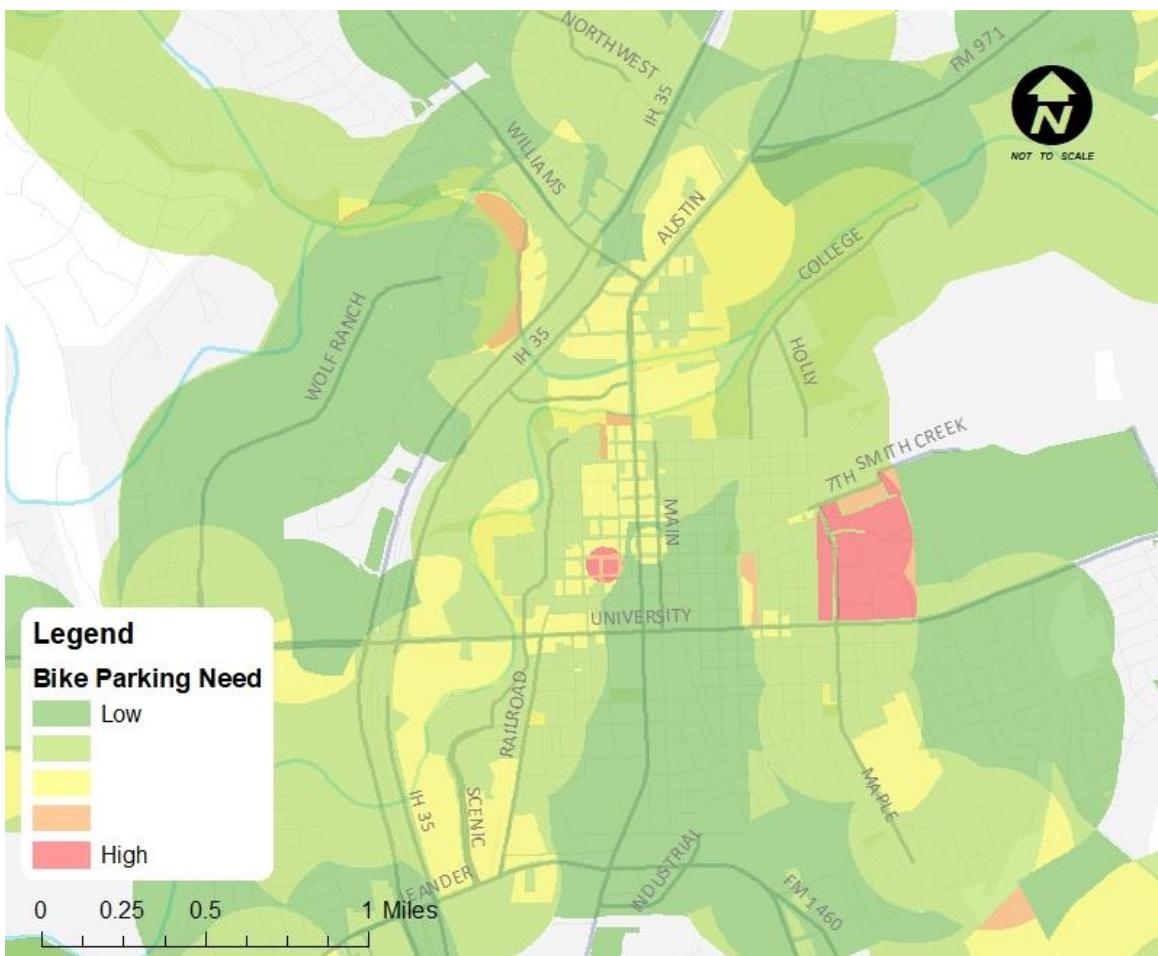


Figure 28. Weighted Suitability Analysis for Bicycle Parking Priority Areas (Zoom to Downtown)

The bike parking hot spots map shown in Figure 27 and Figure 28 can also be used to expand the present bike share program. The popular origins and destinations for bicycle trips shown in red and yellow are natural locations to place future bike share stations. It is recommended that the City begin tracking usage of the shared bikes at the Georgetown Public Library and Visitor's Center. If inventory is often low, additional bikes should be added to these

stations, and new areas with high levels of need for bicycle parking facilities should be explored as a next step in building out the program. There are various automated stations, such as B-cycle in Austin, that could be piloted in Georgetown in order to make bike check out more accessible. Currently, potential users need to enter the library or visitor's center to secure a bicycle, and a kiosk check out point could encourage new users of the service.

Recommendations

On its own, the City should proactively pursue opportunities to build bicycle racks in priority areas on sidewalks without impeding ADA access as shown in Figure 29 below. One example of this practice includes converting on-street parking spaces into bicycle corrals; 8 to 10 bicycles can be accommodated by one on-street car parking space, shown in Figure 30 below.

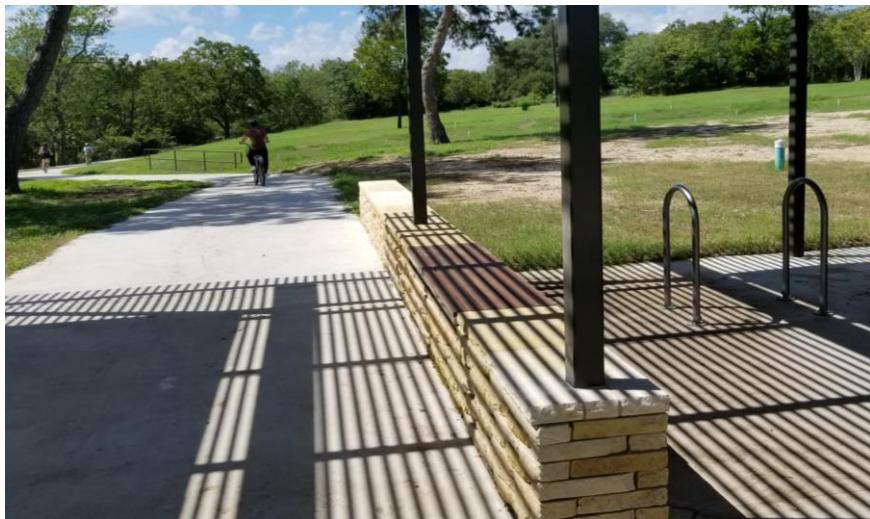


Figure 29. Bike-U Racks in San Gabriel Park



Figure 30. Example of On-Street Parking Spaces Converted to Bike Corral in Austin, TX

3.7 POLICY RECOMMENDATIONS

Georgetown's city ordinances and Unified Development Code (UDC) are the main regulatory documents for building bike infrastructure in the city, providing guidance and a legal framework for builders and residents.

In general, these resources have served Georgetown well, however, the City is evolving and its Comprehensive Plan is in the process of being updated to reflect the city's continued growth. This process presents a key opportunity to update the existing ordinances and the UDC to better ensure adequate multi-modal transportation facilities, particularly bike facilities.

Portions of the code should be amended to better serve the needs of bike riders, and the City should work to ensure that its transportation facilities

are serving all residents, regardless of transportation mode choice.

Maintenance and safety are two key issues that must be considered. Currently, the Public Works Department is responsible for street maintenance, and the Parks and Recreation Department is responsible for maintenance of recreational trails. It is imperative that the two coordinate together to ensure that all facilities are well maintained. The section below outlines recommended changes.

Recommendations

3.7.1 GENERAL AMENDMENTS

- Amend code so Traffic Engineer responsibilities include designating areas for bike lanes.
- Avoid converting wide shoulders into additional vehicle travel lanes on roadways without allocating space for biking facilities.
- Ensure that bike facility usage and performance is being adequately measured.
- Create an active transportation monitoring program within the Transportation Department to assess current and future trends in cycling and walking. This data can be used to reinforce the need for more cycling and pedestrian infrastructure projects.
- Ensure that all re-pavement and maintenance projects consider a multi-modal component.
- Enforce and educate the public on bicycle regulations and laws.
- Target education efforts about how to properly maneuver the streets of Georgetown toward both bicyclists and drivers.
- Develop a bike facility maintenance program within the Public Works Department to ensure bike facilities are cleaned and functional.
- The City of Georgetown should create a new position, or modify job requirements for an existing position, to introduce an official bicycle/pedestrian engineering coordinator who will be responsible for new policies and programs.

- Require adequate signage along key bike routes in the city.
- Roads that qualify as low speed and traffic volume should have sharrows and signs installed.
- Emphasize safety for bicyclists at intersections by painting bike lanes green a different color (such as green) than the roadway itself.

3.7.2 INCORPORATION OF BIKING INTO OTHER PLANNING EFFORTS

Georgetown must consider how to better incorporate biking into other City planning documents, such as the Comprehensive Plan, Capital Improvement Plan, and Parks and Recreation Plan. By making biking a key component of each of these plans, Georgetown can ensure that it is approaching biking holistically and working to create the best bicycle culture possible. To that end, the following changes are recommended:

- Ensure that the Bike Master Plan is a key component of the Comprehensive Plan.
- Improve biking elements in the Overall Transportation Plan.
- Create a separate Bike Capital Projects category in the Annual Budget.

Recommendations

3.7.3 PROGRAM RECOMMENDATIONS

Public engagement and City events can play a key role in promoting biking in the city. Tools such as social media are a great way to ensure that all residents have accurate and up-to-date information regarding community bike events and safety information. After the City installs additions to its bike network, it should incentivize businesses to offer bike parking, as well as storage and showering facilities which can potentially increase people's willingness to bike to work. Organizations such as the Downtown Association host events like the Wine and Music Festival and Market Days, which are a great way to increase tourism in Georgetown. Promoting biking to these events could reduce traffic and increase attendance. The following are programmatic recommendations for City promotion of cycling:

- Ensure adequate communication with residents about new bike infrastructure, bike facilities and city-wide bike events in Georgetown through social media outlets such as Nextdoor, Twitter, and Facebook, as well as flyers and brochures.
- Explore policies that incentivize businesses to provide end of trip biking facilities. These could include creating a simple process for requesting a bike rack from the City, or providing tax credits for shower facilities.
- Promote Georgetown as an active transportation tourism city. Georgetown should consider designating biking and walking as the official transportation modes during active transportation friendly promotions or events. Creating an annual event, such as "Georgetown Bike and Walk Week", is a great way to promote Georgetown as a bike friendly city to tourists.

Recommendations

3.7.4 DESIGN STANDARDS

It is recommended that Georgetown adopt design standards to foster a more bike-friendly community. Currently, the City follows standards set by the American Association of State Highway and Transportation Officials (AASHTO); it is suggested the City transition to National Association of City Transportation Officials (NACTO) guidelines due to greater emphasis on bicycle safety. NACTO focuses on decreasing bicycle stress through standards such as increased shoulder widths, wider minimum bike lane widths, and more frequent signage, which help drivers predict the movement of bikes and reduces potential conflicts.

Complete Streets policies were created by Smart Growth America to enable safe access for all roadway users, including pedestrians, motorists, and bicyclists. Complete Streets design may be appropriate on Austin Ave. or Main St.

The following changes in City design standards are recommended:

- Adopt NACTO recommendations as Georgetown's design standard for cycling infrastructure.
- Require adequate bike signage on roadways with speed limits of 40mph or less and shoulder widths greater or equal to 5 feet.
- Adopt a Complete Streets policy to help systematically design streets such as Austin Ave. and Main St. to accommodate all transportation modes.

Recommendations

3.8 COST ESTIMATE

For the completion of the first phase the bicycle network, City staff will need to identify funding options and allocate staff to manage the implementation plan.

Table 4. Cost Estimate of Proposed Network and Intersection Treatment

Network Element	Quantity	Avg. Cost per mile	Total Cost
<i>On-Street ^a</i>			
Sharrow	7.66 miles	\$15,000	\$ 114,900
Bike Lane	9.84 miles	\$18,955	\$ 186,517
Buffered Bike Lane	9.13 miles	\$29,911	\$ 273,087
Physically Protected Bike Lane	11.11 miles	\$245,388	\$ 2,726,261
Crossing Markings and Bike Boxes	21	\$5,000	\$ 105,000
Subtotal:			\$3,405,765
<i>Off-Street ^b</i>			
Off-Street Path / Bike Trail	26.44 miles	\$525,000	\$13,881,000
Total:			\$17,286,765

References: ^a: Weigand, L., McNeil, N. and Dill, J. 2013. Cost Analysis of Bicycle Facilities: Cases from Cities in the Portland, OR Region. Center for Urban Studies, Portland State University, Table 1, page ii. ^b: TxDOT, 2018. Texas Bicycle Tourism Trails Study (Final Report). TxDOT Public Transportation Division, Table 14, page 74.

The cost of Georgetown's bicycle network will vary depending on operating expenses, but Table 4 provides a high-level cost estimate for various network elements. Estimated costs do not include removal of existing roadway striping, or extensive infrastructure improvements, such as bridges. Costs do include any bike infrastructure specific materials and actions such as lane striping, pavement markings, and bollards for at-grade bike lanes. Cost estimates used were primarily estimated by the City of Portland following their own bike network build out.

The build-out of the recommended priority bicycle network, without considering maintenance costs, staffing, and other operations, is currently estimated at \$14-20 million. The City of Georgetown will need to develop a budget and conduct any required environmental reviews in order to implement the first stages of the bicycle network successfully. A full methodology for determining cost can be found in **Appendix 7: In Depth Methodology for Determining Cost Estimates**.

3.9 DECISION-MAKING PROCESS

Georgetown has a council-manager system of government in which:

- Council members are the leaders elected to represent various segments of the community and to concentrate on policy issues that are responsive to citizens' needs and wishes,
- The City Manager is appointed by Council to carry out policy and ensure that the entire community is being served, and
- The Council approves the budget, determines tax rate, and focuses on the community's goals, major projects, and long-term considerations such as community growth, land use development, capital improvement plans, capital financing, and strategic planning.

City Council approves all plans, including the Bike Plan, Master Plan, and Capital Improvement Plan. A budget then needs to be approved to fund planning efforts.

Finally, the City Manager's office works with various departments in the City to implement the plan. In order to formalize and propel forward implementation of the Bicycle Master Plan within this framework, it is recommended that a formal Bicycle (or Bicycle and Pedestrian) Advisory Committee be created. Decision-making advisors, Jack Daly, the Assistant to the City Manager of Georgetown, and Bonnie Sherman, TxDOT's Statewide Bicycle and Pedestrian Coordinator, were consulted to better understand the decision-making structure and advance implementation of a bike plan. TxDOT works with the City to design roads that it manages during resurfacing and expansion projects, and allocates certain types of funding for bicycle and pedestrian projects in Texas.

Chapter 4:

Make It Happen: Engineering, Education, Encouragement, Enforcement, and Evaluation Plan

4.1 INTRODUCTION

Implementing successful pedestrian and cycling improvements involves much more than simply building new facilities. Since the 1970's the "5E's" framework has become the industry standard, a more holistic approach that integrates Engineering, Education, Encouragement, Enforcement, and Evaluation.

This framework allows public agencies to expand outreach efforts and measure success. Many traffic safety programs, such as Vision Zero and Safe Routes to School, assess themselves using the 5E's framework.

The state of these existing programs provides a rich body of resources that have been used to construct this 5E implementation plan as a component of the Bicycle Master Plan. The 5E's are defined on the following page.

5 E's Plan

- **Engineering:** These efforts are often the most visible to local citizens and come in the form of painting bicycle lanes on roadways, creating physically protected or off-street bike paths, lowering speed limits, or putting up signage to alert motorists of the presence of bicycles.
- **Education:** Cycling safety education programs are often offered to students through school districts. Adult safety classes are also recommended for both motorists and bicycle users to promote respect and awareness of all travel modes and create safer streets.
- **Encouragement:** Encouragement efforts consist of anything that incentivizes citizens to use bicycles. This can include recognizing National Take Your Bike to Work Week and National Bicycle Month, installing additional bike racks across the city, and incentivizing businesses to provide showers and lockers. These efforts can be initiated by the City, but would ideally originate from community leaders and organizations. Working directly with residents will help people feel more invested in promoting cycling and create a sense of local pride in the cycling community.
- **Enforcement:** A set of laws and regulations should be in place to ensure the safety of vulnerable road users such as bicyclists. It should be a priority to spread awareness of new regulations among local law enforcement and residents.
- **Evaluation:** Statistical analysis helps elected officials make important funding and project decisions to best serve the community's needs. Maintaining bike and pedestrian counts, for example, can demonstrate the impact of cycling infrastructure and inform recommendations for future expansion.

The full 5E literature review that informed recommendations can be found in **Appendix 13: "5E's" Literature Review.**

4.2 5E'S RECOMMENDATIONS

More than 40 bike plans, government reports, and agency websites were reviewed and analyzed to develop recommendations for this Bicycle Master Plan that are tailored to existing conditions in Georgetown. For each E, a list of key takeaways from the literature review are presented to inform City employees of important aspects of implementing a cycling improvement project. A set of specific recommendations are also presented in concurrence with the Plan vision. The recommendations for each E include resources and supplemental materials for City employees to use as a starting point when implementing this plan.

4.2.1 ENGINEERING

The proposed bicycle network itself is an engineering recommendation. Engineering improvements should benefit all roadway users and be distributed equitably throughout the city in the form or on- or off-street facilities. The engineering goal of this plan is to create a connected network that serves the whole city.

Key Takeaways

- Engineering efforts can be creative and vibrant, going beyond simple improvements such as striping a bike lane. Creative projects can become an attractors themselves, stimulating economic development for surrounding businesses.
- Coupling bicycle and pedestrian improvements is recommended to provide facilities for non-motorized users of all ages and abilities
- Complete “low-hanging fruit” bicycle facility improvements first. These should be quick, easy, low-cost projects that have high benefits, such as sharrows and signage.

Specific Recommendations

- **Adopt a Stronger Complete Streets Policy:** A Complete Streets policy provides a framework for engineering improvements that makes facilities designed for all roadway users. The Complete Streets website states that these engineering improvements can be made through “a variety of policies, ordinances, and resolutions, rewrites of design manuals, inclusion in comprehensive plans, internal memos from director of transportation agencies, policies adopted by city and county councils, and executive orders from elected officials, such as Mayors or Governors.” Smart Growth America has a section on their website dedicated to providing resources to local governments interested in developing a Complete Streets policy¹⁸.
- **Adopt NACTO and AASHTO Guidelines in all Design Manuals:** Currently, Georgetown’s Construction Specifications manual contains no design guidelines for bicycle infrastructure. Adopting the National Association of City Transportation Officials (NACTO) guidelines will establish baseline standards for any bicycle improvement project. NACTO’s Urban Bikeway Design Guide provides recommendations for these standards¹⁹.

4.2.2 EDUCATION

Education efforts are important for improving safety and awareness of bicyclists. Education for school-aged children in particular should be a priority as courses in bike safety can help reduce dangerous and potentially life-threatening interactions with vehicles. Many educational materials already exist in the public domain that can be adapted for use in Georgetown.

Key Takeaways

- Bicycle safety education programs should be geared toward both bike riders and motorists.
- Bicycle safety education programs should be offered to school-aged children, parents of those children, adults, drivers, and neighbors.
- There exists a plethora of online resources that provide educational materials and courses in bicycle safety.

Specific Recommendations

- **Expand Safe Routes to School Program:** Currently, the extent of Georgetown’s Safe Routes to School program includes a grant of \$399,280 that was awarded to Mitchell Elementary School in 2009. It was used to construct sidewalks, crosswalks, and to install school zone flashers. Georgetown can apply for additional SRTS grants to expand infrastructure and implement educational programs. SRTS funds are distributed by TxDOT’s Transportation Alternatives Set-Aside (TA Set-Aside) Program.

18 - <https://smartgrowthamerica.org/program/national-complete-streets-coalition/publications/what-are-complete-streets/>

19 - <https://nacto.org/publication/urban-bikeway-design-guide/>

5 E's Plan

- **Train City Engineers in Bicycle Facility Design:** The Federal Highway Administration (FHWA) has teamed up with the National Highway Institute to create a short educational course titled “Bicycle Facility Design.”²⁰ According to the course description, this training will teach planners and designers how to apply existing standards and deal with various technical issues involved in bike facility design. City of Georgetown traffic engineers could benefit from participating in this course.
- **Partner with Local Bicycle Advocacy Groups to Provide Educational Classes for Adults and Students:** Georgetown is home to a number of local cycling advocacy groups, including the Georgetown Cyclopaths and the Sun City Cyclists. There is an opportunity for the City of Georgetown to work with volunteers from these groups to distribute educational materials at tabling events, elementary schools, Southwestern University, and local community centers. Adult evening classes can be offered at the Georgetown Library or other community centers. This is a low-cost alternative to hiring and training an outside teacher to distribute educational information.
- **Utilize Online Material and Explore Education Curriculum Options:** There is a wide variety of online educational material that the City of Georgetown can utilize for education and outreach programs, including but not limited to:
 - The League of American Bicyclists’ “Smart Cycling” Course
 - National Highway Traffic Safety Administration’s Bicycle Safety Activity Kit
 - TxDOT’s Bicycle Safety Education Material
 - Bike Texas College Active Transportation Safety Programs

20 - https://www.nhi.fhwa.dot.gov/course-search?tab=0&course_no=142046&sf=0

4.2.3 ENCOURAGEMENT

In Georgetown's vibrant Downtown district there are opportunities for the City to set up tables with brochures, handouts, educational materials, and other resources on cycling safety. Participating in events like Ride Your Bike to Work Week or National Bike Month can encourage citizens to explore bicycling as an option. Southwestern University received an award for its Pirate Bike Appreciation Week in 2009, which could be used as a model for similar programs across the city.

Key Takeaways

- Bicycling encouragement outreach efforts come in many forms, from programs to projects.
- The goal of bicycling encouragement programs is to expose interested but concerned citizens to the benefits of bicycling.



Figure 31 San Antonio Mayor Leading a Bike Ride

Specific Recommendations

- **Create a Bicycle Advisory Committee:** Currently, there are two Tax Increment Reinvestment Zones (TIRZ) in Georgetown that include bicycle infrastructure: the William's Dr. TIRZ and the Downtown TIRZ. A new advisory committee dedicated to resolving cycling issues should be created within the City of Georgetown to advise on funding allocation from the TIRZ and ensure that active steps are being taken to implement the Bike Plan.
- **Implement New Bicycle Encouragement Programs:** Encouragement programs should be fun, engaging, and provide resources for citizens. These programs that could be implemented in Georgetown:
 - SmartTrips – Resource created by the City of Austin to help residents identify their transportation options²¹
 - Youth Bike Club – League of American Bicyclists resource advises on “How to Start a Bike Club”²²
 - Mayor or Council-led bike rides – San Antonio hosted a bike ride with the Mayor after a local bike summit²³
 - National Bike Month – Observed in May to highlight the benefits of biking in communities²⁴

21 - <http://smarttripsaustin.org/>

22 - <http://www.bikeleague.org/>

23 - <http://www.biketexas.org/news/>

24 - <https://bikeleague.org/bikemonth>

- **Work toward Becoming a Bicycle Friendly Community:** One of the goals of the Georgetown Bike Plan is to become a Bicycle Friendly Community (BFC). According to the League of American Bicyclists, which designates these communities, “A BFC welcomes bicyclists by providing safe accommodations for bicycling and encouraging people to bike for transportation and recreation.”²⁵ The City can apply for specific levels of BFC designation, and the application process alone can help to refine and reinforce Georgetown’s goals and progress toward building a truly bike-friendly community.

4.2.4 ENFORCEMENT

The Georgetown Police and Southwestern Police departments can make a substantial difference in local transportation safety culture. Officers should enforce traffic laws related to bicycling through warnings and citations, as appropriate, to reinforce to the community that these laws are taken seriously.

Key Takeaways

- Efforts from local law enforcement can increase awareness of bicyclists in the area.
- Coupling law enforcement efforts with educational campaigns can increase the impact of these campaigns.
- Enforcement of local laws and regulations for both bikers and motorists is critical to building a natural respect between the two over time.

Specific Recommendations

- **Work with Georgetown Police Department to Educate Officers about Bicycle Safety:** There are many resources available to increase local law enforcement’s involvement in the safety of bicyclists, the details of which can be found in **Appendix 13: “5Es” Literature Review**. Surrounding cities frequently invite officers to tabling events to allow residents to engage in conversations with them on bicycle safety. This is a practice that should be implemented in Georgetown.
- **Improve Local Laws and Regulations to Improve Safety of Bicyclists:** Nearby municipalities have implemented laws specific to bikes that Georgetown should review and consider. In 1996, the City of Austin passed a bicycle helmet law that requires all persons to wear a helmet when riding a bike. Safe passing laws and laws requiring motorists to yield to bike riders can also help keep bicyclists safe.

25 - <https://www.bikeleague.org/community>.

4.2.5 EVALUATION

Georgetown should implement an evaluation program to track the impacts of bicycle facility improvements, if possible as the very first step of Bike Plan implementation. Pre-facility usage numbers are as important as the post-facility improvement numbers, because establishing a baseline is required to measure increases in usage. If baseline and ongoing data are collected, decision-makers will have the ability to see the full impact of new infrastructure as they make choices moving forward.

Key Takeaways

- Pedestrian and bicycle counts are valuable data to inform spending on further improvements.
- There are various tools that can be used to monitor bicycle and pedestrian counts.
- Choosing performance measures is an important first step, and tracking a few critical pieces of information well is more beneficial than tracking many measures that will clutter the story the data tells.



Specific Recommendations

- **Create a Bicycle and Pedestrian Monitoring Program:** Use online resources such as FHWA's Traffic Monitoring Guide as guidelines for implementing a bicycle (or bicycle and pedestrian) count program. Certain equipment and software will need to be purchased, so a portion of the budget should be dedicated to obtaining the necessary materials to monitor traffic.
- **Implement a Set of Key System Performance Measures:** Work with Georgetown's City Council and Chamber of Commerce to determine which key performance metrics should be used for Georgetown's Performance Management Program. Fehr and Peers provide a useful online guidebook that lists many examples of active transportation performance measures²⁶, and the FHWA's "Guidebook for Developing Pedestrian and Bicycle Performance Measures" could also be useful²⁷.

Figure 32. A new bicycle traffic counter is tested

Source: Texas A&M Transportation Institute

26 - <http://www.fehrandpeers.com/active-transportation-performance-measures/>

27 - https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/performance_measures_guidebook/

4.3 CONCLUSIONS

Georgetown is creating and implementing a Bicycle Master Plan as a component of the 2030 Comprehensive Plan update. The City seeks to implement the “5E” framework for improving conditions for bicyclists through engineering, education, encouragement, enforcement, and evaluation.

The methods of peer communities to implement 5E strategies were reviewed, and specific recommendations were made to the City of Georgetown for implementing a 5E program of its own.

Improving conditions for bike riders is no longer a single engineering solution; striping a bike lane alone will not ensure long-term results. The 5E's, when implemented together, lead to an increase in community bicycling.

Collection of Appendices

Georgetown Bicycle Master Plan (2019)



The University of Texas at Austin
School of Architecture 1

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Appendix 1: Review of Community Engagement

A1.1 CONSULTATION WITH EXPERTS

Dr. Katie Kam of Wheels & Water, LLC -- Dr. Kam is a planner and engineer as well as President of Wheels & Water, LLC, which promotes electric low speed vehicles (LSV) and creating Low Emission Alternative Networks (LEAN). On September 6, 2018, she spoke to the project team about how to incorporate considerations for low speed electric vehicles into a bicycle plan.

Dr. Phil Lasley of the Texas A&M Transportation Institute -- Dr. Lasley has been actively involved in mobility analysis, congestion mitigation, performance measurement, and transportation policy for over five years. He is a leading researcher for TTI's Transportation Policy Research Center, a research center working with the Texas Legislature on projects of State interest. He has extensive experience in bicycle planning and on October 9, 2018 he gave a lecture to the project team on the essential components of bicycle master plans. In addition, he went through the College Station Bicycle Master Plan that he was part of the planning team.

Shawn Turner, PE, LCI of the Texas A&M Transportation Institute -- Mr. Shawn Turner has managed and performed a wide variety of transportation planning and traffic

operations research since joining the Texas A&M Transportation Institute in 1992. His major areas of emphasis have been in traffic data collection, ITS data archiving, management, and analysis. Mr. Turner is also active on the TRB Pedestrian Committee (currently serving as the Secretary) and the TRB Bicycling Committee, the ITE's Pedestrian and Bicycle Council, and the Association of Pedestrian and Bicycle Professionals.

Mr. Turner reviewed the draft Georgetown Bicycle Master Plan and provided written comments and suggestions.

Bonnie Sherman of TxDOT's Statewide Bicycle and Pedestrian Planning Program -- Ms. Sherman is a planner with TxDOT's Public Transportation Division, Statewide Bicycle and Pedestrian Program. She has worked in active transportation planning and environmental planning for TxDOT, and currently serves as the lead for the agency's project to initiate bicycle and pedestrian data collection across the state. Prior to joining TxDOT, Bonnie worked as an environmental consultant for a national firm. The project team interviewed her on November 26, 2018.

Review of Community Engagement

A1.2 PUBLIC ENGAGEMENT EFFORTS

TIMELINE

September 13, 2018: The City of Georgetown and the UT Project Team held a kickoff meeting to discuss preliminary scoping for the Bicycle Master Plan. The group clarified the project study area and scope of work, discussed objectives, identified available data, established communication channels, and determined the project schedule.

October 2, 2018: The UT Project Team participated in the City of Georgetown's "On the Table" events. Team members attended community meetings at the Southeast Georgetown Community Center to listen in on conversations with Georgetown residents as part of the City's comprehensive plan update efforts. This participation helped ensure that the team had a stronger understanding of the challenges facing the city overall, from affordable housing, to economic development, to bike planning.

October 11, 2018: The City of Georgetown and the UT Project Team held a stakeholder meeting. The team brought together key stakeholders to identify tasks for the Plan update, discuss community outreach efforts, review and comment on proposed improvements, and identify gaps in the City's current bicycle network. The stakeholder group included individuals from the following organizations:

- Georgetown Independent School District (GISD)
- TxDOT
- City of Georgetown Convention and Tourism Bureau
- Williamson County Parks and Recreation
- City of Georgetown Public Works
- City of Georgetown Planning Department
- Southwestern University
- City of Georgetown Parks and Recreation
- City of Georgetown City Manager's Office

Review of Community Engagement

October 11, 2018: Directly following the stakeholder meeting, the City of Georgetown and the UT Project Team conducted the first Bike Master Plan Community Workshop to gather public input about the current bicycling environment in Georgetown. This initial workshop was in the form of an open house with four main stations to gather sentiment about: 1) current bicycle demand, 2) the extent of the current bike network, and 3) community feelings toward biking in Georgetown.

November 15th, 2018: The City of Georgetown and the UT Project Team held a second stakeholder meeting to relay the results of the existing conditions analysis. Stakeholders also had an opportunity to provide feedback on proposed improvements and identify gaps in the draft version of the Bicycle Master Plan.

December 4, 2018: The City of Georgetown and the UT Project Team held a second community workshop, once again in an open house format, to present elements of the draft Bicycle Master Plan and proposed improvements to the public. City officials and community members were invited to participate in the process and comment on the draft.

Review of Community Engagement

COMMUNITY WORKSHOP DETAILS

The UT Project Team conducted a robust informational campaign to inform residents and visitors about the ongoing bike planning process in Georgetown. The first Community Workshop was advertised through flyers posted on community message boards and in local businesses, and a social media campaign was launched in order to raise awareness and encourage attendance. All social media posts shared on official City department social media outlets using the hashtags #BikeGeorgetown and #GeorgetownBici. Several UT study team members are fluent in Spanish and were available to translate as needed.

The Georgetown Public Library was chosen for the location of both community workshops due to its central location and high visibility. Welcome and informational posters were posted throughout the library to inform passersby of the event, and direct those interested to attend. After both community workshops, the UT study team worked to incorporate the feedback and comments received into the draft plan.

During the community workshops, 60 participants used the sign-in sheet, though the study team estimates that more people attended. These participants provided a total of 72 comments through general comment cards and participation in individual exhibits.

The UT Project Team was divided into three groups, each focusing on a different element of the bike plan: Demand, Supply, and Policy. The Demand group was responsible for community outreach for events, and for gathering information from residents regarding the current demand for bicycling in Georgetown. The Supply group took the lead on developing the actual proposed bike network and design considerations. The Policy team focused on cost estimates, decision making structures, and implementation of the bike plan. Each group designed activities to gather feedback that would help inform their own topics.

Review of Community Engagement

COMMUNITY WORKSHOP ACTIVITIES AND DISPLAYS

Demand

Attendees at the first workshop were greeted with two large poster boards at the event space entrance. Each displayed one of the following leading statements:

- I like biking in Georgetown because...
- I don't like biking in Georgetown because...

Colored markers and sticky notes were provided to attendees to write down and then post responses on each board. Three UT Project Team members were available to encourage participation.

A total of 21 unique comments were written on the poster prompting attendees to comment why they like biking in Georgetown, and 29 comments were written regarding why residents do not like biking in Georgetown.

In addition to these unique comments, a number of attendees expressed approval of comments that has already been written by marking them with either a +1 or star symbol. The following questions were prepared to help the project team prompt discussions with attendees to gather additional feedback:

- What brought you to the meeting today?
- Do you bike?
- If no, why not?
- Where do you go when you bike?
- What would encourage you to bike more?
- Do you think Georgetown is doing enough to promote bicycling?
- Do you think your friends, classmates, and co-workers have similar biking habits to yourself, and if not how are they different?

Review of Community Engagement

Policy

The policy group presented two activities. The first activity allowed community members to give feedback on how the City of Georgetown should handle regulations and policy measures dealing with cycling. The second poster was a “did you know” activity to educate community members on current city and state policies about biking, and some examples of how other communities have been implementing bike infrastructure.

Both policy posters sparked interesting conversations with community members, which were recorded and analyzed. The results of these conversations are summarized by topic below.

Present Dangers of Biking

- Roads are currently not cleaned to an appropriate degree leaving debris
- Stray animals pose a danger to bikers and pedestrians alike
- On many main roads traffic travels too fast for bikers to navigate comfortably
- Many roads lack shoulders or sidewalks; Airport Rd. and Austin Ave. were specifically mentioned
- There is inadequate walking and biking infrastructure near schools making these options potentially dangerous for children
- Cyclists reportedly speed through the trails and are a danger to pedestrians; implementing speed limits for bikes on trails was proposed as a solution

Update Codes and Policies

- Residents view this as the first step towards making Georgetown a more bike friendly place
- “No Right Turn on Red” signage suggested for intersections
- Consider completing unfinished sidewalks as part of the bike network
- Make bike lanes mandatory
- Provide an incentive for people to bike to festivals. i.e. if you bike to a festival you receive a 10% discount on your ticket

Typology Feedback is Contradictory

- Many respondents want dedicated bike lanes, particularly on wide roads, but others favor multi-use paths

Lack of Connectivity

- Sidewalks are incomplete or absent in multiple areas of Georgetown
- There are poor connections to regional trails outside of the city
- There should be better connections across IH-35 for bicycles
- Explore the opportunity for a “Rails to Trails” project on the railroad that runs through Georgetown

Education and Awareness

- Bike traffic lights are helpful in drawing driver’s attention to cyclists
- Incentives should be explored to push employers to encourage employees to bike to work
- All road users need to be better educated and aware of the rules of the road
- Education should be targeted toward cyclists and drivers, particularly in the Sun City community
- Installing signs and sharrows would be helpful to the cycling community

Review of Community Engagement

Supply

The Demand Group hosted two mapping exercises for participants to identify specific locations they travel to, and routes they travel on in Georgetown by bicycle as well as by vehicle or other modes. The team members leading this station wrote open-ended comments on post-it notes to provide context for the locations selected on maps. There was an additional mapping exercise to identify opportunities, strengths, threats, and weaknesses in the current bike network. The two mapping activities are described below:

Origin & Destination Map

Participants added different colored push-pins to a map to show 1) where they currently travel to and from by bike, and 2) where they would like to travel by bicycle if a fully connected, safe bicycling network existed in Georgetown. White push-pins represented desired origins, and blue push-pins represented desired destinations. For trips already being made by bicycle, a yellow sticker was used to represent origins, and blue/purple stickers were used to represent destinations. Red stickers were used to indicate crashes that have occurred involving cyclists.

Common destinations expressed by participants include the Downtown Square, Georgetown Country Club, Wrench Brewery, and existing trails.

Network Strengths, Weaknesses, Opportunities, and Threats Map

Participants added red push-pins to a map representing network gaps or problem spots in the existing bike network. Green pins were used to represent good bicycling facilities, and yellow push-pins to represent possible areas for improvement. Red stickers were used to indicate crashes that have occurred involving cyclists that residents were aware of.

Two areas highlighted as positive elements of the bicycle network are as follows:

- Country Road 258 outside of Reagan because of its wide shoulder for bicycling
- Existing parks and trails, with the trail along Scenic Drive marked most often

Primary opportunities for increased safety and connectivity suggested by community members include:

- Incorporate a pedestrian/bicycle element into the future Rivery Dr. IH-35 crossing
- Include a connection for bicyclists on Northwest Blvd. as it is expanded across IH-35
- Encourage College St. as a primary street for cycling
- Install shoulders along Lakeway Dr.
- Incorporate bicycling facilities into the expansion of Airport Rd.
- Facilitate trail connections to Berry Springs Park and the Berry Creek subdivision
- Explore the option of converting the rarely-used Georgetown Railroad into a trail path for pedestrians and cyclists

Review of Community Engagement

COMMUNITY WORKSHOP TAKEAWAYS

The two primary themes of concern from participants include safety and connectivity. Attendees described a willingness and desire to bike, but noted that a lack of connectivity and safety on the routes they would like to take often prevents them from doing so. The group shared that even when destinations are within easy biking distance, dangerous intersections or stretches of roadway motivate them to drive instead. Specifically, IH-35 serves as a significant divider that lacks safe connections for residents to reach the Downtown Square and other local destinations.

Other general concerns included:

- Flooding along hike and bike trails
- The potential of cars parking in bicycle paths in neighborhoods
- Gravel in emergency lanes impacting cyclist's ability to use a wide shoulder
- The fact that shoulders or bicycle lanes are removed after some road improvements

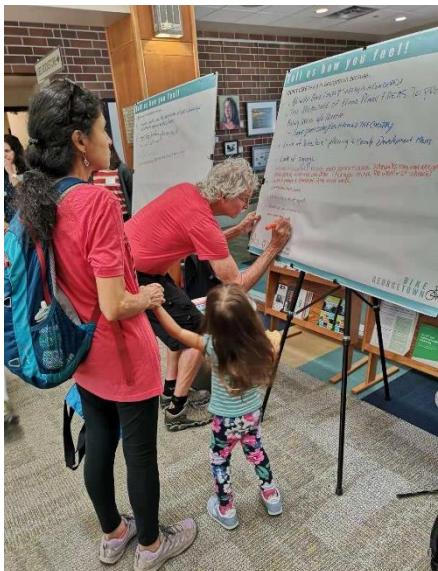
One group of participants were part of a local bicycling group from Sun City, Georgetown. The group organizes rides within Georgetown to a local bakery on Fridays, as well as long rides to outlying areas. Because they have cycled many Georgetown roads, their input was valuable in identifying problem areas.

Residents described a desire to access amenities such as grocery stores by bicycle. Some participants expressed a desire for protected bicycle lanes and separated bicycle paths, while others said that cyclists need no more than a wide shoulder on the road. Many residents suggested efforts to educate drivers, such as posting signage to alert drivers that cyclists may be present on roadways.

Each area of concern was evaluated by the project team. Many direct suggestions were worked into the Plan, while others were studied and reworked to offer a similar solution. All concerns were addressed in the Plan document itself either in the implementation chapters, especially Chapter 4: Engineering, Education, Encouragement, Enforcement, and Evaluation Plan, or in the Proposed Bicycle Network in Chapter 3.

Review of Community Engagement

Community Workshop Participation



Appendix 2: Survey Prompts

A2.1 ONLINE SURVEY

Dear Georgetown Residents/Visitors,

The City is working with graduate students from the University of Texas at Austin conducting a bike study in Georgetown. The purpose of this survey is to understand your views biking activities. Your input is important and will help the city to better understand the level of bike interest in the community. Your answers will be kept confidential. Please complete the survey regardless of your level of involvement with cycling activities. One household may provide multiple survey replies as long as the replies come from different household members.

This section will ask about your activities.

1. Are you a resident of the City of Georgetown?

- a. Yes
- b. No

2. Do you work in the City of Georgetown?

- a. Yes
- b. No

3. Have you ever biked to/from/in Georgetown?

- a. Yes
- b. No

Survey Prompts

4. Why do you bike? Check all that apply. (Skip to question #10 if you do not bike)
- a. Go to work
 - b. Run errands/ Go shopping
 - c. Go to park
 - d. Go to school
 - e. Go to city hall, community center or library
 - f. Visit family or friends
 - g. Transfer for other transportation, for example, to train station, bus stop, et al.
 - h. Exercises or fun
 - i. Other (Please specify) _____
5. How often do you bike between home and work or school?
- a. Daily
 - b. Weekly
 - c. Few times a week
 - d. Monthly
 - e. Never
6. How often do you bike for personal business such as going to the bank or run errands?
- a. Daily
 - b. Weekly
 - c. Few times a week
 - d. Monthly
 - e. Never

Survey Prompts

7. How often do you bike for recreation or exercise purposes?

- a. Daily
- b. Weekly
- c. Few times a week
- d. Monthly
- e. Never

8. What types of paths do you use when biking? Check all that apply.

- a. On-street bike lanes
- b. Sidewalks
- c. Major streets
- d. Neighborhood streets
- e. Hike and bike trails
- f. Other (Please specify) _____

9. When do you bike? Check all that apply.

- a. Workdays
- b. Weekends
- c. Early morning or before breakfast
- d. Morning (7-9am)
- e. Midday or lunch time
- f. Early afternoon
- g. Afternoon (4-6pm)
- h. Evening or after dinner
- i. Other times (please specify)

Survey Prompts

10. Where are your most common non-work trips within Georgetown by any means of transportation? Check all that apply.

- a. Shopping centers
- b. Neighborhood stores
- c. Restaurants
- d. Parks or trails
- e. School
- f. Place of worship
- g. Sporting facility
- h. City Hall
- i. Library
- j. Downtown
- k. Other (please specify) _____

11. When traveling by car within Georgetown, how far is your average destination from home?

- a. Less than 1 mile
- b. 1.1 to 2 miles
- c. 2.1 to 4 miles
- d. 4.1 to 6 miles
- e. 6 + miles
- f. I do not drive

12. How many bicycles/tri-cycles (non-motorized, non-electrical) does your household own?

- a. None
- b. One
- c. Two
- d. Three or more

Survey Prompts

This section will ask about your opinion on biking.

13. Was being in a bicycling friendly area an important consideration in your choice of where to live or work?
- Yes
 - No

14. Do you concur?

Note: On a scale from 1 to 5 where: 1. Strongly disagree; 2. Disagree; 3. Neutral; 4. Agree; 5. Strongly agree					
1	2	3	4	5	Statement
					Biking is a valuable transportation option for citizens
					Biking can Increase health and physical activities
					Roadway safety affects my decision to bike
					Biking encourages positive community interactions
					Biking can have a positive impact on the environment and “green” travel choices
					Biking to school is an important option for school-aged children
					Biking can support tourism and economic development in Georgetown
					Biking can provide affordable transportation options for low-income households or those with limited access to private vehicles
					Biking can enhance access to and experience of the natural environment

Survey Prompts

15. To what extent do you agree/disagree the following statements?

Note: On a scale from 1 to 5 where: 1. Strongly disagree; 2. Disagree; 3. Neutral; 4. Agree; 5. Strongly agree					
1	2	3	4	5	Statements
					Georgetown is overall cycling friendly city.
					Georgetown should improve cycling environment for ALL purposes including commuting, recreation, schooling, et al.
					Biking will grow in popularity as the City population grows.

16. If your taxes were kept the same but the funds would be re-distributed, would you support, oppose or remain neutral for additional city spending of transportation funds for improving cycling conditions?

- a. Support
- b. Oppose
- c. Remain neutral

Survey Prompts

This section will ask about your concerns related to biking.

17. What bicycle barriers do you experience in Georgetown. Check all that apply.

- a. Lack of bicycle lanes
- b. Lack of off-street bicycle trails
- c. Streets too narrow
- d. Poorly lit streets
- e. No bike parking
- f. No direct route
- g. Too many hills
- h. Journey is too long
- i. Concerns about bicycle theft
- j. Concerns about personal safety
- k. Nowhere to shower
- l. Weather concerns
- m. Physical disability/discomfort
- n. Other (please specify) _____

18. What would encourage you to cycle more? Check all that apply.

- a. Dedicated bicycle lanes
- b. Off-street bicycle trails
- c. Paved shoulders
- d. Better connectivity to bike facilities
- e. Better traffic enforcement
- f. Better street lighting
- g. Better traffic signage
- h. Safe bicycle parking
- i. Shopping, schools, parks nearby
- j. Other (please specify) _____

Survey Prompts

19. How often do you use the hike and bike trail system?

- a. Daily
- b. Several times a week
- c. Once a week
- d. A few times a year
- e. Never
- f. Other

20. When visiting the hike and bike trail system, where do you often go? (check all that apply)

- a. Chautauqua Park
- b. Blue Hole Park
- c. VFW Park
- d. Bark Park
- e. San Gabriel Park
- f. Rivery Park
- g. Chandler Park
- h. Booty's Road Park
- i. Lake Georgetown
- j. I have not visited the hike and bike trail system
- k. Other: _____

21. Where do you believe are the most unsafe intersections or locations for cyclists in Georgetown? (text box)

Survey Prompts

22. Identify specific street intersections and locations where you think bicycle facilities would be most beneficial in Georgetown? (text box)

This section will ask about general information.

23. What type of bike rider are you?

- a. Enthusiast
- b. Interested but concerned
- c. Not a rider
- d. Other

24. Please select your age range?

- a. Under 10
- b. 11 to 14
- c. 15 to 17
- d. 18 to 24
- e. 25 to 34
- f. 35 to 54
- g. 55 to 64
- h. 65+

25. What is your gender?

- a. Male
- b. Female
- c. Prefer not to disclose
- d. Other

Survey Prompts

26. What is your race or ethnicity?

- a. White
- b. Black or African American
- c. Hispanic or Latino
- d. Asian or Pacific Islander
- e. Mixed Race or Other
- f. Prefer not to disclose

27. What is the highest level of education you completed?

- a. Less than 9th grade
- b. Some high school
- c. High school diploma or GED
- d. Some college
- e. Associate degree or vocational/technical certification
- f. College degree
- g. Graduate or professional degree

28. How many persons are there in your households?

- a. 1
- b. 2
- c. 3
- d. 4
- e. 5+

29. How many motorized vehicles are there in your households?

- a. 0
- b. 1
- c. 2
- d. 3
- e. 4
- f. 5+

Survey Prompts

30. What is your annual household income?

- a. Less than \$19,999
- b. \$20,000-\$39,999
- c. \$40,000-\$59,999
- d. \$60,000-\$79,999
- e. \$80,000-\$99,999
- f. \$100,000+

31. What is the zip code you live in? _____

32. Do you have any suggestions for the future of cycling in Georgetown? (text box)

33. Would you like to share your email in order to stay connected with future bike planning efforts in Georgetown? If Yes, please enter your email address

Thanks again for completing the survey!

