AGENDA

FLOWER MOUND PARKS BOARD

REGULAR MEETING

JUNE 2, 2022

FLOWER MOUND TOWN HALL
2121 CROSS TIMBERS ROAD
FLOWER MOUND, TEXAS

6:30 P.M.

****

AN AGENDA INFORMATION PACKET IS AVAILABLE FOR PUBLIC INSPECTION ONLINE AT WWW.FLOWER-MOUND.COM/AGENDA/AGENDA.PHP

****

Comments regarding any item on this agenda can be sent to the Parks Board by Emailing: Parks@flower-mound.com or Calling: 972.874.6000

All pagers and cell phones must be turned off in the Council Chambers.

A. CALL REGULAR MEETING TO ORDER

B. INVOCATION

C. PLEDGE OF ALLEGIANCE TO THE AMERICAN FLAG AND TO THE TEXAS FLAG

"Honor the Texas flag; I pledge allegiance to thee, Texas, one state under God, one and indivisible."

D. PUBLIC COMMENTS

To speak to the Parks Board during public comments, please fill out a comment form.

- **Turn in form to the Administrative Assistant prior to the time the meeting is scheduled to begin and up to when the public comment portion of the meeting has concluded**
- **Speakers are limited to 3 minutes; a tone will sound at 30 seconds left and when time has expired**
- **Additional time limits will be provided to members of the public that need to address the Board through a translator.**
- **Please state your name and address when speaking**

The purpose of this item is to allow the public an opportunity to address the Parks Board on issues that are not indicated as a "Public Hearing" on this agenda. Issues regarding daily operational or administrative matters should first be dealt with by calling Parks & Recreation at 972-874-6300 during business hours.

E. DIRECTOR'S REPORT

- Update and status report related to Parks and Recreation issues.

F. CONSENT AGENDA

This agenda consists of non-controversial, or "housekeeping" items required by law. Items may be removed from the Consent Agenda by any Board member by making such request prior to a motion and vote on the Consent Agenda.

1. Consider approval of the minutes from a regular meeting of the Parks Board held on May 5, 2022.

G. REGULAR ITEMS

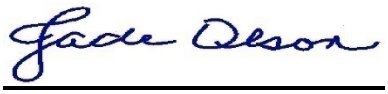
2. Public Hearing to consider a request to amend the Master Plan (MPA21-0010 - Parks and Trails Plan) by removing and replacing Section 5.0, "Parks and Trails Plan," and adopting the 2022 Trails and Bikeways Master Plan, and to consider adopting an ordinance providing for said amendments.

H. COORDINATION OF CALENDARS AND FUTURE AGENDAS/MEETINGS

- The next regular meeting of the Parks Board is scheduled for July 7, 2022.

I. ADJOURN REGULAR MEETING

I do hereby certify that the Notice of Meeting was posted on the bulletin board in Town Hall of the Town of Flower Mound, Texas, a place convenient and readily accessible to the general public at all times and said Notice was posted on the following date and time: May 27, 2022 at 3:30 P.M. at least 72 hours prior to the scheduled time of said meeting.



Jade Olson, Administrative Assistant

The Flower Mound Town Hall and Council Chambers are wheelchair accessible. Requests for accommodations or interpretative services must be made at least 48 hours prior to this meeting by contacting Jade Olson, Administrative Assistant at (972) 874-6425.

PARK BOARD AGENDA ITEM NO. 1

CONSENT ITEM

DATE: June 2, 2022

FROM: Jade Olson, Administrative Assistant

ITEM: **Consider approval of the minutes from a regular meeting of the Parks Board held on May 5, 2022.**

BACKGROUND INFORMATION: The Parks Board held a regular meeting May 5, 2022.

BOARD REVIEW/CITIZEN FEEDBACK: N/A

ALTERNATIVES/OPTIONS: N/A

FISCAL IMPACT: N/A

LEGAL REVIEW: N/A

ATTACHMENTS:

1. Draft minutes from the May 5, 2022 Regular Meeting of the Park Board.

DRAFT MOTION: Move to approve as presented in the agenda caption.

THE TOWN OF FLOWER MOUND PARKS BOARD REGULAR MEETING HELD ON THE 5th DAY OF MAY 2022, IN THE FLOWER MOUND TOWN HALL, LOCATED AT 2121 CROSS TIMBERS ROAD IN THE TOWN OF FLOWER MOUND, COUNTY OF DENTON, TEXAS AT 6:30 P.M.

The Parks Board met in a regular meeting and joint work session with the following members present:

Scott Langley	Place 1
Allen Pichon	Place 2
Rick Kenyon	Place 4 – Vice-Chair
Holly Royer	Place 5
Mark Mayer	Place 6
Jennifer Romaszewski	Place 7
Robert Sheets	Place 10 – Alternate

The following Board members were not in attendance:

Teresa Thomason	Place 3 – Chair
Preston Peterson	Place 8 – Alternate
Brittany Bowden	Place 9 – Alternate

The following members of Town Staff were in attendance:

Chuck Jennings	Director of Parks and Recreation
Mark Long	Assistant Director of Parks and Recreation
David Powell	CAC Manager
John Habern	Parks, Trails, and Landscape Manager
Clayton Litton	Parks Superintendent
Brennon Peltier	Park Development Manager
Jade Olson	Administrative Assistant

A. CALL REGULAR MEETING TO ORDER – 6:30 P.M.

B. INVOCATION – Robert Sheets

C. PLEDGE OF ALLEGIANCE TO THE AMERICAN FLAG AND THE TEXAS FLAG

D. PUBLIC COMMENTS

N/A

E. DIRECTOR'S REPORT

Chuck Jennings, Director of Parks and Recreation had the following announcements:

- Representatives of YMCA Jason Walter, Executive Director and Brady Dunn, Sports Director updated the Board YMCA's operations regarding youth basketball and volleyball sport leagues.
- Trails and Bikeways Master Plan was pushed back one month and will be at the next meeting to start the approval process.
- The tennis center feasibility study was brought to council and staff to discuss funding options.

- Brightivew Landscapes are the new mowing contractors in Flower Mound.

Mark Long, Assistant Director of Parks and Recreation had the following announcements:

- The Easter Egg Scramble took place on Saturday, April 9th at Jake's Hilltop Park.
- Kidfish took place on April 30th at Leonard and Helen Johns Community Park.
- The Concerts in the Park series begins tomorrow night at Heritage Park. The concert series will be held each Friday night in May.
- The Arts Festival will be held Saturday, May 7th at Heritage Park.
- The Father/Daughter Prom will take place this Saturday, May 7th.
- SIMA and Seniors in Motion will hold its annual Elite Chef Competition fundraiser Thursday, May 12th at the Senior Center.
- On Monday, May 30th the Town will host the annual Memorial Day Observance Ceremony at the Flower Mound Senior Center.
- Both the GLASA and FMYSA agreements will expire on August 31st of this year. Per the recommendations of the Youth Sports Task Force, we put out an RFP in late April and are accepting proposal from interested organizations. The deadline to receive proposals is Friday, May 20th.
- Registration is open for both the Youth Summer track program and Blue Fin Swim team.
- Track practice starts Monday, May 23rd.
- Blue Fin began this past Monday.
- Registration for all summer adult sports leagues is currently open and will be accepted through May 31st.
- Registration is also currently open for summer tennis camps through Bad Dawg Tennis.
- All summer programs, leagues, and camps can be found online at www.flower-mound.com.
- Outdoor water park will officially open on May 26th.
- The CAC is still actively hiring regular and seasonal lifeguards for the summer. There are a couple of camp counselor positions available.

Brennon Peltier, Park Development Manger had the following announcements:

- Canyon Falls is still under construction. Construction is expected to be complete by July 2022.
- New LED ballpark and tennis lights have been installed at Glenwick Park.
- Grand Park construction began in early April. It is expected to be completed in late May.
- The outdoor fitness equipment at Heritage Park was fully installed last week. The contractor is working on installing turf.
- John Habern showed a picture of the new trail installed at the Smith Tract.
- The Pink Evening Primrose Trail project is underway. It is estimated to be completed in mid-June.
- Rheudasil Park construction is still underway. Substantial completion is expected in early June.
- Chinn Chapel Soccer Complex drainage improvements project kickoff meeting was April 13th.

- Leonard and Helen Johns Park improvements are underway. Those improvements include relocated electrical equipment.
- The quote for the Peacock Playground equipment has been received and will be presented to council in June. Construction is expected to start in late summer 2022.

F. CONSENT AGENDA

1. Consider approval of the minutes from a regular meeting of the Parks Board held on April 7, 2022.

Board Deliberation
Board Member Pichon moved to approve as presented in the agenda caption. Board Member Mayer seconded the motion.

VOTE ON THE MOTION

AYES: Langley, Pichon, Kenyon, Royer, Mayer, Romaszewski
NAYS: None

G. REGULAR ITEMS

2. Consider approval of a request from Dallas Athletes Racing, Inc. to hold a sanctioned triathlon event at the Community Activity Center and Gerault Park on Sunday, April 2, 2023.

Staff Presentation
David Powell – CAC Manager

Dallas Athletes
Dan Jones
Russ Jackson

Board Deliberation
Board Member Mayer moved to approve as presented in the agenda caption. Board Member Pichon seconded the motion.

VOTE ON THE MOTION

AYES: Romaszewski, Mayer, Royer, Kenyon, Pichon, Langley
NAYS: None

3. Consider approval of a recommendation of parks projects to be funded by the Community Development Corporation in Fiscal Year 2022-2023 using 4B sales tax revenue and incorporate park projects for FY 2024-2027 into the Town's Five-Year Capital Improvement Projects list.

Board Deliberation
Board Member Pichon moved to approve as presented in the agenda caption. Board Member Royer seconded the motion.

VOTE ON THE MOTION

AYES: Langley, Pichon, Kenyon, Royer, Mayer, Romaszewski
NAYS: None

H. RECESS REGULAR MEETING

I. CALL WORK SESSION ORDER

J. WORK SESSION ITEMS

4. Review and discuss park related items for Whyburn Addition residential development generally located east of Long Prairie Rd. and south of Dixon Rd.

Staff Presentation
John Habern – Parks, Trails & Landscape Manager

Land Design Presentation
Heth Kendrick – Representative

The Parks Board provided feedback on likes, dislikes, questions, and concerns.

K. ADJOURN WORK SESSION

L. RECONVENE REGULAR MEETING

M. COORDINATION OF CALENDARS AND FUTURE AGENDAS/MEETINGS

- The next regular meeting is scheduled for June 2, 2022.

N. ADJOURNMENT

Board Member Langley made a motion to adjourn the meeting. Board Member Royer seconded the motion.

Vice-Chair Kenyon adjourned the Regular Meeting at 8:01pm.

TOWN OF FLOWER MOUND, TEXAS

Rick Kenyon – Vice Chair

ATTEST:

Jade Olson, Administrative Assistant

PARKS BOARD
AGENDA ITEM NO. 2

DATE: June 2, 2022
FROM: Chuck Jennings, Director of Parks and Recreation
WORK SESSION ITEM: **Public Hearing to consider a request to amend the Master Plan (MPA21-0010 - Parks and Trails Plan) by removing and replacing Section 5.0, "Parks and Trails Plan," and adopting the 2022 Trails and Bikeways Master Plan, and to consider adopting an ordinance providing for said amendments.**

Background Information: The Town adopted its first comprehensive parks and trails master plan in 1989, which was updated in 1994, 2001, 2010 and 2017. These plans briefly touched on trails and did not cover bikeways. This Trails and Bikeways Master Plan is a comprehensive study that is just focusing on these two areas. The plan will serve as a roadmap to guide short and long-range priorities for the trails and bikeways network in Flower Mound over the next 10+ years. As part of the planning process, an assessment of existing conditions and future needs was conducted for off-street trails, on-street bikeways, equestrian trails, and nature trails.

The Town of Flower Mound entered into a Professional Services Agreement with Halff Associates on February 1, 2021, which was broken into five phases: Phase 1 – Community Understanding, Phase 2 – Community Visioning, Phase 3 – Needs Assessment, Phase 4 – Proposed Network, and Phase 5 – Action Plan. Staff held a kickoff meeting on February 23, 2021, with Halff regarding the master plan and the consultant toured many of the Town's trails and bikeways in March and April of 2021.

Throughout the months of May and June, the consulting team conducted a community input survey which had close to 1,000 responses. The team hosted visioning meetings on May 4 and 5 that included three stakeholder listening sessions, a Steering Committee meeting, Technical Working Group meeting, and a public open house at the Community Activity Center, where over 80 people attended including some from the Town Council and various Town Boards and Commissions. For residents that could not attend these meetings, the Town offered residents the opportunity to visit a virtual engagement room which mimicked the items discussed and questions asked at the public open house. Some questions that were asked of different groups and of the public at the different meetings included the following:

- What is your vision for the future of trails and bikeways in Flower Mound?
- What are some of the challenges related to trails and bikeways in Flower Mound today?
- In your opinion, what is the most important action item that should result from this plan?
- What one word would you use to describe Trails and Bikeways in Flower Mound Today?
- What one word would you use to describe how you envision Trails and Bikeways in Flower Mound in the Future?
- Where are trails and bikeways most needed in Flower Mound?
- Where do barriers to walking, running, cycling, or horseback riding exist in Flower Mound today?

Key take away from the engagement included:

- Creating more of an east/west connection
- Filling in gaps in the system
- Providing a variety of trail types throughout the Town
- Providing more connections to the USACE trails
- More designated bikeway accommodations

- Additional trail access points, trailheads, and trail amenities
- Completing the loops for equestrian trails

Halff was also tasked with performing a deep assessment on five different corridors within Flower Mound. The consultant toured these areas in July and August to fully understand the opportunities, constraints, and feasibility of constructing trail or bikeways. The five areas studied were Cross Timbers E/W Connection, Shiloh Dr., Long Prairie Rd. (Veloweb corridor), Gaston Park/Long Prairie Rd., and Timber Creek trail connection. The study of the five corridors will be included in the overall master plan and will address crossings, overhead clearance, utility conflicts, property ownership and estimates of probable costs.

As part of the master plan process Halff Associates contracted with Civic Brand to develop a project brand identity package to be used throughout the planning process and in marketing pieces. In addition to the project branding, Civic Brand was responsible for the creation and updating of the project webpage (www.flowermoundtrailsplan.com). The website will remain active three months after the completion of the project. Civic Brand worked with Halff and Town staff to create three short, informative videos regarding trails and bikeways to generate excitement about the plan. Lastly, Civic Brand worked with staff to develop trail branding considerations. Signage is typically provided at trailheads and at key decision-making points along a trail. Signage can mark access points to the trail, provide directional and distance guidance for trail users, direct users to locations of key amenities along the trails, and provide brand recognition of the trail system. Halff has incorporated their recommendations into the draft master plan.

Work Sessions were held to review a draft of the Master Plan:

- April 7 Parks Board / Transportation Commission
- April 21 Town Council
- April 25 Planning & Zoning Commission

The master plan will be presented at various meetings as Public Hearings throughout the month of June with final approval occurring in July. The schedule below details the upcoming meeting dates:

- June 2 Parks Board – Public Hearing
- June 14 Transportation Commission – Public Hearing
- June 27 Planning & Zoning Commission - Public Hearing
- July 18 Town Council - Public Hearing for the approval of the Master Plan

To keep up with Flower Mound's growth, new development and redevelopment, and shifting demographic trends, developing a Trails and Bikeways Master Plan is essential to ensure that these facilities meet the needs of the community today and in the future. Having a current Master Plan will place the Town in a good position to apply for future grants.

Fiscal Impact: N/A

Legal Review: James Donovan of Taylor, Olson, Adkins, Sralla, & Elam L.L.P., has reviewed the ordinance as to form and legality.

Attachments:

1. Proposed Ordinance
2. Section 5.0 Parks and Trails Plan
3. Parks and Recreation Master Plan Update

PARKS BOARD
AGENDA ITEM NO. 2

Draft Motion: Move to recommend approval for Planning and Zoning Commission and Town Council consideration amending the Master Plan (MPA21-0010 - Parks and Trails Plan) by removing and replacing Section 5.0, “Parks and Trails Plan,” adopting the 2022 Trails and Bikeways Master Plan, and to consider adopting an ordinance providing for said amendments.

TOWN OF FLOWER MOUND, TEXAS

ORDINANCE NO. _____

AN ORDINANCE OF THE TOWN COUNCIL OF THE TOWN OF FLOWER MOUND, TEXAS, AMENDING THE FLOWER MOUND 2001 MASTER PLAN BY AMENDING ORDINANCE NO. 24-01 IN PART, WHICH ADOPTED THE MASTER PLAN, BY REPEALING AND REPLACING SECTION 5.0, "PARKS AND TRAILS PLAN," AND ADOPTING THE 2022 TRAILS AND BIKEWAYS MASTER PLAN AS A COMPONENT OF THE MASTER PLAN; PROVIDING THAT THIS ORDINANCE IS CUMULATIVE OF ALL ORDINANCES; PROVIDING A SEVERABILITY CLAUSE; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, the Town of Flower Mound is a home rule city acting under its charter adopted by the electorate pursuant to Article XI, Section 5, of the Texas Constitution and Chapter 9 of the Local Government Code; and

WHEREAS, on March 19, 2001, the Town Council of the Town of Flower Mound adopted the Flower Mound 2001 Master Plan (the "Master Plan") which consisted of nineteen component plans, including the Parks and Trails Plan; and

WHEREAS, the Master Plan establishes and articulates a community based vision to: preserve the country atmosphere and natural environment that makes Flower Mound a unique and desirable community; mitigate the ill effects of rapid and intense urbanization; create a balanced tax base to ensure the Town's long-term economic health and prosperity; and ensure all development is of enduring and exemplary quality; and

WHEREAS, the Town engaged HALFF Associates, Inc. to update the Town's Parks and Trails Plan for the year 2022; and

WHEREAS, the Planning and Zoning Commission of the Town of Flower Mound, Texas held a public hearing on June 27, 2022, and the Town Council of the Town of Flower Mound Texas held a public hearing on July 18, 2022, with respect to the Master Plan amendment described herein and to consider adoption of the updated Section 5.0, "Parks and Trails Plan," and the 2022 Trails and Bikeways Master Plan, as components of the Master Plan; and

WHEREAS, upon due deliberation and consideration of the recommendation of the Planning and Zoning Commission and of all testimony and information submitted during the public hearings, the Town Council of the Town of Flower Mound, Texas, has determined that it is in the best interest of the citizens of the Town of Flower Mound that the Master Plan be amended to remove and replace Section 5.0 Parks and Trails Plan, and to adopt the 2022 Trails and Bikeways Master Plan as components of the Master Plan.

NOW, THEREFORE, BE IT ORDAINED BY THE TOWN COUNCIL OF THE TOWN OF FLOWER MOUND, TEXAS, THAT:

SECTION 1

All of the above premises are hereby found to be true and correct legislative and factual findings of the Town of Flower Mound, and they are hereby approved and incorporated into the body of this Ordinance as if copied in their entirety.

SECTION 2

From and after the effective date of this Ordinance, Section 5.0, "Parks and Trails Plan," of the Master Plan, is hereby amended by repealing and replacing the existing Section 5.0, "Parks and Trails Plan," with a new Section 5.0, "Parks and Trails Plan," to read as set forth in Exhibit A attached hereto.

SECTION 3

The 2022 Trails and Bikeways Master Plan, attached hereto as Exhibit B is hereby adopted as a component of the Master Plan.

SECTION 4

This Ordinance shall be cumulative of all provisions of ordinances of the Town of Flower Mound, Texas, except where the provisions of this Ordinance are in direct conflict with the provisions of such ordinances, in which event the conflicting provisions of such ordinances are hereby repealed.

SECTION 5

It is hereby declared to be the intention of the Town Council that the phrases, clauses, sentences, paragraphs, and sections of this Ordinance are severable, and if any phrase, clause, sentence, paragraph, or section of this Ordinance shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs, and sections of this Ordinance, since same would have been enacted by the Town Council without the incorporation in this Ordinance of any such unconstitutional phrase, clause, sentence, paragraph, or section, and said remaining portions shall remain in full force and effect.

SECTION 6

This Ordinance shall take effect and be in full force on and after its passage.

DULY PASSED AND APPROVED BY THE TOWN COUNCIL OF THE TOWN OF FLOWER MOUND, TEXAS, BY A VOTE OF _____ TO _____, ON THIS THE 18TH DAY OF

JULY 2022.

_____
DEREK FRANCE, MAYOR

ATTEST:

_____
THERESA SCOTT, TOWN SECRETARY

5.0 PARKS AND TRAILS PLAN

Contents

Introduction and Purpose 3
Physical Features and Development 3
Previous Parks, Trails and Recreation Master Planning Efforts 4
Park Planning Process 5
Park and Recreation Resources 5
Town Facilities 5
Public School/Joint Use Facilities 5
Park Classification and Park Design Principles 5
Definitions used in the Park Design Principles 6
Design Principles for each park classification are as follows. 7
Pocket Parks 7
Neighborhood Park 7
Community Park 8
Regional Park 9
Sports Complex 10
Special Use Park/Facility 11
Greenbelts/Trails 12
Open Space/Natural Area 13
Technical Needs Analysis 13
Equity Mapping 13
Level of Service Standards 29
Trails and Bikeways Master Plan 31
Trails and Bikeways Plan Overview 31
Phase 1: Community Understanding 31
Phase 2: Community Visioning 31
Phase 3: Needs Assessment 32
Phase 4: Proposed Network 32
Phase 5: Action Program 32
System Overview 34
Trail System Needs 35
Facility Types 36
Trail Recommendations 38
Level of Service 39
Park and Facility Priority Rankings 40
Trail Priority Rankings 42
Strategic Recommendations 45
Capital Improvement Recommendations 49

DRAFT

Critical Capital Improvement Recommendations 50
Trails and Bikeways Plan High Priority Projects 51
Sustainable Capital Improvement Recommendations 54
Visionary Capital Improvement Recommendations 55
Updating the Parks and Trails Plan 56
Parks and Trails Map 57

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Introduction and Purpose

The purpose of the Town of Flower Mound Parks and Trails Plan is to provide guidelines and strategies for future acquisition and development of recreational facilities and guide the development of trails and bikeways facilities recommendations, design guidelines, and implementation strategies for the Town of Flower Mound. This chapter of the Flower Mound Master Plan 2001 is a summary document highlighting the major components of the Town of Flower Mound Parks and Recreation Master Plan, and Trails and Bikeways Master Plan, which contain more detailed information on individual parks, trails, bikeways, the planning processes, community demographic data, park planning standards, trail design standards, and implementation strategies. Also included in the Plans are recreation programming and maintenance/operations supplements. These plans are based on recognized park planning principles and standards, and reflects input from the citizens of Flower Mound, Town staff, Parks Board, Transportation Commission, Planning and Zoning Commission, and Town Council.

The Parks and Trails Plan focuses on the Town's needs analysis through current and ten-year needs. It is a community-based document that will aid Town staff and Town decision-makers in providing recreational facilities and amenities to the citizens of Flower Mound and in preserving the Town's floodplains and other open space areas in an orderly and economical way. When considering the Trails and Bikeways the plan focuses on the Town's needs in short (1-5 year), mid (5-10 years), and long-range (beyond 10 years) timeframes. It will create a diverse system of transportation and recreation options to provide residents with access to active and healthy lifestyle opportunities.

Physical Features and Development

Flower Mound has floodplain land within the Town limits, desirable for open space preservation and the development of trails and parkland. Although floodplain land is generally unsuitable for community development due to the potential for flooding and Federal Emergency Management Agency (FEMA) regulations, these areas provide natural corridors of open space, woodlands, and wildlife habitat throughout the Town. Several creeks flow through Flower Mound including Timber Creek, Prairie Creek, Sharps Branch, Whites Branch, Stone Creek, Bakers Branch, and Graham Branch forming picturesque greenways through both the Town's rural areas and urban core. Potential exists for additional park, trail, and greenway developments along these corridors.

Lake Grapevine, with 6,684 acres of surface area, is a significant physical feature of the Town and forms the southern and southwestern edge of the Town. There are currently four Army Corps of Engineers parks on the northern shore of Grapevine Lake that fall within the Town limits: North Shore Park, Knob Hills Park, Rocky Point Park, and Murrell Park. Twin Coves Park is also along the northern shore of Grapevine Lake and is leased and maintained by the Town. These parks offer citizens access to approximately 1,650 acres of land with opportunities for camping, fishing, boating, hiking, mountain biking, and equestrian trail riding.

Parks, like other types of land uses, produce both peak and off-peak volumes of traffic. Athletic complexes such as the Chinn Chapel Soccer Complex, Bakersfield Park, and Gerault Park can generate

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substantial traffic during competitive events, tournaments, and playoffs. Four-lane streets are recommended adjacent to athletic complexes or multi-field installations.

Neighborhood parks are best located on local streets where the low-traffic volume allows for safe routes for pedestrian travel to these parks. Sidewalks in adjacent neighborhoods generally promote walking to these parks rather than driving. Neighborhood parks typically do not have parking spaces, however each site should be considered for parking needs.

The recreational needs of teens, seniors, and residents with disabilities are specialized and should be addressed as future parks are planned. Additional adventure recreational activities, passive recreational activities, as well as fully accessible athletic facilities and playgrounds, should be considered to encourage the use of park facilities and participation in park programs by these populations.

Previous Parks, Trails and Recreation Master Planning Efforts

The Town adopted its first comprehensive Parks and Trails Plan in 1989, which was updated in 1994, 2001, 2010, and 2017. Over the past decade, the Town has been involved in an extensive parks and recreation capital improvements program, primarily funded by the 1997 Parks Bond Election, the 2002 Parks and Recreation Bond Election, and the 2007 voter-approved ¼-cent sales tax that generates approximately $3.6 million annually for park improvements.

The 2017 Parks and Recreation Master Plan (PRMP) provided a framework for strategies regarding future acquisition and development of recreation facilities in Flower Mound. The 2017 PRMP plan outlined near and long-term priorities using public engagement insights as a foundation. The primary outcomes of the 2017 PRMP was to identify a vision for the Parks and Recreation Department, determine the level of needs in current offerings, identify new opportunities that can be met by the department, complete initial testing on strategies for funding, and identify possible park facility components for new and future facilities. Finally, the plan identifies a variety of recommendations for the direction of the Parks and Recreation facilities for implementation.

According to the PRMP's level of service analysis, paved multi-use trails were listed as the highest priority need out of all parks and recreation amenities assessed as part of the plan. Nature trails and unpaved multi-use trails were also listed as a high priority. Additionally, the overall quality of walking and biking trails was identified as the highest-ranking response for survey takers when asked which services should receive the most attention over the next five years. Equestrian trails were ranked near the bottom in several questions related to community-wide needs and priorities.

The 2017 PRMP recommended that the Town perform a more comprehensive study of the trails and bikeways system. This comprehensive study was accomplished during this review and is detailed in the 2022 Trails and Bikeways Master Plan.

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Park Planning Process

The PRMP planning process spanned a thirteen month period from February 2016 through March 2017. This included multiple meetings between the consultant team and Town staff, Parks Board, Planning and Zoning Commission, and Town Council. Besides these open public work sessions, meetings, and public hearings; three special Town Hall meetings were held to gain input for the development of the plan. In April and May 2016, statistically valid surveys, as well as, an online survey were conducted to determine community attitudes and needs regarding parks and recreation. A detailed summary of the meetings, focus groups, surveys and survey results is included in the Plan Update.

Park and Recreation Resources

Town Facilities

The Town of Flower Mound's recreational facility inventory is continually changing as the Town develops. As a part of this master planning process, the consultant visited each of Flower Mound's parks to assess the general condition of each park and to inventory each of the park's facilities. A detailed description and photographs of each park are included in the Plan Update. The Town has 979.91 acres of total parkland, of which 863.4 acres is developed and 116.51 acres is undeveloped or open space. Overall, Flower Mound's parks appear uniformly clean and very well maintained.

Public School/Joint Use Facilities

Lewisville Independent School District (LISD) owns recreational facilities, which may be available to the public during non-school hours and activities. They are not included in the Town facility inventory because school district needs and programs take priority over general public needs. Agreements between cities and school districts for joint use of facilities are common in north Texas, and they raise the level of service for the facilities listed in the agreements. These agreements also reduce the need to duplicate facilities and foster a sense of community spirit in such cities. Currently, there is an Interlocal Cooperation Agreement for Joint Use Property between the Town of Flower Mound and the Argyle ISD. The Town also has a Facility Use Agreement with the LISD.

Residents of Flower Mound also have access to other facilities in or near Flower Mound not currently owned or operated by the Town, including Bridlewood Golf Club, Flower Mound Equestrian Center, Greater Lewisville Family YMCA, Lifetime Fitness, Lake Grapevine, The Flower Mound, and Tour 18 Golf Club.

Park Classification and Park Design Principles

In developing design principles for parks, it is important that each park be programmed, planned, and designed to meet the needs of its service area and classification within the overall parks and recreation system. The term programming, when used in the context of planning and developing parkland, refers to a list of uses and facilities and does not always include staff-managed recreation

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programs. The program for a site can include such elements as ball fields, spray parks, shelters, restrooms, game courts, trails, natural resource stewardship, open meadows, nature preserves, or interpretive areas. These types of amenities are categorized as lead or support amenities. The needs of the population of the park it is intended to serve should be considered and accommodated at each type of park.

Park Design Principles in this document should apply to existing and future parks needing Master Plans. Every park, regardless of type, needs to have an established set of outcomes. Park planners/designers design to those outcomes, including operational and maintenance costs associated with the design outcomes.

Each park classification category serves a specific purpose, and the features and facilities in the park must be designed for the number of age segments the park is intended to serve, the desired length of stay deemed appropriate, and the uses it has been assigned. Recreation needs and services require different design standards based on the age segments that make up the community that will be using the park. A varying number of age segments will be accommodated with the park program depending on the classification of the park. The age segments are:

- Ages 2-5
- Ages 6-8
- Ages 9-12
- Ages 13-17
- Ages 18-24
- Ages 25-34
- Ages 35-44
- Ages 45-54
- Ages 55-64
- Ages 65-75
- Ages 76+

Definitions used in the Park Design Principles

- **Land Usage**: The percentage of space identified for either passive use or active use in a park. A Parks and Recreation Master Plan should follow land usage recommendations.
- **Programming**: Can include active or passive (i.e. none). Active means it is organized and planned with pre-registration by the user. Examples of active programming include sports leagues, day camps, and aquatics. Passive programming is self-directed by the user at their own pace. Examples of passive programming include playground usage, picnicking, disc golf, reading, or walking the dog.
- **Park/Facility Classifications:** Includes Pocket Park, Neighborhood Park, Community Park, Regional Park, Sports Complex Facility, Special Use Park/Facility, Greenbelts/Trails, and Open Space/Natural Area.
- **Revenue Facilities:** These include facilities that charge to play on them in the form of an access fee, player fee, team fee, or permit fee. These could include pools, golf courses, tennis courts,

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recreation centers, sport field complexes, concession facilities, hospitality centers, reservable shelters, outdoor or indoor theatre space, and special event spaces.

- **Signature Facility/Amenity:** This is an enhanced facility or amenity which is viewed by community as deserving of special recognition due to its design, location, function, natural resources, etc.

Design Principles for each park classification are as follows.

Pocket Parks

According to the NRPA, a pocket park is a small outdoor space, usually less than 0.25 acres up to 1 acre, most often located in an urban area surrounded by commercial buildings or houses. Pocket parks are small, urban open spaces that serve a variety of functions, such as: small event space, play areas for children, spaces for relaxing and socializing, taking lunch breaks, etc. Successful pocket parks have four key qualities: they are accessible; allow people to engage in activities; are comfortable spaces that are inviting; and are sociable places. In general, pocket parks offer minimal amenities on site and are not designed to support programmed activities. The service area for pocket parks is usually less than a quarter-mile and they are intended for users within close walking distance of the park.

Neighborhood Park

The service radius for a neighborhood park is one half mile or six blocks. Neighborhood Parks should have safe, pedestrian access for surrounding residents; parking may or may not be included but if included accounts for less than ten cars and provides for ADA access. Neighborhood Parks serve the recreational and social focus of the adjoining neighborhoods and contribute to a distinct neighborhood identity. A neighborhood park should be three to 10 acres; however, some Neighborhood Parks are determined by use and facilities offered and not by size alone.

- Service radius: 0.5 mile radius
- Site Selection: On a local or collector street. If near an arterial street, provide natural or artificial barrier. Where possible, located next to a school. Encourage location to link subdivisions and linked by trails to other parks
- Length of stay: One hour experience or less
- Amenities: One signature amenity (e.g. playground, spray ground park, sport court, gazebo); no restrooms unless necessary for signature amenity; may include one non-programmed sports field; playgrounds for ages 2-5 and 5-12 with some shaded elements; no reservable shelters; loop trails; one type of sport court; no non-producing/unused amenities; benches, small picnic shelters next to play areas. Amenities are ADA compliant
- Landscape Design: Appropriate design to enhance the park theme/use/experience
- Revenue facilities: none
- Land usage: 85 percent active/15 percent passive
- Programming: Typically none, but a signature amenity may be included which is programmed
- Maintenance Standards: Provide the highest level maintenance with available funding. Seek a goal of Level 2 maintenance standards. Some amenities may require Level 1 maintenance
- Signage: Directional signage and facility/amenity regulations to enhance user experience

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- Parking: Design should include widened on-street parking area adjacent to park. Goal is to maximize usable park space. As necessary, provide 5-10 spaces within park including handicap spaces. Traffic calming devices encouraged next to park
- Lighting: Security only. Lighting on all night for security
- Naming: Consistent with the Town's ordinances for naming of parks, or may be named after a prominent or historic person, event, or natural landmark
- Other: Customized to demographics of neighborhood; safety design meets established Crime prevention through environmental design (CPTED) standards; integrated color scheme throughout
- Size of park: Typically, Three to 10 acres

Community Park

Community Parks are intended to be accessible to multiple neighborhoods and should focus on meeting community-based recreational needs, as well as preserving unique landscapes and open spaces. Community Parks are generally larger in scale than neighborhood parks, but smaller than regional parks and are designed typically for residents who live within a three mile radius. When possible, the park may be developed adjacent to a school. Community Parks provide recreational opportunities for the entire family and often contain facilities for specific recreational purposes: athletic fields, swimming pool, tennis courts, extreme sports amenity, recreation center, loop trails, picnic areas, reservable picnic shelters, sports courts, permanent restrooms with drinking fountains, large turfed and landscaped areas and a playground and/or spray ground. Passive outdoor recreation activities such as meditation, quiet reflection, and wildlife watching also take place at Community Parks.

Community Parks generally range from 10 to 100 acres depending on the community. Community Parks serve a larger area –contain more recreation amenities than a Neighborhood Park.

- Service radius: One to three mile radius
- Site Selection: On two collector streets minimum and preferably one arterial street. If near an arterial street, provide natural or artificial barrier. Minimal number of residences abutting site. Preference is streets on four sides, or three sides with school or municipal use on fourth side. Encourage trail linkage to other parks
- Length of stay: Two to three hours experience
- Amenities: Four signature amenities at a minimum: (e.g., trails, sports fields, large shelters/ pavilions, community playground for ages 2-5 and 5-12 with some shaded elements, recreation center, pool or family aquatic center, sports courts, water feature); public restrooms with drinking fountains, ample parking, and security lighting. Amenities are ADA compliant. Sport Fields and Sport Complexes are typical at this park.
- Revenue facilities: One or more (e.g. pool, sports complex, pavilion)
- Land usage: 65 percent active and 35 percent passive
- Programming: Minimum of four essential program services (e.g. sports, day camps, aquatics)
- Maintenance Standards: Provide the highest level maintenance with available funding. Seek a goal of Level 2 maintenance standards. Some amenities may require Level 1 maintenance.

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- Parking: Sufficient to support the amenities; occupies no more than 10 percent of the park Design should include widened on-street parking area adjacent to park. Goal is to maximize usable park space. Traffic calming devices encouraged within and next to the park
- Lighting: Amenity lighting includes sport field light standards. Security lighting on dual system with 50 percent of lights off at a set time and 50 percent on all night for security
- Signage: Directional signage and facility/amenity regulations to enhance user experience. May include kiosks in easily identified areas of the facility
- Landscape Design: Appropriate design to enhance the park theme/use/experience. Enhanced landscaping at park entrances and throughout park
- Naming: Consistent with the Town's naming right ordinance, may be named after a prominent or historic person, event, or natural landmark
- Other: Strong appeal to surrounding neighborhoods; integrated color scheme throughout the park; partnerships developed with support groups, schools and other organizations; loop trail connectivity; linked to Regional Park, trail or recreation facility; safety design meets established CPTED standards.
- Size of park: Typically, 10 to 100 acres

Regional Park

A regional park serves a large area of several communities, residents within a town, city or county, or across multiple counties. Depending on activities within a regional park, users may travel as many as 60 miles for a visit. Regional parks include recreational opportunities such as soccer, softball, golf, boating, camping, conservation-wildlife viewing and fishing. Although regional parks usually have a combination of passive areas and active facilities, they are likely to be predominantly natural resource-based parks.

A common size for a regional park is 100 to 1,000 acres but some parks can be 2,000 to 5,000 acres in size. A regional park focuses on activities and natural features not included in most types of parks and often based on a specific scenic or recreational opportunity. Facilities could include those found in a Community Park and have specialized amenities such as an art center, amphitheater, boating facility, golf course, or natural area with interpretive trails. Regional parks can and should promote tourism and economic development. Regional parks can enhance the economic vitality and identity of the entire region. Twin Coves Park is considered a regional park.

- Service radius: Three mile or greater radius
- Site Selection: Prefer location which can preserve natural resources on-site such as wetlands, streams, and other geographic features or sites with significant cultural or historic features. Significantly large parcel of land. Access from public roads capable of handling anticipated traffic.
- Length of stay: All day experience
- Amenities: 10 to 12 amenities to create a signature facility (e.g. golf course, tennis complex, sports complex, lake, regional playground, 3+ reservable picnic shelters, camping, outdoor recreation/extreme sports, recreation center, pool, gardens, trails, zoo, specialty facilities); public restrooms with drinking fountains, concessions, restaurant, ample parking, special event site. Sport Fields and Sport Complexes are typical at this park.

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- Revenue facilities: More than two; park designed to produce revenue to offset operational costs
- Land usage: Up to 50 percent active/50 percent passive
- Programming: More than four recreation experiences per age segment with at least four core programs provided
- Maintenance Standards: Provide the highest level maintenance with available funding. Seek a goal of Level 2 maintenance standards. Some amenities may require Level 1 maintenance
- Parking: Sufficient for all amenities. Traffic calming devices encouraged within and next to park
- Lighting: Amenity lighting includes sport field light standards. Security lighting on dual system with 50 percent of lights off at a set time and 50 percent on all night for security
- Signage: Directional signage and facility/amenity regulations to enhance user experience, May include kiosks in easily identified areas of the facility
- Landscape Design: Appropriate design to enhance the park theme/use/experience. Enhanced landscaping at park entrances and throughout park
- Naming: Consistent with the Town's naming ordinance, may be named after a prominent or historic person, event, or natural landmark
- Other: Safety design may meet CPTED safety standards; integrated color scheme throughout the park; linked to major trails systems, public transportation available, concessions, food and retail sales available, dedicated site managers on duty. Telephone/Cable TV conduit.
- Size of park: Typically, 100 to 1,000 acres

Sports Complex

Sports complexes at Community Parks, Regional Parks, and stand-alone Sports Complexes are developed to provide four to 16 fields or courts in one setting. A sports complex may also support extreme sports facilities, such as BMX and skateboarding. Sports Complexes can be single focused or multi-focused and can include indoor or outdoor facilities to serve the needs of both youth and adults. Outdoor fields should be lighted to maximize value and productivity of the complex. Agencies developing sports complexes focus on meeting the needs of residents while also attracting sport tournaments for economic purposes to the community.

Sport field design includes appropriate field distances for each sport's governing body and support amenities designed to produce revenue to offset operational costs.

Signature sports complexes include enhanced amenities such as artificial turf, multipurpose field benches and bleachers, scoreboards, amplified sound, scorer's booths, etc. Enhanced amenities would be identified through discussion between Town and Schools and or sports associations and dependent upon adequate funding.

- Service radius: Determined by community demand
- Site Selection: Stand-alone sports complexes are strategically located on or near arterial streets. Refer to community or regional Park sections if sport complex located within a park. Preference is streets on four sides, or three sides with school or municipal use on fourth side.
- Length of stay: Two to three hours experience for single activities. Can be all day for tournaments or special events

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- Amenities: Four to sixteen fields or sports courts in one setting; public restrooms, ample parking, turf types appropriate for the facility and anticipated usage, and field lighting. Amenities are ADA compliant.
- Revenue facilities: Four or more (e.g. fields, concession stand, picnic pavilion)
- Land usage: 95 percent active and 5 percent passive
- Programming: Focus on active programming of all amenities
- Maintenance Standards: Provide the highest level maintenance with available funding. Plan for Level 1 and sometimes 2 level of maintenance standards at signature facility
- Parking: Sufficient to support the amenities. Traffic calming devices encouraged within and next to park
- Lighting: Amenity lighting includes sport field light standards. Security lighting on dual system with 50 percent of lights off at a set time and 50 percent on all night for security
- Signage: Directional signage and facility/amenity regulations to enhance user experience. May include kiosks in easily identified areas of the facility
- Landscape Design: Appropriate design to enhance the park theme/use/experience. Enhanced landscaping at entrances and throughout complex
- Naming: Consistent with the Town's naming ordinance, may be named after a prominent or historic person, event, or natural landmark
- Other: Integrated color scheme throughout the park; safety design meets established CPTED standards.
- Size of park: Preferably 40 or more acres for stand-alone complexes

Special Use Park/Facility

Special Use facilities are those spaces that don't fall within a typical park classification. A major difference between a Special Use facility and other parks is that they usually serve a single purpose whereas other park classifications are designed to offer multiple recreation opportunities. It is possible for a Special Use facility to be located inside another park. Special Use facilities generally fall into four categories:

- **Historic/Cultural/Social Sites** – unique local resources offering historical, educational, and cultural opportunities. Examples include historic downtown areas, commercial zones, plaza parks, performing arts parks, arboretums, display gardens, performing arts facilities, indoor theaters, churches, and amphitheaters. Frequently these are located in Community or Regional Parks
- **Golf Courses** – Nine and 18-hole complexes with ancillary facilities such as club houses, driving ranges, program space and learning centers. These facilities are highly maintained and support a wide age level of males and females. Programs are targeted for daily use play, tournaments, leagues, clinics and special events. Operational costs come from daily play, season pass holders, concession stands, driving range fees, earned income opportunities and sale of pro shop items
- **Indoor Recreation Facilities** – specialized or single purpose facilities. Examples include community centers, senior centers and community theaters. Frequently these are located in Community or Regional Parks

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- **Outdoor Recreation facilities** – Examples include aquatic parks, disk golf, skateboard, BMX, and dog parks, which may be located in a park
    - Size of park: Depends upon facilities and activities included. Their diverse character makes it impossible to apply acreage standards
    - Service radius: Depends upon facilities and activities included. Typically serves special user groups while a few serve the entire population
    - Site Selection: Given the variety of potential uses, no specific standards are defined for site selection. As with all park types, the site itself should be located where it is appropriate for its use.
    - Length of stay: varies by facility
    - Amenities: varies by facility
    - Revenue facilities: Due to nature of certain facilities, revenue may be required for construction and/or annual maintenance. This should be determined at a policy level before the facility is planned and constructed
    - Land usage: varies by facility
    - Programming: varies by facility
    - Maintenance Standards: Provide the highest level maintenance with available funding. Seek a goal of Level 2 maintenance standards. Some amenities (i.e., rose gardens) will require Level 1 maintenance
    - Parking: On-street or off-street parking is provided as appropriate. Design should include widened on-street parking area adjacent to park. Goal is to maximize usable park space. As necessary, provide a minimum of five to 10 spaces within park including handicap spaces. Traffic calming devices encouraged next to park
    - Lighting: Security or amenity only. Lighting on dual system with 50 percent of lights off at a set time and 50 percent on all night for security
    - Signage: Directional signage and facility/amenity regulations to enhance user experience
    - Landscape Design: Appropriate design to enhance the park theme/use/experience
    - Naming: Follows Town ordinance for naming or may be named after a prominent or historic person, event, or natural landmark
    - Other: Integrated color scheme throughout the park; safety design meets established CPTED standards. Cable TV conduit as appropriate.

Greenbelts/Trails

Greenbelts/Trails are recognized for their ability to connect people and place and often include either paved or natural trails. Trails can also be loop trails in parks. Linking neighborhoods, parks, recreation facilities, attractions, and natural areas with a multi-use trail fulfills two guiding principles simultaneously: protecting natural areas along creeks and open space areas and providing people with a way to access and enjoy them. Multi-use trails also offer a safe, alternative form of transportation; provide substantial health benefits, habitat enhancements for plants and wildlife, and unique opportunities for outdoor education and cultural interpretation.

- Site Selection: Located consistent with approved Trails Master Plan
- Amenities: Parking and restrooms at major trailheads. May include small parks along the trail
- Maintenance standards: Demand based maintenance with available funding

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- Lighting: Security lighting at trailheads is preferred. Lighting on dual system with 50 percent of lights off at a set time and 50 percent on all night for security
- Signage: Mileage markers at ¼ mile intervals. Interpretive kiosks at all trailheads and where deemed necessary
- Landscape Design: Coordinated planting scheme in urban areas. Limited or no planting in open space areas
- Other: Connectivity to parks or other Town attractions and facilities is desirable
- Size: Typically at least 30 ft width of unencumbered land for a Greenbelt. May include a trail to support walk, bike, run, equestrian type activities. Typically, an urban trail is 10-12 ft wide to support pedestrian and bicycle uses. Trails incorporate signage to designate where a user is located and where the trails connect in the Town.

Open Space/Natural Area

Open Space/Natural Areas are undeveloped but may include natural or paved trails. Grasslands under power line corridors are one example; creek areas are another. Open Space contain natural resources that can be managed for recreation and natural resource conservation values such as a desire to protect wildlife habitat, water quality and endangered species. Open Space also can provide opportunities for nature based, unstructured, low-impact recreational opportunities such as walking and nature viewing.

- Amenities: May include paved or natural trails, wildlife viewing areas, mountain biking, disc golf, interpretation and education facilities
- Maintenance standards: Demand-based maintenance with available funding. Biological management practices observed.
- Lighting: None
- Signage: Interpretive kiosks as deemed appropriate
- Landscape Design: Generally none. Some areas may include landscaping, such as entryways or around buildings. In these situations, sustainable design is appropriate.

Technical Needs Analysis

Equity Mapping

To further illustrate the distribution of current park types and park assets of the parks and recreation system across the entire community, an equity-mapping analysis was conducted. The maps included show the service areas of the *current* inventory of park types and park assets based on the *current* level-of-service standard. The current standard established per 1,000 residents per acre of park type or 10,000 residents per type of park asset are also indicated in the map title. The service area is calculated by the quantity of inventory of each site extended in a uniform radius until the population served by the recommended standard is reached. Shaded areas indicate the extent of the service area based on recommended inventories; unshaded areas indicate locations that would remain outside of the standard service area for each park type or park asset. Unshaded areas are not always the most appropriate location for future parks or park assets. They only represent areas that might be more thoroughly reviewed for potential additional facilities. Although there are occasions when the service area may extend beyond the border of Flower Mound, only Flower Mound resident

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populations were utilized for calculating service-area standards in this analysis.