Survey Prompts

A2.2 INTERCEPT SURVEY – CYCLIST

- | | | |
|---|-----|----|
| 1. Have you ever biked to/from/in Georgetown? | Yes | No |
| 2. Are you a resident of the City of Georgetown? | Yes | No |
| 3. Do you work in the City of Georgetown? | Yes | No |
| 4. How often do you bike? | | |
| a. Daily | | |
| b. Few times a week | | |
| c. Weekly | | |
| d. Monthly | | |
| 5. Where do you go when you bike? (Check all that apply. Skip if you have never biked.) | | |
| a. Workplace | | |
| b. Shopping center | | |
| c. Neighborhood stores | | |
| d. Restaurants | | |
| e. Parks or trails | | |
| f. City Hall | | |
| g. The Library | | |
| h. Downtown | | |
| i. Other (please specify) _____ | | |

Survey Prompts

6. When traveling by car within Georgetown, how far is your average destination from home?
- Less than 1 mile
 - 1.1 - 2 miles
 - 2.1 - 4 miles
 - 4.1 - 6 miles
 - 6 + miles
 - I do not drive
7. To what extent do you agree/disagree the following statements? (1 strongly disagree - 5 strongly agree)
- Georgetown is an overall cycling friendly city _____
 - Biking will grow in popularity as the city population grows _____
8. Do you concur? (Yes, No, or Neutral)
- Roadway safety affects my decision to bike _____
 - Biking encourages positive community interactions _____
9. What bicycle barriers do you experience in Georgetown?
10. If your taxes were kept the same but the funds would be redistributed, would you support, oppose or remain neutral for additional city spending of transportation funds for improving cycling conditions? (Support, Oppose, Neutral)
11. Do you have any suggestions for the future of cycling in Georgetown?
12. Would you like to stay connected to future bike planning efforts in Georgetown? If yes, please provide email
-

Survey Prompts

A2.3 INTERCEPT SURVEY – NON-CYCLIST

1. Have you ever biked to/from/in Georgetown? Yes No
2. Do you work in the City of Georgetown? Yes No
3. Are you a resident of the City of Georgetown? Yes No
4. When traveling by car within Georgetown, how far is your average destination from home? _____ mile/s
5. How many bicycle/tri-cycles (non-motorized) does your household own?

6. Do you agree? (Yes, No, Neutral)
 - a. Biking is a valuable transportation option for citizens
 - b. Roadway safety affects my decision to bike
 - c. Biking to school is an important option for school-aged children
 - d. Biking will grow in popularity as the City population grows
7. If your taxes were kept the same but the funds were re-distributed, would you support additional spending of transportation funds for improving CYCLING? (Yes, No, Neutral)
8. How many motorized vehicles are there in your household? _____ (#)
9. What is the Zip code you live in? _____
10. Do you have any suggestions for the future of cycling in Georgetown?

Survey Prompts

9. Would you like to share your email in order to stay connected with future bike planning efforts in Georgetown? If yes, please enter your email address

Survey Prompts

A2.4 ENVIRONMENTAL AUDIT PROMPT

Location	Photo Taken?	YES	NO	Date	Time	Name
1 Are there bicyclists using this street segment?			A lot	Some	None	
2 Is there right-of-way dedicated to bicyclists?			Yes	No		
3 What type of path are bicyclists riding on?			Wide Shoulder	Shared Path/Lane - Unmarked	Sidewalk	Bike Lane
4 Is the path smooth, stable, and free of obstacles?			Yes	No		
5 Is there quality lighting along this street segment?			Yes	No		
6 Are the street lanes or shoulder wide enough to accommodate a new, 5-ft wide bike lane?			Yes	No		
7 Is there bicycle parking available nearby?			Yes	No		
8 Are bicycle accommodations continuous along the segment?			Yes	No		
9 Is the visibility of cyclists adequate from all road users' perspectives?			Yes	No		
10 Are signs and pavement markings (e.g. bike lane, crosswalk) in good condition and visible for all road users?			Yes	No		
11 What is the posted speed limit on this street segment?			15 mph or less	16 to 25 mph	26 to 35 mph	higher than 35 mph
12 How many lanes wide is this street (both way total)?			2	3	4	5+
13 Are there pedestrians walking near this location?			Yes	No		
14 What is the predominant land use at or near this location?			Residential	Neighborhood Commercial/ Retail	Large Scale Commercial	Office
15 Does public transit operate along this street segment?			Yes	No		
16 What type of vehicle parking is available on this segment?			On-street parallel	Off-street angled	Driveways	Park/ Open Space
17 Describe the street/trail grade			Steep	Flat		
18 Are there street trees/shade along this street?			Yes	No		

Comments/Notes:

Appendix 3: Survey Report – Analysis of Survey Results

A3.1 SURVEY STRATEGY SUMMARY

Public outreach is essential in understanding the demand for bicycling in Georgetown. Two surveys were administered -- an online survey and an in-person intercept survey. Input was gathered from people of various demographics and biking perspectives. **1,172 online surveys and 307 intercept surveys were completed.**

Initial surveys were conducted by a UT study team in 2016, and the 2018 survey language is identical to allow results to be combined for a larger, more representative data set. Results from the two study periods were compared to ensure there were no discrepancies or duplications.

Survey questions were written with guidance from previous national

bicycle surveys, and research on important factors influencing cycling¹. The online survey was hosted on Survey Monkey in both English and Spanish, and was sent out to the City's citizen engagement platform, Next Door. It was also advertised on the City's social media channels (Facebook, Twitter) and website, emailed via community group listservs, and available during the community workshops. The online survey was live from October 1 to November 2, 2018. The intercept surveys were conducted by project team members in person in the fall of 2018. Individuals were approached on sidewalks and outside of popular destinations and asked survey questions verbally.

1 - The Heart Foundation Women and Cycling Survey, 2013.; Thanet Cycling Questionnaire, 2010.; Australian Cycling Participation Survey, 2013.

A3.2 SURVEY METHODS

The biking survey conducted in Georgetown was based on research methods formulated by the Social Research Methods Knowledge Base to gauge residents' opinions about biking, as well as current biking conditions, needs, and barriers. This section outlines the accepted method for conducting a survey:

- 1. Choosing an appropriate survey method:** Based on population, accessibility, literacy, and the nature of the questions, a two-part intercept and online survey was chosen. To be inclusive of a range of literacy levels, intercept surveys were conducted in personal interview format, and the online survey in a written format. The online questionnaire was written in both Spanish and English, and intercept surveys were conducted by bilingual team members to ensure the Hispanic demographic in Georgetown was included.
- 2. Calculating the ideal sample size:** Sample size is dependent upon the size of the city's population that the sample is meant to represent. A margin of error of +/- 5% and a 95% confidence level are considered ideal. If the sample size is relatively small, a lower level of confidence and a higher margin of error must be selected. The ideal sample size for the population of Georgetown to achieve a 95% confidence level that the results are representative is 342.
- 3. Survey design:** It is important to consider the way questions are phrased and presented when crafting a survey. For sensitive topics, questions that are less politically charged may be ideal. Per best practices, general questions were asked first, followed by more specific and personal questions. Open ended questions that required the most time and effort were placed after shorter multiple-choice questions. Highly sensitive questions regarding salary, ethnicity and household data were last and were optional.

Survey Report

4. Collection and analysis:

- a) Data preparation - Survey responses were coded in a binary format whenever possible, and in all other cases subjective responses were retained. Subjective responses were coded by key themes.
- b) Weighting - Based on the overall gender, age, and ethnicity makeup of Georgetown, the sample collected was determined to be representative of the cycling population. With any survey, it is possible that some population segments are over-sampled while others may be under-sampled. In these cases, a scaling process would be necessary to project the true opinion of the population. Again, this was not required in analyzing survey responses as results were statistically valid to represent Georgetown.
- c) Correlation and inferences – Responses were examined to identify correlations and trends, such as a correlation between age or gender and biking preferences. Inferences were made based on the final opinion splits and correlations.
- d) Data description - Data from surveys was used to make broader inferences about biking behavior in the city. The key themes that emerged from survey data were integrated into the Bike Plan's key themes. Results were also used to make policy recommendations.

A3.3 SURVEY ANALYSIS

Demographic Response

Despite targeted efforts to reach underrepresented groups, the online survey still did not capture the exact gender and racial/ethnic breakdown of Georgetown.

Survey responses neared gender parity, but male responses slightly outnumbered female, and a small percentage of respondents answered “other” or did not disclose. This may be partially explained by the fact that men are more likely to cycle than women, and therefore men may have

been more likely to express interest in completing the survey².

In proportion to the demographic breakdown of Georgetown, response rates were low from non-white ethnic and racial groups. Efforts were made to conduct a large portion of intercept surveys in predominantly Hispanic communities, and several surveys were conducted in Spanish. However, intercept surveys did not ask for racial/ethnic identification information, and for this reason survey results may under report the number of Hispanic respondents.

2 - <https://bikeleague.org/womenbike>

Survey Report

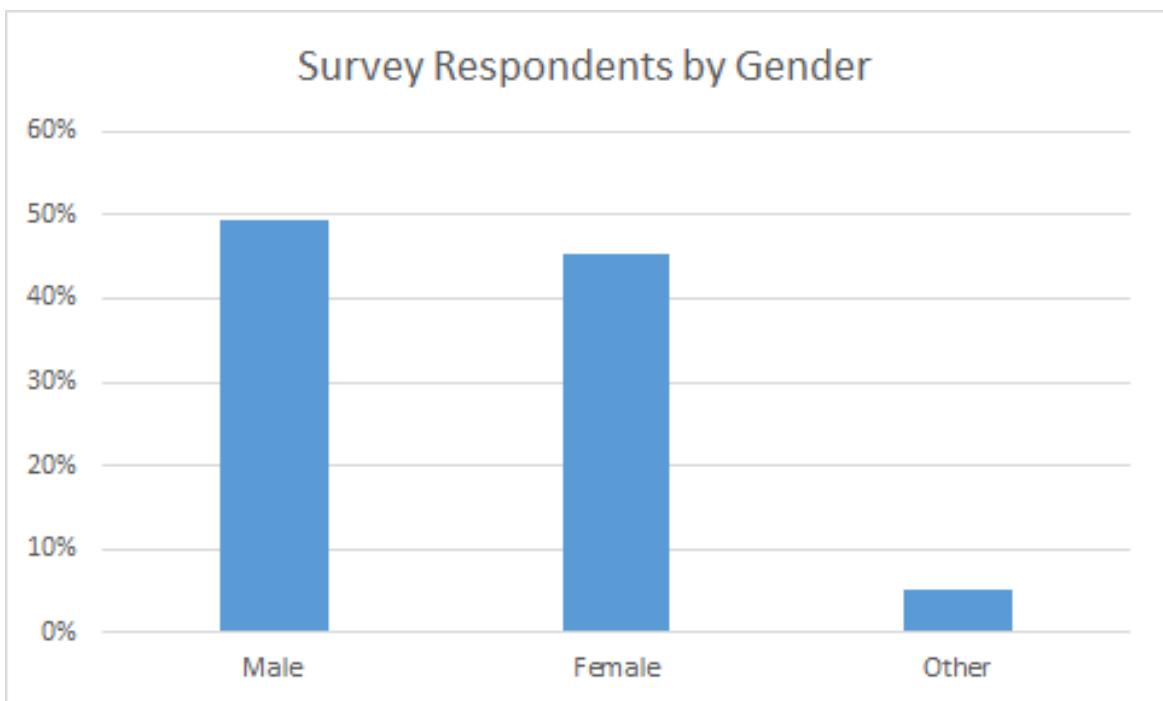


Figure 1. Survey Respondents by Gender

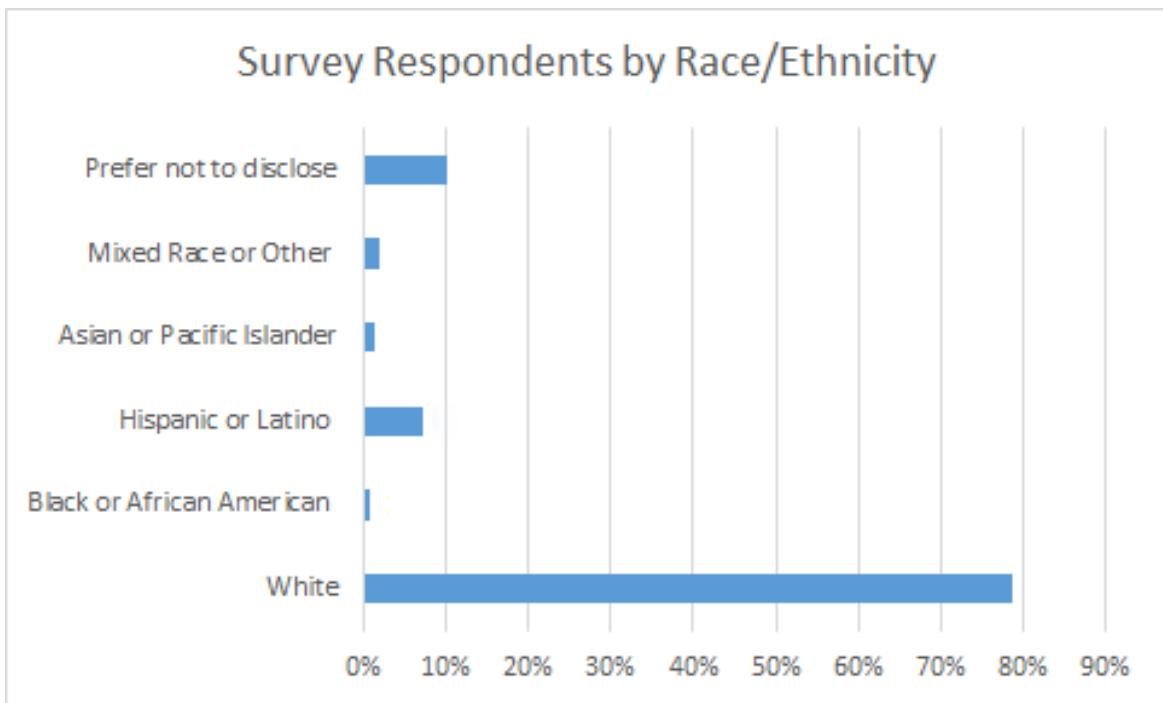


Figure 2. Respondents by Race/Ethnicity

Survey Report

Bike Trip Type

Understanding where and why people ride bikes within Georgetown is key to understanding and addressing the needs of the community. The survey asked questions related to the location and purpose of bike trips, and opportunities to convert non-cycling trips to cycling. Insights gathered helped make decisions regarding infrastructure types and locations, as well as what types of encouragement campaigns may work in the city within the Plan.

An overwhelming majority – 89% – of respondents indicated that they ride for exercise or fun most frequently. Biking to the park is the second most popular reason for biking, with 37% of respondents indicating that they do so. Utilitarian bike trips are less popular than those taken for recreational purposes. Only 22% of survey respondents said they run errands on their bike, and nearly 60% of survey respondents never bike to school or work.

Why do you bike?

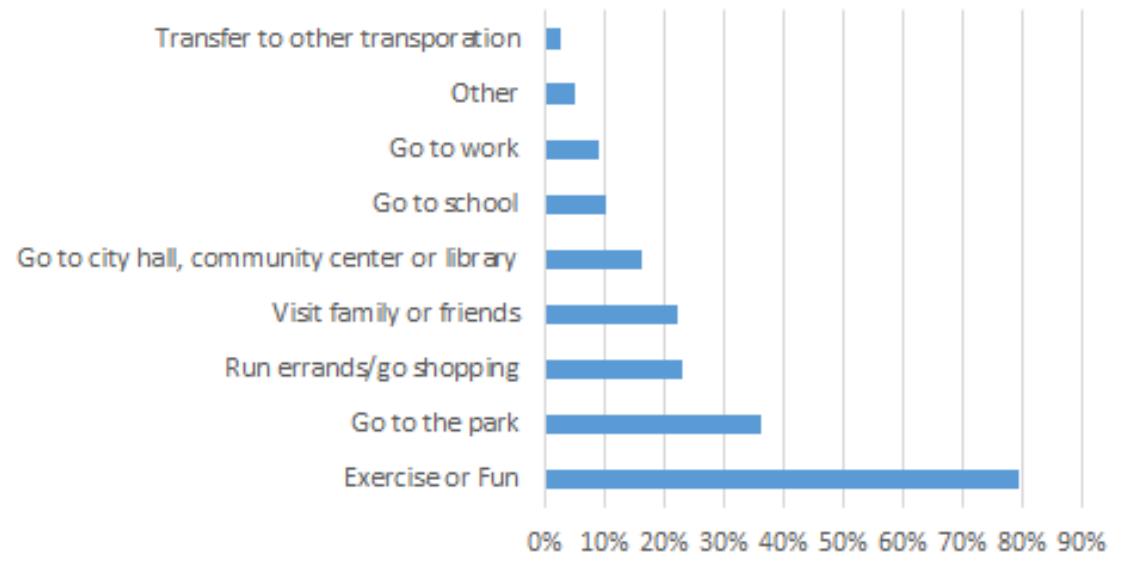


Figure 3. Do You Bike? Results

Survey Report

How often do you bike between home and work or school?

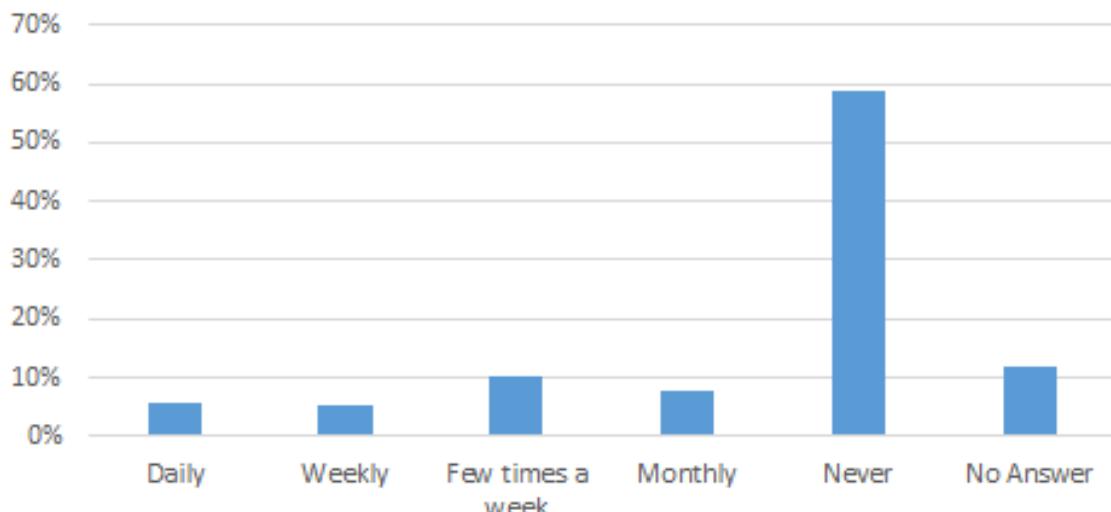


Figure 4. How Often Do You Bike Between Home and Work or School? Results

What are your most common non-work trips within Georgetown (by any means of transportation)?

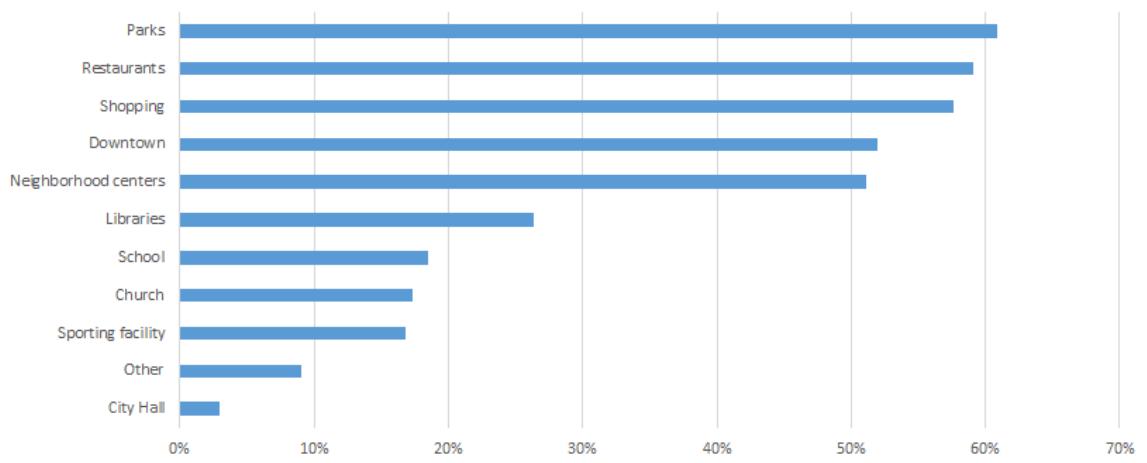


Figure 5. Most Common Non-Work Trips? Results

Survey Report

Bike Demand in Georgetown

The question “What type of rider are you?” showed that 29% of respondents consider themselves “interested but concerned” riders. This group is interested in cycling, but

has concerns regarding safety and connectivity of the bike network. If barriers and points of concern are addressed, there is potential convert those “interested but concerned,” and potentially “not bikers” into cyclists.

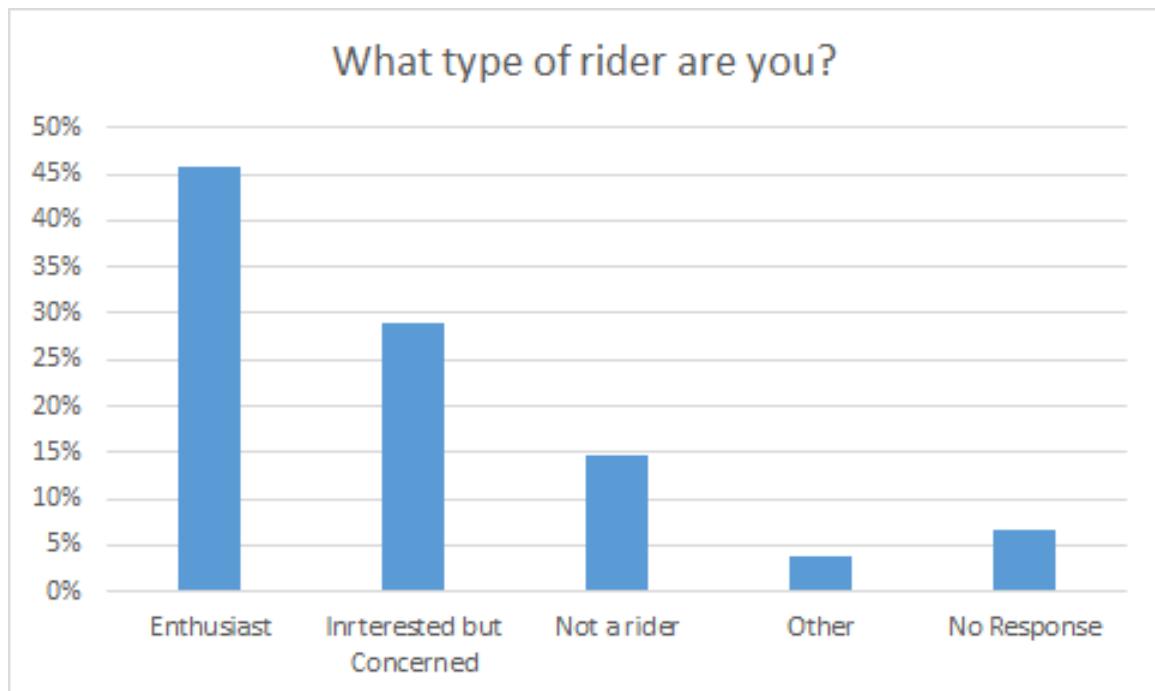


Figure 6. What type of Rider are You? Results

Survey Report

Bicycling Barriers in Georgetown

Lack of bicycle lanes and personal safety were the top concerns for both cyclists and non-cyclists. Barriers that prevent current residents from cycling are due to a lack of dedicated bicycle infrastructure, including bicycle lanes and off-street bicycle trails. Barriers are graphed in Figure 7.

Despite the barriers indicated, many residents are enthusiastic about the

potential of bicycling in Georgetown. Many expressed interest in the bicycle master plan, investing in bicycling infrastructure, and promoting bicycling in the city. Non-cyclists and infrequent cyclists indicated that the most impactful method for increasing their biking habits would be installing dedicated bike lanes, off-street bicycle trails, and paved shoulders, as indicated in Figure 8.

Bicycle Barriers Experienced in Georgetown

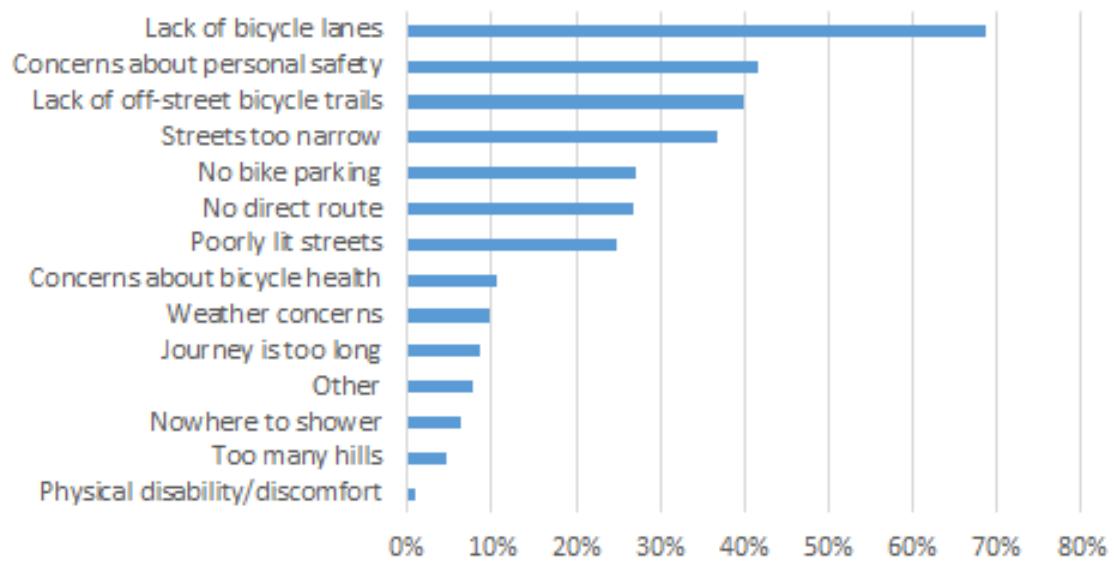


Figure 7. Bicycle Barriers Results

Survey Report

What would encourage you to cycle more?

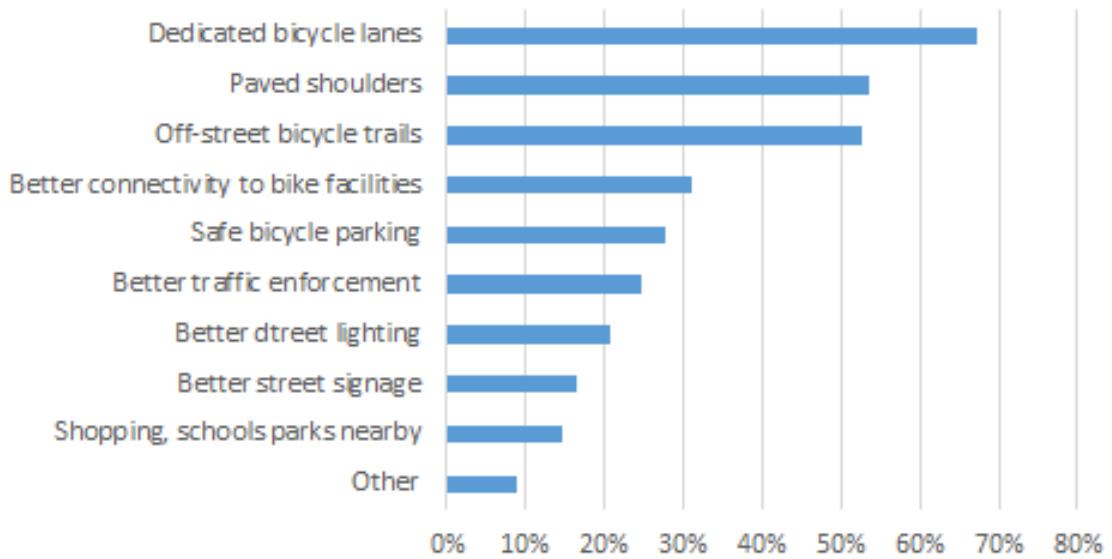


Figure 8. What Would Encourage You to Cycle More? Results

Appendix 4:

Current Conditions Analysis

Supporting Maps

To inform the recommendations within the Georgetown Bike Plan, the project team conducted a substantial existing conditions analysis. A series of maps and geospatial analyses were produced to help choose the most appropriate location for each segment of the proposed network.

A4.1 ENVIRONMENTAL CONDITIONS

An environmental conditions assessment was completed to identify natural landmarks and visualize flood risk in Georgetown. Figure 9 shows a map of Georgetown's city limits in conjunction with the Federal

Emergency Management Agency (FEMA) flood plain. Figure 10 shows an elevation map of the city, and Figure 11 shows the slopes and topography of Georgetown.

Current Conditions

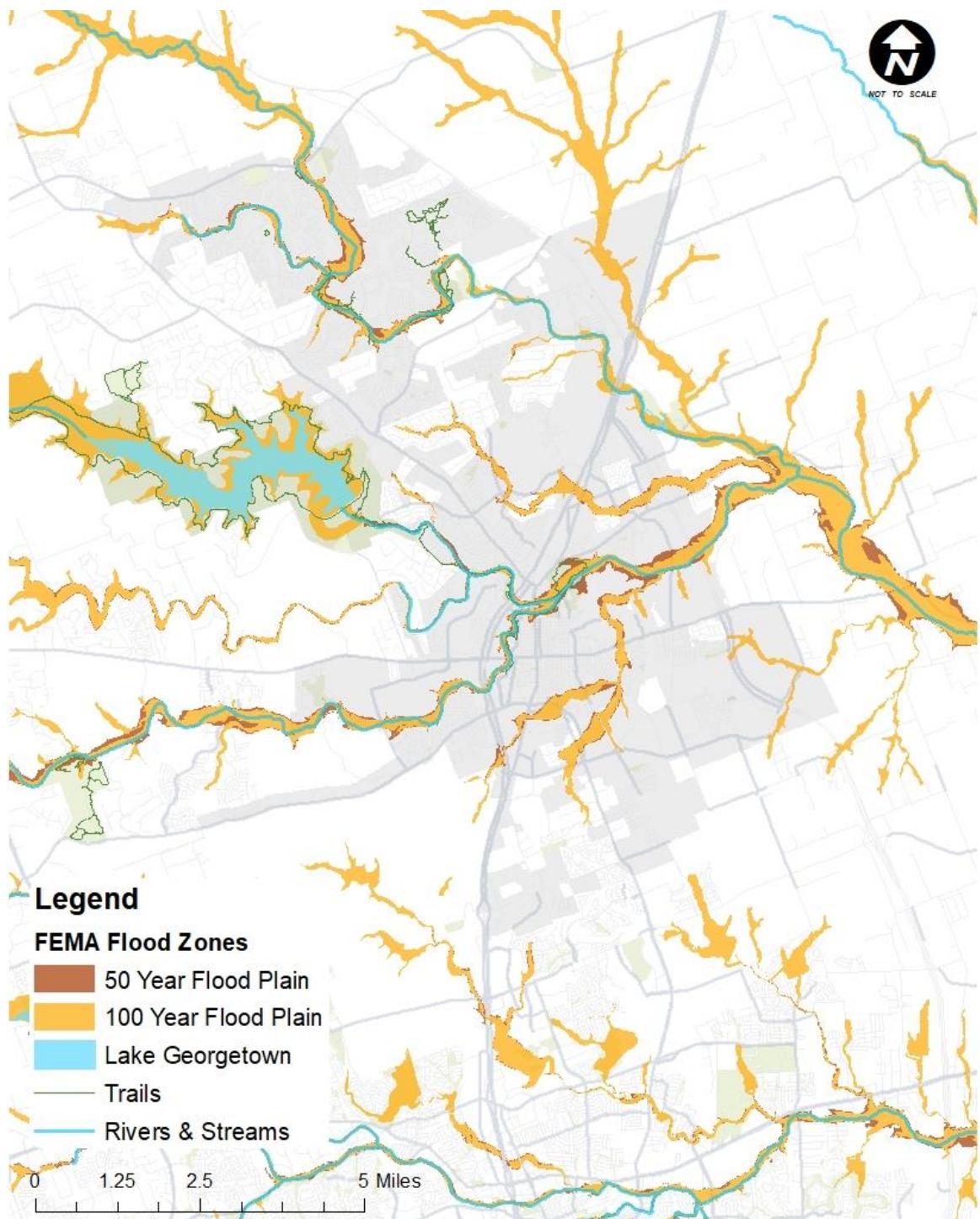


Figure 9. FEMA-designated Flood Plains³

3 - Williamson County (2013)

Current Conditions

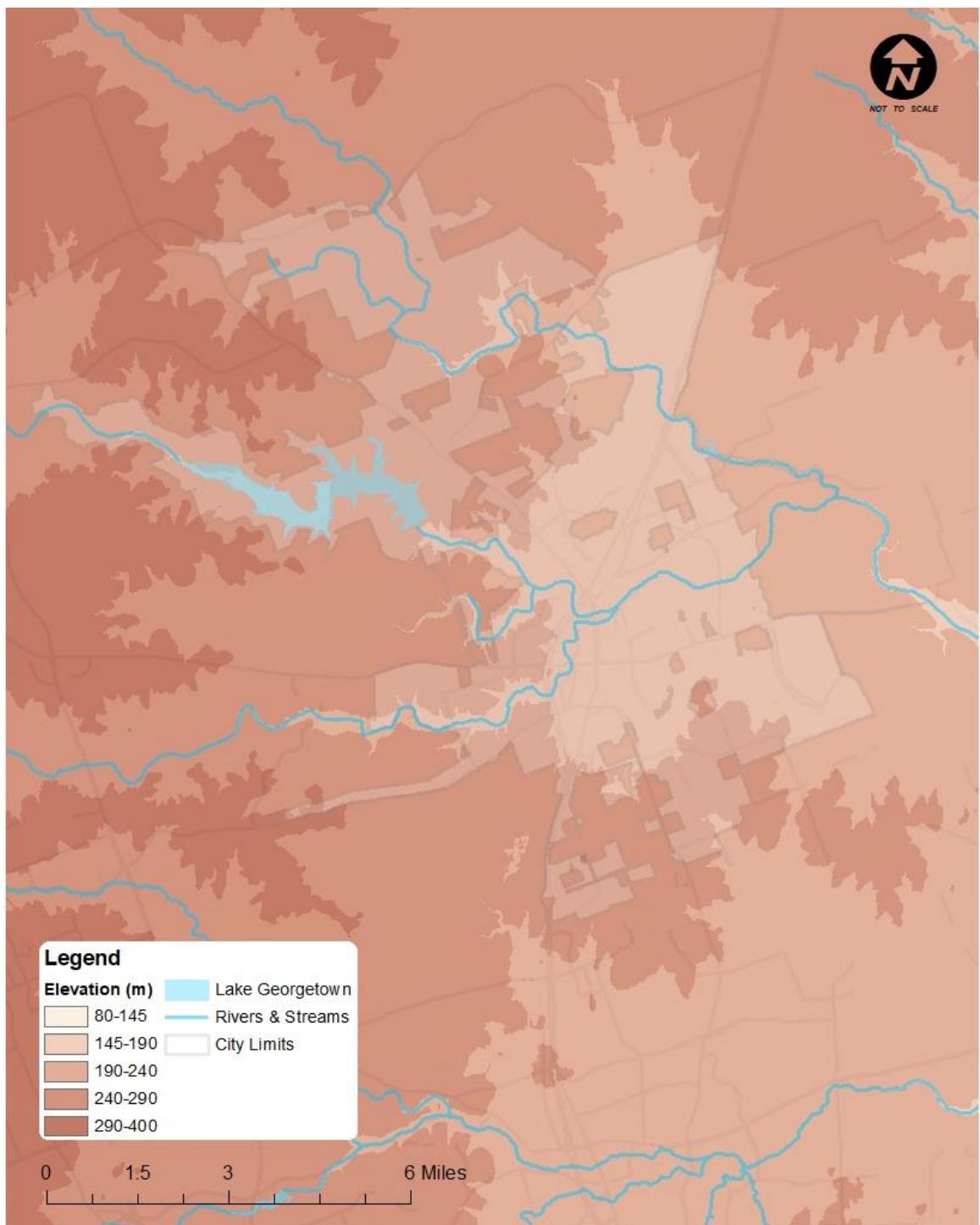


Figure 10. Elevation Map⁴

4 - USGS.com (2018)

Current Conditions

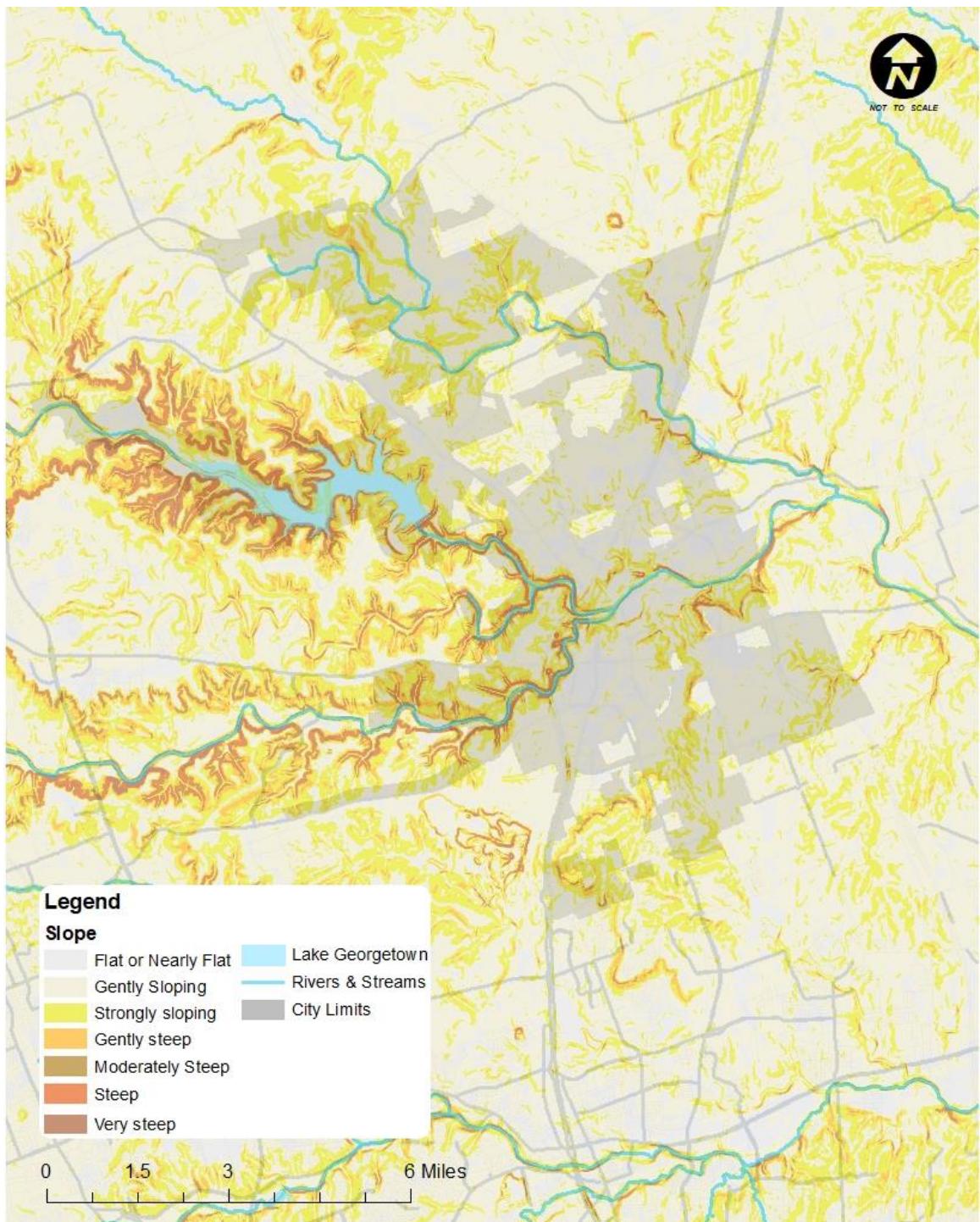


Figure 11. Slope Map⁵

5 - USGS.com (2018)

Current Conditions

A4.2 DEMOGRAPHIC FACTORS

Demographic factors were taken into consideration when creating the bike plan in order to better understand the community that was being planned for. Certain density and demographic characteristics impact individual

decisions to bike, as well as which potential bike routes will serve the most people. Figure 12, Figure 13, and Figure 14 show basic demographic information, while Figure 15 shows bike commuter density.

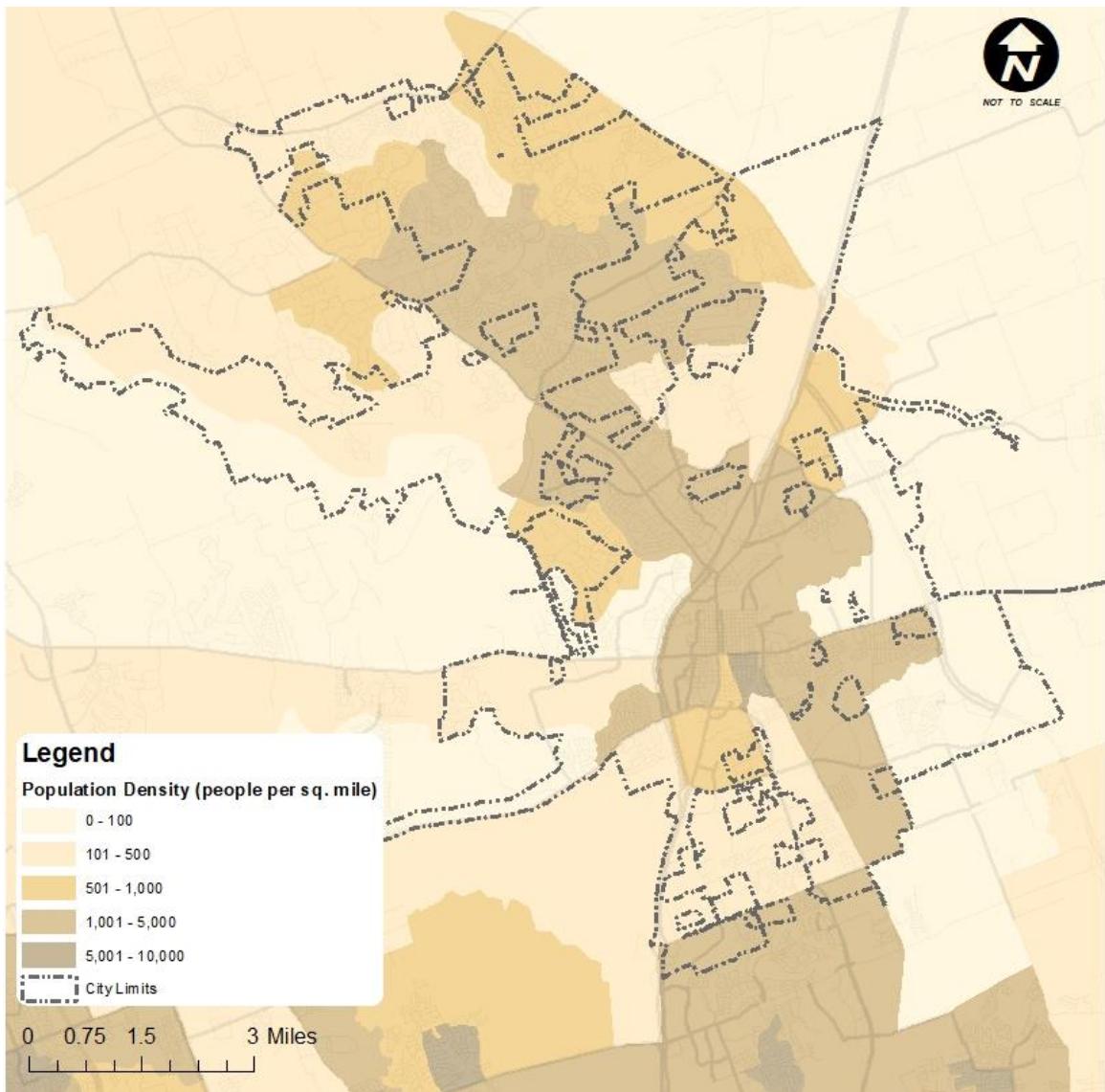


Figure 12. Georgetown Population Density⁶

6 - 2016 American Communities Survey (ACS), 5-Year

Current Conditions

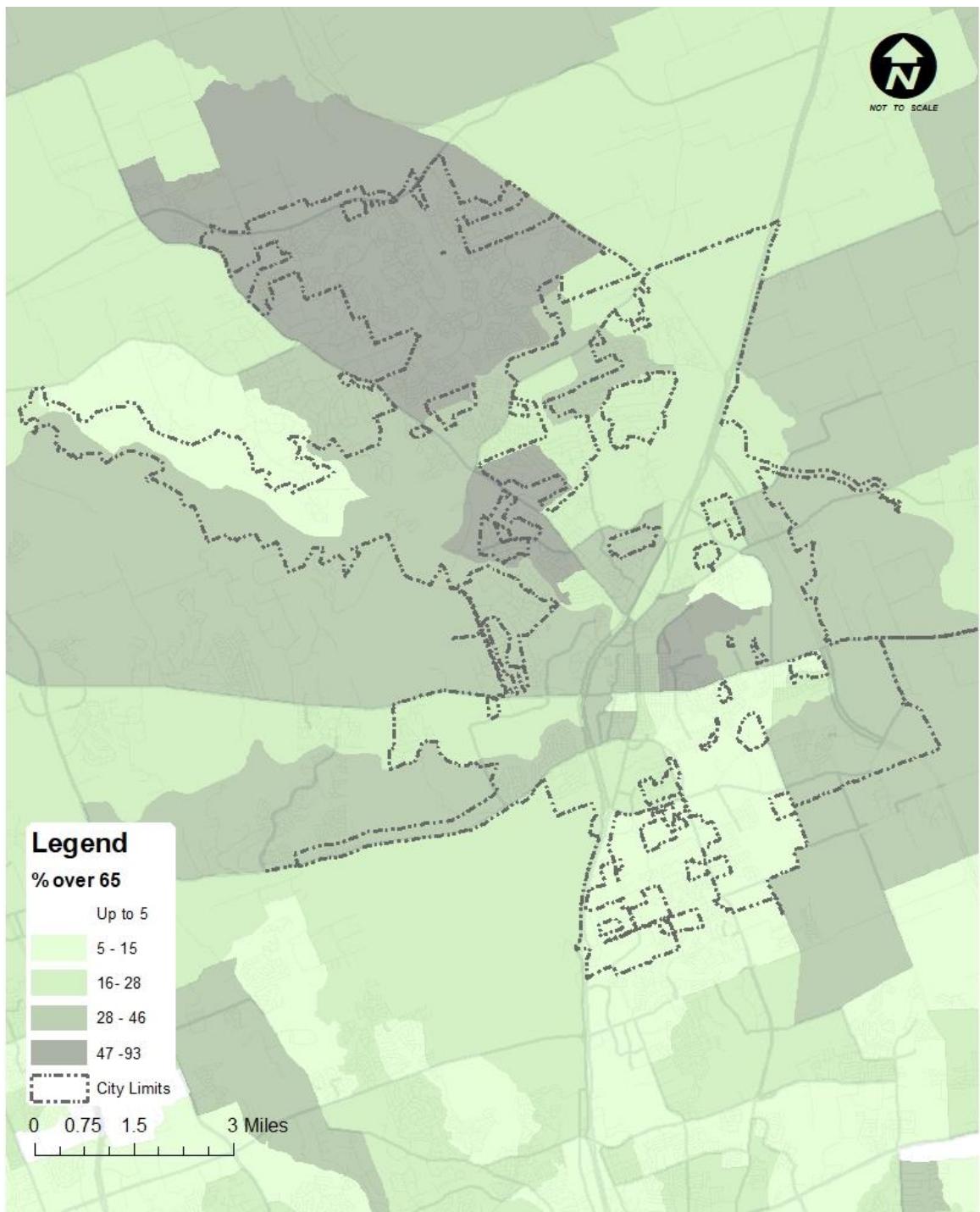


Figure 13. Percent of Population Age 65+⁷

7 - 2016 American Communities Survey (ACS), 5-Year

Current Conditions

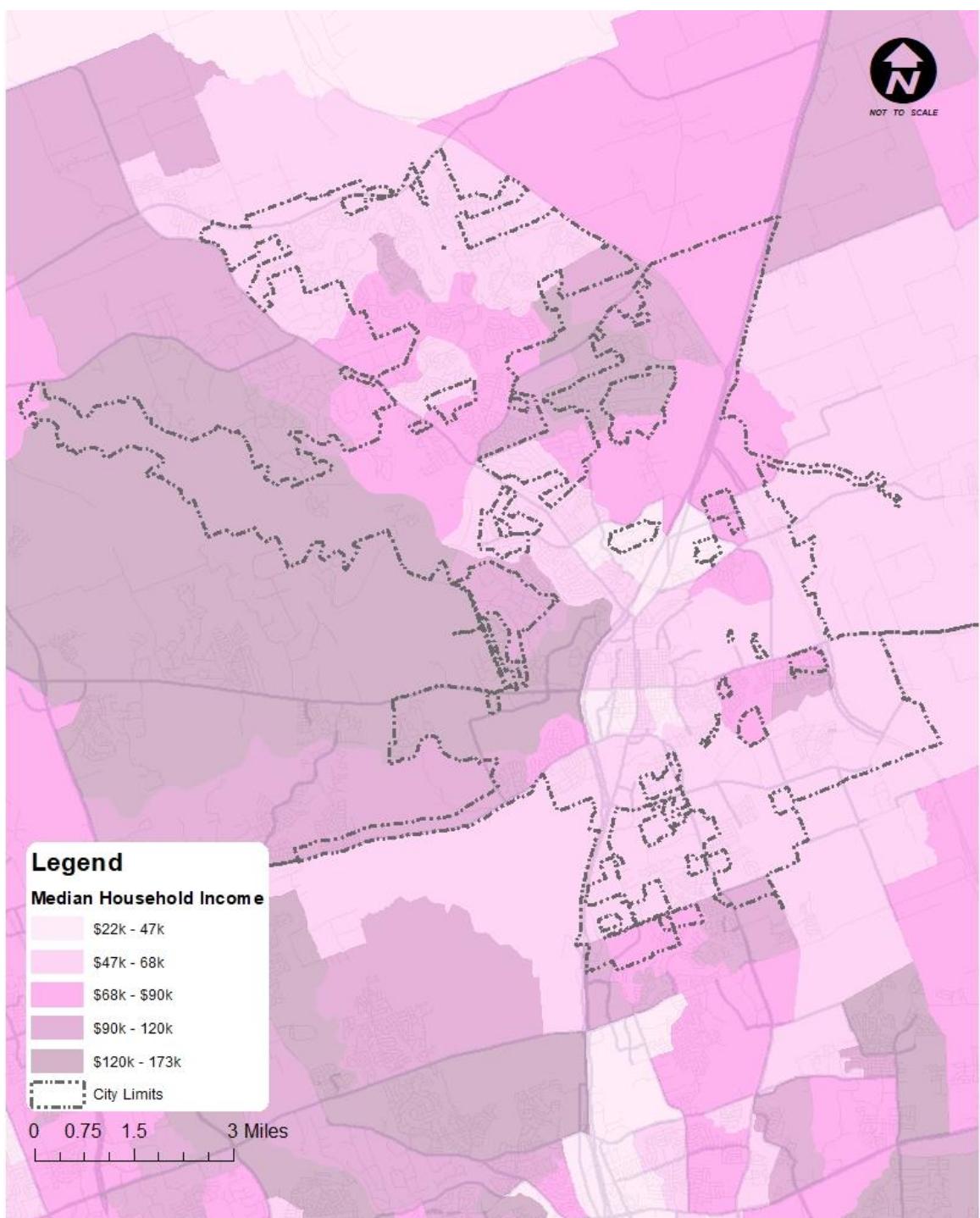


Figure 14. Median Income⁸

8 - 2016 American Communities Survey (ACS), 5-Year

Current Conditions

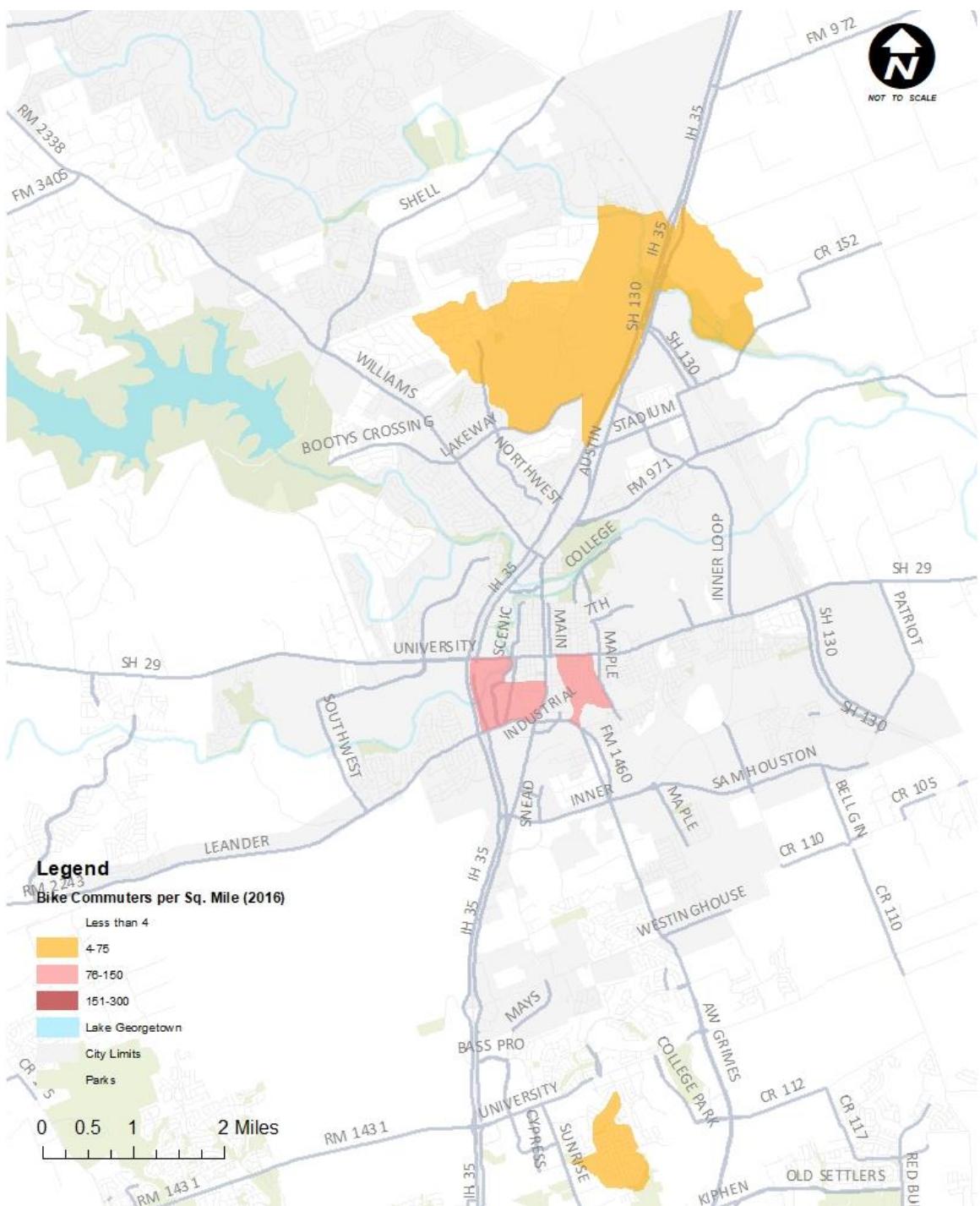


Figure 15. Bike Commuter Density⁹

9 - 2016 American Communities Survey (ACS), 5-Year

Current Conditions

A4.3 CURRENT TRANSPORTATION CONDITIONS IN GEORGETOWN

Figure 16 maps the concentration of people traveling to particular geographical destinations in Georgetown. Many trips occur to Downtown Georgetown, as well as Southwestern University, Sun City,

and other key shopping centers and neighborhoods. Figure 17 shows completed and on-going transportation projects in Georgetown. Figure 18 maps schools, sidewalks, and existing trails.

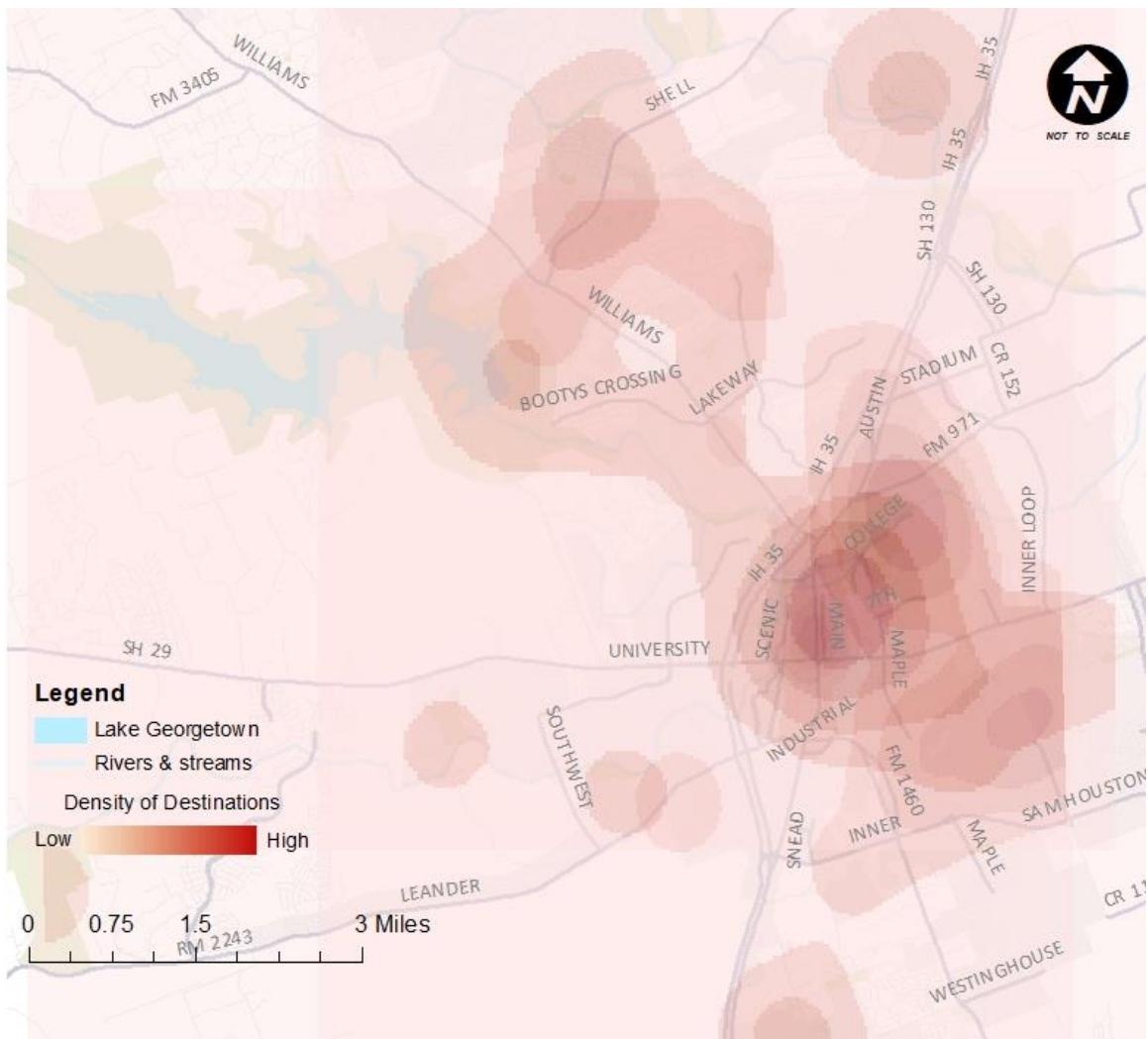


Figure 16. Destination Heat Map¹⁰

Current Conditions

Ongoing projects such as 2 and 5 produce construction debris and eliminate wide shoulders, limiting suitable routes for cyclists. Projects 3B and 7 could be opportunities for creating shadow network in the future.



Figure 17. Recent and Future Roadwork in the City of Georgetown¹¹

Current Conditions

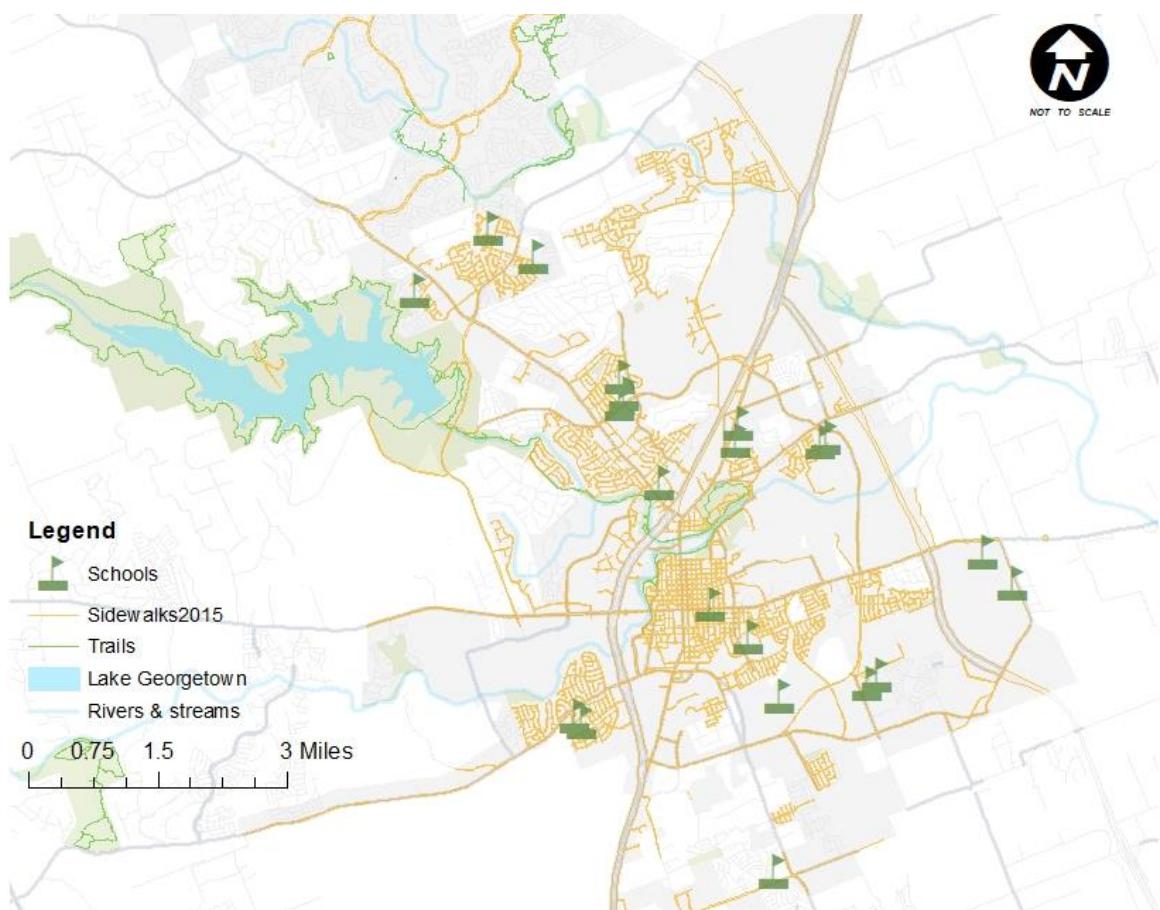


Figure 18. Schools, Sidewalks, and Trails¹²

Figure 19 and Figure 20 show portions of the Williamson County Bike Master Plan. The County's proposed network stretches more than 350 miles, and includes new trails along most of the major arterials in Georgetown. It should be noted that these proposals are not in line with the recommendations of this Plan.

The planned Williamson County network includes connections to

Liberty Hills, Florence and Jarrell by extending the existing off-street trails on the San Gabriel River and in Sun City. On the east side of Georgetown, a proposed trail will connect Berry Creek Trail and further extend to Taylor. FM 1460 would serve as a regional corridor to connect Round Rock in the south. On the south-west side of the city, the proposed trail along south fork of San Gabriel River will connect to Leander.

12 - City of Georgetown (2018)

Current Conditions

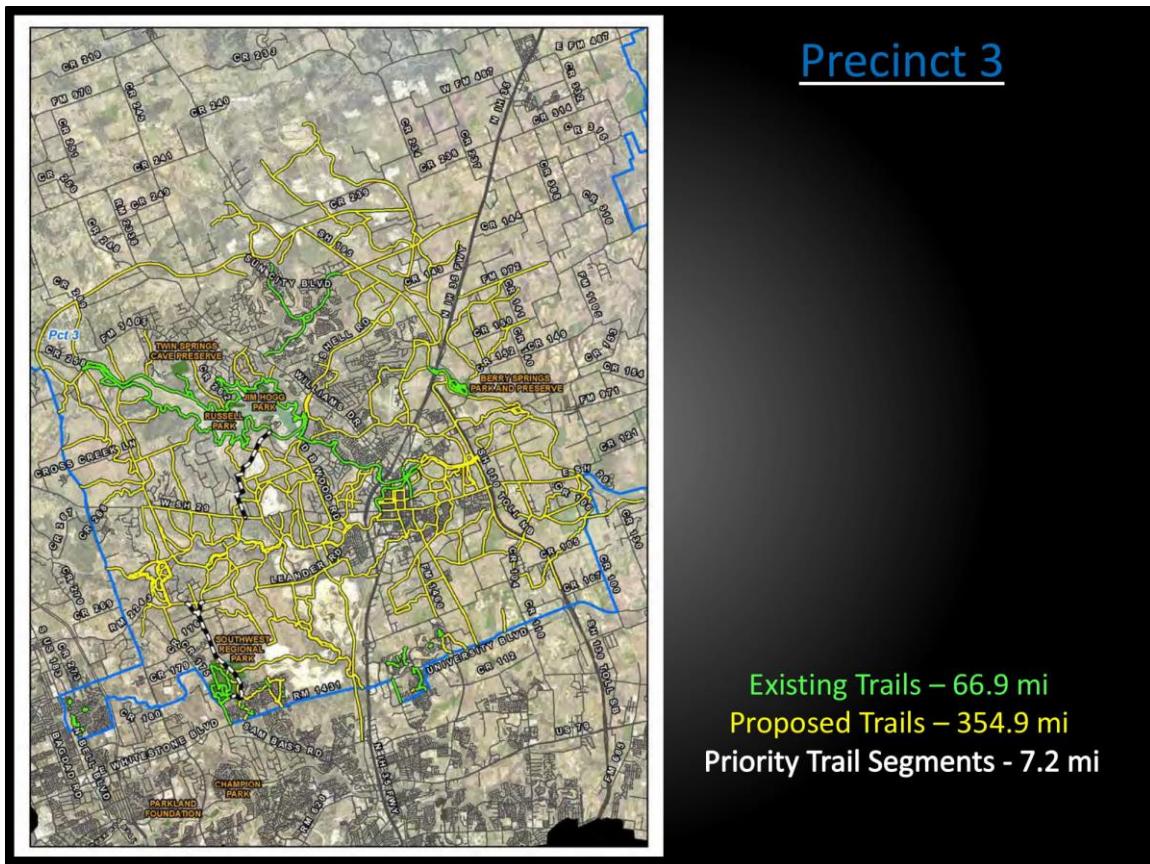


Figure 19. Existing, Proposed and Priority Trail Segments¹³

13 - Williamson County Comprehensive Parks Master Plan (2018)

Current Conditions

Map 4.1, Proposed Trail System

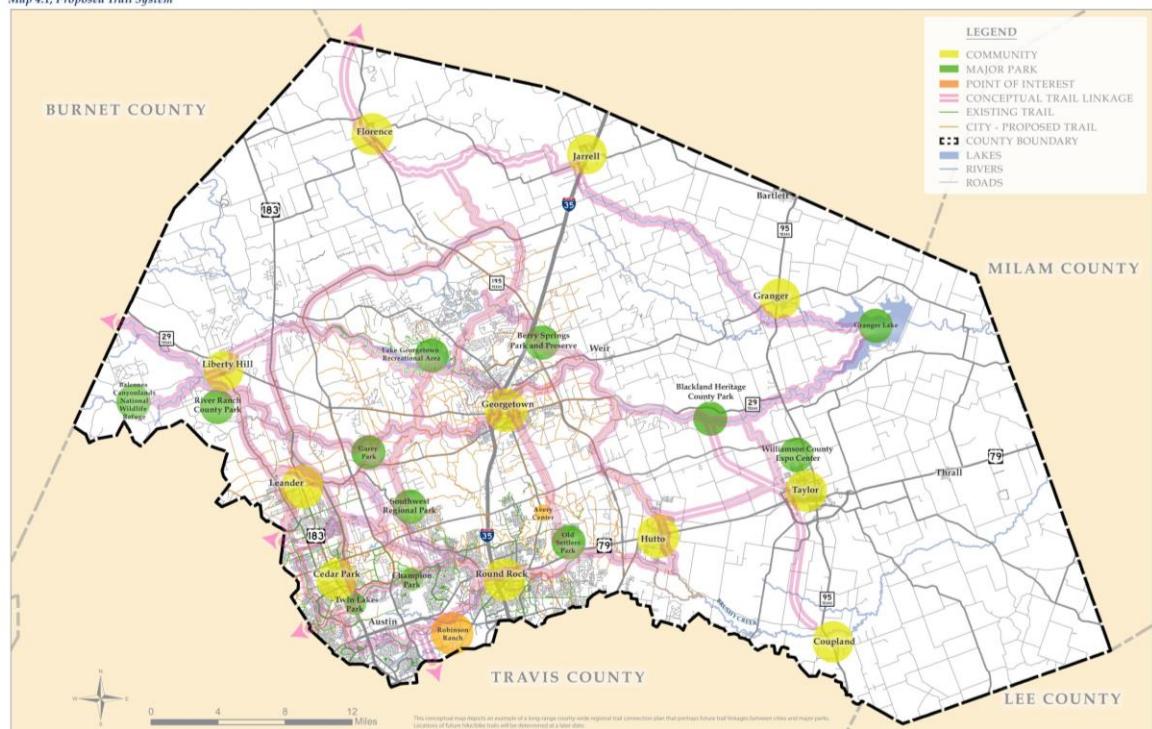


Figure 20. Proposed Regional Trail Network¹⁴

Current Conditions

Figure 21 and Figure 22 show current railroads, airports, and transit stops.

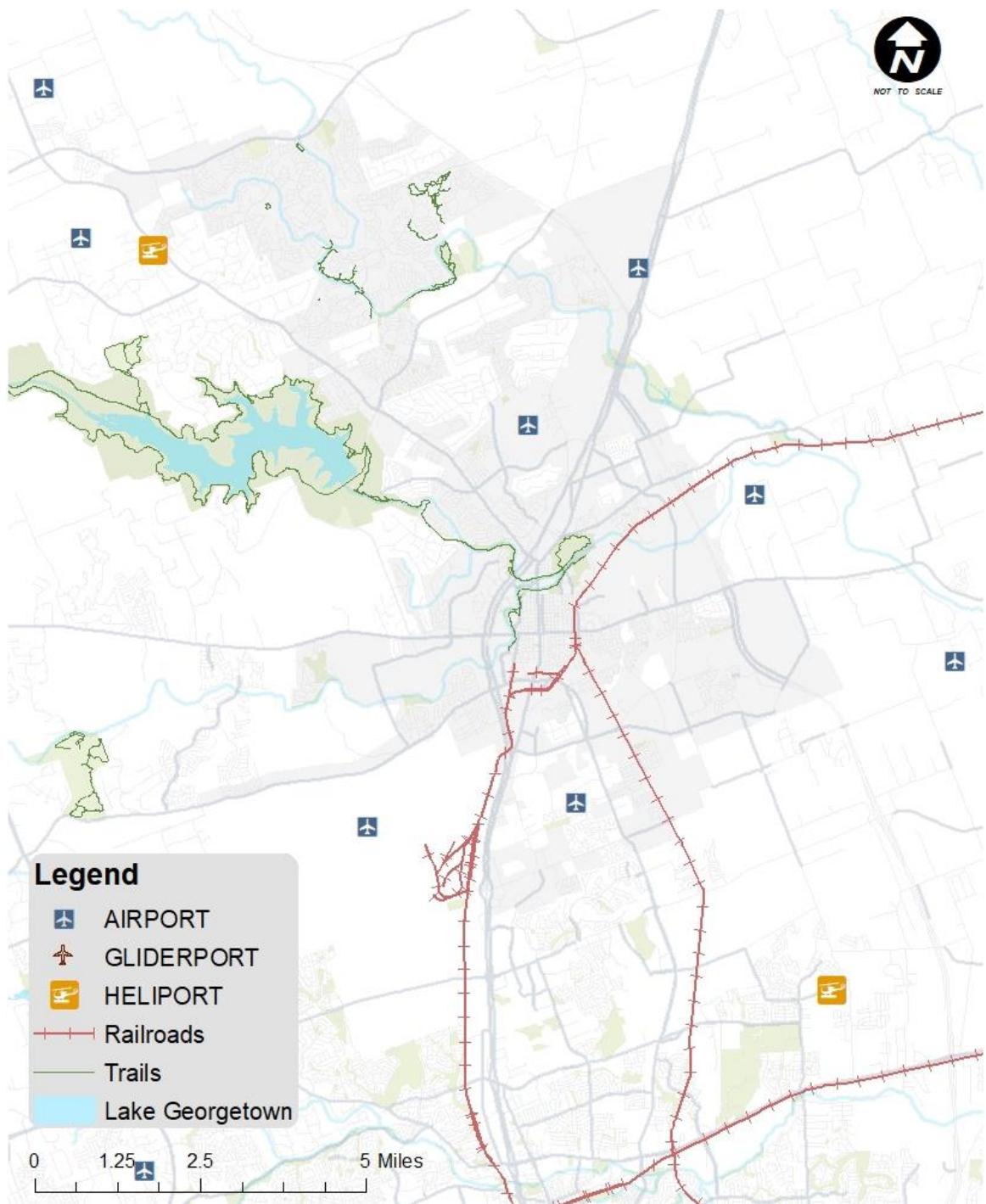


Figure 21. Railroads and Airports¹⁵

15 - Williamson County (2018)

Current Conditions

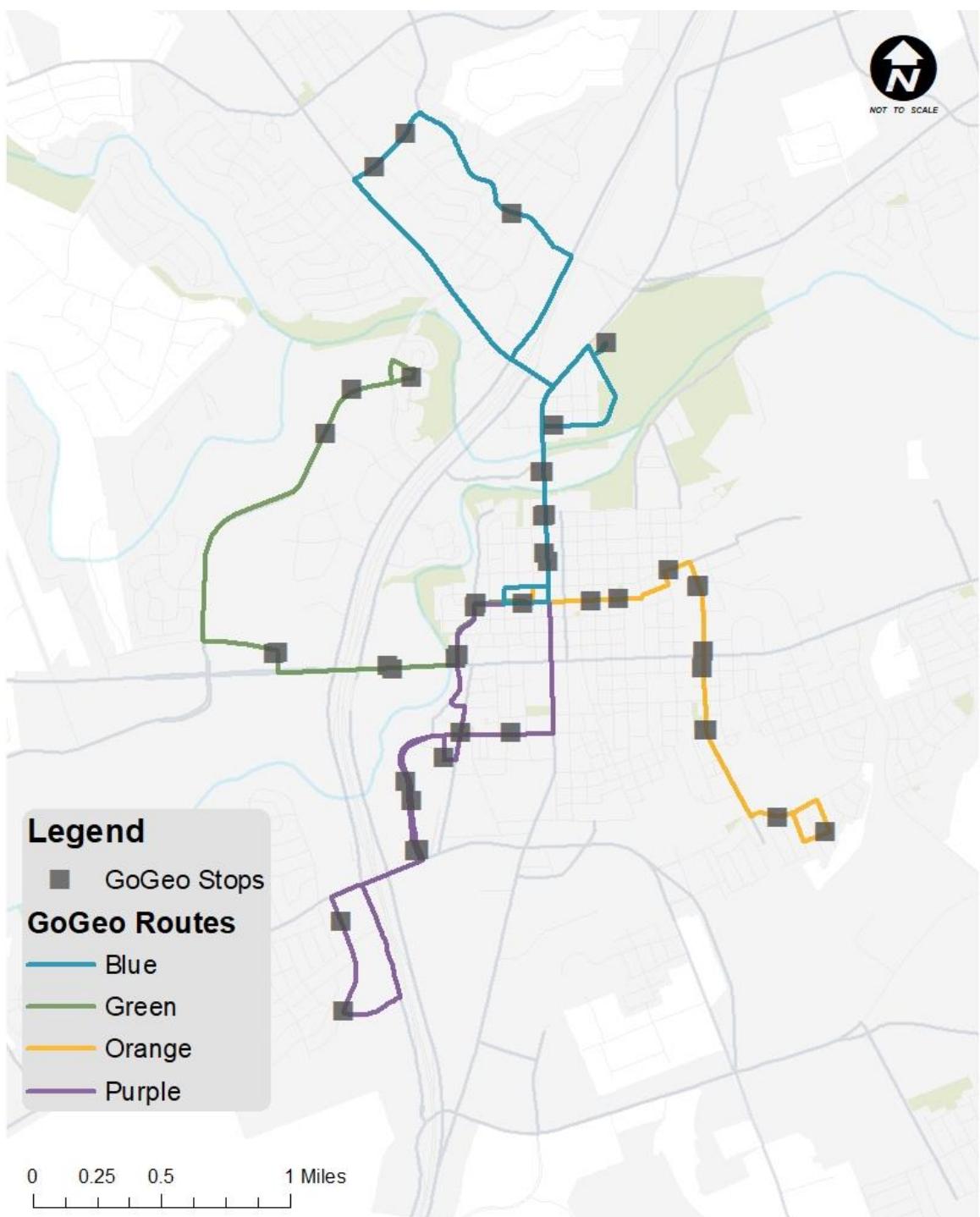


Figure 22. GoGeo Georgetown Transit Routes¹⁶

16 – City of Georgetown(2018)

A4.4 CONNECTIVITY ANALYSIS

Current bike infrastructure connectivity was primarily analyzed using a function called the Service Area spatial statistic function in ArcMap, a mapping software. The project team first identified routes that are currently comfortable to bike on (streets with BLTS ≤ 2 , see Section 2.5 in the Bike Plan) using both existing trails and roads.

Popular points of interest such as schools, parks, and transit stops were mapped, and then service or catchment areas were generated for each. These catchment areas are shown through a series of maps

below, and can be defined as the geographical area in which a person could reach one of these points of interest, traveling on presently comfortable routes within 5, 10, and 20 minutes on a bike. The average cyclist can travel 0.8, 1.6, and 3 miles, respectively in these times.

Catchment areas were regenerated using the proposed network from this Plan in addition to current comfortable bike routes, to visualize the degree to which access would be improved through implementation of the proposed Plan.

Current Conditions

Schools

As shown in Figure 23 schools in Georgetown are not fully connected to neighborhoods and many residences don't have safe biking access to school for children.

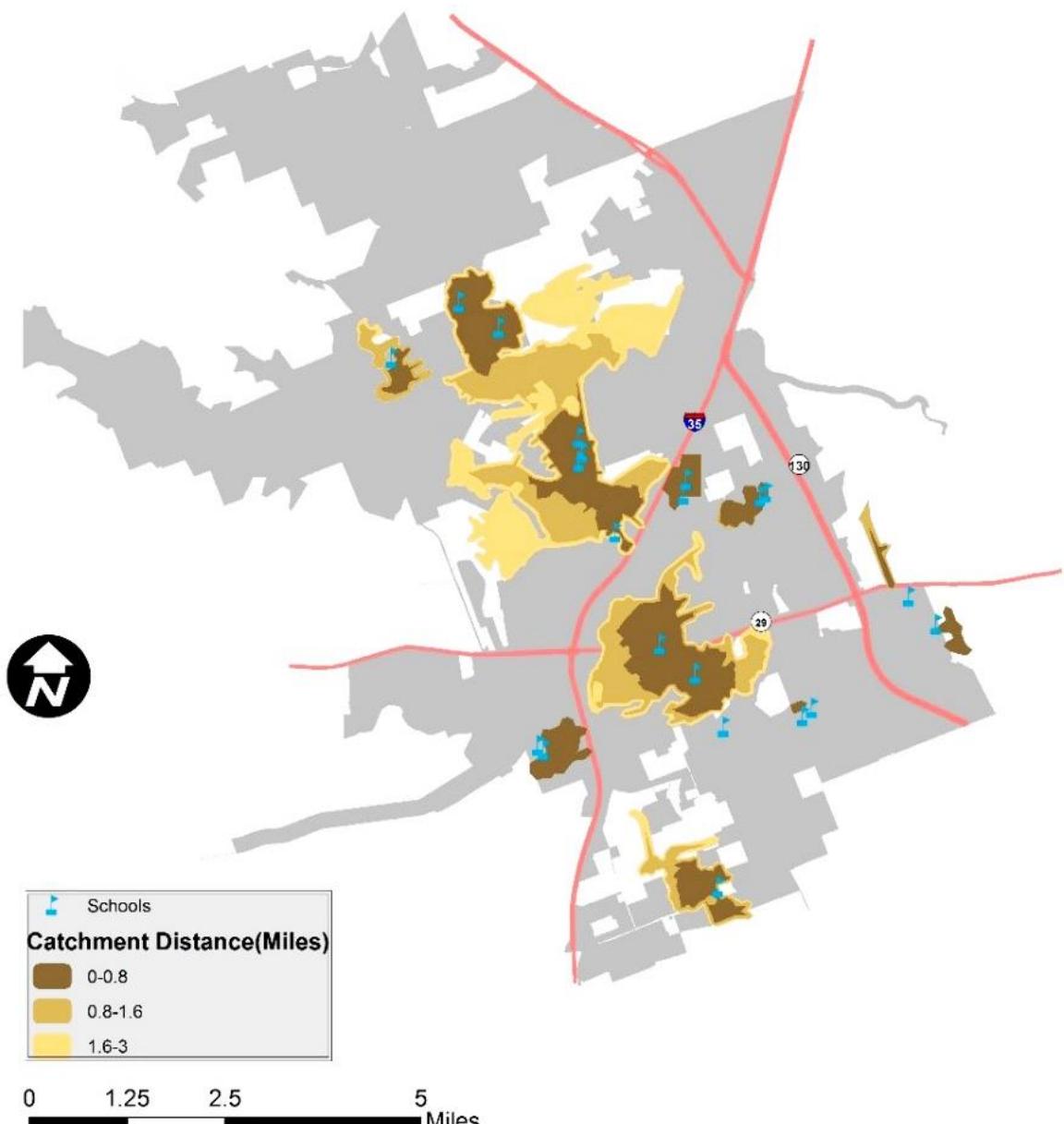


Figure 23. Current School Connectivity

Current Conditions

Figure 24 shows the potential for expanding school accessibility through the proposed network. More direct routes would be available for kids to ride their bikes, including safe crossings at major intersections that currently separate residential neighborhoods from schools.

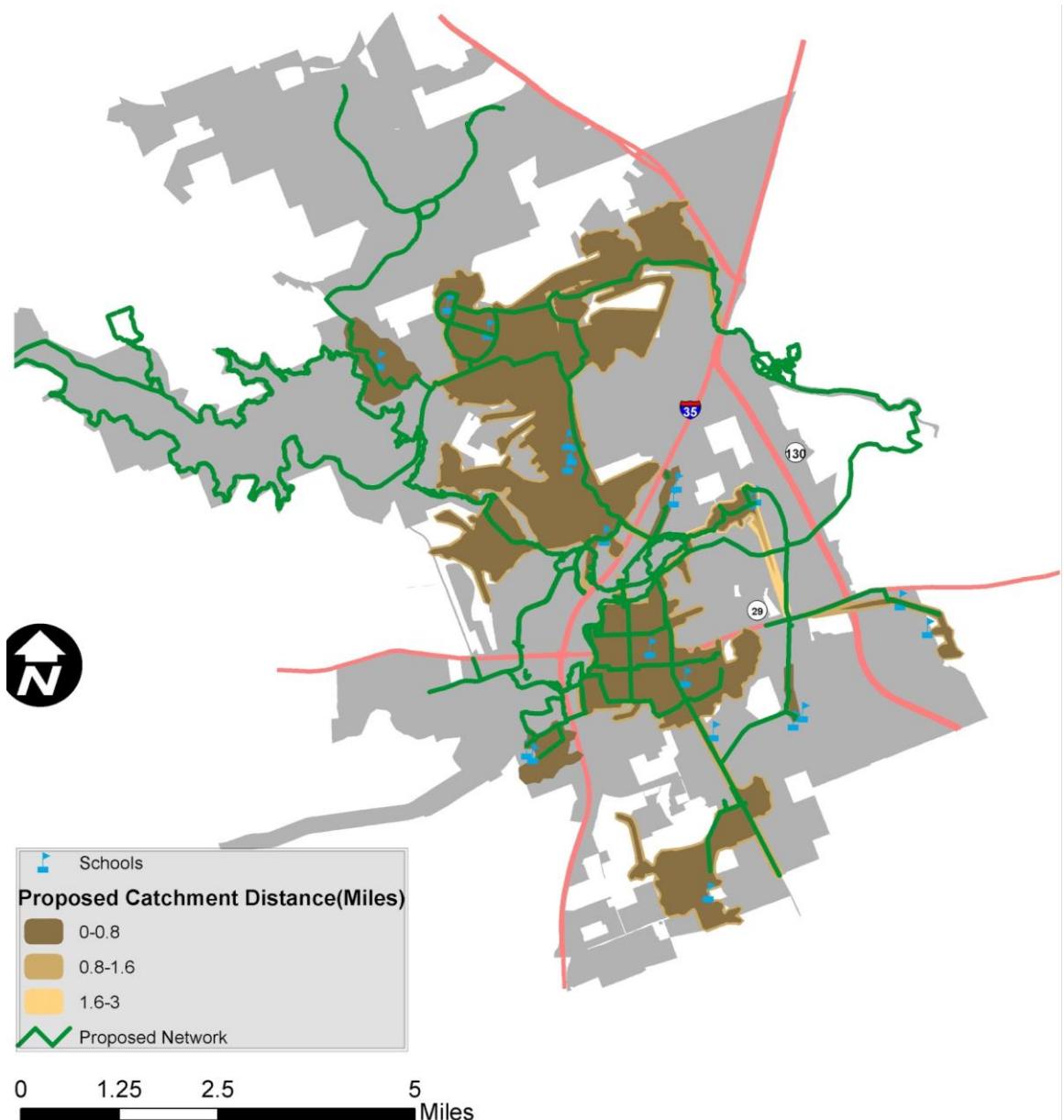


Figure 24. Future School Connectivity

Current Conditions

Table 1. School Proximity to Low-Stress Bike Network

School	Current Distance from Bike-safe Network (Feet)	Future Distance from Bike-safe Network (Feet)
James E Mitchell Elementary	725	131
East View High School	1,399	532
James Tippit Middle School	474	265
George Wagner Middle School	702	597

Current Conditions

Transit Stops

Figure 25 below shows how present bike infrastructure connects to transit. The map highlights that connectivity is low west of IH-35.

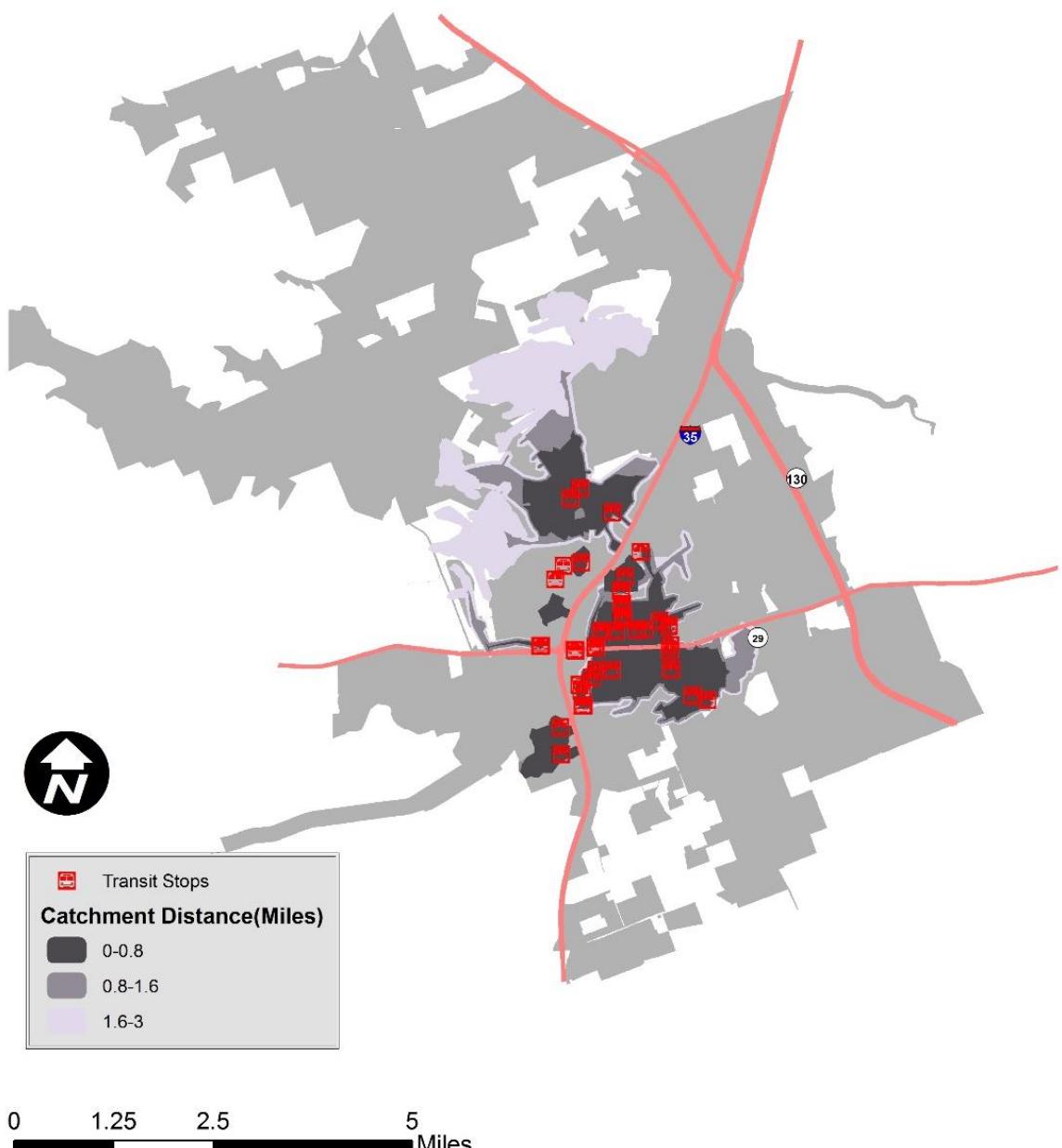


Figure 25. Current Transit Stop Connectivity

Current Conditions

By implementing the proposed bike network, bus stops to the west of I-35 are more accessible to Sun City and other communities in the northern portion of Georgetown. Access is also expanded further into southeast Georgetown communities, as depicted in Figure 26.

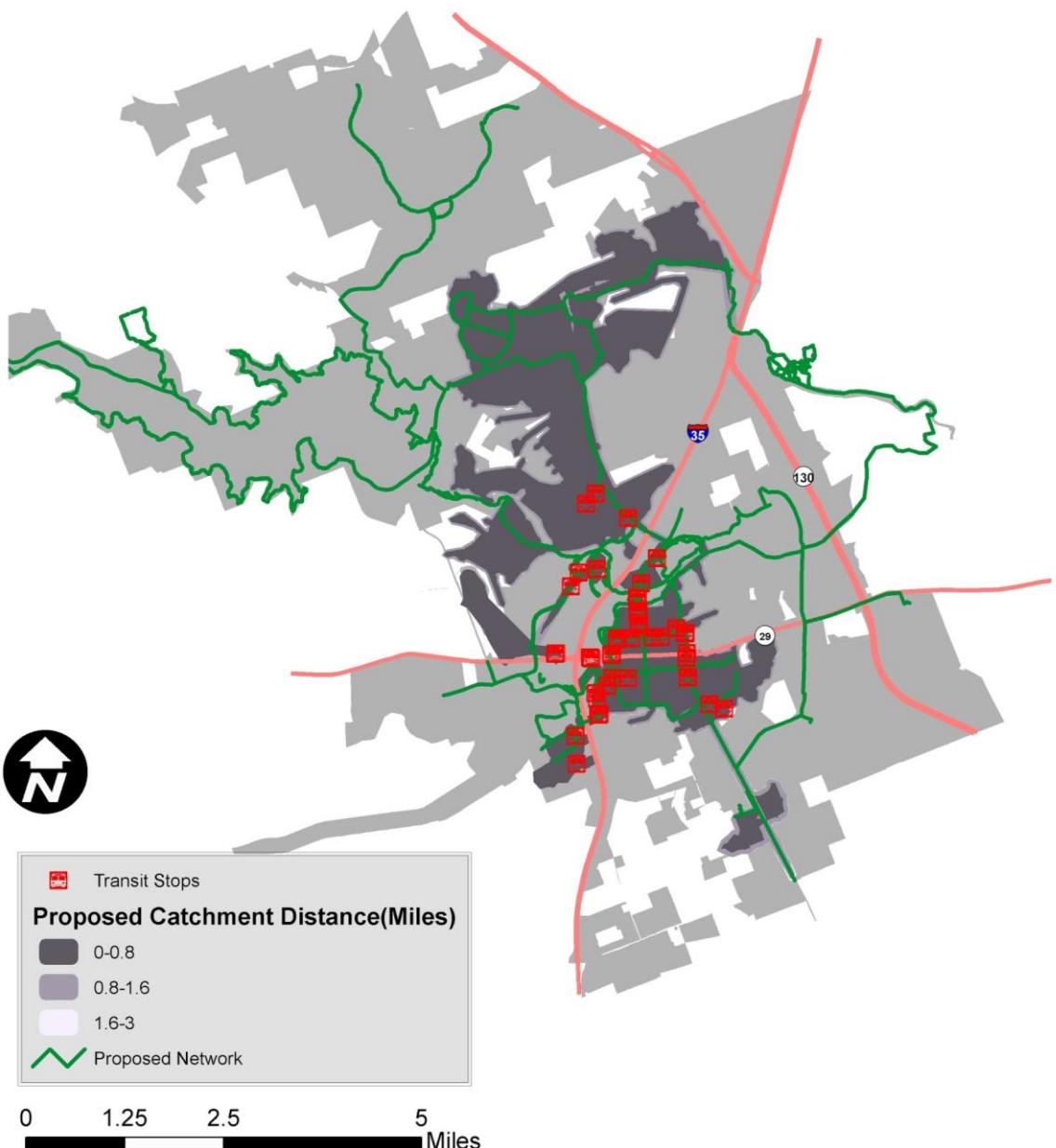


Figure 26. Future Transit Stop Connectivity

Current Conditions

The two bus stops on Wolf Ranch Pkwy. have poor current accessibility because the road itself serves as a major barrier. Figure 27 shows that the proposed off-street trails along Wolf Ranch Pkwy. would provide improved access to both stops.