Community-wide maps of park types, or classifications, identified in this Master Plan, as well as the major park assets, are provided in the pages that follow. The maps on the following pages identify:

1. Pocket Parks
2. Neighborhood Parks
3. Community Parks
4. Regional Parks
5. Ball Fields
6. Picnic Shelters/Pavilions
7. Multi-Purpose Rectangle Fields (Football, Lacrosse, Cricket)
8. Soccer Fields
9. Basketball Multi-Use Courts, Outdoor
10. Tennis Courts
11. Playgrounds
12. Dog Parks
13. Outdoor Swimming Pools
14. Recreation/Gymnasium

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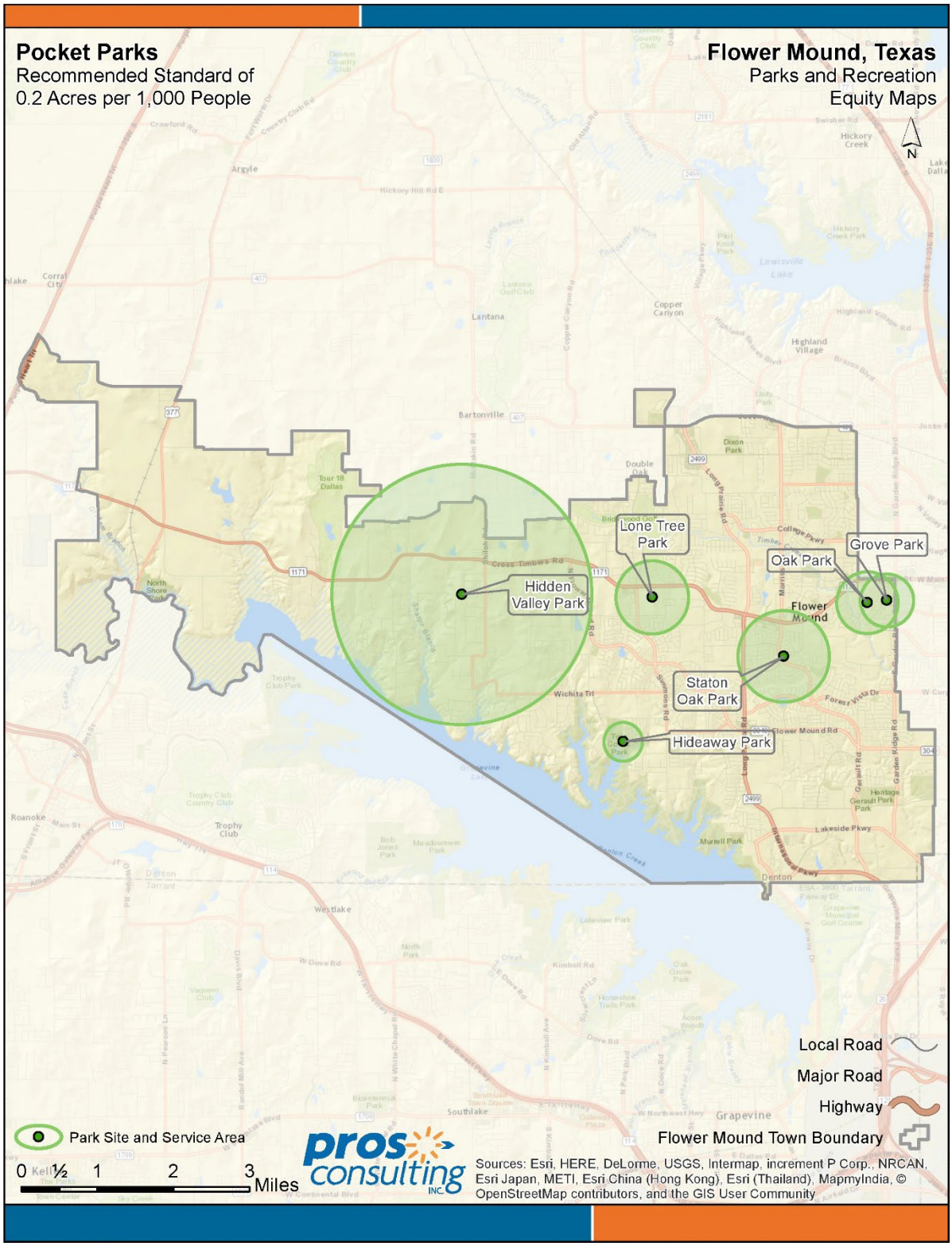
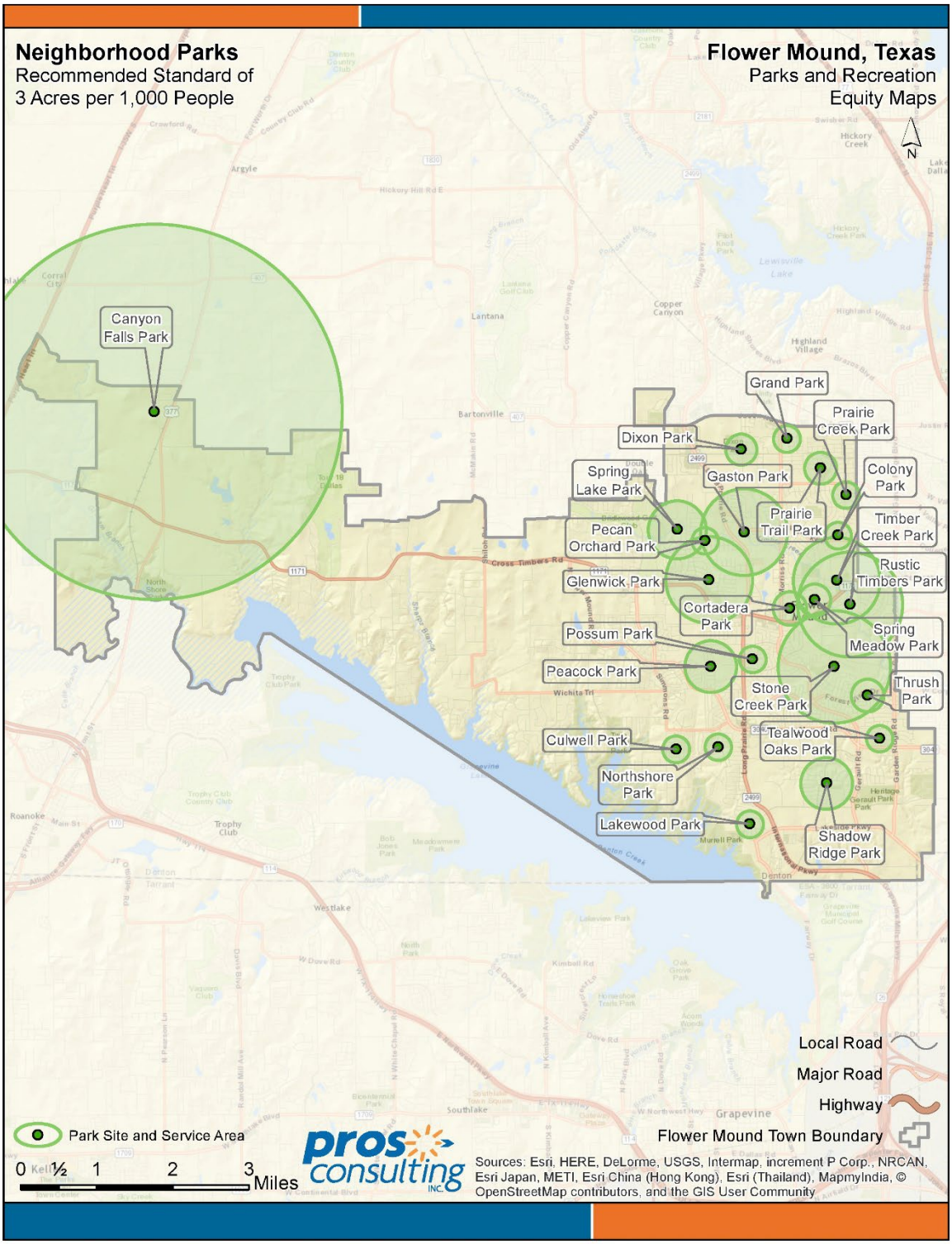
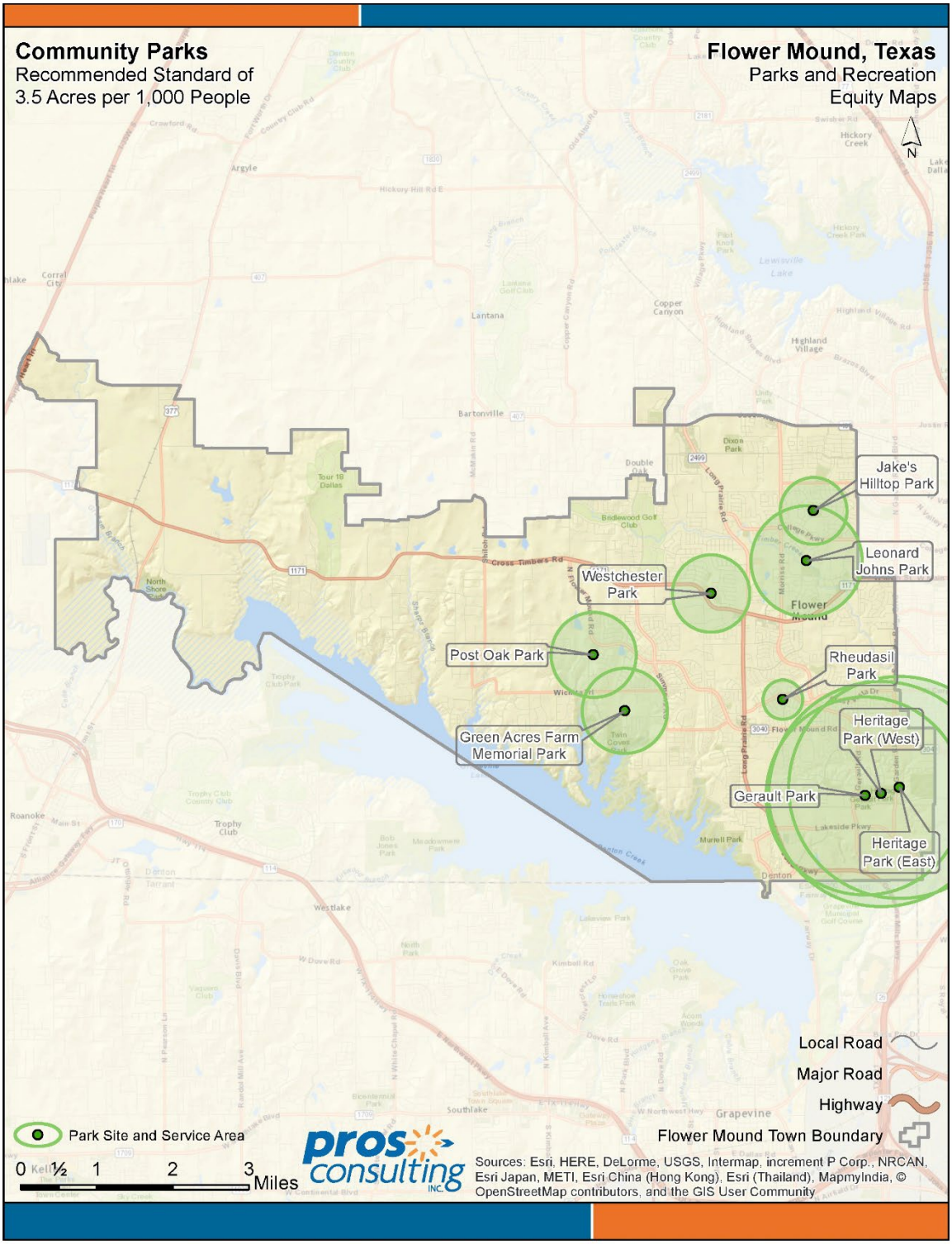
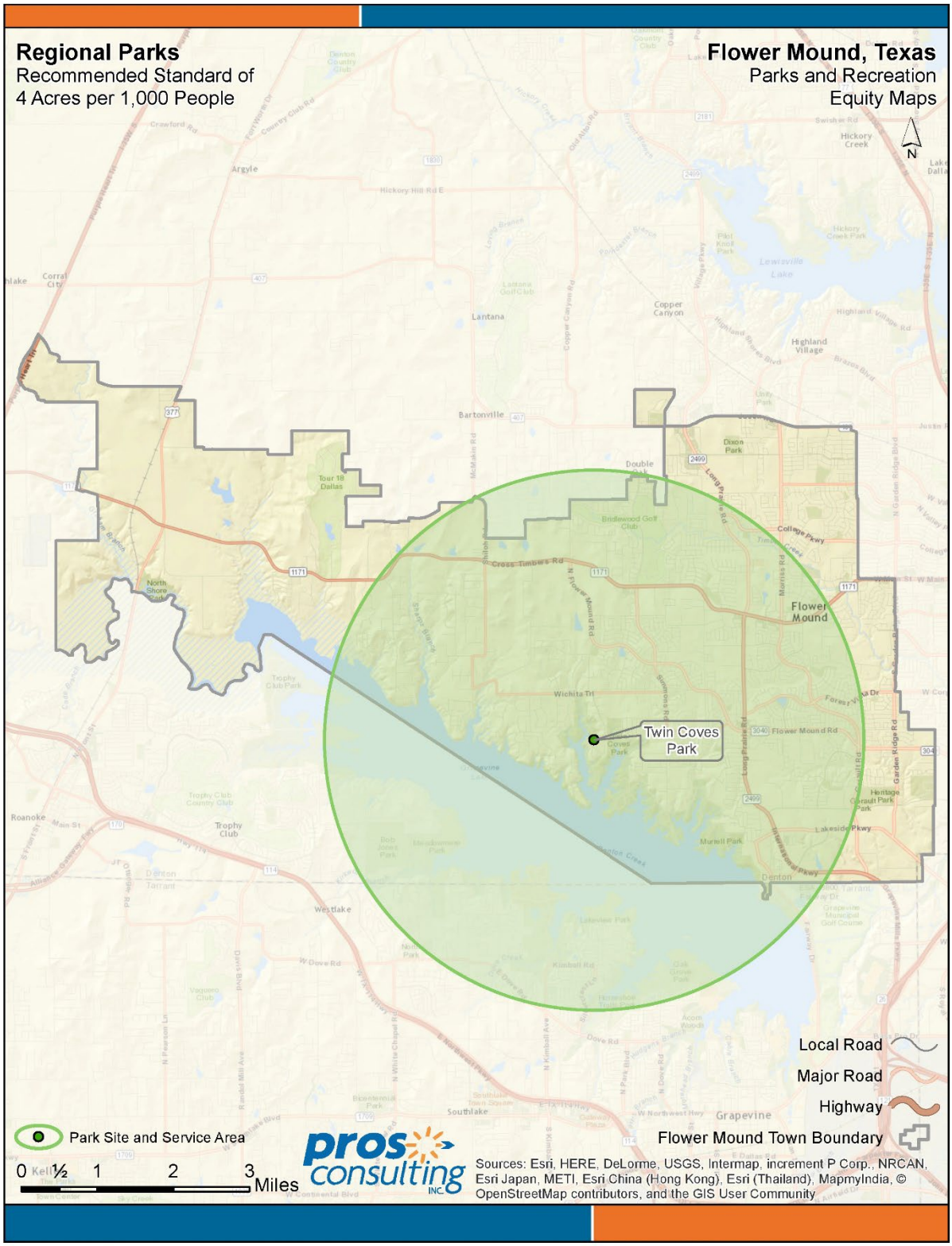
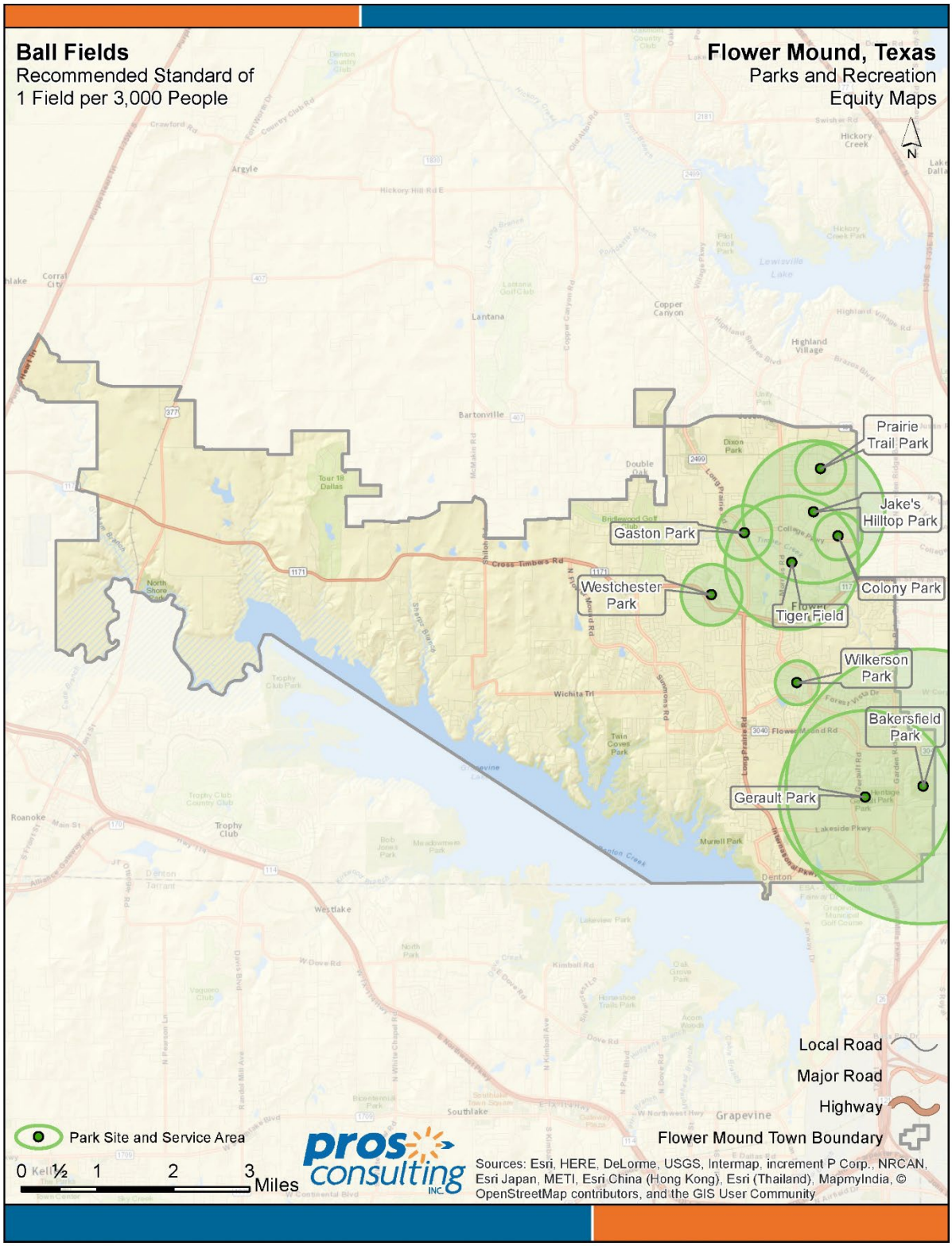
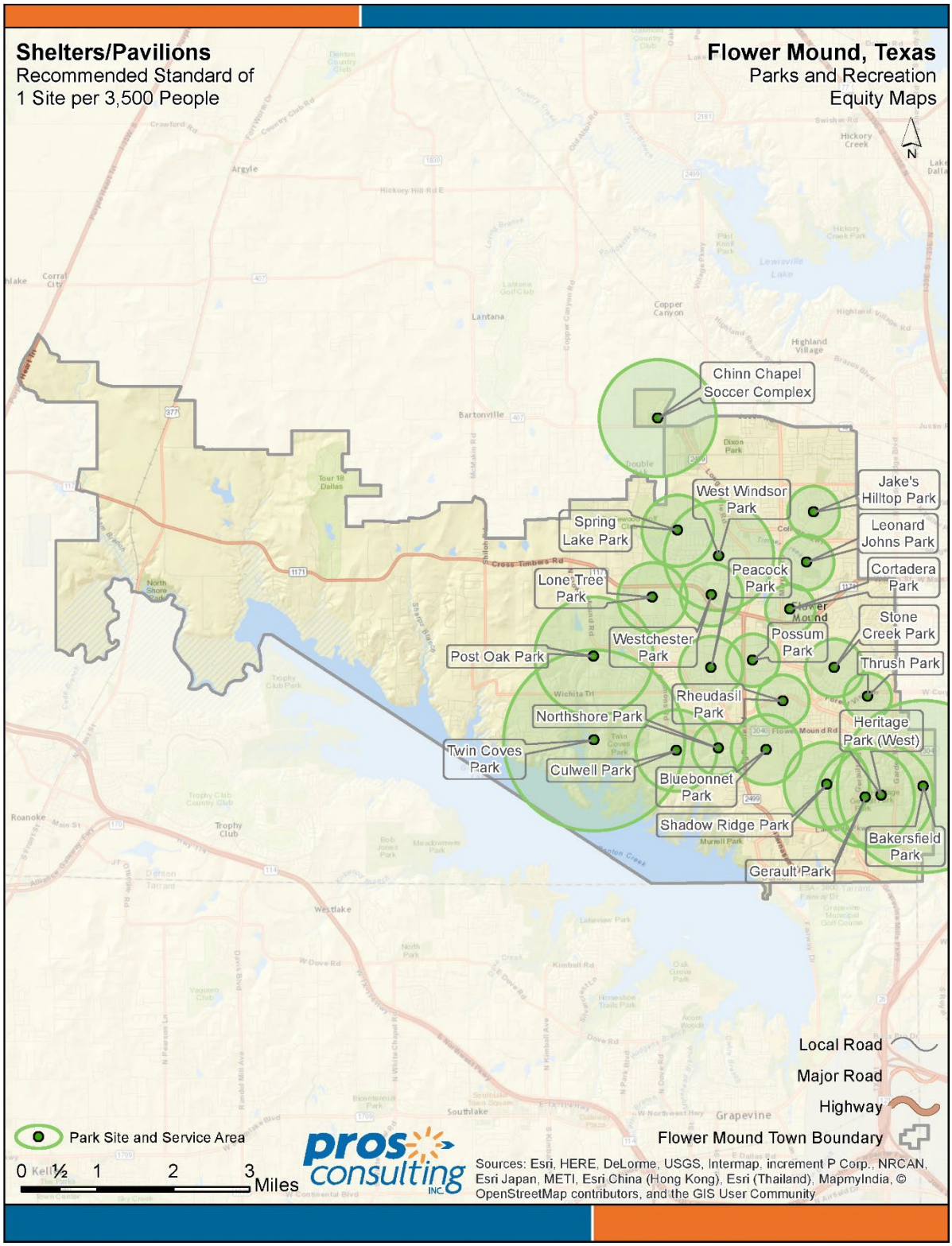

Pocket Parks
Recommended Standard of
0.2 Acres per 1,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Lone Tree Park
Grove Park
Oak Park
Hidden Valley Park
Staton Oak Park
Hideaway Park
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

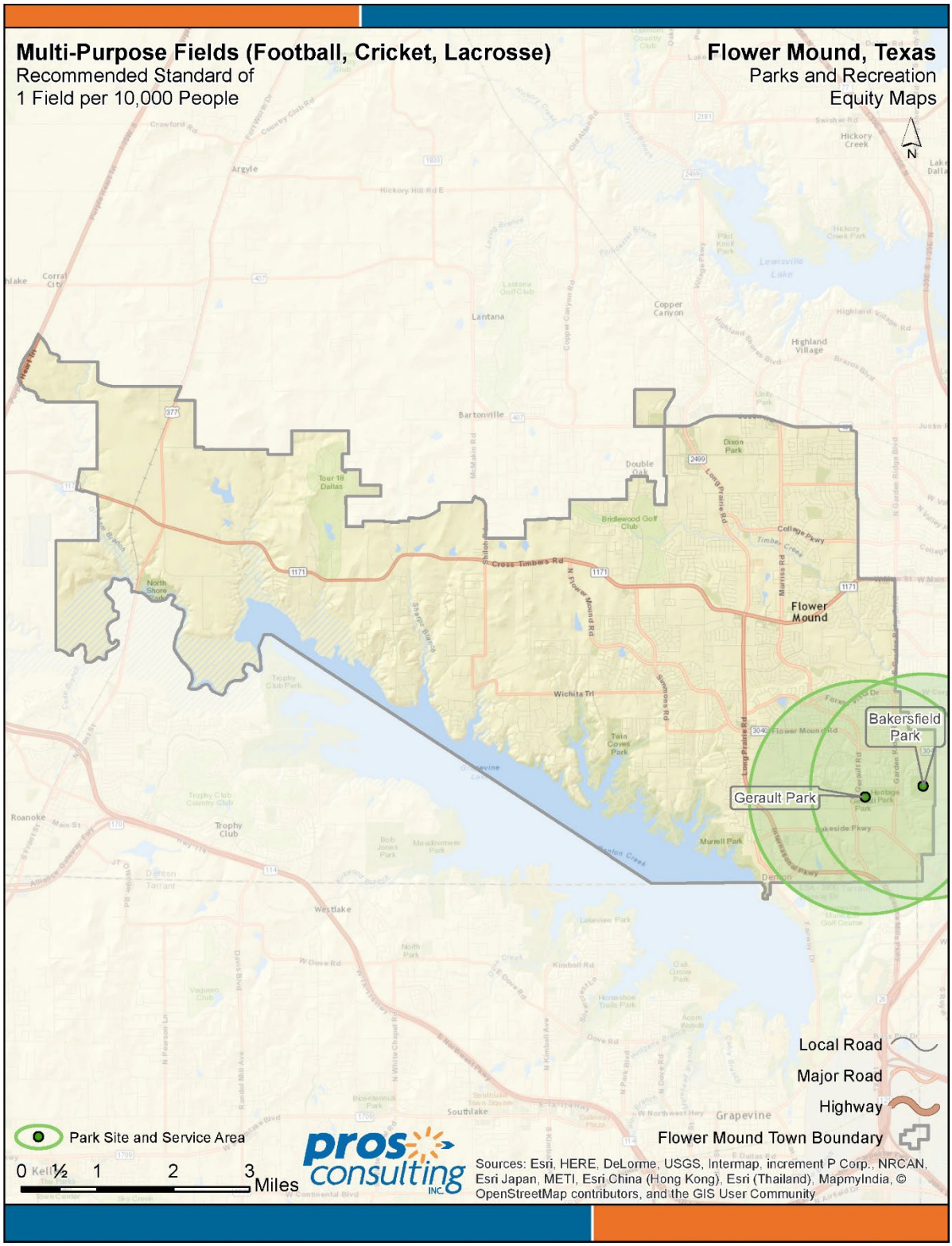

Neighborhood Parks
Recommended Standard of
3 Acres per 1,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Canyon Falls Park
Grand Park
Prairie Creek Park
Dixon Park
Spring Lake Park
Gaston Park
Colony Park
Prairie Trail Park
Timber Creek Park
Pecan Orchard Park
Rustic Timbers Park
Glenwick Park
Cortadera Park
Spring Meadow Park
Possum Park
Peacock Park
Thrush Park
Stone Creek Park
Culwell Park
Tealwood Oaks Park
Northshore Park
Lakewood Park
Shadow Ridge Park
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

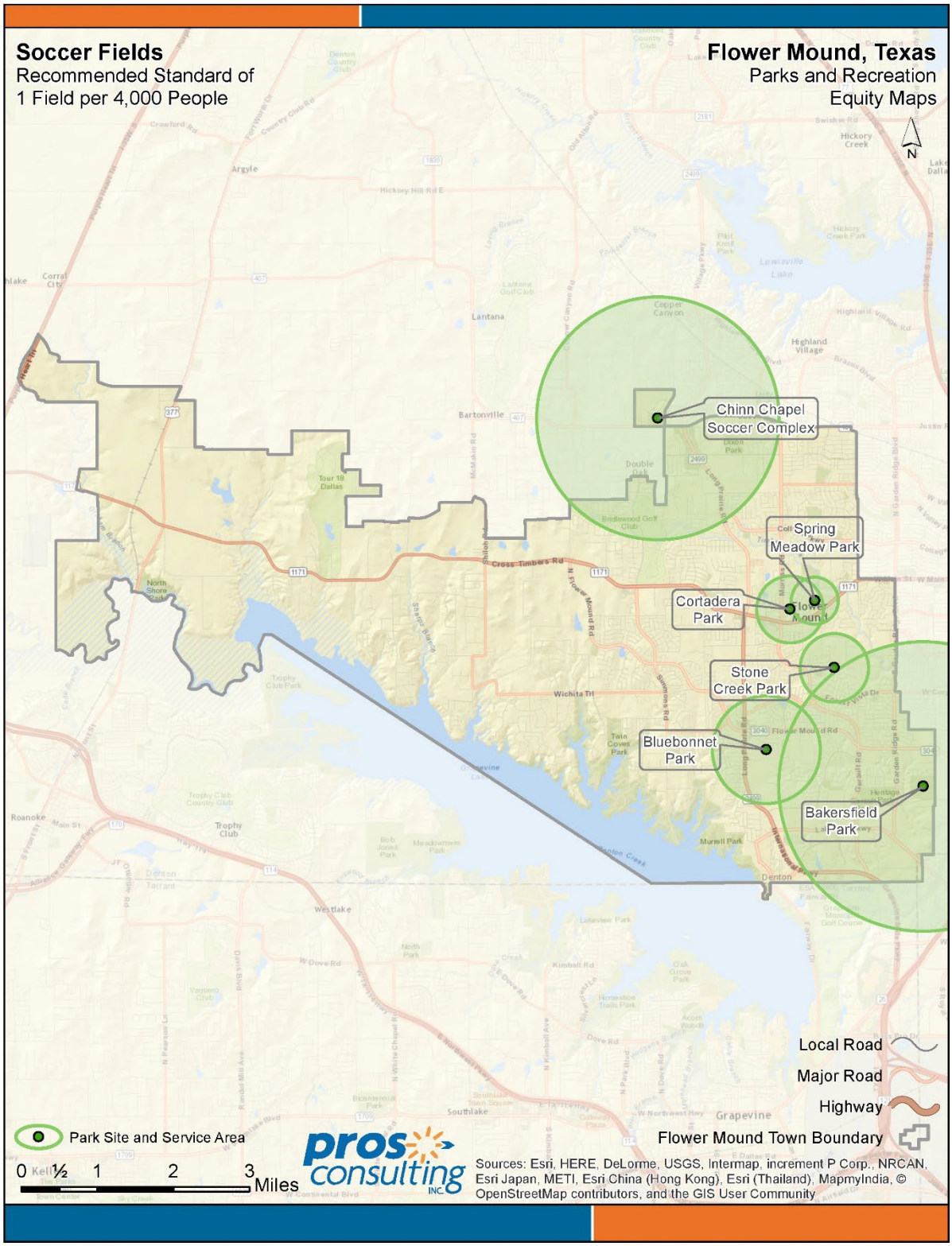

Community Parks
Recommended Standard of
3.5 Acres per 1,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Jake's Hilltop Park
Leonard Johns Park
Westchester Park
Post Oak Park
Rheudasil Park
Heritage Park (West)
Green Acres Farm Memorial Park
Gerault Park
Heritage Park (East)
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

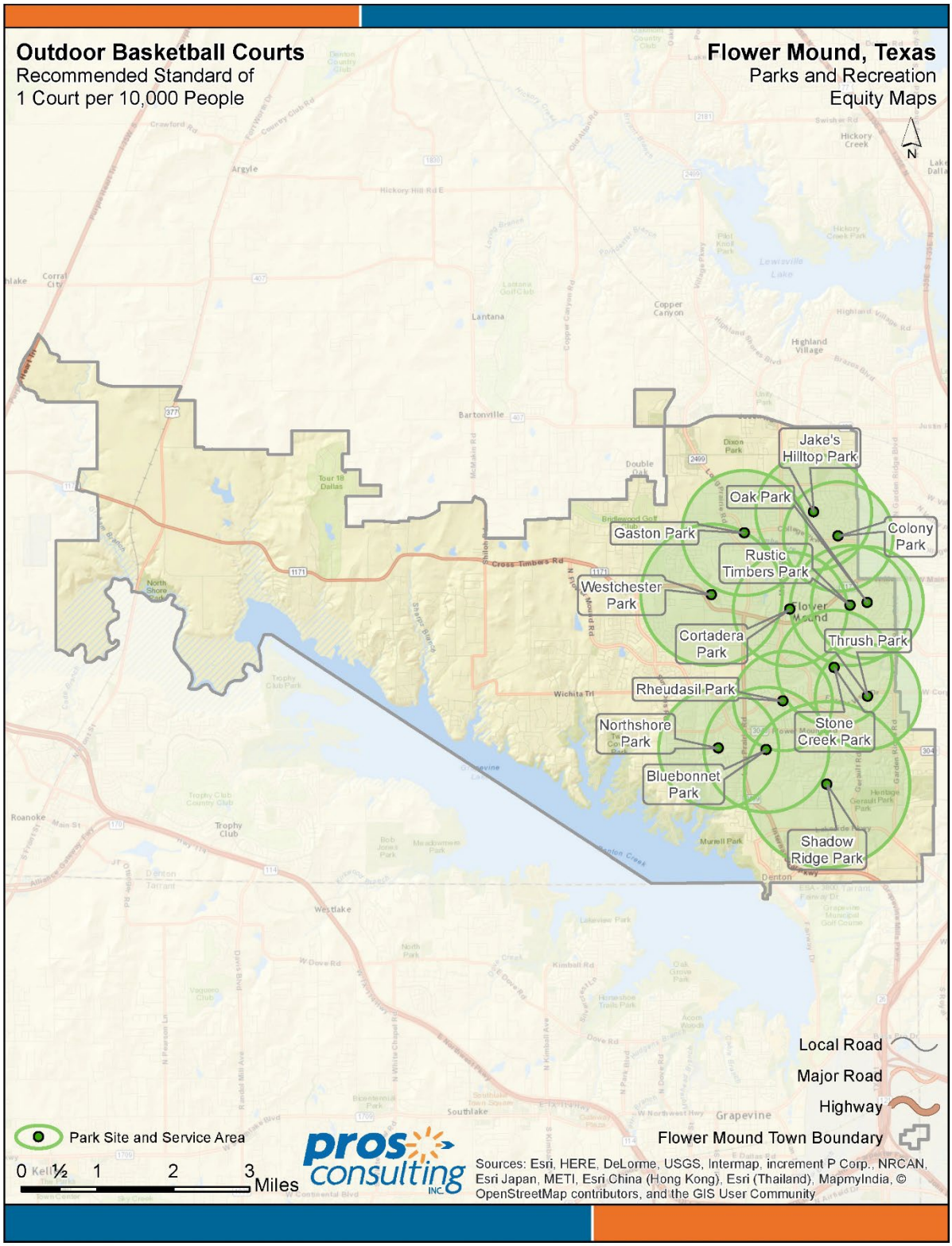

Regional Parks
Recommended Standard of
4 Acres per 1,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Twin Coves
Park
Flower
Mound
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

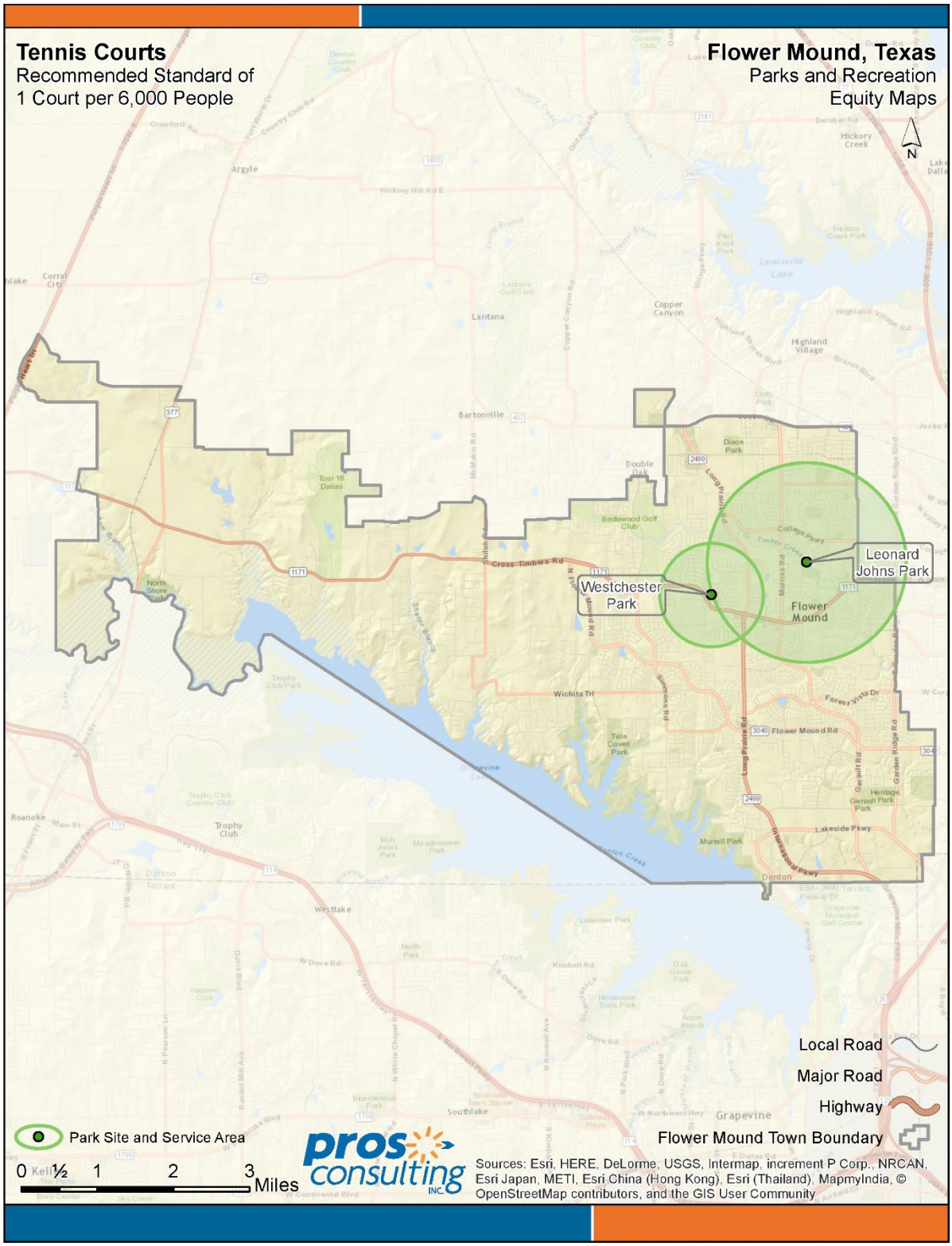

Ball Fields
Recommended Standard of
1 Field per 3,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Prairie Trail Park
Jake's Hilltop Park
Gaston Park
Westchester Park
Colony Park
Tiger Field
Wilkerson Park
Bakersfield Park
Gerault Park
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

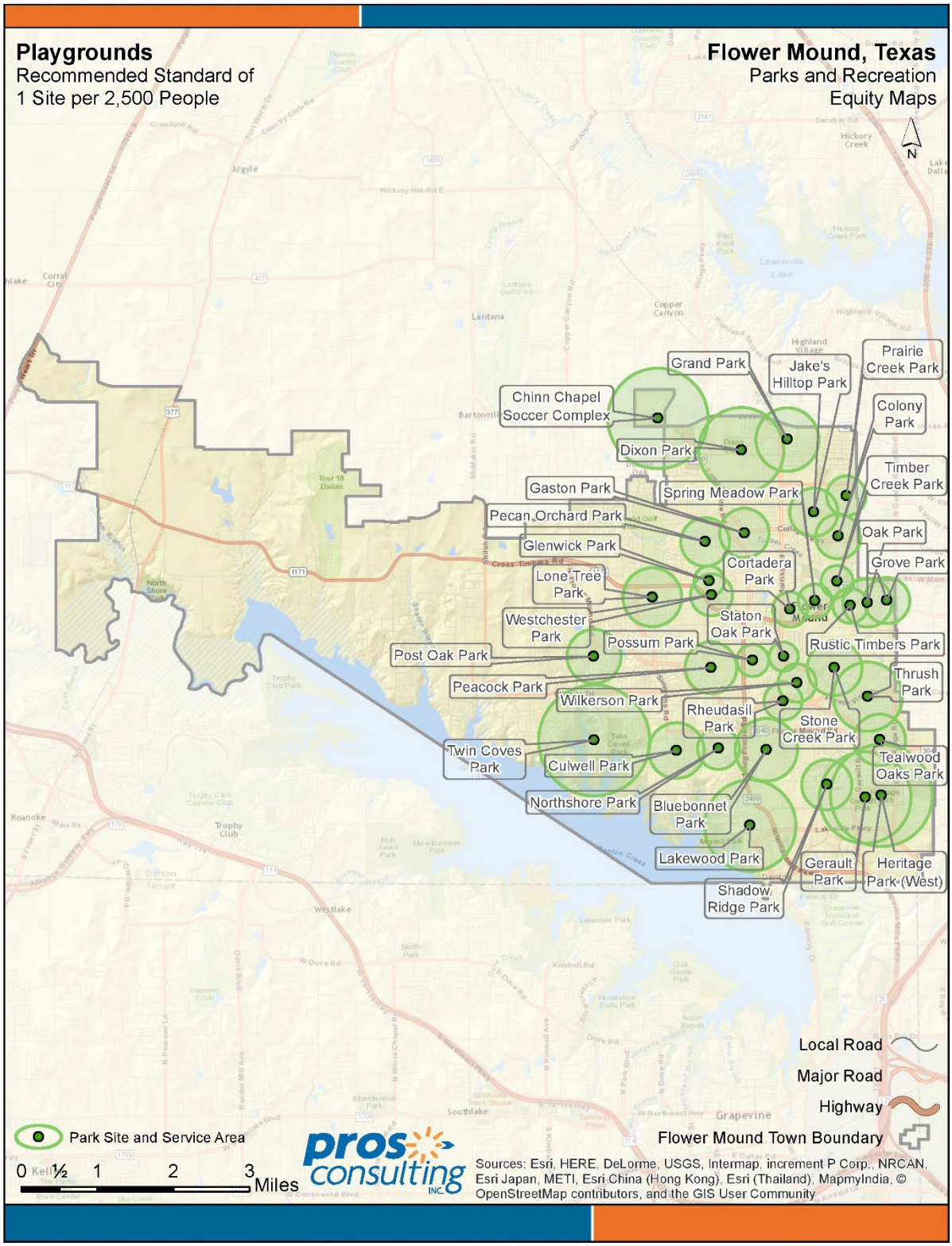

Shelters/Pavilions
Recommended Standard of
1 Site per 3,500 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Chinn Chapel Soccer Complex
West Windsor Park
Jake's Hilltop Park
Spring Lake Park
Leonard Johns Park
Peacock Park
Cortadera Park
Lone Tree Park
Stone Creek Park
Possum Park
Westchester Park
Post Oak Park
Thrush Park
Rheudasil Park
Northshore Park
Heritage Park (West)
Twin Coves Park
Culwell Park
Bluebonnet Park
Shadow Ridge Park
Bakersfield Park
Gerault Park
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

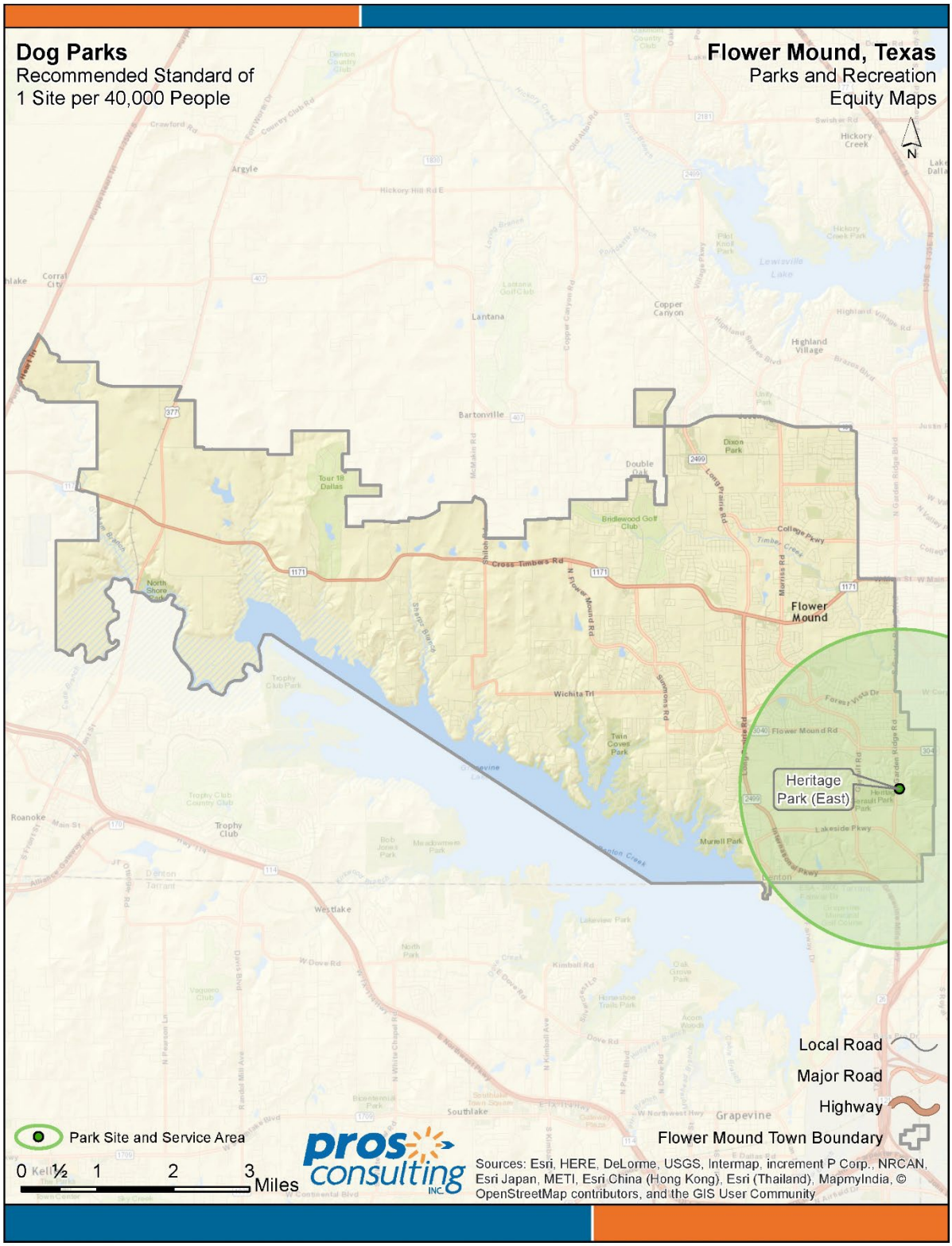

Multi-Purpose Fields (Football, Cricket, Lacrosse)
Recommended Standard of
1 Field per 10,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Bakersfield Park
Gerault Park
Flower Mound
Lantana
Bartonville
Argyle
Trophy Club
Westlake
Southlake
Grapevine
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

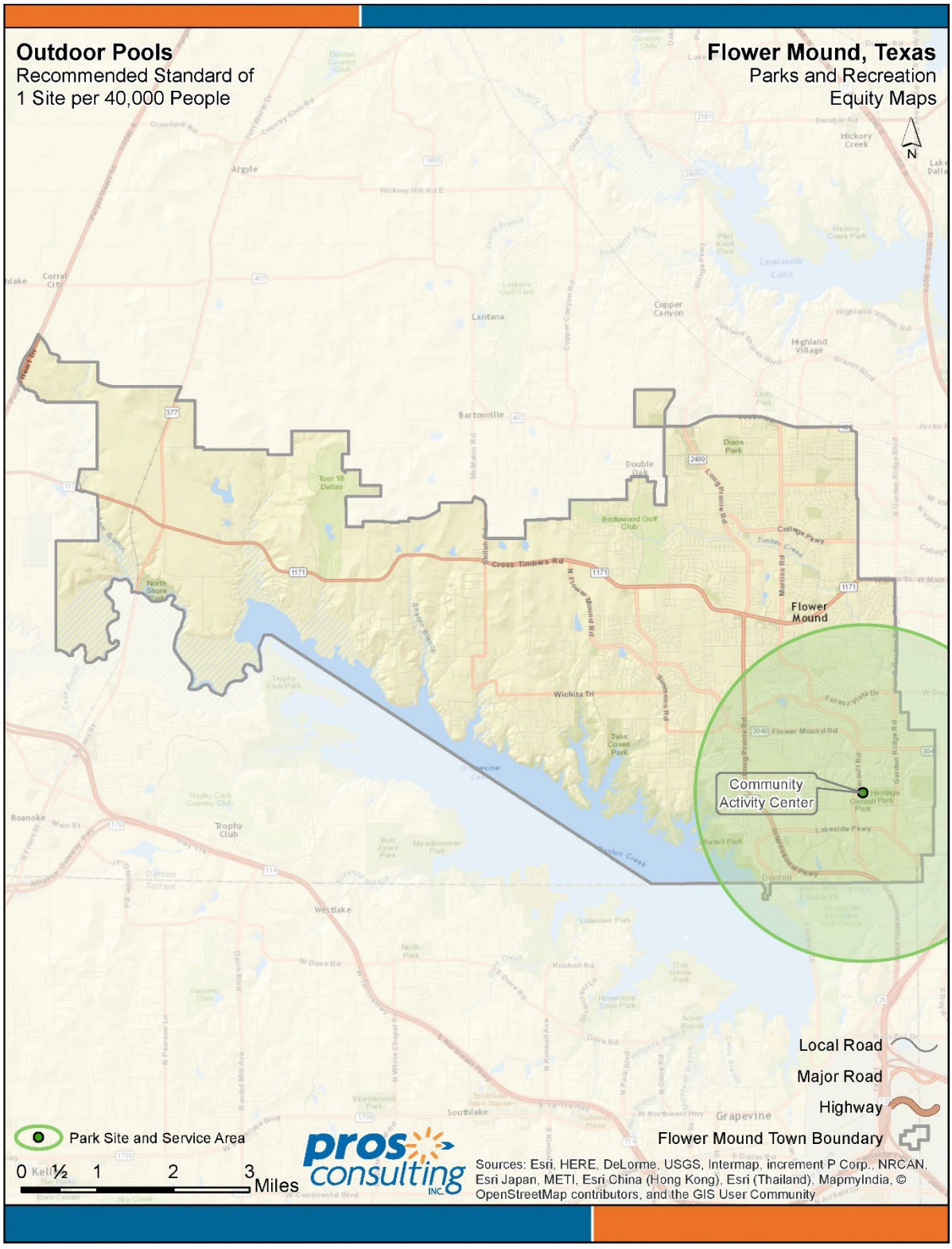

Soccer Fields
Recommended Standard of
1 Field per 4,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Chinn Chapel
Soccer Complex
Spring
Meadow Park
Cortadera
Park
Stone
Creek Park
Bluebonnet
Park
Bakersfield
Park
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

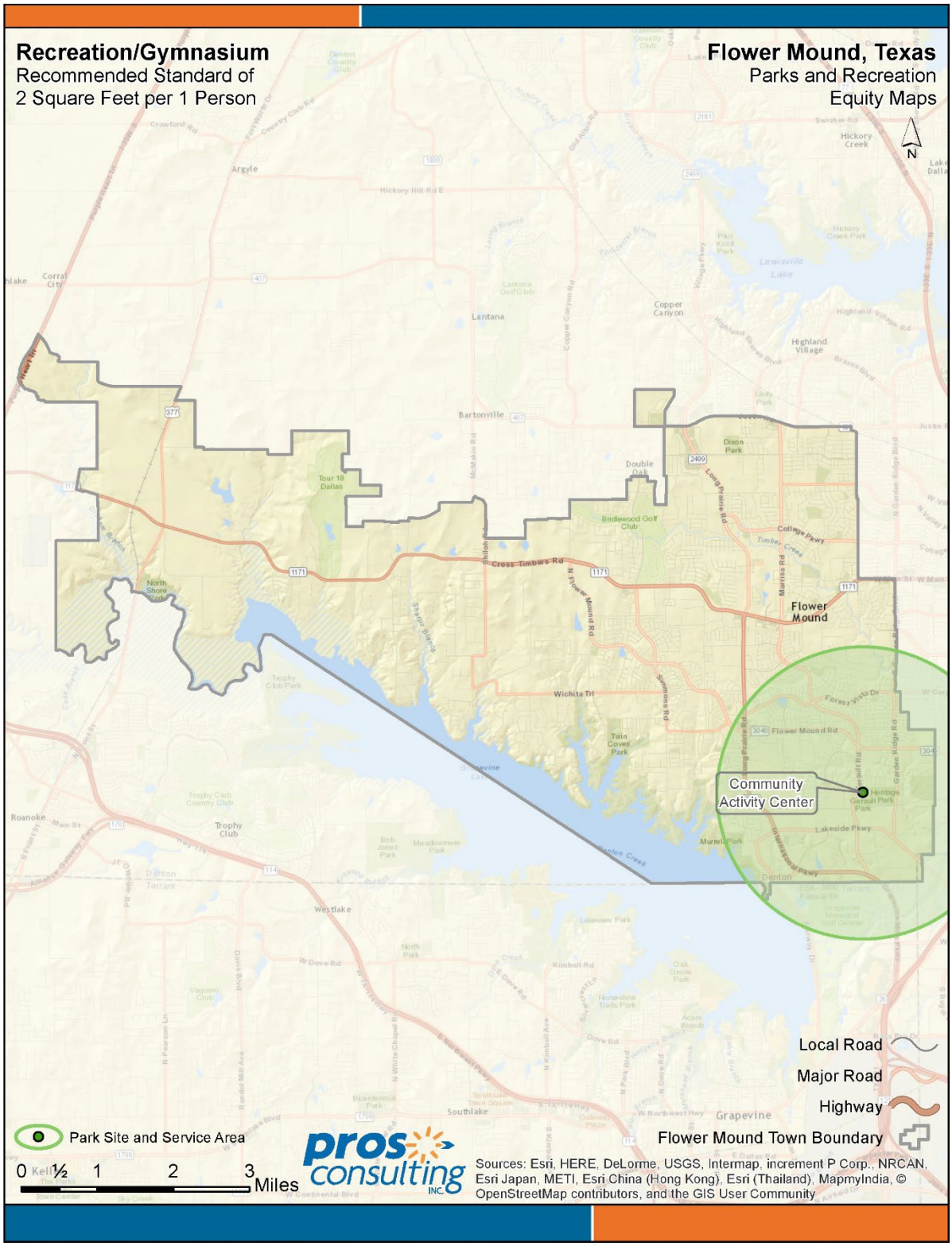

Outdoor Basketball Courts
Recommended Standard of
1 Court per 10,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Jake's Hilltop Park
Oak Park
Colony Park
Gaston Park
Rustic Timbers Park
Westchester Park
Flower Mound
Cortadera Park
Thrush Park
Rheudasil Park
Northshore Park
Stone Creek Park
Bluebonnet Park
Shadow Ridge Park
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Tennis Courts
Recommended Standard of
1 Court per 6,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Leonard Johns Park
Westchester Park
Flower Mound
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Playgrounds
Recommended Standard of
1 Site per 2,500 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Grand Park
Jake's Hilltop Park
Prairie Creek Park
Chinn Chapel Soccer Complex
Colony Park
Dixon Park
Timber Creek Park
Gaston Park
Spring Meadow Park
Pecan Orchard Park
Oak Park
Glenwick Park
Grove Park
Cortadera Park
Lone Tree Park
Staton Oak Park
Westchester Park
Possum Park
Rustic Timbers Park
Post Oak Park
Thrush Park
Peacock Park
Wilkerson Park
Rheudasil Park
Stone Creek Park
Twin Coves Park
Culwell Park
Tealwood Oaks Park
Northshore Park
Bluebonnet Park
Lakewood Park
Gerault Park
Heritage Park-(West)
Shadow Ridge Park
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Dog Parks
Recommended Standard of
1 Site per 40,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Heritage
Park (East)
Flower
Mound
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Outdoor Pools
Recommended Standard of
1 Site per 40,000 People
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Community
Activity Center
Flower
Mound
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community


Recreation/Gymnasium
Recommended Standard of
2 Square Feet per 1 Person
Flower Mound, Texas
Parks and Recreation
Equity Maps
N
Community Activity Center
Flower Mound
Cross Timbers Rd
Flower Mound Rd
Local Road
Major Road
Highway
Flower Mound Town Boundary
Park Site and Service Area
0 ½ 1 2 3 Miles
pros consulting INC.
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Level of Service Standards

Level of Service (LOS) standards are guidelines that define service areas based on population that support investment decisions related to parks, facilities and amenities. LOS standards can and will change over time as the program lifecycles change and demographics of a community change.

In 2017, PROS evaluated park facility standards using a combination of resources. These resources included: National Recreation and Park Association (NRPA) guidelines; recreation activity participation rates reported by the Sports & Fitness Industry Association's (SFIA) 2015 Study of Sports, Fitness, and Leisure Participation as it applies to activities that occur in the United States and the Flower Mound area; community and stakeholder input; and general observations. This information allowed standards to be customized to the Flower Mound Parks and Recreation Department.

These LOS standards should be viewed as a guide. The standards are to be coupled with conventional wisdom and judgment related to the particular situation and needs of the community. By applying these standards to the population of Flower Mound, gaps and surpluses in park and facility/amenity types are revealed. These standards should be used to inform decisions when planning to develop new parks, facilities, and amenities. It should also be noted that pocket parks are not commonly found in a public park system, and are normally designed, constructed and maintained as a common's area within a Homeowner's Association.

Currently, there are multiple needs to be met in Flower Mound to properly serve the community now and in the future. As can be seen on the following page, the Town of Flower Mound currently provides a total LOS of 12.63 acres of parkland per 1,000 residents. The planning team has recommended increasing the LOS standard to 14.60 acres/1,000 population as a goal. This means that as of today, the Town is deficient by 135 acres. To keep up with the projected population growth, the Town would need to add a total of 214 acres to the parks and recreation system by the year 2021 in order to achieve the recommended standard.

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Flower Mound Level of Service Standards

	2016 Inventory	Service Levels						2016 Facility Standards			2021 Facility Standards		
Park Type	**Flower Mound**	**Current Service Level based upon population**			**Recommended Service Levels; Revised for Local Service Area**			**Meet Standard/ Need Exists**	**Additional Facilities/ Amenities Needed**		**Meet Standard/ Need Exists**	**Additional Facilities/ Amenities Needed**	
Pocket Parks	16.89	0.25	acres per	1,000	0.25	acres per	1,000	Need Exists	0	Acre(s)	Need Exists	2	Acre(s)
Neighborhood Parks	178.87	2.62	acres per	1,000	3.00	acres per	1,000	Need Exists	26	Acre(s)	Need Exists	43	Acre(s)
Community Parks	176.35	2.58	acres per	1,000	3.25	acres per	1,000	Need Exists	46	Acre(s)	Need Exists	63	Acre(s)
Regional Parks	243.00	3.56	acres per	1,000	4.00	acres per	1,000	Need Exists	30	Acre(s)	Need Exists	52	Acre(s)
Sports Complex	136.80	2.00	acres per	1,000	2.00	acres per	1,000	Meets Standard	-	Acre(s)	Need Exists	11	Acre(s)
Specialty Parks	3.59	0.05	acres per	1,000	0.10	acres per	1,000	Need Exists	3	Acre(s)	Need Exists	4	Acre(s)
Greenbelt/Linear Parks	107.90	1.58	acres per	1,000	2.00	acres per	1,000	Need Exists	29	Acre(s)	Need Exists	40	Acre(s)
Undeveloped/Open Space Acres	116.51	1.70	acres per	1,000	0.00	acres per	1,000	Meets Standard	-	Acre(s)	Meets Standard	-	Acre(s)
Total Park Acres	**979.91**	**12.63**	**acres per**	**1,000**	**14.60**	**acres per**	**1,000**	**Need Exists**	**135**	**Acre(s)**	**Need Exists**	**214**	**Acre(s)**
OUTDOOR AMENITIES:													
Shelters/Pavilions	27.00	1.00	site per	2,532	1.00	site per	3,500	Meets Standard	-	Sites(s)	Meets Standard	-	Sites(s)
Soccer Fields	19.00	1.00	field per	3,598	1.00	field per	4,000	Meets Standard	-	Field(s)	Meets Standard	-	Field(s)
Multi-Purpose Fields (Football, Cricket, Lacrosse)	4.00	1.00	field per	17,089	1.00	field per	10,000	Need Exists	3	Field(s)	Need Exists	3	Field(s)
Ball Fields	29.00	1.00	field per	2,357	1.00	field per	3,000	Meets Standard	-	Field(s)	Meets Standard	-	Field(s)
Basketball Courts	13.00	1.00	court per	5,258	1.00	court per	10,000	Meets Standard	-	Court(s)	Meets Standard	-	Court(s)
Tennis Courts	6.00	1.00	court per	11,392	1.00	court per	6,000	Need Exists	5	Court(s)	Need Exists	6	Court(s)
Playgrounds	35.00	1.00	site per	1,953	1.00	site per	2,500	Meets Standard	-	Site(s)	Meets Standard	-	Site(s)
Dog Parks	1.00	1.00	site per	68,354	1.00	site per	40,000	Need Exists	1	Site(s)	Need Exists	1	Site(s)
Skate Park	-	1.00	site per	50,000	1.00	site per	50,000	Need Exists	1	Site(s)	Need Exists	1	Site(s)
Sand Volleyball	-	1.00	site per	30,000	1.00	site per	30,000	Need Exists	2	Site(s)	Need Exists	2	Site(s)
Paved Multi-Use Trails	59.90	0.88	miles per	1,000	0.50	miles per	1,000	Meets Standard	-	Mile(s)	Meets Standard	-	Mile(s)
Outdoor Pools	1.00	1.00	site per	68,354	1.00	site per	40,000	Need Exists	1	Site(s)	Need Exists	1	Site(s)
INDOOR AMENITIES:													
Recreation Center (Square Feet)	61,000.00	0.89	SF per	person	2.00	SF per	person	Need Exists	75,708	Square Feet	Need Exists	86,598	Square Feet

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Trails and Bikeways Master Plan

The purpose of the 2022 Trails and Bikeways Master Plan is to guide the development of network recommendations, design guidelines, and implementation strategies for a comprehensive system of multi-trails and on-street bikeways throughout the Town of Flower Mound. This active transportation and recreation system aims to increase accessibility for users to key destinations within Flower Mound and leverage key regional connections to adjacent communities. This plan will augment previous planning efforts to create a more complete community and provide active and healthy lifestyle opportunities.

The plan contains more detailed information on trail and bikeway facilities, the trails planning process, community demographic profiles, existing system assessments, recommendation strategies, trail and bikeway design standards and implementation mechanisms. This plan's principles are guided by industry standards for trail and bikeway planning methodology and reflects input from the residents of Flower Mound, Town staff, Parks Board, Transportation Commission, Planning and Zoning Commission, and Town Council.

Trails and Bikeways Plan Overview

The development of this plan spanned approximately 17 months, starting in February 2021 and concluding in July 2022. Throughout this process, the Town staff working group, a designated steering committee, stakeholders, elected/appointed officials, and residents were engaged to guide the master plan recommendations. The resulting community-driven vision forms the foundation for trails and bikeways in Flower Mound for the next decade and beyond. The formation of the plan included five distinct but iterative phases, shown in Figure 1.1.

Phase 1: Community Understanding
Phase One assessed existing trails and bikeways identified opportunities and barriers, reviewed community demographics and relevant studies that may impact the Trails and Bikeways Master Plan.

The Town's current system provides residents with diverse options and access to various parks, schools, and destinations. Barriers to the system include safety issues like grading and slope in existing trails, major physical barriers like roadways, narrow trail segments and accessibility concerns.

Phase 2: Community Visioning

The vision and goals of this plan were developed through an evaluation of feedback received through the plan's community engagement process. The process offered input opportunities through virtual engagement rooms, public open houses, an online survey, interactive maps, and pop-up tents at community events.

Key takeaways from community engagement include:

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- Residents love the trails; however, the current system is incomplete with numerous gaps and patches of trail which end without warning.
- The trail system lacks consistent and reliable wayfinding. A more comprehensive wayfinding system would help users better identify trails and destinations.
- Residents envision a future of trails and bikeways that is safe, provides connections, and has a variety of amenities (such as benches, parking, lighting, and drinking fountains).
- Off-street trails were preferred over on-street bikeways.

Phase 3: Needs Assessment
An analysis of the overall trails system needs included assessing the existing network, identifying safety issues and barriers, determining where gaps exist, and understanding demand for new facilities.

AASHTO and NACTO recommend trail widths of 10'-14' based on anticipated usage but many of the Town's current trails do not meet this national standard. Flower Mound's trails are frequently used by residents of all ages and abilities, which creates conflicts at pinch points such as blind curves, intersection crossings, and the convergence of trails.

An assessment of the named trails was conducted at the beginning of the planning process. General improvements for the trail system include:

- More comprehensive wayfinding system through consistent branding.
- Improved crossing at both roadways and mid-block where applicable with additional striping and signage.
- More amenities along the trail to improve the user experience.
- Identifying where trail segments need shade
- Improved curb ramps at intersections

Phase 4: Proposed Network
Based on the needs assessment, an expanded town-wide network was generated based on the barriers, opportunities, and desires of the community. The proposed network includes a variety of facility types, guidance on facility design standards, and policies related to bikeway and trail development.

Phase 5: Action Program
Finally, an action plan was developed to provide implementation strategies for the proposed network. Recommendations for implementation are prioritized by short-term (1-5 years), mid-term (6-10 years), and long-term (10+ years) priorities.

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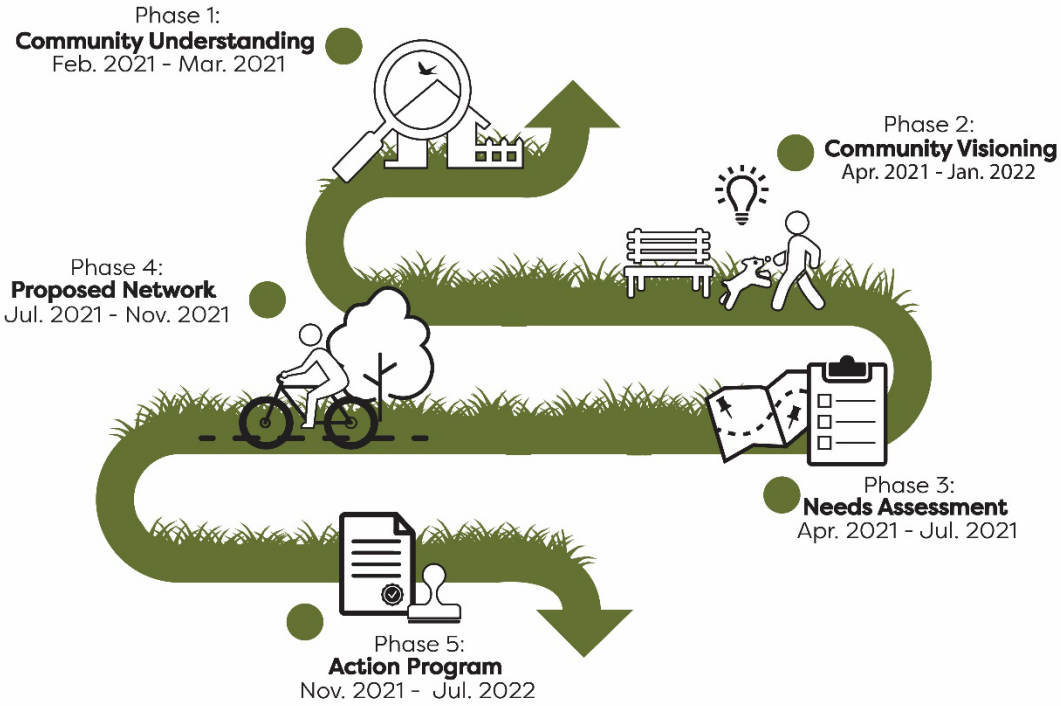
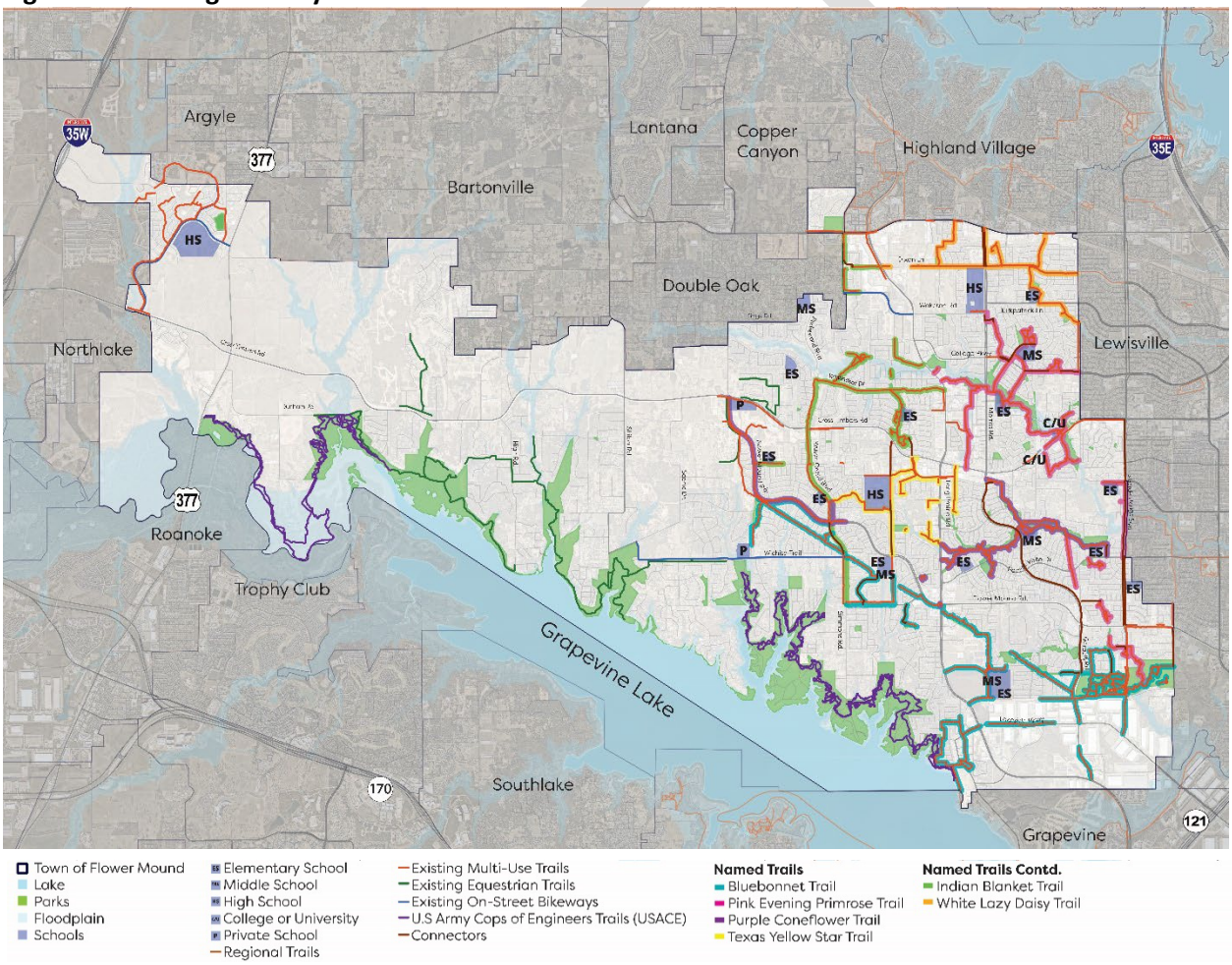
Figure 1.1 Planning Process



System Overview

The Flower Mound trails system has diverse offerings for its residents and visitors from across the region and beyond. These trails aim to connect residential neighborhoods to schools, parks, and commercial centers and expand mobility for its residents. Flower Mound has a unique natural landscape that adds to the overall experience of trail users. Currently, there 65.5 miles of 8' or wider paved Town trails. Town trails include multi-use trails, soft surface trails and equestrian trails maintained by the town. There are 14.6 miles of town maintained equestrian trails. There is 6.3 miles of on-street bikeways that include shared-use markings and bike lane designations. Finally, there are 34.5 miles of trails owned and maintained by other entities within Flower Mound that include soft-surface hike and bike trails as well as some equestrian trails. Figure 1.2 depicts the Town's existing system trail and bikeway facilities.

Figure 1.2 Existing Trails System



Trail System Needs

The planning process include a series of meetings with key town stakeholders and the public During those meetings, attendees were asked how they envision walking, cycling, riding, and paddling in Flower Mound in the future. Input from these meetings and interviews helped shape the vision and goals for the Town of Flower Mound Trails and Bikeways Master Plan.

The Recommendation network map, depicted in Figure 1.4 (page 5.39), was developed through a combination of research, field observation, and community input. The network depicted encourages recreation, active transportation, and healthy living for future generations.

Based off the findings in the need assessment and community engagement, the criteria below were used to determine the level of impact and feasibility of each segment of the network.

- **Connects the system**: The segment would provide connections to the existing or planned system by filling a gap within the existing network.
- **Connects to destinations**: The segment would provide connections to community destinations such as parks, schools, entertainment, and employment opportunities.
- **Addresses safety issues**: The segment would address safety concerns to improve access to the system.
- **Increases access**: The segment is located close to residential areas and would provide additional connectivity to neighborhoods.
- **Feasibility of corridor**: The segment should be generally feasible to construct. Elements considered during a planning level review include available right-of-way or easements, lane widths, property ownership, topography, and floodplain.

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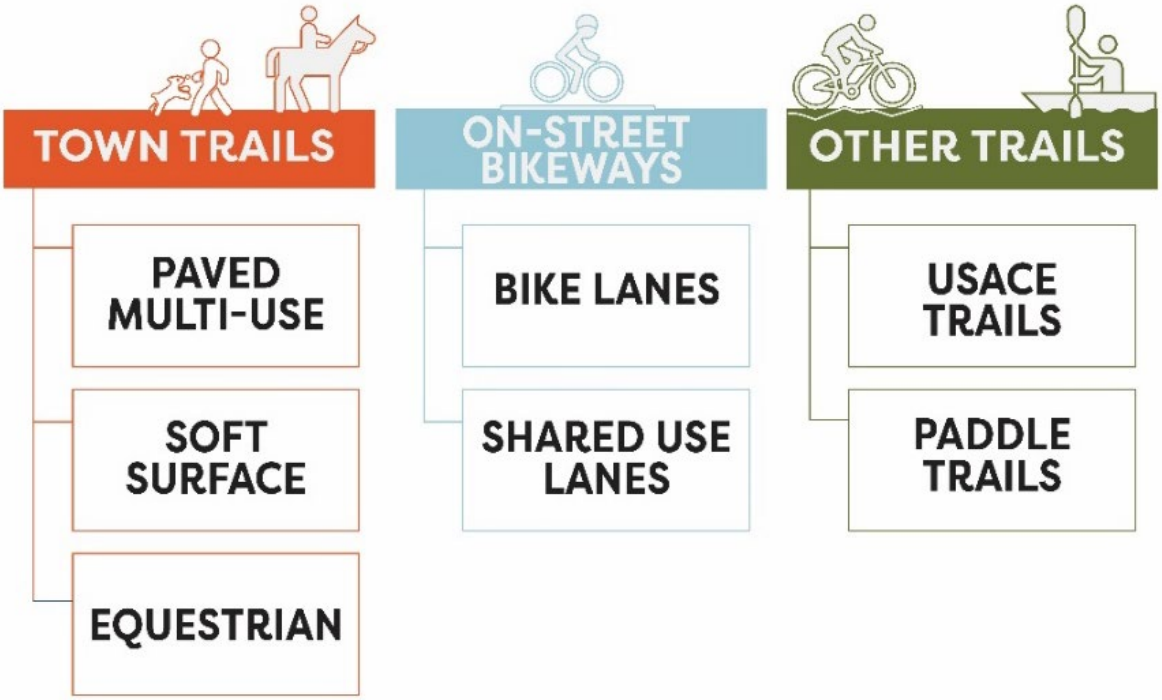
Facility Types

The Master Plan divides the town trails and bikeways network into three categories: town trails, on-street bikeways, and other trails. Each facility is designed to accommodate specific users.

Figure 1.3 Trail System Facility Types



Town Trails are multi-use facilities that are designed to provide a high level of comfort for users by providing more space for users in locations that promote safety and usability. Town trails include paved multi-use, soft surface trails, and equestrian trails.

- *Paved multi-use trails* can be located adjacent to roadways, within utility easements, or within parks and greenways. These wide, paved facilities are comfortable for bicycle and pedestrian users of various ages and abilities. The minimum width for trails is recommended to be 12', however, 10' may be applicable in areas where there are existing ROW constraints. This is consistent with AASHTO and regional standards. For trails designated as part of the Regional Veloweb trail system, the trail should be 12' to meet NCTCOG standards and provide for a high level of comfort.
- *Soft surface trails* maintained by the Town should be designed with decomposed granite or another soft surface material, and can be used in environmentally sensitive areas and should be a minimum of 8’ in width. Soft surface trails provide recreational opportunities, connect people to nature, and can be less expensive to construct than other trails. There is heavier maintenance required on these trails to maintain ADA accessibility. Anticipated users include walkers, joggers, and people wanting to experience the outdoors.

- *Equestrian trails* are trails for primary use by people on horseback. These natural surface trails can be located through wooded and vegetated areas to provide people with alternative riding experiences and allows them to explore nature. The surface material is typically compacted earth with a width of approximately 15’. Where possible, considerations for hitching posts and trailer parking should be incorporated into equestrian trailheads.

On-Street Bikeways are bicycle facilities within existing road rights-of-way. These facilities are intended to support the movement of bicyclists only and include bike lanes and shared-use lanes.

- *Bike lanes* are designated spaces on roadways with relatively higher volumes and travel speeds. Based on AASHTO and Town standards, the minimum width of a bike lane is 5' to provide a more comfortable space for bicyclists. When the facilities are buffered with either striping or a physical barrier, bike lanes can be attractive for a wider range of comfort levels.
- *Shared-use lanes* are designated roadways with low traffic volumes and speeds and include pavement markings on the road to indicate the street is to be shared between vehicles and bicyclists. Pavement markings include arrows and a bicycle, and the roads typically include shared lane signage. In lower traffic areas such as residential streets, these roadways can be designated with signage and no pavement markings.

Other Trails include USACE trails and paddling trails. These facilities provide diversity in the network, service a variety of users, and enhance recreational opportunities in the Town.

- *Other soft surface trails* include US Army Corps of Engineers (USACE) soft-surface trails along Grapevine Lake maintained by the Dallas Off-Road Bicycling Association (DORBA) and the Cross Timbers Equestrian Trails Association (CTETA). These trails provide recreational opportunities for mountain bikers, hikers, people on horseback, and nature seekers. Any proposed changes to the trail system should be coordinated with USACE. These trails vary in width and are typically compacted dirt.
- *Paddling trails* located on Grapevine Lake are designated water way trails that provide the opportunity to explore the lake, engage with nature, bird watch, fish, and experience similar water-based activities. Paddling trails are associated with a series of launch points where paddling users can put in and take out their watercraft. Considerations for interactions with operators of motorized boats is important.

Other Facilities include enhanced sidewalks. Most existing streets have limited right-of-way and space to expand sidewalks to a multi-use trail. These gaps in the trail system should be filled with wide connectors.

- *Connectors* are enhanced sidewalks up to 8' in width that connect neighborhoods to key destinations, such as employment centers, entertainment opportunities, schools, and parks. All new connectors or reconstruction of existing connectors should be widened to a width of 6'-8' where feasible. This facility type is typically found along major roadways that have constraints restricting the construction of a wider multi-use path. These facilities differ from other sidewalks within the Town since they fill in key gaps in the overall trail and bikeway system.

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Trail Recommendations

Flower Mound's recommended network of trails, bikeways, and connectors were informed by public input, needs assessments, corridor evaluations, and guidance from the overall plan goals. The combined recommendation map displays the Town's cumulative network of existing and proposed multi-use trails, equestrian trails, connectors, and on-street bikeways. The recommendations displayed in the Figure 1.3 below create a comprehensive trails and bikeways system. The key components of this network leverage connections to major destinations, the creation of regional connections, and the reduction of existing gaps. Cumulatively, Flower Mound's recommended network would include approximately 130 miles of new trails and bikeways in Flower Mound, shown in Table 1.1. These new facilities can increase accessibility for residents in the communities and serves as a blueprint for Town staff, leaders, and developers when considering new trails and bikeways within Flower Mound.

Table 1.1 Trail Recommendations

TOWN TRAILS

FACILITY TYPE	Existing	Proposed	Total
MULTI-USE TRAILS – OFF-STREET	37.2	51.4	88.6
MULTI-USE TRAILS – ON-STREET	28.3	31.4	59.7
SOFT-SURFACE TRAILS[1]	0.1	0	0.1
EQUESTRIAN TRAILS	14.6	10.9	25.5

ON-STREET BIKEWAYS

FACILITY TYPE	Existing	Proposed	Total
BIKE LANES	5.0	16.5	20.8
SHARED-USE LANES	1.3	18.3	19.6

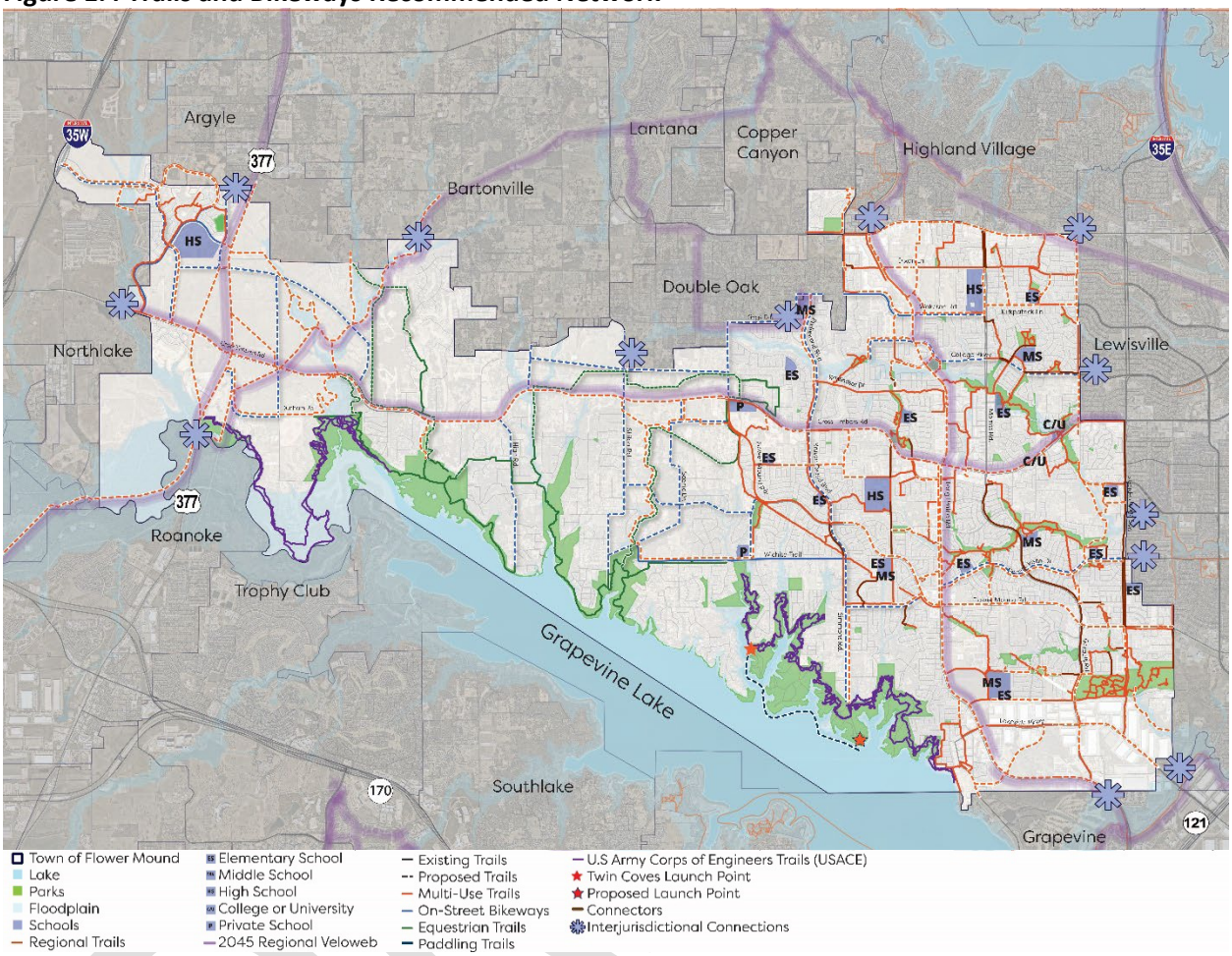
OTHER TRAILS

FACILITY TYPE	Existing	Proposed	Total
USACAE[2]	34.5	0	34.5
PADDLING TRAILS	0	2.3	2.3

1 ***Soft surface trails will be strategically located based off of towns digression in the future due to maintenance cost***

2 United States Army Corps of Engineers Trails

Figure 1.4 Trails and Bikeways Recommended Network



Level of Service

Level of service (LOS) is a metric used to compare the miles of trail within a community to the total population. The LOS analysis compares the existing and proposed network to current population and future population projections. Table 1.2 below shows the level of service for multi-use trails based off of the trails in the recommendation network.

Table 1.2 Trails and Bikeways Level of Service

2020 POPULATION	**78,080**
2038 POPULATION[3]	109,544
CURRENT TRAIL LOS (2020)[4]	1 mile per 1,310 residents
FUTURE TRAIL LOS (2038) [5]	1 mile per 1,318 residents
ALL RECOMMENDED TRAILS LOS (2038)	1 mile per 898 residents

3 ***Source: Town of Flower Mound Buildout Projections***

4 ***Trail LOS for only multi-use trails***

5 ***Future Trail LOS for only multi-use trails***

Park and Facility Priority Rankings

The purpose of the Park and Facility Priority Rankings is to provide a prioritized list of facility/amenity needs and recreation program needs for the community served by Flower Mound Parks and Recreation. This model evaluates both quantitative and qualitative data.

Quantitative data includes the statistically valid community survey, which asked residents to list unmet needs and rank their importance. Qualitative data includes resident feedback obtained in community input, stakeholder interviews, staff input, local demographics, recreation trends, and planning team observations.

A weighted scoring system is used to determine the priorities for parks and recreation facilities. These weighted scores provide an overall score and priority ranking for the system as a whole. The results of the priority ranking are tabulated into three categories: High Priority (top third), Medium Priority (middle third), and Low Priority (bottom third).

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Facility	Priority
Paved multi-use trails	High
Small neighborhood parks	
Nature trails (paved and unpaved)	
Large community parks	
Outdoor swimming pools/water parks	
Outdoor amphitheaters	
Off-leash dog park	
Unpaved multi-use trails	
Community garden	Medium
Outdoor water splash pads	
Picnic areas/pavilions	
Outdoor tennis courts	
Playground equipment	
Indoor gymnasiums	
Outdoor basketball courts	
Disc golf course	
Outdoor fishing areas	
Soccer fields	Low
Campgrounds	
Skate park	
Baseball & softball fields	
Football & lacrosse fields	
Boardwalks	
Cricket fields	
Equestrian trails	

Trail Priority Rankings

This plan recommends approximately 130 miles of new trail and bikeway facilities in Flower Mound. To prioritize those projects over time trail segments were ranked based on criteria established and refined with the Steering Committee and Technical Working Group. Once the criteria were set, each proposed trail and bikeway segment was scored based on the established criteria and given an overall score, which was then translated to high, medium, and low priorities. High priority corridors are projects for the first five years of plan implementation, medium priority is five to ten years and low priority is beyond ten years. Additional priority considerations included addressing existing safety concerns and intersections, and overall improvements to the trail user experience through trailheads, wayfinding, and other trail amenities. The prioritization of the trails, bikeways, and other trails are shown in **Figure 1.4 – Figure 1.6**.

Figure 1.5 Multi-Use Trail Prioritization

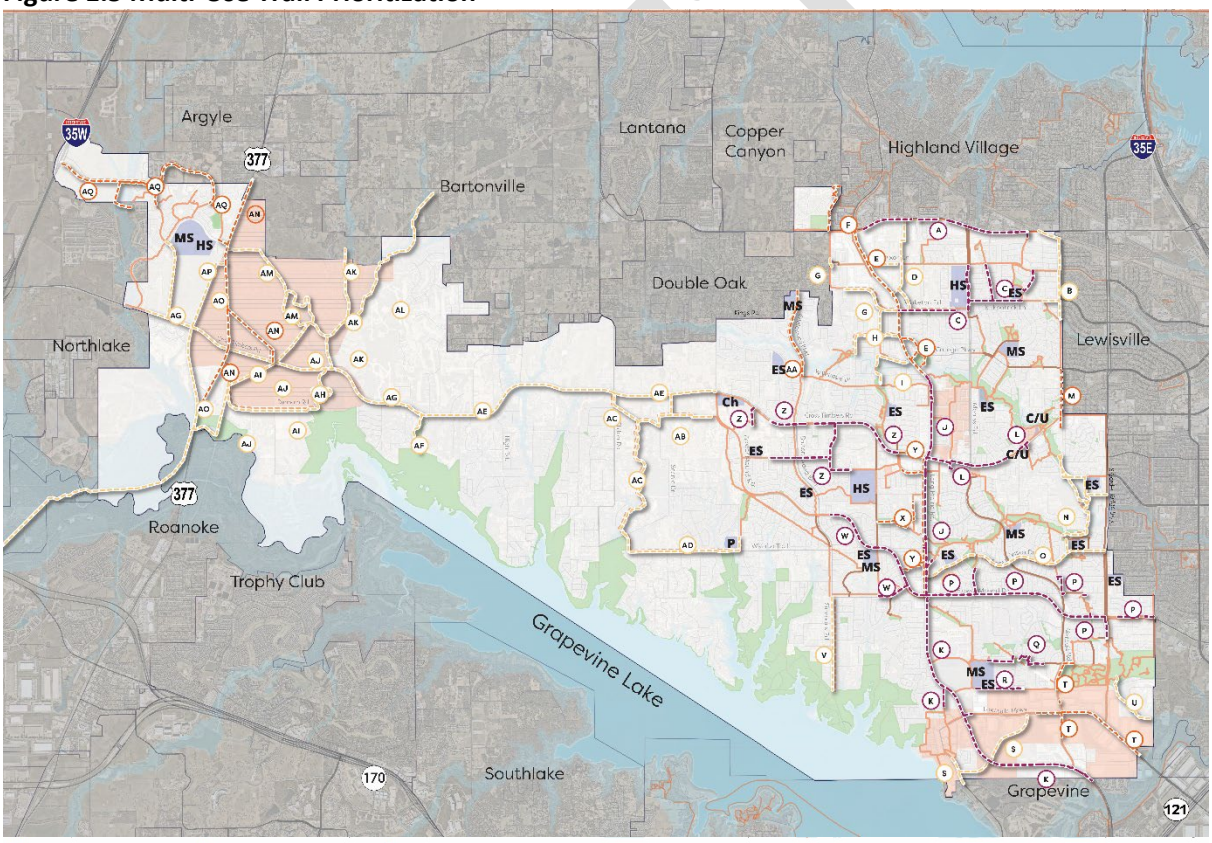


Figure 1.6 On Street Bikeways Prioritization

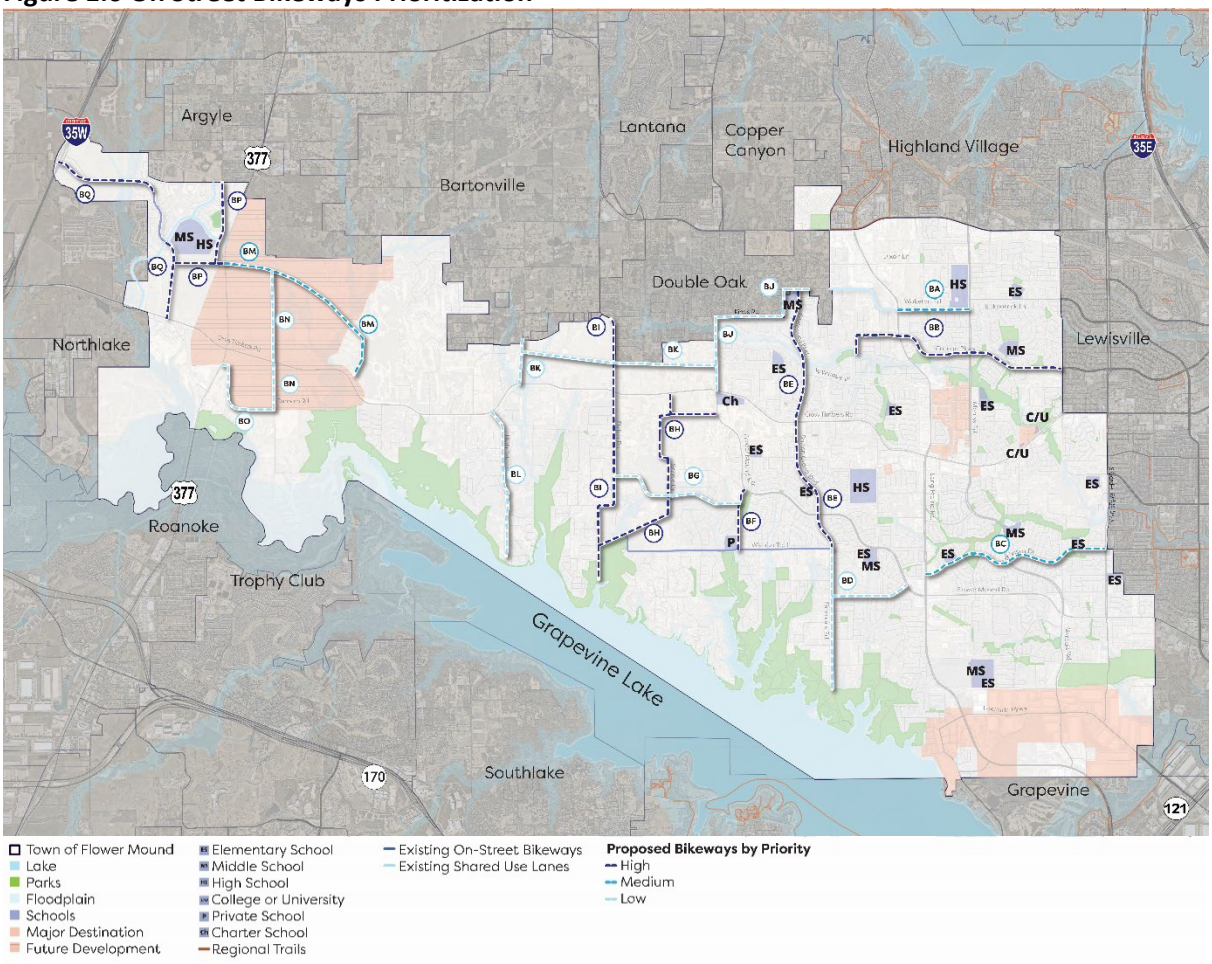
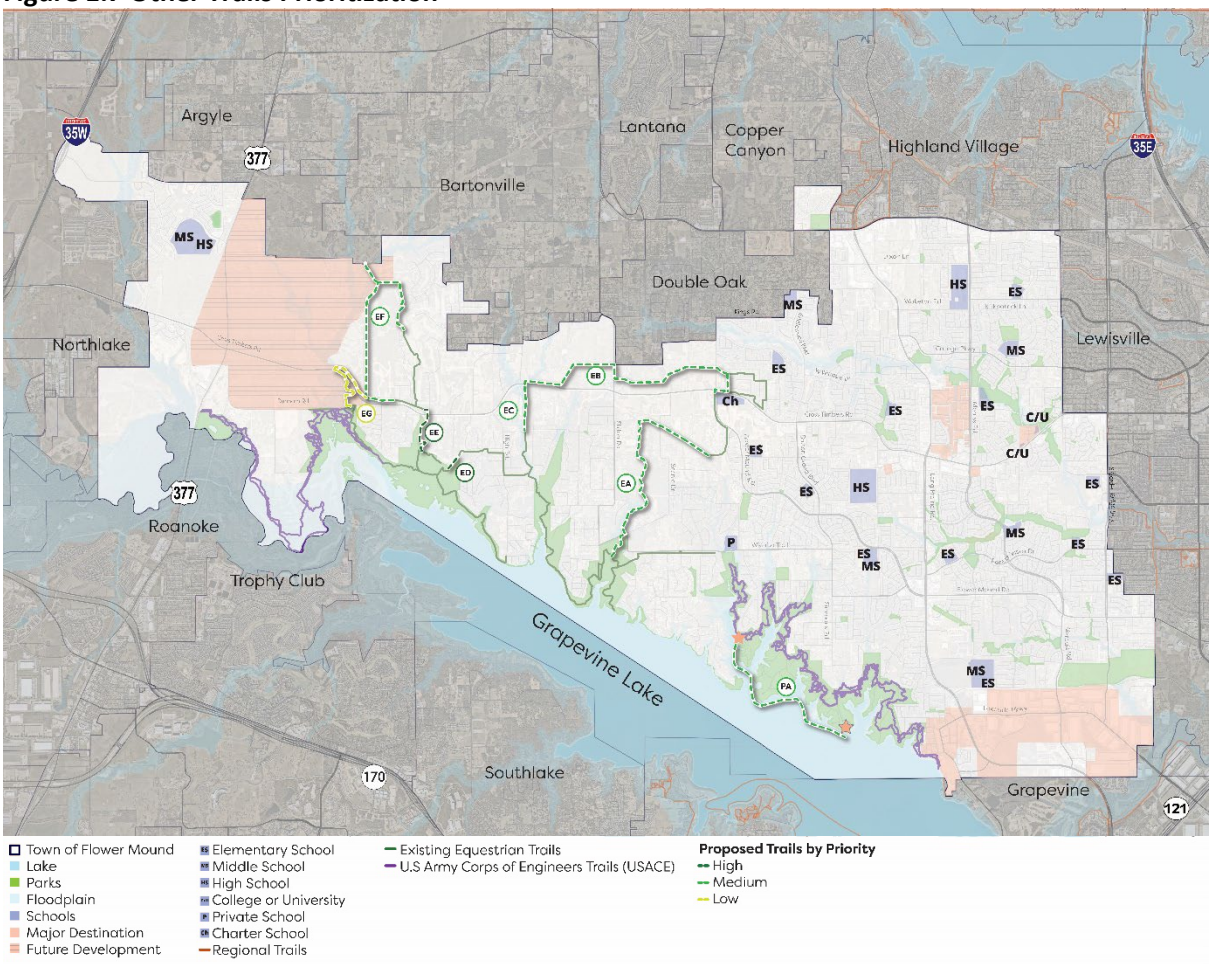


Figure 1.7 Other Trails Prioritization



Strategic Recommendations

The following Action Plan presents a summary of all major strategic recommendations.

	Community Vision for Park Land and Trails Community Mandates
	Create great parks and trails that create a sense of place that makes living in Flower Mound the place to be.
Strategy	Develop a network of parks, trails and open spaces that protect the natural areas in Flower Mound, connect to population centers that will support the needs of all residents through well designed parks and recreation amenities.
Strategy	Develop hard surface trails that create a network of accessibility and equity.
Strategy	Adopt Design Principles for each type of park (neighborhood, community, regional, special use, sports complex) to guide landscape architects and design architects to follow and for the operational staff to follow when the amenity or park is developed.
Strategy	Determine which parks are the Signature Parks that are defined as parks that frame the highest quality of land management maintenance and park related services that everyone in the community can identify with its purpose for recreation and in selling the quality of life aspects for living in Flower Mound.
Strategy	Ensure Healthy Biodiversity.
Strategy	Establish a lifecycle asset management plan for the Department.
Strategy	Update the Trails Master Plan to follow the Parks and Recreation Master Plan Update process to highlight updating existing trails, increasing access and connectivity but adding new trails to developing areas in the Town.
Strategy	Encourage trails to be funded and built in appropriate areas of the Town and to be maintained by private entities.

	Community Vision for Facilities
	Create signature recreational facilities that support all ages and make living in Flower Mound the best place to live, work, and play.
Strategy	Update the Community Activity Center to support a higher level of users to keep up with the demands of residents.
Strategy	Consider developing plans for a future recreation center on the west end of Flower Mound to support the resident's needs that exist today and in the future.
Strategy	Create recreation amenities desired by the community as it applies to the future approved level of service standards in the Master Plan.
Strategy	Consider program themes for park and facility updates to maximize use and value.
Strategy	Consider updating existing parks to maximize use for residents by increasing or improving basic amenities.

	Community Vision for Programming
	Increase community participation in programs to 35%.
Strategy	Refine core program services in Outdoor Adventure and Recreation, Wellness/Fitness, After School, Tennis, Arts and Teens.
Strategy	Track program lifecycles of programs and drop programs in their down cycle by adding new programs to take their place.
Strategy	Develop additional senior adult programs in Arts, Travel and Fitness, and Wellness
Strategy	Create additional marketing strategies to inform residents of the services being provided.
Strategy	Develop a yearly program plan specifically for the core program areas across the Town not just at the Community Activity Center and Senior Center.
Strategy	Create equitable partnerships across the system with sports and not-for-profit groups.
Strategy	Continue to grow the department's marketing and outreach to target current and potential users through additional mediums and Web 2.0 technology.
Strategy	Create a stronger volunteer system that builds advocacy and support for the park and recreation system.
Strategy	Continue to develop special events as a core service and economic tool for the Town.

	Community Vision for Operations and Staffing
	Empower and prepare the Department.
Strategy	Ensure job descriptions are reviewed and updated, and a complete salary assessment is done every five years to meet pay levels that keep salaries competitive.
Strategy	Institute demonstrated management practices and measure performance in parks and recreation services.
Strategy	Create a dedicated funding source to support operations and maintenance.
Strategy	Allow the Department to keep revenues earned to support operational costs.
Strategy	Develop earned income opportunities to support capital and operational needs.
Strategy	Seek to become 40% self-supporting from user fees, permits, reservations, earned income and effective partnerships.
Strategy	Develop a long term financial plan that is consistent with the goals of the Town and supports the initiatives and strategies reflected in the Master Plan to ensure long term sustainability.

The 2022 Trails and Bikeways Master Plan identified programs, policies, and initiatives to achieve the plan. Key recommendations of this plan were driven by the community's vision and identified goals.

Vision Statement: The Town of Flower Mound will have a connected, safe, and accessible system of trails and bikeways that promotes public health, economic development, and active transportation to improve overall quality of life for residents and visitors for generations to come.

	Trails and Bikeways
	Connected Community – Create a complete trails and bikeways system that connects the community with active transportation options.
Objective	Increase trail level of service.
Objective	Provide trail and bikeway connections to key destinations.
Objective	Fill in gaps in the existing trail system.

	Trails and Bikeways
	Safe and Accessible System – Ensure the trails and bikeway system is safe, comfortable, and accessible for users of all ages and abilities
Objective	Provide a variety of facility types appropriate for users of different abilities.

Objective	Improve overall safety and comfort of existing facilities.
Objective	Address areas identified as barriers within the existing trail system.

	Trails and Bikeways
	User Friendly – Improve awareness, signage, and usability of the trails and bikeways system
Objective	Increase awareness of the existing trail and bikeway system.
Objective	Create a consistent brand across the trails system so it is easily recognizable.
Objective	Install wayfinding signage to direct users to destinations along the trails.

	Community Vision for Trails and Bikeways
	Unique System – Design and construct trails that support the health and wellness of the community and natural environment
Objective	Provide trails through natural areas, parks, and open space.
Objective	Provide for interpretive signage and educational opportunities along trails.
Objective	Utilize an environmentally-friendly and context-sensitive approach to developing and maintaining trails.

	Community Vision for Trails and Bikeways
	Partnerships – Leverage partnerships between the Town and the community, internal and external organizations, and outside agencies to achieve a connected trails and bikeways system
Objective	Pursue joint projects with surrounding cities, the County, NCTCOG, TxDOT, TPWD, USACE, and utility providers.
Objective	Maintain relationships with user groups to solicit feedback on the trails and bikeways system.
Objective	Work with other departments to incorporate bicycle and pedestrian accommodations into ongoing or upcoming projects.

	Community Vision for Trails and Bikeways
	Funding – Pursue a variety of funding sources for trails and bikeway development
Objective	Apply for grant funding to implement trail and bikeway projects.

Objective	Continue to work with developers to ensure trails and bikeways are included with new development.
Objective	Coordinate with user and volunteer groups to help fund improvements to trails and bikeways.

The Action Matrix can be used to develop and prioritize work plans. It can be used as a road map for continued improvements in the department. The key to success for the department is to continue to build on current success and address the major issues and recommendations in a systematic manner. This requires retaining what the department has achieved while adding programs, services, and facility improvements that will generate revenue, reduce operational expenditures, and enhance the experience for the users. In addition, focus needs to be placed on filling the off-peak times through effective pricing, and programming. The most important consideration is to keep the department fresh through programming and strategic improvements for the users and guests to ensure long-term success.

Capital Improvement Recommendations

This section of the plan reflects the capital improvement recommendations that are necessary to fulfill the facility needs of the community. In order to plan and prioritize investments, it is recommended that the Parks and Recreation Department applies specific guiding principles that balance the maintenance of current assets over the development of new facilities. The departmental investment framework is also utilized to determine and plan projects and make budget decisions that are sustainable over time. These criteria (e.g., safety compliance, commitment, efficiency, revenue) and priorities are also focused on maintaining the integrity of the current infrastructure and facilities before expanding and/or enhancing programs and facilities.

The community, through this planning process, has indicated strong support for this concept of prioritization. Even with the indications of a modest economic turnaround, funding is not sufficient to take care of all existing assets and build new facilities.

The result is the recommendation to develop a three-tier plan that acknowledges a stark fiscal reality, leading to the continuous rebalancing of priorities and their associated expenditures. Each tier reflects different assumptions about available resources.

- The **Critical Alternative** has plans for prioritized spending within existing budget targets. The intention of this alternative is to refocus and make the most of existing resources with the primary goal being for the department to maintain services. The actions associated with the Fiscally Constrained Alternative address deferred maintenance at existing facilities and is funded through existing tax dollars.
- The **Sustainable Alternative** describes the extra services or capital improvement that should be undertaken when additional funding is available. This includes strategically enhancing existing programs, beginning new alternative programs, adding new positions, or making other strategic changes that would require additional operational or capital funding. In

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coordination with the Town Manager's Office and Town Council, the Parks and Recreation Department would evaluate and analyze potential sources of additional revenue, including but not limited to capital bond funding, partnerships, program income, grants, and existing or new taxes.

- The **Visionary Alternative** represents the complete set of services and facilities desired by the community. It is fiscally unconstrained but can help provide policy guidance by illustrating the ultimate goals of the community, and by providing a long-range look to address future needs and deficiencies. In this Master Plan, the Visionary Alternative addresses aging facilities to make improvements in operational effectiveness and the overall sustainability of the park and recreation system. Funding for visionary projects would be derived from partnerships, private investments and new tax dollars.

The following pages detail the recommended investments in the parks and recreation system for the three-tier spending plan.

Critical Capital Improvement Recommendations

This section outlines the projects that focus on the repair and lifecycle replacement of existing parks, facilities, and amenities.

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CRITICAL PROJECTS (Repair Existing)				
Asset	**Project Type**	**Brief Description**	**Estimated Total Project Cost**	**Years in which to be completed**
Bluebonnet Park	Repair	Playground Replacement; Trail backfill trail. Improve irrigation on soccer fields.	$300,000	1-5
Chinn Chapel Soccer	Repair	Playground Replacement	$200,000	1-5
Colony Park	Repair	Irrigation improvements and tree planting. Renovate basketball court. Trail improvements including backfill. Level practice infield and replace backstop.	$250,000	1-5
Cortadera Park	Repair	Dredge pond	$300,000	1-5
Culwell Park	Repair	Upgrade playground surfacing. Renovate/upgrade perimeter sidewalk.	$150,000	1-5
Gaston Park	Repair	Playground Replacement	$200,000	
Gerault Park	Repair	Renovate/replace Pavilion w/4 picnic tables, electric outlets, barbeque grill, and trash receptacle; Playground replacement	$450,000	1-5
Glenwick Park	Repair	Playground Replacement	$200,000	1-10
Grand Park	Repair	Playground Replacement; backfill trail	$250,000	1-5
Grove Park	Repair	Playground Replacement	$200,000	1-5
Hideaway Park	Repair	ADA Accessibility	$50,000	1-5
Jake's Hilltop Park	Repair	Partial pavilion conversion for maintenance purposes and scoreboards	$150,000	1-5
Lakewood Park	Repair	Playground and Pavilion Replacement	$450,000	1-5
Leonard Johns Park	Repair	ADA accessibility	$50,000	1-5
Oak Park	Repair	ADA accessibility improvements and playground replacement	$250,000	1-5
Parker Square Park	Repair	Lifecycle replacement of amenities	$50,000	1-5
Peacock Park	Repair	Playground Replacement	$200,000	1-5
Pecan Orchard Park	Repair	Playground Replacement	$200,000	1-5
Rustic Timbers Park	Repair	Creek bank stabilization, ADA improvements, Upgrade playground surfacing, consider relocating play area out of the floodplain.	$350,000	1-5
Shadow Ridge Park	Repair	ADA Accessibility Improvements; backfill trail	$75,000	1-5
Spring Lake Park	Repair	Drainage/Sidewalk Improvements; Clear vegetation for casting area at pond	$100,000	1-5
Spring Meadow Park	Repair	Playground Replacement	$200,000	1-5
Staton Oak Park	Repair	Replace irrigation system	$200,000	1-5
Stone Creek Park	Repair	Lifecycle replacement of park amenities including playground; ADA Improvements; add irrigation; renovate/replace pavilion	$550,000	1-5
Tealwood Oaks Park	Repair	ADA accessibility especially in the southern portion of the park in the picnic area along the creek; upgrade bridges and all amenities	$350,000	1-5
Thrush Park (west)	Repair	Playground Replacement	$200,000	1-5
Wilkerson Park	Repair	Backfill trails; drainage improvements;	$50,000	1-5

Trails and Bikeways Plan High Priority Projects

High priority projects are those that are recommended to be completed in the first five years of plan adoption. These projects project longer routes through the town, provide connections to destinations and surrounding communities, reduce gaps in the existing trails system, and address existing safety concerns.

Table 1.3 is the overall recommendation summary for the high priority trail segments in Flower Mound. The table reflects the facility type, length and the average estimated cost based on the estimated project costs above. The last column for funding partnerships displays mechanisms that can assist in the development of each of the corridors. Figure 1.7 graphically depicts the priority corridors. Figure 1.8 graphically depicts where other projects should be considered in the near-term, including safety projects, enhancement of existing trailheads, and intersection evaluations.