Figure 27. Wolf Ranch Pkwy. / Rivery Dr. & City Lights Stations

Current Conditions

Commercial Locations

Connectivity to major commercial properties was analyzed, including: Wolf Ranch Town Center, HEB on SR 29, the HEB in Sun City, and a commercial strip at Williams Dr. and Austin Ave. Figure 28 shows current commercial connectivity.

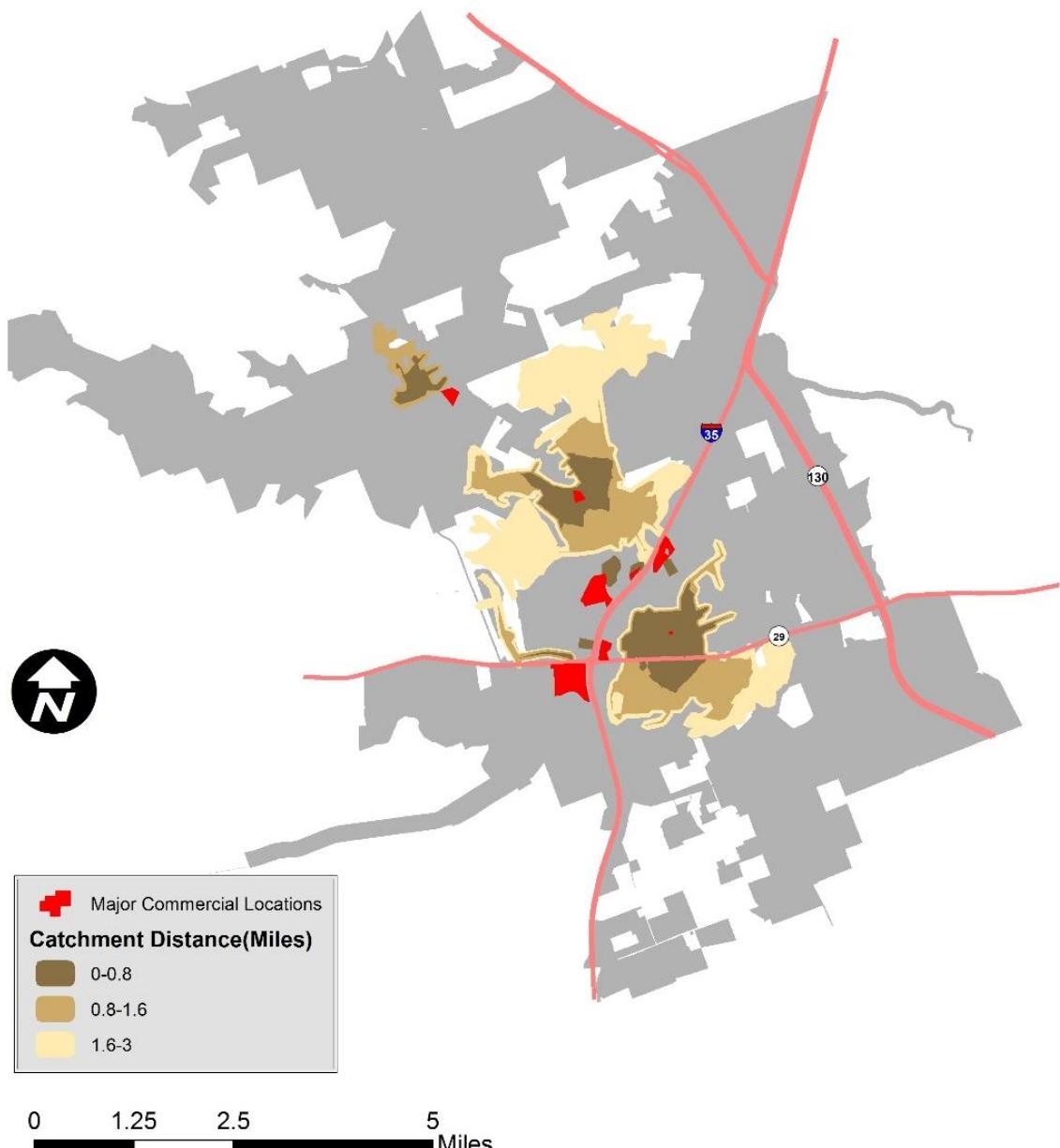


Figure 28. Current Commercial Lot Connectivity

Current Conditions

Because major commercial destinations along I-35 are not currently accessible to bikes, dedicated paths connecting Wolf Ranch and HEB on University Ave to nearby bike routes are proposed in this Plan. People living in neighborhoods west of IH-35, have easier and faster bike access to the Sun City HEB, as well.

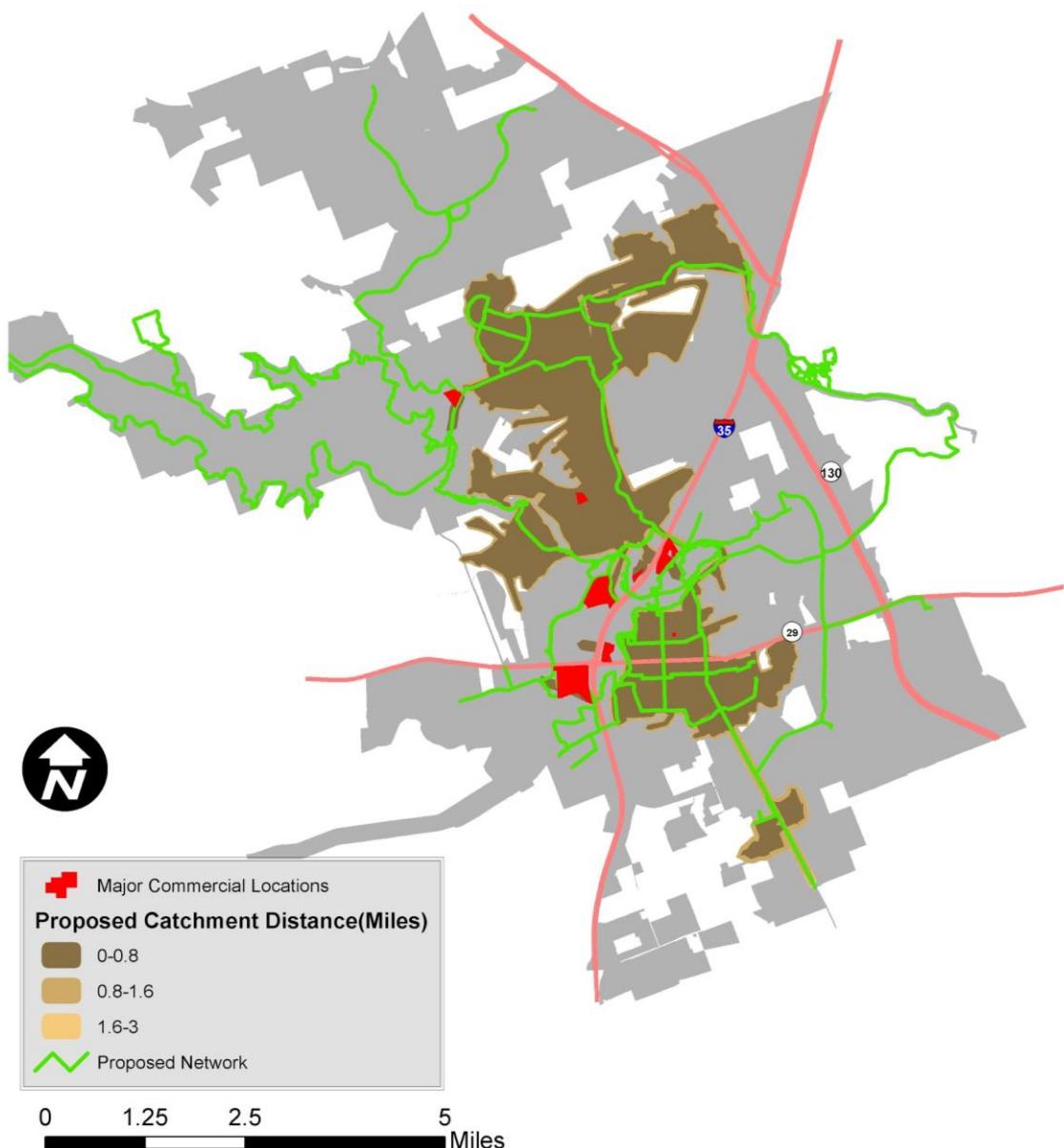


Figure 29. Future Commercial Connectivity

Current Conditions

Public Facilities and Parks

Bike access to parks and public facilities is shown in the figures below. Figure 30 and Figure 32 show existing conditions of public facilities and parks, respectively. Figure 31 and Figure 33 show future connectivity, post bike plan implementation.

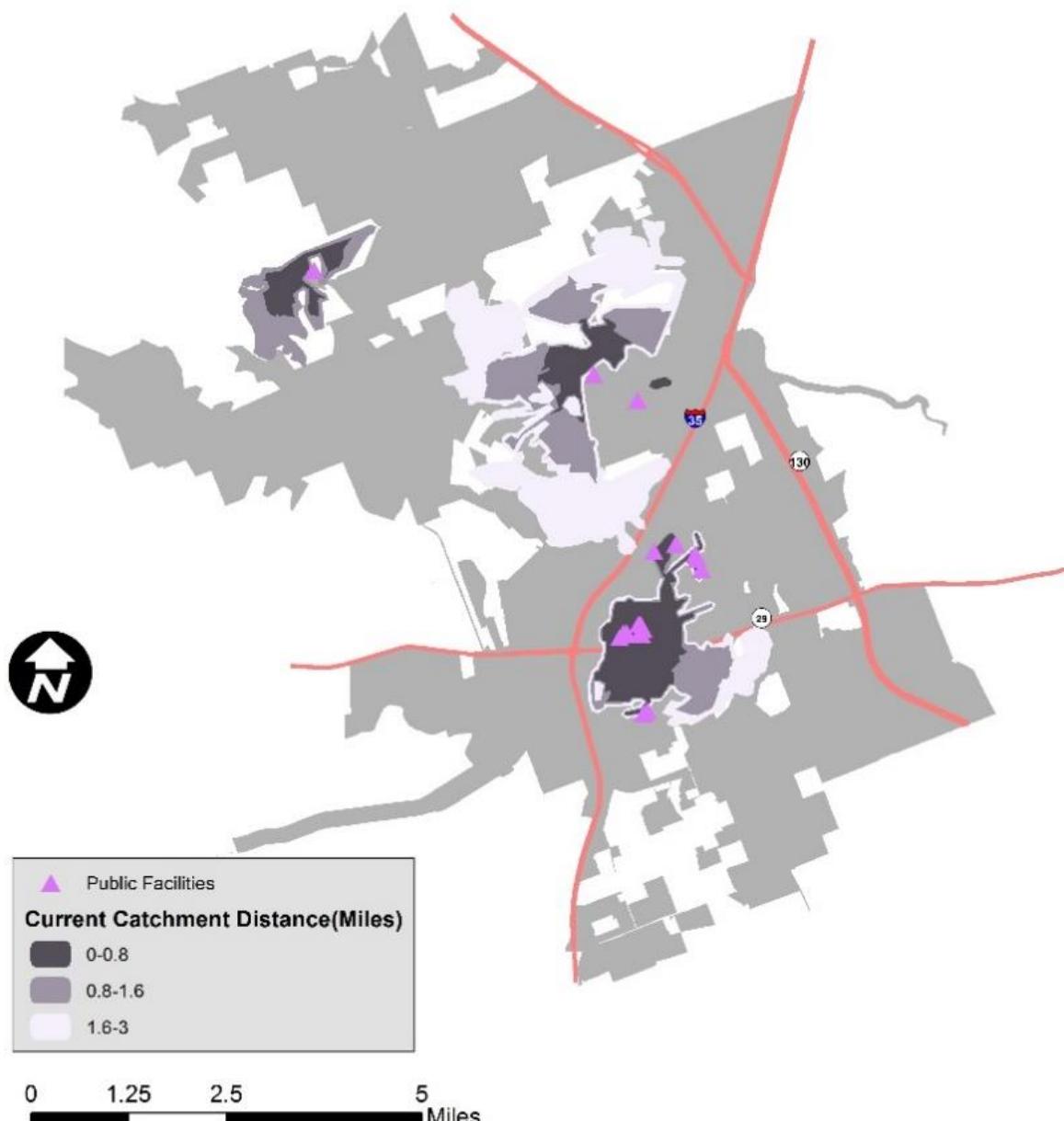


Figure 30. Current Public Facility Connectivity

Current Conditions

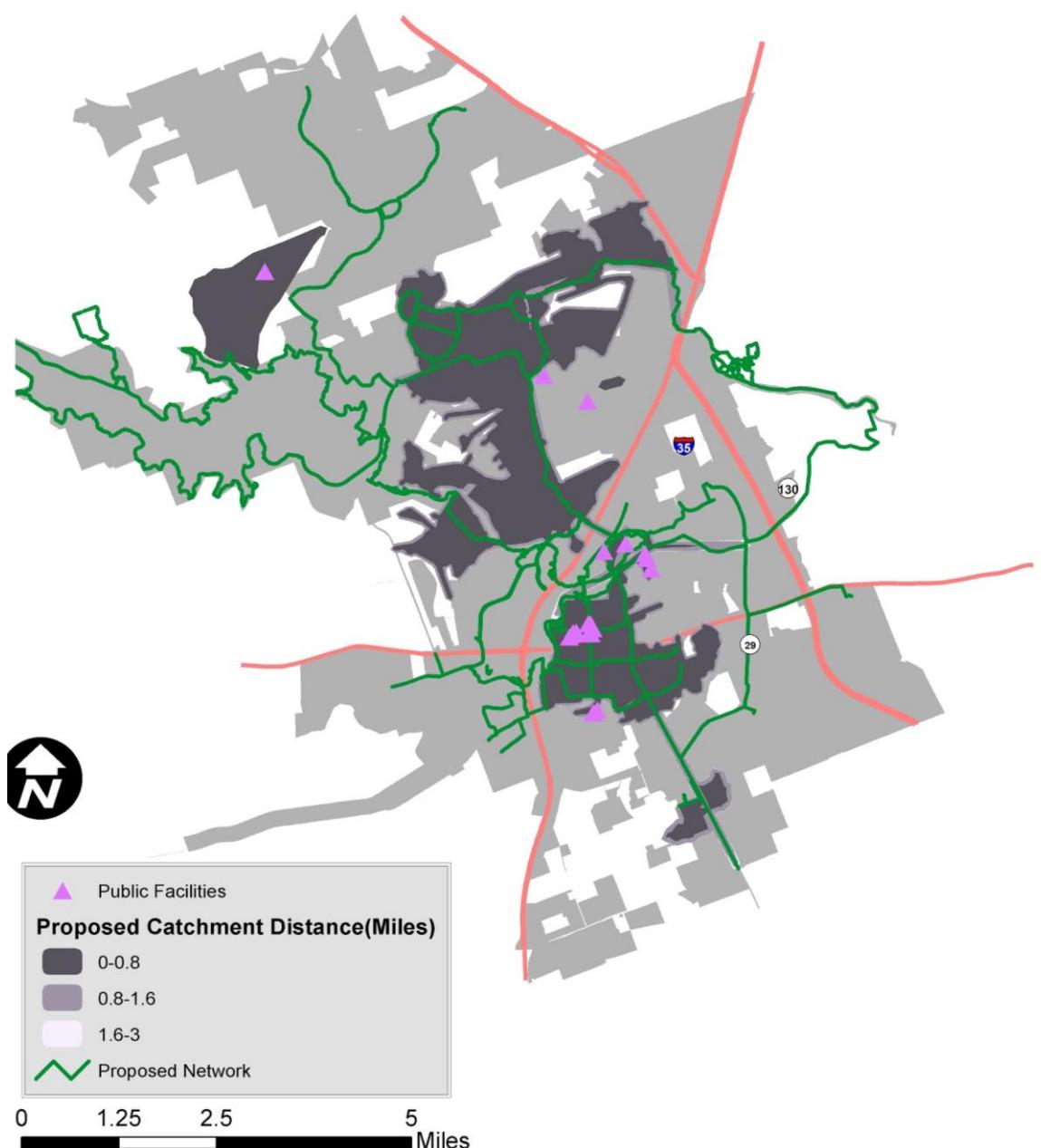


Figure 31. Future Public Facility Connectivity

Current Conditions

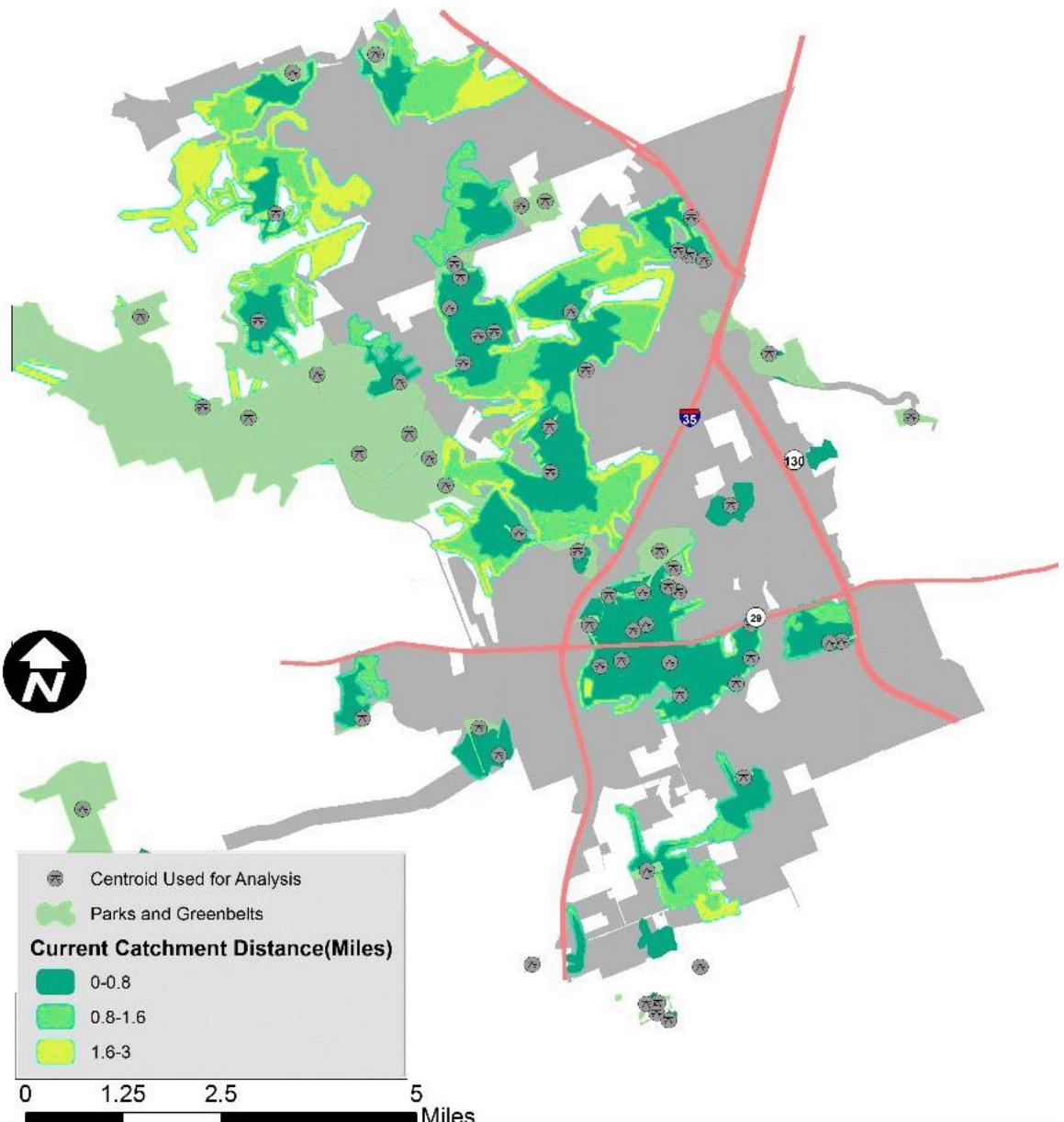


Figure 32. Current Parks Connectivity

Current Conditions

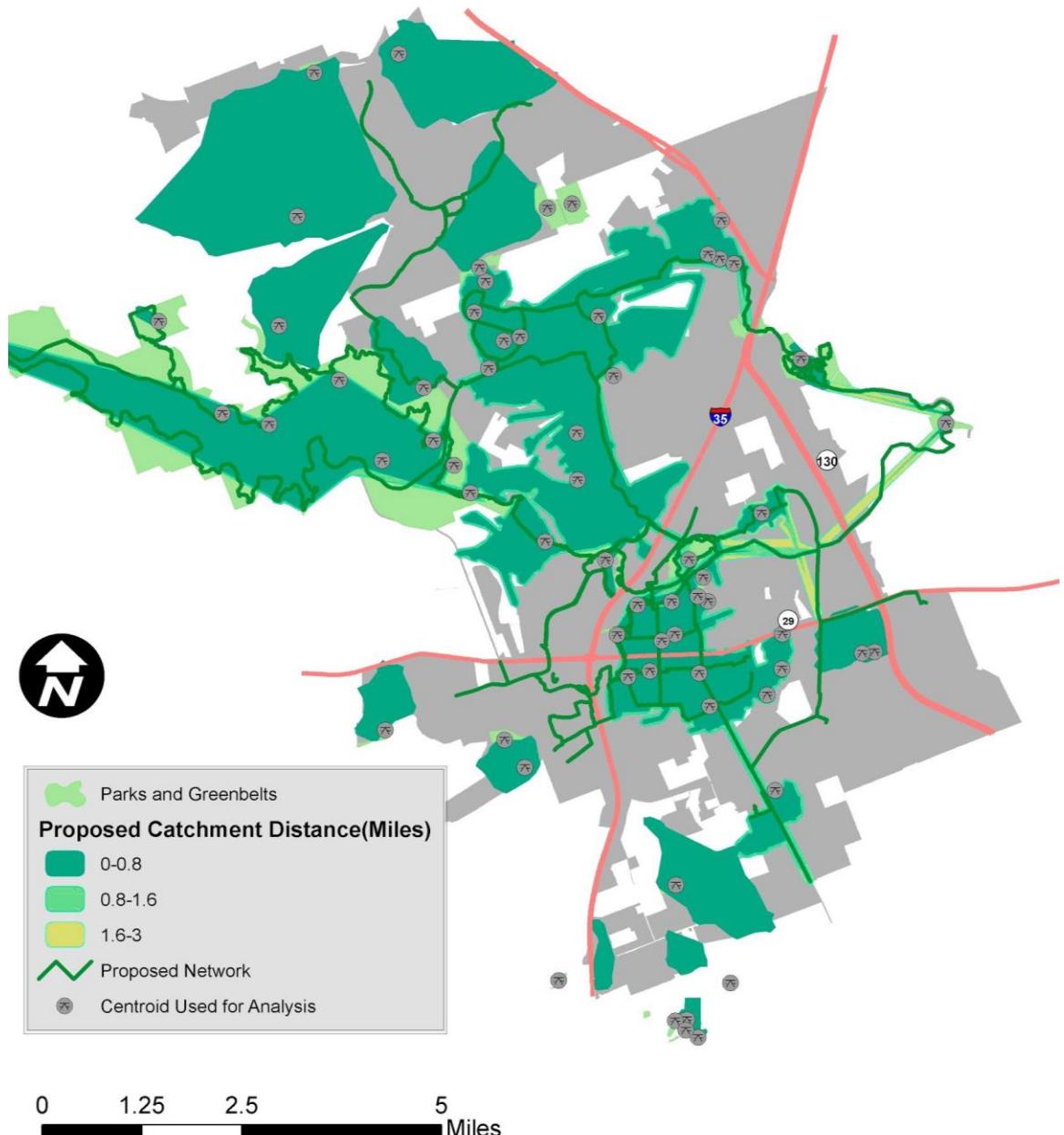


Figure 33. Future Parks Connectivity

A4.5 BICYCLE LEVEL OF TRAVEL STRESS ANALYSIS

Bicycle Level of Traffic Stress (BLTS) is an objective, data-driven way to evaluate the traffic stress imposed on cyclists. It was originally developed by researchers at the Mineta Transportation Institute and later adopted by governments and nonprofits.

Based on the criteria of Dr. Peter G. Furth from the College of Engineering at Northeastern University, level of traffic stress ranges from a comfortable 1 to a very high-stress 4. The higher stress the bike lane is, the fewer people are willing to use it¹⁷. Most BLTS measures involve the incorporation of traffic volume data; Annual Average Daily Traffic (AADT)

volume measures were available on approximately 40 roadway segments of the thousands present in the Georgetown network. We have sourced roadway design volume ranges based on functional classification from the 2030 Comprehensive Plan (see Table 2 below). These vehicles per day (VPD) values by roadway segment are mapped in Figure 35.

To avoid speculative approximations of traffic volume on the many other roads in Georgetown, a BLTS matrix was developed based on best practices from other US studies which did not require traffic volume data in their methodologies.

17 - Furth, P. (2012). Level of Traffic Stress. Retrieved from <http://www.northeastern.edu/peter.furth/criteria-for-level-of-traffic-stress/>.

Current Conditions

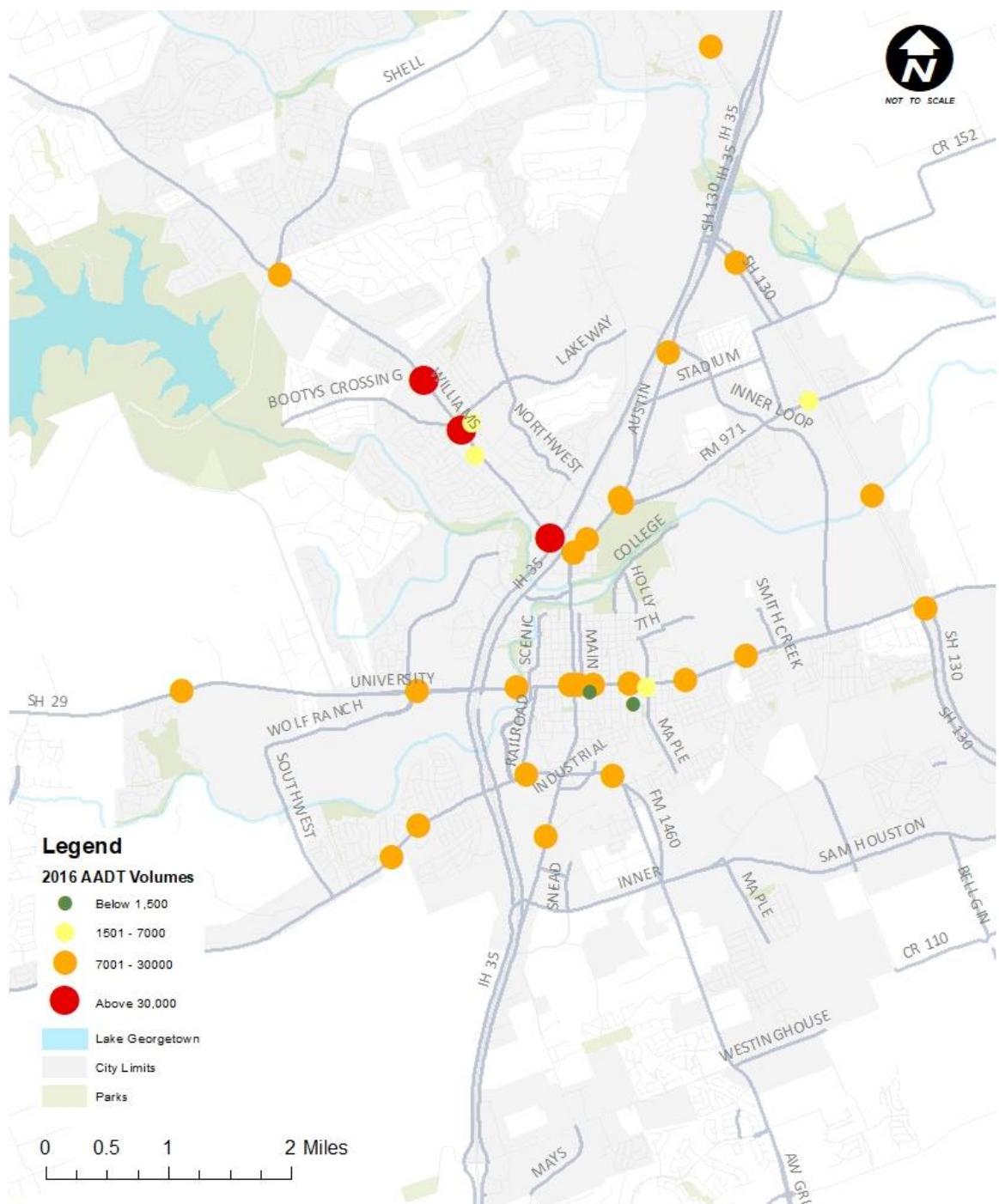


Figure 34. AADT Volumes¹⁸

18 - TxDOT (2016) and City of Georgetown (2018)

Current Conditions

Table 2. Design Volume Ranges by Functional Classification¹⁹

Functional Classification	Volume Ranges
Local Streets	< 2,500 vpd
Collector Streets (2 lane with Parking)	2,500 to 5,000 vpd
Collector Streets (3 lane)	5,000 to 8,500 vpd
Collector Streets (4 lane)	8,500 to 12,500 vpd
Minor Arterials	12,500 to 24,000 vpd
Major Arterials	24,000 to 36,000 vpd
Freeways/Expressways	> 36,000 vpd

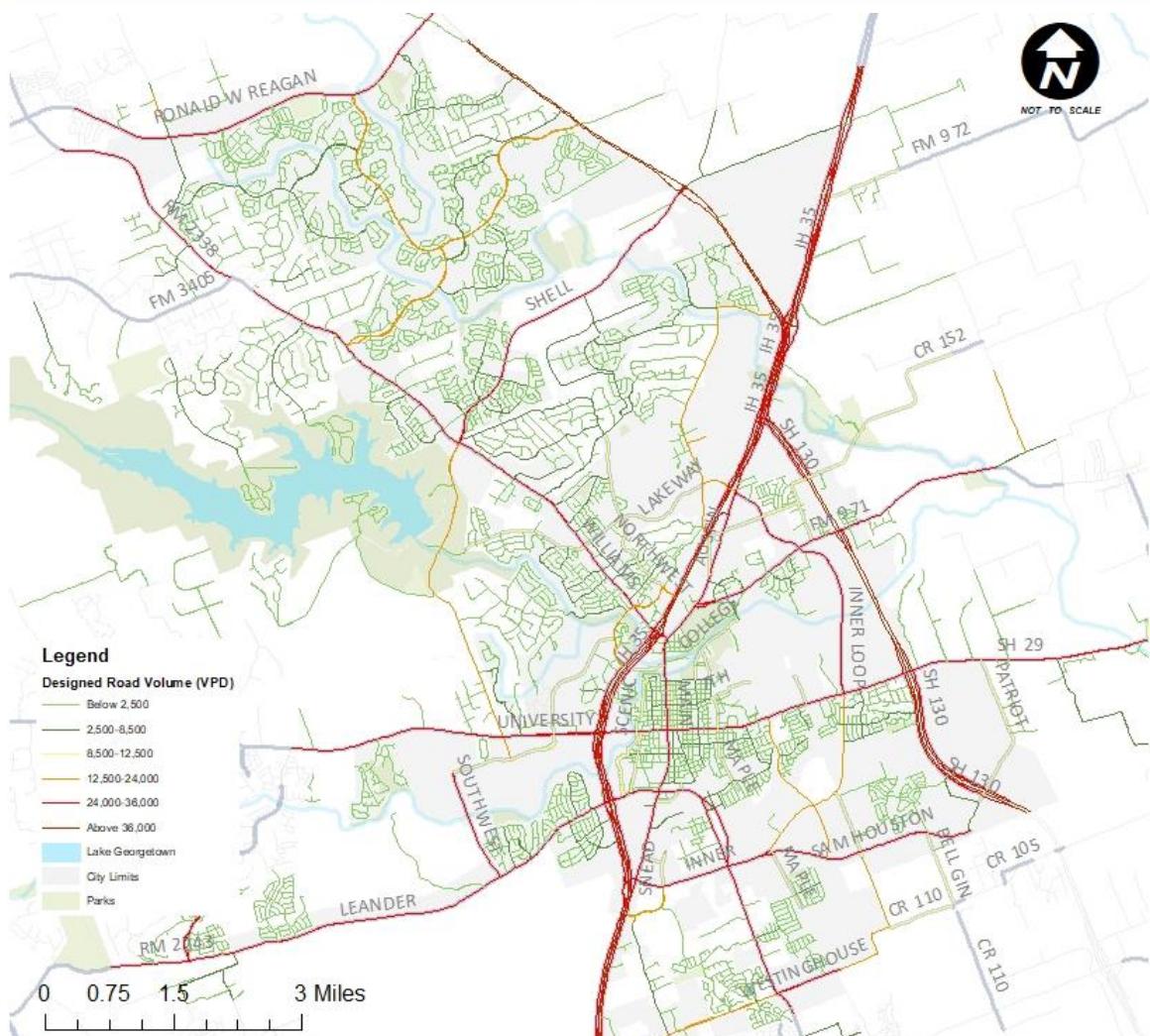


Figure 36. Designed Road Volume (VPD) by Street Segment

19 - Georgetown Overall Transportation Plan (2015)

Current Conditions

Furth (2012) indicates that stand-alone, off-street paths achieve the lowest level of BLTS with a rating of '1'. This is logical since most of travel stress occurs as a result of interactions and sharing space with motorized vehicles. Georgetown features a number of off-street trails, both paved and unpaved, that connect areas along the San Gabriel River basin, along the Berry Springs Canyon, around Lake Georgetown, and in some select locations within Sun City. Furth (2012) classifies streets with dedicated bicycle facilities using a separate matrix from streets with bicycles traveling in mixed traffic. Each matrix uses the following information to delineate four levels of stress: street width, bike-lane width, speed limit, and regularity of bike lane blockage.

Montgomery County revised the Mineta Transportation Institute's original BLTS method by considering the effects of the street center lines, on-street parking, shoulder width, and number of lanes. Due to the unavailability of a robust AADT dataset, traffic volume was not used as a major attribute in their analysis. According to Table 4, the Montgomery County Planning Department used AADT to distinguish two-lane arterials from two-lane residential streets. Because the City of Georgetown has a similar population to Rockville, the county seat of Montgomery County, this method sets a suitable precedent for conducting a BLTS analysis without using traffic volume data as a major attribute.

Table 3. BLTS for Bike Lanes Not Alongside a Parking Lane²⁰

	LTS \geq 1	LTS \geq 2	LTS \geq 3	LTS \geq 4
Street width (thru lanes per direction)	1	2, if directions are separated by a raised median	more than 2, or 2 without a separating median	(n.a.)
Bike lane width	6 ft or more	5.5 ft or less	(n.a.)	(n.a.)
Speed limit or prevailing speed	30 mph or less	(n.a.)	35 mph	40 mph or more
Bike lane blockage	rare	(n.a.)	frequent	(n.a.)

20 - Furth, P. (2012). Level of Traffic Stress. Retrieved from <http://www.northeastern.edu/peter.furth/criteria-for-level-of-traffic-stress/>.

Current Conditions

Table 4. BLTS Criteria for Mixed Traffic Roadway Segments²¹

		Street Width		
Speed Limit or Prevailing Speed		2-3 lanes	4-5 lanes	6+ lanes
Up to 25 mph		LTS 1 ^a or 2 ^a	LTS 3	LTS 4
30 mph		LTS 2 ^a or 3 ^a	LTS 4	LTS 4
35+ mph		LTS 4	LTS 4	LTS 4

^a Use lower value for streets without marked centerlines and with ADT \leq 3000; use higher value otherwise.



21 - Furth, P. (2012). Level of Traffic Stress. Retrieved from <http://www.northeastern.edu/peter.furth/criteria-for-level-of-traffic-stress/>.

Current Conditions

Table 5. Mixed Traffic Street Segment: Level of Stress^{22 + 23}

Posted Speed Limit (mph)	# of Through Lanes	Mixed Traffic					
		No Parking		Parking			
		Center Line	No Center Line	Center Line & High Parking Turnover	Center Line & Low Parking Turnover	No Center Line & Non-Residential	No Center Line & Residential
≤ 25	2-3	3 (2c)	2 (1d)	2.5	2	2.5	2 (1d)
	4-5	3	n/a	3	3	n/a	n/a
	≥ 6	4	n/a	4	4	n/a	n/a
30	2-3	3	2	3	3	2.5	2
	4-5	4	n/a	4	4	n/a	n/a
	≥ 6	4	n/a	4	4	n/a	n/a
35	2-3	4	4	4	4	n/a	n/a
	4-5						
	≥ 6						
40	2-3	4	4	4	4	n/a	n/a
	4-5						
	≥ 6						
≥ 45	2-3	5	5	5	5	n/a	n/a
	4-5						
	≥ 6						

22 - Montgomery County (2018)

23 - c. if Average Daily Traffic is less than 6,000 ADT; d. If Average Daily Traffic is less than 3,000 ADT

Current Conditions

There are currently very few applications of on-street bicycle facilities in the City of Georgetown. The facilities that are used for on-street cycling (e.g. shoulders, emergency lanes) are not signed as dedicated cycling lanes. However, shoulders that are greater than 5 feet wide are prevalent in

Georgetown, and are considered comfortable cycling facilities. In an effort to reconcile the original classifications developed by Fruth with the data available for Georgetown, the following matrix was developed to rate BLTS by street segment (see Table 6).

Table 6. BLTS Ratings Utilized to Grade Georgetown, TX

BLTS Ratings	Undivided		2-3 lanes		4-5 lanes		6+ lanes	
	Yes	No	Yes	No	Yes	No	Yes	No
Up to 25mph	1	1	1	2	3	3	3	4
30 mph	1	2	2	3	3	4	4	4
35 mph	3	4	3	4	3	4	4	4
40+ mph	n/a	n/a	4	4	4	4	4	4

Key:

Lowest Stress

Low Stress

Medium Stress

High Stress

Current Conditions

The data available to the project team to generate BLTS measure includes: street width by number of lanes, presence of a bikeable shoulder (greater than 5 ft.), and posted speed limit. Each of these data categories are mapped in Figure 36, Figure 37, and Figure 38. The final BLTS map is shown in Figure 39.

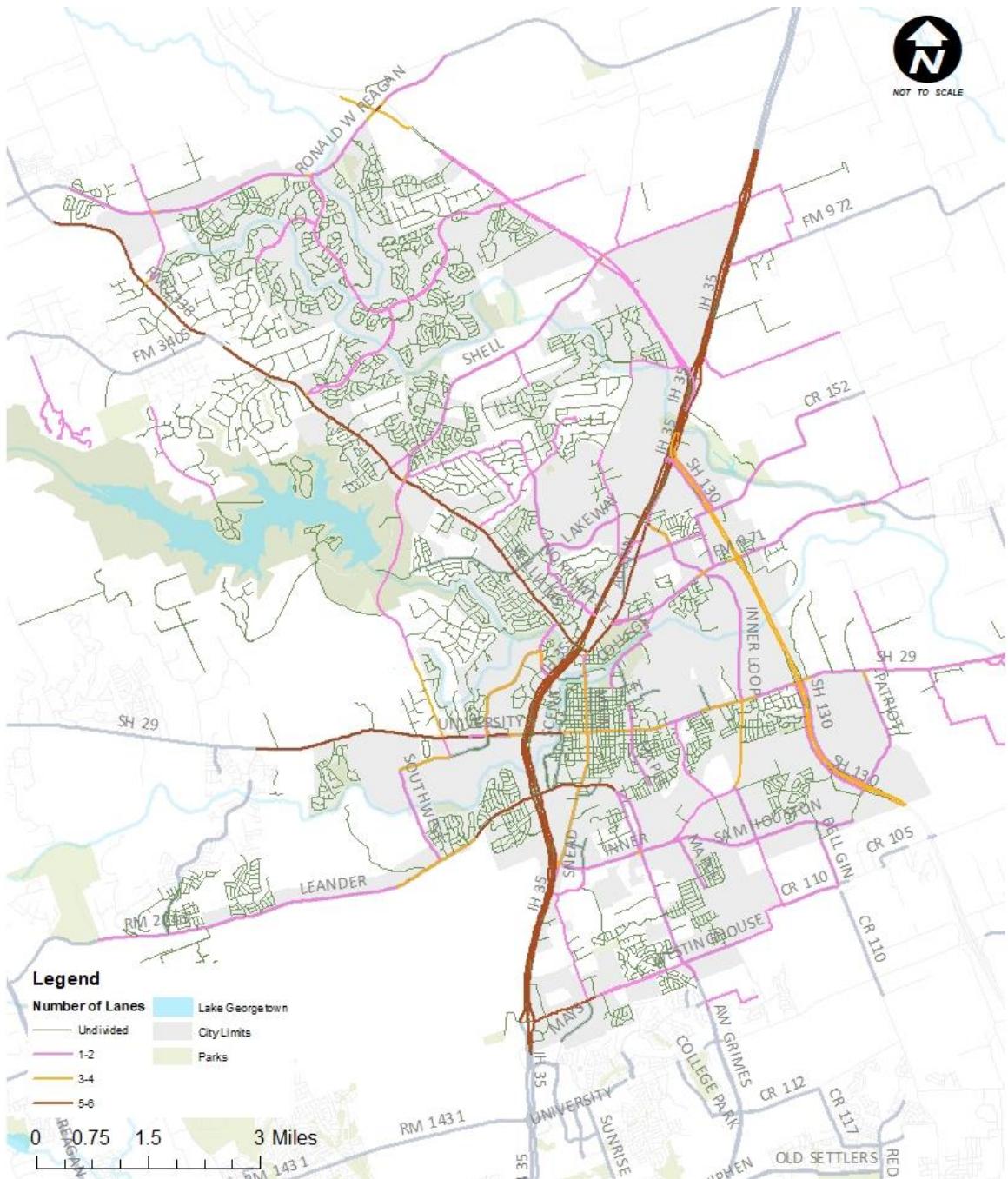


Figure 37. Street Segment by # of Vehicle Travel Lanes

Current Conditions

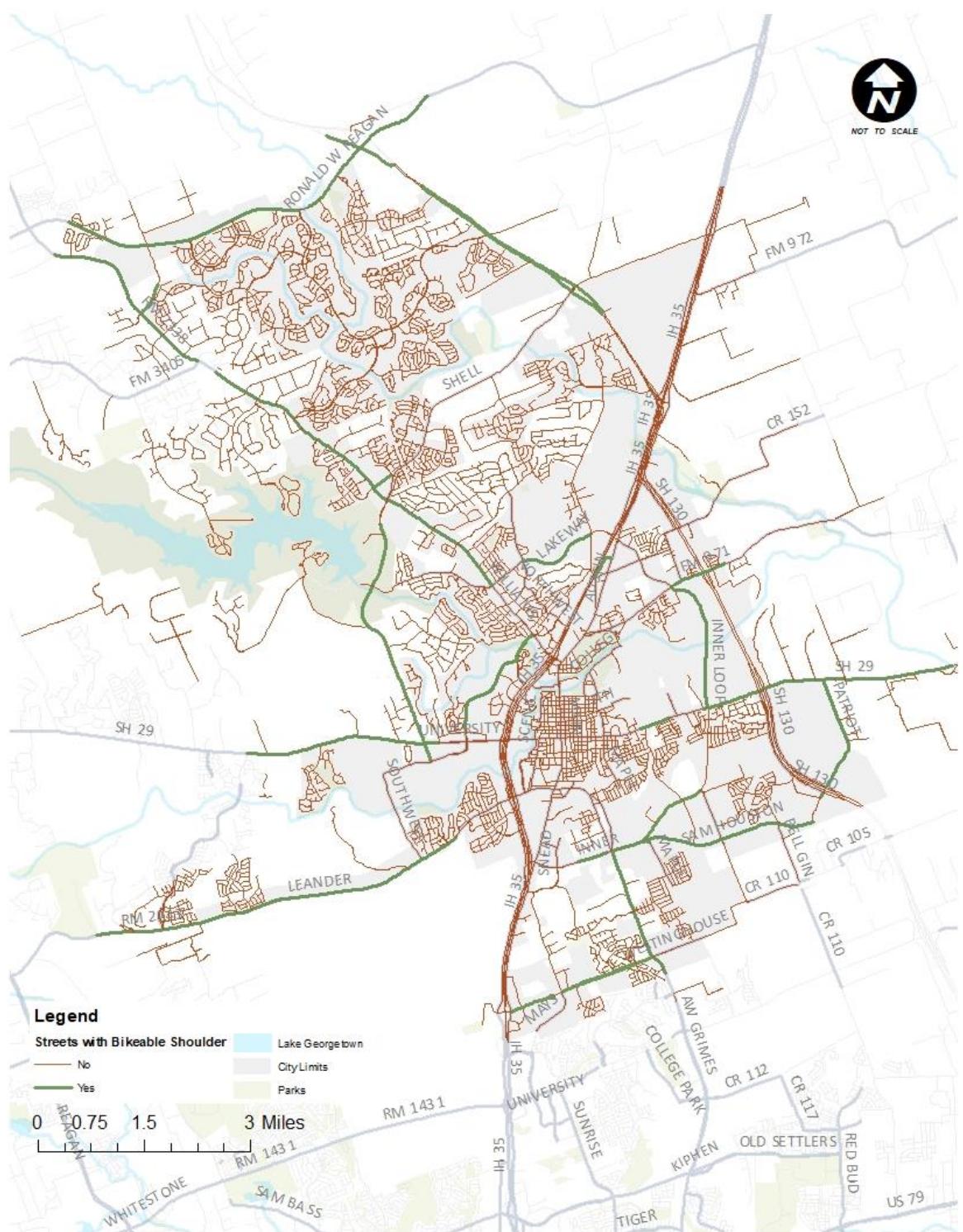


Figure 38. Street Segment by Provision of 5' or More Bikeable Shoulder

Current Conditions

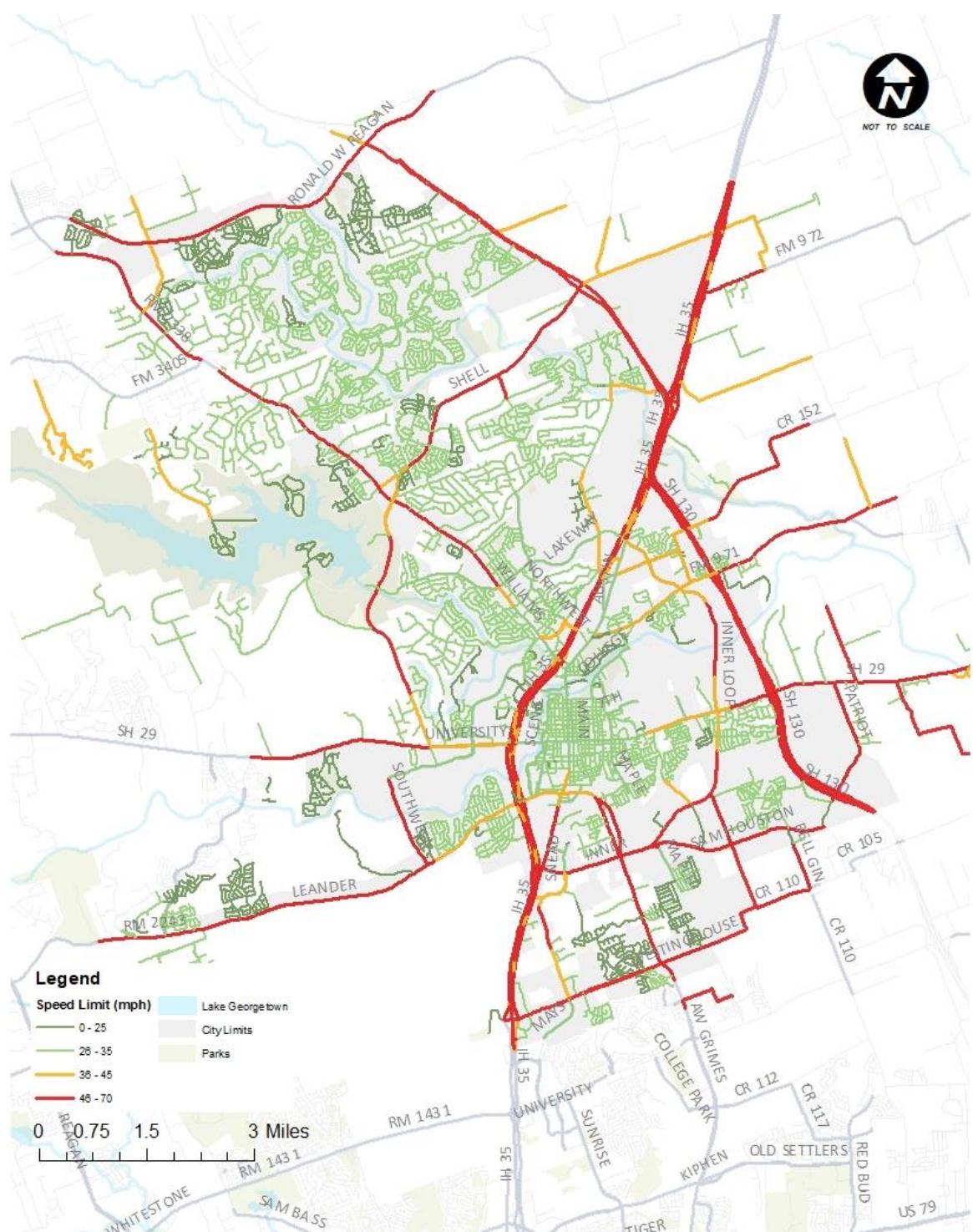


Figure 39. Street Segment by Posted Speed Limit

Current Conditions

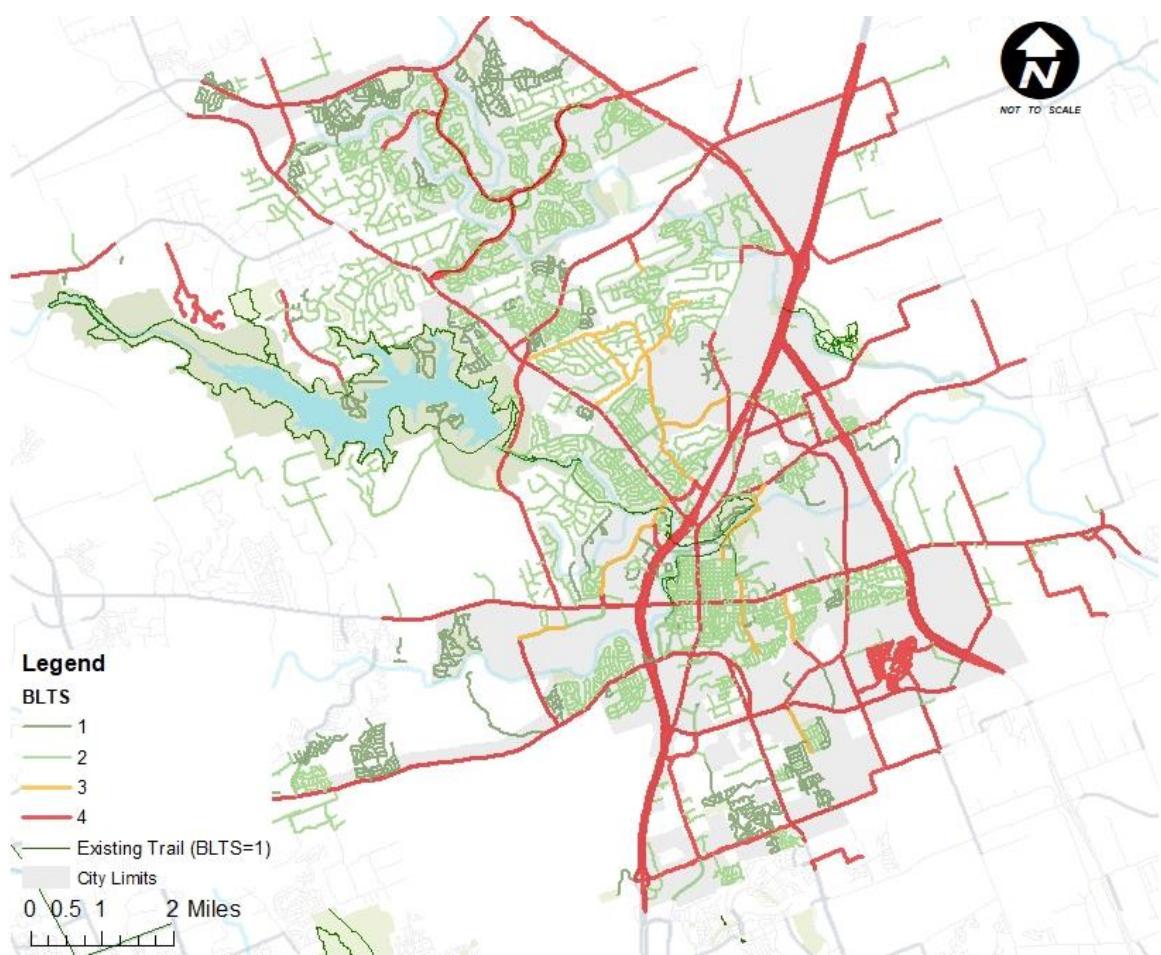


Figure 40. Final BLTS Rating Map by Street Segment

In reviewing the final BLTS map above, a number of islands of 'green' (BLTS 1 & 2) are visible, which are suitable for all ages and abilities. However, most of these areas face connectivity issues to other parts of town and remain walled off either geographically (e.g. river), by property (e.g. private property, fencing), or by

roadway barriers. IH-35 is the most visible and prominent of these dividers, but crossing barriers are also prevalent along Austin Ave. or University Ave. which can dissuade cyclists falling into the 'interested but concerned' from cycling to the otherwise highly comfortable Downtown area.

Current Conditions

A4.6 PEDESTRIAN SUITABILITY INDEX

Pedestrian suitability can be determined based on many factors, such as the environment surrounding a road segment and the types of development that the road or sidewalk connects. A foundational factor in determining the suitability of an area or street segment for pedestrians is the roadway speed limit. High-volume and speed

roadways are the least compatible with pedestrian activity.

Figure 40 below highlights the dangers relative to speed limits in increments of ten. The difference between a car travelling at 20 and 40 mph is dramatic, and the City of Georgetown's roadway speeds reach up to 80 mph.

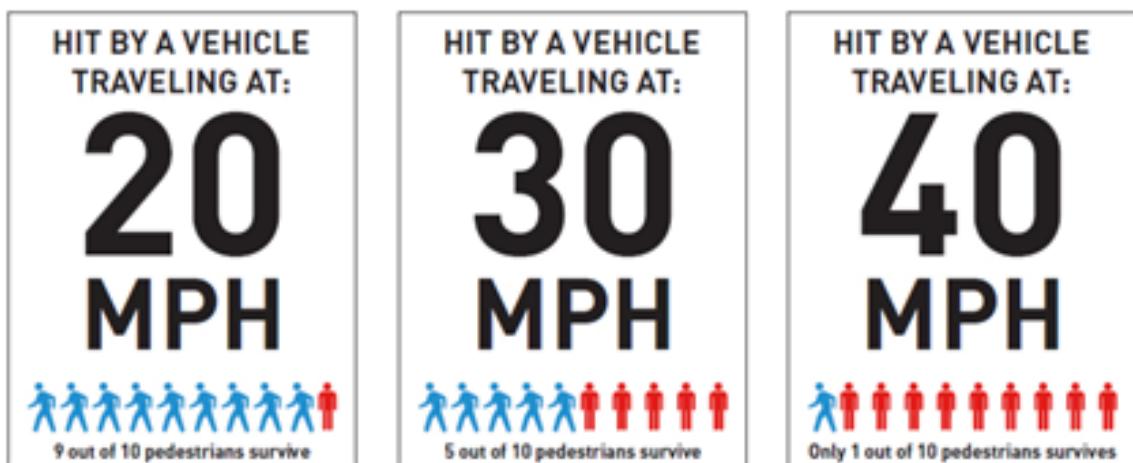


Figure 41. Fatality Risk by Speed Limit Increase²⁴

The Pedestrian Suitability Index in Table 7 incorporates Georgetown's speed limits and data gathered from the Georgetown Sidewalk Master Plan, which was adopted by Georgetown City Council in 2015. A map of existing conditions (Figure 41) displays the distribution of sidewalk conditions as of 2015.

Sidewalks are classified by Excellent, Good, Passable, Limited Failure, Failing, and N/A. 'N/A' indicates that no sidewalk facilities are present along the segment. Based on the statistics of fatality risks related to speed limits, 5 indices were developed for pedestrian suitability. The geographic distribution of the index is shown in Figure 42.

Current Conditions

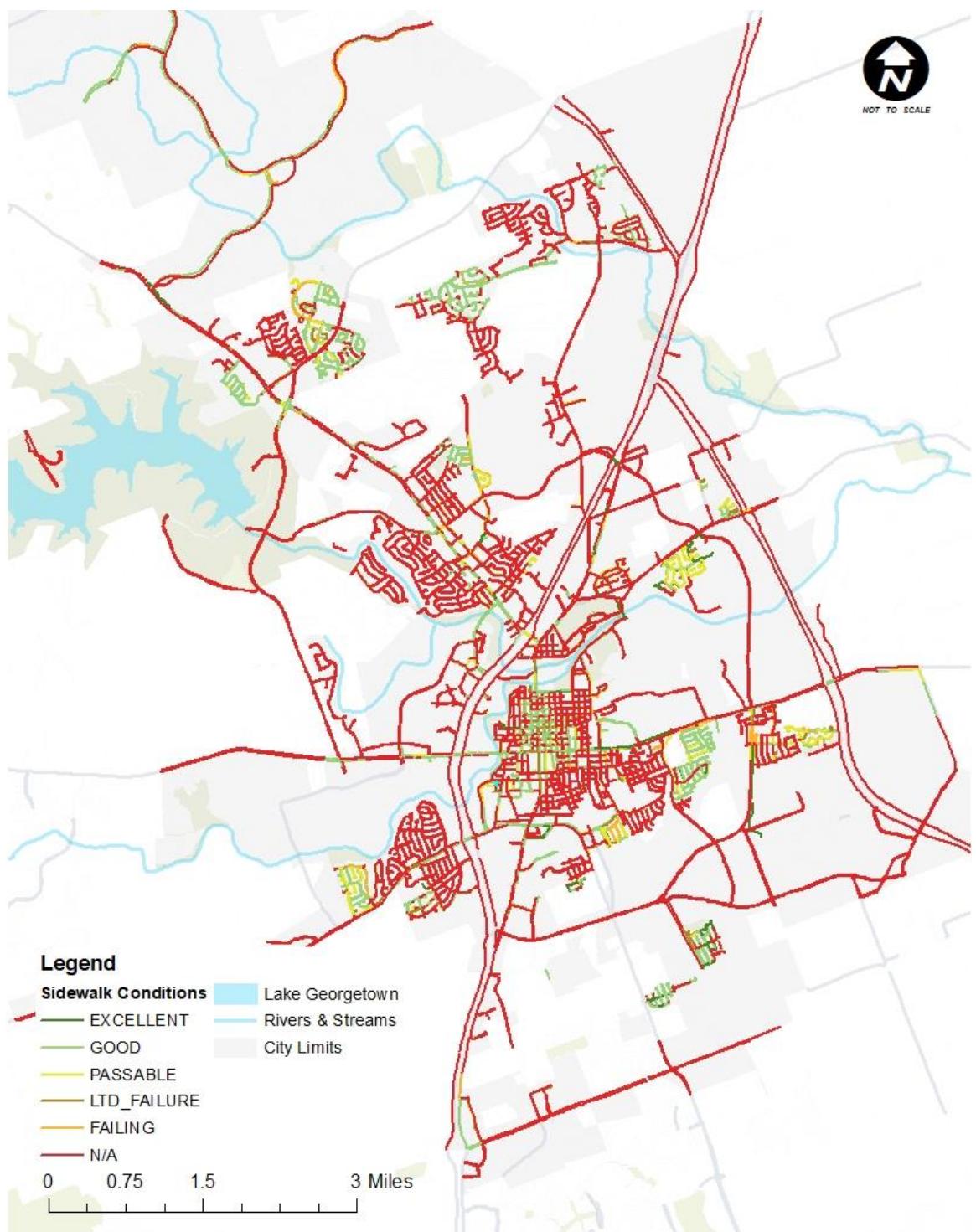


Figure 42. Sidewalk Conditions Map by Sidewalk Segment

Current Conditions

Table 7. Pedestrian Suitability Index Category Definitions

Index	Sidewalk Condition	Speeds
1	Excellent, Good, Passable	Under 20 mph
2	Excellent, Good, Passable	20-29 mph
3	Limited Failure	Under 20mph
4	Excellent, Good, Passable	30-39 mph
5	Limited Failure	20-39
6	All sidewalk condition types	40+ mph

Current Conditions

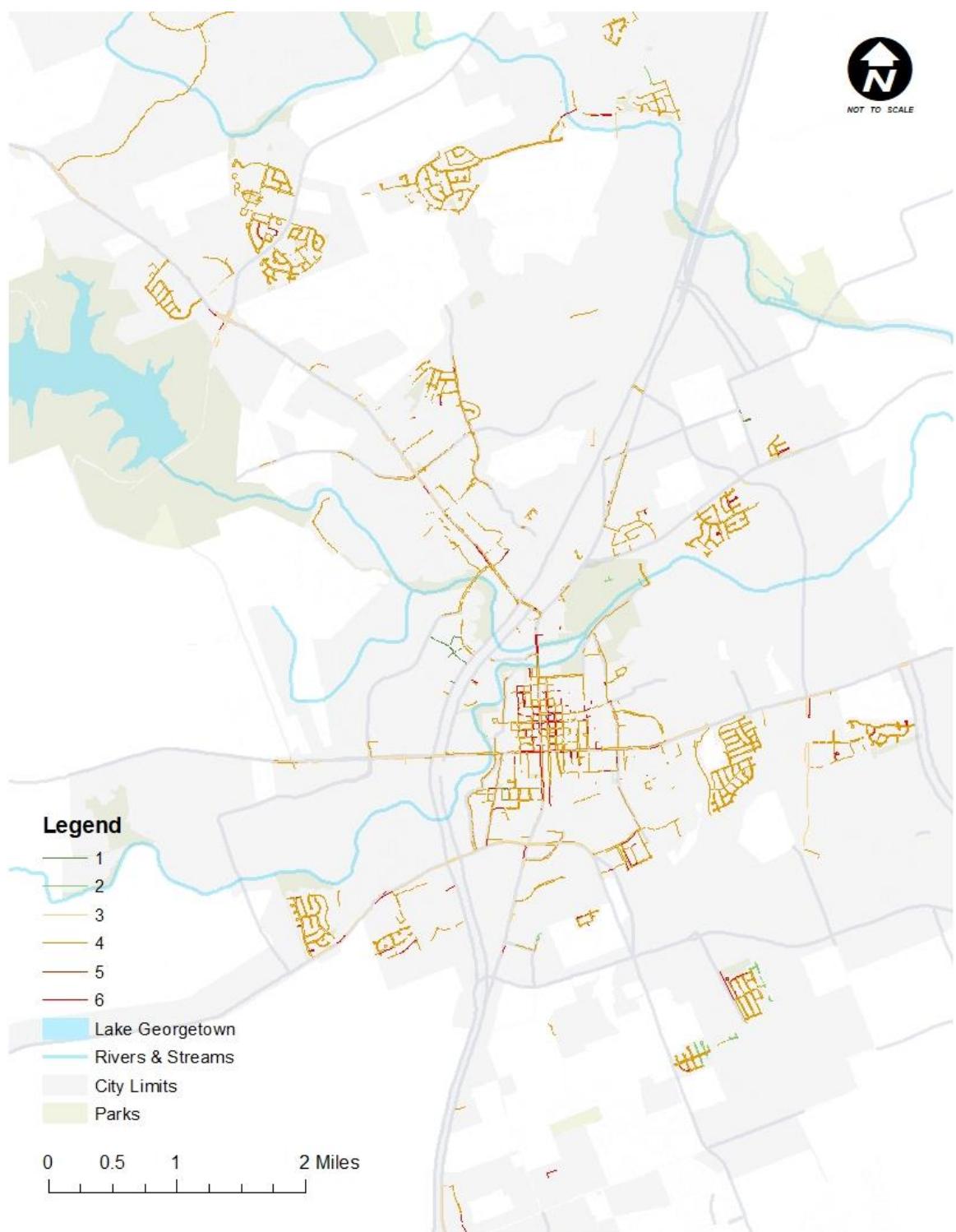


Figure 43. Sidewalk Ratings Map by Sidewalk Segment

Current Conditions

A4.7 CRASH ANALYSIS SUPPLEMENT MAPS

A description of the crash analysis can be found in Section 2.7 in the bike plan. Below are additional figures and close-ups of the crash analysis.

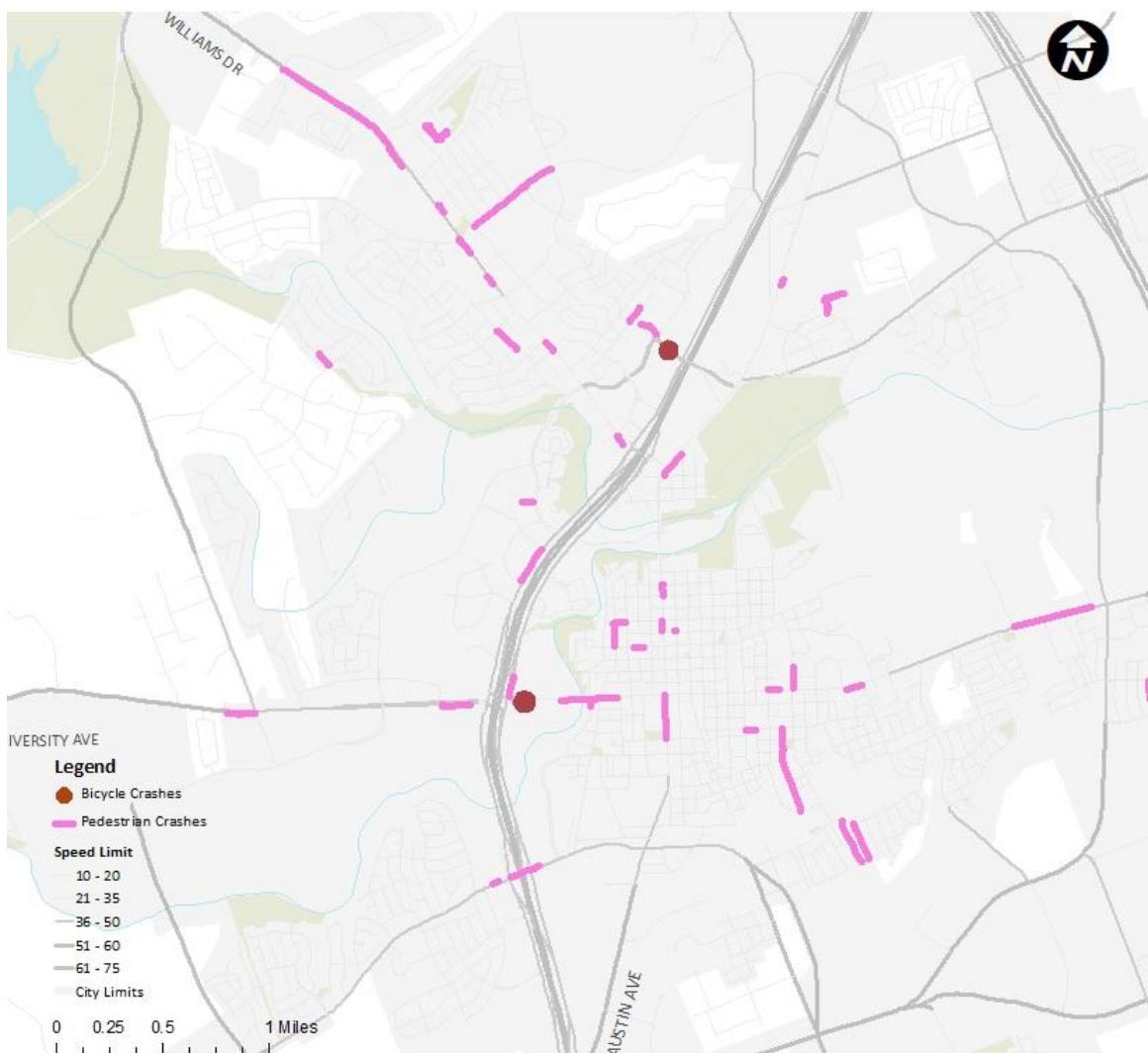


Figure 44. Pedestrian and Bicycle Crash Locations²⁵

25 - Georgetown Sidewalk Master Plan (2015) & Georgetown Bicycle Master Plan Community Workshop

Current Conditions

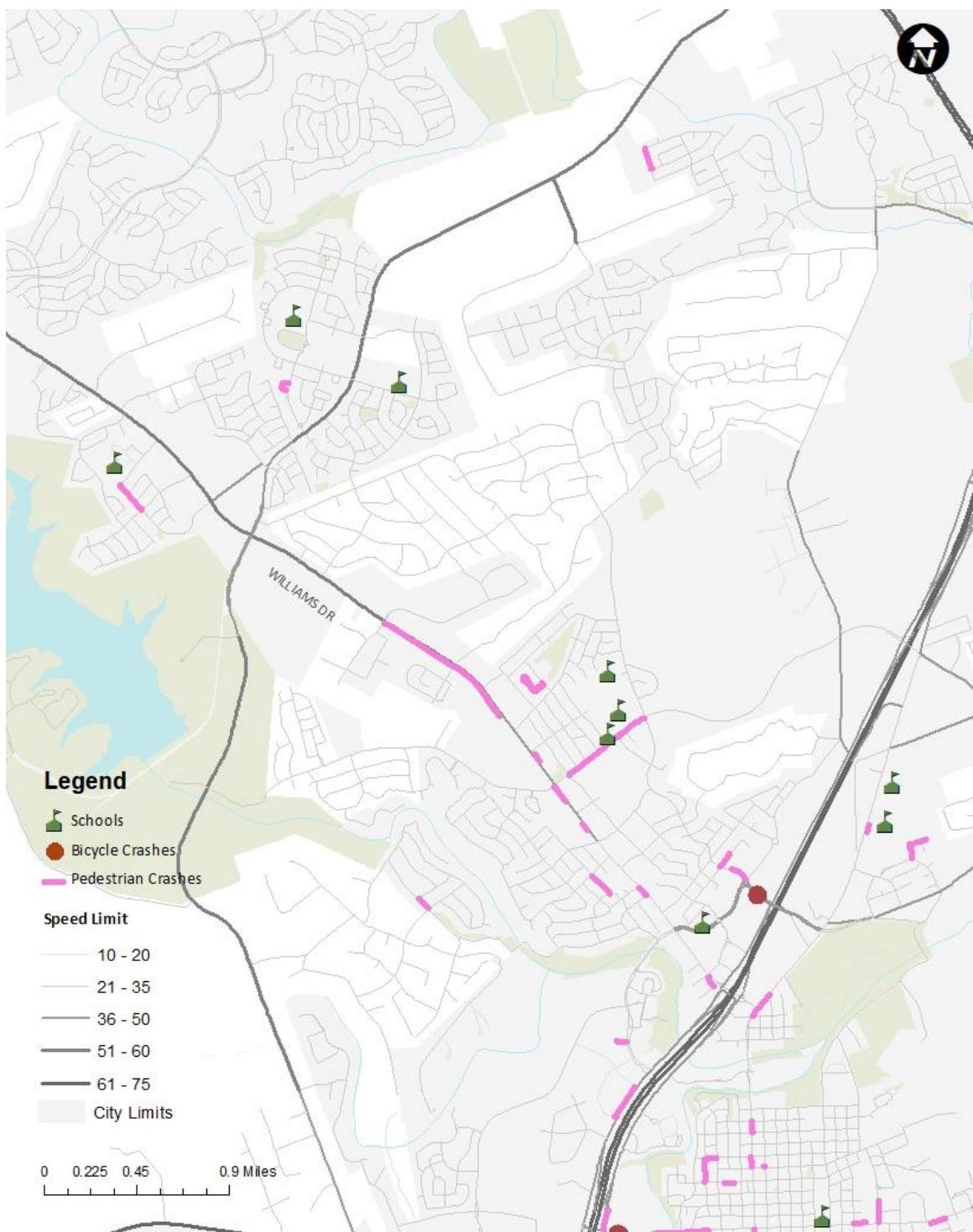


Figure 45. Bicycle and Pedestrian Crashes with Roadway Speed Limits – Northwest Georgetown

Current Conditions

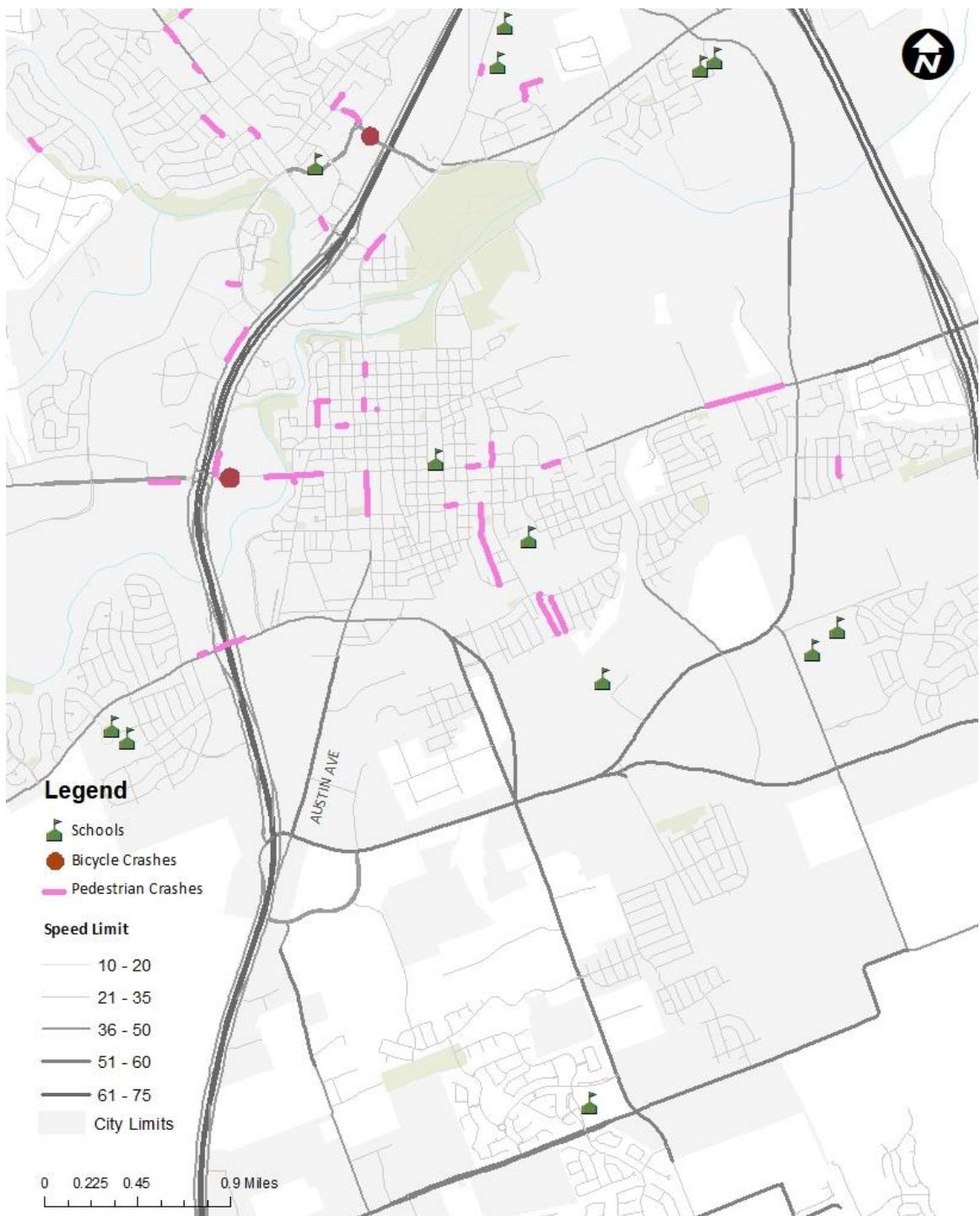


Figure 46. Bicycle and Pedestrian Crashes with Roadway Speed Limits – Central Georgetown

Appendix 5: Bikeway Design Guidelines and Standards

A5.1 BICYCLE FACILITIES

There are multiple types of bicycle facilities that are recommended by the Urban Bikeway Design Guide, authored by the National Association of Transportation Officials (NACTO) within the context of Georgetown. Bike lanes are defined as dedicated space for non-motorized vehicles to travel without interacting with automobiles. Various types of bicycle lanes exist, ranging from a simple painted white line, to a physically protected bike lane that physically separates bikes from vehicles using bollards, poles, concrete curbs, or planters.

The following recommendations only address on-street infrastructure types, as facility design differs greatly on hike and bike trails, off-street trails, and other types of recreational

facilities. Choosing the correct treatment for each street segment will allow cyclists throughout the city to reach their destinations safely and efficiently. On-street facilities can encourage residents to swap their short vehicle trips for biking trips, and can connect Georgetown's extensive off-street trails to popular destinations in a way that helps more cyclists feel comfortable.

The following types of bicycle treatments are recommended:

- Sharrow
- Conventional Bike Lane
- Buffered Bike Lane
- Physically Protected Bike Lane
- Off-Street Path / Bike Trail

Sharrows

Sharrows legitimize cyclists' presence through markings on the street. Often referred to as a shared-lane marking, a sharrow is not considered an actual bicycle lane since cyclists must share space with motorists. Sharrows are the most inexpensive type of bike infrastructure because they do not require road redesign. While they

are effective in discouraging wrong-way biking, the lack of dedicated space may discourage inexperienced cyclists. Texas law classifies bicycles as vehicles when traveling on streets, but sharrows offer no physical protection. This makes sharrows the least safe treatment, compared to the types that follow.



Figure 47. Sharrow Example

Bikeway Design

Conventional Bike Lane

Conventional bike lanes are the most common bicycle infrastructure in America. These lanes are usually located on the right side of regular traffic lanes, and are separated by a solid white line indicating that the space is off limits for automobile users. This type of infrastructure allows cyclists to travel at their own speed without competing for space with cars.

Although separate bike lanes are safer than sharrows, they still do not rate highly on the safety spectrum. The implementation of additional infrastructure will improve cyclist safety.

Bicycle lanes are typically placed between the curb and vehicular travel lane. When a street contains on-street parking, the bike lane may be placed either between the vehicle travel lane and the parking lane, or between the curb and the parking lane to enhance safety.

Conventional bike lanes offer a multitude of benefits. First, a dedicated space allows cyclists to travel at their own speed without worrying about competition for road space with automobile users. Second, installation typically doesn't involve acquiring additional right of way as many roads already have shoulders that can be repurposed, which saves on cost and

time. Conventional bike lanes are a low-cost option for municipal governments and provide an increased level of safety and comfort when compared to shared-use roads.

Required features of conventional bike lanes:

- The minimum desirable width of a conventional bike lane next to a curbside is 6 feet; it must not be less than 4 feet if adjacent to parking.
- A solid white line indicates separation between cyclists and motorists and must be 6 to 8 inches wide.
- If the lane is next to a guardrail, an additional 2 feet must be provided to the cyclist.



Figure 48. Conventional Bike Lane Example

Buffered Bike Lanes

Buffered bike lanes are conventional bike lanes with a buffer space to provide additional separation between cyclists and motorists. Research has consistently shown that buffered bike lanes have higher usage and higher perceived safety than conventional lanes, and they are recommended as a minimum treatment for high speed or volume roads. For specific standards and legal guidance, refer to the MUTCD section 3D-01²⁶.

Buffered bike lanes have advantages beyond further separation from vehicles -- it is easier to maneuver around parked vehicles without veering into general traffic lanes, cyclists are able to pass other cyclists, and they encourage less confident cyclists to bike due to increased security.

Required features for buffered bike lanes:

- MUTCD markings must be painted on the designated bike area.
- The buffer must be marked with two solid white lines, six to eight inches apart.
- Hatching must be included between the two white lines if the area is three or more feet apart.
- Hatched lines should be painted at 30 to 45-degree angles at intervals of 10 to 40 feet.
- The minimum width of buffered bike lanes is seven feet.



Figure 49. Buffered Bike Lane Example

26 - <https://mutcd.fhwa.dot.gov/htm/2009r1r2/part3/part3d.htm>

Bikeway Design

Physically Protected Bike Lane

Physically protected bike lanes provide another level of protection for cyclists. The buffered space between the bike lane and vehicle lane, contains additional physical barriers that generate greater comfort and a sense of confidence for the cyclist. These barriers can include bollards, traffic poles, planters, concrete curbs, and more.

Required features for physically protected bike lanes :

- MUTCD requires that bicycle lane words, symbols, and/or arrow markings be placed at the beginning of a physically protected bike lanes and at periodic intervals along the facility based on engineering judgment.
- Solid white lane line markings must be painted.
- Diagonal hatched markings must be placed in the neutral area to further emphasize the buffer.
- Raised medians or other barriers must provide physical separation to the bike lane.



Figure 50. Physically Protected Bike Lane Example

Bikeway Design

Off-Street Path / Bike Trail

The highest level of protection that can be given to cyclists is through an off-street cycle path or trail. These bike facilities are fully separated from vehicle traffic by a strip of greenway or are built completely on their own. Off-street cycle lanes are usually for the exclusive use of bicycles, but can be shared between bikes and pedestrians.

Required features of off-street cycle lanes:

- The lane must be fully separated from vehicular traffic by a strip of greenway.
- Lanes must be a minimum of eight feet wide, and a 10-foot width is recommended.



Figure 51. Off Street Path / Bike Trail Example

A5.2 INTERSECTION DESIGN

Intersections are integral to street design as they are where motorists, pedestrians, and cyclists converge. Based on NACTO guidelines, the intersection design standards recommended here will benefit motorists and cyclists through enhanced visibility, predictability, and safety.

Bike Boxes

The bike box intersection design standard consists of a dedicated space at the head of traffic and prior to the pedestrian crosswalk. It is essential that this space be painted to indicate bicycle priority and avoid conflicts. In this space, cyclists are able to wait for signal changes at the head of the intersection, helping them cross more comfortably. The positioning of the cyclist results in a greater sense of predictability and visibility from a motorist's perspective.

Required features for bike boxes:

- Stop lines must be used to indicate the point behind which vehicles are required to stop in compliance with a traffic control signal; stop lines must be 12 to 24 inches wide²⁷.
- Stop lines must be placed 4 feet in advance of the nearest crosswalk line.
- A “No Turn on Red” sign must be present to prevent vehicles from entering the bike boxes.
- Specific pavement markings should be painted in the bike box²⁸



Figure 52. Bike Box Example

27 - MUTCD 3B.16, <https://mutcd.fhwa.dot.gov/htm/2009/part3/part3b.htm#section3B16>

28 - MUTCD 9C-3A or 9C-3B,
https://mutcd.fhwa.dot.gov/htm/2009/part9/fig9c_03_longdesc.htm

Bikeway Design

Crossing Markings

Intersection crossing markings indicate a clear cycling path through an intersection. Crossing markings consist of dashed lines that can range in width and length, and can be supplemented with bicycle markings, arrows, or paint.

Crossing markings increase visibility and predictability of cyclists for motorists, and are particularly helpful at wide or complex intersections where the bicycle path may be less clear.

Georgetown bicyclists repeatedly made clear that right-turns are one of the most unsettling aspects of intersections. Unless directed by

existing signs, vehicles in Georgetown are able to turn right at a red light, which can induce a greater sense of discomfort in cyclists. The following two intersection designs are a method for managing right turns at intersections.

Required features for crossing markings are:

- Dotted lines must bind the crossing space²⁹.
- Striped lines must be a minimum of six inches wide.
- Crossings should match the width and lateral positioning of leading bike lane striping, except for elephants' feet markings.



Figure 53. Crossing Markings Examples

29 - MUTCD 3B.08, <https://mutcd.fhwa.dot.gov/htm/2009/part3/part3b.htm#section3B08>

Bikeway Design

Through Bike Lanes

If a road is expanded to accommodate a right turn lane, through bike lanes guide cyclists from the bike lane to the intersection, across right-turning traffic. Through lanes help alert motorists to bike traffic that may interrupt normal vehicle flows into the turn lane.

Required features of through bike lanes:

- Lanes must be a minimum of four feet wide; it is recommended that they are six feet wide

- Symbols or markings must be painted per MUTCH regulations³⁰.
- Through bike lane must be placed to the left of right-turn-only lanes.
- Through bike lanes should not be used where there are double right turn lanes.
- Dotted lines signifying the merge must begin a minimum of 50 feet before the intersection, or a minimum of 100 feet for high speed or high-volume roadways.

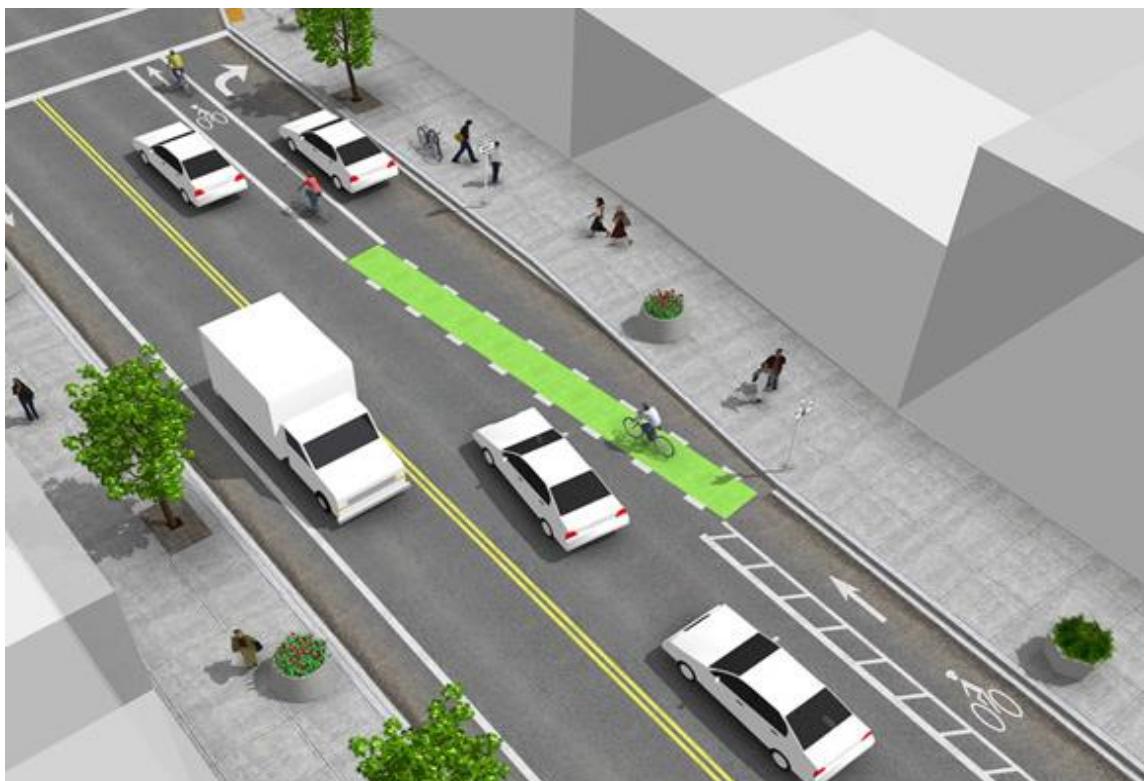


Figure 54. Through Bike Lanes

30 - MUTCD Figure 9C-3, https://mutcd.fhwa.dot.gov/htm/2009/part9/fig9c_03_longdesc.htm

Bikeway Design

Combined Bike Lane/Turn Lane

Similar to through bike lanes, combined bike lane/turn lanes help cyclists navigate street segments where dedicated bike lanes end and vehicle turn lanes begin. Shared lane markings or conventional bicycle stencils with a dashed line can delineate the space for bicyclists and motorists within the shared turn lane or indicate the intended path for through bicyclists³¹. This treatment is less expensive than through bike lanes, but provides less separation and awareness as bike space is combined with vehicle space.

Required features of combined bike lane/turn lanes³²:

- Some form of bicycle marking should be painted to delineate which portion of the turn lane is dedicated to the cyclist.
- The bicycle lane portion of the lane must be a minimum of four feet wide.
- The width of the combined lane should be a minimum of nine feet and a maximum of 13 feet.
- A four-inch-wide dotted line should be painted to separate the bicycle portion of the lane.



Figure 55. Combined Bike/Turn Lane Example

31 - <https://nacto.org/publication/urban-bikeway-design-guide/intersection-treatments/combined-bike-laneturn-lane/>

32 - <https://nacto.org/publication/urban-bikeway-design-guide/intersection-treatments/combined-bike-laneturn-lane/>

A5.3 BICYCLE PARKING FACILITIES

Public Bicycle Parking

Public bike racks are a common type of bicycle parking facility. Standard public bicycle racks are inexpensive and take up little space, which allows for frequent and convenient placement near common destinations. These types of racks required cyclists to provide their own bike locks, and are not very secure in some cities. Additional public parking facilities include bike cages, which typically require a membership, are costly to install, and take up a generous amount of space.

Bicycle Repair Facilities

Cities can choose to install public bicycle repair stations. They provide tools to help cyclists solve common bike problems, such as air pumps to reinflate tires and stands to conduct chain adjustments. Stations like this, when placed throughout common cycling areas, can give residents peace of mind that if they choose to travel by bike and have unexpected issues, they will still be able to reach their destination.



Figure 56. Bike Box Example

Appendix 6: Bicycle Friendly Community Designation Action Plan

The League of American Bicyclists recognizes states, communities, universities, and businesses that have achieved a certain level of bicycle friendliness. The League's Bicycle Friendly Program is a tool for entities to encourage bicycling as a viable transportation option for everyone. Since the creation of the Bicycle Friendly Communities (BFC) program in 1995, 450 communities have been recognized as BFCs³³. The League provides hands-on assistance to these communities, giving them the necessary building blocks to realize their vision of a bikeable community.

In order for Georgetown to become a Bicycle Friendly Community the following 10 criteria must be addressed. These building blocks are subcategories of the 5 E's, which are the primary components of a Bicycle Friendly Community³⁴.

1. High-speed roads with bicycle facilities
2. Total bicycle network mileage to total road network mileage ratio
3. Bicycle education in schools
4. Percentage of total transportation budget allocated to bicycling projects and maintenance
5. An active bicycle advocacy group
6. An official active bicycle advocacy committee
7. Bike Month and Bike to Work events
8. Bicycle friendly laws and ordinances
9. A current and effective bike plan
10. Bike program staff to population ratio

The infographic below provides a visual representation of the building blocks, and color-coded steps to help get communities get started, make progress, and set standards.

33 - "Bicycle Friendly AmericaSM." League of American Bicyclists, League of American Bicyclists, 26 Aug. 2016

34 - League of American Bicyclists, <https://bikeleague.org/content/building-blocks-bicycle-friendly-communities>

Bicycle Friendly Community Plan

The BFC program has five award levels -- diamond, platinum, gold, silver, and bronze -- that rate the bicycle friendliness of a community. Although the BFC program makes suggestions for entry-level efforts, there is no single way for a community to achieve any of

the five rankings. This makes it easy for a community to customize its action plan. Georgetown staff will need to work with community members and stakeholders to choose the best route for the City to achieve a BFC designation.

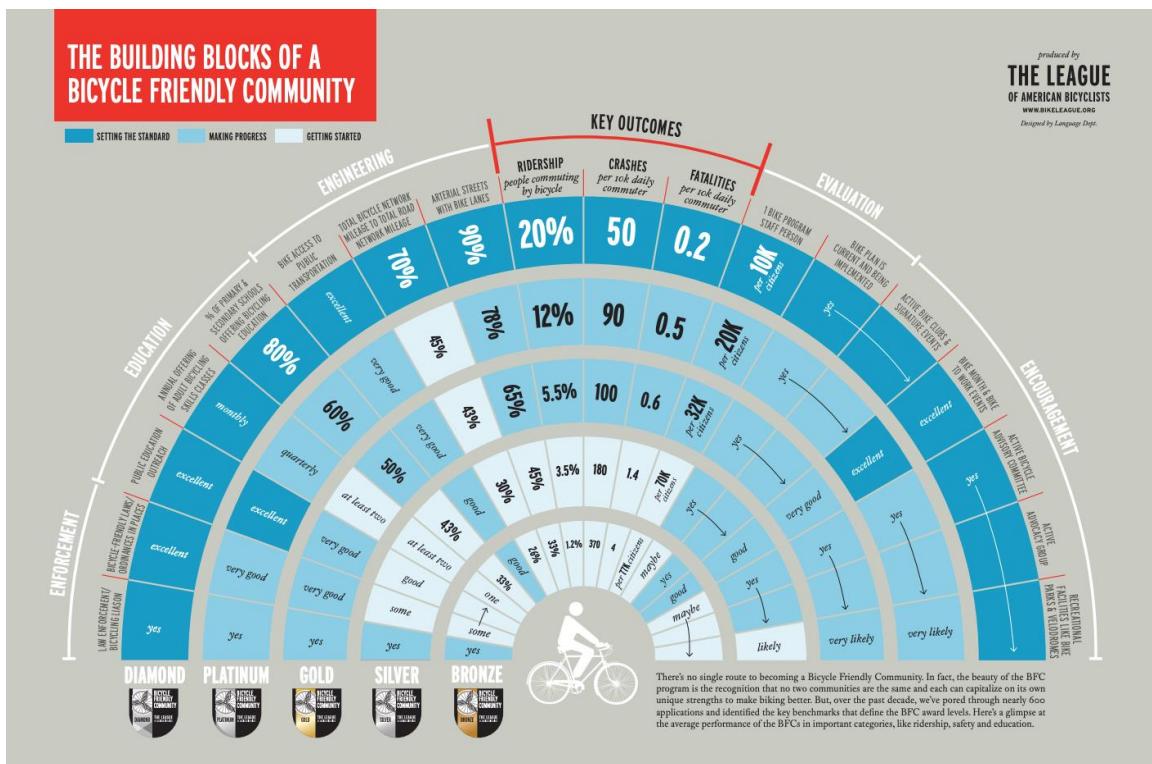


Figure 57. BFC Building Blocks

Much of the BFC application process focuses on how evolved a community is in terms of the 5 E's framework. The application requires performance measures from each of the E's, which are outlined in Chapter 4 of the Bike Plan. Georgetown will be awarded a BFC designation equivalent to the City's progress on these measures at the time of application.