Table 1.3 Trails and Bikeways High Priority Projects

Corridor ID	Corridor	Facility Type	Length (miles)	Average Cost Estimate	Funding Partnerships
A	Justin Rd	Multi-Use	1.7	$2,763,600	Developer, CIP, Bond
C	Waketon/Morris/Kirkpatrick Ln	Multi-Use	2.3	$3,802,653	Developer, CIP, Bond
J	Long Prairie Rd	Proposed Veloweb	2.5	$4,119,589	Developer, CIP, NCTCOG, Bond
K	Long Prairie Rd	Proposed Veloweb	3.5	$5,696,871	Developer, CIP, NCTCOG, Bond
L	Cross Timbers Rd	Proposed Veloweb	1.12	$1,824,699	Developer, CIP, NCTCOG, Bond
P	Flower Mound Rd/Garden Ridge Blvd	Multi-Use	3.18	$5,169,875	Developer, CIP, NCTCOG, Bond
Q	Shadow Ridge Park/Sweet Water Ln	Multi-Use	0.77	$1,255,926	Developer, CIP
R	Spinks Rd	Multi-Use	0.53	$856,482	Developer, CIP
W	Flower Mound Rd/McKamy Creek	Multi-Use	1.87	$2,953,822	Developer, CIP, Bond
Z	Cross Timbers Rd/Auburn Dr/Quail Rn/Peters Colony	Multi-Use, Proposed Veloweb	2.98	$4,837,647	Developer, CIP, NCTCOG, Bond
BB	College Pkwy	Shared-Use Lane	2.57	$192,649	CIP, NCTCOG, Developer
BE	Bridlewood Blvd/Burton Orand Blvd	Shared-Use Lane	3.01	$225,985	Transportation Funds, CIP, NCTCOG
BF	Skillern Rd	Shared-Use Lane	0.67	$50,034	Transportation Funds, CIP, NCTCOG
BH	Scenic Dr	Bike Lane/Shared-Use Lane	2.80	$226,775	Transportation Funds, CIP, NCTCOG
BI	Shiloh Rd	Bike Lane	3.01	$285,904	Transportation Funds, CIP, NCTCOG
BP	Future Corridor/Stonecrest Dr	Shared-Use Lane/Bike Lane	0.90	$85,667	Transportation Funds, CIP, NCTCOG
BQ	Denton Creek Blvd	Bike Lane	1.73	$163,998	Transportation Funds, CIP, NCTCOG
ED	Hidden Brook Farm	Equestrian	0.58	$363,736	Developer, CIP
EE	Cross Timbers	Equestrian	0.16	$100,288	Developer, CIP
Priority Project Totals			35.88	$34,976,200	

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Figure 1.8 Priority Network

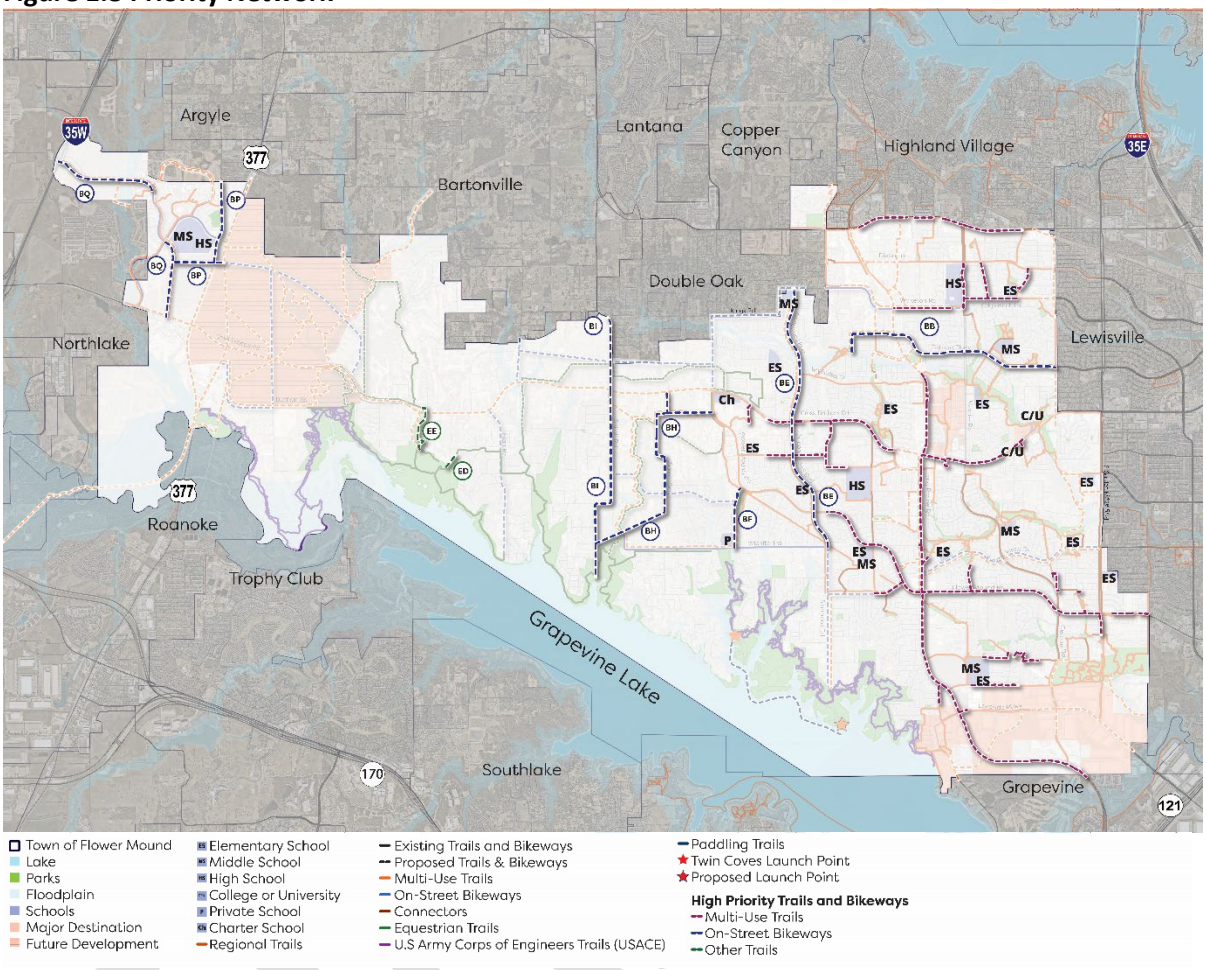
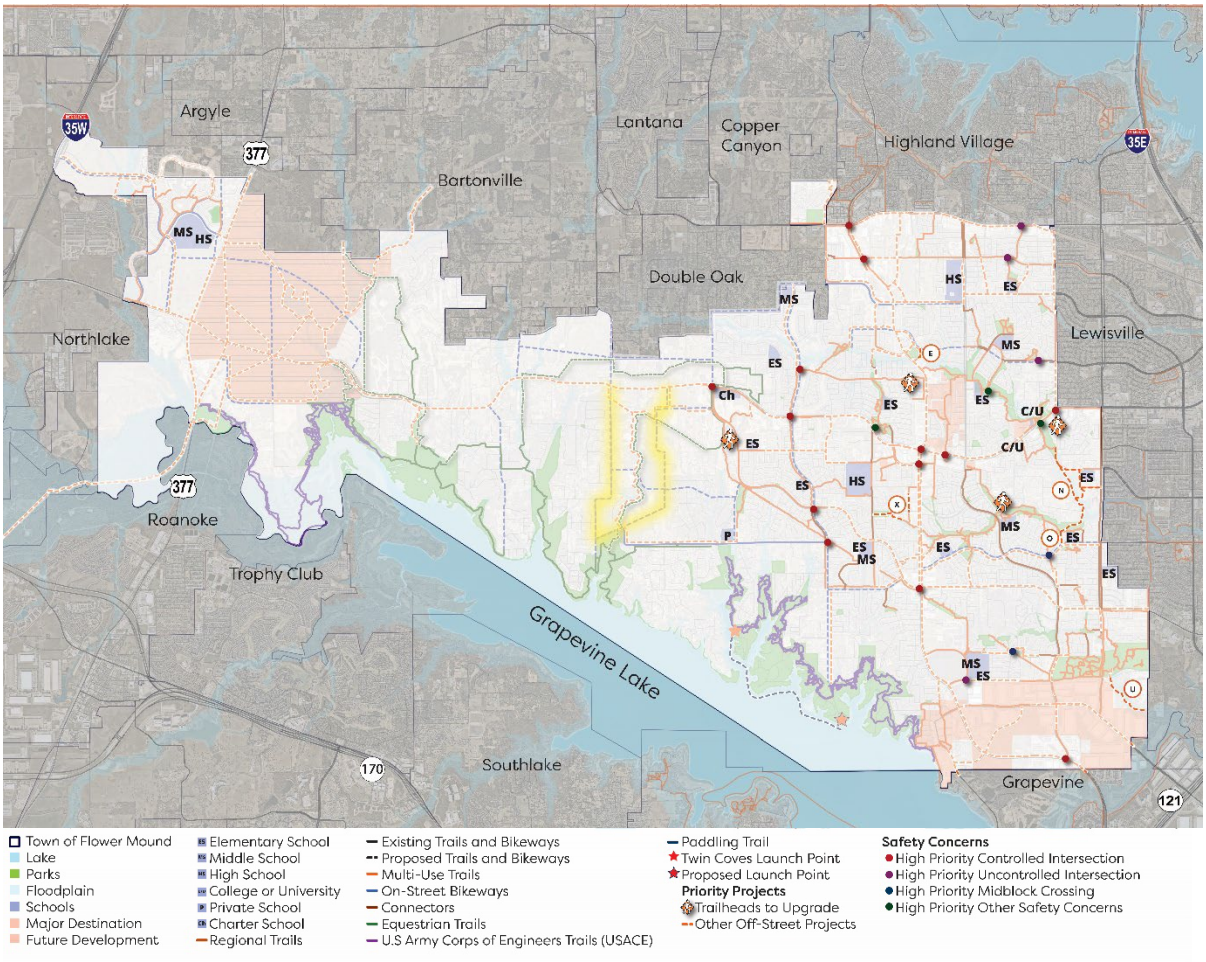


Figure 1.9 Other Priorities



Sustainable Capital Improvement Recommendations

Options described in this section provide the extra services or capital improvement that could be undertaken when additional funding is available to meet need(s) with a focus on enhancements to existing facilities. The following provides a summary of the sustainable options recommended.

SUSTAINABLE PROJECTS (Upgrade and Renovation)				
Asset	**Project Type**	**Brief Description**	**Estimated Total Project Cost**	**Years in which to be completed**
Bakersfield Park	Upgrade	LED lighting upgrade; parking lot lighting improvements; restroom and multi-purpose field lighting; add 5 picnic pavilions	$1,000,000	1-10
Bluebonnet Park	Upgrade	Flower bed around signage needs improvement; park and trail connection is needed;	$25,000	1-10
Canyon Falls Park	Upgrade	Master Plan	$50,000	1-10
Chinn Chapel Soccer Complex	Upgrade	LED lighting upgrade; LED parking lot lighting improvements. ADA, drainage, and fencing improvements.	$250,000	1-10
Community Activity Center	Expansion	Expansion of Community Center	$22,000,000	1-10
Cortadera Park	Upgrade	Add loop trail to connect amenities, add irrigation, and add fencing between soccer field and pond.	$300,000	1-10
Dunham Ranch	Upgrade	Update Master Plan	$150,000	1-10
Dixon Park	Upgrade	Add picnic pavilion with two picnic tables, grill, and trash receptacle. Add "No Overnight Parking" signage.	$250,000	1-10
Forest Park	Upgrade	Add ADA compliant picnic station.	$25,000	1-10
Gaston Park	Upgrade	Master Plan	$100,000	1-10
Gerault Park	Upgrade	LED lighting upgrade; parking lot lighting improvements. Regrade the north field, add a monument sign, and convert one field to synthetic turf.	$1,750,000	1-10
Glenwick Park	Upgrade	LED lighting upgrade	$100,000	1-10
Grand Park	Upgrade	Pavilion w/1 picnic table, electric outlets, barbeque grill, and trash receptacle.	$250,000	1-10
Green Acres Farm	Upgrade	Master Plan	$100,000	1-10
Heritage Park	Upgrade	LED parking lot lighting improvements; Restroom at Dog Park on the East side; Upgrade playground surfacing on West	$750,000	1-10
Lawson Park	Upgrade	Wildflower improvements	$25,000	1-10
Leonard Johns Park	Upgrade	Addition of restroom	$250,000	1-10
Northshore Park	Upgrade	Add pavilion w/2 picnic tables, grill, trash receptacles, picnic/shade structures.	$250,000	1-10
Peacock Park	Upgrade	Boardwalk with Bioswale for Environmental and Wildlife education	$100,000	1-10
Post Oak Park	Upgrade	Restroom, interpretive signage; wayfinding signage; trail Improvements; remove stock pond; boardwalk improvements	$500,000	1-10
Prairie Trail Park	Upgrade	Master Plan	$100,000	1-10
Rheudasil Park	Upgrade	Implement Master Plan	$2,000,000	1-10
Spring Lake Park	Upgrade	Adult Fitness Stations	$100,000	1-10
Spring Meadow Park	Upgrade	Add Irrigation, Pavilion w/1 picnic table, grill, trash receptacle, loop trail,	$300,000	1-10
Tealwood Oaks Park	Upgrade	Add pavilion with 2 picnic tables and grill; consider parking addition.	$350,000	1-10
Timber Creek Park	Upgrade	Install Butterfly Garden and ADA Accessibility	$100,000	1-10
Thrush Park	Upgrade	Master Plan	$100,000	1-10
Tiger Field	Upgrade	Add a restroom facility	$250,000	1-10
Timber Creek Park	Upgrade	Install Butterfly Garden and additional picnic tables on concrete pads (ADA Accessibility)	$100,000	1-10
Westchester Park	Upgrade	Install restrooms; provide ADA accessibility, new backstop, improve parking lot, add splash pad, and backfill trails	$750,000	1-10
West Windsor Park	Upgrade	Landscape Beautification	$100,000	1-10
Wilkerson Park	Upgrade	LED Light Upgrade for ballfield; add landscaping and irrigation around parking lot.	$150,000	1-10

Visionary Capital Improvement Recommendations

Recommendations described in this section represent the complete set of services and facilities desired by the community. It is fiscally unconstrained but can help provide policy guidance by illustrating the ultimate goals of the community, and by providing a long-range look to address future

needs and deficiencies. The following new development and redevelopment projects have been identified as relevant to the interests and needs of the community and are relevant to the Town's focus because they feature a high probability of success.

VISIONARY PROJECTS (New, Significant Upgrades)				
Asset	**Project Type**	**Project Title**	**Estimated Total Project Cost**	**Years in which to be completed**
Park Development	NEW	Canyon Falls	$2,500,000	1-5
Park Development	NEW	Dunham Ranch Recreational Area	$5,000,000	1-10
Facility Development	NEW	Recreation Center - West Flower Mound	$30,000,000	1-10
Facility Development	NEW	Tennis Center	$2,500,000	1-10
Trail Master Plan	NEW	Update Trails Master Plan	$250,000	6-10
Land Acquisition and Park Development	NEW	Neighborhood Parks - 43 acres	$10,750,000	6-10
Land Acquisition and Park Development	NEW	Community Parks- 63 acres	$15,750,000	6-10
Land Acquisition and Park Development	NEW	Regional Parks - 52 acres	$13,000,000	6-10
TOTAL			**$79,750,000**	

Updating the Parks and Trails Plan

Master planning should be viewed as a continuing process rather than the result of a study undertaken at a particular time. This master plan will be adopted by Town Council in July of 2022, but it will need to be reviewed and updated to reflect changes in available resources, the changing needs and desires of Flower Mound's residents, unexpected challenges and opportunities, and the Town's changing population and demographics. This plan has been prepared in compliance with the guidelines for park and recreation system master plans established by Texas Parks and Wildlife (TP&W). TP&W requires that plans be updated every five years to remain eligible for grant funding as well as reflect the changes in a growing community. A new plan is required every 10 years to remain eligible for grant funding.

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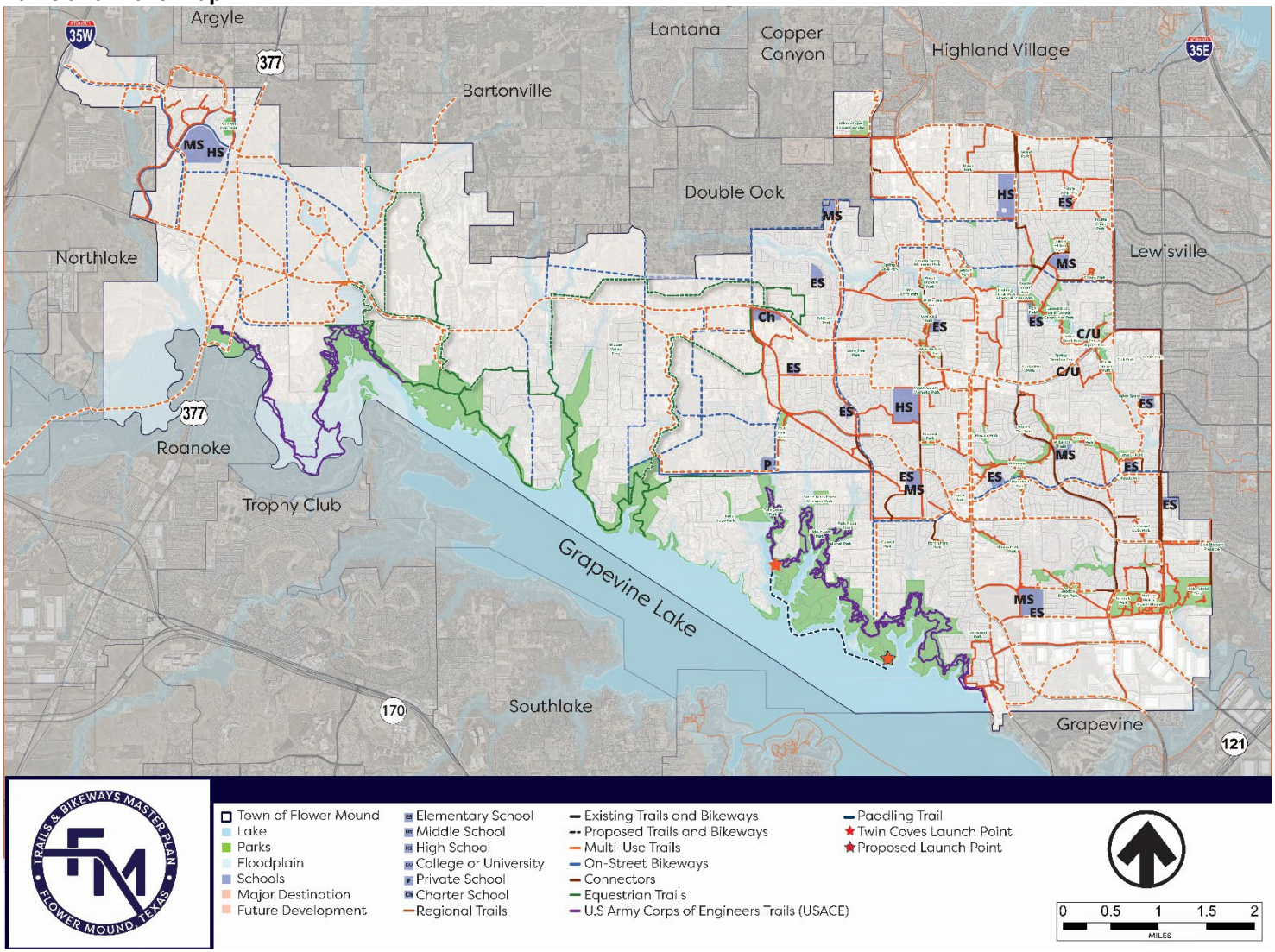
Parks and Trails Map



Attachment 3

THE TOWN OF FLOWER MOUND Parks & Recreation

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ACKNOWLEDGMENTS

The following individuals are recognized for their significant contributions to the preparation of the Town of Flower Mound Trails and Bikeways Master Plan.

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Rick Kenyon (Vice Chair)
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Mark Mayer
Jennifer Romaszewski
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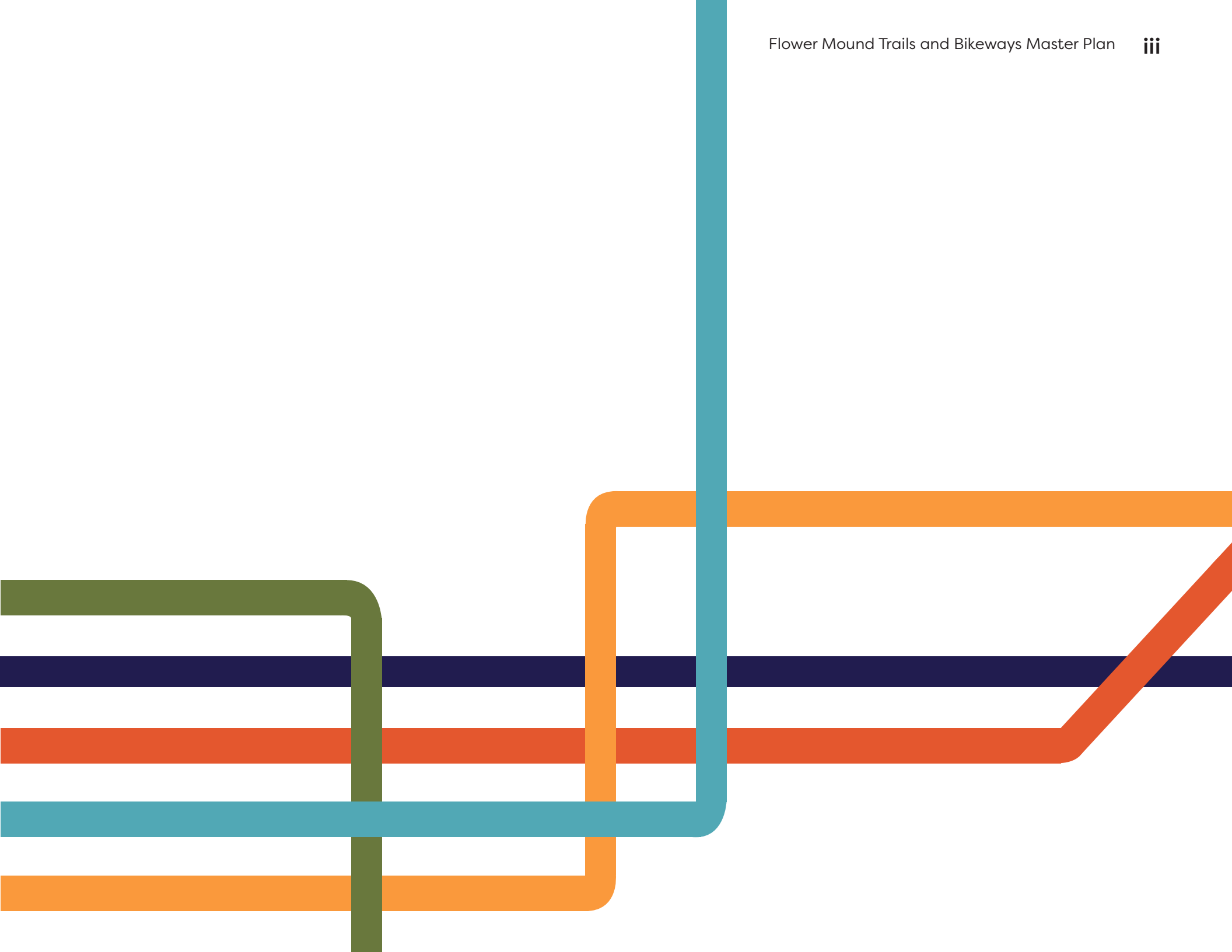


TABLE OF CONTENTS

ES Executive Summary

xi Introduction
xii Needs Assessment Findings
xiv Existing System Overview
xv Needs Assessment Findings
xvi Recommended Network
xvii Plan Prioritization

01 Introduction

03 Introduction
04 Plan Purpose
05 Benefits of Active Transportation
06 Plan Process
07 Plan Structure
08 Vision & Goals

02 Community Context

13 History
14 Demographics
22 Planning Guidance
27 Existing Trails & Bikeways System

03 Trails & Bikeways System Needs

41 System Users
43 Community Input
55 Needs Assessment
68 Barriers & Opportunities

04 Trails & Bikeways System Network

75 Corridor Identification Criteria
75 Facility Hierarchy
79 Recommended Network

05 Trails & Bikeways Design Standards

91 Design Guidelines Toolbox
113 Using the Toolbox

06 Implementation

123 Corridor Prioritization
134 Plan Implementation
146 Conclusion

07 Appendix

149 Glossary of Terms
152 Commonly Used Signage
156 Detailed Community Input
203 Feasibility Corridors
227 Detailed Maps

LIST OF TABLES

Table 2.1: Race and Ethnicity Characteristics....15
Table 2.2: Household Characteristics (2010-2020)....16
Table 2.3: Town Trail Inventory....29
Table 2.4: Other Trail Inventory....33
Table 2.5: On-Street Bikeway Inventory....35
Table 2.6: Existing and Currently Planned System....37
Table 3.1: Trail Level of Service....63
Table 3.2: Bicycle and Pedestrian Crash Data....65
Table 4.1: Hierarchy Summary....78
Table 4.2: Recommended Systemwide Facility Mileage....79
Table 4.3: Build-Out Level of Service....79
Table 4.4: Town Trails Recommendation Summary....81
Table 4.5: On-Street Bikeway Recommendation Summary....83
Table 4.6: Other Trails Recommendation Summary....85
Table 6.1: Multi-Use Trails Criteria Descriptions....124
Table 6.2: Town Multi-Use Trails Recommendation Summary....126
Table 6.3: On-Street Bikeways Criteria Descriptions....129
Table 6.4: On-Street Bikeways Recommendation Summary....130
Table 6.5: Non-Traditional Trails Recommendation Summary....132
Table 6.6: Typical Project Costs by Facility....134
Table 6.7: Priority Trails Recommendation Summary....135

LIST OF FIGURES

Figure 1.1: Planning Process....6
Figure 2.1: Historical Timeline of Flower Mound....13
Figure 2.2: Flower Mound Population Growth....14
Figure 2.3: Age and Gender, 2020....15
Figure 2.4: Consumer Spending....16
Figure 2.5: Educational Attainment, 2020....17
Figure 2.6: Average Commute Time, 2019....17
Figure 2.7: Health Spending, 2021....18
Figure 2.8: Percent of Population with a Disability, 2014....18
Figure 2.9: ESRI Tapestry Segments....19
Figure 2.10: Prioritized Program Rankings in Parks Master Plan....22

LIST OF FIGURES (CONT.)

Figure 2.11: Distribution of Land Uses from the Town of Flower Mound's Master Plan....24
Figure 2.12: NCTCOG Regional Veloweb Map....26
Figure 2.13: Existing Trails....28
Figure 2.14: Existing Town Trails....30
Figure 2.15: Existing Town Multi-Use Trail Width Percentages....31
Figure 2.16: Existing Town Multi-Use Trails by Width....32
Figure 2.17: Existing Other Trails....34
Figure 2.18: Existing On-Street Bikeways....36
Figure 2.19: 2017 Master Plan Proposed Trails & Bikeways....38
Figure 3.1: Virtual Engagement Room Results....50
Figure 3.2: Interactive Online Engagement Map....53
Figure 3.3: Bluebonnet Trail Key Map....56
Figure 3.4: Indian Blanket Trail Key Map....57
Figure 3.5: Pink Evening Primrose Trail Key Map....58
Figure 3.6: Purple Coneflower Trail Key Map....59
Figure 3.7: Texas Yellow Star Trail Key Map....60
Figure 3.8: White Lazy Daisy Trail Key Map....61
Figure 3.9: Bicycle and Pedestrian Crash Map, 2016-2020....66
Figure 3.10: Strava Pedestrian Heat Map, May 2021....67
Figure 3.11: Strava Bicycle Heat Map, May 2021....67
Figure 3.12: Major Barriers for Trails & Bikeways in Flower Mound....69
Figure 3.13: Major Opportunities for Trails & Bikeways in Flower Mound....72
Figure 4.1: Facility Hierarchy....75
Figure 4.2: Combined Recommendations Map....80
Figure 4.3: Town Trails Recommendations Map....82
Figure 4.4: On-Street Bikeways Recommendations Map....84
Figure 4.5: Other Trails Recommendations Map....86
Figure 5.1: Typical Trail Cross-Section....92
Figure 5.2: Typical Intersection Treatment....93
Figure 5.3: Typical Blind Curve Design....94
Figure 5.4: Typical Equestrian Trail Cross-Section....95
Figure 5.5: Typical Soft-Surface Trail Cross-Section....96
Figure 5.6: Typical Standard Bike Lane....97
Figure 5.7: Typical Buffered Bike Lane....97
Figure 5.8: Typical Shared-Use Lane....98
Figure 5.9: Typical Bike Box Treatment....99
Figure 5.10: Mid-Block Crossing....103
Figure 5.11: Example Major Trailhead....104
Figure 5.12: Example Minor Trailhead....104
Figure 5.13: Branding Considerations....104

LIST OF FIGURES (CONT.)

Figure 5.14: Recommended Trail Regions of Flower Mound....109
Figure 5.15: Major Arterial Proposed Cross-Section....114
Figure 5.16: Greenway Urban Arterial Proposed Cross-Section....114
Figure 5.17: Greenway Rural Arterial Proposed Cross-Section....115
Figure 5.18: Urban Minor Arterial Proposed Cross-Section....115
Figure 5.19: Urban Minor Arterial with Shared Lane Proposed Cross-Section....116
Figure 5.20: Urban Minor Arterial with On-Street Parking Proposed Cross-Section....116
Figure 5.21: Urban Minor Arterial with Bike Lanes Proposed Cross-Section....117
Figure 5.22: Urban Collector Proposed Cross-Section....117
Figure 5.23: Rural Collector Proposed Cross-Section - A....118
Figure 5.24: Rural Collector Proposed Cross-Section - B....118
Figure 5.25: Local Residential Urban Proposed Cross-Section....119
Figure 5.26: Local Residential Estate Proposed Cross-Section....119
Figure 6.1: Primary Trail System....125
Figure 6.2: Town Multi-Use Trail Priority Breakdown....126
Figure 6.3: Town Multi-Use Trails Recommended Network....128
Figure 6.4: On-Street Bikeways Priority Breakdown....130
Figure 6.5: On-Street Bikeways Recommended Network....131
Figure 6.6: Non-Traditional Trails Priority Breakdown....132
Figure 6.7: Non-Traditional Trails Recommended Network....133
Figure 6.8: Priority Breakdown....134
Figure 6.9: High Priority Trails and Bikeways Corridors....136
Figure 6.10: Primary Trails, Trailheads, and Major Conflict Points....139

LIST OF ACRONYMS

AASHTO: American Association of State Highway Transportation Officials
ACS: American Community Survey
ADA: Americans with Disabilities Act
ADAAG: Americans with Disabilities Act Accessibility Guidelines
CRIS: Crash Record Information System
CTETA: Cross Timbers Equestrian Trail Association
DFW: Dallas-Fort Worth
DORBA: Dallas Off-Road Bicycle Association
ESRI: Environmental Systems Research Institute
ISD: Independent School District
ITE: Institute of Transportation Engineers
LOS: Level of Service
NACTO: National Association of City Transportation Officials
NCTCOG: North Central Texas Council of Governments
PRMP: Parks and Recreation Master Plan
PROWAG: Public Rights-of-Way Accessibility Guidelines
ROW: Right-of-Way
RRFB: Rectangular Rapid Flashing Beacons
TAS: Texas Accessibility Standards
TMUTCD: Texas Manual on Uniform Traffic Control Devices
TTI: Texas Transportation Institute
TxDOT: Texas Department of Transportation
USACE: U.S. Army Corps of Engineers

Introduction
Needs Assessment Findings
Existing System Overview
Needs Assessment Findings
Recommended Network
Plan Prioritization

EXECUTIVE SUMMARY

INTRODUCTION

The purpose of the Town of Flower Mound Trails and Bikeways Master Plan is to guide the development of network recommendations, design guidelines, and implementation strategies for a comprehensive system of multi-use trails and on-street bikeways throughout the Town of Flower Mound. This active transportation and recreation system aims to increase accessibility for users to key destinations within Flower Mound and leverage key regional connections to adjacent communities. This plan will augment previous planning efforts to create a more complete community and provide active and healthy lifestyle opportunities.

PLANNING PROCESS

The development of the Town of Flower Mound Trails and Bikeways Master Plan spanned approximately 17 months, starting in February 2021 and concluding in June 2022. Throughout this process, Town staff, a designated steering committee, stakeholders, elected/appointed officials, and residents were engaged to guide the master plan recommendations. The resulting community-driven vision forms the foundation for trails and bikeways in Flower Mound for the next decade.

Plan development was spread over five distinct but iterative phases.

Phase One assessed existing trails and bikeways identified opportunities and barriers, and reviewed community demographics and relevant studies that may impact the Trails and Bikeways Master Plan.

The vision and goals of this plan were developed through an evaluation of feedback received through the plan's community engagement process.

An analysis of overall trails system needs included assessing the existing network, identifying safety issues and barriers, determining where gaps exist, and understanding demand for new facilities.

Based on the needs assessment, an expanded town-wide network was generated based on the barriers, opportunities, and desires of the community.

Finally, an action plan was developed to provide implementation strategies for the proposed network. Recommendations for implementation are prioritized by short-term (1-5 years), mid-term (6-10 years), and long-term (10+ years) priorities.

PLAN VISION

The planning process include a series of meetings with key town stakeholders and the public. During those meetings, attendees were asked how they envision walking, bicycling, riding, and paddling in Flower Mound in the future. Input from these meetings and interviews helped shape the vision and goals for the Town of Flower Mound Trails and Bikeways Master Plan.

The plan's vision statements and goals help outline the needs of the community.

KEY TAKEAWAYS FROM THE COMMUNITY ENGAGEMENT:

- The current system is incomplete, with numerous gaps and trail endings without warning.
- The trail system would be improved with branding, wayfinding, and trailheads.
- Safety along the system should be prioritized, including enhanced roadway crossings at intersections and mid-block crossings.
- Improved amenities, such as benchs, shade, waste receptacles, and similiar, along the trails system will improve the user experience.
- Provide a wider variety of on-street facilities and off-street trails to create a dynamic system, including trails, equestrian trails, and paddling trails.
- Residents want more east/west connections through the Town.
- Safer and more connections to the Army Corps of Engineers trails.
- There is a desire to complete the equestrian loops in the Town for best rider experience.

VISION STATEMENT:

The Town of Flower Mound will have a connected, safe, and accessible system of trails and bikeways that promotes public health, economic impact, and active transportation to improve overall quality of life for residents and visitors for generations to come.

PLAN GOALS

GOAL 1: CONNECTED COMMUNITY

Create a complete trails and bikeways system that connects the community with active transportation options.

GOAL 2: SAFE AND ACCESSIBLE SYSTEM

Ensure the trails and bikeway system is safe, comfortable, and accessible for users of all abilities and ages.

GOAL 3: USER FRIENDLY

Improve awareness, signage, and usability of the trails and bikeways system.

GOAL 4: UNIQUE SYSTEM

Design and construct trails that support the health and wellness of the community and natural environment.

GOAL 5: PARTNERSHIPS

Leverage partnerships between the Town and the community, internal and external organizations, and outside agencies to achieve a connected trails and bikeways system.

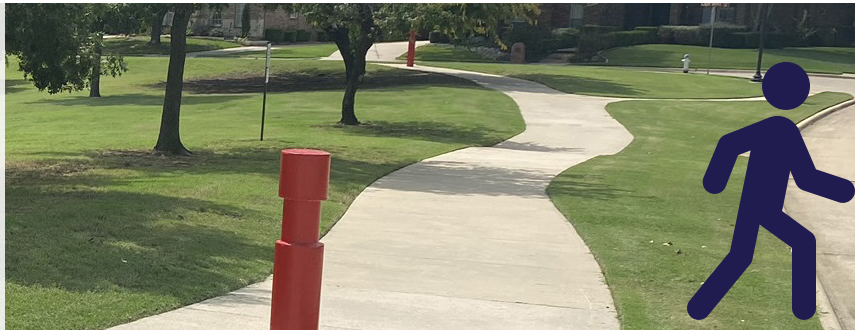
GOAL 6: FUNDING

Pursue a variety of funding sources for trails and bikeway development.

EXISTING SYSTEM OVERVIEW

The Flower Mound trails system has diverse offerings for its residents and visitors from across the region and beyond. These trails aim to connect residential neighborhoods to schools, parks, and commercial centers and to expand mobility for its residents. Flower Mound has a unique natural landscape that adds to the overall experience of trail users. The existing system includes Town Trails, On-Strret Bikeways, and Other Trails.

Town Trails:
There are 59.6 miles of 8-foot or wider paved Town trails. Town trails include multi-use trails, soft surface trails and equestrian trails maintained by the town. There are 14.6 of town maintained equestrian trails.



Other Trails:
there are 34.5 miles of trails owned and maintained by other entities within Flower Mound that include soft-surface hike and bike trails as well as some equestrian trails.

On-Street Bikeways:
There is 5.6 miles of on-street bikeways that include shared-use markings and bike lane designations.

NEEDS ASSESSMENT FINDINGS

The needs assessment included a review of benchmark communities, existing conditions for the trails, community needs, and a feasibility review of propsed corridors.

The assessment of Flower Mound's multi-use trails considered surface conditions, trailway clearance, grades and slopes, roadside clearance, street intersections/trail crossings, constructed trailway features, safety/security, signage and wayfinding, and trailheads. The major takeaways from the evaluation found that wayfinding and directional signage, and improved roadway crossings are needed, that trails of less than 8' in width will not be classified as a trail, and that trailway gaps should be closed to improve connectivity.

When assessing on-street bikeways the following metrics were considered: speed limit, traffic volumes, thoroughfare classification, number of Lanes and right-of-way characteristics. The goal of recommending new bikeway designations is to provide safe on-street bicycle routes throughout Flower Mound that increase connectivity between neighborhoods and to regional destinations. The two recommended types of on-street bikeway accommodations are shared-use lanes and bike lanes.

A feasibility review of proposed corridors reviewed rights-of-way, environmental features, the built environment, location of utilities, and similiar elements which impact the feasiblity of constructing a trail or bikeway.

The needs assessement informed the overall recommendations system. This system will connect the system, provide connections to destinations, improve safety, and increase safety.

WHITE LAZY DAISY TRAIL

RECOMMENDED NETWORK

The recommended network includes variety of facility types including paved multi-use trails, both on-street and off-street, soft surface trails, equestrian trails, bike lanes, shared-use lanes, paddling trails, and other soft surface trails. The key components of this network leverage connections to major destinations, the creation regional connections and the reduction of existing gaps. Cumulatively, Flower Mound's recommended network would include over 129 miles of new trail. This plan does not recommend additional Town maintained soft surface trails or other soft surface trails. Town maintained soft surface trails will be strategically located based off of towns digression in the future due to maintenance cost

BLUEBONNET TRAIL

PAVED MULTI-USE TRAILS

Existing: 59.3 miles
Proposed: 82.1 miles
Total: 141.4 miles

SOFT SURFACE TRAILS

Existing: 0.3 miles
Proposed: 0 miles
Total: 0.3 miles

EQUESTRIAN TRAILS

Existing: 14.6 miles
Propsoed: 10.9 miles
Total: 25.5 miles

BIKE LANES

Existing: 4.3 miles
Propsoed: 16.5 miles
Total: 20.8 miles

SHARED-USE LANES

Existing: 1.3 miles
Propsoed: 18.3 miles
Total: 19.6 miles

PADDLING TRAILS

Existing: 0 miles
Propsoed: 2.3 miles
Total: 2.3 miles

PLAN PRIORITIZATION

Implementation of this plan's trails and bikeways recommendations will take time, funding, and coordination amongst various partners. This plan recommends over 90 miles of new trail and bikeway facilities in Flower Mound. To prioritize those projects over time trail segments were ranked based on criteria established and refined with the Steering Committee and Technical Working Group . Once the criteria were set, each proposed trail and bikeway segment was scored based on the established criteria and given an overall score, which was then translated to high, medium, and low priorities. High priority corridors are projects for the first five years of plan implementation, medium priority is five to ten years and low priority is beyond ten years. Specific criteria were used to rank multi-use trails and bikeways respectively.

PRIORITY PROJECTS

The development of the Town of Flower Mound Trails and Bikeways Master Plan spanned approximately 17 months, starting in February 2021 and concluding in June 2022. Throughout this process, Town staff, a designated steering committee, stakeholders, elected/appointed officials, and residents were engaged to guide the master plan recommendations. The resulting community-driven vision forms the foundation for trails and bikeways in Flower Mound for the next decade.

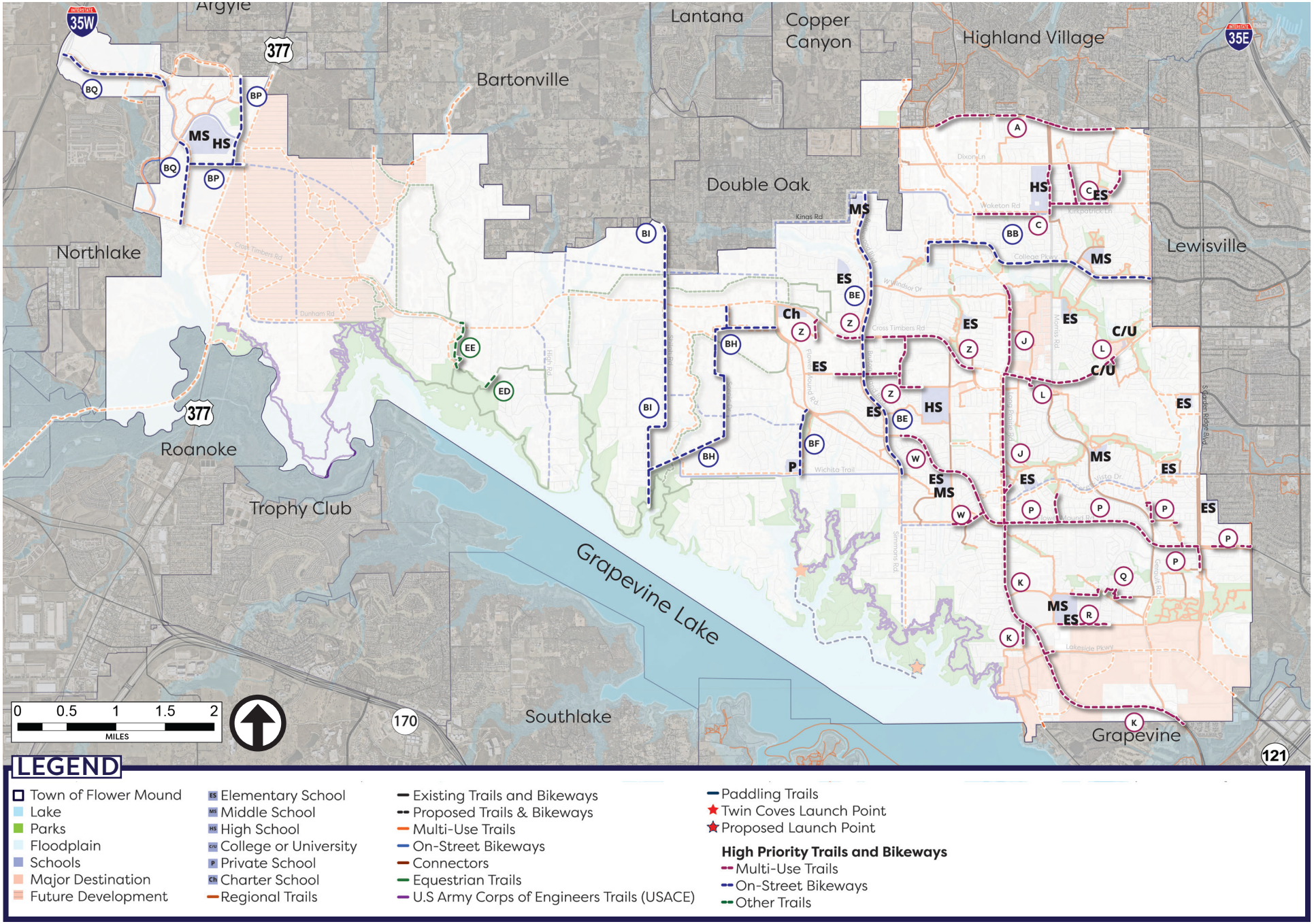
Other priorty projects include addressing existing safety issues, improving amenities and trailheads, and analyzing existing roadway crossings.

Based on the final priority for all the facility types 50 percent of the high priority projects are for Town multi-use trails, 39 percent are for bikeways, and 11 percent are for equestrian trails. All high priority projects are combined into a single systemwide prioritization table (page xviii) and map (page xix). The table is the overall recommendation summary for the high priority trail segments in Flower Mound. The table reflects the facility type, length and the average estimated cost based on the estimated project costs above. The last column for funding partnerships displays mechanisms that can assist in the development of each of the corridors.

EXISTING BLIND SPOT

NEIGHBORHOOD ACCESS TO TRAILS SYSTEM

Corridor ID	Corridor	Facility Type	Length (miles)	Average Cost Estimate	Funding Partnerships
A	Justin Rd	Multi-Use	1.7	$2,763,600	Developer, CIP, Bond
C	Waketon/Morris/Kirkpatrick Ln	Multi-Use	2.3	$3,802,653	Developer, CIP, Bond
J	Long Prairie Rd	Proposed Veloweb	2.5	$4,119,589	Developer, CIP, NCTCOG, Bond
K	Long Prairie Rd	Proposed Veloweb	3.5	$5,696,871	Developer, CIP, NCTCOG, Bond
L	Cross Timbers Rd	Proposed Veloweb	1.12	$1,824,699	Developer, CIP, NCTCOG, Bond
P	Flower Mound Rd/Garden Ridge Blvd	Multi-Use	3.18	$5,169,875	Developer, CIP, NCTCOG, Bond
Q	Shadow Ridge Park/Sweet Water Ln	Multi-Use	0.77	$1,255,926	Developer, CIP
R	Spinks Rd	Multi-Use	0.53	$856,482	Developer, CIP
W	Flower Mound Rd/McKamy Creek	Multi-Use	1.87	$2,953,822	Developer, CIP, Bond
Z	Cross Timbers Rd/Auburn Dr/Quail Rn/Peters Colony	Multi-Use, Proposed Veloweb	2.98	$4,837,647	Developer, CIP, NCTCOG, Bond
BB	College Pkwy	Shared-Use Lane	2.57	$192,649	CIP, NCTCOG, Developer
BE	Bridlewood Blvd/Burton Orand Blvd	Shared-Use Lane	3.01	$225,985	Transportation Funds, CIP, NCTCOG
BF	Skillern Rd	Shared-Use Lane	0.67	$50,034	Transportation Funds, CIP, NCTCOG
BH	Scenic Dr	Bike Lane/Shared-Use Lane	2.80	$226,775	Transportation Funds, CIP, NCTCOG
BI	Shiloh Rd	Bike Lane	3.01	$285,904	Transportation Funds, CIP, NCTCOG
BP	Future Corridor/Stonecrest Dr	Shared-Use Lane/Bike Lane	0.90	$85,667	Transportation Funds, CIP, NCTCOG
BQ	Denton Creek Blvd	Bike Lane	1.73	$163,998	Transportation Funds, CIP, NCTCOG
ED	Hidden Brook Farm	Equestrian	0.58	$363,736	Developer, CIP
EE	Cross Timbers	Equestrian	0.16	$100,288	Developer, CIP
Priority Project Totals			**35.88**	**$34,976,200**	


Argyle
Lantana
Copper Canyon
Highland Village
Bartonville
Double Oak
Lewisville
Northlake
Roanoke
Trophy Club
Grapevine Lake
Southlake
Grapevine
35W
35E
377
170
121
0 0.5 1 1.5 2
MILES
LEGEND
Town of Flower Mound
Lake
Parks
Floodplain
Schools
Major Destination
Future Development
Elementary School
Middle School
High School
College or University
Private School
Charter School
Regional Trails
Existing Trails and Bikeways
Proposed Trails & Bikeways
Multi-Use Trails
On-Street Bikeways
Connectors
Equestrian Trails
U.S Army Corps of Engineers Trails (USACE)
Paddling Trails
Twin Coves Launch Point
Proposed Launch Point
High Priority Trails and Bikeways
Multi-Use Trails
On-Street Bikeways
Other Trails

Introduction
Plan Purpose
Benefits of Active Transportation
Planning Process
Plan Structure
Vision & Goals

01 INTRODUCTION

VISIONING PUBLIC OPEN HOUSE

HERITAGE PARK

INTRODUCTION

The Town of Flower Mound Trails and Bikeways Master Plan serves as a blueprint for the future implementation of trail facilities and on-street bikeways throughout the town. The facilities recommended in this plan provide safe routes for cycling, walking, running, hiking, paddling, and horseback riding throughout the town that would provide connectivity to adjacent communities.

BACKGROUND

The Town of Flower Mound is located in Denton County. The town lies on the northern shore of Lake Grapevine, approximately 23 miles northwest of Dallas and 23 miles northeast of Fort Worth. With its proximity to the Dallas Fort Worth Airport, major employers and entertainment opportunities, a unique and cultivated environment, great schools, and high-quality public facilities, Flower Mound has become a desirable place to live in the Dallas-Fort Worth (DFW) Metroplex. The Town's population has grown 20% in the last 10 years and is projected to roughly double in size to 117,555 residents by 2045[1]. While the eastern side of the town is primarily built out, there is an abundant amount of open space and vacant land in the western portion of Flower Mound. As the town continues to grow, the demand for a high-quality trails and bikeways system will continue to increase for both recreation and commuting purposes.

In 2017, the Town of Flower Mound updated their parks and recreation master plan. While this plan addressed trails, it did not provide the detailed guidance and implementation necessary to create a comprehensive system. The Town's intent was to later develop a trails and bikeways master plan to better assess the community's trail system needs today and in the future.

The trails and bikeways in Flower Mound today include a variety of branded trails named after wildflowers on the eastern side of town and soft surface trails used by hikers, mountain bikers, and equestrian users around Grapevine Lake. While these are great amenities and provide residents and visitors with active recreation opportunities, overall the trails are not well-connected and lack way-finding. This plan identifies key opportunities to expand and enhance the trails and bikeways system to connect residents to schools, parks, neighborhoods, entertainment centers, and adjacent communities.

1. Source: NCTCOG Regional Data Center, 2020.

PLAN PURPOSE

The purpose of the Trails and Bikeways Master Plan is to guide the development of network recommendations, design guidelines, and implementation recommendations for a system of off-street trails and on-street bikeways that will connect users to key destinations within Flower Mound and provide connections to adjacent communities. This plan will augment previous planning efforts to create community and provide active and healthy lifestyle opportunities.

A key component of the Trails and Bikeways Master Plan is a needs assessment which determines the existing conditions of the trail system, compares it to similar communities, and explores opportunities to enhance the network. A corresponding implementation plan provides a guide for trail and bikeway development and design through the next decade.

KEY OBJECTIVES OF THIS PLAN:

- Create a *vision* for the trails and bikeways system based on a robust public engagement process;
- Conduct a *needs assessment* to determine how Flower Mound aligns with benchmark communities and where trails and bikeways are needed;
- Identify a *comprehensive and connected network* of trails and bikeways to be implemented over the next 20+ years;
- Provide *design standards and policy recommendations* for the system; and
- Provide guidance necessary to *implement the plan* in short, mid, and long-range targets.

BLUEBONNET TRAIL

BENEFITS OF ACTIVE TRANSPORTATION

The benefits of active transportation are well documented and include: healthier lifestyles, economic benefits, safer spaces, and social benefits.

HEALTH BENEFITS

Source: https://www.saferoutespartnership.org/healthy-communities/101/facts

By providing a safe and connected trails and bikeways system, walking and biking becomes more convenient. It is easier to incorporate physical activity into daily life when there is an accessible system. Active transportation can help combat obesity, improve mental health, and improve moods.

ECONOMIC BENEFITS

Source: Active Transportation and Health Economic Impact Study, Southern California Association of Governments

Proximity to parks and trails can have a positive impact on property values. There has been an increased demand for walkable places in Flower Mound, as illustrated in the Town Plan. Walking and biking can reduce costs associated with vehicle ownership, like routine maintenance, gas, and wear and tear on tires.

SOCIAL BENEFITS

Source: "Impact Speed and a Pedestrian's Risk of Severe Injury or Death," Brian Teft, September 2011, http://aaafoundation.org/wp-content/ds/2018/02/2011PedestrianRiskVsSpeedReport.pdf

Trails and bikeways can connect residents to neighborhoods, parks, schools, entertainment areas, and surrounding communities. By activating the public realm, you can create social spaces that encourage interaction, and increase safety along corridors. Trails and bikeways provide safe, equitable transportation options.