Applications are accepted in the spring and fall of each year. The most current round opened in February 2019 and will close in August 2019. The League of American Bicyclists provides applications and instructions about how to apply on their website³⁵.

35 - www.apply.bikeleague.org

Appendix 7: In Depth Methodology for Determining Cost Estimates

Details on the parameters used to develop the cost estimates for the Georgetown bicycle network can be found below. Estimated costs are broken down into the following categories: sharrows, bike lane, buffered bike lane, physically protected bike lane, and off-street path/bike trail. First, the number of linear miles or markings was determined for each type of infrastructure treatment. Table 8 below shows the miles of the Top 10 recommended projects in the Plan.

Table 8. Facility Miles Recommended in Top 10 Projects

Project Rank	Project Name	Facility Type	Miles
1	Austin Ave. Bridge	Off-street path	0.49
2	8th St.	Protected bike lane & off-street path	1.04
3	Main St.	Protected bike lane	1.20
4	Holly St. Bridge	Off-street path	0.14
5	Maple St. Phase 1	Protected bike lane & off-street path	1.14
6	Northwest Blvd./ IH-35 Crossing Phase 1	Bike lane & protected bike lane	1.08
7	San Gabriel River Crossing at St. David's Hospital	Off-street path	0.91
8	Williams Dr.	Off-street path	0.45
9	DB Wood Rd. and Williams Dr.	Off-street path	0.74
10	SR-29 East View HS connection across SR 130	Off-street path	1.26

Cost Estimates

Next, unit costs were then assigned to each of the different types of treatments recommended as part of the network. The unit costs are based on the cost of bicycle infrastructure in the City of Portland³⁶, as well as different cost structures used by cities that have already implemented bicycle facilities. The following high and low estimate unit costs per foot were assigned to estimate a cost range for each project: \$0.83 to \$6.35 per ft. for bike lanes, \$2.00 to \$9.33 per ft. for buffered bike lanes, and \$24.79 to \$68.16 per ft. for physically protected bike lanes.

Sharrows cost \$250~\$339 per marking reported by the same Portland study. This plan used \$250~\$339 per marking , assuming four markings each two-way street block and an average block size of 450 feet, which gave approximately 50 markings per mile.

These costs were multiplied by 5,280 ft. to obtain the cost per mile that is reflected in Table 9 for all proposed new bike infrastructure and treatments.

The Portland study by Weigand, et al. (2013)³⁶ does not provide cost information on off-street paths. This plan referred to the report by TxDOT³⁷ on bike trails, which suggests cost range of off-street path /bike trail being \$480,000~\$570,000 per mile.

This plan did not provide exact installations of bike parking, bicycle repair facilities, and other cycling-related infrastructure elements throughout the city. A FHWA report prepared by Bushell, et al. (2013)³⁸ offers a convenient reference on cost estimates for these elements .

When implementing an on-street facility, the street resurfacing that may be required to remove previously existing striping is a significant cost associated with implementation. These cost estimates have not been considered due to their fluctuating nature.

36 - Weigand, L. et al. (2013). Cost Analysis of Bicycle Facilities. Retrieved from https://activelivingresearch.org/sites/activelivingresearch.sdsc.edu/files/Dill_Bicycle_Facility_Cost_June2013.pdf

37 - TxDOT, 2018. Texas Bicycle Tourism Trails Study (Final Report). TxDOT Public Transportation Division. Retrieved from <https://ftp.dot.state.tx.us/pub/txdot-info/ptn/btts-final-report.pdf>

38 - Bike and Pedestrian Information Center. (2013). Costs for Bicycle and Pedestrian Improvements. http://www.pedbikeinfo.org/cms/downloads/countermeasure%20costs_report_nov2013.pdf

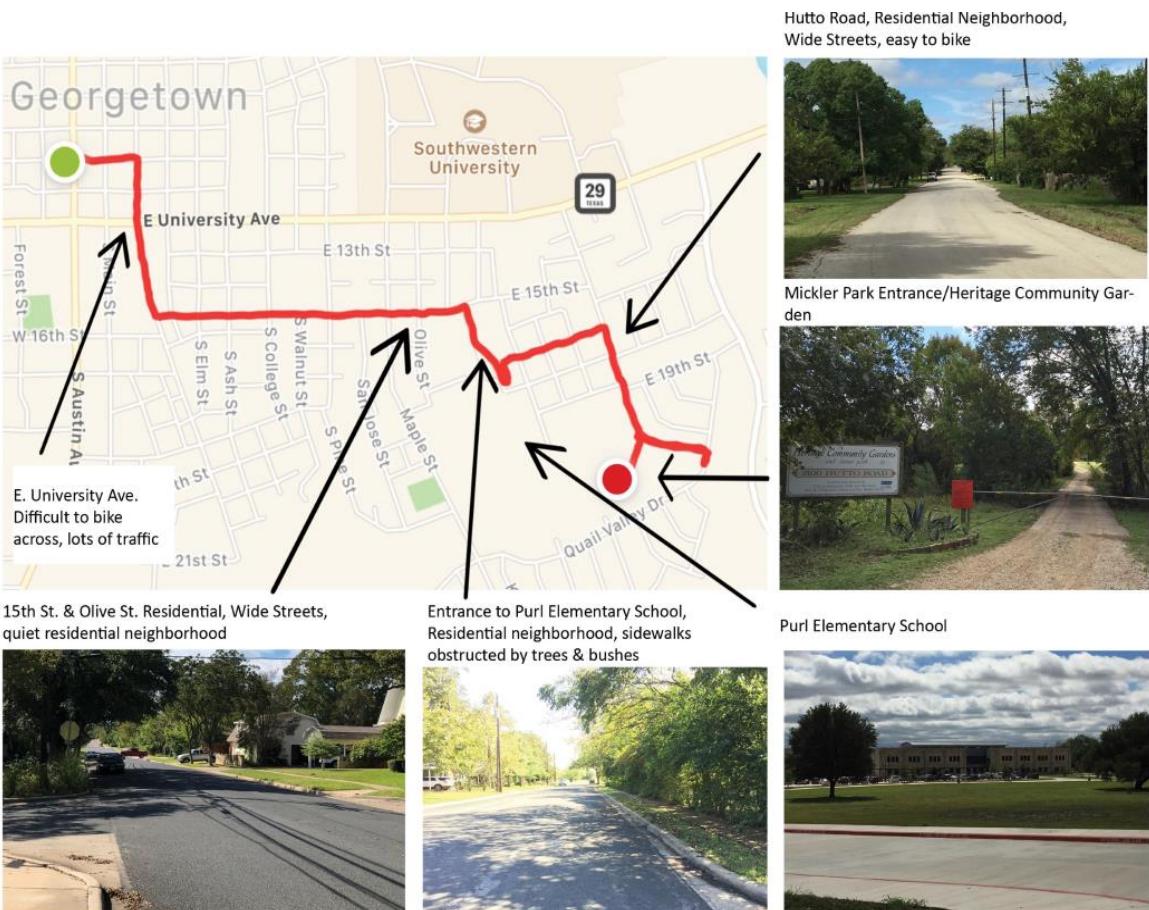
Cost Estimates

Table 9. Network Cost Estimates

Network Element	Quantity	Cost per Unit (Low)	Cost per Unit (High)	Total Cost Range
<i>On-Street</i>				
Sharrow	7.66 miles	\$ 12,500	\$ 17,500	\$95,750 - \$134,050
Bike Lane	9.84 miles	\$ 4,382	\$ 33,528	\$43,119 - \$329,916
Buffered Bike Lane	9.13 miles	\$ 10,560	\$ 49,262	\$96,413 - \$449,762
Physically Protected Bike Lane	11.11 miles	\$ 130,891	\$ 359,885	\$1,454,199 - \$3,998,322
Crossing Markings and Bike Boxes	21	\$ 5,000	\$ 5,000	\$105,000
Subtotal:				\$1,794,481 – \$5,017,050
<i>Off-Street</i>				
Off-Street Path / Bike Trail	26.44 miles	\$480,000	\$570,000	\$12,691,200 - \$15,070,800
Total:				\$14,485,681 - \$20,087,850

Appendix 8: Compilation of Field Investigation Reports

During field investigations, the project team rented bikes from the Georgetown Public Library and rode city streets to see what it is like to bike in Georgetown. Environmental conditions were documented from on-the-ground experience. Below is a collection of all bike routes taken by the cyclists documented using the Map My Ride app to geo-locate the specific paths traveled



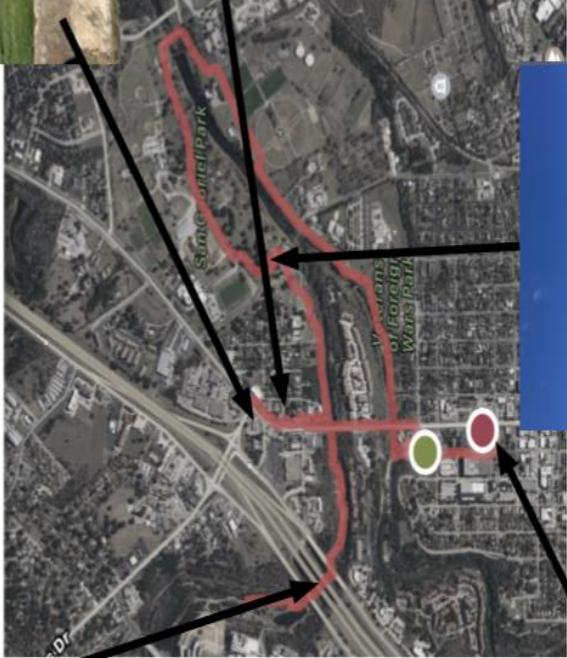
Field Investigations



Austin Ave. and Williams Dr. Intersection has a heavy volume of cars. There is no crosswalk for pedestrians.



There is no bike path on Austin Ave. The sidewalks are relatively narrow for people to be pushing their bikes.



The overpass of I-35 where the trail travels north to Spring Valley Rd. Under the overpass, the trail zig zags and is hard to ride on.



This trip started from the Library on 8th St. 8th St. is a 2-lane s with angled street parking. Given the low traffic volume, biking is comfortable.

A nicely built restroom on the trail is equipped with water fountains. The facility is new and well-maintained. The surrounding park had children and senior citizens present during this workday visit.

Field Investigations



College St. is another main road that crosses the river. It has less traffic than Austin Ave. and has continuous sidewalks. However, at the north end, where the sidewalk ends there is not a place for cyclists to cross the river safely.

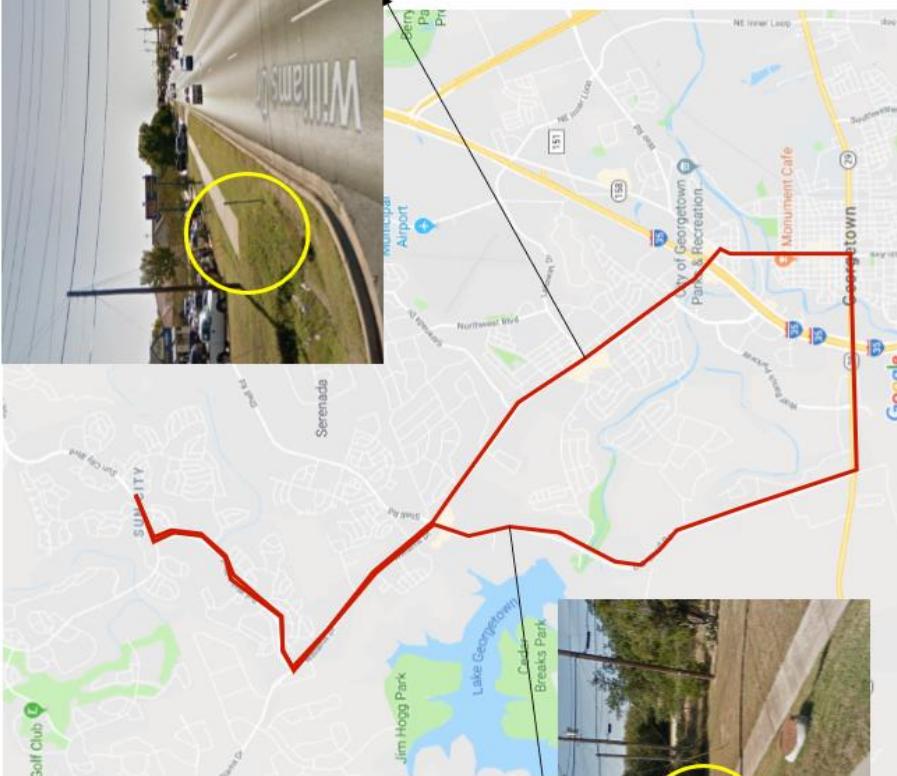


Austin Ave. is the main road in Downtown for external and through traffic. It lacks road signage which makes it difficult to distinguish lanes. There is a bike rack at the intersection of Austin Ave. and 8th St.

Field Investigations



The heavy traffic on Williams Dr. is a threat to cyclists. There is potential to install a separated bike lane to help connect Sun City to Downtown in a more comfortable manner.



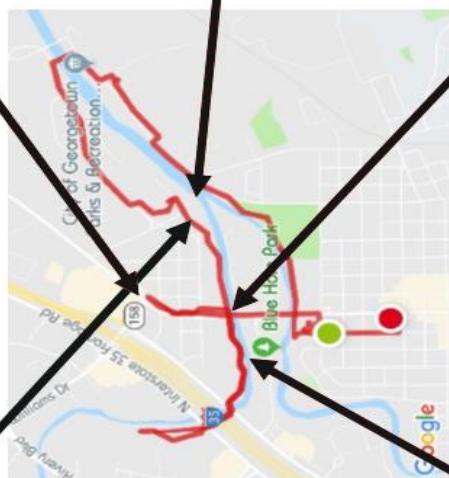
Multiple residents mentioned a discontinuous sidewalk on DB Wood Rd. From conversations DB Wood seems to be an important connection between Downtown and Sun City, as well as a main access point to the trails in the Cedar Breaks park.



Field Investigations

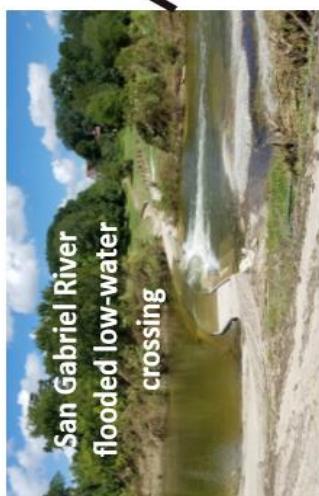


Sidewalks are prone to ending and require cyclists to merge with vehicle traffic.



There are a number of high-quality, off street trails in Georgetown, particularly within the park system.

River crossings are flooded quite often and create a connectivity problem for cyclists.



The Austin Ave. bridge is intimidating to cross, and requires cyclists to dismount bikes and walk alongside them.

Field Investigations



There are multiple places in Georgetown where cars, buses, and bikes must cross railroads.



On many neighborhood streets, speeds are low enough for cars to maneuver around bikes, however some cyclists may not be comfortable in mixed traffic.



Lack of Bike Parking

Cyclists have to get creative when securing their bikes due to a lack of proper bike racks.



Pirate Bikeshare

at SU

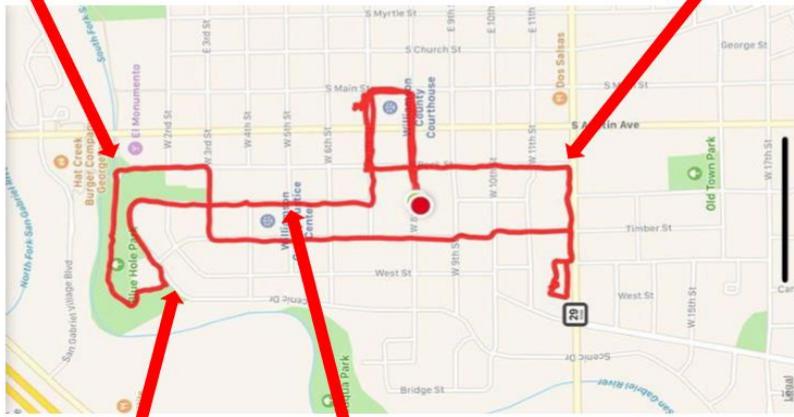
There are numerous yellow Pirate Bikes throughout the Southwestern Campus. Though the bikes are not meant to leave campus, some can be found in other spots around town.

Field Investigations

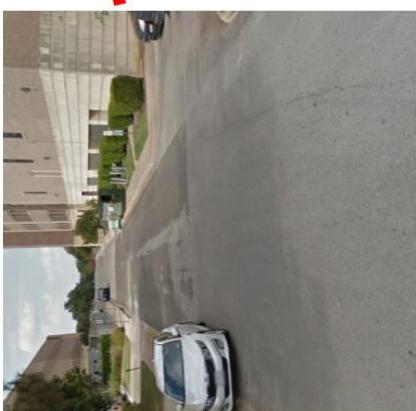


The opening to the bike trail.

Cycling on University Ave. was very dangerous. We stayed on the sidewalk, but the terrain was so rough that we were in danger of falling. Trash cans littered the sidewalk as well, so it was hard to cycle on stretches of this road.



The bike trail was well-paved, smooth, and had a great view. However, this part of the trail was so extremely steep that we had to get off our bikes and walk.



The long ride back to the library was interesting. The roads were fairly steep, and there were stretches where we were either riding dangerously fast due to the slope, or putting in a strong effort to reach the peak. However, lanes were very wide and could easily accommodate cycling infrastructure.

Field Investigations



Wide shoulder on roadway could serve as cycling infrastructure for confident riders. High speeds are not safe for unprotected cycling and could produce bicycling high stress levels.



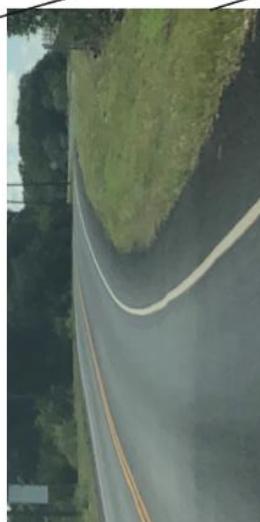
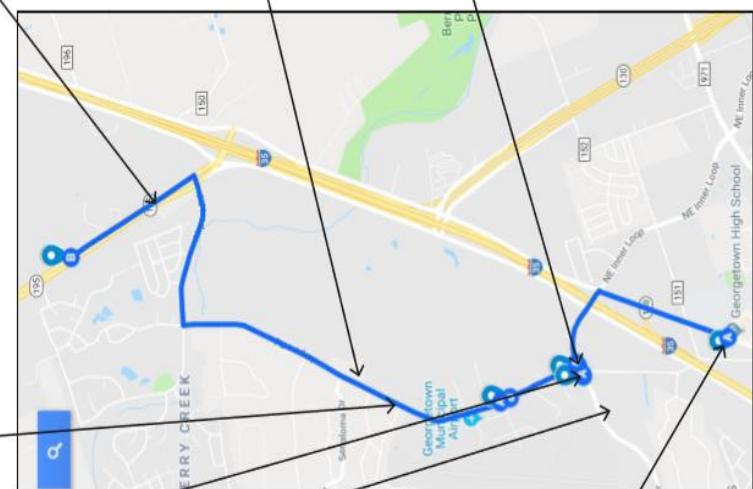
Example of industrial roads off of Airport Rd.
not conducive to cycling.



Lakeway Dr., east of Airport Rd., right before the road narrows from four to two lanes. Unsafe conditions for cyclists on either side of the road.



Airport Rd. is very narrow and could serve as a connection to northwest Georgetown. There is limited ROW which provides an unsafe environment and no space to add bike lanes.



Sharp turns on Lakeway Dr. and lack of lighting provide unsafe conditions for cyclists.

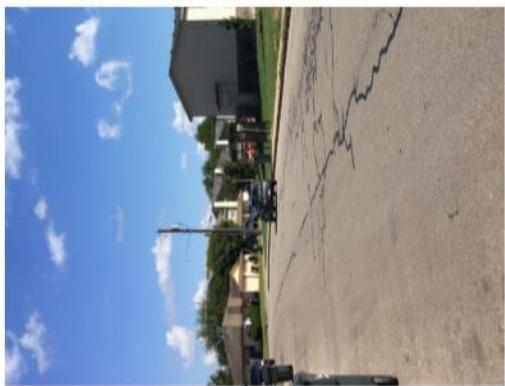


Roadway conditions in front of Georgetown High School; small, potential bike lane on high speed roadway is not safe.

Field Investigations



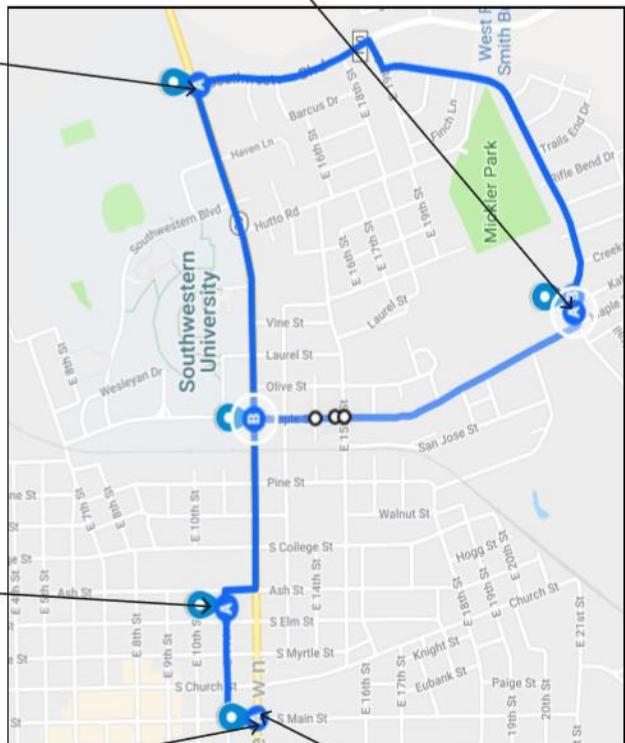
Southwestern Blvd. connects to Southwestern and the trail on campus. Posted speed limits are 30mph but roadway conditions may yield faster speeds.



Bus stop on Quail Valley; cars are parked on one side of the residential street.



11th St. between Ash and Elm; residential neighborhoods between the Square and Southwestern University. The area has wide roads and some sidewalks.



Major intersection of University Ave. and Main St. This is a good example of conditions for cyclists to cross at signalized intersections.



Parking conditions in Downtown

Appendix 9: Case Study Reviews

The following are other cities' and jurisdictions' bicycle plans that were reviewed by the project team as part of the development process of the Georgetown Bicycle Master Plan. Takeaways from each plan and how they were incorporated in the Bike Georgetown planning process are listed below.

A9.1 MADISON, WI METROPOLITAN AREA AND DANE COUNTY BICYCLE TRANSPORTATION PLAN³⁹

This Bicycle Master Plan was created by the Madison Area Transportation Planning Board, and MPO and the regional transportation planning body for Madison, WI and its surrounding cities. This plan was chosen for review because several of the cities within this planning jurisdiction have received Bicycle Friendly Community designations . The following attributes were noted as useful for the Georgetown bike planning process and Plan document:

Framework:

The Madison Area Plan's goals are safety (increase safety and decrease crashes), usage (increase mode share of biking), connectivity (connect people to the places they want to go), equity (ensure equal access), livability (enhance quality of life), and longevity (maintain the bike network).

Then, the plan translates these goals into seven "E's" to implement them. These Es are: Education, Encouragement, Enforcement, Engineering, Envisioning, Evaluation, and End of Trip Facilities. This framework translated well into the Georgetown context, and many similarities can be seen between the two plan's goals and implementation sections.

Prioritization and Cost Estimates:

The Madison Plan has a clear list of first-priority projects and their cost estimates. This methodology was used for the Georgetown plan as well, since it was successful in kickstarting this area's bike infrastructure implementation. Bike Georgetown also recommends a number of federal, state, and local funding sources similarly to the Madison Area Plan.

39 - Madison Area Transportation Planning Board. (2015). Bicycle Transportation Plan. Retrieved from: <http://www.madisonareampo.org/planning/BikePlan.cfm>

A9.2 CITY OF DENTON, TX PEDESTRIAN AND BICYCLE LINKAGE COMPONENT OF THE DENTON MOBILITY PLAN⁴⁰

Denton's plan was reviewed because it is similarly situated to Dallas as Georgetown is to Austin. Both cities are suburbs of major Texas urban centers, and grapple with similar transportation issues as much of the population commutes into a major city each day. The following aspects of the Denton Plan inspired portions of the Georgetown Bike Plan:

Design Standards:

The Denton Plan details design standards carefully, providing the guidance needed to implement all recommended treatment types. The same approach was taken in the Georgetown Plan following this review.

Implementation Strategies:

Denton's bicycle plan included a strong implementation section which outlines five action areas: organize a bicycle program, plan and construct needed facilities, promote bicycling and walking, educate bicyclists and the public, and law enforcement and regulations. Each action area has action items, and specific tasks. The Georgetown Bike Plan uses a very similar framework in Chapter 4: 5 E's Recommendations in order to communicate general implementation strategies, and those specific to Georgetown along with clear directions for reaching targets.

40 - City of Denton. (2012). Update to the Pedestrian and Bicycle Linkage Component of the Denton Mobility Plan. Retrieved from: https://www.cityofdenton.com/CoD/media/City-of-Denton/Residents/Getting%20Around%20Denton/Pedestrian_and_Bicycle_Linkage_Component_Plan.pdf

A9.3 CITY OF BERKELEY, CA BICYCLE PLAN⁴¹

Berkeley, California's plan was chosen because it is a medium-sized city well known for cycling infrastructure, and is home to a University that generates cycling demand as Southwestern University does in Georgetown.

According to the plan, Berkeley holds the fourth highest bicycle commute share of any city in the United States with 8.5% of people choosing bicycling as their primary commute mode. The following portions of the Berkeley Plan were applied in Georgetown:

Incorporate other Planning Efforts:

The Berkeley Plan aligns itself with the seven goals of Berkeley's most recent general plan, particularly those pertaining to preserving Berkeley's unique character and quality of life, and those regarding sustainability, and high-quality public infrastructure. The Plan is also built upon past city and regional transportation planning efforts, namely the Berkeley Strategic Transportation Plan and the Alameda County Transportation Commission's Countywide Transportation Plan and Countywide Multimodal Arterial

Plan. As a result, Georgetown's bike planning process included reviewing current planning documents in order to intentionally align with previously established City goals and objectives.

Shadow Networks:

Berkeley is famous for its deployment of 'bicycle boulevards' as a cost-efficient means to achieving a wide-reaching low-stress cycling network taking advantage of quieter neighborhood streets of the city's grid. Using simple tactics like distinct visual identity with signage and pavement markings, bicycle prioritization through traffic calming, and safe intersection crossing facilities, the city is able to develop a number of high comfort cycling facilities without constructing expensive segregated cycling infrastructure or acquiring right-of-way to construct off-street paths. Similarly, Georgetown's Plan has placed shadow networks at the heart of its bicycle planning methodology to enhance connectivity at a lower cost and on more compatible roads.

41 - City of Berkeley. (2017). City of Berkeley Bicycle Plan. Retrieved from:
<https://www.cityofberkeley.info/berkeleybikeplan/>

A9.4 CITY OF GREENVILLE, SC BICYCLE MASTER PLAN⁴²

Greenville, SC is of a similar size and population to the City of Georgetown. Greenville's first bike lane was installed in 2005 and incremental steps have been made since toward increasing the bicycling network and becoming a more bicycle friendly community. The City also has a very similar staffing structure to Georgetown, as existing greenways or bikeways are managed by the Parks and Recreation Department, and the Public Works Department where the City's Traffic Engineer works. The following are important ideas generated by Greenville's Plan used as guidance for the Georgetown Plan:

Focus on Bicycle Friendly Community:

Community-led groups were cited as a major cause of the rising popularity of bicycling in Greenville as they are hosting educational programs and events. After conducting a sample count of bicyclists around the city, the masterplan includes key observations regarding cycling behaviors: most bicycles counted were male, bicycling seemed to be more common on the weekend than weekdays, and existing parks and trail pathways were the most popular destinations for bicycling. One of the goals pervasive in the plan is the desire to grow bicycling in the community and become a bicycle-friendly community.

The focus on listening to the community regarding key destinations and routes was carried forth into the Georgetown Bicycle Plan, as well as leveraging community groups to enhance education and awareness.

Low Cost First:

Greenville identified low-cost and potentially high-impact improvements such as striping bicycle lanes on roadways that already have a large enough right of way to carry out first. As a City with similar budget constraints and the desire to increase community participation in biking quickly, similar projects were identified as first priority in the Georgetown Plan.

Rider Typologies:

The Greenville Plan identifies four types of bicyclists: strong and fearless; enthused and confident; interested but concerned; and no way no how. Defining the types of bicyclists that exist within Greenville naturally helps best serve community members by understanding their comfort levels and goals. Georgetown surveys all required respondents to classify themselves by rider type and responses were used in planning for facility types similarly to Greenville.

42 - City of Greenville. (2011). Bikeville: City of Greenville Bicycle Master Plan. Retrieved from: www.greenvillesc.gov/544/Bikeville.

A9.5 CITY OF FORT COLLINS, CO BICYCLE MASTER PLAN⁴³

Fort Collins is a medium sized city, well known for its biking infrastructure and is a Platinum level Bicycle Friendly Community since 2013. It is also home to Colorado State University, and is an example of a rapidly growing smaller city that has successfully implemented a connected bicycle network. The city also has extensive hike and bike trails that now connect to on street bicycling infrastructure – a major goal for Georgetown.

All Ages and Abilities:

The overall vision for the Fort Collins Plan is as follows:

“It is a city where people of all ages and abilities have access to a comfortable, safe, and connected network of bicycle facilities, and where bicycling is an integral part of daily life and the local cultural experience”. It is made clear throughout the Plan that facilities in Fort Collins should seek low-speed and low-volume streets to attract a wider range of bicyclists. Specifically, those that would cycle if they felt comfortable and safe. This idea was integrated heavily into the Georgetown Plan through the use of shadow networks, careful treatment choice based on road type, and an emphasis on connections to schools.

43 - City of Fort Collins. (2014). Bicycle Master Plan. Retrieved from:
<https://www.fcgov.com/bicycling/bike-plan.php>

A9.6 CITY OF SACRAMENTO, CA BICYCLE MASTER PLAN⁴⁴

While Sacramento is a much larger city than the City of Georgetown (both in size and population), the cities are similar in geography and climate. They both have flat topography and a temperate year-round climate which is attractive to bicyclists. Both cities face similar barriers to bicycling, since the City of Sacramento is divided by 2 rivers (The Sacramento and the American) and by 5 major highways (I-5, I-80, Highway 50, State Route 160, and State Route 99), which form barriers to travel between adjacent neighborhoods. Like in Georgetown, there are only a limited number of bridges over the rivers, which hinder bicycle connections. Considering the similar challenges both the cities face, Sacramento is an excellent model to follow since the city is designated as a "Silver Level" Bicycle Friendly Community by the League of American Bicyclists. Key takeaways are as follows:

Underrepresented Populations:

The sampling strategy, as well as the implementation strategy outlined in the Sacramento Plan focuses on engaging underrepresented communities in the city. The Plan includes a GIS Equity analysis of historically disadvantaged and underserved areas, and outlines a

robust and targeted Community Outreach strategy that incorporated these areas. In Georgetown, minority communities and in particular the Hispanic community, were underrepresented in the 2016 round of surveys, and the City had a primary concern to ensure that all voices were heard in the planning process. The project team conducted a geospatial analysis to identify areas where feedback had not been received, targeted those areas through on-the-ground interviews, and made materials translated into Spanish and Spanish-speaking interviewers accessible.

Connections to Other Modes:

There is a focus in the Sacramento Plan on using cycling to fully connect all modes of transportation and increase total connectivity in the city. In the case of Sacramento, it is planned that the downtown area will be reorganized through a grid system that considers motor vehicles, transit, bicycles, and pedestrians, as well as how easily they all integrate with one another. The Georgetown Plan explores options for connecting bike to the GoGeo bus system, the primary form of transit in the city. It also recommends an expansion of bike sharing as a method for connecting pedestrian travel to bike travel.

44 - City of Sacramento. (2016). City of Sacramento Bicycle Master Plan. Retrieved from: <http://www.cityofsacramento.org/-/media/corporate/files/public-works/transportation/bicycle-master-plan/sacramento-2016-bicycle-master-plan.pdf>

A9.7 SAN ANTONIO, TX BIKE PLAN + IMPLEMENTATION STRATEGY⁴⁵

San Antonio's location within the State of Texas made this a relevant plan to review, as many of the same policies and regulations govern Georgetown's ability to plan a bike network. It also has a well-known recreational trail network which has faced challenges connecting to on-street facilities in the past, similar to Georgetown. The following are key portions of the San Antonio Plan that were referenced in the drafting of Georgetown's Bike Plan:

Monitoring and Evaluation:

The San Antonio Plan has a strong implementation chapter that also explains the importance of monitoring and evaluating infrastructure performance as it is installed. It is stated that this helps the Plan get updated accordingly as goals are or are not being met. The Georgetown Plan recommends installing bicycle counters as infrastructure is implemented, as well as collecting baseline biking information now, so

that decision makers will have the data they need to make changes and recommendations in the future.

City Department Collaboration:

The San Antonio Bike Master Plan emphasizes the many departments that are necessary to successfully plan and implement a connected bicycle network. It is stated that departments must be in contact with one another to not only support the bike plan but also to help achieve the many other City initiatives. Georgetown's planning process included members of the Parks and Recreation Department, Police Department, Public Works Department, Communications Department, and Fire Department to help ensure that the Bike Plan is in harmony with other department's current goals and initiatives. Feedback was also gathered to ensure that the Plan will be implementable from many different perspectives.

45 - City of San Antonio. (2013). City of San Antonio Bike Plan + Implementation Strategy. Retrieved from: <https://www.sanantonio.gov/SABikes/BicycleMasterPlan>

A9.8 THE WOODLANDS TOWNSHIP, TX PEDESTRIAN AND BICYCLE MASTER⁴⁶

The Woodlands began is similar to Georgetown due to its location in Texas and position as a suburb of a major city, Houston. It adopted its first bike master plan recently, in 2016, making it new to formal bicycle planning as well. The following are notable portions of the Woodlands Plan that were considered during the creation of the Georgetown Plan:

Intersections for All:

The Woodlands Plan identifies that intersections are a key point in a bicycle network and should be designed so that pedestrians, cyclists, and drivers should all be aware of one other, and have a clear path for crossing. The Georgetown Plan recommends design standards

specifically for intersections such as bike boxes, and various types of cycling paths to raise awareness of and for cyclists. Intersections are also identified through public input and a crash analysis which should be treated for safety and ease of use.

Project Phasing:

The Woodlands identified projects as either short-term, mid-term, and long-term, providing a phasing approach to building out the complete bike network. This gives a clear road map for those working on these projects in the future that may not have worked directly in the planning process. Georgetown's Plan identifies Tier 1 and Tier 2 projects which should be implemented in phases.

46 - The Woodlands Township. (2016). The Woodlands Township Pedestrian and Bicycle Master Plan. Retrieved from: <https://www.thewoodlandstowmship-tx.gov/1212/PedestrianBicycle-Master-Plan>

Appendix 10: Bicycle Network and Complete List of Improvement Projects

This appendix provides larger versions of proposed sections of the bicycle network. A complete list of all 47 bicycle improvement projects are listed with a brief description and rough cost estimate.

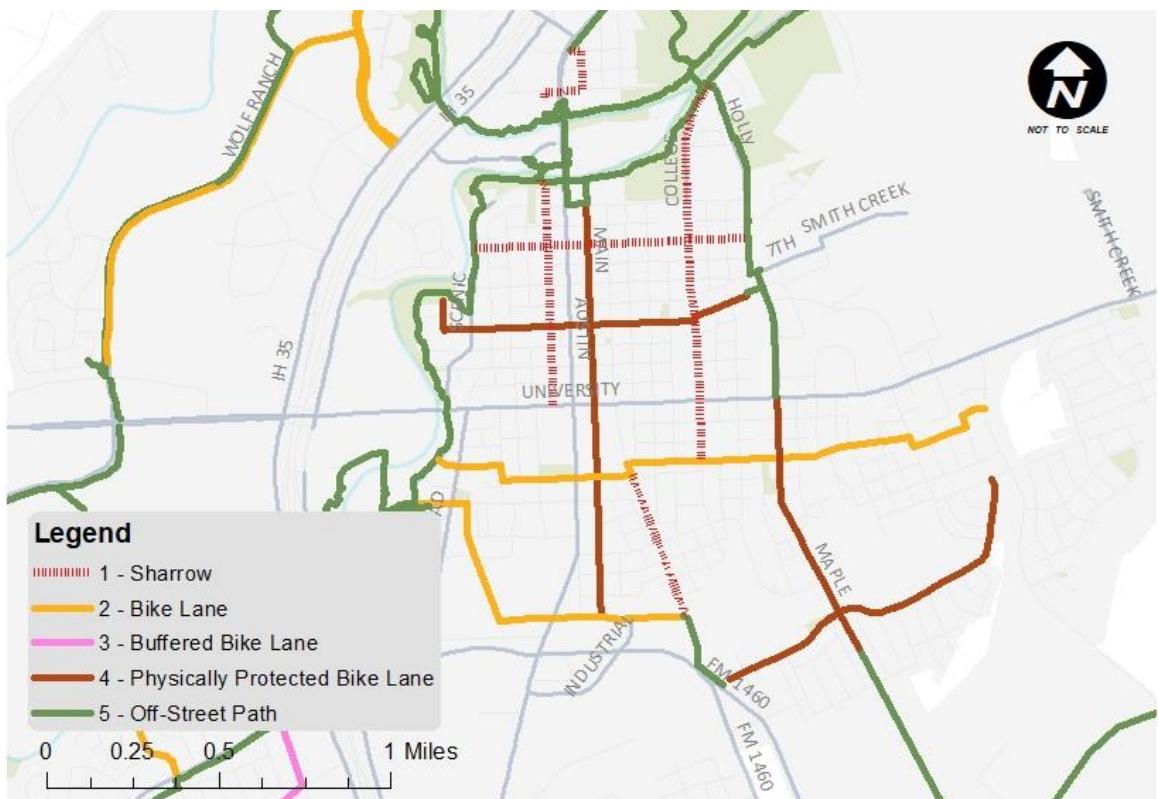


Figure 58. Downtown Georgetown Area Map - Proposed Bike Network

Bicycle Network

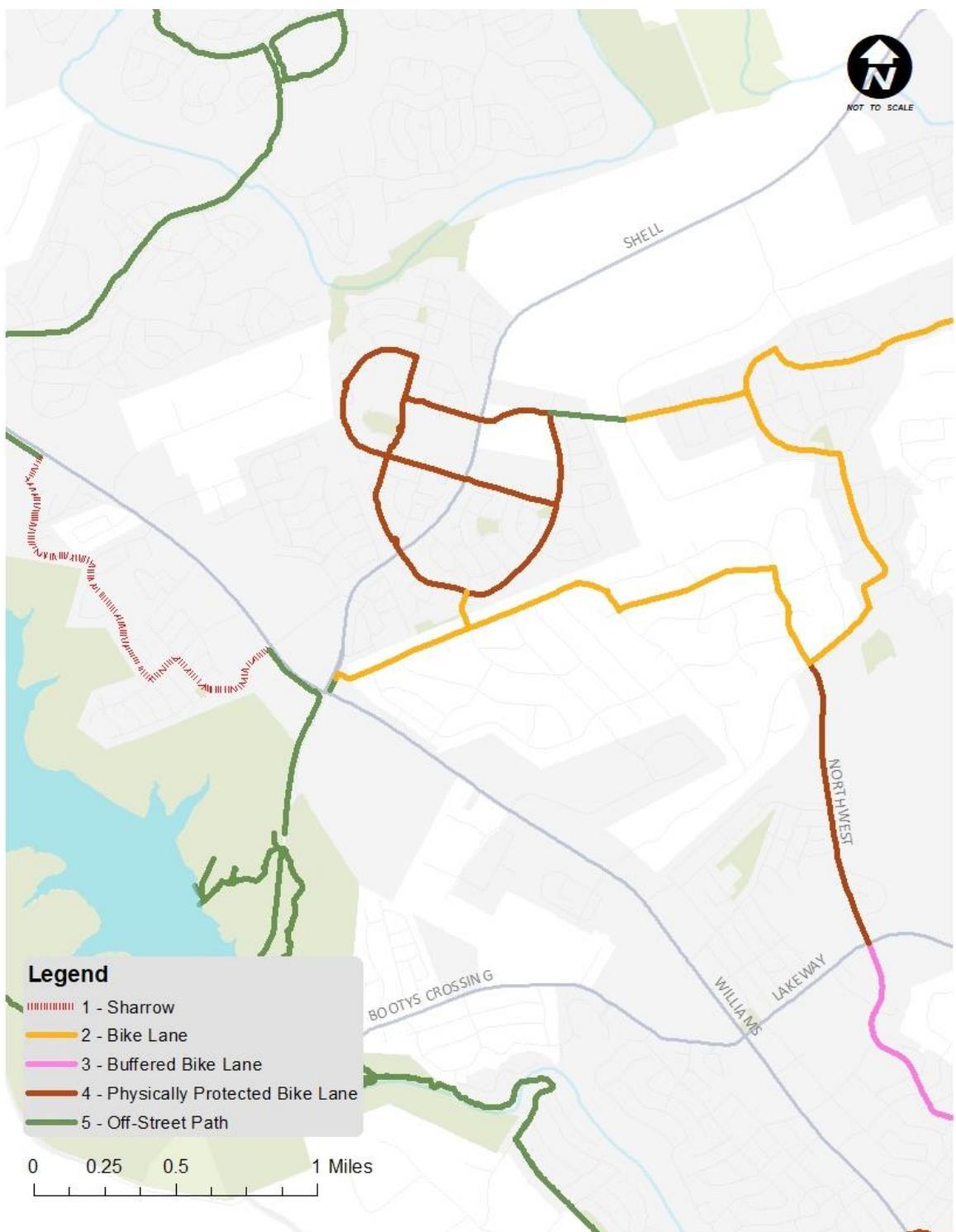


Figure 59. Northwest Georgetown Area Map - Proposed Bike Network

Bicycle Network

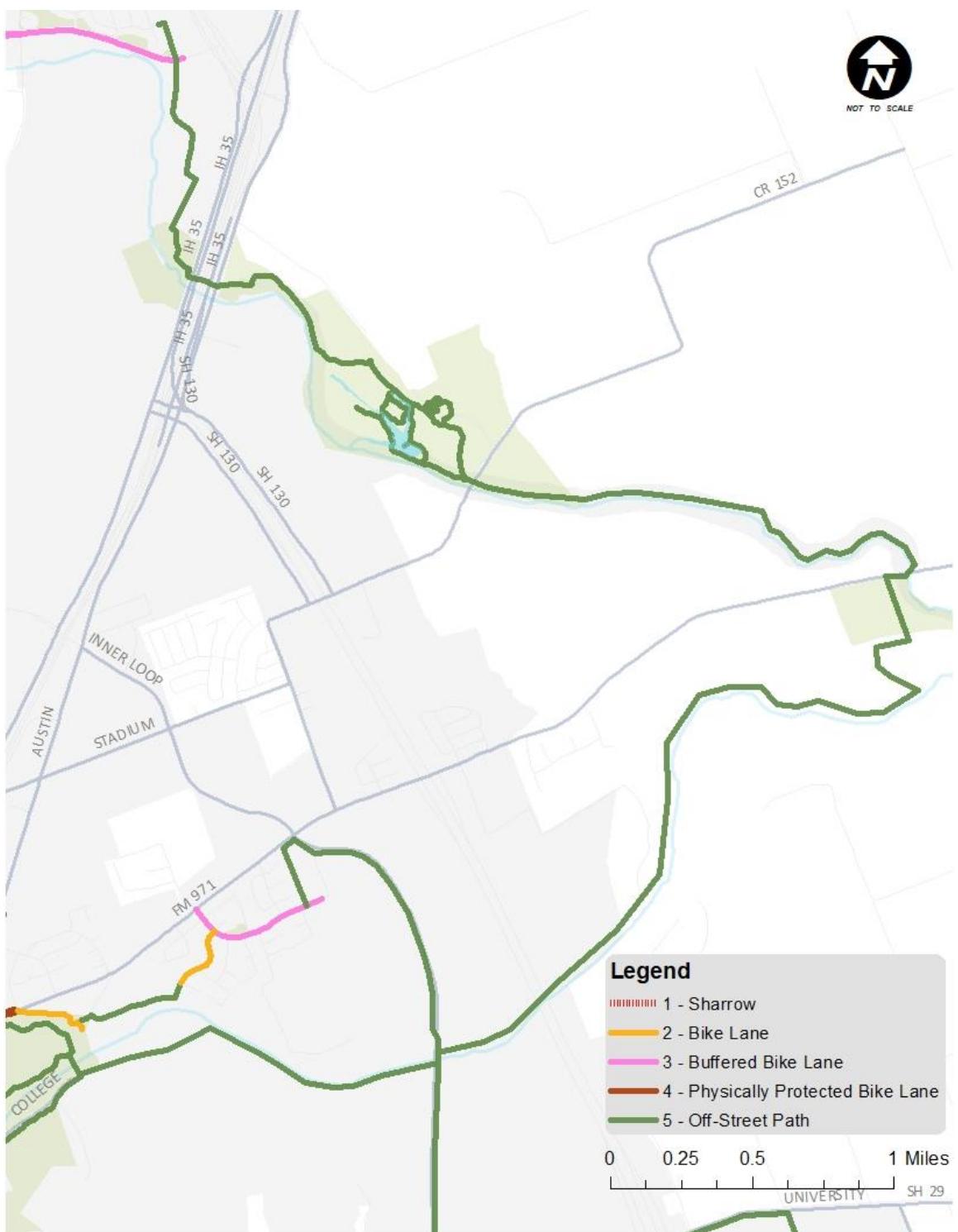


Figure 60. Northeast Area Map - Proposed Bike Network

Bicycle Network

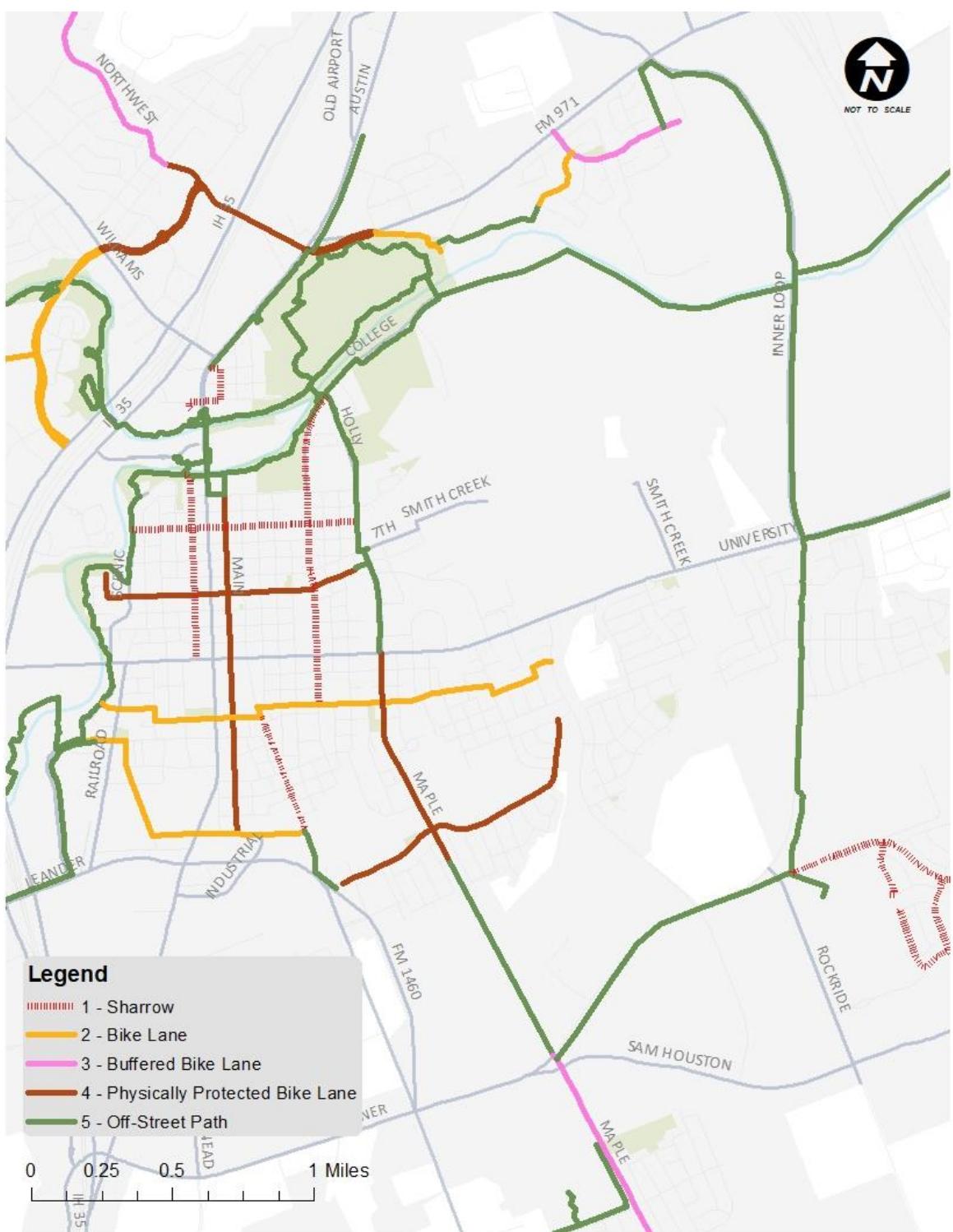


Figure 61. East Georgetown Area Map - Proposed Bike Network

Bicycle Network



Figure 62. Southeast Georgetown Area Map - Proposed Bike Network

Bicycle Network

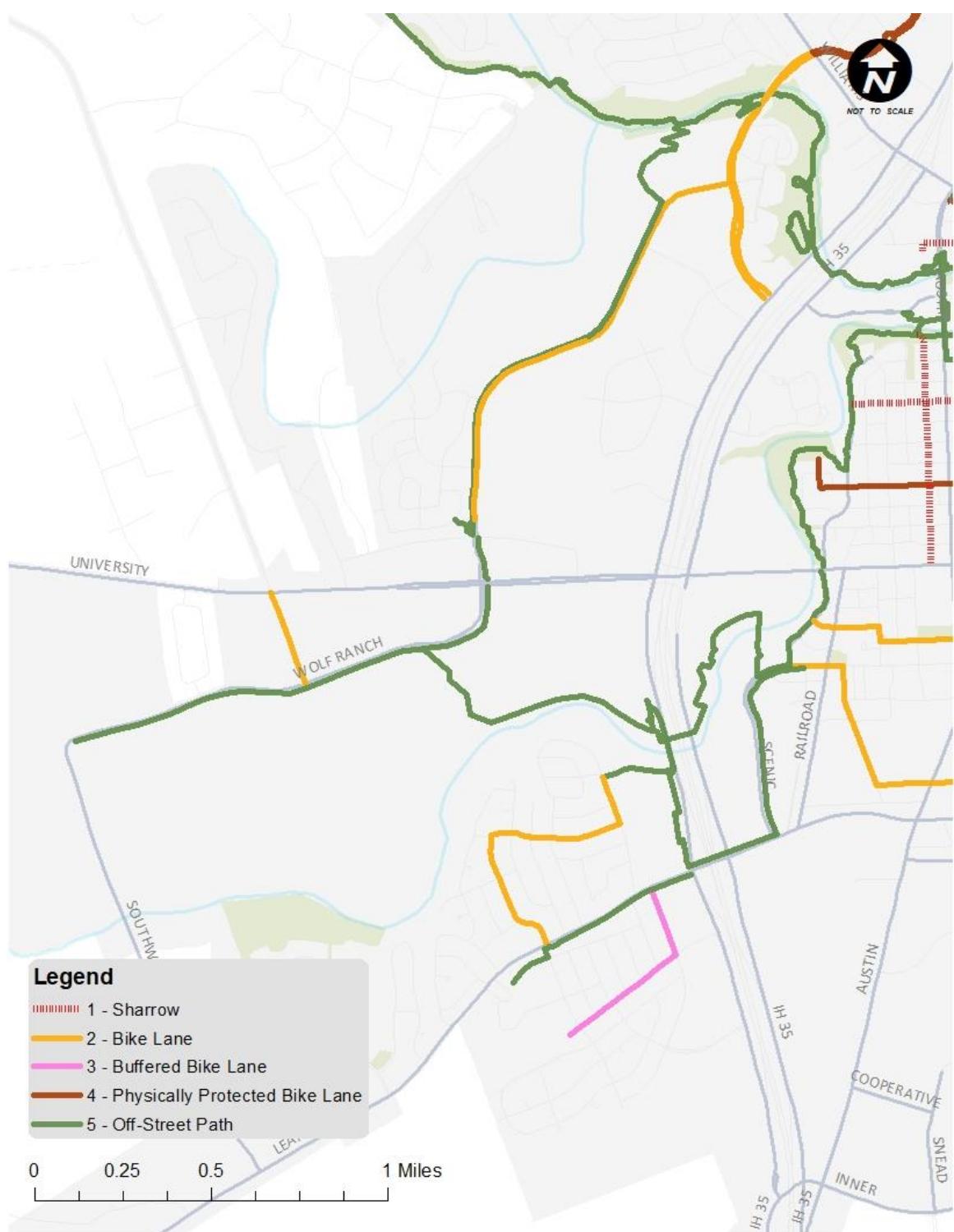


Figure 63. Southeast Georgetown Area Map - Proposed Bike Network

Bicycle Network

Table 10. Complete List of Bicycle Improvement Projects

Project Rank	Name and Extent	Cost (in thousands)	Phase
1	Austin Ave. Bridge: Off street path connecting across San Gabriel River to the Northwest Blvd. Bridge project	\$129 - 238	Planned (approved by Council)
2	8th St: Scenic Dr. trail connection to Maple St. bicycle corridor	\$142 - 379	Proposed
3	Main St: Buffered bike lane from 2nd St. to 21st St.	\$157 - 431	Proposed
4	Holly St. Bridge: San Gabriel River crossing from Holly St. to the North San Gabriel River Trail	\$37 - 67	Planned (unfunded)
5	Maple St. Phase 1: Combination of off-street paths and protected bicycle lanes from 7th St. to Britannia St., including a safe connection across University Blvd.	\$197 - 456	Proposed
6	Northwest Blvd./ IH-35 Crossing Phase 1: Regular and buffered bike lanes across IH-35 from Rivery Dr. to FM-971	\$108 - 297	Planned and funded
7	San Gabriel River Crossing at St. David's Hospital: Connection from Scenic Dr. to Wolf Ranch Town Center across IH-35	\$238 - 438	Proposed

Bicycle Network

8	Williams Dr: Off-street path from Del Webb Blvd. to Gatlin Creek	\$119 – 219	Proposed
9	DB Wood Rd. and Williams Dr: Bike lanes from Wildwood Dr. to Overlook Park	\$194 - 357	Proposed
10	SR-29 East View HS connection across SR 130: Bike lanes from East View High School across SR-29 between Reinhardt Blvd. and Eastview Dr.	\$328 - 605	Proposed
11	Wolf Ranch Town Center: Off-street path between Wolf Ranch Pkwy. & Proposed St. David's I-35 trail crossing	\$209 - 385	Proposed
12	Rivery Blvd: Buffered Bike Lane from Northwest Blvd. to Williams Dr., and off-street path connecting the Randy Morrow Trail to Wolf Ranch Pkwy.	\$349 - 757	Planned
13	15th/16th St: Bike Lanes: Scenic Dr. to Southwestern Blvd.	\$8 - 29	Proposed
14	San Gabriel River Trail: Extension from College St. to Katy Crossing Trail Park	\$397 - 731	Construction
15	North Austin Ave: Off-Street path from Williams Dr. to Chamber Way	\$67 - 124	Planned
16	Saddle Creek Development: Access Sharrows to Wagner Middle School and Mitchell Elementary School	\$18 - 19	Proposed

Bicycle Network

17	Leander St. & 21st St: Bike Lane from Kelley Park to Church St. & East 21st St.	\$5 - 17	Proposed
18	Quail Valley Dr: Physically Protected Bike Lane from 1460 to 19th St.	\$141 - 386	Proposed
19	Northwest Blvd. Phase 2: Buffered & physically protected bike lanes from Rivery Dr. to Seranada Dr.	\$185 - 507	Proposed
20	SR-2S: Protected bike lanes between Westbury Ln. and Bellaire Dr. and Rosedale Blvd. and Village Commons Blvd. connecting McCoy and Village Elementary Schools	\$482 – 1,325	Proposed
21	Wolf Ranch Pkwy: Off-Street path from CR-265 to SR-29	\$31 - 57	Proposed
22	Leander Rd: Off-Street path from Scenic Dr. to I-35 S Frontage Rd.	\$70 - 129	Proposed
23	Wolf Ranch Pkwy: Off-Street Path to San Gabriel River Trail	\$13 - 23	Proposed
24	Berry Creek: Neighborhood connections along Champions Dr., Shinnecock Hills Dr., Luna Trail, & Seranada Dr.	\$26 - 78	Proposed
25	North Austin Ave: Access sharrows between E. Spring Street, Main St. & W. Morrow St.	\$2 - 3	Proposed

Bicycle Network

26	Wolf Ranch Pkwy: Off-Street path from SR-29 to future Wolf Ranch Elementary School	\$87 - 160	Planned
27	Leander Dr: Off-Street Path from I-35 SB Frontage Rd. to Rockcrest Dr.	\$18 - 33	Proposed
28	Scenic Dr: Off-Street path extension from 17th St. to Leander Rd.	\$153 - 281	Proposed
29	Gatlin Creek: Sharrows and signage on Limestone Lake Dr., Lakeside Ranch Rd., Cedar Lake Blvd., and Wildwood Dr.	\$11 - 12	Proposed
30	Seranada Dr: Connection to McCoy Elementary School, combining bike lanes on Lovie Ln. and an off-street path	\$70 - 132	Proposed
31	College St: Sharrows from VFW Park to East 15th St.	\$8 - 9	Proposed
32	Berry Creek Trail: Off-Street path from Berry Springs Park to Airport Rd. along Berry Creek	\$259 - 477	Proposed
33	Thousand Oaks Blvd./Luther Dr: Buffered bike lane from Pickett Elementary School to Leander Dr.	\$7 - 16	Proposed
34	Church St: Sharrows from 15th St. to 21st St.	\$3 - 4	Proposed

Bicycle Network

35	Trail segment: Off-street trail Connection from 21st St. and Church St. to Quail Valley Dr.	\$65 - 119	Proposed
36	SE Inner Loop: Off-street path from Rockride Ln. to Maple St.	\$289 - 532	Proposed
37	Sunshine Dr: Off-street path between I-35 S Frontage Rd. and San Gabriel Overlook Blvd.	\$54 - 99	Proposed
38	Woodview Dr. and Rockcrest Dr: Off-street path extension to create access to Tippit Middle School	\$39 - 72	Proposed
39	Ridge Oak Dr./Tallwood Dr: Bike lane from Sunshine Dr. to Leander Rd.	\$4 - 15	Proposed
40	San Gabriel River Trail: Extension from College St. to Berry Springs Park	\$1,308 – 2,410	Planned
41	4th St: Sharrows from Scenic Dr. Trail to Holly St.	\$5 - 6	Proposed
42	NE Inner Loop: Off-Street path from SR-29 to Forbes Middle School and to Cooper Elementary School	\$568 – 1,046	Proposed

Bicycle Network

43	Katy Crossing: Buffered bike lane from Katy Crossing Trail Park to Cooper Elementary School	\$6 - 14	Proposed
44	Sequoia Spur and Shell Dr: Bike lane from Seranada Dr. to Shell Rd., and off-street trail on Shell Dr. creating a connection to Williams Dr. crossing	\$27 - 67	Proposed
45	River Park Ln: Bike lane from Katy Crossing Trail Park to Katy Crossing Rd.	\$2 - 4	Proposed
46	Rock St: Sharrows from San Gabriel River Trail to University Ave.	\$4 - 5	Proposed
47	Maple St. Phase 2: Combination of off-street paths and protected bicycle lanes from Britannia St. To Westinghouse Rd.	\$434 - 804	Proposed

Appendix 11:

Crash Analysis Study

Recommendations

The following types of improvements will enhance traffic and road safety for all road users by prioritizing major arterials and intersections with high crash rates.

Create a bicycle crash database

It is recommended that a database that records bicycle crash data in Georgetown be created. Having this data easily available will help identify major safety issues, and track impacts of roadway improvements over time. Data will stay up-to-date through reports from the City of Georgetown Police Department taken at the time of each crash. Engagement with the Capital Area Metropolitan Planning Organization (CAMPO) and Texas Department of Transportation could help develop a wider-reaching, more robust crash database for central Texas.

Create a shadow network for bicycling

As recommended throughout this Plan, a shadow network should be created for bicyclists, to promote active transportation off of high-speed arterial roadways.

Primary elements of this type of network include safe crossings at major safety barriers, such as IH-35, Williams Dr, and University Avenue, and clear signage directing cyclists toward nearby low-speed streets or bicycle infrastructure.

Maintain an ongoing commitment to prioritize safer streets

Incorporating bicycles into Georgetown's current commitment to prioritize safer streets may help influence decisions regarding types of infrastructure for pedestrians and cyclists. Safer bicycle facilities tend to be more expensive, however, the cost of a protected bicycle facility capital improvement is marginal to the cost of a life due to unsafe street conditions. This type of policy can enable The City of Georgetown to evaluate its most dangerous streets and intersections based on national safety guidelines and evaluate potential engineering and design improvements over time.

Crash Analysis

Adjust speeds to be context-appropriate⁴⁷

Speed limits on Georgetown roadways vary widely, and small changes to the City's speed methodology could help improve the safety of cyclists. The FHWA Safety Program developed a speed management toolkit for all cities to use a guide for various road improvements and enhancements to manage speeds on various road-way types⁴⁸. Some speed management tactics are determined by development area type, which the City of Georgetown could apply to its own multiple development type areas.

Implement slow traffic zones around schools and high crash volume areas

Slow Zone pilot projects can be used to test low-cost and high-impact safety improvements, such as introducing new signage and roadway markings that indicate a change in speed limit.

Crosswalks can also be painted to indicate a space for pedestrians and bicyclists, particularly near schools and locations identified in crash analysis in Section 2.6., or other traffic safety measures like roundabouts can be used in the case of demonstrated need for additional levels of improvements.

Increase education of all road users on sharing the road

Texas Share the Road is an educational initiative to improve bicycling safety in Texas. The organization has created multiple videos sharing safety tips for both cyclists and motorists to understand the safest ways to move through specific roadway scenarios alongside other modes⁴⁹. Launching a safety campaign that incorporates educational videos and safety brochures into City offices with TV paneling or screens, or inclusion in local news stations can help improve education in Georgetown⁵⁰.

47 - FHWA (2012). "Methods and Practices for Setting Speed Limits: An Informational Report." FHWA Safety Program. Retrieved from:

https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa12004/

48 - FHWA (2019). "Speed Management Toolkit." FHWA Safety Program. Retrieved from: https://safety.fhwa.dot.gov/speedmgt/ref_mats/docs/speedmanagementtoolkit_final.pdf

49 - Share the Road. (2016). "Campaign Materials." Retrieved from: www.sharetheroadtexas.org/campaign-materials/.

50 - Share the Road. (2017). "Safety Tips." Retrieved from: www.sharetheroadtexas.org/safety-tips/.

Appendix 12: Bicycle Parking Suitability Analysis

A12.1 INTRODUCTION

Georgetown currently features a handful of secure bike parking areas, including artistic bike racks at the Courthouse and Library decorated with the city's iconic red poppy flower. Southwestern University, some school campuses, and select public parks are the only locations outside of Downtown where bicycle racks are available.



Figure 64. Existing Bicycle Rack on San Gabriel Trail

Bicycle Parking

Based on the analysis below, Georgetown does not presently have enough secure bicycle parking to accommodate a growing base of cyclists. Though Georgetown reports extremely low crime rates, many people are still generally uncomfortable leaving their bicycle unattended. As a result, lack of parking creates a barrier for those who want to use bikes to reach public transit, or to complete any type of trip that requires getting off of the bicycle.

The purpose of this study is to identify areas that will have high demand for bicycle parking after significant progress has been made in expanding the city's bike network per this Bicycle Master Plan. Based on key destinations and points of interest indicated by the public through online

surveys, in-person surveys, and community workshops, and major connections within the proposed network itself, a geographic information system (GIS)-based spatial analysis was employed to generate a map of priority focus areas for bike parking additions.

Currently, the Georgetown Unified Development Code (UDC) does not offer any requirements or guidance on off-street bicycle parking and can be amended to do so. Furthermore, the City can proactively pursue opportunities to build bicycle racks in priority areas on sidewalks in a way that does not impede ADA walking access, or consider converting on-street parking spaces into bicycle corrals which can accommodate eight to 10 bicycles per car parking space.

A12.2 RELATED STUDIES

Bicycle parking and support facilities can often be overlooked in the build out of a bicycle network. However, according to Alta Planning + Design consultants, "End-of-trip facilities are just as important as on-and-off-street bikeways in encouraging bicycle use for transportation"⁵¹. A lack of available bicycle parking can diminish the positive potential economic effects of the bicycle network by limiting

shopping trips that require a person to leave their bike unattended for any portion of time. Studies conducted in San Francisco and Toronto indicate positive economic effects of replacing on-street car parking with wider sidewalks, bike lanes, and bike parking as in these contexts, "patrons arriving by foot and bicycle visit the most often and spend the most money"⁵².

51 - Durrant, S. (2014). Bike Parking. Retrieved from <https://altaplanning.com/services/complete-streets/bike-parking/>

52 - Clean Air Partnership. (2009). Bike Lanes, On-Street Parking and Business: A Study of Bloor Street in Toronto's Annex Neighbourhood. Retrieved from: http://www.bikeleague.org/sites/default/files/bikeleague/bikeleague.org/programs/bicyclefriendlyamerica/bicyclefriendlybusiness/pdfs/toronto_study_bike_lanes_parking.pdf

Bicycle Parking

As cycling increases in popularity in Georgetown, there is potential that dockless bike and scooter providers will enter the market, providing new challenges to parking infrastructure. This issue has manifested itself in many cities around the world, but is particularly apparent in Sydney, Australia where companies deployed over 5,500 bikes to a city with only 2,500 public bike parking spots⁵³. One study concludes that when limited parking is available in an area with high demand, a “conformity effect” occurs between bicyclists that can result in undesirable results like “chronic illegal bicycle parking”⁵⁴.

Various methodologies exist for determining bicycle parking demand, many of which pertain to individual projects, rather than an entire network. The Metropolitan Washington Council of Governments bicycle parking demand analysis for

the Purple Line Light Rail project, bases demand on transit ridership projections, and set percentages of forecast bicycle access rates⁵⁵. The City of Eugene-Springfield, Oregon uses a school-based bicycle parking assessment involving environmental audits and policy analysis⁵⁶. Lane Transit District in Eugene, Oregon, in its regional bike parking study, considers input from a variety of key stakeholder groups, an inventory of existing conditions, and mapped bicycle demand points in downtown and at transit stations⁵⁷. The Georgetown parking methodology builds upon these studies, along with a version of suitability analysis which finds points of overlap between different weighted attributes⁵⁸, sourced from public input and public online data portals, to determine a geospatially defined prioritization of bicycle parking space demand throughout the city of Georgetown.

53 - Fuller, G., Waitt, G., Buchanan, I., & Ozolins, N. (2018). “The problem isn’t dockless share bikes. It’s the lack of bike parking.” The Conversation. Retrieved from: <http://theconversation.com/the-problem-isn-t-dockless-share-bikes-its-the-lack-of-bike-parking-102985>

54 - Fukuda, D., & Morichi, S. (2007). “Incorporating aggregate behavior in an individual’s discrete choice: An application to analyzing illegal bicycle parking behavior.” Transportation Research Part A: Policy and Practice, 41(4), 313–325. <https://doi.org/10.1016/j.tra.2006.09.001>

55 - Metropolitan Washington Council of Governments. (n.d.). Purple Line Bicycle Parking Demand Analysis. Retrieved from <http://www1.mwcog.org/transportation/activities/tlc/pdf/PurpleLine3-5.pdf>

56 - MacRhodes, S., & Newman, E. (2015). “School Bicycle Parking Assessment.” Retrieved from: <https://www.oregonsaferoutes.org/wp-content/uploads/2017/08/SchoolBikePkingAssessment.2015.pdf>

57 - Lane Transit District, & Alta Planning + Design. (2013). Regional Bike Parking Study. Eugene, Oregon.

58 - McHarg, I. (1969). Design with Nature (1st ed.). Garden City, New York: Natural History Press.

A12.3 STUDY METHOD AND PROCESS

In order to quantify bicycle parking priority areas spatial data was aggregated based on descriptions of the proposed bicycle network with destinations, intermodal connection points, and special points of interest. Employing the same basic principles of multidisciplinary-based suitability analysis described in Section 2 above, polygon-based representations of these elements were overlaid with various weighting properties. The sum of these weights in a given location translates to a nominal value between zero and eight describing the relative need or priority for bicycle parking.

Proposed Bicycle Network

The lines on the map representing the connected bicycle network have been generated through an intensive process of weighing various community and network priorities.

Because the amount of parking needed will be proportional to the amount of ridership on a given route, different weights have been assigned to different bicycle route types. Due to the high level of comfort associated with off-street paths, these network facilities will receive a higher bicycle parking weight when compared to routes where simple bike lanes or sharrows are proposed. Using an access shed of $\frac{1}{4}$ mile, a buffer was generated along the proposed bicycle network facilities, and a weight value was assessed for each polygon buffer according to the following framework:

- Off-Street Path = 4 points
- Physically Protected Bike Lane = 3 points
- Buffered Bike Lane = 2 points
- Conventional Bike Lane/Sharrow = 1 point
- No bicycle facilities = 0 points

Bicycle Parking

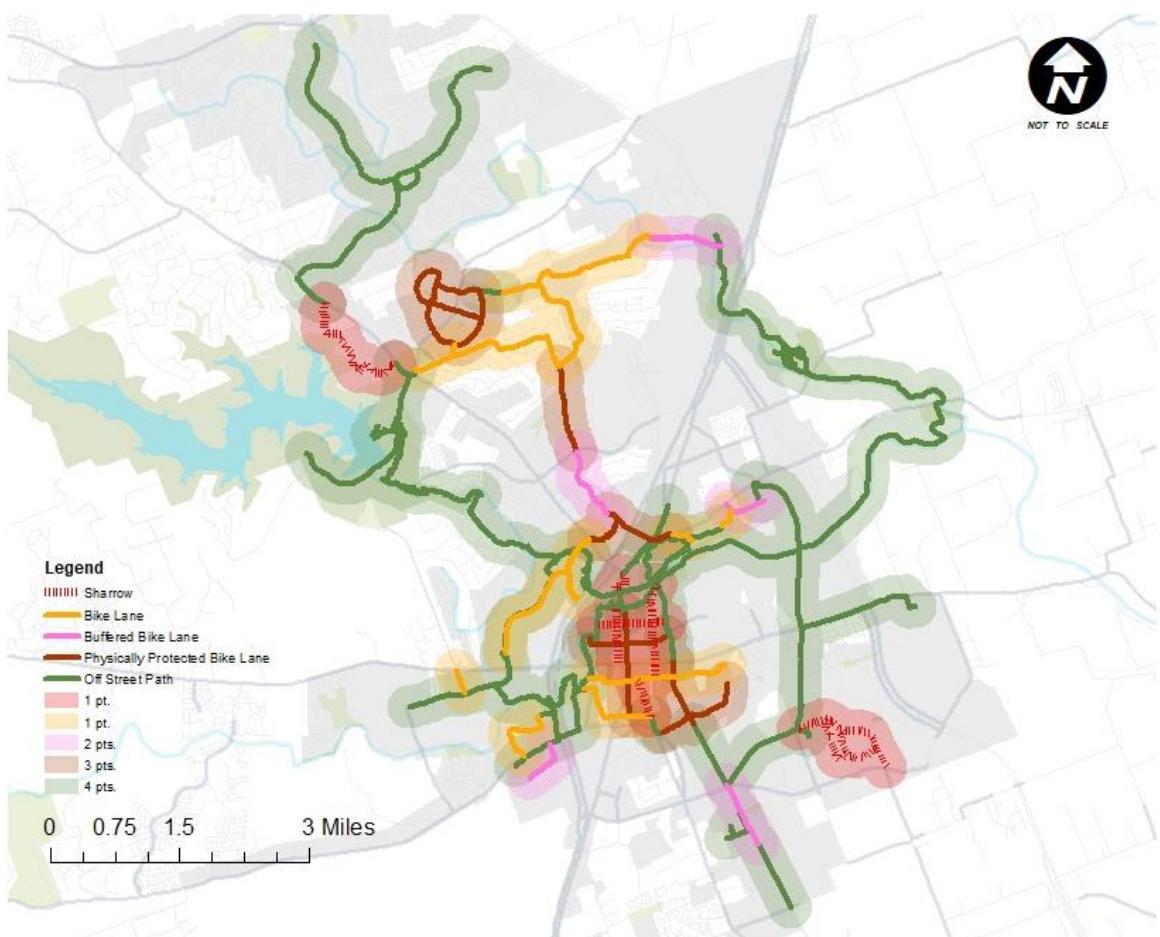


Figure 65. Proposed Bicycle Network Buffer Weights

Key Destinations

Based on community feedback received through surveys and in-person public engagement efforts, three primary destination types were identified: 1 - Parks, 2 - Shopping destinations, 3 - public facilities such as schools, colleges, and athletic complexes.

Parks are the most popular bicycling destination because of the high level of recreational biking in Georgetown using the city's trail network.

San Gabriel Park, Lake Georgetown (Overlook Park), and Rivery Park are the top three destinations, respectively, and all are connected via the San Gabriel River Trail. Some bicycle parking facilities already exist in these locations. Polygons representing parks are given a value of one on the weighting scale, but since many parks overlap with off-street trails (four points), they rise to the upper end of bicycle parking priority areas.

Bicycle Parking

Shopping areas represent the second most popular bicycling destinations. In order to quantify this broad term spatially, all zoning parcels which include shopping uses (General Commercial, Local Commercial, Neighborhood Commercial, and Downtown Mixed-Use) were combined, and resulting polygons were assigned a value of one point.

The third most popular areas, and arguably the most important from a safety perspective, are public facilities like schools and athletic fields.

The primary users of these facilities are youths who for age or financial reasons are restricted to walking and bicycling for everyday mobility. As such, these vulnerable road users should be prioritized in this framework to allow them to safely access Georgetown via bike.

Elementary, Middle, and High School polygons are given a value of two points. Southwestern University's campus and adjacent athletic facilities are given a value of three points due to the density of students and bike-friendly culture.

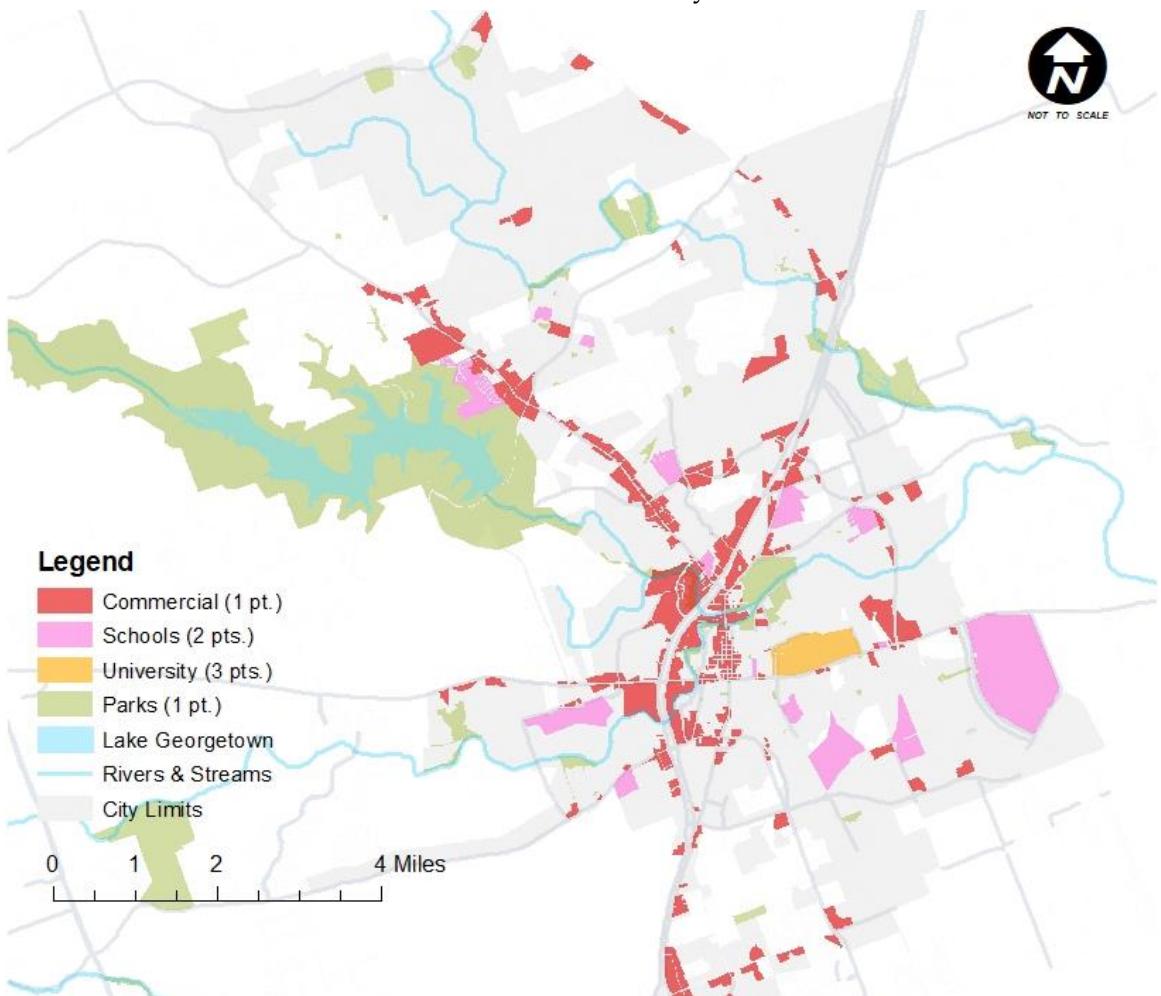


Figure 66. Destination Polygon Weights

Bicycle Parking

Intermodal Connection Points

Bus trips between Georgetown and Round Rock are offered three times a day by the Capital Area Regional Transit System (CARTS). From Round Rock, connections can be made to express bus services into Downtown Austin. Additionally, with the introduction of the four GoGeo public transit routes in Georgetown, intermodal connectivity is an important factor to take into consideration locally. Currently the routes only operate once hourly, but

future growth in Georgetown will likely warrant additional bus frequency. Bicycles extend the potential radius of transit access beyond the standard $\frac{1}{4}$ mile walking threshold. The public transit system should complement the proposed bicycle network to provide a safe, interconnected, and accessible multimodal transport network. A $\frac{1}{4}$ mile access buffer is generated around each bus stop and is assigned a value of one point on the map below.

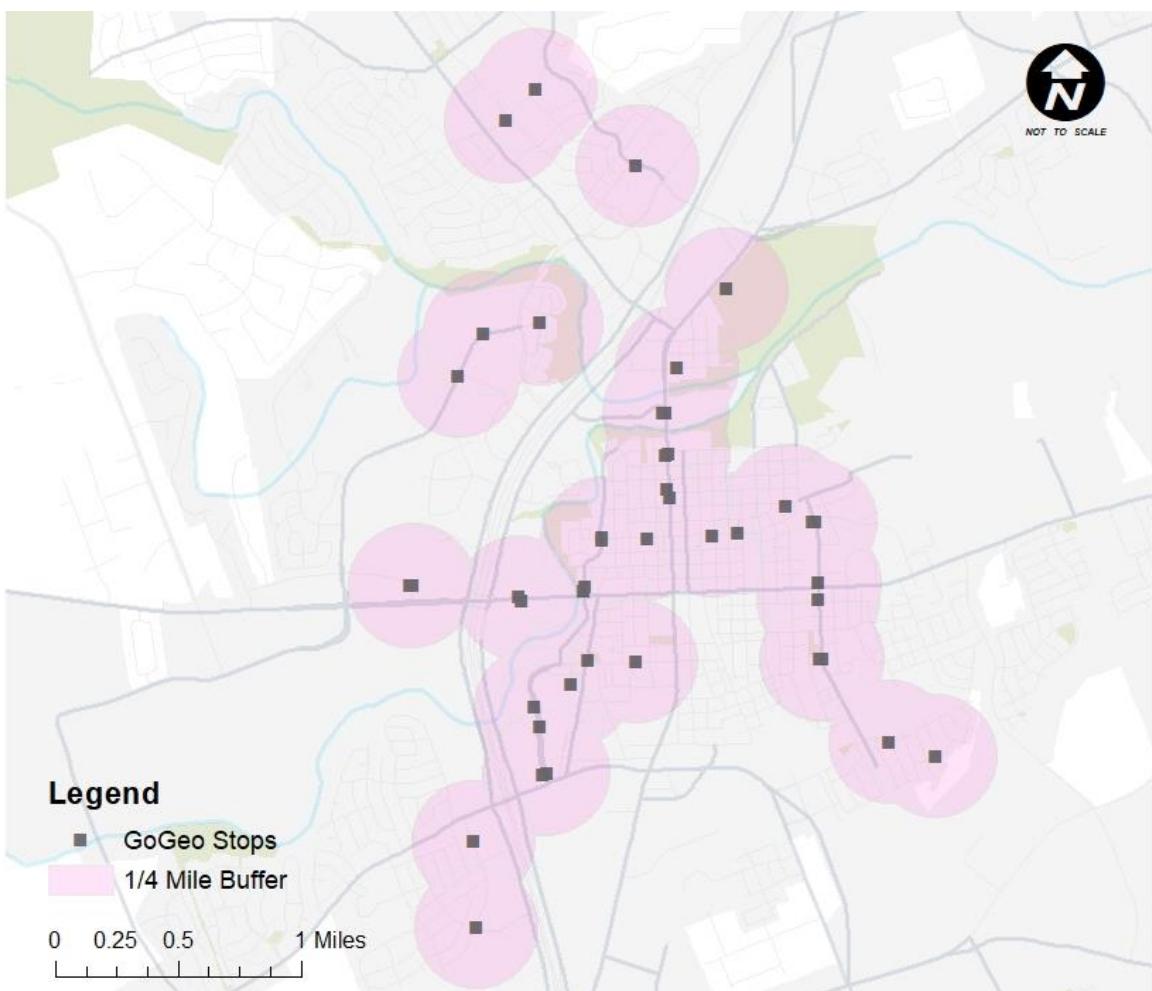


Figure 67. Transit Stop $\frac{1}{4}$ Mile Buffer Weights

Bicycle Parking

Special Generators/Points of Interest
A few points of interest within Georgetown that are likely to generate large volumes of attraction for all travel modes did not necessarily fall into any of the wider buckets quantified above. As such, another attraction category for special generators was added. These points represent a standard block length, or 300-foot buffer around the following sites:

- Williamson County Courthouse Square = 3 points
- Georgetown Public Library = 2 points
- Sun City Texas Community Association = 2 points

Aggregating All Inputs

Each of the aforementioned polygon sets and corresponding weights were overlaid in ArcMap. A new field representing the sum of weighted points from each category returns the final prioritization score.

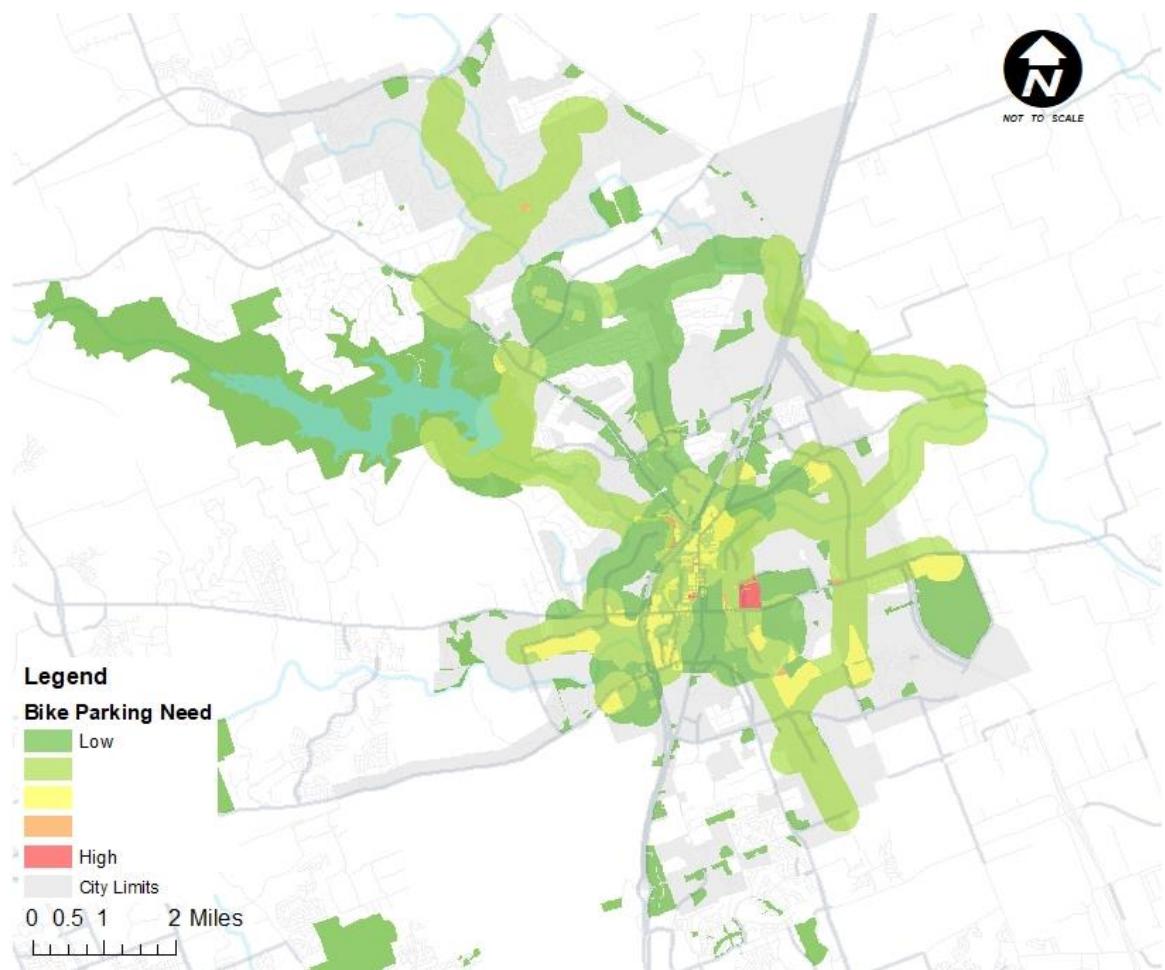


Figure 68. Weighted Suitability Analysis for Bicycle Parking Priority Areas

Bicycle Parking

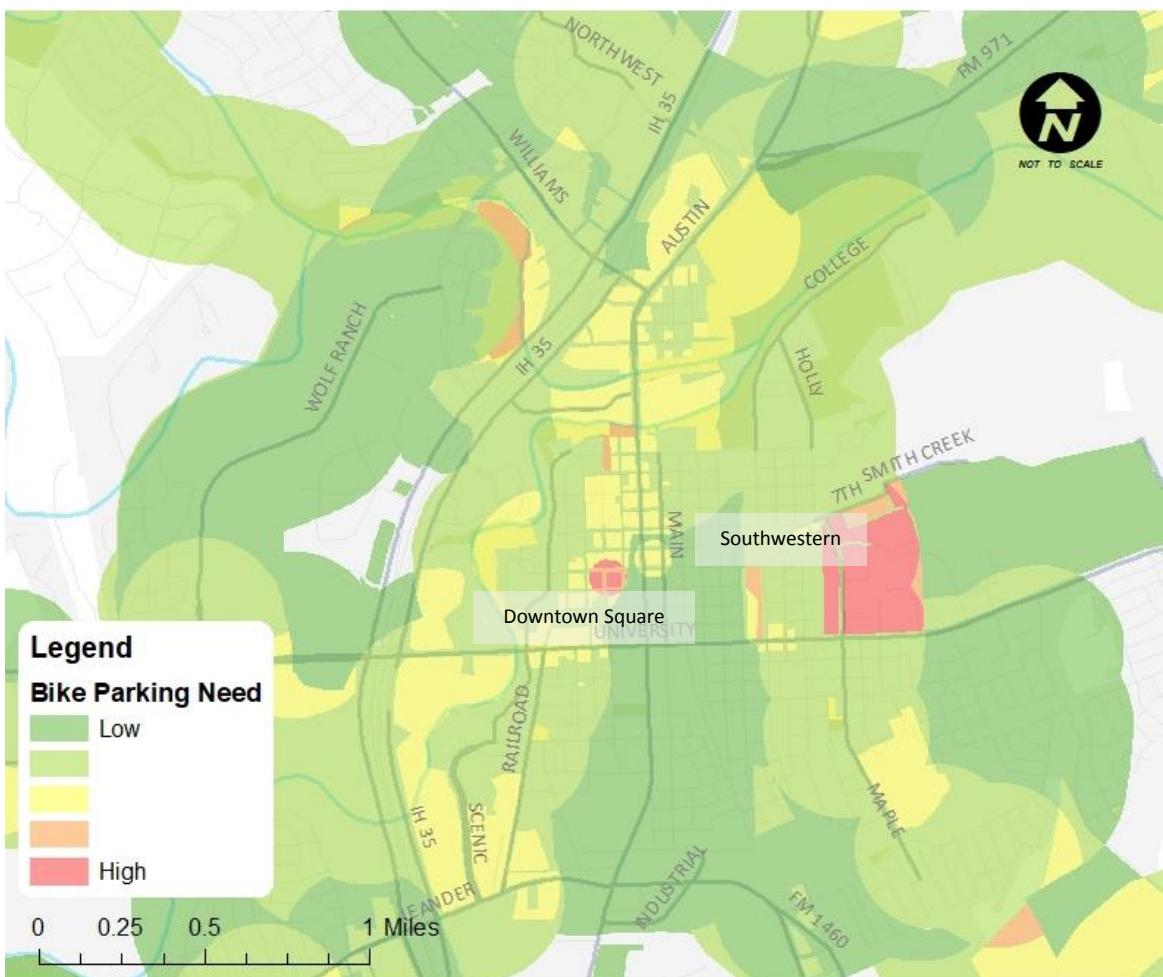


Figure 69. Weighted Suitability Analysis for Bicycle Parking Priority Areas (Zoom to Downtown)

Bicycle Parking

A12.4 FINDINGS AND CONCLUSIONS

The suitability analysis returned the map shown in Figure 67 and Figure 68 with defined areas of high and low values of bicycle parking demand, based on the given input datasets. Table 11 below displays the top demand locations identified through this process.

Table 11. Top 10 Bicycle Parking Demand Locations

RANK	NAME	SCORE
1	Southwestern University Campus & Athletic Fields	8
2	Georgetown Public Library & surrounding block	8
3	Blue Hole Park & Rock St.	7
4	Rivery Park, Sheraton Hotel and surrounding mixed-use development	7
5	Sun City Texas Community Association	7
6	College St. & University Ave. School Complex	7
7	Georgetown Soccer Association at Purl Elementary School	7
8	Williamson County Courthouse and nine block Downtown	6
9	East Side HS, Georgetown HS, Wagner MS, Tippit MS, Forbes MS, Cooper ES, Mitchell ES, Ford ES, Dell-Pickett ES, and Wolf Ranch ES	6
10	Wolf Ranch Town Center	6

Bicycle Parking

With limited vehicle parking spaces, the cost of a parking permit, an existing campus bike-sharing program, and a youthful population with positive attitudes towards cycling, Southwestern University is the leader for bicycle parking needs.

Public facilities like the Georgetown Public Library and the Williamson County Courthouse Square are key nodes in the network and already hubs of a bike-share system afforded to residents for free through library membership. The high demand scores for these destinations also align with community feedback, as these central locations were among the most mentioned by residents.

Blue Hole Park and Rivery Park sit at the confluence of multiple network nodes and adjacent to major commercial attractors. In the case of Blue Hole Park, there are restaurants on both sides of the low-water crossing including El Monumento and Hat Creek Burger Company. Rivery Park abuts the Rivery Blvd. mixed-use development surrounding the Sheraton Hotel, known for its popular bike rental services. Rivery Park is also located near one of the only paved trail crossings of I-35, providing connections to other activities available along Rivery Blvd.

The Sun City Texas Community Association offers athletic services like a community gym, tennis courts, and social meeting spaces for residents. The facility sits at the crossroads of the Sun City trail system and also serves as the home for the weekly Sun City Farmer's Market. This age-restricted retirement community has constructed its own off-street trail

network, many of which are currently off-limits for bicyclists. There is a large demand for bicycling infrastructure and amenities in the community, which is home to one of the region's most popular bicycling clubs.

City of Georgetown has already constructed a Safe Routes to School off-street path connecting Wagner Middle School and Mitchell Elementary School to nearby neighborhoods along SE Inner Loop. The planned network seeks to expand this network and provide easy bicycle access from the adjacent Saddle Creek community, which is currently under construction. All schools in Georgetown have been connected to the core low-stress bicycle network and proper, secure parking facilities should be included on these schools' campuses to accommodate the demand of these young cyclists.

The Wolf Ranch Town Center is a key shopping and employment destination within the City of Georgetown. The Bicycle Master Plan network proposes connecting this complex to the eastern side of I-35 through a trail underneath the highway behind St. David's Medical Center. The complex is now connected on its southern side via a recently constructed ADA-accessible pedestrian bridge along the I-35 frontage road. Furthermore, in the future, the complex will be connected along the entirety of Wolf Ranch Parkway to the west to the future Wolf Ranch Elementary School and housing development, and to the north to Rivery Blvd. by an off-street bicycle path.

Bicycle Parking

Implementation Strategies and Best Practices

Currently, the Georgetown Unified Development Code does not offer any requirements or guidance for the addition of off-street bicycle parking and should be amended to do so. For example, the City of Austin's Bicycle Advisory Council recently passed a recommendation that the City amend its land development code's bicycle parking minimums to align with the goals set forth in the Imagine Austin Comprehensive Plan and the Austin Bicycle Master Plan. This requires all new developments to provide 5-15% of the building's maximum fire code person capacity in bicycle parking spaces⁵⁹.