SAFETY BENEFITS

Source: https://www.saferoutespartnership.org/

Roadways can be designed to be safer for all roadway users. Improvements include reduction in the number or width of travel lanes, widths, and speeds as well as intersection and mid-block crossing improvements. This can lead to less severe crashes, increased comfort, and usability of the roadway system for all users.

PLANNING PROCESS

The development of this plan spanned approximately 15 months, starting in February 2021 and concluding in July 2022. Throughout this process, Town staff, a designated steering committee, stakeholders, elected/appointed officials, and citizens were engaged to guide the master plan recommendations. The resulting community-driven vision forms the foundation for the future of trails and bikeways in Flower Mound for the next decade.

Phase 1: Community Understanding

The first step in any planning process is understanding the existing trails and bikeways system in the Town. This includes assessing the trails system, identifying strengths and opportunities, as well as gaining an understanding of the current population and relevant studies that may impact the Trails and Bikeways Master Plan.

Phase 2: Community Visioning

Engaging the community for their vision to create the overall system helps to create the vision and goals for plan. Engagement opportunities included virtual engagement rooms, public open houses, an online survey, interactive maps, and pop-up tents at community events.

Phase 3: Needs Assessment

An analysis of the needs and overall trails system compared to national best practices helps to identify recommendations for the proposed trails and bikeways network. This includes assessing the existing network, identifying safety issues and barriers, determining where gaps may exist, and assessing demand for new facilities.

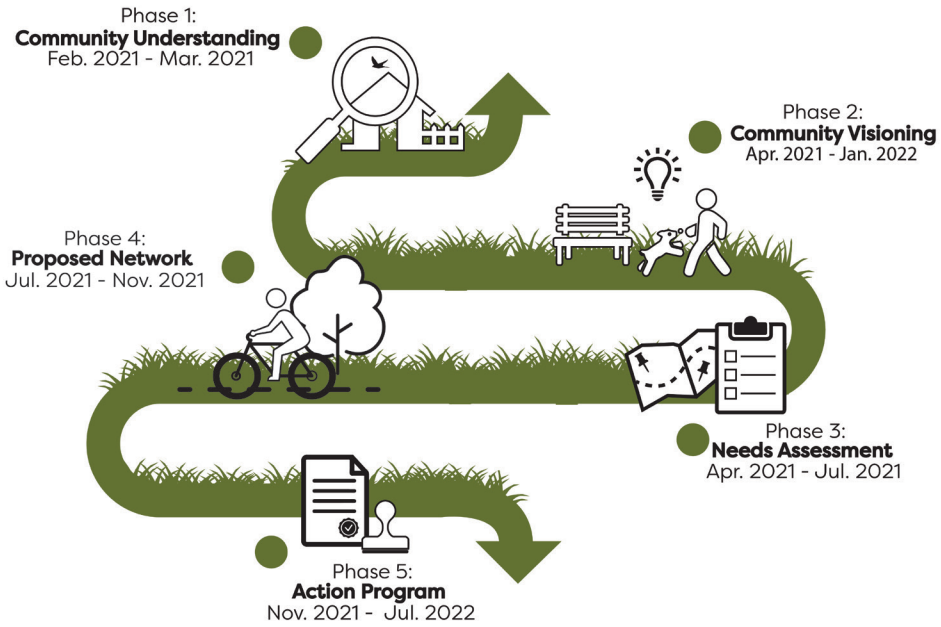
Phase 4: Proposed Network

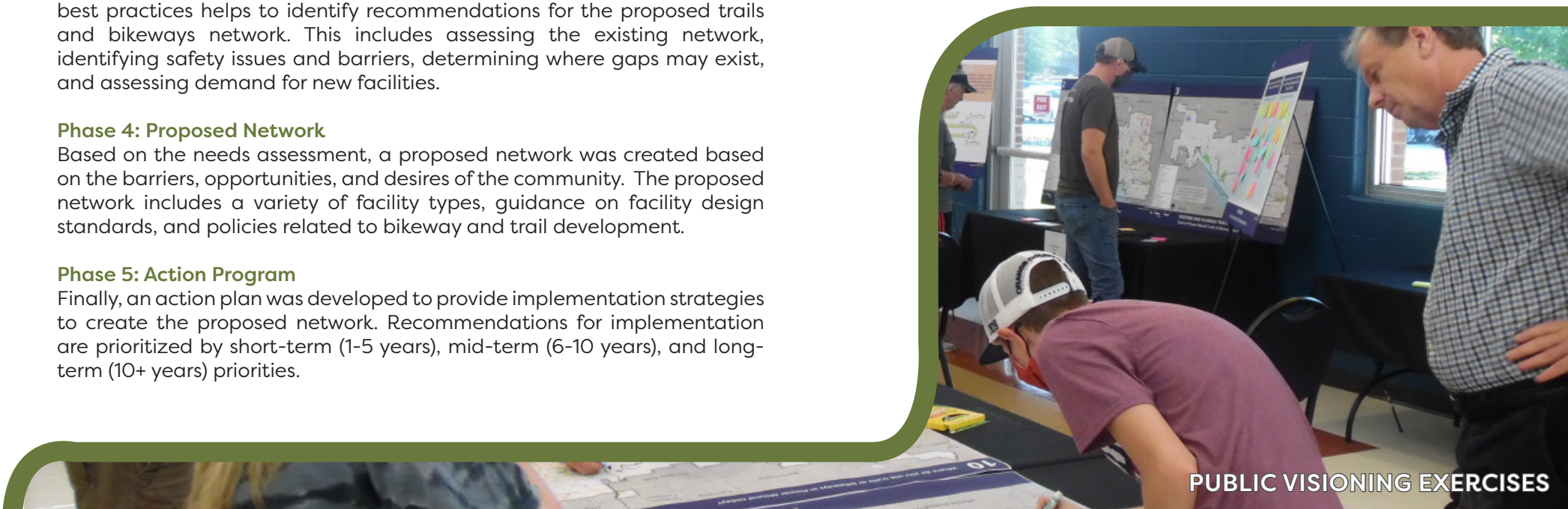
Based on the needs assessment, a proposed network was created based on the barriers, opportunities, and desires of the community. The proposed network includes a variety of facility types, guidance on facility design standards, and policies related to bikeway and trail development.

Phase 5: Action Program

Finally, an action plan was developed to provide implementation strategies to create the proposed network. Recommendations for implementation are prioritized by short-term (1-5 years), mid-term (6-10 years), and long-term (10+ years) priorities.

FIGURE 1.1 PLANNING PROCESS





PUBLIC VISIONING EXERCISES

PLAN STRUCTURE

The Flower Mound Trails and Bikeways Master Plan is separated into seven chapters.

01 **Introduction** – Describes the plan purpose and background and provides the plan's vision and goals.

02 **Community Context** – Provides an overview of the Town of Flower Mound, including demographics, relevant plans and studies, and the existing trails and bikeways system.

03 **Trails & Bikeways System Needs** – Documents the analysis undertaken which determines the needs for additional trails and bikeways by determining the current level of service, community needs, and barriers and opportunities for the system.

04 **Trails & Bikeways System Network** – Creates a proposed network and facility hierarchy to connect neighborhoods to key destinations and to surrounding communities.

05 **Trails & Bikeways Standards** – Provides design guidelines for the creation of bikeway facilities, roadway crossing safety, trailheads and amenities, signage/way-finding, maintenance, and a framework for a branding system.

06 **Implementation** – Prioritizes projects and provides implementation strategies for short and long-term improvements. This chapter identifies policy recommendations, potential projects, and potential funding mechanisms and partnerships to develop the system.

07 **Appendix** – Provides additional data, graphics, and resources to support the Trails and Bikeways Master Plan.

PLAN VISION AND GOALS

Visioning was a substantial and important part of the public engagement process. In the first phase of the project, the Town hosted a variety of public engagement meetings with key stakeholders and the general public. During those meetings, attendees were asked how they envision walking, cycling, riding, and paddling in Flower Mound in the future. Input from the engagement helped shape the vision and goals for the Town of Flower Mound Trails and Bikeways Master Plan.

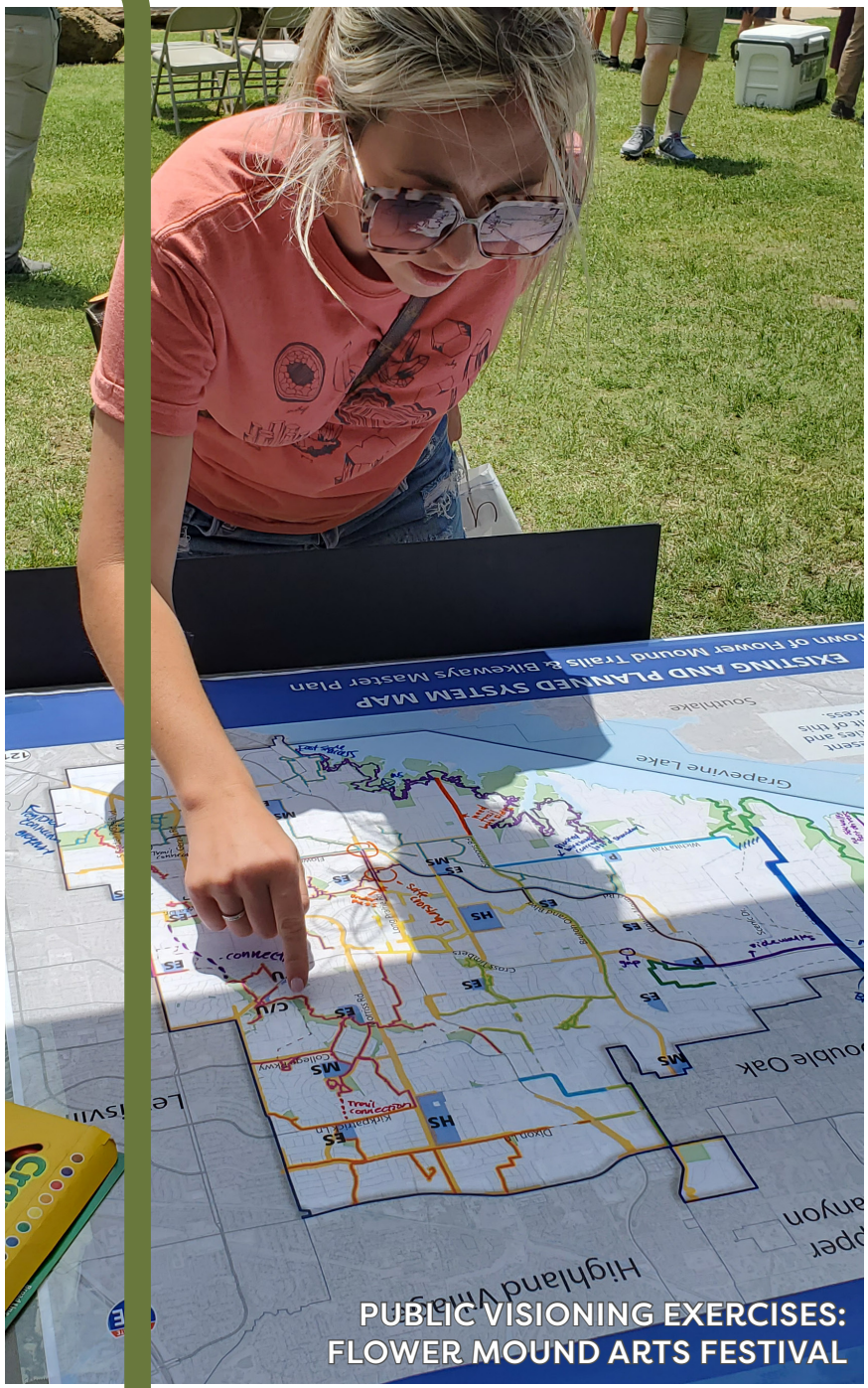
PLAN VISION

The Town of Flower Mound will have a connected, safe, and accessible system of trails and bikeways that promotes public health, economic development, and active transportation to improve overall quality of life for residents and visitors for generations to come.

GOAL 1: CONNECTED COMMUNITY

Create a complete trails and bikeways system that connects the community with active transportation options.

Objective 1.1: Increase trail level of service.
Objective 1.2: Provide trail and bikeway connections to key destinations.
Objective 1.3: Fill in gaps in the existing trail system.



PUBLIC VISIONING EXERCISES:
FLOWER MOUND ARTS FESTIVAL

GOAL 2: SAFE AND ACCESSIBLE SYSTEM

Ensure the trails and bikeway system is safe, comfortable, and accessible for users of all abilities and ages.

Objective 2.1: Provide a variety of facility types appropriate for different abilities.
Objective 2.2: Improve overall safety and comfort of existing facilities.
Objective 2.3: Address areas identified as barriers within the existing trail system.

GOAL 3: USER FRIENDLY

Improve awareness, signage, and usability of the trails and bikeways system.

Objective 3.1: Increase awareness of the existing trail and bikeway system.
Objective 3.2: Create a consistent brand across the trails system so it is easily recognizable.
Objective 3.3: Install wayfinding signage to direct users to destinations along the trails.

GOAL 4: UNIQUE SYSTEM

Design and construct trails that support the health and wellness of the community and natural environment.

Objective 4.1: Provide for safe and convenient active transportation options.
Objective 4.2: Provide for interpretative and educational opportunities along trails.
Objective 4.3: Utilize an environmentally-friendly and context-sensitive approach to developing and maintaining trails.

INDIAN BLANKET TRAIL

GOAL 5: PARTNERSHIPS

Leverage partnerships between the Town and the community, internal and external organizations, and outside agencies to achieve a connected trails and bikeways system.

Objective 5.1: Pursue joint projects with surrounding cities, the County, NCTCOG, TxDOT, USACE, and utility providers.
Objective 5.2: Maintain relationships with user groups to solicit feedback on the trails and bikeways system.
Objective 5.3: Work with other departments to incorporate bicycle and pedestrian accommodations into ongoing or upcoming projects.

GOAL 6: FUNDING

Pursue a variety of funding sources for trails and bikeway development.

Objective 6.1: Apply for grant funding to implement trail and bikeway projects.
Objective 6.2: Continue to work with developers to ensure trails and bikeways are included with new development.
Objective 6.3: Coordinate with user and volunteer groups to help fund improvements to trails and bikeways.

LAKESIDE VILLAGE MIXED USE DEVELOPMENT

History
Demographics
Planning Guidelines
Existing Trails and Bikeways System

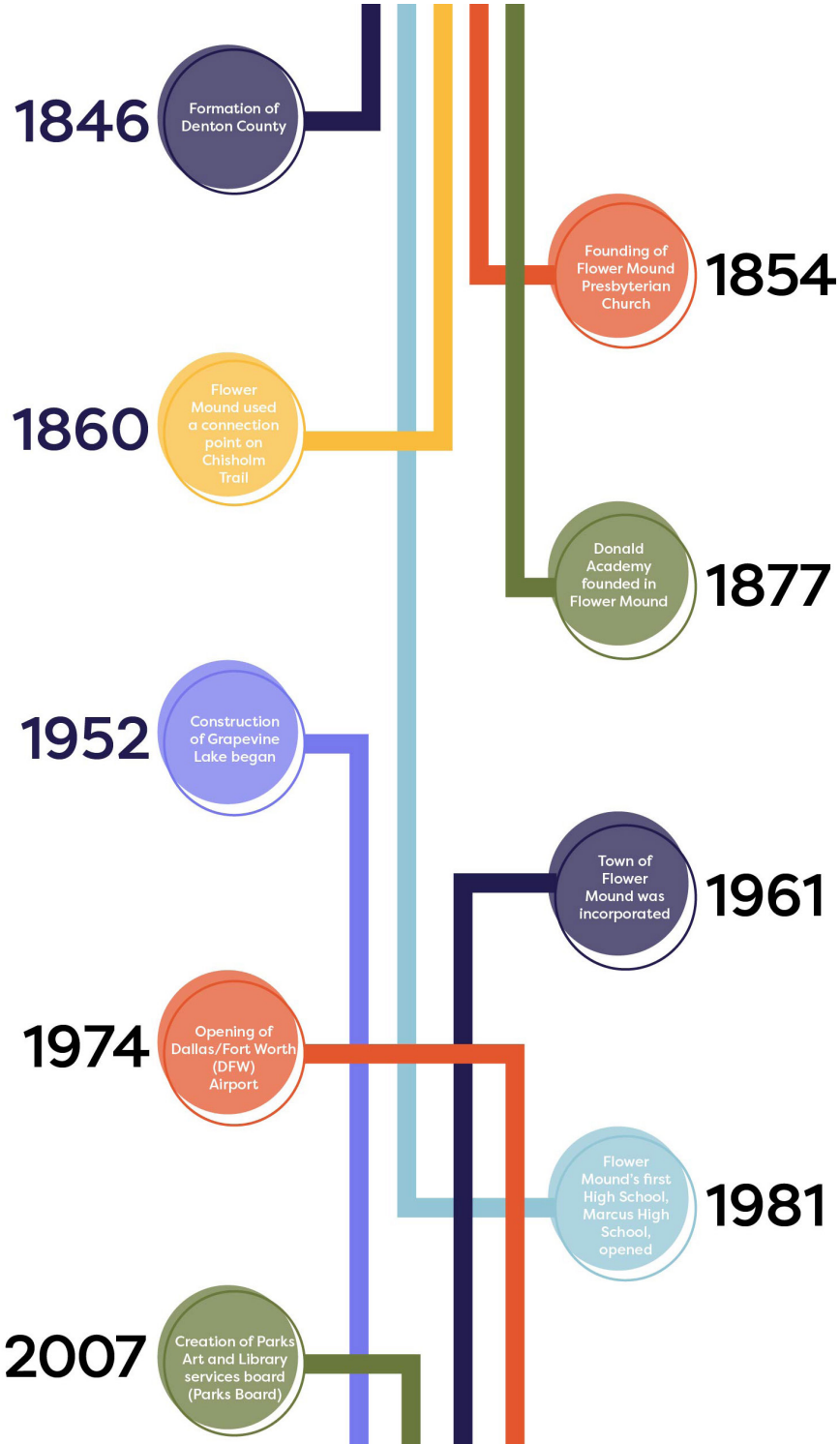
02 COMMUNITY CONTEXT

HISTORY

Based off archaeological surveys completed by the U.S. Army Corps of Engineers (USACE), people settled in Denton County as early as 4,000 – 2,500 B.C. However, in 1846 Denton County was officially formed in Texas. During the 1840s, the area of Flower Mound was used as religious camps and was permanently inhabited during the 1850s. In 1854, Flower Mound Presbyterian Church was founded. The community's most unique feature is its natural landscape, which made the area a great location for the historic Chisholm Trail. During the 1860s, along what would be Interstate 35 West (I-35W) today, the Chisholm Trail provided a network to over six million cattle during the 20-year period following the Civil War. In 1877, Donald Academy was founded in Flower Mound and was the largest rural school in Denton County. The school catered to grades first to tenth.

Transitioning into the 20th century, the landscape of Flower Mound began to truly take its form. In 1952, the construction of Grapevine Lake began and lasted for about a year. With the opening of road networks during the late 1950s like I-35 East, regional visitors could travel more easily throughout the Dallas-Fort Worth area. To avoid being annexed by the City of Irving, in 1961 the Town of Flower Mound became incorporated, and Bob Rheudasil became the first mayor of the Town. With the opening of Dallas/Fort Worth (DFW) Airport in 1974, Flower Mound's population boomed. During this decade, the first school in the Lewisville Independent School District, Timber Creek Elementary, opened. Then in 1981, Marcus High School, Flower Mound's first high school within the town boundaries, opened its doors to students. While the first traces of Flower Mound's Park Board dates before 1985, in 2007 the Town's Parks, Art and Library Services Board was created which is now readily recognized as today's parks board. Over the years, Flower Mound has continued to expand and build a community filled with recreation opportunities for its residents.

FIGURE 2.1: HISTORICAL TIMELINE OF FLOWER MOUND



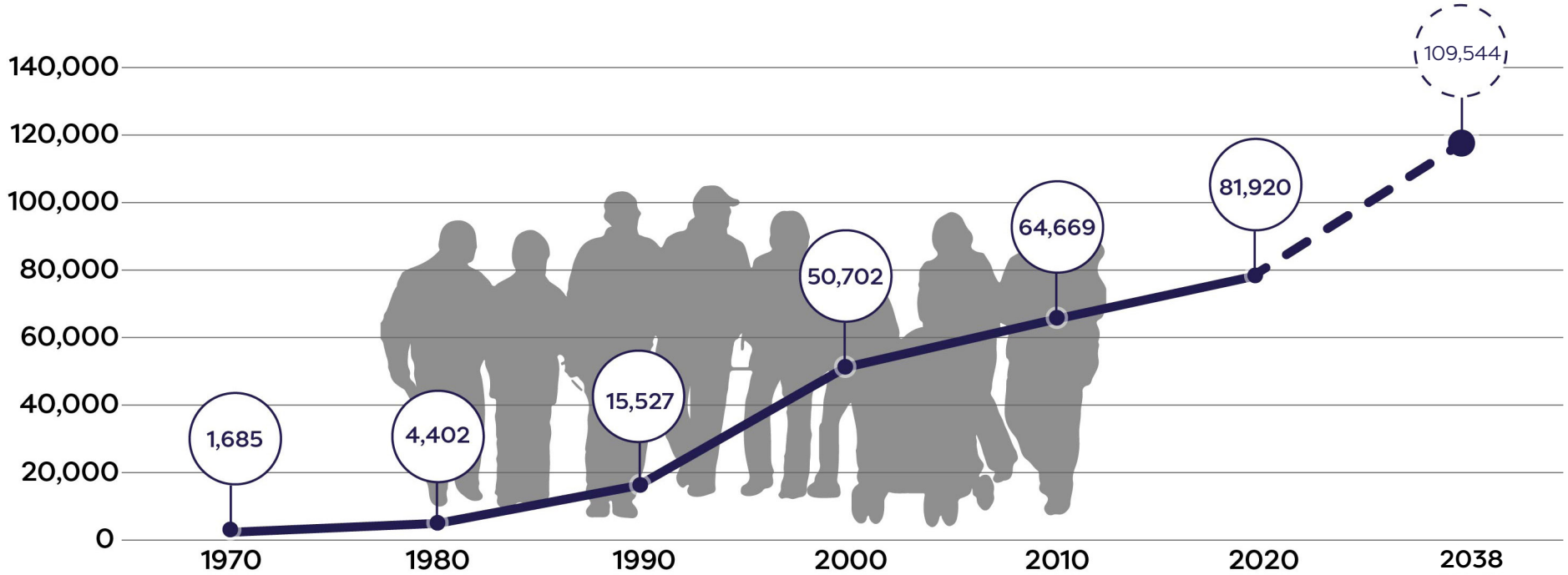
DEMOGRAPHICS

The demographic makeup of a community is significant in the beginning of the planning process. Demographic characteristics such as population growth, age, gender, race, and income help paint the landscape of a community and contribute to what the needs are for trails and bikeways.

GROWTH TRENDS

Flower Mound experienced a significant increase in population during the 1970s. This corresponds with many neighboring communities as the entire region saw a huge population boom during this time with the opening of DFW Airport in 1974 and subsequent expansion of road networks and job opportunities. Over the next 30 years, Flower Mound's population would continue to expand exponentially, with the most significant growth period occurring during the 1980s. After the 1990s, Flower Mound's population growth began to plateau. However, the town has seen an increase in their population by 54 percent since 2000. Based off population projections by the Town of Flower Mound, by 2038 the Town will be built-out with a population of approximately 109,544 residents. This would be about a 50 percent increase over the next 20 years.

FIGURE 2.2: FLOWER MOUND POPULATION GROWTH



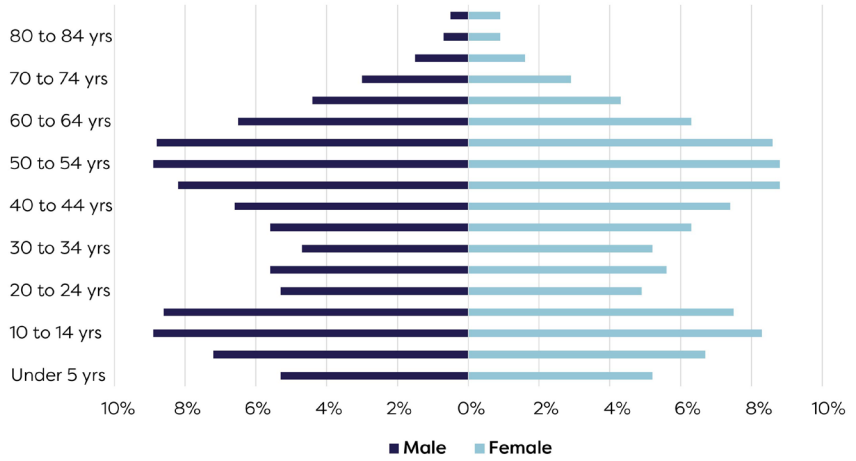
Source: Town of Flower Mound Planning Department

AGE AND GENDER CHARACTERISTICS

Flower Mound's population is characterized by two principal age groups: middle-aged adults and children. In 2020, individuals between the ages of 45-54 represented the largest portion of the population, equaling 17.4 percent. The next largest age group is between the ages of 55-64 making up 11 percent. The third largest group is younger adults between the ages of 10-14. Together these three cohorts reflect an older population being dominant in Flower Mound along with a strong presence of families. This idea can also be reinforced through the Town's median age of 39 years. This is older than both Denton County's median age of 35 and the state of Texas median age of 34.

Females make up 50.8 percent of the overall population. However, males in Flower Mound surpass their female counterparts between the ages of 5 to 24 and 50 to 74. The age groups where females surpass males is children under the age of 5 and individuals between the ages 30 to 49 and 70+.

FIGURE 2.3: AGE AND GENDER, 2020



RACE AND ETHNICITY CHARACTERISTICS

In 2020, 77.7 percent of Flower Mound's population identified as white, followed by 12.5 percent of residents identifying as Asian, and 4.4 percent identifying as Black. The percentage of residents that identify as Hispanic ethnicity is 9.9 percent. Over the past ten years, Flower Mound's overall population has increased by about 27 percent and during that time most racial and ethnic groups saw an increase as well. The group with the largest percent increase was the Asian population (85 percent increase from 2010 to 2020). The second group that saw the second largest increase was Black residents with a percent increase of 74 percent.

TABLE 2.1: RACE AND ETHNICITY CHARACTERISTICS

Race	2010	2020	Percent Change
Total Population	64,669	81,920	26.7%
White	83.8%	77.7%	- 17.3%
Black	3.2%	4.4%	74.4%
American Indian and Alaska Native	0.5%	0.5%	23.5%
Asian	8.6%	12.5%	85.4%
Native Hawaiian and Other Pacific Islander	0.1%	0.1%	45%
Other Race	1.6%	2.1%	62.9%
Two or More Races	2.2%	2.7%	59%
Ethnicity			
Hispanic or Latino (of any race)	8.4%	9.9%	49.7%

Source: U.S. Census Bureau, Census 2010 Summary File 1. ESRI forecasts for 2020.

HOUSEHOLD CHARACTERISTICS

The majority of Flower Mound's housing stock is occupied and owned. In 2020, 99 percent of housing units were occupied. Since 2010, this percentage has increased by 2 percent. Of the occupied housing units in Flower Mound, 83.9 percent are owned, meaning that the remaining 15.4 percent are rented. The remaining 0.8 percent represents vacant units. These housing characteristics have stayed relatively consistent since 2010. The average housing value is currently $403,416, which is one of the highest average values in the DFW region. 51.1 percent of houses in Flower Mound fall within the value bracket of $300,000 to $499,999.

The median household income in Flower Mound is $138,873. This is significantly higher than the median household income of Denton County ($86,913) and the state ($61,874). Of the residents that live in Flower Mound, 68.8 percent of the population make $100,000 or more. These housing characteristics indicate that many households in Flower Mound have higher disposable incomes than other communities in the DFW region to spend on recreation and leisure.

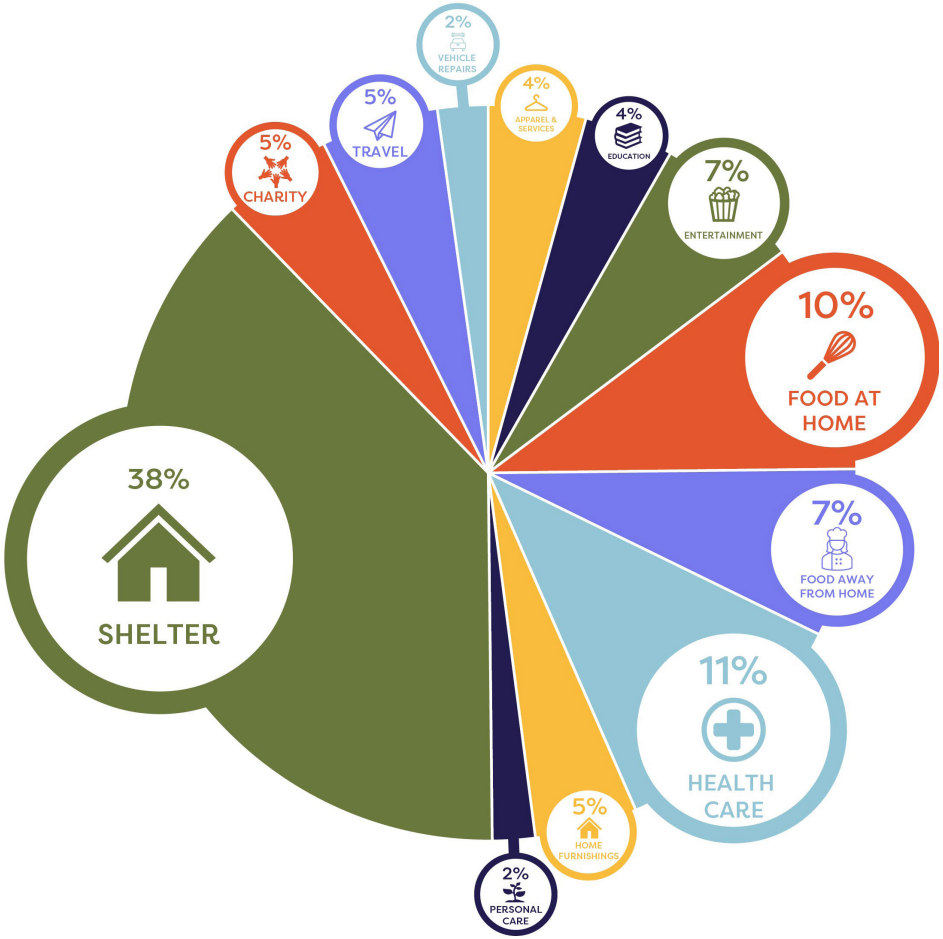
Figure 2.4 displays Flower Mound's consumer spending in 2020. Consumer spending shows the amount spent on a goods and services by households in Flower Mound in the year of 2020. The largest category individuals in Flower Mound spent money on was towards their houses (38 percent). The second largest category was spent towards health care costs (11 percent), followed by food categories, such as food at home (10 percent) and food away from home (7 percent).

TABLE 2.2: HOUSEHOLD CHARACTERISTICS (2010-2020)

	2010	2020
Total Housing Units	43,097	51,244
Occupied Housing Units (%)	90.6%	91.1%
Vacant Housing Units (%)	9.4%	8.%
Owner-Occupied Housing Units	18,488	22,747
Median Mortgage Cost	$1,545	$1,698
Renter-Occupied Housing Units	47.7%	46.7%
Median Rent	$782	$1,082
Total Households	95,794	126,100

Source: 2015-2019 American Community Survey 5-Year Estimates; 2006-2010 American Community Survey 5-Year Estimates.

FIGURE 2.4: CONSUMER SPENDING

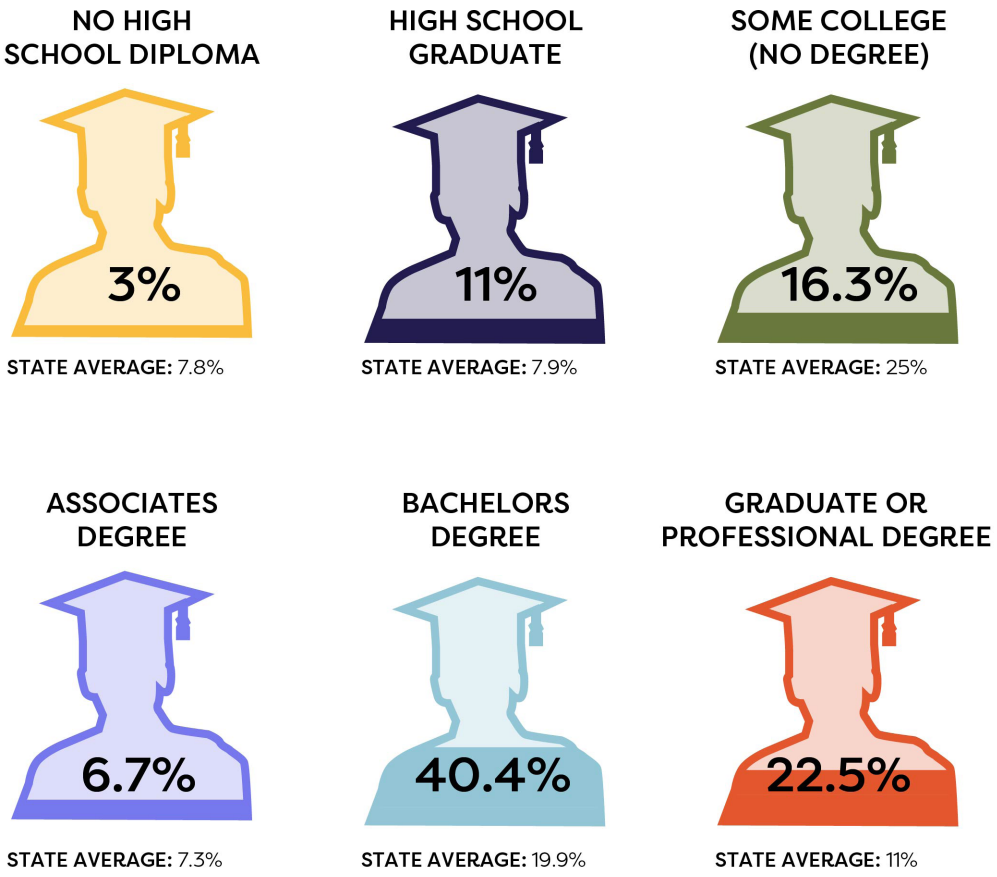


Source: U.S. Census Bureau, Census 2010 Summary File 1. ESRI forecasts for 2020.

EDUCATIONAL ATTAINMENT

Among the residents in Flower Mound who are over the age of 25, 40.4 percent have a bachelor's degree. This percentage is higher than the Denton County average at 30.8 percent and the state average at 19.9 percent. The next largest group is residents who earned their graduate or a professional degree, which make up 22.5 percent of Flower Mound's population. This percentage is also higher than the Denton County average of 15.4 percent and the state average of 11 percent. Overall, most of the population who are over the age of 25 have received a bachelor's degree or higher.

FIGURE 2.5: EDUCATIONAL ATTAINMENT, 2020



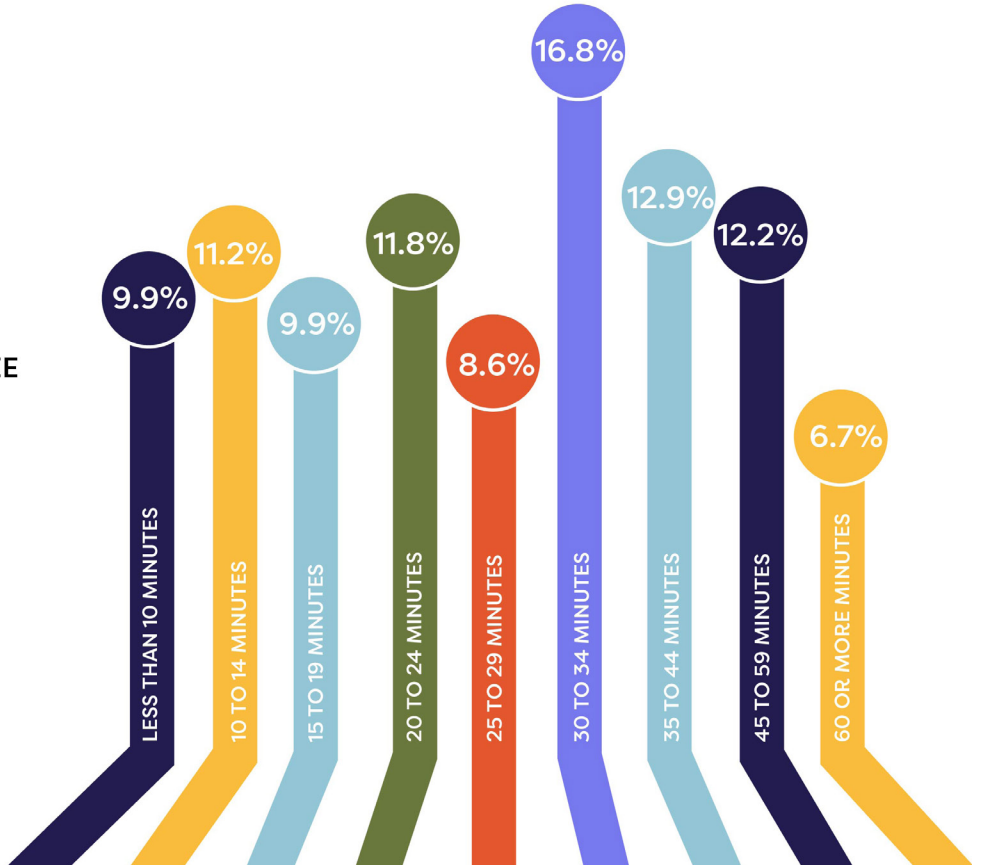
Source: U.S. Census Bureau, Census 2010 Summary File 1. ESRI forecasts for 2020.

COMMUTE TIME

According to the Census Bureau, the average commute time in 2019 was 28.4 minutes. Over the past five years, this number has decreased from 29.2 minutes and currently is at its lowest. For the working population over the age of 16, the most common commute time frame was between 30 - 34 minutes (16.8 percent). Additionally, 21.1 percent of the population in Flower Mound have a shorter commute time between 10 - 19 minutes and 25.1 percent of the population have a longer commute time between 35 – 59 minutes. In 2019, most of the population used a car, truck, or van as a means of transportation to work (86.6 percent). This number has fallen slightly since 2014. Over the past five years, Flower Mound has seen an increase of its population working from home and biking to work.

FIGURE 2.6: AVERAGE COMMUTE TIME, 2019

Source: U.S. Census Bureau, 2018 ACS 5-Year Estimates.

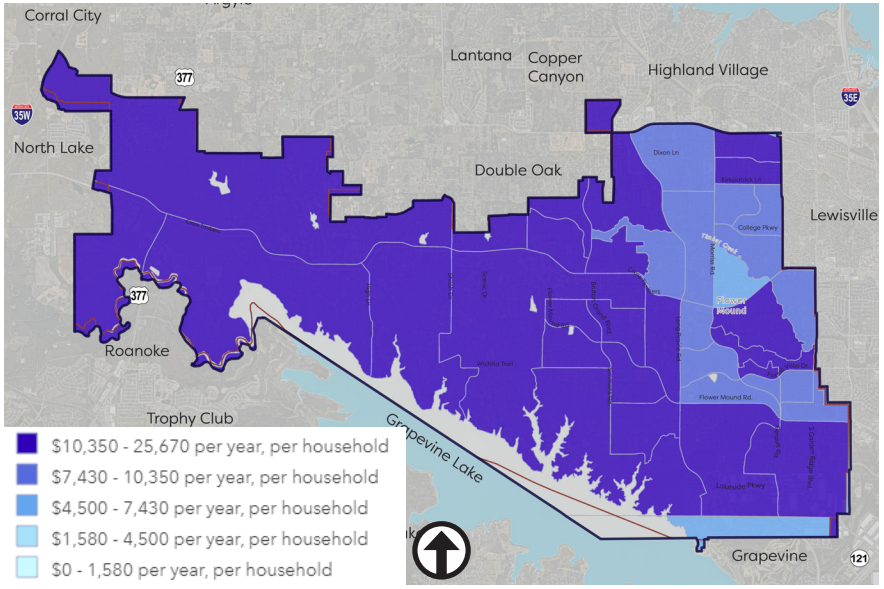


HEALTH

Figure 2.7 displays the average amount spent on healthcare per household in Flower Mound in 2021. All residents in the Town spend at least $4,500 per year towards their health. However, the largest proportion of the Town spends in the highest bracket that ranges between $10,350 - $25,670 a year. This aligns with healthcare services being the second largest category of consumer spending for the Town.

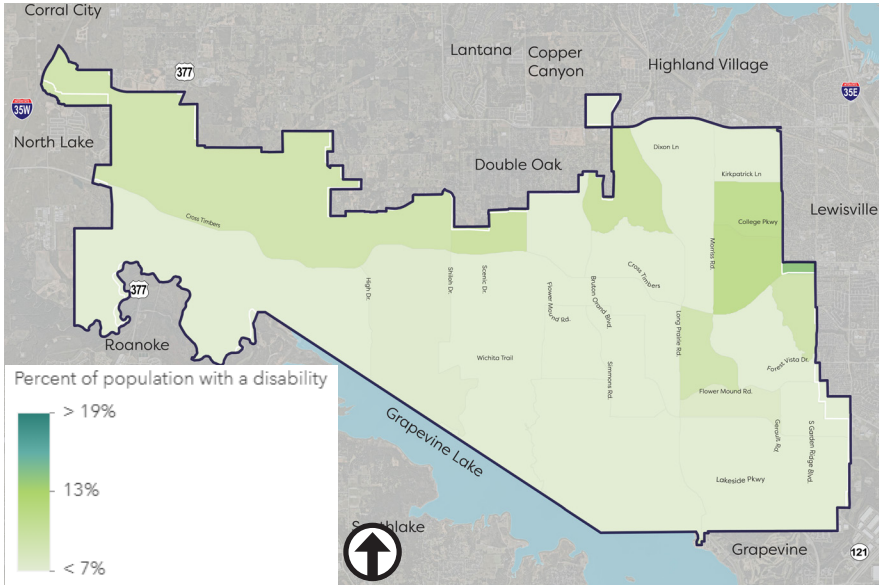
Figure 2.8 displays the percent of population with a disability, based off the six different types of disabilities: mobility/physical, visual, mental health, intellectual, hearing, and learning. Overall, Flower Mound has a low percentage of its population with a disability; in 2019, 5.8 percent of Flower Mound residents had a disability. The largest share of the population with a disability was residents over the age of 65 (55 percent). They are also concentrated on the east side of Flower Mound between Kirkpatrick St and Cross Timbers, primarily around the Pink Evening Primrose Trail.

FIGURE 2.7: HEALTH SPENDING, 2021



Source: ESRI's 2021 U.S Consumer Spending Data in Census 2010 Geo-graphics, Business Analyst.

FIGURE 2.8: PERCENT OF POPULATION WITH A DISABILITY, 2014

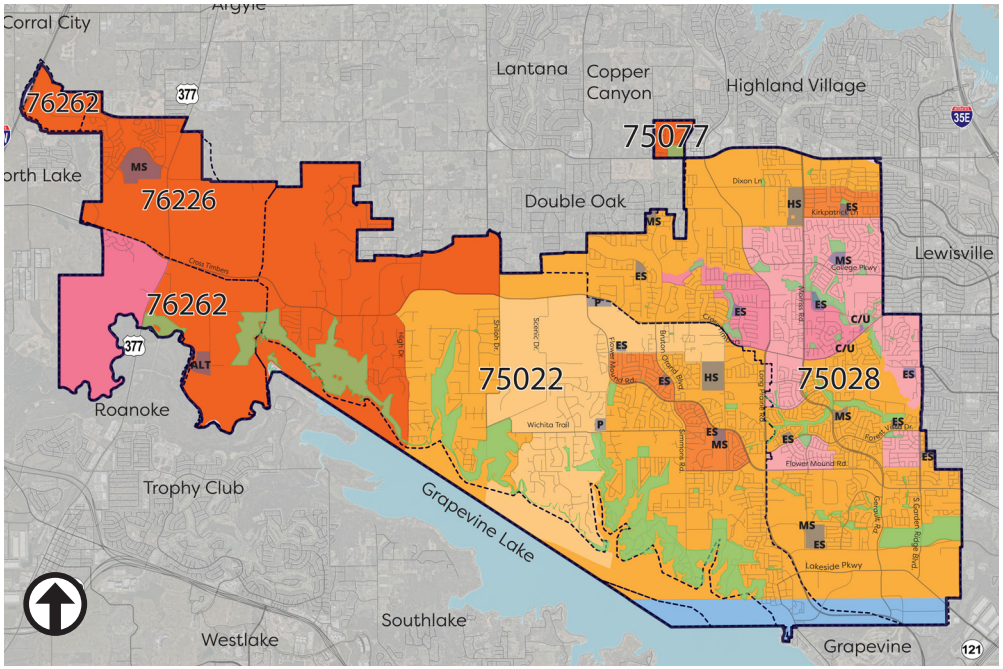


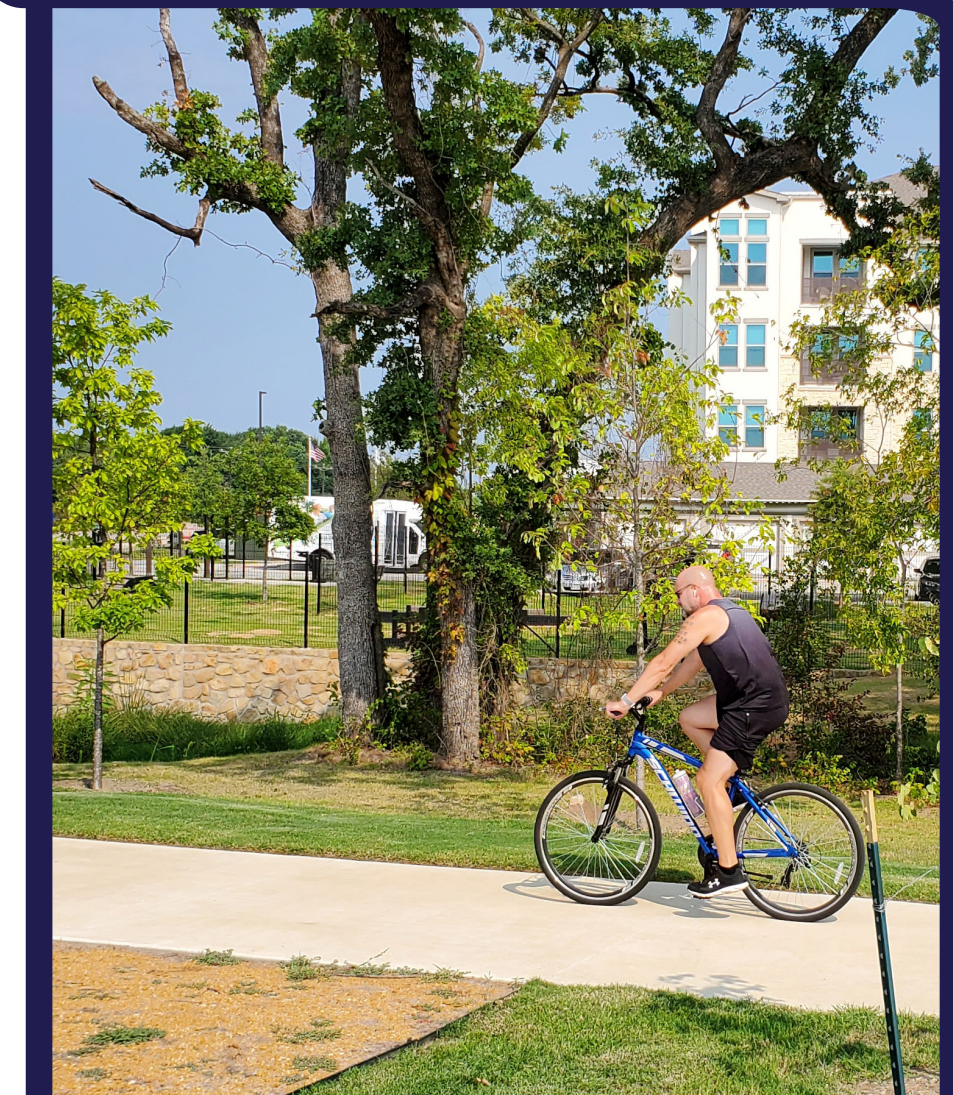
Source: 2010-2014 American Census Survey 5 year-data, Business Analyst.

ESRI TAPESTRY SEGMENTS

ESRI (Environmental Science and Research Institute) is a demographic and mapping company that uses spatial data to help inform communities. The ESRI tapestry market segmentation identifies markets in each community using its geographic, socioeconomic, and demographic characteristics. This helps communities better understand their consumer market. Based on Census block groups in Flower Mound, the top three most represented segments within Flower Mound are "Professional Pride," "Soccer Moms," and "Boomburbs". Page 25 and 26 display all the segments that are represented within Flower Mound along with their associated characteristics and definitions. **Figure 2.9** displays the location of zip codes in Flower Mound and the associated tapestry segments.

FIGURE 2.9: ESRI TAPESTRY SEGMENTS





1A TOP TIER

This segment is considered the wealthiest Tapestry market; members earn more than three times the average US household income. They are also highly educated and more than one in three residents have a postgraduate degree. They are socially responsible consumers that aim for a balanced lifestyle and take interest in expanding their knowledge.

Median Household Income
$173,200
Median Age
47.3
Average Household Size
2.84

1B PROFESSIONAL PRIDE

These residents are well-educated, career professionals that work in fields such as science, technology, law, or finance. They are goal-oriented and have well established families. Households in this segment like routine as a daily ingredient to their lifestyle.

Median Household Income
$138,100
Median Age
40.8
Median Household Size
3.13

1C BOOMBURBS

This is a new growth market with many well-educated young professionals with new families. The unemployment in this segment is low and most households have more than two workers. They are well connected to the newest technology and trends. Physical fitness is a priority for this group and leisure activities include sports such as hiking, biking, and golf.

Median Household Income
$113,400
Median Age
34
Median Household Size
3.25

1D SAVVY SUBURBANITES

This segment includes residents who are well educated and well capitalized. They are informed shoppers and do extensive research prior to making a purchase. They are in older neighborhoods and include families that have no children or adult children. Their suburban lifestyle has a focus on the outdoors like gardening or active pursuits.

Median Household Income
$108,700
Median Age
45.1
Median Household Size
2.85

4A SOCCER MOMS

These residents are an affluent and family-oriented market. The neighborhoods have a country flavor that are in the suburban periphery of metropolitan areas. This group carries a higher level of debt with the largest proportion having only some college. They favor time saving services and purchases revolve around family-oriented products. Outdoor activities are an important aspect of this group's lifestyle.

Median Household Income
$90,500
Median Age
37
Median Household Size
2.97

4B HOME IMPROVEMENT

This group is comprised of primarily married couple families that own a single-family home. They have high participation in the labor force and households typically have 2+ workers. Majority of incomes go towards paying off student loans, home mortgages, and eating out.

Median Household Income
$72,100
Median Age
37.7
Median Household Size
2.88

4C MIDDLEBURG

These residents have transformed from the easy pace of country living to semi-rural subdivisions. They are family-oriented consumers and typically a younger demographic. 65 percent have a high school diploma or some college and have a labor force participation rate typical of a younger population. Outdoor activities popular with this segment include hunting, fishing, and baseball.

Median Household Income
$59,800
Median Age
36.1
Median Household Size
2.75

3B METRO RENTERS

This segment is highly mobile and well educated with many still enrolled in college. Socializing is important to them as well as environmentally safe practices. They participate in leisure activities such as outdoor activities and yoga. They are very well connected and get a lot of their information via technology.

Median Household Income
$67,000
Median Age
32.5
Median Household Size
1.67

PLANNING GUIDANCE

PARKS AND RECREATION MASTER PLAN UPDATE

The 2017 Parks and Recreation Master Plan (PRMP) provides a framework for strategies regarding acquisition and development of recreation facilities for Flower Mound in the future. This plan focuses on the needs of the community within the next five to ten years and uses insights through engagement efforts as a foundation. The primary outcomes of the master plan were to identify a vision for the Parks and Recreation Department, determine the level of needs in current offerings, identify new opportunities that can be met by the department, complete initial testing on strategies for funding, and identify possible parks/facility components for new and future facilities. Finally, this plan identifies a variety of recommendations for the direction of the Parks and Recreation facilities for implementation.

According to the PRMP's level of service analysis, **paved multi-use trails were listed as the highest priority need** out of all parks and recreation amenities assessed as part of the plan. Nature trails and unpaved multi-use trails were also listed as a high priority. Additionally, the overall quality of walking/biking trails was identified as the highest-ranking response for survey takers when asked which services should receive the most attention over the next five years. Equestrian trails were ranked near the bottom in several questions related to identifying needs and priorities moving forward.