The City should pursue partnerships with existing business owners, Southwestern University and transit providers to expand bicycle parking facilities around Georgetown. Business owners would benefit from attraction of more regular, frequent customers and tourists, as well as from discouraging illegal parking practices such as chaining bikes to trees, street furniture or utility poles that can detract from the atmosphere of the business district. The University has a limited supply of car parking facilities, and could benefit by converting some car trips to campus to bike trips, reducing the need to

expand vehicle parking. It is also a notable benefit that bike parking spaces cost much less than vehicle parking spots, and could provide a cost savings benefit. Bicycle parking facilities should be provided adjacent to bus stops to help accommodate first and last mile connections to transit, especially since each bus has space to carry only two bicycles. Together, bicycling and transit can offer users more mobility options than either are able to individually, and according to the American Public Transit Association's Bicycle/Transit Integration Best Practices Guide, lack of secure parking at transit stops "will discourage and preclude potential riders."⁶⁰

In order to determine how many bicycle parking spaces to provide at each stop, the City should set a quantitative threshold based on peak transit ridership.

The City should proactively pursue opportunities to build bicycle racks in priority areas on sidewalks without impeding ADA access. One example of this practice includes converting on-street parking spaces into bicycle corrals; 8-10 bicycles can be accommodated by one on-street car parking space.

59 - 5% represents the citywide mode choice goal and 15% represents the central city area mode choice goal for bicycling according to the Austin Bicycle Master Plan & Imagine Austin Comprehensive Plan.

60 - American Public Transit Association. (2018). *Bicycle and Transit Integration: A Practical Transit Agency Guide to Bicycle Integration and Equitable Mobility* (Recommended Practice No. SUDS-UD-RP-009-18). Washington, DC. Retrieved from <https://www.apta.com/resources/standards/Documents/APTA%20SUDS-UD-RP-009-18.pdf>

Limitations of Analysis and Future Studies

The survey mechanism administered in online form only asked for popular destinations in a categorical format to ease response coding (e.g. Shopping, School, Work). Specific locations like the Georgetown Public Library and the mixed-use development around Rivery Blvd., among others, could only be gleaned from in-person intercept surveys and at the community workshops. If more time were available, it would be better to obtain a statistically significant.

sample of specific locations to prioritize bicycle parking, not simply zoned parcels.

The buffering conducted for the network and transit stop overlays is conducted as the crow flies rather than constrained by the existing street/sidewalk network. A more accurate way of representing accessibility would be to create a network and measure access sheds with respect to this available network

Appendix 13: “5E’s” Literature Review

A13.1 STUDY METHOD AND PROCESS

Many online resources were reviewed and assessed to develop the recommendations for this study. The 5 E’s framework itself was researched to understand the benefits of its use when implementing traffic safety improvements for vulnerable road users.

Surprisingly, not much literature is provided on why this framework is so popular. Many bike plans, bike programs, and other cycling and pedestrian efforts use this approach; however, not much theoretical background is provided in terms of the origin of the framework outside of a brief overview from the Federal Highway Administration. Additionally, the framework has changed over the years, beginning at the 3E’s, and is sometimes now seen as the 6E’s.

Multiple variations of this framework have been produced across various

fields, including those outside of transportation safety such as railroad safety⁶¹, fire prevention⁶²⁻⁶³, and workplace safety⁶⁴. According to the FHWA, the original application of this framework took place in the 1970’s within progressive cities such as Boulder, CO, and Madison, WI. The framework originally obtained only 3E’s: Engineering, Enforcement, and Education. This framework is still seen in some cities today, such as the City of Chilliwack⁶⁵, the State of New York⁶⁶, and the Los Angeles County Metropolitan Transportation Authority⁶⁷.

61 - Sheehan-McCulloch, N. (2014). The Three E’s: Education, Engineering and the third E is... Enforcement. California Operation Lifesaver. Retrieved from <https://caoperationlifesaver.wordpress.com/2015/03/04/the-three-es-education-engineering-and-the-third-e-is-enforcement/>.

62 - Cotton, J. (2016). Education, Engineering, and Enforcement. Buildings Insider Issue. Retrieved from <https://www.buildings.com/buzz/buildings-buzz/entryid/139/education-engineering-and-enforcement>.

63 - Marcus, S. (2013). Fire Safety Education: The “Three E’s” of Fire Prevention. Firehouse. Retrieved from <https://www.firehouse.com/prevention-investigation/community-risk-reduction/article/11201116/fire-safety-education-the-three-es-of-fire-prevention>.

64 - EHS Insight Resources. (2015). The 5 E’s of Workplace Safety. EHS Insight. Retrieved from <https://www.ehsinsight.com/blog/the-5-es-of-workplace-safety>.

65 - The 3’E’s – Engineering, Enforcement, and Education. The City of Chilliwack. Retrieved from <https://www.chilliwack.com/main/page.cfm?id=1361>.

5Es Lit Review

Since then, the framework has added more E's, including Evaluation⁶⁸, Encouragement, and sometimes entities also include Equity⁶⁹, Emergency Management Systems (EMS)⁷⁰, and/or Engagement⁷¹. The current five listed in this report: Engineering, Education, Encouragement, Evaluation, and Enforcement are the most common factors used to assess transportation safety.

In this report, close attention was paid to the Bicycle Friendly Community application, as one effort of Georgetown's Bicycle Master Plan is to create a plan for achieving BFC recognition. This program was founded in 1995 by the League of American Bicyclists. According to the League's website, the Bicycle Friendly

Community Program "provides a roadmap to improving conditions for bicycling and guidance to help make your community's vision for a better, bikeable community a reality"⁷². The application relies heavily on the status of the 5 E's within a community.

The 5 E's are evaluated individually in the next section, with supporting material from over 35 references. Each E is assessed and examples from other bicycle plans or programs are discussed. The next section will act as a basis for recommending action steps for Georgetown's Bicycle Master Plan. Examples frequently referenced are the Safe Routes to School Program, FHWA's Course on Bicycle and Pedestrian Safety and the League of American Bicyclists.⁷³

66 - The Three Es. New York State. Retrieved from <https://www.ny.gov/pedestrian-safety/three-es>.

67 - Washington, P. (2015). Spelling Safety Through the Three Es: Engineering, Education, Enforcement. Mass Transit. Retrieved from <https://www.masstransitmag.com/article/12130845/spelling-safety-through-the-three-es-engineering-education-enforcement>.

68 - The 5 E's – Education, Encouragement, Enforcement, Evaluation, and Engineering. State of Vermont – Safe Routes to School. Retrieved from <https://saferoutes.vermont.gov/your-school/5es>.

69 - City of Austin. (2016). Beyond the 5Es: Adding Equity to Traffic Safety. Vision Zero Conference. Retrieved from https://austintexas.gov/sites/default/files/files/Imagine_Austin/VisionZero/equity_V0confforweb.pdf.

70 - DOAADI. (2018). The Four E's of Road Safety. Diary of an ADI. Retrieved from <https://www.diaryofanadi.co.uk/?p=7227>.

71 - The 7 E's of Safe Routes. Lawrence-Douglas County Health Department. Retrieved from <https://ldchealth.org/271/The-7-Es-of-Safe-Routes>.

72 - League of American Bicyclists. (2018). Bicycle Friendly Communities. Retrieved from <https://bikeleague.org/community>.

73 - League of American Bicyclists. (2018). The 5E's. Retrieved from <https://www.bikeleague.org/content/5-es>.

A13.2 RELATED APPLICATIONS

This section assesses the implementation strategies of various cities or programs. It includes a brief literature review, and a comprehensive approach for improving conditions for cyclists on roadways.

Engineering

Engineering is the most tangible of the 5E's. Engineering efforts are physical improvements to roadway systems, including painting bicycle lanes, creating shared-use paths, and adding striping and signage to intersections. Various types of facilities can be implemented, including sharrows, bike lanes, buffered bike lanes, and physically protected bike lanes. The types chosen are dependent on the local context and the amount of money available to be spent on these efforts.

One visible effort that a city can make is to adopt a Complete Streets program.

In 2015, the Fixing America's Surface Transportation (FAST) Act was the first federal transportation act that included a conversation about Complete Streets⁷⁴. According to Smart Growth America's website, Complete Streets are "streets for everyone. They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities"⁷⁵. Adopting a Complete Streets policy falls under the engineering section because, even though it is a policy action, it is a policy that requires by law all street improvements be made for the betterment of all road users, not just motorized vehicles.

Figure 69 shows the overall idea of what a complete street would look like before and after improvements. This is an example from New York City's First Avenue⁷⁶.

74 - Smart Growth America. (2018). Federal Policy. Complete Streets. Retrieved from <https://smartgrowthamerica.org/program/locus/advocacy/federal-policy/>.

75 - Smart Growth America. (2018). What are Complete Streets? Complete Streets. Retrieved from <https://smartgrowthamerica.org/program/national-complete-streets-coalition/publications/what-are-complete-streets/>.

76 - NYSDOT. (2014). Complete Streets at NYSDOT. Retrieved from <https://www.dot.ny.gov/programs/completestreets/nysdot>.



Figure 70. Complete Streets Before and After – New York City's First Avenue Example

Figure 70 depicts a Complete Streets effort in Orlando, FL. The depicted roadway segment underwent significant engineering changes that made it easier for cyclists and pedestrians to share the road facilities with vehicles. There is room for creativity in these engineering efforts

so they can become local attractors and statement pieces that can trigger increased usage. Complete Streets efforts not only make an area safer for non-motorized roadway users, but also activate economic development in surrounding areas due to increased usage.



Figure 71. Complete Streets Example – Orlando, FL

The Safe Routes to School (SRTS) program focuses engineering efforts to create a safer environment for school-aged children to walk and bike to school through concentrated efforts to slow traffic, make drivers aware of their surroundings, and create safe crossing areas⁷⁷. According to the SRTS website, “the physical environment often determines whether many children walk or bike to school.

To safely walk or bike to school along a street or a separate path... children need well-designed, well-built, well-maintained, and accessible facilities.”⁷⁸ The website recommends specific engineering improvements, such as including standard school zone signs and pavement markings, in accordance to the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)⁷⁹.

77 - Safe Routes to School. (2017). Engineering. SRTS Guide. Retrieved from <http://guide.saferoutesinfo.org/engineering/index.cfm>.

78 - Safe Routes to School. (2017). Guiding Principles for Applying Safe Routes to School Engineering Solutions. SRTS Guide. Retrieved from http://guide.saferoutesinfo.org/engineering/guiding_principles_for_applying_srts_engineering_solutions.cfm.

79 - Federal Highway Administration. (2003). Manual on Uniform Traffic Control Devices for Streets and Highways. Part 7. U.S. Department of Transportation. Retrieved from <https://mutcd.fhwa.dot.gov/pdfs/2003/Ch7.pdf>.

The City of Greeley's Bicycle Master Plan, implemented in 2015, has a section dedicated to "lay out a plan focused on the next ten to twenty years for enhancing the network and support facility components of the bikeway system in Greeley."⁸⁰

Their improvements consist of intersections, mid-block crossings, shoulder widening, railroad crossing safety improvements, and bicycle parking. Figure 71 is the recommended bicycle parking requirements table created for the Greeley Plan.

Table 4-2: Recommended Bicycle Parking Requirements

Type of Activity	Long-Term Bicycle Parking Requirement	Short-Term Bicycle Parking Requirement
Residential Land Uses		
Single-family dwelling	No spaces required	No spaces required
Multi-family dwelling		
a) with private garage for each unit	No spaces required	0.5 for each bedroom
b) without private garage for each unit*	0.5 spaces for each bedroom, minimum 2 spaces	0.5 spaces for each bedroom, min 2 spaces
c) Senior housing	Minimum 2 spaces	Minimum 2 spaces
Civic/Cultural Land Uses		
Non-assembly cultural (library, government buildings, etc.)	1 space for each 10 employees, min. 2 spaces	1 space for each 10,000 s.f. of floor area, minimum 2 spaces
Assembly (church, theater, stadium park, beach)	1 space for each 20 employees, min. 2 spaces	Spaces for 2% of minimum expected daily attendance
Health care/hospital	1 space for each 20 employees, or 1 space for each 70,000 s.f. of floor area, whichever is greater, min. 2 spaces	1 space for each 20,000 s.f. of floor area, minimum 2 spaces
Education		
a) Public, parochial, and private day-care centers for 15 or more children	1 space for each 20 employees, min. 2 spaces	1 space for each 20 students of planned capacity, minimum 2 spaces
b) Public, parochial and private nursery schools, kindergartens, and elementary schools (1-3)	1 space for each 10 employees, min. 2 spaces	1 space for each 20 students of planned capacity, minimum 2 spaces
c) Public, parochial and elementary (4-6) public and high schools	1 space for each 10 employees, plus 1 space for each 20 students or planned capacity, min. 2 spaces	1 space for each 20 students of planned capacity, minimum 2 spaces
d) Colleges and universities	1 space for each 10 employees, plus 1 space for each 10 students planned capacity; or 1 space for each 20,000 s.f. of floor area, whichever is greater	1 space for each 20 students of planned capacity, minimum 2 spaces
Rail/bus terminals and stations/airports	Spaces for 5% of projected am peak period daily ridership	Spaces for 1.5% am peak period daily ridership
Commercial Land Uses		
Retail		
General food sales or grocery	1 space for each 12,000 s.f. of floor area, min. 2 spaces	1 space for each 2,000 s.f. of floor area, minimum 2 spaces
General retail	1 space for each 12,000 s.f. of floor area, min. 2 spaces	1 space for each 5,000 s.f. of floor area minimum 2 spaces
Office	1 space for each 1,000 s.f. of floor area, min. 2 spaces	1 space for each 20,000 s.f. of floor area, minimum 2 spaces
Auto related		
Automotive sales, rental & delivery, automotive servicing/repair, cleaning	1 space for each 12,000 s.f. of floor area, min. 2 spaces	1 space for each 20,000 s.f. of floor area, minimum 2 spaces
Off-street public parking lots/garages without charge on a fee basis	1 space for each 20 automobile spaces, min. 2 spaces - unattended surface parking lots excepted	Min 6 spaces or 1 per 20 auto spaces - unattended surface parking lots excepted
Industrial Land Uses		
Manufacturing and production	1 space for each 15,000 s.f. of floor area, min. 2 spaces	Number of spaces to be prescribed by Planning Director or Coordinator. Consider min. 2 spaces at each public building entrance

* A private locked storage unit may be considered as a private garage if a bicycle can fit into it.

Figure 72. Greeley's Bicycle Master Plan Recommended Bicycle Parking Requirements

80 - Alta Planning + Design. (2015). Bicycle Master Plan. City of Greeley. Retrieved from <https://greeleybikes.com/wp-content/uploads/2017/11/bicycle-master-plan.pdf>.

The assessed literature concludes that it is always ideal to execute “low-hanging fruit” projects. These projects are simple, low-cost efforts and produce immediate results.⁸⁰ SRTS says: “smaller, more cost-effective projects... are likely to have lasting impacts on the built environment and garner interest and support from the community.”⁷⁸ The easy, low-cost projects on the list of engineering efforts should be executed first.

Education

Public education is a key component to communicate the dangers, as well as opportunities, that come with bicycling. Bicycling education campaigns should reach the whole community: children, parents, adults, drivers, and neighbors⁸¹. Safe Routes to School is a key provider of educational materials for school-aged children⁸², with various types of content available. Content is also available for parents, as it is key to keep parents involved in this process because they can serve as role models for safe cycling behaviors, and provide guidance when cycling with their children.

The Los Angeles County Bicycle Master Plan has a list of cycling education programs that the county sponsors, including Community

Bicycle Education Courses, youth bicycle safety education, bicycle rodeos, Share the Path campaigns, and public awareness campaigns⁸³. A specific program that is recommended, both in this Plan, and in the Bicycle Friendly Community application, is the Smart Cycling course⁸⁴. This course covers topics like signaling, finding a properly sized helmet, riding at night, riding on sidewalks, and understanding traffic laws.

The City of Austin has made extensive efforts to educate all road users on the safety of cyclists. According to the City of Austin’s 2014 Bike Plan, the City “educates school-aged children on bicycling and walking to school through the Public Works Department’s Child Safety Program and the Health and Human Services Department’s Safe Routes to School Program.” Because providing education programs requires budget that may not always be available, Austin’s Bike Plan recommends that the City “provide low-cost or free educational classes to the public through City programming or partnerships with organizations.”⁸⁵ Figure 72 is a brochure handed out to the citizens of Austin detailing the challenges of sharing the road with motorists.

81 - Safe Routes to School. (2017). Education. SRTS Guide. Retrieved from <http://guide.saferoutesinfo.org/education/index.cfm>.

82 - Safe Routes to School. (2017). Key Messages for Children. SRTS Guide. Retrieved from http://guide.saferoutesinfo.org/education/key_messages_for_children.cfm.

83 - Alta Planning + Design. (2012). County of Los Angeles Bicycle Master Plan. County of Lost Angeles. Retrieved from <https://dpw.lacounty.gov/pdd/bike/docs/bmp/FINAL%20Bicycle%20Master%20Plan.pdf>.

84 - The League of American Bicyclists. Smart Cycling. Retrieved from <https://bikeleague.org/ridesmart>.

85 - City of Austin. (2014). 2014 Austin Bicycle Plan. Retrieved from https://austintexas.gov/sites/default/files/files/2014_Austin_Bicycle_Master_Plan_Reduced_Size_.pdf.

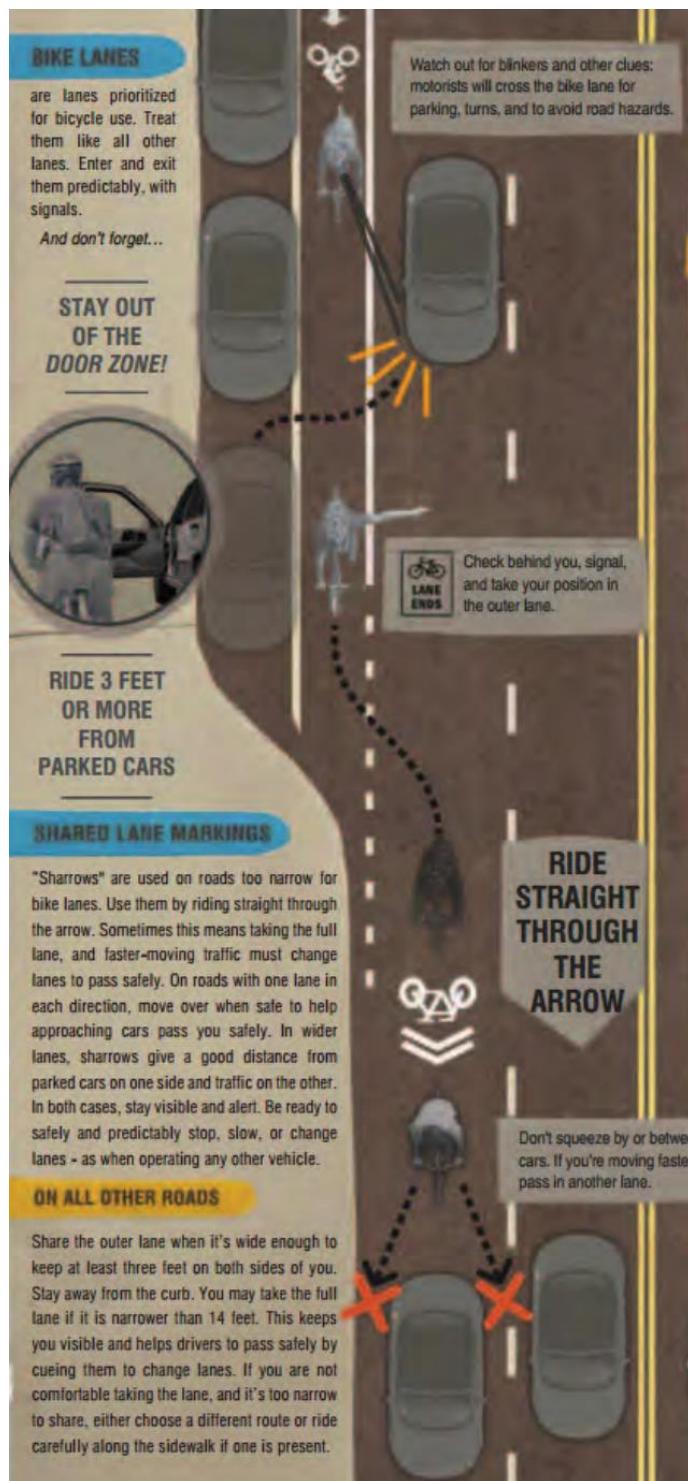


Figure 73. City of Austin's Bicycle Education Example Material

Encouragement

Encouragement covers a wide variety of outreach efforts. Encouragement efforts seek to find creative ways to incentivize individuals to get out of their cars, and use a bicycle as a regular form of transportation.

Austin's Bike Plan reports that 17% of Austinites are interested in riding a bike; however, only 2% of people bike to work.⁸⁵ Implementing programs to encourage cycling is a proven way to convert short automobile trips to other modes. According to Portland's 2030 Bicycle Plan, encouragement programs "are designed to motivate 'interested but concerned' residents to ride a bicycle confidently and securely."⁸⁶ One of Portland's most progressive encouragement efforts is to measure behavior changes, though programs such as the SmartTrips Program, which helps residents plan a biking route between destinations and can track use based on the number of requests received. These continuous outreach programs seek to change behavior over time to reduce the number of motorized vehicles on the road, and have been successful in Portland.⁸⁶

The Federal Highway Administration promotes many activities for encouraging cycling. Key activities

include reducing barriers for walking and cycling, creating barriers for single-occupancy-vehicles, providing non-cyclists a casual and friendly introduction to cycling, and use various outreach methods such as brochures, flyers, and social media. Other community encouragement methods can include promoting programs like Take Your Bike to Work Week and National Bike Month. These types of activities will allow the City to engage in conversations with citizens about cycling. The City of San Diego has created a local bicycle committee that is present at local meetings and local government sessions, in addition to monitoring bicycle counts, and organizing cycling events.⁸⁷ Forming a local bicycling committee can encourage active community participation in cycling-oriented programs. A cycling committee can benefit all five areas of outreach efforts, not just encouragement. San Diego also engages in a local program called "CicloSDias." This event temporarily closes streets to create temporary parks that are open to the public for biking, walking, dancing, and scootering. This event raises awareness and enthusiasm for alternative forms of transportation.⁸⁷

86 - Portland Transportation. (2012). Portland Bicycle Plan for 2030. City of Portland, OR. Retrieved from <https://nacto.org/wp-content/uploads/2012/06/City-of-Portland-2010-2030-Plan.pdf>.

87 - Alta Planning + Design. (2013). San Diego Bicycle Master Plan. City of San Diego. Retrieved from https://www.sandiego.gov/sites/default/files/legacy/planning/programs/transportation/mobility/pdf/bicycle_master_plan_final_dec_2013.pdf.

Ultimately, there are many ways that local communities can engage with the public through encouragement activities. There are plenty of resources available to aid local entities in setting up encouragement programs or campaigns. For example, Alta Planning+Design offers marketing services for education and.

encouragement programs, such as creating banners, brochures, social media posts, and events⁸⁸. Figure 73 shows an example of some of the products this company offers. Partnering with a planning firm for encouragement activities can be a useful way to boost event attendance



Figure 74. Cycling Encouragement Activities - Marketing Services Example (Retrieved from Alta Planning + Design)

88 - Alta Planning + Design. Campaigns and Marketing. Retrieved from <https://altaplanning.com/services/education-and-encouragement-programs/campaign-and-marketing/>.

Enforcement

Research has shown that enforcement, when coupled with physical improvements and public engagement, reduces pedestrian and bicycle crashes. One study found an increase in vehicle yielding rates to bicycles and pedestrians between 4-7% in areas that introduced targeted police operations⁸⁹. Another study found that after a targeted policing effort was implemented, helmet usage in observed middle schools increased across the board⁹⁰. By working with local law enforcement, agencies can ensure that motorists and cyclists are both following the law. The City of Pasadena's Bike Plan points out the importance of combining enforcement with educational campaigns because, "it is vitally important that bicyclists, motorists, and pedestrians all take responsibility for their own safety as well as the safety of other on the roadways because targeted enforcement programs are temporary."⁹¹

Enforcement is primarily concerned with reducing pedestrian and cycling related crashes with motor vehicles. Police officers should be refreshed on safe passing laws, requirements to yield to cyclists when turning right,

and other traffic violations which could put cyclists in danger. The Pedestrian and Bicycle Information Center has created a guidebook on involving law enforcement in improving safety for cyclists and pedestrians. This book emphasizes the importance of establishing partnerships with local advocacy groups, law enforcement, and other municipal or regional departments; a balanced approach in enforcing both motorized and non-motorized travelers; and maintaining enforcement investments long-term.⁹²

Enforcement activities are often coupled with education campaigns. The City of Austin frequently partners with the Austin Police Department to implement their Vision Zero program which pledges to "1) target enforcement on high injury and fatal roadways, and on the most dangerous driving behaviors, 2) enforce improper driver behavior around traffic calming devices, crossing devices, and bicycle facilities, 3) coordinate enforcement across all law enforcement agencies and coordinate to increase prosecution of repeat offenders, and 4) work with the APD to continue enforcement of transit priority lanes."⁹³

89 - Sandt, L., Marshall, S., Rodriguez, D., Evenson, K., Ennet, S., Roinson, W. (2013). Effect of a community-based pedestrian injury prevention program on driver yielding behavior at marked crosswalks. TRB Annual Conference 2017. Retrieved from <http://amonline.trb.org/16-5125-1.2980849?qr=1>.

90 - Van Houten, R. (2013). Impact of a Comprehensive Safety Program on Bicycle Helmet Use Among Middle-School Children. Journal of Applied Behavior Analysis. Vol. 40, No. 2. Retrieved from <https://onlinelibrary.wiley.com/doi/abs/10.1901/jaba.2007.62-06>.

91 - KOA Corporation. (2015). Bicycle Transportation Action Plan. City of Pasadena. Retrieved from <https://ww5.cityofpasadena.net/transportation/wp-content/uploads/sites/6/2016/05/Pasadena-Bike-Action-Plan-08-17-2015.pdf>.

Evaluation

A data-driven approach to monitoring pedestrian and cyclist activity is critical to proving that public dollars are being invested properly. Data gathered from engineering, education, enforcement, and encouragement programs can provide policymakers with information about how infrastructure improvements are encouraging and protecting cyclists. Data points can include:

- Decreases in the number of cyclist and pedestrian related crashes after infrastructure improvements
- The amount of people reached at tabling events

- Behavioral change surveys to monitor increased use of helmets, choice to travel by bicycle instead of car, and many other behaviors
- The number of cyclists and pedestrians using the new facilities

The FHWA has a standardized toolkit for monitoring traffic. The "Traffic Monitoring Guide," provides local DOTs and public entities with the resources to collect traffic data.⁹⁴

Special equipment such as inductive loops, radar sensors, video imaging, or even manual observations can be used. Figure 74 shows the strengths and weaknesses of each monitoring device, and how to choose the ones best for individual communities.

92 - Pedestrian and Bicycle Information Center. (2017). The Role of Law Enforcement in Supporting Pedestrian and Bicycle Safety: An Idea Book. Retrieved from http://www.pedbikeinfo.org/pdf/Lifesavers_CaseStudies_FINAL.pdf.

93 - City of Austin. Vision Zero 2016-2018 Action Plan. Retrieved from https://austintexas.gov/sites/default/files/files/Imagine_Austin/VisionZero/ActionPlan_5.19.16adoption.pdf.

Federal Highway Administration. (2016). Traffic Monitoring Guide. U.S. Department of Transportation. Retrieved from

https://www.fhwa.dot.gov/policyinformation/tmguide/tmg_fhwa_pl_17_003.pdf.

94 - Federal Highway Administration. (2016). Traffic Monitoring Guide. U.S. Department of Transportation. Retrieved from

https://www.fhwa.dot.gov/policyinformation/tmguide/tmg_fhwa_pl_17_003.pdf.

5Es Lit Review

1. What Are You Counting?



Technology	Bicyclists Only	Pedestrians Only	Pedestrians & Bicyclist Combined	Pedestrians & Bicyclist Separately	Cost
Permanent	Inductance Loops ¹	●		●	\$\$
	Magnetometer ²	○			\$-\$
	Pressure Sensor ²	○	○	○	\$\$
	Radar Sensor	○	○	○	\$-\$
	Seismic Sensor	○	○	○	\$\$
	Video Imaging: Automated	○	○	○	\$ \$\$
	Infrared Sensor (Active or Passive)	○ ³	●	●	\$ \$\$
	Pneumatic Tubes	●		●	\$-\$
	Video Imaging: Manual	○	○	●	\$-\$ \$
	Manual Observers	●	●	●	\$-\$-\$

○ Indicates what is technologically possible.
 ● Indicates a common practice.
 ○ Indicates a common practice, but must be combined with another technology to classify pedestrians and bicyclists separately.
 \$, \$-, \$-\$: Indicates relative cost per data point.
¹ Typically requires a unique loop configuration separate from motor vehicle loops, especially in a traffic lane shared by bicyclists and motor vehicles.
² Permanent installation is typical for asphalt or concrete pavements; temporary installation is possible for unpaved, natural surface trails.
³ Requires specific mounting configuration to avoid counting cars in main traffic lanes or counting pedestrians on the sidewalk.

Figure 75. Bicycle and Pedestrian Monitoring Devices (Retrieved from FHWA's Traffic Monitoring Guide)

The Texas A&M Transportation Institute recently completed a study that establishes a standard methodology for bicycle and pedestrian data collection.⁹⁵ The report provides tools for annualizing bicycle and pedestrian counts to calculate annual average daily traffic for non-motorized vehicles.

Efficient system performance management practices should also be implemented. The City of College

Station's Bicycle, Pedestrian, and Greenways Master Plan outlines seven key areas in its performance management system⁹⁶:

- system development
- safety
- usage
- education, encouragement, and enforcement
- environment
- maintenance
- cost

95 - Turner S., Benz, R., Dadashaova, B., Das, S., Graham, M., Griffin, G., Hudson, J., Jha, K., Lasley, P. (2018). Evaluation of Bicycle and Pedestrian Monitoring Equipment to Establish Collection Database and Methodologies for Estimating Non-motorized Transportation. Texas Department of Transportation. <https://static.tti.tamu.edu/tti.tamu.edu/documents/0-6927-PSR.pdf>

These performance measures were established along with target goals, and data was collected and presented to College Station's Parks and Recreation Advisory Board, the Planning and Zoning Commission, and the City Council. The FHWA developed the Guidebook for Developing Pedestrian and Bicycle Performance Measures, which provides agencies a framework for monitoring the efficacy of a bicycle network. This report provides the metric, the data sources needed to complete the measurement, the goals

achieved from the metric, and related measures. It includes metrics such as access to jobs, miles of facilities, throughput, route directness, user perceptions, and vehicle miles traveled (VMT) impacts⁹⁷.

Many bicycle plans use performance measures to track progress and to stay accountable to set goals. Performance measures should be chosen carefully by working with local stakeholders and governing bodies to choose those that will be most helpful to policymakers.

96 - City of College Station. Bicycle, Pedestrian, and Greenways Master Plan. Retrieved from <http://cstx.gov/modules>ShowDocument.aspx?documentid=10289>.

97 - Semler, C., Vest, A., Kingsley, K., Mah, S., Kittelson, W., Sunderstrom, C., Brookshire, K. (2016). Guidebook for Developing Pedestrian and Bicycle Performance Measures. Federal Highway Administration. Retrieved from https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/performance_measures_guidebook/pm_guidebook.pdf.

Appendix 14: Bike Infrastructure Financing Options

A14.1 GUIDE TO FUNDING OPTIONS

The following guide gives a high level view of how each proposed funding option performs in terms of three categories: 1) effort required, 2) potential payoff, and 3)

competitiveness of a suburban bike project relative to the other options. It should be noted that this scoring rubric loses some of the nuance required in making funding decisions, but is intended as a starting point in deciding which sources may be appropriate for a particular project.

Scoring was tallied using the guidelines in the rubrics below, with individual point allocations within each for specific criteria in each category. Lower total scores in a particular category indicate more positive outcomes within those scoring criteria. Factors were chosen after review of many types of applications and processes for the funding mechanisms previously outlined.

To calculate level of effort required for particular funding options, three factors were taken into account:

number of steps, whether specialized knowledge is required, and whether dedicated staff would be needed.

Steps were identified by reviewing the full application process for each funding option. Specialized knowledge requirements were decided based on the depth of the information requested. For example, some applications only require the applicant to include an amount and the purpose the bike infrastructure will serve in the community. Others require very time consuming and difficult analyses such as a cost-benefit analysis or a detailed construction phasing breakdown. Dedicated staff requirements were determined similarly – using the level of depth required for the application or development of the funding opportunity. If extra analyses such as cost benefit analysis were required outside of the application itself, funding was scored to require staff.

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Payoff was calculated based on the amount of funding that could potentially be received, whether the money needs to be paid back (a loan), and if matching is required. Amounts were all pulled from the application criteria, as all grants and loans set requirements for maximum dollar awards. Loans were given extra points because the funds would need to be paid back, which is less cost-beneficial when compared to a grant. Matching requirements were stated in all application materials.

The final category, competitiveness, was calculated using a number of factors including: how commonly the mechanism is used to bicycle infrastructure specifically, and whether that particular type of grant or funding mechanism has been used for suburban bicycle infrastructure. For those that are not grants or do not require an application there is a category for non-competitive methods.

Table 12. Effort Scoring Rubric

EFFORT	Points					TOTAL
	Criteria	3	2	1	0	
Number of steps	4+ steps	2-3 steps	1 step	--	--	High 4-5 points
Specialized knowledge required	--	--	Yes	No	--	Medium 3 points
Dedicated staff required	--	--	Yes	No	--	Low 1-2 points

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Table 13. Payoff Scoring Rubric

PAYOFF	<i>Points</i>					TOTAL
	3	2	1	0		
Funding amount	\$1k-	\$100k-	\$2M+	--	High	
	\$100k	\$2M	--	--	4 points	
Loan	Yes	--	--	No	Medium	
	--	--	Yes	No	3 points	
Matching required	--	--	--	--	Low	2 points

Table 14. Competitiveness Scoring Rubric

COMPETITIVENESS	<i>Points</i>						TOTAL
	3	2	1	0	-1		
Frequency awarded to bike projects alone	Never	Sometimes	Often	--	--	High	
	--	--	--	--	--	3 points	
Suburban bike projects (bonus point)	--	--	--	--	Yes	Medium	
	--	--	--	--	--	2 points	
Non-competitive/ not applicable	--	--	--	Yes	--	Low	0-1 points

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This scoring table reflects that, as predicted, local funding options require the lowest levels of effort relative to other options. Local options also benefit from lack of competition, and since the amount is chosen rather than requested, generally cover the cost of the project. These attributes

serve to make local funds the primary method through which bicycle infrastructure is funded. There are also very suitable options stemming from TxDOT, MPOs, and private and nonprofit options. The following coded guide is ranked roughly from most suitable for suburban bike infrastructure to least.

Table 15. Funding Source Ratings

POINT OF ACCESS	FUNDING SOURCE	EFFORT	PAYOUT	COMPETITIVENESS
Local	TIRZ Funds	LOW	HIGH	HIGH
Local	Capital Improvement Program	LOW	HIGH	HIGH
Local	Development Impact Fees	MEDIUM	HIGH	HIGH
TxDOT	Bike Lanes on TxDOT Roads	MEDIUM	HIGH	HIGH
TxDOT	SRTS Grant	MEDIUM	HIGH	HIGH
Local	Bonds	LOW	LOW	HIGH
Local	Parking Benefits Districts	HIGH	HIGH	HIGH

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Private/ Nonprofit	Walmart Foundation Community Grant	LOW	MEDIUM	MEDIUM
Private/ Nonprofit	State Farm Good Neighbor Citizenship Company Grant	LOW	MEDIUM	MEDIUM
CAMPO	TA Set Aside	HIGH	MEDIUM	HIGH
Private/ Nonprofit	PeopleForBikes Community Grant	MEDIUM	LOW	HIGH
Federal	BUILD Grant	HIGH	HIGH	LOW
Federal	INFRA Grant	HIGH	HIGH	LOW
Federal	TIFIA Loan	HIGH	LOW	LOW

Based on reviewing the application procedures, requirements, and past awards, federal discretionary funds require very high levels of effort, and often bike projects are not competitive for these funding sources. However, high payoff can sometimes result if the odds are overcome and a bike project is funded in this manner through inclusion in a larger project.

State and MPO funding options show

promise as the primary place that local governments should be looking when funding bicycle infrastructure outside of their own pockets. These grants often do require a moderate amount of up-front effort, but payoff meets needs, suburban bicycle projects are very well suited to these grants' scoring criteria, and there is an established track record for these pots funding exactly the types of projects in question.

Financing Options

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State and MPO funding options show promise as the primary place that local governments should be looking when funding bicycle infrastructure outside of their own pockets. These grants often do require a moderate amount of up-front effort, but payoff meets needs, suburban bicycle projects are very well suited to these

grants' scoring criteria, and there is an established track record for these pots funding exactly the types of projects in question.

Private and nonprofit grants do not seem to typically require as rigorous processes as federal, state, and MPOs and may not require the staffing or technical knowledge that some other grants do. However, they often have small payouts and are difficult to win due to the large volume of competitors and wide breadth of eligible projects outside of bike and pedestrian infrastructure. These could make sense in particular circumstances for smaller projects, but not as a regularly tapped resource in a bicycle funding plan.

A14.2 GEORGETOWN PRIORITY NETWORK FUNDING OPTIONS

It is possible that in choosing appropriate sources for funding individual bicycle projects various stakeholders within City government may have differing opinions regarding which method is most appropriate. For this reason, it is recommended here that initial funding plans include two to three streams that could be tapped for each project to leave room for discussion in final decision-making conversations. This provides a starting point for making these decisions quickly and efficiently. Not all projects may have more than one, if any, appropriate funding streams outside of the City's budget, and local funding can be the best path in a number of cases. While the City's general fund is not directly listed as an option considered through

this scoring rubric — although CIP funding can come from many places including the general fund — it is always a silent final choice for any project.

The build-out of the recommended Georgetown priority bicycle network (the Top 10), without considering maintenance costs, staffing, striping removal and other operations, is currently estimated between \$1.7 and \$3.5 million.

Because these are the first projects to be implemented as part of the new bike plan, it is recommended that they are built quickly in order to begin garnering public support for the remaining projects. Due to this time sensitivity, primarily targeted funding

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sources that ranked green in the competitiveness category should be considered. This eliminates the three federal discretionary options, as well as all but one of the private or nonprofit options, suggesting that a combination of state, MPO, and local funding may be most appropriate.

It is next important to note the level of funding required for each project to ensure that if effort is exerted to apply for funding that it will be worthwhile and able to push the project through to completion. All of the Top 10 projects, other than the Holly St. Bridge, happen to classify within the medium cost category on this scoring rubric, falling between \$100,000 and \$2 million. Therefore, the funding options will likely need to return an orange or green result in the payoff category to meet needs. This deduction calls into question the appropriateness of a local bond option. However, bonds should be considered slightly differently than grants as the money must be repaid, but is often still a prudent way to implement public projects. In this case, unless a transportation bond is already under consideration and

could wrap in bicycle funding, this option may not be timely for quick implementation.

Because these projects are medium sized in terms of investment, it would likely also be prudent to choose funding sources that require lower levels of effort to ensure that costs do not outweigh benefits.

After combining each specific need from each of the three categories, it appears that funds from existing TIRZ districts and CIP inclusion may be the most suitable financing methods, with the options of TxDOT SRTS funding, inclusion of bike infrastructure on TxDOT roads, and development impact fees requiring slightly more effort, but showing as strong contenders. These are not the only sources recommended, as the scoring rubric alone did not inform the choices presented below. Rather, a combination of the scoring rubric, local knowledge, and further research produced the following potential funding sources for each priority segment of the Georgetown Bicycle Master Plan.

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Table 16. Potential Funding Options

Project Rank	Project Name	Top Funding Options
1	Austin Ave. Bridge	<ul style="list-style-type: none"> • Inclusion on TxDOT Roads • Downtown TIRZ • Development Impact Fees (Riverplace Georgetown)
2	8th St: Scenic Dr. trail Connection to Maple St.	<ul style="list-style-type: none"> • Downtown TIRZ • Capital Improvement Program • Development Impact Fees (mixed use development at the corner of 8th and Church)
3	Main St: Buffered bike lane from 2nd St. to 21st St.	<ul style="list-style-type: none"> • Downtown TIRZ (northern half) • TxDOT SRTS (Purl Elementary)
4	Holly Street Bridge	<ul style="list-style-type: none"> • Capital Improvement Program
5	Maple St. Phase 1: 7th St. to Britannia Blvd.	<ul style="list-style-type: none"> • TxDOT SRTS (Purl Elementary)
6	Northwest Blvd./ IH-35 Crossing Phase 1: Rivery Dr. to FM-971	<ul style="list-style-type: none"> • TxDOT Roads (I-35, in progress)⁹⁸ • 2015 Transportation Bond (in progress)

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7	San Gabriel River Crossing at St. David's Hospital: Scenic Dr. to Wolf Ranch Town Center	<ul style="list-style-type: none"> ● TxDOT Roads (I-35) ● Wolf Lakes TIRZ ● Development Impact Fees (Wolf Lakes Village)
8	Williams Dr: Del Webb Blvd. to Gatlin Creek	<ul style="list-style-type: none"> ● CAMPO Transportation Alternatives Set-Aside (due to recommendations in the Williams Drive study and ongoing partnership) ● TxDOT SRTS (Benold Middle School and Frost Elementary)
9	DB Wood Rd: Wildwood Dr. to Overlook Park along Williams Dr. & DB Wood Rd.	<ul style="list-style-type: none"> ● CAMPO TA Funding (due to recommendations in the Williams Drive study and ongoing partnership) ● TxDOT SRTS (McCoy Elementary and Village Elementary)
10	SR-29 East View HS connection across SR 130: Reinhardt Blvd. to Eastview Dr.	<ul style="list-style-type: none"> ● TxDOT SRTS (East View High School)

98 - Williamson County. (2018).

<http://ftp.dot.state.tx.us/pub/txdot/my35/capital/implementationplan/williamson/williamson.pdf>

Financing Options

Based on this exercise, it seems that leveraging several tools in addition to the general fund would be beneficial in more efficiently building out Georgetown's bicycle network. Partnerships with TxDOT could prove very beneficial due to the strong presence of state-owned I-35 in Georgetown, one of the most commonly cited barriers to cycling. Although Georgetown would still need to contribute financially to these projects, TxDOT dollars could be leveraged as well (TxDOT, 2015)⁹⁹.

The established and future TIRZs in the city are also important resources to consider in allocating funding to bicycle infrastructure, as multiple proposed segments coincide with their boundaries, and bike lanes are already authorized as approved uses of funds in each.

With recent strong development interest in the area, development impact fees should be strengthened and utilized where appropriate to garner private dollars to build bike infrastructure where it is planned and larger-scale developments are being proposed (City of Georgetown, 2019). Georgetown currently has water and wastewater impact fees in its Code of Ordinances (City of Georgetown, 2019), and has commissioned traffic impact fee studies in the past for potential incorporation into City policy (City of Georgetown, 2009)¹⁰⁰. With the present car-dependent state of Georgetown, it may be difficult to

make a case for a development causing a proportional impact requiring a bike lane. However, in certain highly developing areas they could be implemented now.

A number of the projects in the Top 10 are within the two-mile radius of a public school, as required to receive Safe Routes to School funding. An application for TxDOT SRTS funding that combines all of these projects into one proposal could provide a very logical and fruitful return on effort and allow simultaneous construction of lanes in various parts of the City if obtained. This application in particular might be an ideal opportunity to leverage other resources such as a consultant to help draft the application, or to partner with the Georgetown Independent School District to share the burden.

Lastly, in many cases it does make sense to use more general local funds through the CIP in order to build out smaller projects that do not fit well into the criteria for outside grants. Georgetown's CIP is divided into three categories: Georgetown Utility Systems, Transportation, and General Capital Projects. Bicycle infrastructure would likely fall into the transportation category, but in some cases may be classified in the General Capital Projects category where sidewalks, parks, and the Downtown Master Plan reside. A key source within the CIP could be Georgetown's street maintenance sales tax, which

99 - TxDOT. (2015). 2015 TAP Award Summary. Retrieved from:
<http://ftp.dot.state.tx.us/pub/txdotinfo/ptn/programs/tap-summary-15.pdf>

100 - City of Georgetown. (2009). Roadway Impact Fee Study.
<https://gus.georgetown.org/files/2009/08/2009-12-10-FINAL-Georgetown-RIF-Report.pdf>

Financing Options

is a quarter cent tax consistently approved by voters that goes toward transportation projects and road maintenance. This tax set-aside can be used only for curb-to-curb street maintenance, and is prohibited from funding new roads or off street trails, as reiterated in its most recent renewal, Prop A in 2018. Sidewalks in the 2016 CIP were funded by transportation bonds, nearly \$1M were allocated in that year and nearly \$5.5M over a five year period (City of Georgetown, 2016)¹⁰¹. The 2018 CIP incorporates multiple road projects that correspond with the locations of proposed bicycle improvements in Bike Georgetown. Funds for most of these road redesign or resurfacing projected are set be expended in 2020-2022, creating an opportunity to work the proposed bike lanes or treatments into the design of the project (City of Georgetown, 2018)¹⁰².

Some projects on the list already have a funding source in mind, or have had outside agencies involved in the planning process that may also be able to assist with funding. This include the Northwest Blvd. project which is already included in the Transportation Bond passed in 2015 (City of Georgetown, 2015)¹⁰³, and the Williams Dr. project which heavily engaged CAMPO in the planning and design process (City of Georgetown & CAMPO, 2018).¹⁰⁴ Although the

Williams Dr. project itself may not have originally qualified based on the rubric to apply for CAMPO TA set aside funds, the familiarity of the MPO with the project could make this application a good fit for this project.

As a note, bonds may be an excellent options for future projects. Georgetown approved a Transportation Bond in 2015 which authorized \$105M to fund transportation projects over a 10 year period. Projects from the City's 2014 Master Sidewalk Plan were incorporated into that bond and proposed sidewalk segments have been built out as planned. Road projects funded in the planning and design phases by this 2015 bond could still potentially incorporate bicycle infrastructure, including streets proposed for bike improvements in the Georgetown Bicycle Master Plan such as DB Wood Rd., Shell Rd., Williams Dr., East University Ave., and SE Inner Loop (City of Georgetown, 2015).

Should another transportation bond be brought to Georgetown voters in the future, incorporating bike infrastructure specifically, as sidewalks were incorporated into the 2015 bond, could be a very impactful and efficient way to fund some of the most critical routes.

101 - City of Georgetown. (2016). Capital Improvement Plan. Retrieved from:
<https://files.georgetown.org/files/2015/04/GTAB2015.pdf>

102 - City of Georgetown. (2018). Capital Improvement Plan. Retrieved from:
<https://finance.georgetown.org/files/2016/06/11-CIP-2018.pdf>

103 - City of Georgetown. (2009). City of Georgetown. (2015). 2015 Transportation Bond.
<https://bonds.georgetown.org/transportation-bond-2015/>

104 - City of Georgetown and the Capital Area Metropolitan Planning Organization. (2018). Williams Drive Study. <https://47kzwj6dn1447gy9z7do16an-wpengine.netdna-ssl.com/wp-content/uploads/2018/02/Williams-Drive-Final-Report-062917-Compressed.pdf>