The strategic recommendations in the Parks and Recreation Master Plan outline action plans towards the community vision. There are four core community visions that are summarized by parkland and trails community mandates, facilities, programming, and operations and staffing. These four concepts each have a set of strategies that can be used as a road map for the future.

FIGURE 2.10: PRIORITIZED PROGRAM RANKING IN PARKS MASTER PLAN

Facility	Priority
Paved multi-use trails	High
Small neighborhood parks	
Nature trails (paved and unpaved)	
Large community parks	
Outdoor swimming pools/water parks	
Outdoor amphitheaters	
Off-leash dog park	
Unpaved multi-use trails	
Community garden	Medium
Outdoor water splash pads	
Picnic areas/pavilions	
Outdoor tennis courts	
Playground equipment	
Indoor gymnasiums	
Outdoor basketball courts	
Disc golf course	
Outdoor fishing areas	
Soccer fields	Low
Campgrounds	
Skate park	
Baseball & softball fields	
Football & lacrosse fields	
Boardwalks	
Cricket fields	
Equestrian trails	

BLUEBONNET TRAIL

ECONOMIC DEVELOPMENT PLAN

The mission of the Economic Development Plan is to expand the commercial tax base and increase sales tax revenue through resiliency and sustainability efforts. This plan outlines goals, objectives, and strategies to create a diversified and regionally competitive economy within Flower Mound. One major goal outlined in this plan is to develop community resources that contribute to a business environment to encourage development. One example of a strategy that supports this concept is the prioritization of transportation and mobility planning to ensure the efficiency of the thoroughfare system. Another example is maintaining comprehensive park systems and preserving the natural environment that enhance the quality of life and support economic goals. Together, these strategies work to support the community in encouraging high-quality development and promote economic activity.

OPEN SPACE PLAN

A previous vision for Flower Mound identified that a key goal was focused on preservation. The Open Space Plan creates the foundation of a vision for how to adequately produce strategies towards defining and conserving open spaces. These strategies provide an array of techniques to maintain the town's unique natural environment. The plan highlights that it is not to be used as simply an inventory but instead provides an appropriate menu of protection techniques for agricultural, natural, and scenic open spaces in Flower Mound. This plan also determines funding strategies with the best potential as well as voluntary and incentive opportunities for landowners. Finally, the plan does reference providing trail connections throughout open space areas, but also notes that paved recreational trails are not the primary intended use of open space in Flower Mound.

LAND USE PLAN

The Land Use Plan aims to promote more efficient uses of land within Flower Mound. The plan goals center around preservation of the unique natural environment, mitigation efforts of rapid urbanization, creation of a balanced tax base, and development efforts that have exemplary quality and design. These goals reflect Flower Mound's vision of the community and dictates the shape of the town and identifies strategies achieved. The specific land use categories can be found in this plan in more detail, along with specific details regarding six major planning areas which include: Lakeside Business District, Long Prairie District, Cross Timbers Protection Area, Cross Timbers Conservation Development District, Prairie Vista District and Denton Creek District.

The Lakeside Business District prioritizes commercial development to spark economic growth. Long Prairie District is 90 percent developed, however any future uses will comply with emphasizing quality of life and preserving remaining natural landscapes. The Cross Timbers Protection Area covers the areas within the Long Prairie District where Cross Timbers ecosystem exists. The purpose is to preserve the remnants of the Cross Timbers that have been compromised due to urbanization and enact development standards to uphold the remaining Cross Timbers environmental character. The Cross Timbers Conservation Development District and the Prairie Vista District preserve the ecological area in central Flower Mound. Lastly, the Denton Creek District prioritizes future growth and economic opportunity through supporting uses such as commercial, industrial development, mixed office, retail, and residential uses.

FIGURE 2.11: DISTRIBUTION OF LAND USES FROM THE TOWN OF FLOWER MOUND'S MASTER PLAN

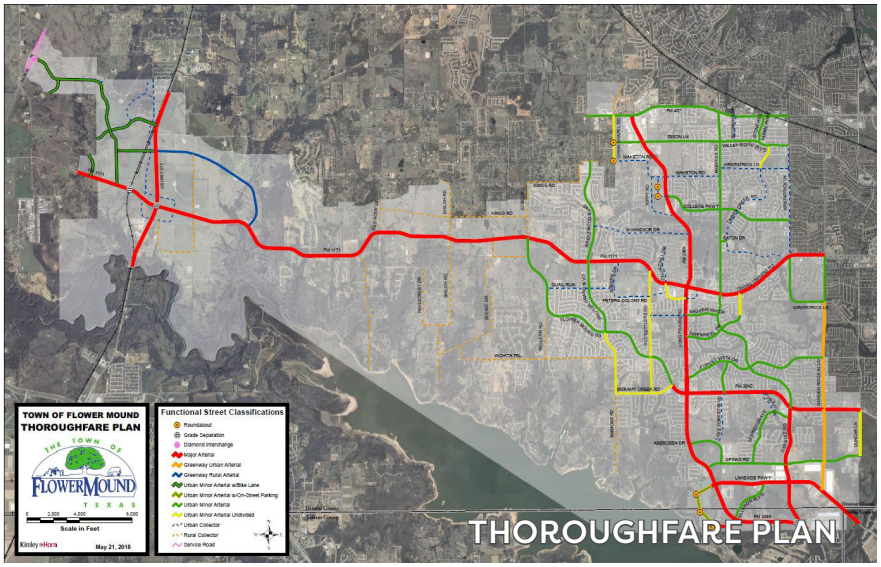
Land Use	Percentage of the Acreage	Flexibility Factor
Non-residential Uses*	45%	-25%
Public Uses	5%	±5%
Residential Uses**	45%	25%
Civic/Open Space (Public and Private)	5%	+10%
Total	**100%**	

**Non-residential uses shall include retail, office, hospitality, entertainment, etc.*

*** Residential uses above commercial uses shall not be included in the calculation of percentage of residential uses in the overall development*

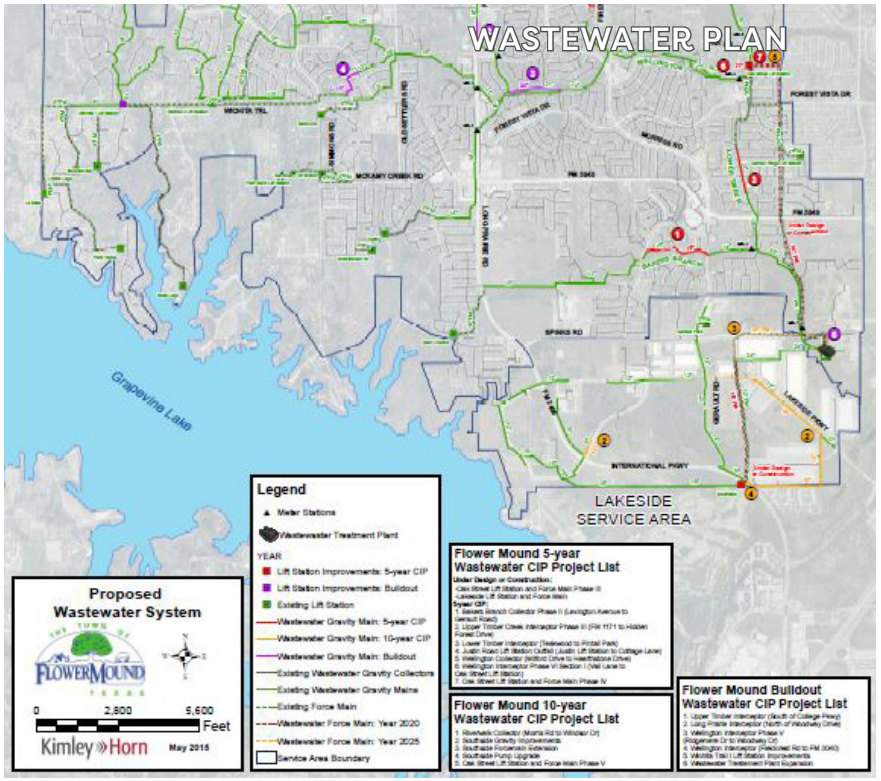
THOROUGHFARE PLAN

The Thoroughfare Plan uses projected land uses to guide the development of future thoroughfares. Recommendations were based off technical modeling and information obtained by the public in hearings. The features of this plan include a lakeside parkway connection to SH 121, Flower Mound Road, Kirkpatrick Extension, and collector street cross-sections. Recommendations display cross-sections that display the intended configuration of future roadways based on their purpose; the cross-section with on-street bicycle accommodations are the urban minor arterial with bike lanes and the rural collector. In these cross-sections, a 5' bike lane is included in both directions with striping designating the bike lane from the travel lane. According to the 2018 thoroughfare map, roadways designated as the urban minor arterial with bike lanes are all located in the far western portion of the town which is currently primarily undeveloped.



WASTEWATER PLAN

The Wastewater Plan is an update from the Wastewater Master Plan adopted in 2009 and then amended in 2015 based on new demographics, land uses, and growth projections. The purpose was to provide strategies for the future of wastewater management within Flower Mound. The 2015 amendments projected growth for 2020, 2025, and community build out and provided a guide to infrastructure needs. These recommendations directly link to the community's land use plan. Two major planning areas were identified to project wastewater demands: Lakeside and Denton Creek. This plan provides recommendations for the wastewater treatment plant, service areas, and each of the five districts outlined in the land use plan.



WATER PLAN

The Water Plan is based on the updates created in 2015 to the 2009 Water Master plan. The purpose of this plan is to assess the existing conditions of the water storage and distribution system as well as to project future needs. The components that have been evaluated in this document are water supply, ground storage, elevated storage, pumping stations, and the distribution system. Other aspects of this plan outline the Denton Creek Reuse Water Master Plan and the Lakeside Reuse Water Master Plan. Both master plans were adopted to meet Flower Mound's reuse water system infrastructure needs, and to provide tools and strategies for current and future needs.

URBAN DESIGN PLAN

The Flower Mound Urban Design Plan provides design guidelines for landscaping elements and architectural standards for non-residential buildings. This was created as part of the Flower Mound Master Plan and was reviewed via community engagement and focus groups. The purpose of the plan is to provide structure to establish community-wide architectural standards for non-residential projects and landscape, gateway, and intersection treatments in the five districts outlined in the land use plan. Each district has a distinct goal that aims to strengthen the community and character identity of the following districts:

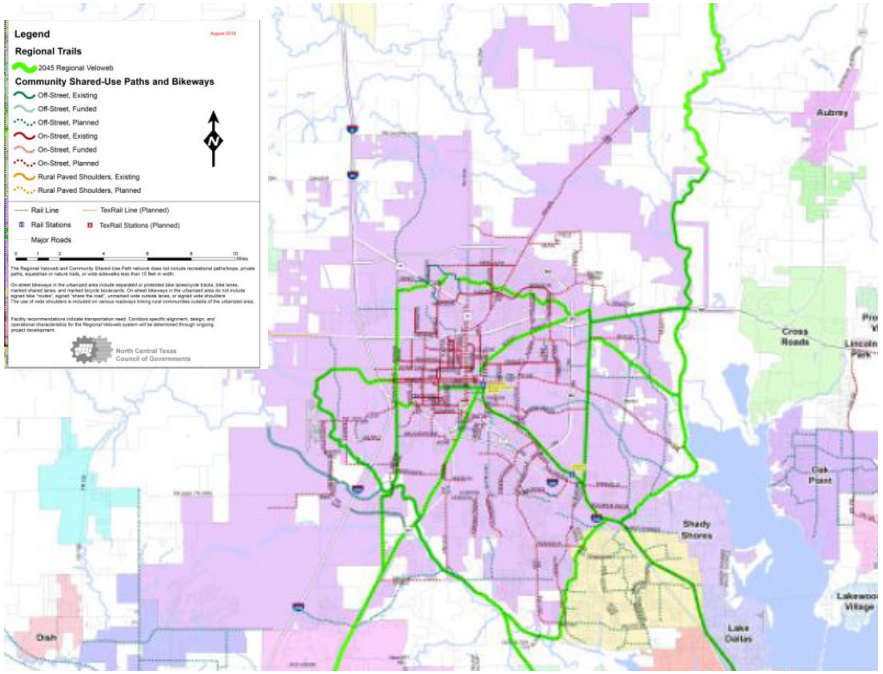
- Lakeside Business District
- Long Prairie District
- Cross Timbers Conservation Development District
- Denton Creek District
- Prairie Vista District

NCTCOG VELOWEB

The North Central Texas Council of Governments (NCTCOG) Regional Veloweb is a regional network of off-street shared use trails. These trails serve as a network of active transportation for multiple user groups including bicyclists, pedestrians, and other non-motorized modes of transportation. The Veloweb is updated by NCTCOG and the latest version of the regional network is included in the NCTCOG Mobility 2045 plan. This plan contains 1,876 miles of off-street trails that has planned connections in 10 counties and 105 cities in North Central Texas. Determining the alignments for the Veloweb trails are achieved through collaborative planning efforts between NCTCOG staff and local governments.

The Mobility 2045 Plan outlines the Veloweb trail segments as existing, funded and planned. Within the context of Flower Mound, all the Veloweb segments are categorized as 'planned' trails. Most of the planned trails are north to south making connections to neighboring communities.

FIGURE 2.12: NCTCOG VELOWEB REGIONAL MAP

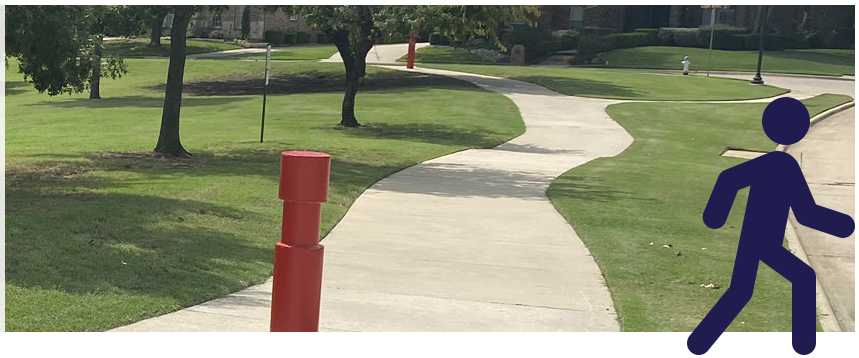


EXISTING TRAILS AND BIKEWAYS SYSTEM

The Flower Mound trail system has diverse offerings for its residents and visitors from across the region and beyond. These trails aim to connect residential neighborhoods to schools, parks, and commercial centers and expand mobility for its residents. Flower Mound has a unique natural landscape that adds to the overall experience of trail users. Currently, there are 65.5 miles of 8' or wider paved Town trails, 6.3 miles of on-street bikeways, 14.6 miles of equestrian trails, and 34.5 miles of trails owned and maintained by other entities within Flower Mound. **Figure 2.13** and **Table 2.3** displays Flower Mound's inventory of trails and on-street bikeways.

For the purpose of this inventory the following facility definitions are used:

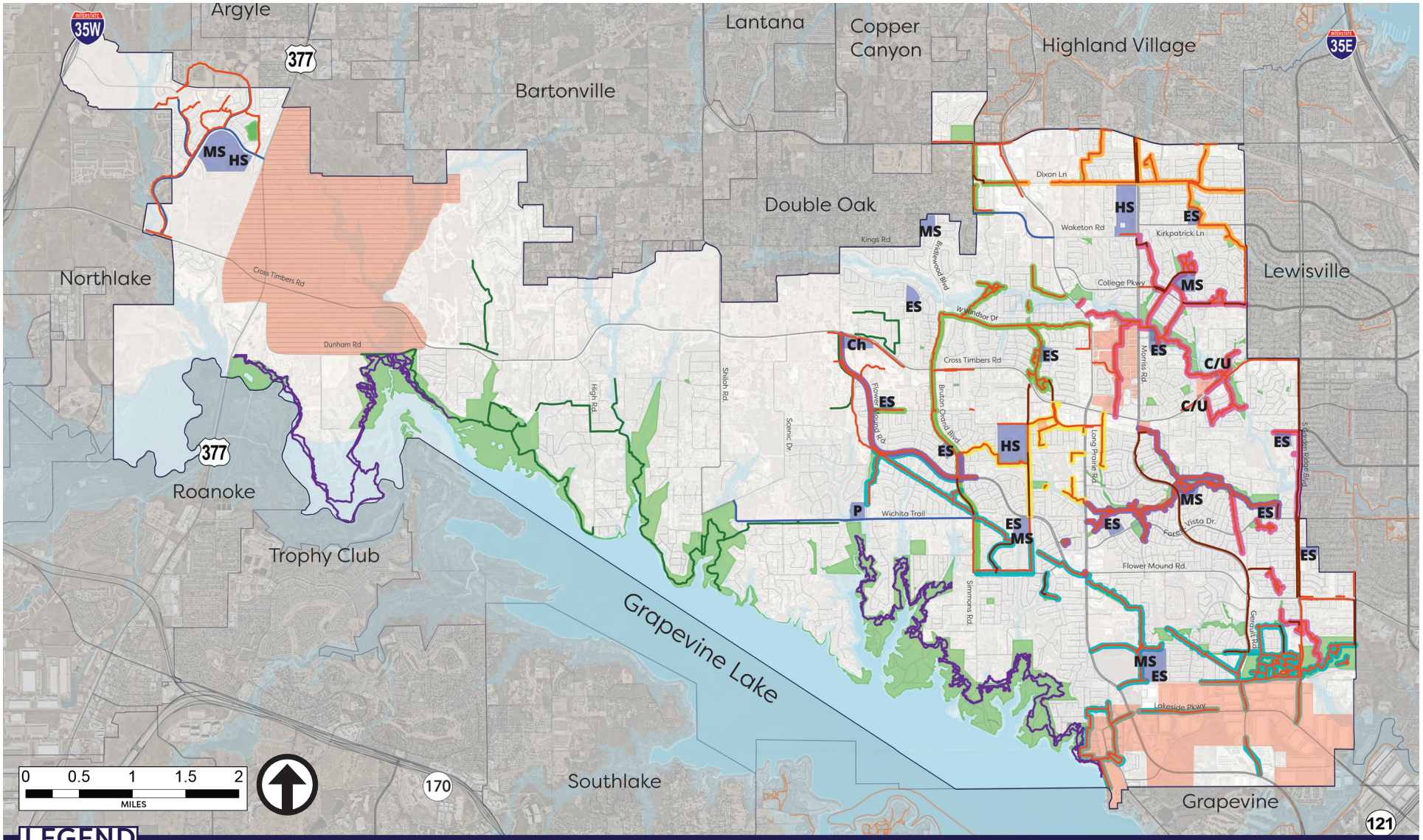
Town Trails:
Trails that are owned and mostly maintained by the Town of Flower Mound. These trails include multi-use paved trails that are between 4' and 10' in width, soft-surface trails, and equestrian soft-surface trails within an easement range from 15' to 50'. The Town has developed a trail naming system for much of the existing trail system; the majority of existing trails are named after various wildflowers. These trails are referred to as “branded trails”.



Other Trails:
Multi-use soft-surface paths for hiking and mountain biking that are located within the Town of Flower Mound and are not owned or maintained by the Town. The Dallas Off-Road Bicycle Association (DORBA) maintains over 30 miles of soft-surface trails on USACE land along the shores of Grapevine Lake.

On-Street Bikeways:
Designated accommodations for bicyclists within a roadway such as bike lanes and shared-use lanes. There are existing on-street bikeways in Flower Mound today.

FIGURE 2.13: EXISTING TRAILS



TOWN TRAILS

Flower Mound's town trails include paved multi-use, soft-surface, and equestrian trails. These trails are owned and mostly maintained by the Town of Flower Mound. Currently, there are 65.5 miles of multi-use trails within Flower Mound's trail system that are 8 feet or wider. 70.6 percent of those paved multi-use trails that are 8 feet or wider are within Flower Mound's designated branded trail network, which are named after wildflowers found in Texas. The Bluebonnet Trail has the most mileage out of all the branded multi-use trails and connects to the town's most prominent park, Heritage Park. There is one short segment of the Pink Evening Primrose trail that is made from decomposed granite. Another type of soft-surface trail maintained by the Town is the equestrian trails. There is a total of 14.6 miles of equestrian trails located in Flower Mound, most of which are located on U.S Army Corps of Engineers land and is not maintained by the town. 4.2 of those miles of equestrian trails are maintained by the town.

TABLE 2.3: TOWN TRAIL INVENTORY

Trail Name	Length (Miles)	Width (Feet)	Surface Type
Bluebonnet Trail	16.2	4'-10'	Concrete
Indian Blanket Trail	8.1	5'-10'	Concrete
Pink Evening Primrose Trail	12.5	4'-10'	Concrete/Soft-Surface
Purple Coneflower Trail	7.5	4'-8'	Concrete
Texas Yellow Star Trail	3.3	4'-8'	Concrete
White Lazy Daisy Trail	4.7	4'-10'	Concrete
Unnamed Multi-Use Trails	14.9	4'-10'	Concrete
Connectors (Unnamed)	6.4	4'	Concrete
Equestrian Trails	14.6	15'-50'	Soft-Surface
Total Length	**77.8**		
Total Length*((8ft or wider) (*Does not include equestrian or soft-surface trails)	**65.5**		
Total Length* (Less 8ft) (*Does not include equestrian or soft-surface trails)	**12.3**		

FIGURE 2.14: EXISTING TOWN TRAILS

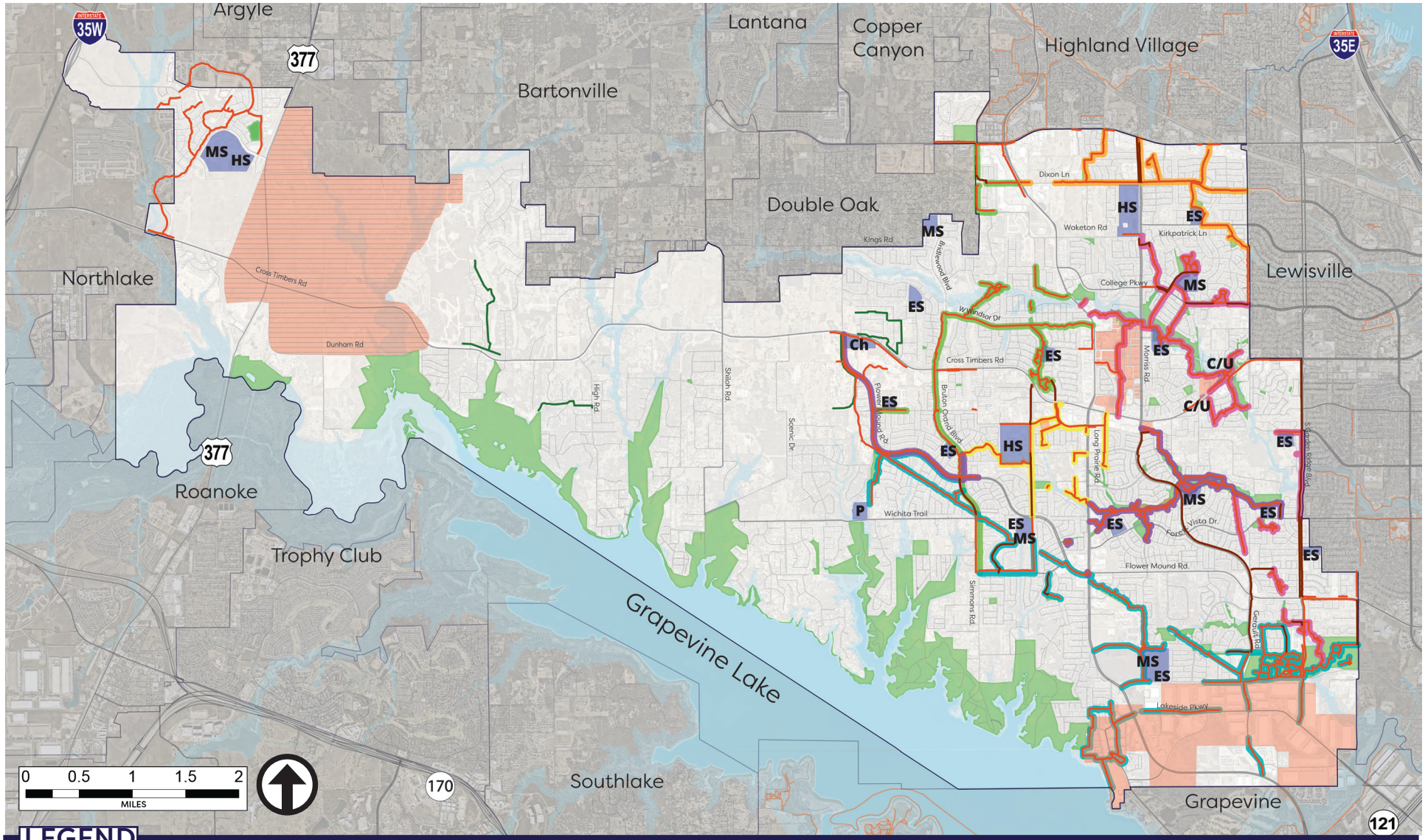
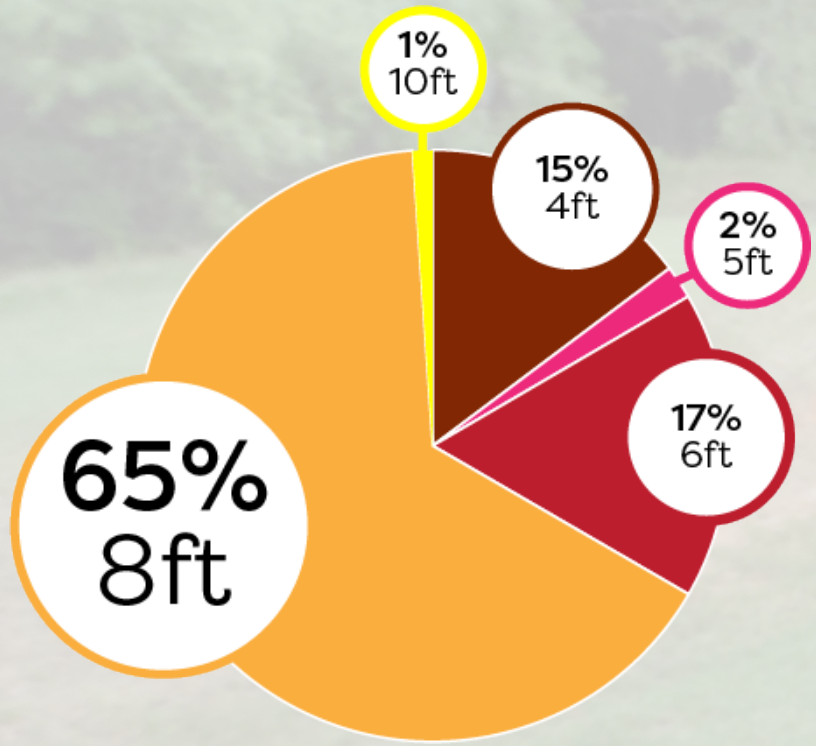


TABLE 6.1: * MAP AS OF APRIL 2022, TRAILS BUILT

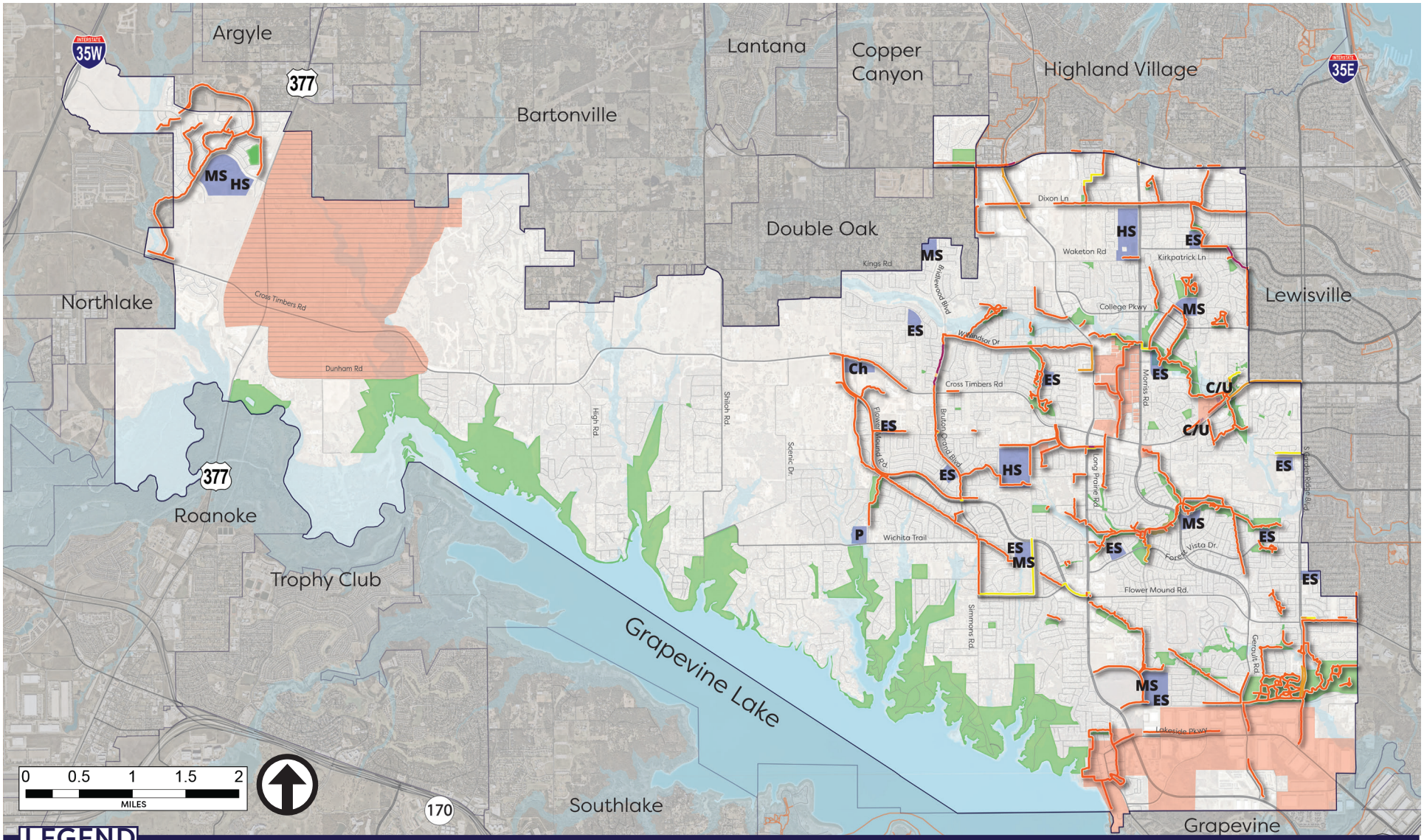
While there are segments of the existing branded trails that are 4-foot – 6-foot in width, to be considered multi-use trails, the facilities should be at least 8-foot wide, but preferably 10-foot. **Figure 2.15** depicts the breakdown of the widths of existing town trail facilities not including equestrian widths. Segments that depict 8-foot -10- foot widths reflect the town multi-use trails and segments under 8-foot reflect connectors in the towns trail system.

FIGURE 2.15: EXISTING TOWN TRAIL FACILTIES BY WIDTH



PURPLE CONEFLOWER TRAIL

FIGURE 2.16: EXISTING TOWN TRAIL FACILITIES BY WIDTH



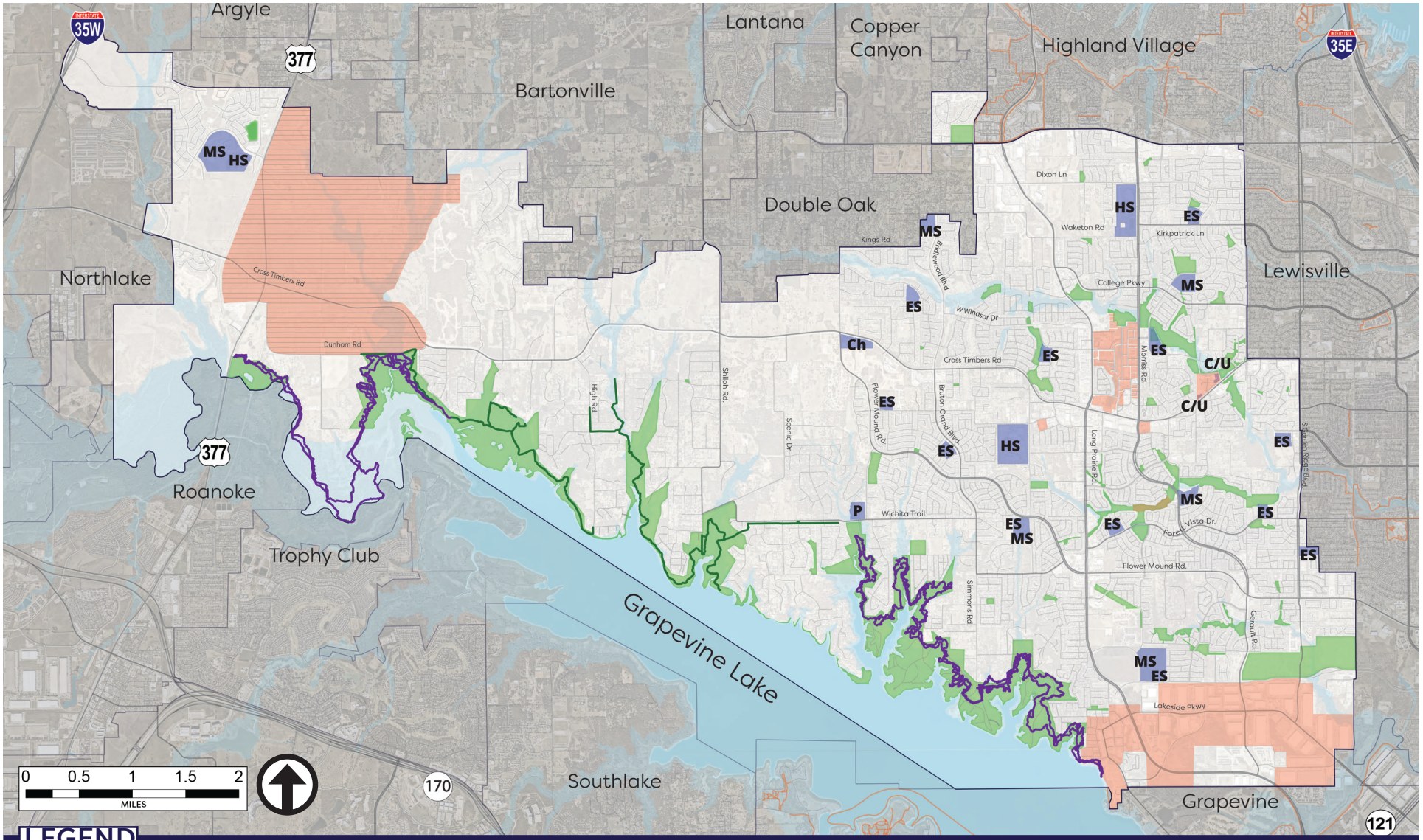
OTHER TRAILS

Flower Mound's proximity to Grapevine Lake adds to the natural landscape of the town. Many of the soft-surface trails in Flower Mound are located along the northern shore of Grapevine Lake on the Town's southern border. These trails are located on United States Army Corps of Engineers (USACE) property and are maintained by DORBA (Dallas Off-Road Bicycle Association). The USACE trails are primarily used for mountain biking, hiking, and where designated, equestrian use.

TABLE 2.4: OTHER TRAILS INVENTORY

Trail Name	Length (Miles)	Width (Feet)	Surface Type
Blue Diamond	0.6	6'	Soft-Surface
Boy Scout Loop	3.0	6'	Soft-Surface
Knob Hill	12.9	6'	Soft-Surface
MAAD East Loop	3.5	6'	Soft-Surface
MAAD West Loop	3.3	6'	Soft-Surface
Murrell Loop	3.3	6'	Soft-Surface
North Shore Far West	2.7	6'	Soft-Surface
Rockledge Loop	2.3	6'	Soft-Surface
Twin Coves Loop	2.7	6'	Soft-Surface
Undesignated	0.2	N/A	Soft-Surface
Total Length	**34.5**		

FIGURE 2.17: EXISTING OTHER TRAILS



ON-STREET BIKEWAYS

Flower Mound currently has a limited offering for existing on-street bikeways. The types of on-street bikeways in Flower Mound are primarily designated bike lanes that are located on Wichita Trail and Canyon Falls Drive. There are also shared lane markings on Prairie Ridge Road and Waketon Street.

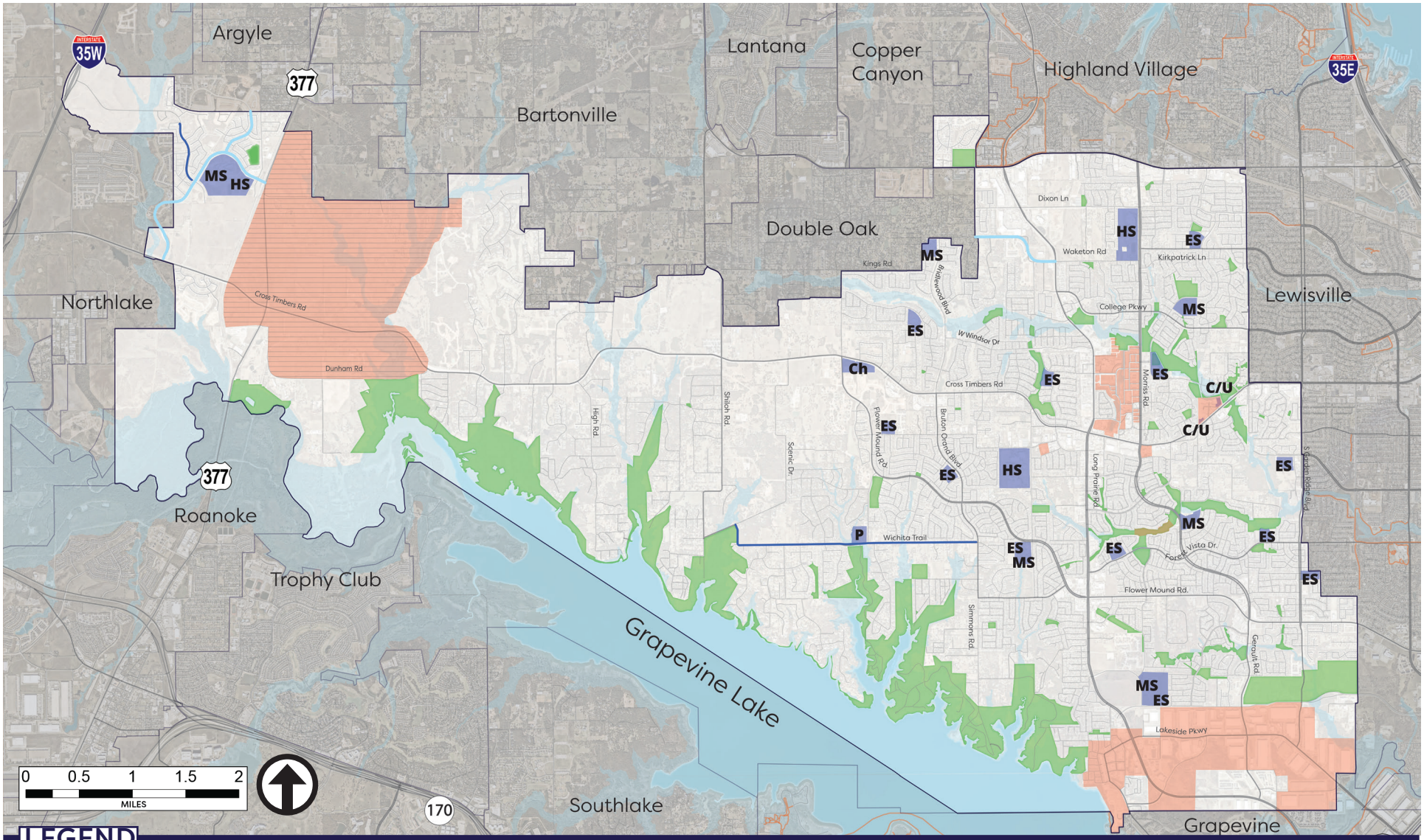
TABLE 2.5: ON-STREET BIKEWAY INVENTORY

Bikeway Name	Length (Miles)	Accommodation
Canyon Falls Drive	1.9	Bike Lane
Denton Creek Blvd	0.7	Bike Lane
Prairie Ridge Road	0.5	Shared Lane Markings
Waketon Street	0.8	Shared Lane Markings
Wichita Trail	2.4	Bike Lane
Total Length	6.3	

SHARED-USE LANE

CYCLISTS

FIGURE 2.18: EXISTING ON-STREET BIKEWAYS



CURRENTLY PLANNED SYSTEM

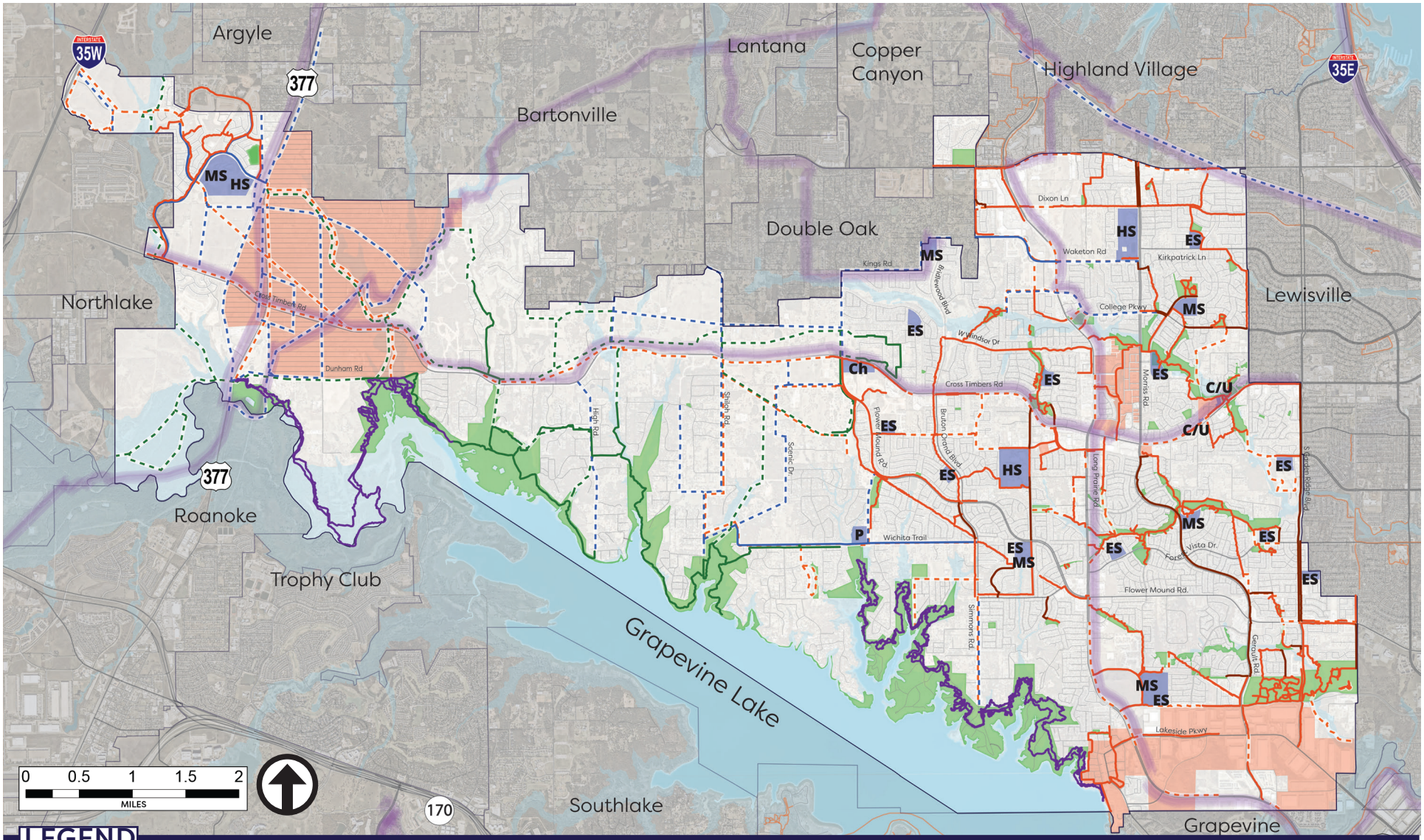
The 2017 Park and Trails Plan established a network of planned trails and bikeways for the town. This plan identified over 50 miles of additional Town Trails and nearly 30 miles of additional on-street bikeways. These planned routes aim to fill gaps in the current trails system in Flower Mound and increase regional and internal connectivity. The currently planned trails will be reviewed as part of this planning effort to determine if they are still warranted and feasible.

TABLE 2.6: EXISTING & CURRENTLY PLANNED SYSTEM

Facility Type	Existing Length (miles)	Planned Length (miles)
Town Trails (8' or wider)	62.2	53.4
On-Street BIkeways	5.6	29.0
Equestrian Trails	13.0	22.7
Total Length	**80.8**	**105.1**

SHILOH ROAD SIGNAGE

FIGURE 2.19: 2017 MASTER PLAN PROPOSED TRAILS & BIKEWAYS



System Users
Community Input
Needs Assessment
Barriers & Opportunities

03 TRAILS AND BIKEWAYS SYSTEM NEEDS

A comprehensive trails and bikeways system is designed based on the needs of the community, the opportunities that exist, and the barriers that may prevent connections. This chapter describes Flower Mound's identified needs based on existing conditions, safety issues, standards, and benchmarking. This chapter also identifies needs based on community engagement, existing barriers in the trail system, and opportunities for new trail and bikeway corridors.

SYSTEM USERS

Trails and bikeways can be designed to serve a range of users that express and exhibit different needs, interests, and abilities. Communities that recognize and acknowledge the overlapping needs and preferences of their residents are best able to develop a trails and bikeways system that efficiently accommodates multiple user groups.

PEDESTRIANS

A large number of people use trails for recreational purposes and some use them for commuting purposes as well. Walking is a great option for passive recreation because it is affordable and accessible for most people. It is also important to provide pedestrian connections for residents without access to a vehicle. Therefore, it is crucial that trails provide connectivity between neighborhoods and nearby destinations to encourage walking. When developing trails for pedestrians it is important to design them to be safe, enjoyable, and comfortable.

RUNNERS/JOGGERS

Trail systems are great locations for runners and joggers who seek opportunities for sports, leisure, and fitness since they provide a safe, off-street environment away from motor vehicles. Multi-use trails provide adequate space for runners and joggers to safely and comfortably pass other users and provides enough space for running groups and meet-ups. Runners prefer either paved or soft-surface trails, so providing options for both is important.

BICYCLISTS

Bicyclists consist of three groups: the occasional rider (children and seniors); the recreational rider (basic); and, the more experienced rider (advanced).

Children and Seniors

Children and seniors represent some of a community's most vulnerable demographic groups and therefore require easily accessible trail routes that are simple and easy to navigate. When developing trails and bikeways, it is important to provide spaces that are safe and comfortable for children and seniors. These groups typically prefer to ride on an off-street trail that is located away from the roadway to minimize potential interaction with motorists.

Basic

Bicyclists who fall within the basic skill category typically ride for leisure and prefer off-street trails or sidepaths adjacent to roadways. This user group is less likely to cycle as a mode of transportation since they are generally less confident riders. However, they are more likely to ride on-street within residential neighborhoods with low traffic speeds and within parks.

Advanced

Experienced bicyclists typically view cycling as a mode of transportation and are more comfortable using on-street facilities. These bicyclists are confident on roadways and undeterred by various roadway conditions, including sharing lanes with motor vehicle traffic. Users within this group may be part of a cycling organization or view cycling as a viable commuting option for some of their weekly trips. If advanced riders use trails, implementing speed control elements is recommended to reduce the potential for conflict with slower trail users.

MOUNTAIN BIKERS

Mountain bikers use soft-surface off-road trails for recreation and fitness purposes. Soft-surface trails can incorporate features such as jumps, ramps, and grade changes to add obstacles for the trail users. These narrow trails can be designed for beginners through advanced riders and typically attract visitors from outside of the community.

HIKERS

Hikers use soft-surface off-road trails for recreation, leisure, and fitness purposes. Hikers enjoy physical activity in a more natural setting. Hiking trails can be designed with grade changes and switch backs to add variation for beginners to advanced hikers.

EQUESTRIAN USERS

Equestrian trails are enjoyed by people on horseback as a way to explore nature and ride in a different environment than arena riding. These trails are often soft-surface and natural. Equestrian trails may be designed primarily for horseback riding, or they may be shared for soft-surface walking, jogging, and biking. If multiple users are allowed, the trails should provide etiquette on sharing the trail for all users.

PADDLE SPORTS

Kayakers and canoers utilize a network of waterway trails. These trails, sometimes called paddling trails or blueways, are accessed through launch points along a river, creek, lake, or other body of water. Paddlers may consist of people in kayaks, canoes, small non-motorized boats, or paddle boards and may have varying experience levels.

COMMUNITY INPUT

Engaging with current and future trail system users to collaborate on the vision and goals of the trail system is a crucial part of the planning process. Establishing engagement sessions that reach a variety of residents in Flower Mound help the Town benchmark needs of the community regarding opportunities and barriers in the existing trails system. Various engagement methods were utilized that involved a variety of stakeholders and the community. These engagement efforts included a steering committee representing a diverse selection of community members and interests, a technical working group comprised of town staff, listening sessions, and in-person and online public engagement.

STEERING COMMITTEE

The Steering Committee is comprised of community leaders and key community stakeholders to review and guide the plan development. Members included representatives from cycling, running, and riding groups, boards and commissions, Lewisville ISD, and students. This committee met three times during the process to help with identifying trails and bikeways needs, visioning, reviewing findings and preliminary recommendations, and recommending approval of the final plan.

STEERING COMMITTEE MEETING

TECHNICAL WORKING GROUP

The Technical Working Group is comprised of town staff members from various departments to assist with review and development of the plan. During the planning process, the group met three times to discuss current and future needs, review preliminary recommendations, and provide final guidance on the draft plan. Having input from different departments throughout the process helped to ensure that the recommendations were feasible.

TECHNICAL WORKING GROUP

STAKEHOLDER LISTENING SESSIONS

During the initial phase of the project, visioning meetings with community organizations and key community representatives were conducted to solicit feedback on the strengths and weaknesses of the Town's existing trails and bikeways system. These meetings were designed to assess the needs and desires for the trails and bikeways system in the Town. Invited groups included governmental agencies, trail and bikeway user groups, economic development groups, and education groups.

STAKEHOLDER LISTENING SESSION

OPEN HOUSE

Two public open houses were offered to solicit feedback from the community during the planning process. The first was conducted in person and virtually to determine the needs and vision of the community for the trails and bikeways system. The second meeting was held at the end of the project to allow the community to review and provide feedback on the draft master plan.

PUBLIC MEETING

POP-UP EVENTS

The team attended Town of Flower Mound events to increase awareness of upcoming engagement opportunities (discussed on page 45) and to collect information about the existing trails and bikeways system in Flower Mound. The pop-up events included the Arts in the Park inaugural event and a Friday night concert series event in Heritage Park.

ARTS IN THE PARK

BOARD & COMMISSION MEETINGS

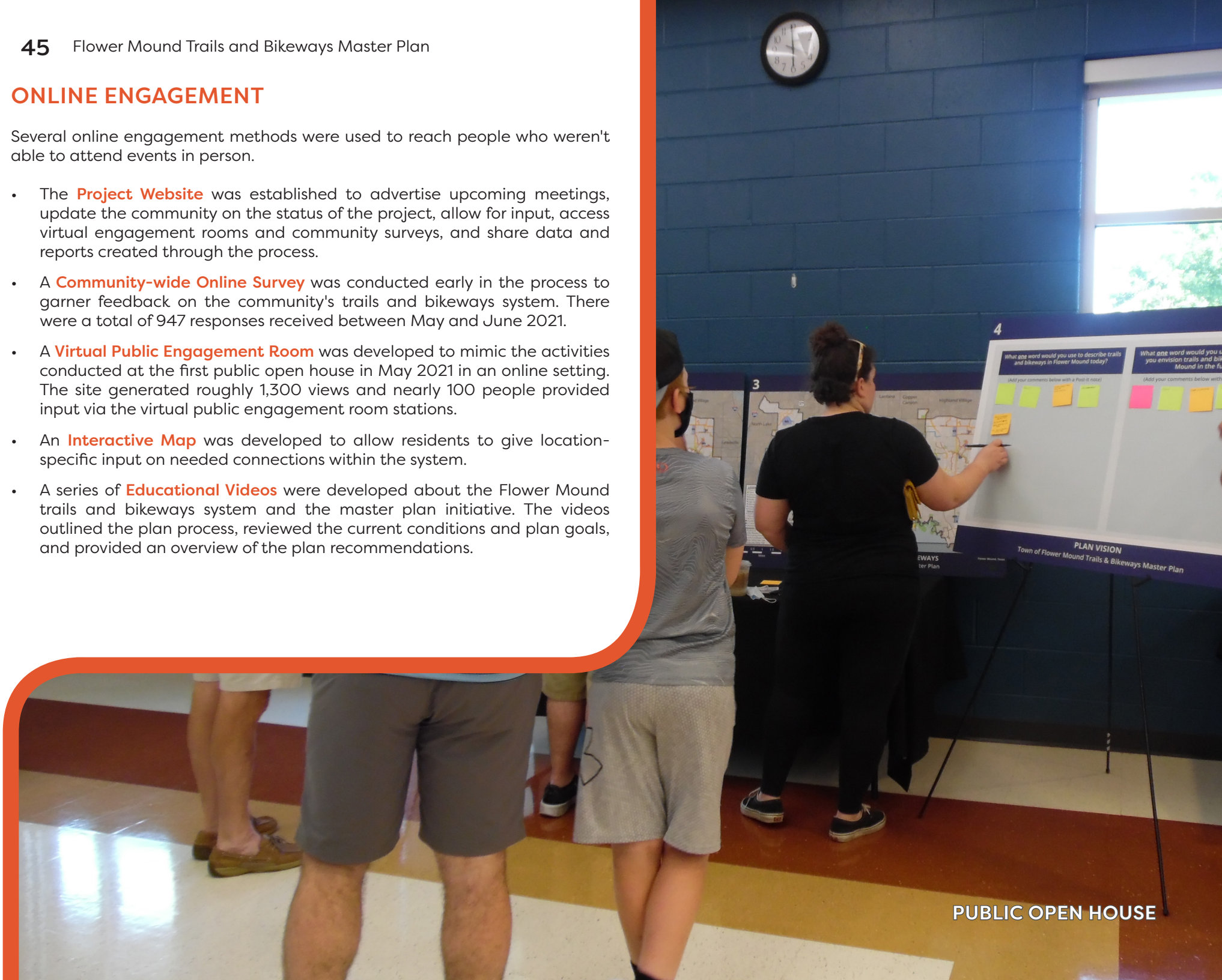
Presentations to the Parks Board, Transportation Commission, Planning & Zoning Commission, and Town Council during the process allowed the team to gather additional input and review draft recommendations for the plan.

PARKS BOARD MEETING

ONLINE ENGAGEMENT

Several online engagement methods were used to reach people who weren't able to attend events in person.

- The **Project Website** was established to advertise upcoming meetings, update the community on the status of the project, allow for input, access virtual engagement rooms and community surveys, and share data and reports created through the process.
- A **Community-wide Online Survey** was conducted early in the process to garner feedback on the community's trails and bikeways system. There were a total of 947 responses received between May and June 2021.
- A **Virtual Public Engagement Room** was developed to mimic the activities conducted at the first public open house in May 2021 in an online setting. The site generated roughly 1,300 views and nearly 100 people provided input via the virtual public engagement room stations.
- An **Interactive Map** was developed to allow residents to give location-specific input on needed connections within the system.
- A series of **Educational Videos** were developed about the Flower Mound trails and bikeways system and the master plan initiative. The videos outlined the plan process, reviewed the current conditions and plan goals, and provided an overview of the plan recommendations.



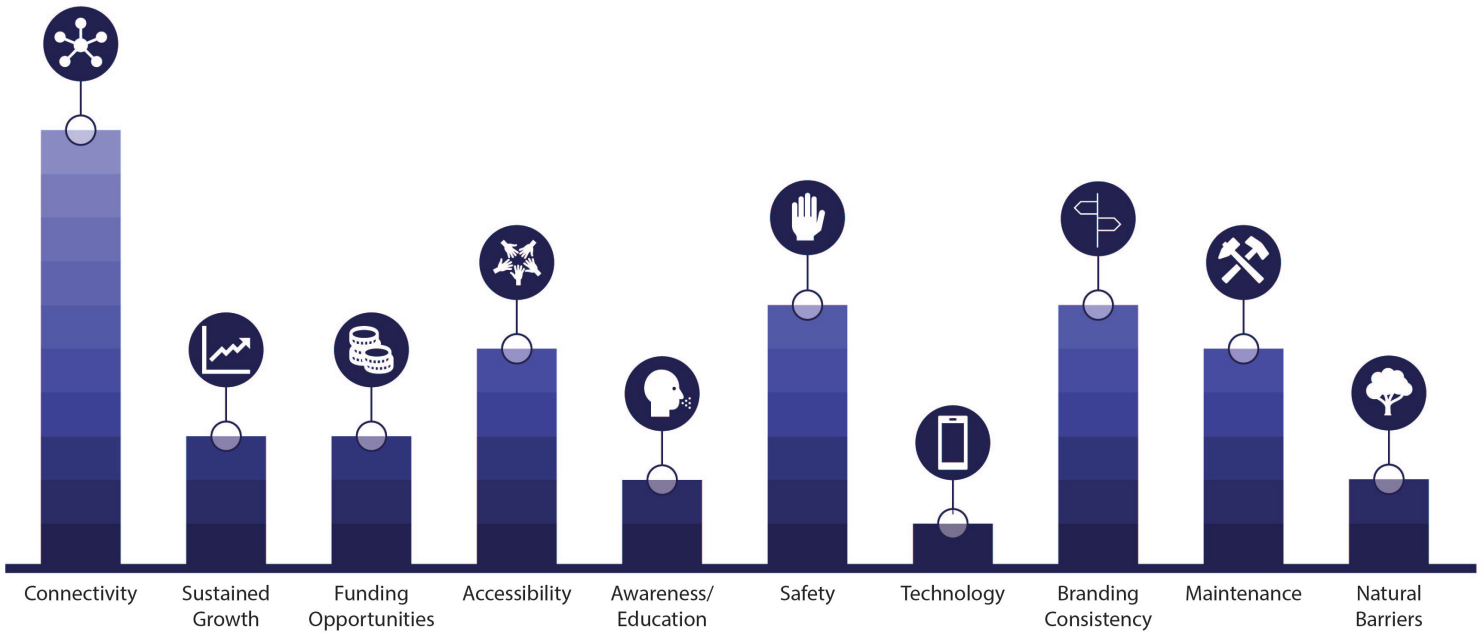
PUBLIC OPEN HOUSE

ENGAGEMENT RESULTS:
Steering Committee, Technical Working Group, and Stakeholder Listening Sessions

The following questions were asked during our visioning sessions in May 2021. The following graphics are a summary of the questions that were posed to the Steering Committee, Technical Working Group, and stakeholder listening sessions.

WHAT IS YOUR VISION FOR THE FUTURE OF TRAILS AND BIKEWAYS IN FLOWER MOUND?

WHAT ARE SOME OF THE CHALLENGES RELATED TO TRAILS AND BIKEWAYS IN FLOWER MOUND TODAY?



ENGAGEMENT RESULTS:
Public Open House & Virtual Public Engagement Room

The following questions were asked during the first public open house in May 2021 and within the virtual public engagement room that was available immediately following the open house. The following graphics are a summary of the feedback that was received during those meetings.

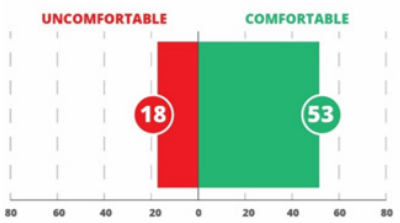
WHAT ONE WORD WOULD YOU USE TO DESCRIBE TRAILS AND BIKEWAYS IN FLOWER MOUND TODAY?

WHAT ONE WORD WOULD YOU USE TO DESCRIBE HOW YOU ENVISION TRAILS AND BIKEWAYS IN FLOWER MOUND IN THE FUTURE?

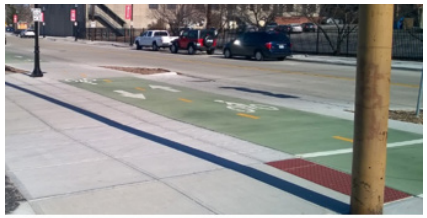
ENGAGEMENT RESULTS:
Public Open House & Virtual Public Engagement Room

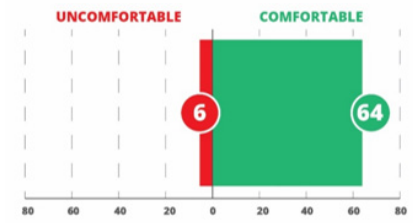
The following graphics summarize feedback received during the public open house and virtual public engagement room. Participants were asked to choose if they would feel comfortable or uncomfortable using the depicted facility. The number below each picture show the total responses for each.

WHAT IS YOUR LEVEL OF COMFORT WITH THE FOLLOWING TYPES OF ON-STREET BICYCLE FACILITIES? (TOP 3 OF 6)

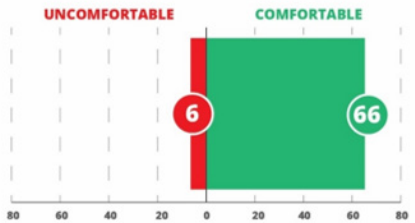


WIDE SHOULDER



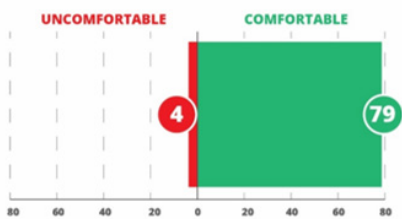


CYCLE TRACK

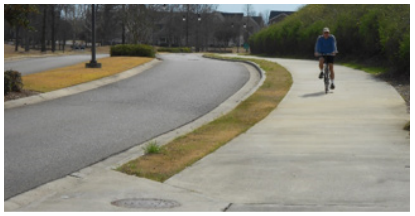


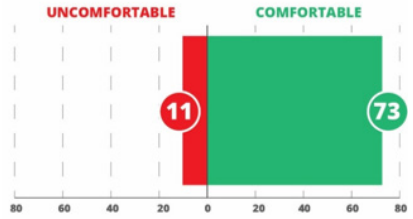
BUFFERED BIKE LANE

WHAT IS YOUR LEVEL OF COMFORT WITH THE FOLLOWING TYPES OF OFF-STREET TRAILS? (TOP 3 OF 6)

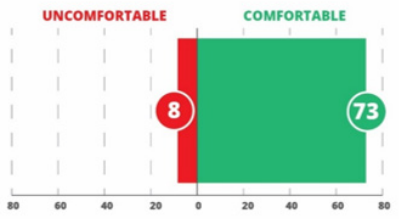


SHARED-USE PATH (PAVED)





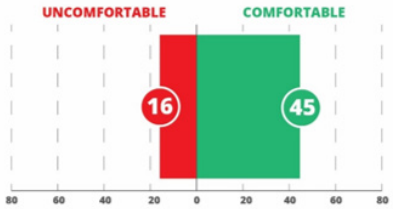
SIDEPATH (PAVED)



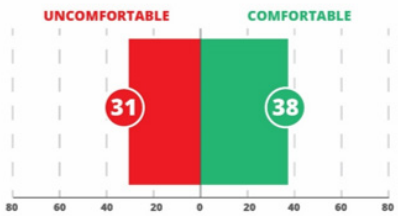
SHARED-USE PATH (SOFT SURFACE)

ENGAGEMENT RESULTS:
Public Open House & Virtual Public Engagement Room

WHAT IS YOUR LEVEL OF COMFORT WITH THE FOLLOWING TYPES OF EQUESTRIAN PATHS?



SOFT-SURFACE (AWAY FROM ROAD)

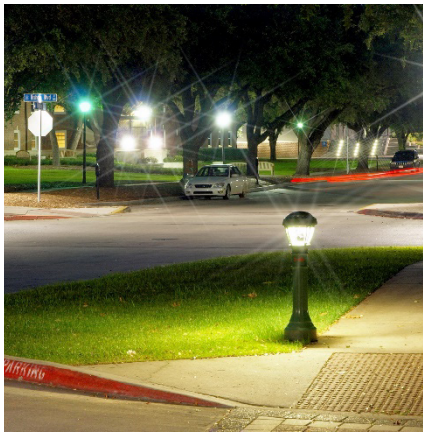


SOFT-SURFACE (ADJACENT TO ROAD)

WHAT ARE YOUR TOP THREE PREFERRED TRAIL AMENITIES THAT YOU WOULD LIKE TO SEE ALONG TRAILS IN FLOWER MOUND?

WAYFINDING SIGNAGE

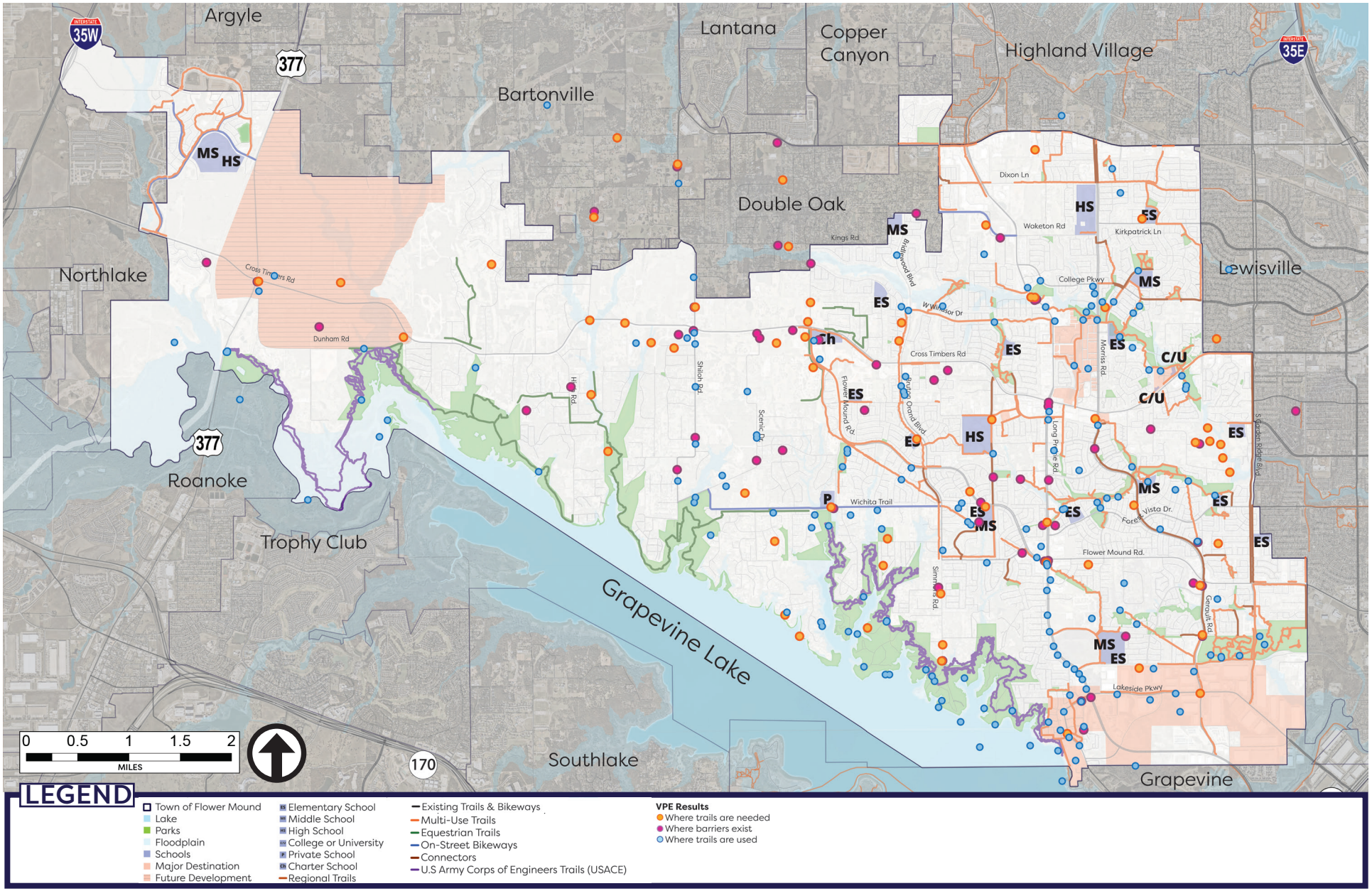
PARKING



LIGHTING

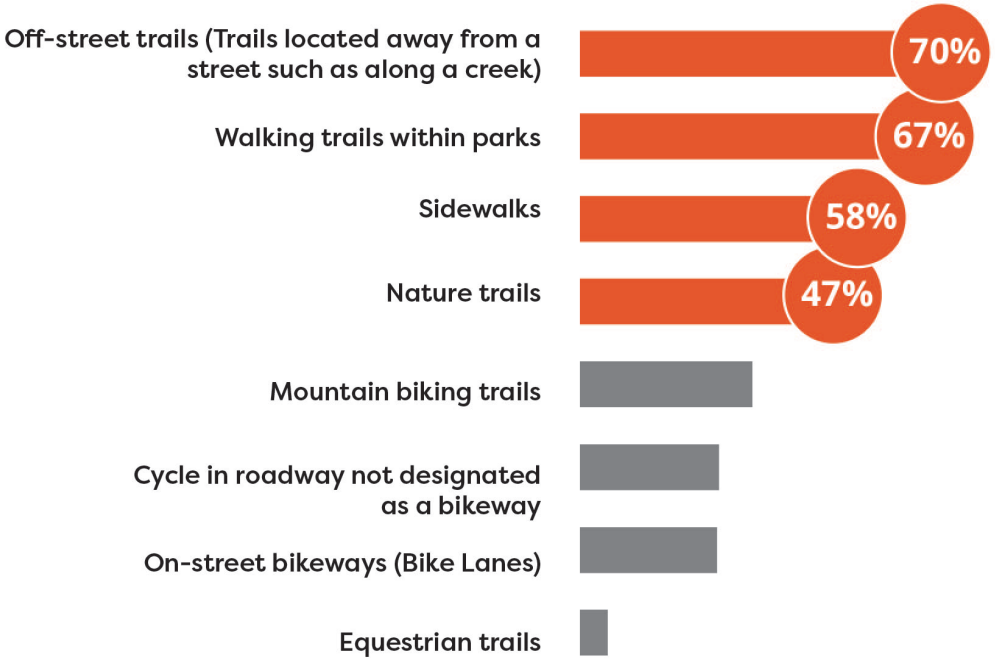
ENGAGEMENT RESULTS:
Virtual Public Engagement Room

FIGURE 3.1: VIRTUAL ENGAGEMENT ROOM RESULTS

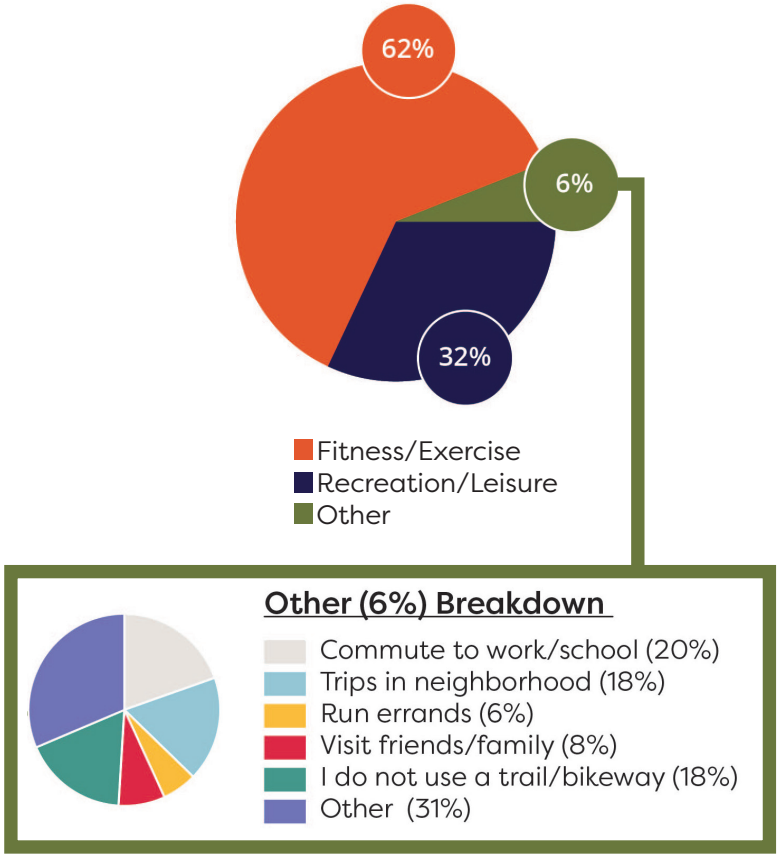


ENGAGEMENT RESULTS:
Public Open House & Virtual Public Engagement Room

WHAT TYPE OF TRAIL OR BIKEWAY IN FLOWER MOUND DO YOU GENERALLY USE?

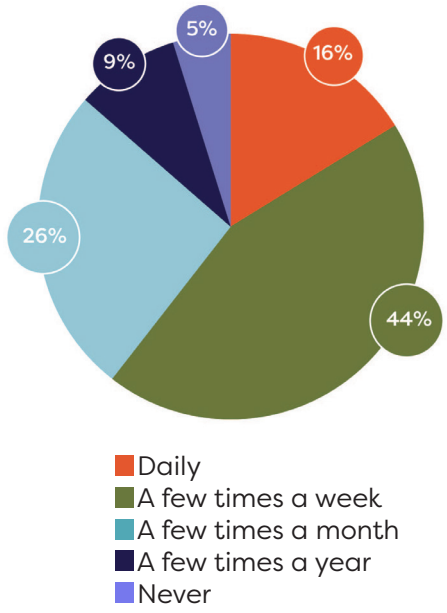


WHAT IS YOUR PRIMARY PURPOSE FOR USING A TRAIL OR BIKEWAY IN FLOWER MOUND?

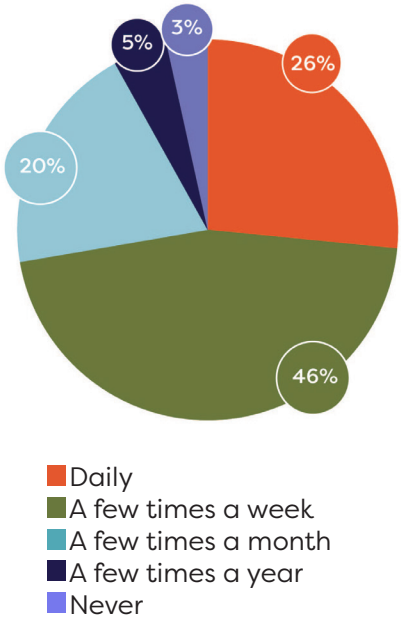


ENGAGEMENT RESULTS:
Public Open House & Virtual Public Engagement Room

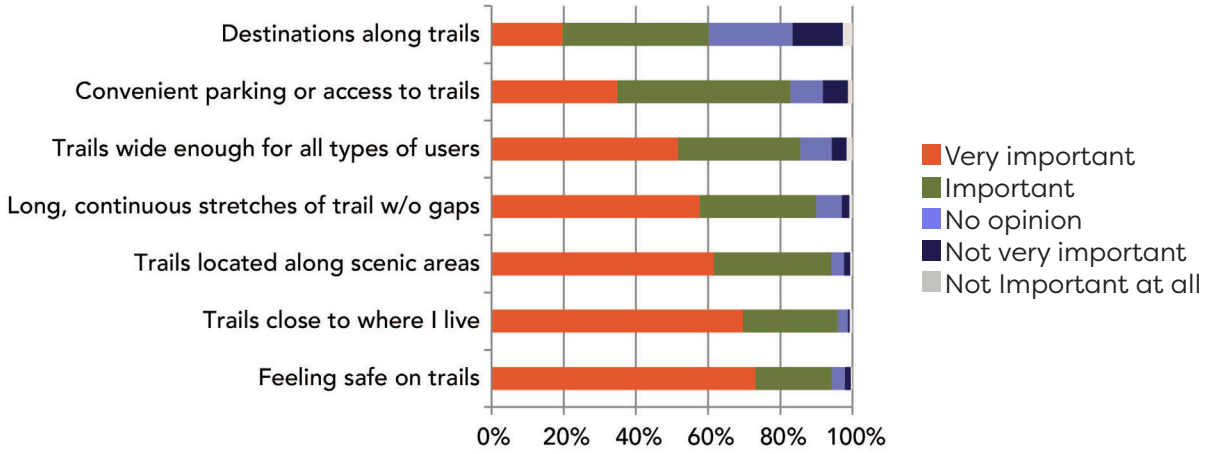
HOW OFTEN DID YOU USE TRAILS OR BIKEWAYS IN FLOWER MOUND PRE-COVID?



HOW OFTEN DID YOU USE TRAILS OR BIKEWAYS IN FLOWER MOUND DURING COVID?

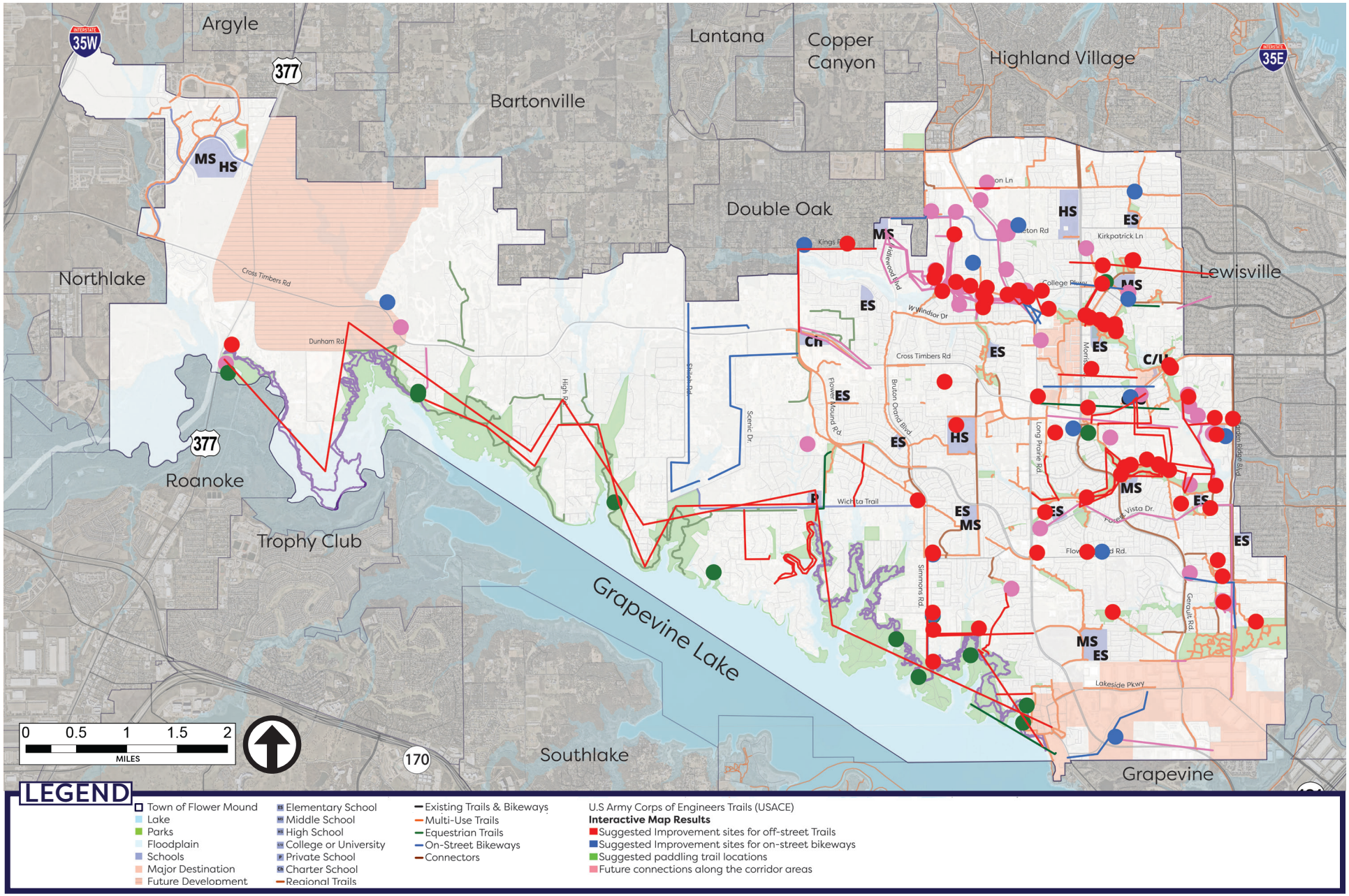


HOW IMPORTANT ARE EACH OF THE FOLLOWING FEATURES OF TRAIL FACILITIES?



ENGAGEMENT RESULTS: Interactive Online Map

FIGURE 3.2: INTERACTIVE ONLINE ENGAGEMENT MAP



ENGAGEMENT KEY TAKEAWAYS:

- Filling in gaps in the system for overall better connectivity is needed.
- Wayfinding and directional signage is needed to help users identify what trail they are on and where they are going.
- Intersection crossings should be improved in many areas.
- Additional amenities, such as lighting, parking, and drinking fountains, are desired throughout the trail system.
- Off-street trails are preferred by a majority of respondents to roadside trails.

PURPLE CONEFLOWER TRAIL

NEEDS ASSESSMENT

As indicated in the previous section, the residents of Flower Mound have established that trails and bikeways are very important to their community. As the population in the town continues to increase, an additional burden will be placed on existing trail and bikeway facilities. This section provides the current state of Flower Mound's trails and bikeways today and projected into the future.

To evaluate the needs of the community, assessments of the existing system were conducted. Based on the assessment findings, recommendations for the future network can be proposed to ensure users of all ages and abilities are considered. Assessments are based on community input, trail evaluations, trail level of service, comparison to benchmark communities, opportunities and barriers, roadway characteristics, and potential corridor assessments.

TRAIL EVALUATION

This planning process evaluated the existing named trails in the Flower Mound system. The assessment considered trail surface conditions, trailway clearance, grades and slopes, roadside clearance, street intersections/trail crossings, constructed trailway features, safety/security, signage and wayfinding, and trailheads. This section provides the key findings from each of the evaluations.

PINK EVENING PRIMROSE TRAIL

KNOB HILLS TRAIL

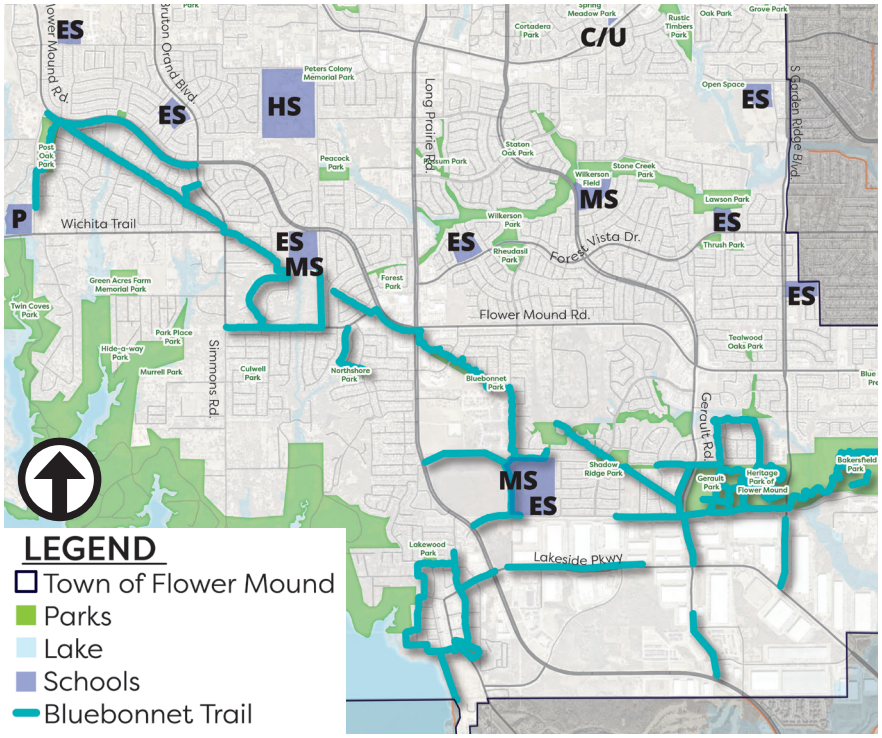
BLUEBONNET TRAIL

Length: 18.07 miles

The Bluebonnet Trail runs from Bakersfield Park in the far southeastern corner of the town to the northwest ending at Post Oak Park. The trail is the longest of all the six branded trails (see page 27). There are numerous neighborhood connections to the trail; while the trail provides access to residents, it is disconnected in areas and features some segments that are only 4' in width. The trail is generally in good condition with adequate vertical and horizontal clearance. Most of the trail is designed at a grade and slope that is comfortable. However, the segment along Winding Oaks Drive and Pasadena Place includes switchbacks and a slope that may not be ADA accessible.

Improvements to intersection crossings are needed, both within the neighborhoods and along major corridors such as FM 2499. There are benches, waste receptacles, and pet waste stations scattered along the trail, however additional facilities such as water fountains, bike racks, and bike repair stations would improve the overall user experience. Additional signage and trail branding are needed for wayfinding and safety. Finally, the trail connects to many parks, schools, and other named trails, but additional segments would better connect the community.

FIGURE 3.3: BLUEBONNET TRAIL KEY MAP



Trail marker in a neighborhood

Trail within a power line easement

Retaining wall adjacent to trail

Trailhead marker

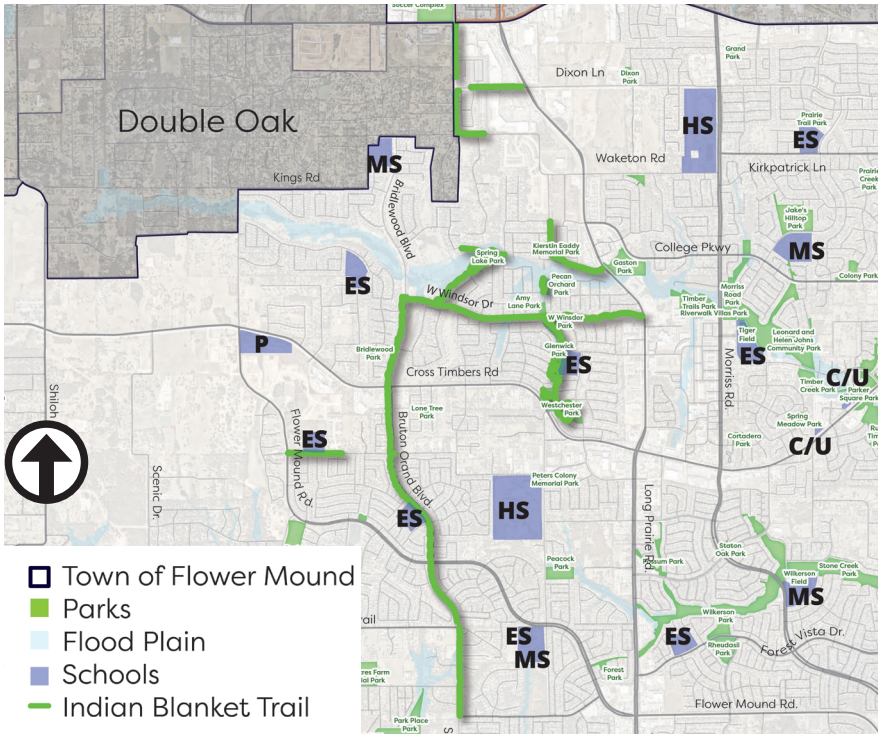
INDIAN BLANKET TRAIL

Length: 8.33 miles

The Indian Blanket Trail runs along West Windsor Drive, south to Simmons Road, connects Westchester Park to Spring Lake Park, and eventually connects to the Bluebonnet Trail. The trail segments north of Windsor Drive are largely disconnected, and there are portions of the trail that are only 4'-6' in width. The trail is generally in good condition with adequate vertical and horizontal clearance and designed at a grade and slope that is comfortable.

Improvements to intersection crossings are needed throughout the trail corridor. There are benches, waste receptacles, and pet waste stations, however additional facilities such as water fountains and bike racks could improve the overall user experience. Additional signage is needed for wayfinding and safety. The addition of trailheads would better identify the branding and location of the trail. Finally, the trail provides good access to neighborhoods, but aside from parks and schools there are not many destinations accessible from the trail.

FIGURE 3.4: INDIAN BLANKET TRAIL KEY MAP



Trail adjacent to roadway

Signalized pedestrian crossing

8' trail segment

Amphitheater in Park

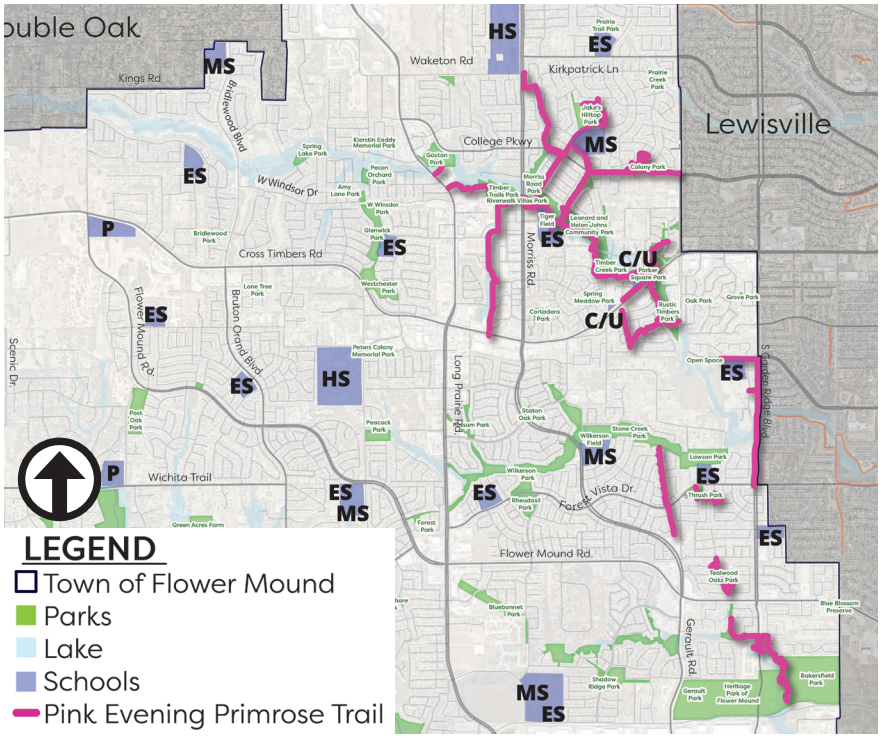
PINK EVENING PRIMROSE TRAIL

Length: 12.18 miles

The Pink Evening Primrose Trail is a north-south trail corridor in the far eastern portion of Flower Mound. The trail runs through numerous neighborhoods and connects to schools, parks, and the Bluebonnet Trail. The trail width varies from 6' to 8'. The trail is generally in good condition with adequate vertical clearance, however in some areas trees, vegetation, and retaining walls present horizontal clearance constraints. Most of the trail is designed at a grade and slope that is ADA accessible, but there are a few areas along the trail that are a little steep. The trail includes a few pedestrian activated signals, but additional improvements to intersection crossings are needed. The trail also travels under two major roadways: Morriss Road near the Riverwalk and Cross Timbers Road (FM 1171). Both undercrossings would be safer if they were wider and if they had more cautionary signage to ensure users slow down when approaching the bridge. There are many segmented parts of the overall trail that could be better connected.

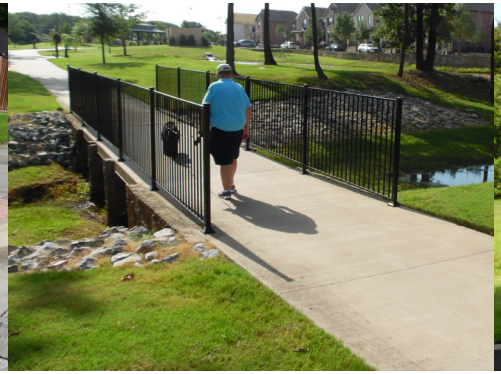
There are benches, waste receptacles, fitness stations, and pet waste stations located along the trail, however those facilities are mainly around the Timber Trails Park. Additional facilities such as water fountains, bike racks, and bike repair stations installed along the trail would improve the experience for trail users. Additional signage is needed for wayfinding and safety. Some of the corners and bends in the trail are difficult to navigate and views of oncoming traffic by trail users are obscured. There are also older bridges that should be assessed by a structural engineer to ensure their safety. Finally, the trail connects parks and schools but filling the gaps in the overall corridor would improve connectivity to schools, parks, and key destinations such as Riverwalk.

FIGURE 3.5: PINK EVENING PRIMROSE TRAIL KEY MAP



Red bollards designating trail

Intersection ramp



Trail bridge near Riverside

Fitness station along trail

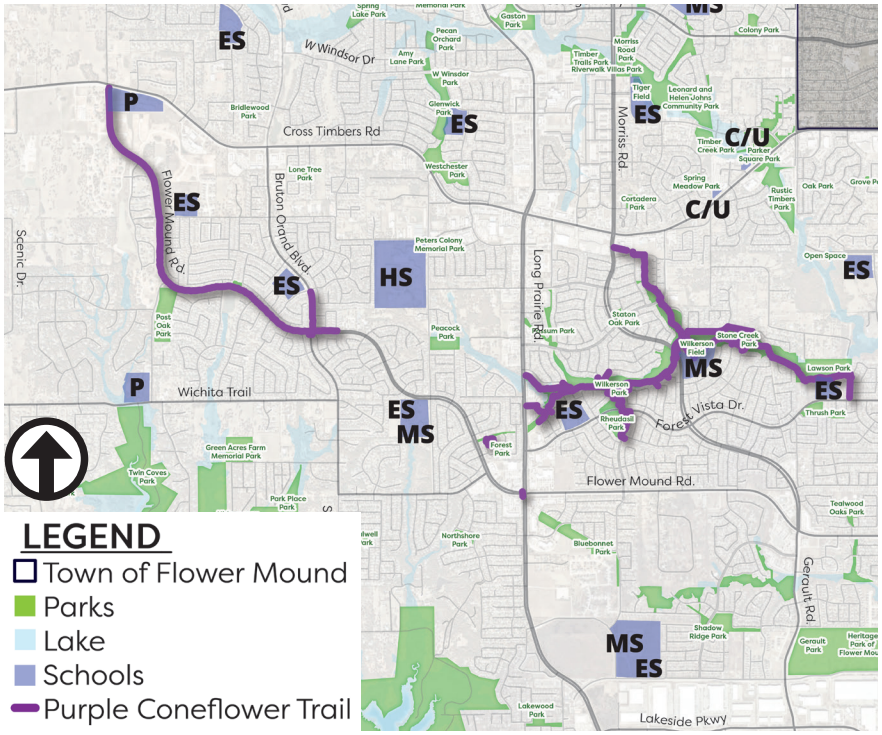
PURPLE CONEFLOWER TRAIL

Length: 11.93 miles

The Purple Coneflower Trail is an east/west corridor located north of the Bluebonnet Trail and connects the Tree Farm to Liberty Elementary School. While the trail provides access to numerous residents, it is disconnected in areas and has segments that are 4' to 6' in width in neighborhood loops. Additionally, the segment located along Flower Mound Road is only 4' wide. It is generally in good condition with adequate vertical and horizontal clearance. Most of the trail is designed at a grade and slope that is comfortable, but a few segments have steep slopes and grading issues. Improvements to some intersection crossings are needed as there are fewer pedestrian activated signals along this trail compared to others within the town. Long Prairie Road (FM 2499) poses a significant barrier as the only way to get across now is at a signalized intersection.

There are standard amenities such as benches, waste receptacles, and pet waste stations, but enhancements to the amenities such as water fountains, lighting, and bike repair stations could improve trail experiences. Red bollards are prevalent along the trail, and there are two larger trailheads. Additional signage is needed for wayfinding and safety. Finally, the trail connects parks and schools, but additional routes or segments would better connect the community to other trails and destinations.

FIGURE 3.6: PURPLE CONEFLOWER TRAIL KEY MAP



Pedestrian bridge over creek

Red bollards within a neighborhood

Trail leading to a park

Trailhead

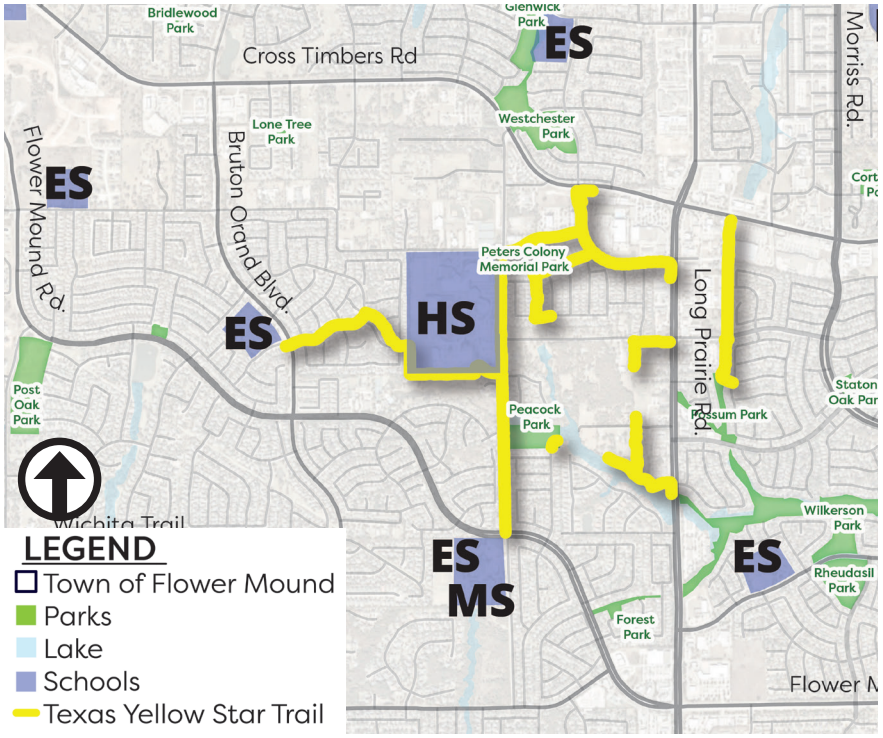
TEXAS YELLOW STAR TRAIL

Length: 4.73 miles

The Texas Yellow Star Trail is a shorter trail corridor in central Flower Mound. It links Wellington Elementary School and Flower Mound High School to the surrounding community. The trail is in good condition, with most segments being 8'-10' in width, and primarily runs adjacent to Old Settlers Road. Newer sections of trail that have been built with recent development are in very good condition. Much of the landscape is maintained by non-municipal entities such as homeowner associations.

The trail has adequate vertical and horizontal clearance and is designed at a grade and slope that is accessible for most users. Improvements to intersection crossings are needed. There are minimal amenities along the trail so additional trail amenities would improve the trail experience. Additional signage is needed for wayfinding and safety. The trail connects parks and schools, but additional routes or segments would better connect the community.

FIGURE 3.7: TEXAS YELLOW STAR TRAIL KEY MAP



Red bollards within a neighborhood

Trail near the high school

Overgrowth along trail

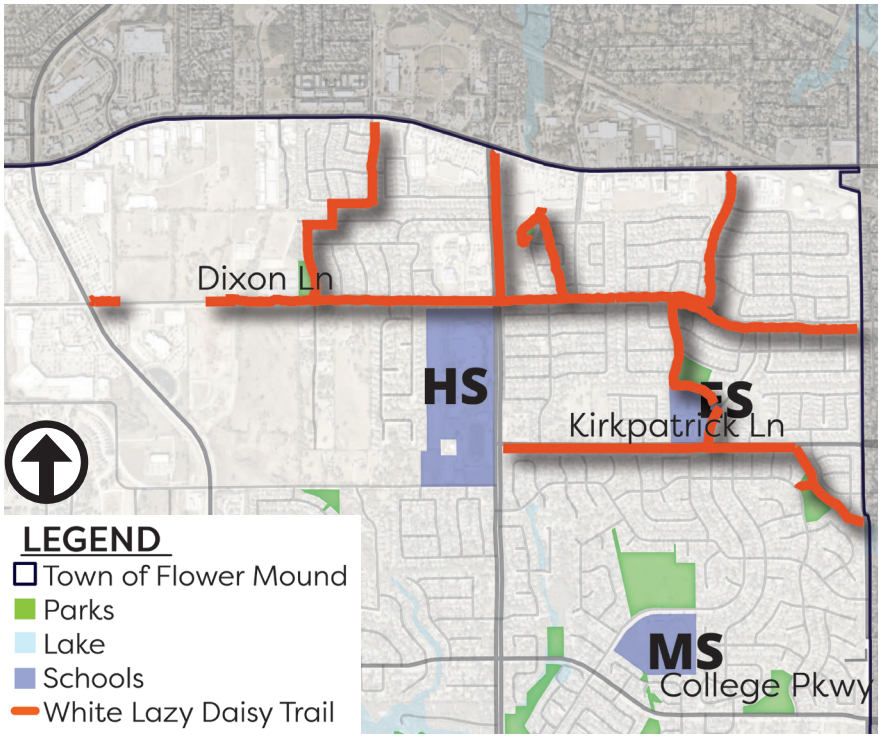
Neighborhood access point

WHITE LAZY DAISY TRAIL

Length: 5.78 miles

The White Lazy Daisy Trail is located in northern Flower Mound and connects Dixon Park to Prairie Trail Elementary School. There are numerous neighborhood connectors to the trail. The trail is in good condition, is mostly 8' in width, and runs adjacent to the roadway with some shade provided by vegetation. There is adequate vertical and horizontal clearance, with some vegetation encroachment. Most of the trail is designed at a grade and slope that is comfortable, however, portions along Valley Ridge Boulevard are steep and may not allow for ADA accessibility. Improvements to intersection crossings are needed as crosswalks, signage, improved ramps, and lighting is lacking along the corridor. There are limited amenities along the trail. Additional signage is needed for wayfinding and safety.

FIGURE 3.8: WHITE LAZY DAISY TRAIL KEY MAP



Curb ramp

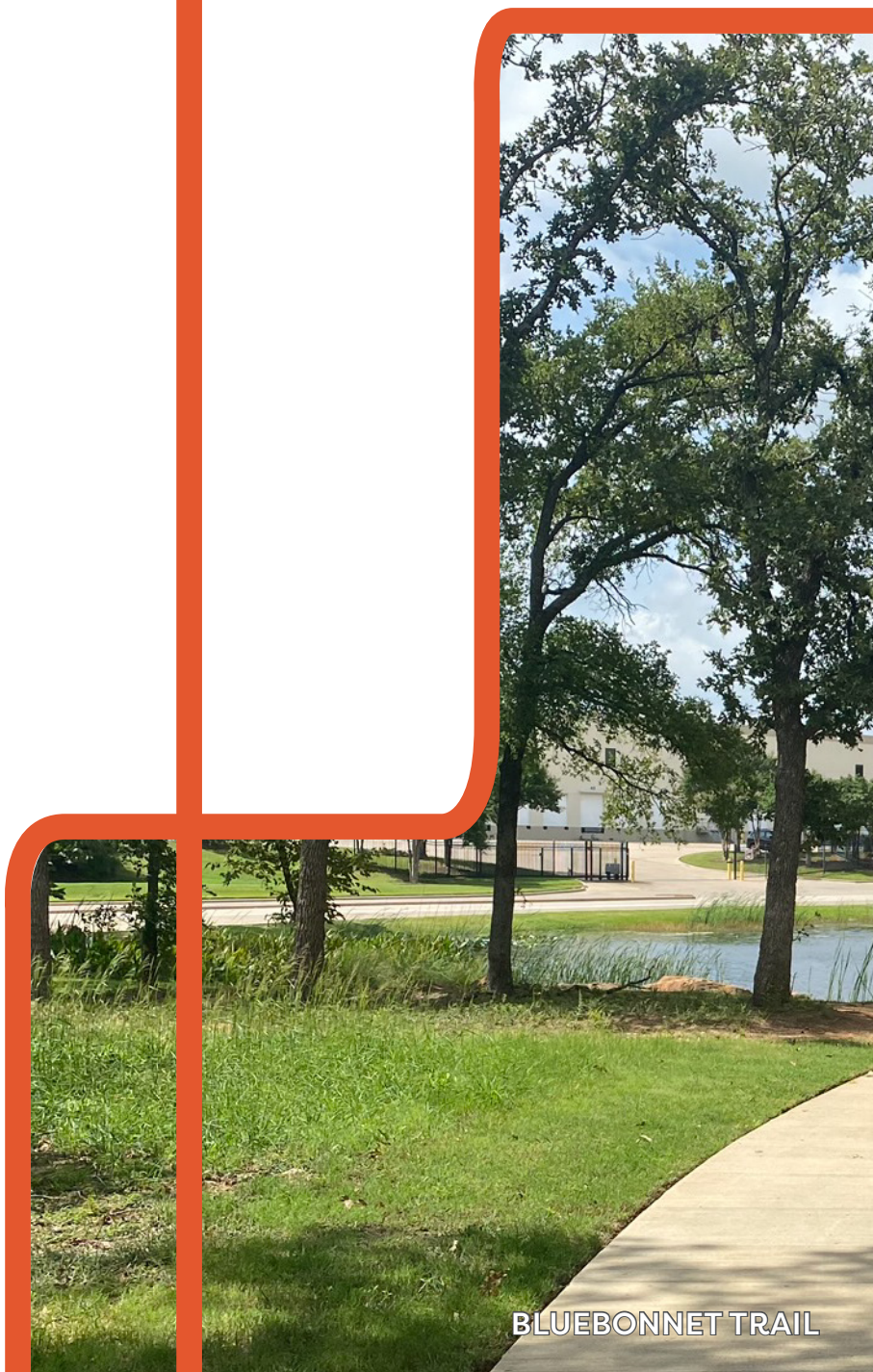
Trail between houses

Trail adjacent to a school

Intersection crossing

OVERALL TRAIL EVALUATION KEY FINDINGS

- Wayfinding and directional signage along the trail system is needed.
- Four-foot wide segments should not be considered “trails”, instead they should be denoted as connectors to the trail system.
- Roadway crossings need to be improved to increase the safety for trail users, especially at major intersections that are identified as barriers to the system.
- Additional amenities along the trail are needed, such as bike racks, and lighting at trailheads.
- Maps located at trailheads are outdated and with a rapidly growing system will likely continue to be. Alternatives such as QR codes that link to an online map should be explored.
- Emergency call boxes, lighting, cameras, and other safety factors should be included to increase safety and comfort.
- An overall ADA assessment of the trail system would confirm where trails are not ADA accessible.



TRAIL LEVEL OF SERVICE

Level of Service (LOS) is a metric used to compare the miles of trail within a community with the total population. The LOS analysis includes an assessment of existing and proposed trails and compares it to existing and future populations. Table 3.1 below shows the level of service for 6' and wider paths and 8' and wider paths. In order to compare to other communities, the LOS figures for trails 8' or wider is recommended to meet regional standards. The Future LOS represents the level of service if no additional trails were built between now and 2038, indicating that the level of service would decrease with expected additional population growth. For the DFW region, a target benchmark of 1 mile of trail for every 1,200 residents has been established. Chapter 4 reviews the recommended network. When the trails in the recommended network are constructed, the Town will surpass the regional target benchmark.

TABLE 3.1: TRAIL LEVEL OF SERVICE

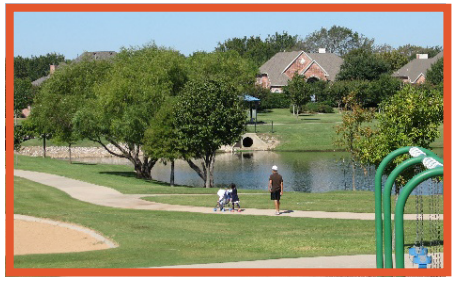
2020 Population* (Current Population)		**78,080**	
2038 Population (Projected Build-Out Population)**		**109,544**	
Trails = 6' or wider multi-use paths		**Trails = 8' or wider multi-use paths**	
Current LOS - 2020	1 mile per 867 residents (1.15 miles per 1,000)	**Current LOS- 2020**	1 mile per 1,251 residents (0.80 miles per 1,000)
Future LOS - 2038 (No additional trails built)	1 mile per 1,217 residents (0.82 miles per 1,000)	**Future LOS -2038 (No additional trails built)**	1 mile per 1,756 residents (0.57 miles per 1,000)
Future LOS - 2038 (All currently proposed trails built)	1 mile per 769 residents (1.30 miles per 1,000)	**Future LOS-2038 (All currently proposed trails built)**	1 mile per 947 residents (1.06 miles per 1,000)

**Source: NCTCOG Regional Data Center, 2020.*
***Source: Town of Flower Mound.*

HERITAGE PARK

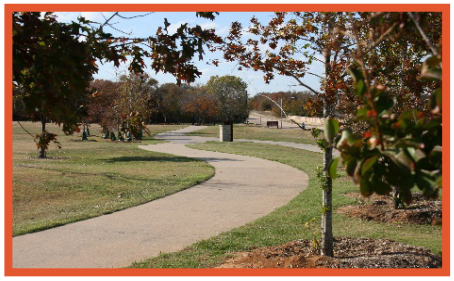
BENCHMARK COMMUNITIES

When analyzing the current LOS for Flower Mound, it is important to consider how it compares to cities of similar size and demographic composition in the DFW region. The population-per-mile benchmark is used to compare to the different cities; the lower the population-per-mile, the higher the LOS is for the trail system. Based on an average of many DFW communities, a regional benchmark of 1 mile of trail for every 1,200 residents has been established. The following communities are frequently used by Flower Mound to compare amenity and facility offerings. The following comparison only considers existing paved trails that are 8' or greater in width. Flower Mound has a current (2021) LOS of 1 mile per 1,251 residents. This ratio is better than the other identified benchmark communities, which indicates that Flower Mound has more trails per resident than the other communities but does not indicate the connectivity and accessibility of the overall system by comparison. Additionally, LOS just looks at the quantity of trails, not at the quality or condition of trails.



COLLEYVILLE

1 mile per 1,330 residents
Population: 26,462
Existing Trail Miles: 20
City Area: 8,384 Acres

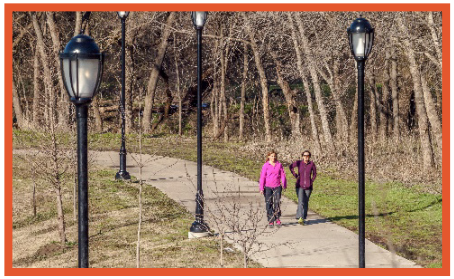


LEWISVILLE

1 mile per 5,172 residents
Population: 106,386
Existing Trail Miles: 21
City Area: 23,488 Acres

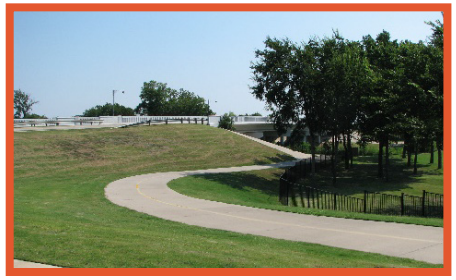
GRAPEVINE

1 mile per 2,424 residents
Population: 53,317
Existing Trail Miles: 22
City Area: 20,480 Acres



MCKINNEY

1 mile per 3,515 residents
Population: 182,055
Existing Trail Miles: 52
City Area: 40,320 Acres



KELLER

1 mile per 2,783 residents
Population: 46,813
Existing Trail Miles: 17
City Area: 11,840 Acres

FLOWER MOUND

1 mile per 1,251 residents
Population: 78,080
Existing Trail Miles: 62.4*
City Area: 27,776

**Includes paved multi-use paths 8' or wider*

BICYCLE AND PEDESTRIAN CRASH DATA

To identify potential safety issues for the existing bicycle and pedestrian network in Flower Mound, bicycle and pedestrian crash data was evaluated. The database used for this section is the Texas Department of Transportation (TxDOT) Crash Record Information System (CRIS) 2016-2020 bicycle and pedestrian crash data. Only reported crashes are represented in the data, so if a minor crash occurs that was not reported to the police, this data would not reflect it. The points displayed in **Table 3.2** represent the number of crash types in Flower Mound. **Figure 3.9** on page 66 represents the locations of bicycle and pedestrian crashes separated by user type (bicycle or pedestrian) and crash type (fatal or non-fatal), where the location of the crash was available.

Of all crashes involving a bicyclist and/or pedestrian between 2016-2020, sixty-five percent involved bicycles and were mostly non-fatal. Thirty five percent involved pedestrians and were mostly non-fatal. A common thread for the crashes is that they occurred along major roadways mainly at intersections where the trail system exists on at least one side of the road. The crashes can be contributed to gaps in the system and unsafe, unidentified, or non-existent pedestrian crossings. The fatal pedestrian crash was in the same location as a non-fatal bicycle crash and a non-fatal pedestrian crash, indicating that the intersection may need improvements. The fatal bicycle crash occurred on a six-lane major thoroughfare between two existing neighborhoods and close to Heritage Park. Without appropriate signage and advanced warning, motorized vehicles may not be aware of pedestrians and bicyclists crossing roadways or using facilities along roadways.

TRAIL USAGE

Strava is a Global Positioning System (GPS) application that allows runners, cyclists, and walkers to track their preferred routes or discover popular routes used by other users. Recent Strava data for Flower Mound is shown as a heat map in **Figure 3.10** on page 67 to indicate the most frequently used trail facilities while **Figure 3.11** on page 67 displays the most frequently used bikeway facilities. Strava data was used to show where people are biking and walking in Flower Mound today. As illustrated by Figures 3.12 and 3.13, major trails are heavily used, as well as sidewalks along major roadways and within neighborhoods. Sidewalks, bike lanes, and trails are more prevalent and used in the eastern part of Flower Mound. Both figures illustrate the locations of gaps in the system, where barriers may exist, and where trails and bikeways can be added.

TABLE 3.2: BICYCLE AND PEDESTRIAN CRASH DATA

Crash Type	Number of Crashes
Non-Injury Bicycle	23
Suspected Injury Bicycle	16
Fatal Bicycle	1
Non-Injury Pedestrian	21
Suspected Injury Pedestrian	10
Fatal Pedestrian	2
Total Crashes	**72**

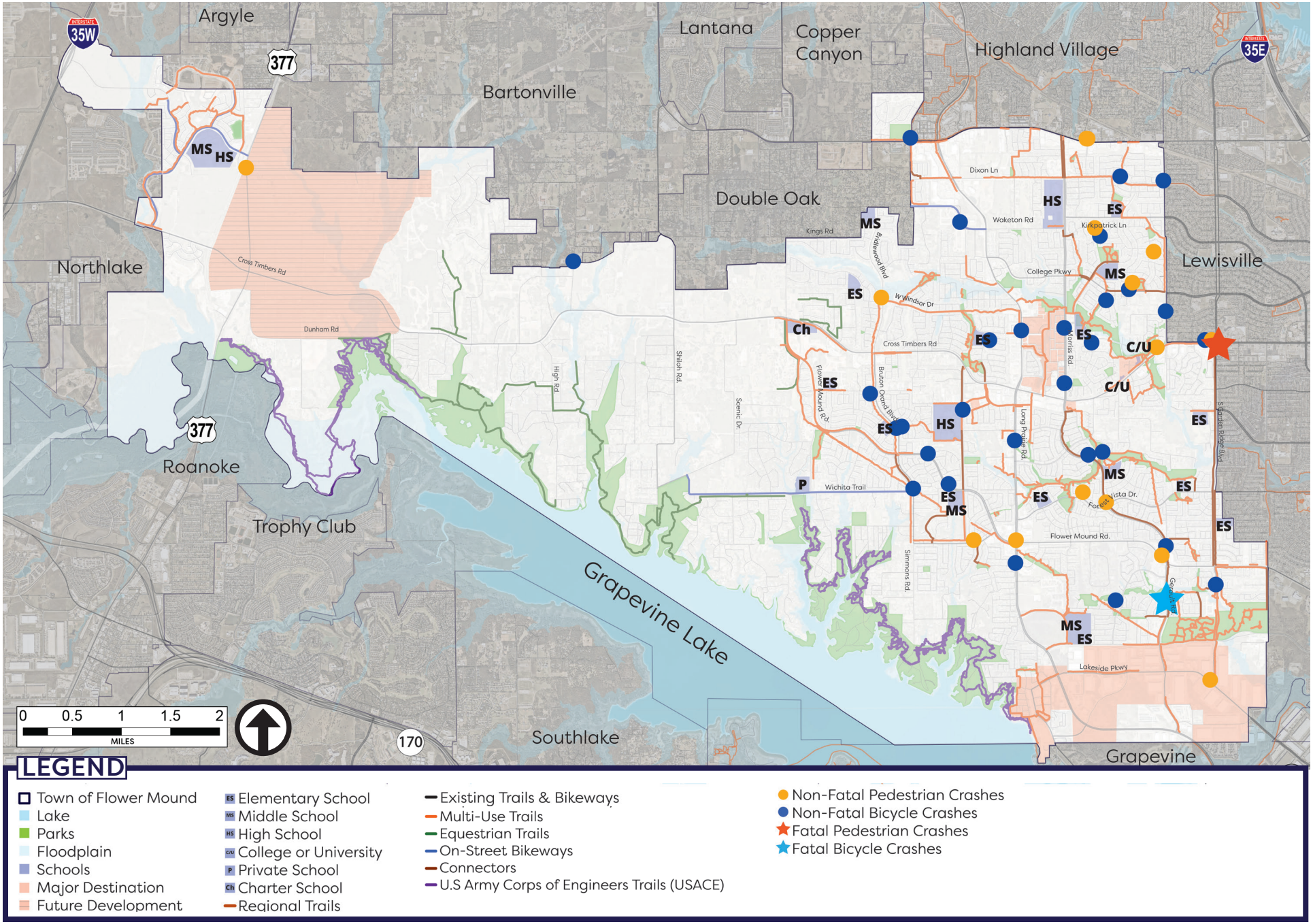
Source: TxDOT Motor Vehicle Crash Data for Flower Mound, 2016-2020
Note: Not all crashes are geo-located, some may be on boundary with other municipalities.

VISION ZERO

Vision Zero is the belief that everyone has the right to a safe transportation network. This approach is intended to improve safety on roadways for all users and prevent fatalities and severe injuries from crashes through design, policies, and technology. An effective Vision Zero policy focuses on the built enviornment, behaviors, and equity in order to have a data-driven and measurable impacts to the system.

A Vision Zero policy can foster and encourage active transportation, improve accessibility to the roadway system for all users, and reduce economic impacts resulting from crashes through an implementable action plan. An action plan provides the Town with goals and recommended steps to improve roadway safety for all. These steps may include educational campaigns, safe speed design standards and engineering, data collection, and regular monitoring and evaluation.

FIGURE 3.9: BICYCLE AND PEDESTRIAN CRASH MAP, 2016 - 2020



Source: TxDOT Motor Vehicle Crash Data for Flower Mound, 2016-2020

ON-STREET BIKEWAY ASSESSMENT

The goal of recommending new bikeway designations is to provide safe on-street bicycle routes throughout Flower Mound that increase connectivity between neighborhoods and to regional destinations. The three types of on-street bikeway accommodations that are preferred by planning participants are shared-use lanes, standard bike lanes, and buffered bike lanes. These accommodations were determined by examining multiple attributes of Flower Mound's existing roadway system such as speed limit, existing traffic volumes, available capacity, and right-of-way widths. Examples of these facilities can be found on page 48 in the engagement section. As a reminder, bicyclists can also use sidepaths or off-street trails if they do not wish to ride in the street.

SHARED – USE LANES

Shared-use lanes are the easiest to implement and are proposed for roadways with low speeds and volumes since cyclists share the lane with motor vehicles. Utilizing these bikeway accommodations along Flower Mound's local and collector roads provides opportunities to expand upon the existing network and connect key areas.

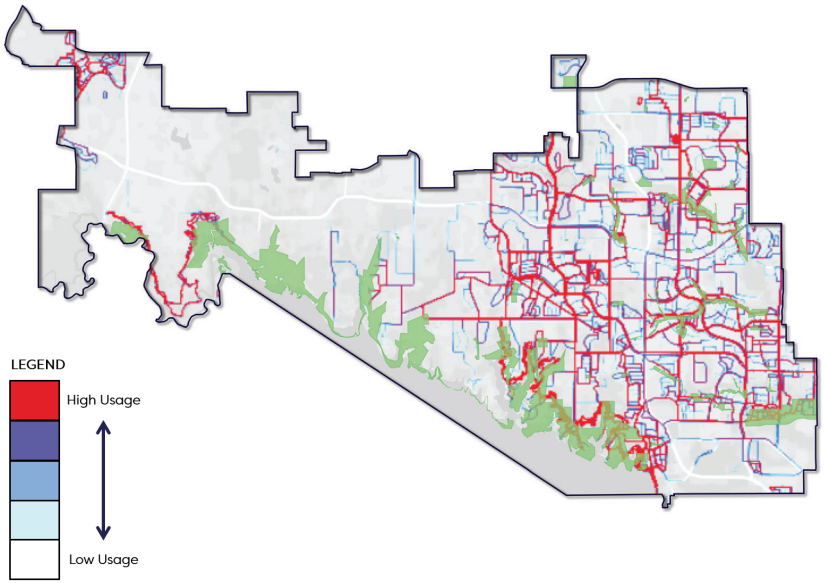
STANDARD BIKE LANES

Standard bike lanes are recommended along roadways that have slightly higher speeds and volumes for the safety of the user. These designations are also recommended on roadways that have the available width to accommodate modifications. Standard bike lanes offer increased comfort for cyclists and can encourage use by those that don't feel comfortable in a shared lane.

BUFFERED BIKE LANE

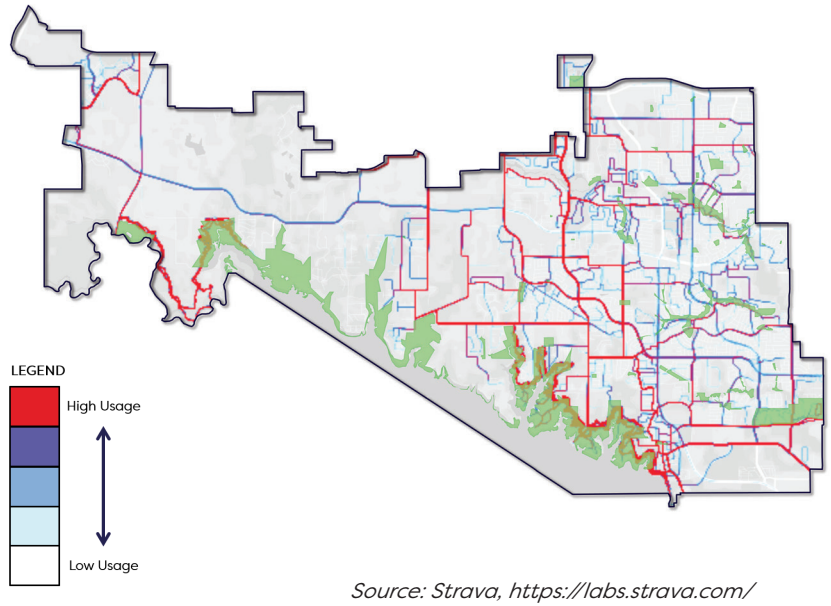
Similar to standard bike lanes, buffered bike lanes are offered along roadways that have higher speeds and volumes that need a spatial separation from the motor vehicles. However, these act as a major arterial for the bikeway network of a community. A buffered bike lane is used to connect major destinations and are proposed along major arterials in a community.

FIGURE 3.10: STRAVA PEDESTRIAN HEAT MAP, MAY 2021



Source: Strava, https://labs.strava.com/

FIGURE 3.11: STRAVA BICYCLE HEAT MAP, MAY 2021



Source: Strava, https://labs.strava.com/

BARRIERS AND OPPORTUNITIES

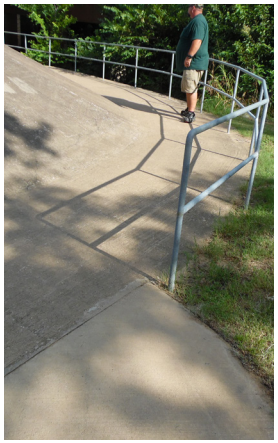
Based on the needs assessment and public input described earlier in this chapter, a series of barriers and opportunities were identified to help further expand the trails and bikeways system.

BARRIERS

The major barriers that exist in Flower Mound today can be divided into the following four categories and are shown in **Figure 3.12** on page 69.

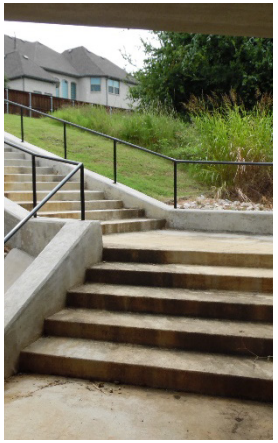
SAFETY ISSUES

This type of barrier includes major safety concerns along the trails such as lack of cautionary signage, unsafe roadway crossings, steep slopes or drop-offs, and poor visibility. Safety issues may discourage use of trails and bikeways because a user cannot cross roadways or maneuver trails safely. Improved roadway crossings throughout the system could improve safety for trail and bikeway users. Slope concerns exist along the Texas Yellow Star Trail and the White Lazy Daisy Trail. There is a need for additional cautionary signage at each of the trail crossings under roadway bridges.



PHYSICAL BARRIERS

This type of barrier includes major roadways, rail lines, and water features which may present difficulties to connect the trail system. Intersections with Flower Mound Road, Cross Timbers Road, Gerault Road, and Long Prairie Road present major challenges to the safety and accessibility of the trails and bikeways system.



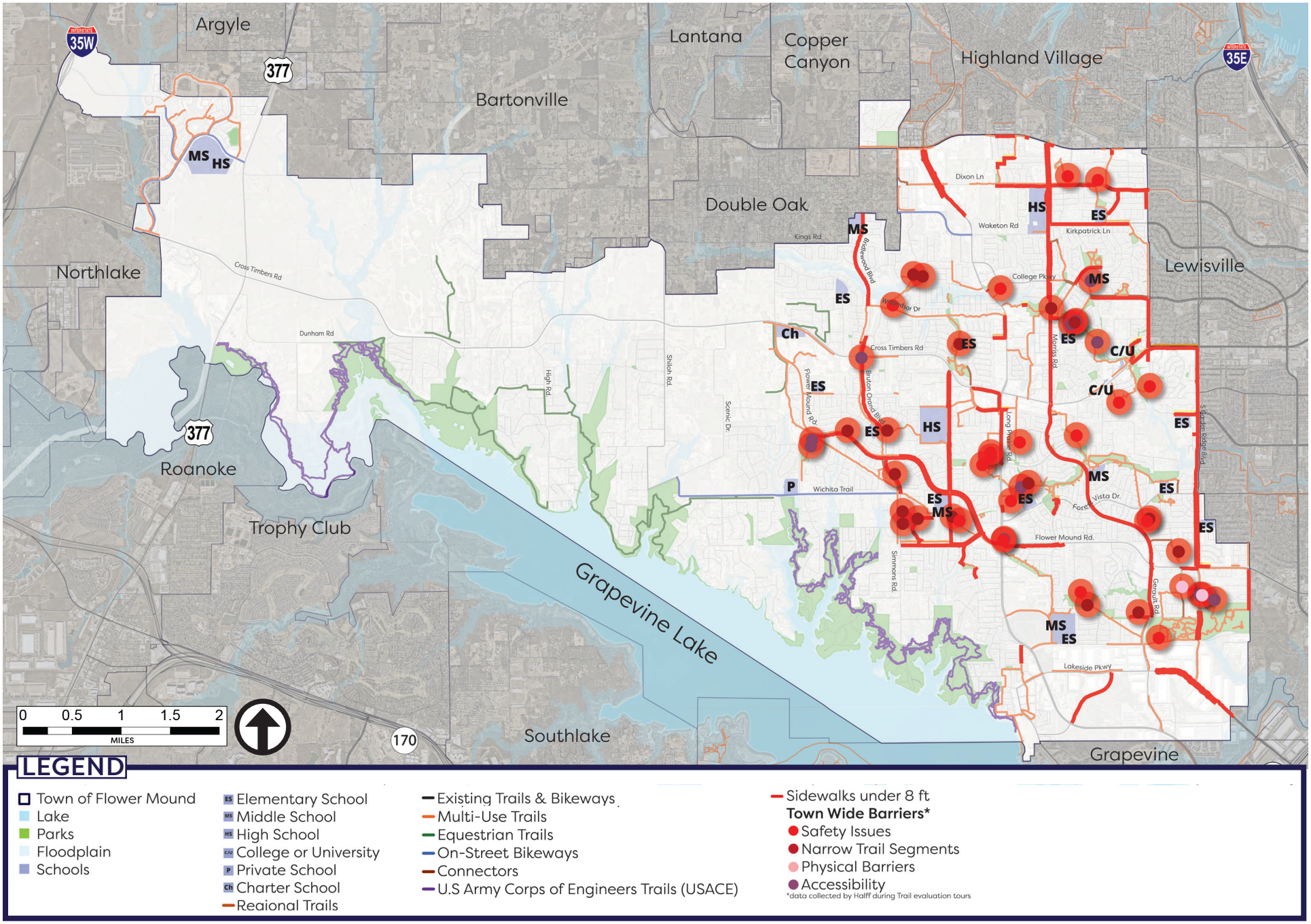
NARROW TRAIL SEGMENTS

This type of barrier includes trail segments that are too narrow, including trails that are less than 8' in width. These segments may not be able to be widened due to right-of-way constraints, physical barriers, or may include bridges and infrastructure that cannot be widened. Narrow segments existing throughout the system, but are especially frequent within neighborhoods and internal to parks. As shown in **Figure 3.14**, just 64 percent of the trail system is 8 foot or wider. Narrow segments should be evaluated to see if they can be widened to meet national standards for trail widths.

ACCESSIBILITY

This type of barrier includes potential ADA compliance, lack of wayfinding/directional signage, and locations where trails dead end without warning. The entire trail system would benefit from increased wayfinding signage, but this would be especially useful where named trails intersect, or to provide direction to key destinations in Flower Mound.

FIGURE 3.12: MAJOR BARRIERS FOR TRAILS & BIKEWAYS IN FLOWER MOUND



OPPORTUNITIES

Based on the needs assessment, evaluation of the existing trail system, and stakeholder input, opportunities for the trails and bikeways system were identified. These opportunities serve as a framework for the recommendations presented later in the document. **Figure 3.15** on page 72 shows opportunities in map form and the following categories are described below and on page 71.

CONNECTIONS TO MAJOR DESTINATIONS

Connections throughout the town were identified as important by system users. Key destinations include schools, parks, libraries, and activity centers such as Lakeside, Riverwalk, Parker Square, Grapevine Lake, Town Hall, and Stone Creek. Providing better connectivity to these places can reduce dependence on automobiles and encourage active transportation and healthier lifestyles.

INTERJURISDICTIONAL CONNECTIONS

Interjurisdictional connections present opportunities to connect Flower Mound to adjacent communities like Grapevine, Coppell, Lewisville, Highland Village, Double Oak, North Lake, Roanoke, and Trophy Club. Improving bicycle and pedestrian connections to these communities, either through the expansion of the Regional Veloweb trailway system or through new connections, will enhance regional connectivity and provide access to key activity centers for residents of the region.

ACCESSIBILITY

The overall trails and bikeways system can be enhanced through filling in gaps in the existing system and providing for better connections to existing neighborhoods. Gaps in the system exist along all named and unnamed trails in Flower Mound. Potential new trails and connections would improve the accessibility of the system.

CORRIDORS TO WIDEN

Segments of trails that are less than 8 feet in width should be widened where possible to meet current standards and best practices. Opportunities to widen existing trails exist along Long Prairie Road, Gerault Road, S. Garden Ridge Blvd, Lakeside Parkway, and many other roads in eastern Flower Mound, as shown in **Figure 3.13**.

OPPORTUNITIES CONTD.

ADDITIONAL CONNECTIVITY OPPORTUNITIES

Opportunities to expand the system exist throughout the town. This plan considers five feasibility corridors discussed later in this plan and utility corridors as places where new trails can be constructed to expand the system. It also looks at new paddling launch points for a paddling trail system, additional locations for trails along greenways or creeks, and improved intersection crossings to improve overall connectivity of the system.

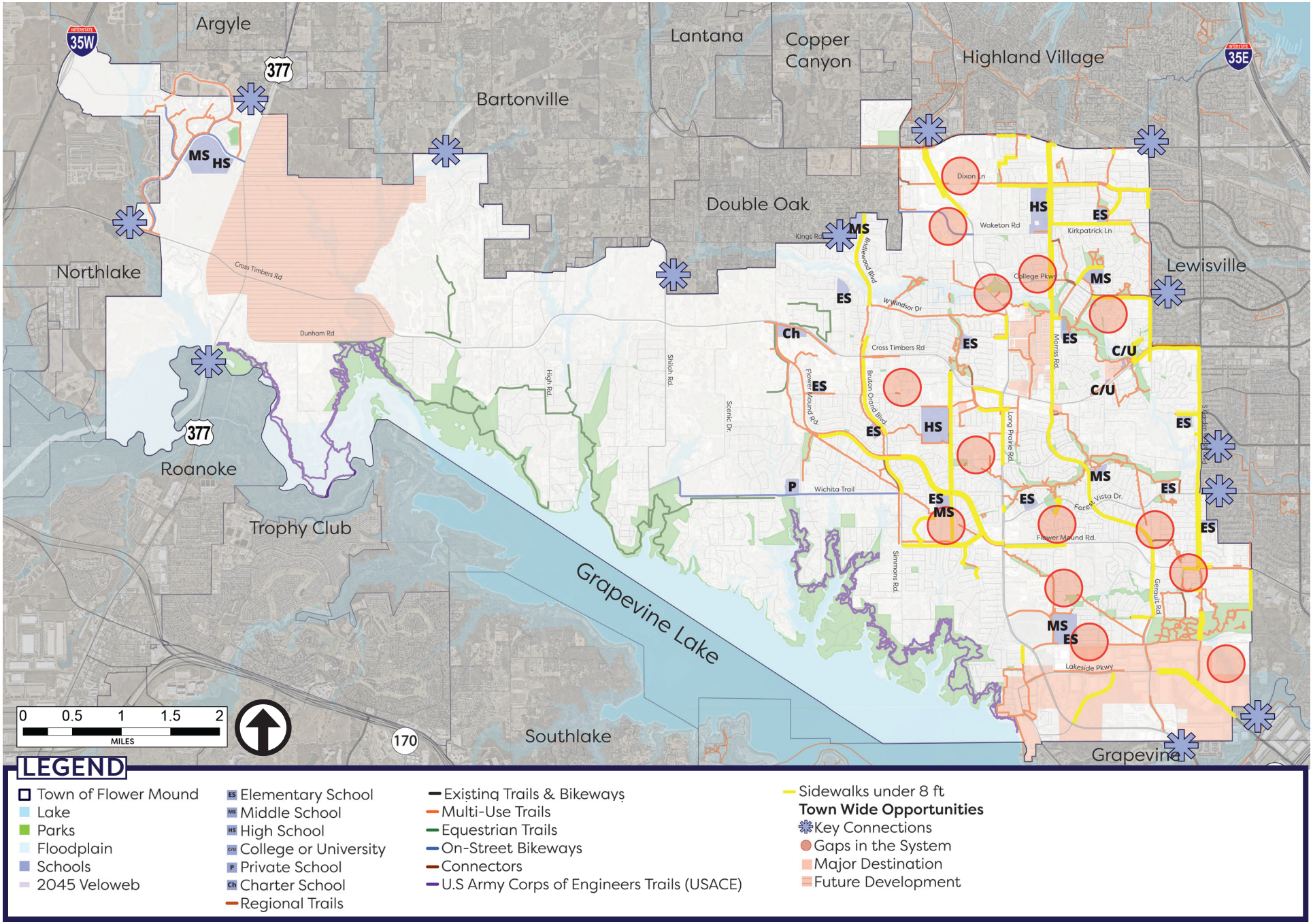
PLACEMAKING

Placemaking can help strengthen and improve a community or system by improving the public realm. Placemaking strategies that can improve the trails and bikeways system in Flower Mound include branding of the trail system through trail naming, wayfinding, and trailheads. Interpretive signage can be included along trails to help educate the community about environmental resources, arts, culture, and history. Intersections of trails can be designed to match the brand of the trail systems.

AMENITIES

Amenities can improve the overall experience for trail users. They provide shade, shelter, places to rest, and places to dispose of waste. Trailheads can be used to identify the start and end of trails. Wayfinding signage can help people identify where they are and where they want to go, while providing for branding along the trail. Other amenities that can improve user experience along trails, bikeways, and at trailheads include: bike racks, bike repair stations, waste receptacles, benches, pet waste stations, lighting, and parking.

FIGURE 3.13: MAJOR OPPORTUNITIES FOR TRAILS & BIKEWAYS IN FLOWER MOUND



Corridor Identification
Facility Hierarchy
Recommended Network

04 TRAILS & BIKEWAYS SYSTEM NETWORK

INDIAN BLANKET TRAIL

This plan proposes a well-connected network of on- and off-street trails and bikeways throughout the town. The proposed network was developed through a combination of research, field observation, and community input, much of which has been summarized in preceding chapters. The network depicted intends to encourage recreation, active transportation, and healthy living for generations to come.

CORRIDOR IDENTIFICATION

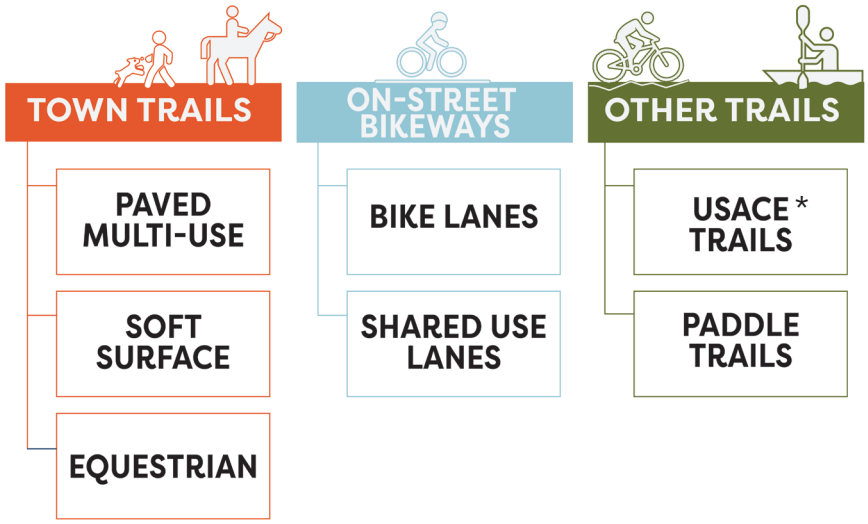
Five primary evaluation criteria were considered to determine the suitability of the trails and bikeways network in Flower Mound. These criteria, listed below, are used to help determine the level of impact and feasibility of each segment. Not all trails align with each criterion.

Connects the system – The segment would provide connections to the existing or planned system by filling a gap within the existing network.
Connects to destinations – The segment would provide connections to community destinations such as parks, schools, entertainment, and employment opportunities.
Addresses safety issues – The segment would address safety concerns to improve access to the system.
Increases access – The segment is located close to residential areas and would provide additional connectivity to neighborhoods.
Feasibility of corridor – The segment should be generally feasible to construct. Elements considered during a planning level review include available right-of-way or easements, lane widths, property ownership, topography, and floodplain.

FACILITY HIERARCHY

The Town of Flower Mound's network includes town trails, connectors, on-street bikeway facilities, and other trails, as shown in Figure 4.1. Each facility is designed to accommodate specific users. This section discusses key characteristics of each facility hierarchy. More details on design characteristics of each facility type is included in Chapter 5.

FIGURE 4.1: FACILITY HIERARCHY



* US Army Corps of Engineers

TOWN TRAILS

Town Trails provide a high level of comfort for users based on widths and locations of the trails. These trails include paved multi-use trails, soft surface trails, and equestrian trails that are maintained by the Town.

PAVED MULTI-USE TRAILS

Paved multi-use trails can be located adjacent to roadways, within utility easements, or within parks and greenways. These wide, paved facilities are comfortable for bicycle and pedestrian users of various ages and abilities. The minimum width for trails is recommended to be 12', however, 10' may be applicable in areas where there are existing ROW constraints. This is consistent with AASHTO and regional standards. For trails designated as part of the Regional Veloweb, the trail should be 12' to meet NCTCOG standards and provide for a high level of comfort. These paths can be used for recreational uses or for commuting when they connect to employment centers and schools.

SOFT SURFACE TRAILS

Soft surface trails maintained by the Town should be designed with decomposed granite or another soft surface material, and can be used in environmentally sensitive areas and should be a minimum of 8' in width. Soft surface trails provide recreational opportunities, connect people to nature, and can be less expensive to construct. There is heavier maintenance required on these trails to maintain ADA accessibility. Anticipated users include walkers, joggers, and people wanting to experience the outdoors.

EQUESTRIAN TRAILS

Equestrian trails are trails for primary use by people on horseback. These natural surface trails can be located through wooded and vegetated areas to provide people with alternative riding experiences and allows them to explore nature. The surface material is typically compacted earth with a width of approximately 15'. Where possible, considerations for hitching posts and trailer parking should be incorporated into equestrian trailheads.

PAVED MULTI-USE TRAIL

SOFT SURFACE TRAIL

BRIDLEWOOD EQUESTRIAN TRAIL

ON-STREET BIKEWAYS

BIKE LANES

Bike lanes are designated spaces on roadways with relatively higher volumes and travel speeds. Based on AASHTO and Town standards, the minimum width of a bike lane is 5' to provide a more comfortable space for bicyclists. When the facilities are buffered with either striping or a physical barrier, bike lanes can be attractive for a wider range of comfort levels.

SHARED-USE LANES

Shared-use lanes are designated roadways with low traffic volumes and speeds, and include pavement markings on the road to indicate the street is to be shared between vehicles and bicyclists. Pavement markings include arrows and a bicycle, and the roads typically include shared lane signage. In lower traffic areas such as residential streets, these roadways can be designated with just signage and not pavement markings.

SHARED-USE LANE

OTHER TRAILS

OTHER SOFT SURFACE TRAILS

The US Army Corps of Engineers (USACE) owns soft-surface trails along Grapevine Lake that are maintained by the Dallas Off-Road Bicycling Association (DORBA) and the Cross Timbers Equestrian Trails Association (CTETA). These trails provide recreational opportunities for mountain bikers, hikers, people on horseback, and nature seekers. Any proposed changes to the trail system should be coordinated with the USACE. These trails vary in width and are typically compacted dirt.

PADDLING TRAILS

Paddling trails located on Grapevine Lake are designated water way trails that provide the opportunity to explore the lake, engage with nature, bird watch, fish, and experience similar water-based activities. Paddling trails are associated with a series of launch points where paddling users can put in and take out their watercraft. Considerations for interactions with operators of motorized boats is important.

USACE TRAIL AT GRAPEVINE LAKE

TWIN COVES PARK KAYAK LAUNCH

OTHER FACILITIES

CONNECTORS

Connectors are enhanced sidewalks up to 8' in width that connect neighborhoods to key destinations, such as employment centers, entertainment opportunities, schools, and parks. All new connectors or reconstruction of existing connectors should be widened 6'-8' where feasible. This facility type is typically found along major roadways that have constraints restricting the construction of a wider multi-use path. These facilities differ from other sidewalks within the Town since they fill in key gaps in the overall trail and bikeway system.

HIERARCHY SUMMARY

Table 4.1 provides a summary of the key characteristics of each proposed facility type. For additional descriptions of the design of each facility type, please refer to Chapter 5.

TABLE 4.1: HIERARCHY SUMMARY

Facility Type	Preferred Surface Material	Width (Feet)	Primary Users	Locations
Town Trails				
Paved Multi-Use Trails	Concrete	12', 10' if existing ROW constraints	Pedestrian and Cyclist	Adjacent to roadways, greenbelt corridors, utility easements, within parks
Soft Surface Trails	Decomposed Granite	8'	Pedestrians	Areas of environmental interest
Equestrian Trails	Compacted Earth	15'	Equestrian Users	Located away from roadways
On-Street Bikeways				
Bike Lanes	Pavement	5' minimum	Cyclist	Roadways with speeds less than 45 mph
Shared-Use Lanes	Pavement	14' lane width	Cyclist	Roadways with speeds less than 35 mph
Other Trails				
USACE Trails	Compacted Earth	Varies	Hikers, Mountain Bikers, Equestrian	Within USACE land
Paddling Trails	n/a	n/a	Kayaks, Canoes	Along Grapevine Lake
Other Facilities				
Connectors	Concrete	6'-8' depending on existing ROW constraints	Pedestrians	Adjacent to roadways

RECOMMENDED NETWORK

The recommended network of trails, bikeways, and connectors were informed by public input, needs assessments, corridor evaluations, and guidance from the overall plan goals. This section discusses the proposed network.

COMBINED RECOMMENDATIONS

The combined recommendations create a robust trails and bikeways system throughout Flower Mound to connect residents to key destinations and to the larger DFW region. Some of the key components of the network recommendations are described below.

Major Destinations in Flower Mound include parks, schools, major employers, and entertainment centers. As development occurs in these areas, there are opportunities to enhance the system by widening existing facilities, filling in gaps, and constructing new facilities. As development occurs in western Flower Mound, connections should be provided to future destinations.

Regional Connections are important to connect residents to opportunities in surrounding communities. Interjurisdictional connections include trails and bikeways that can connect Flower Mound's citizens to all the DFW Metroplex has to offer, and improves overall regional connectivity, mobility, and recreation.

Filling in Gaps in the existing trail and bikeway system was identified as a priority through the master plan public input process. Many of the existing trail gaps are located in the eastern part of Town that is primarily built-out. This plan sought to fill in strategic gaps to provide more continuous trail segments. Many of these gaps are found along the branded trails such as the Pink Evening Primrose Trail and the Bluebonnet Trail.

HOW TO USE THE MAP

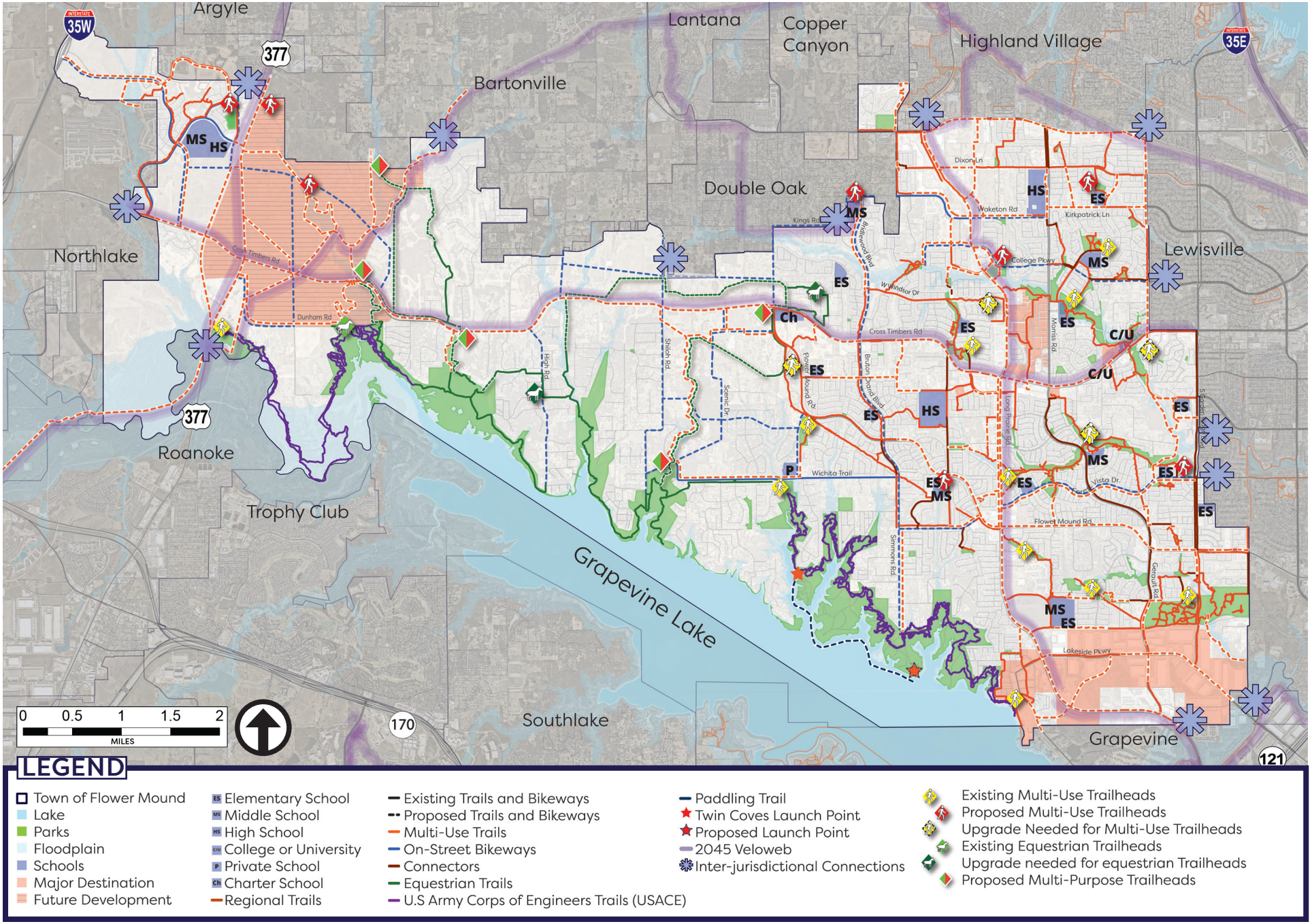
The Trails and Bikeways Master Plan recommendations map should serve as a blueprint for town staff, leaders, and developers when considering new trails and bikeways within Flower Mound. Whenever a new development or redevelopment is proposed, the associated recommended trail facility is required to be constructed by the developer. Moreover, whenever a roadway is built, expanded, or reconstructed, the proposed bikeway accommodations should be included. Furthermore, future updates to the Thoroughfare Plan may necessitate modifications to the alignments of trails adjacent to roadways and on-street bikeway accommodations. Finally, the Trails and Bikeways Master Plan map may be amended by the Town Council; it is recommended that these modifications occur annually to reflect facilities that are built and other needed changes.

Figure 4.2 on the facing page represents the collective network recommendations for the Town of Flower Mound. Table 4.2 provides details on the existing and proposed mileage of all facility types.

TABLE 4.2: RECOMMENDED SYSTEM WIDE FACILITY MILEAGE

Facility Type	Existing Mileage	Recommended Mileage	Total Mileage
Town Trails	91.3	93.8	185.1
On-Street Bikeways	6.3	34.1	40.4
Other Trails	34.5	2.3	36.8
Total	**100.4**	**129.4**	**244.4**

FIGURE 4.2: COMBINED RECOMMENDATIONS MAP



TOWN TRAIL RECOMMENDATIONS

Figure 4.3 illustrates the network of town trails intended to accommodate both pedestrians and bicyclists. The designated facilities aim to provide town-wide connectivity to destinations and the larger DFW Region.

PAVED MULTI-USE TRAILS

The proposed paved multi-use trails include on-street sidepaths and off-street trails to create connections and fill in gaps in the existing trail network town-wide. These trails provide local and regional connections, access to recreation and destinations, and improve overall accessibility of the system. The recommended segments include widening existing trails to meet new standards, and constructing new trails to improve the overall network. 55 percent of the proposed trails are off-street and 33 percent are on-street.

SOFT SURFACE TRAILS

Soft surface trails will primarily exist on the USACE property along Grapevine Lake. Beyond the existing soft-surface trails that are managed by the Town today, there are no additional soft-surface trails recommended since they are not accessible to all users. While this plan does not recommend these types of trails, this does not prohibit the Town from installing them in parks or floodways in the future.

EQUESTRIAN TRAILS

The Town of Flower Mound has an active and avid equestrian community. This plan seeks to connect existing trails, create trail loops, and enhance the overall equestrian trails network to connect riders with nature. There are opportunities to finish trail loops where development is proposed on the more natural, west side of Town. The addition of trails to connect north of Cross Timbers Road to the USACE trails along Grapevine Lake are provided at locations where trails either already exist, or where there will be enhanced trail crossing infrastructure, such as an underpass. 12% of the proposed trails are equestrian.

TOWN CONNECTORS

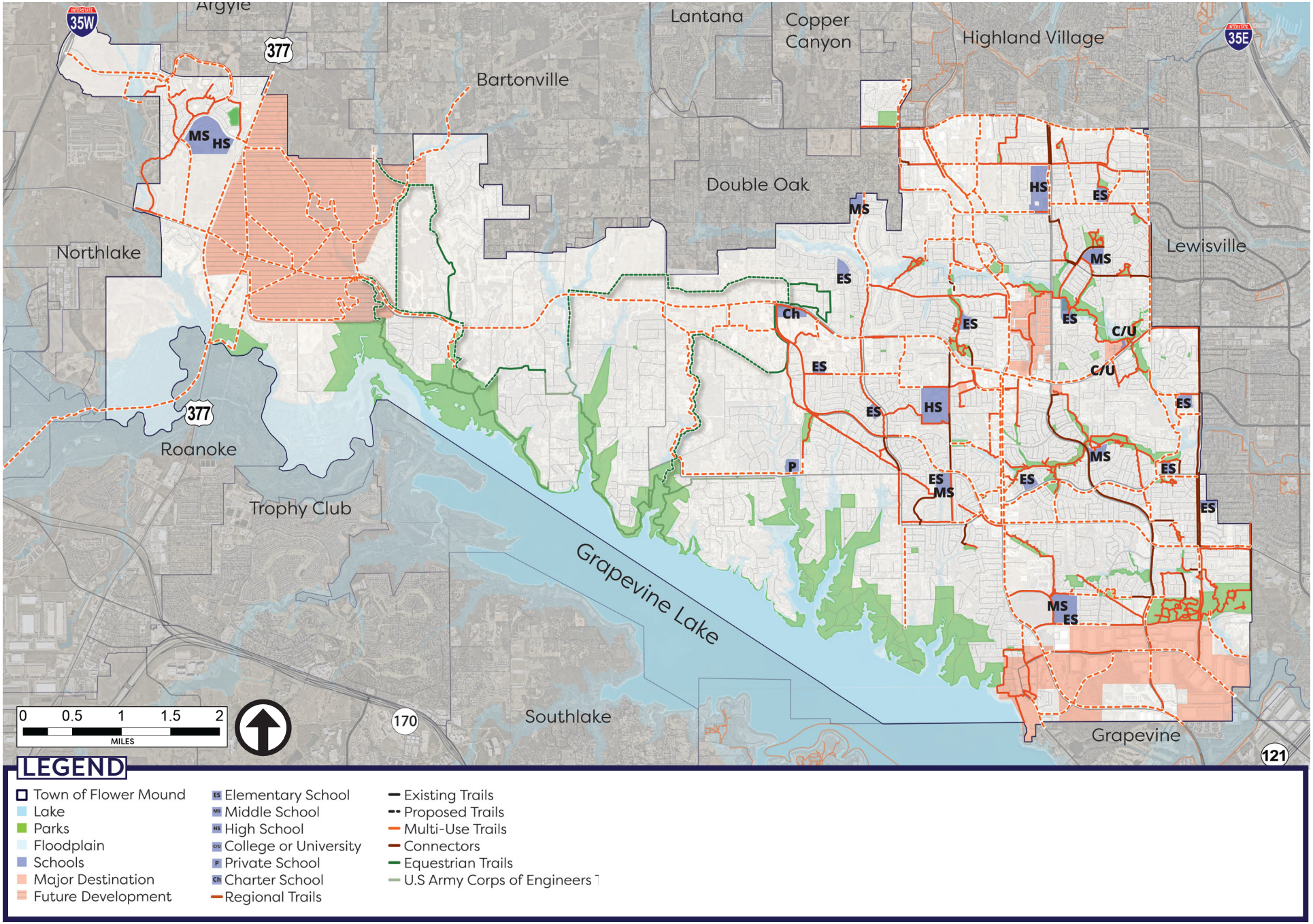
These are sidewalks that connect to major destinations and are usually on major roadways where existing constraints prohibit widening to a trail. The desired width for connectors is 8', however where existing constraints exist and sidewalks cannot be widened, they should be a minimum of 6'.

TABLE 4.3: TOWN TRAILS RECOMMENDATION SUMMARY

Facility Type	Existing Mileage	Recommended Mileage	Total Mileage
Paved Off-Street Trails	37.2	51.4	88.6
Paved On-Street Sidepaths/Trails	28.3	31.4	59.7
Soft Surface Trails	0.1	0	0.1
Equestrian Trails	14.6	10.9	25.5
Connectors	11	0.1	11.1
Total	**91.3**	**93.8**	**185.1**

TEXAS YELLOW STAR TRAIL

FIGURE 4.3: TOWN TRAILS RECOMMENDATIONS MAP



ON-STREET BIKEWAYS RECOMMENDATIONS

BIKE LANES

Bike lanes have been recommended for the roadways that have relatively higher speeds and volumes and have the available right-of-way, or pavement width, to accommodate the modifications necessary to install bike lanes. Proposed bike lanes were designated along roadways where continuous and comfortable routes for residents are feasible. They provide key connections to the mountain biking trails along Grapevine Lake and to the proposed or existing Town Trails. Generally, riders feel an increased level of comfort on separated facilities, such as bike lanes, and as such they should be implemented opportunistically. The Town should consider designs to add bike lanes where feasible and there is available right-of-ways when thoroughfares are updated, whether they are shown on this map or not. Future updates to the thoroughfare plan can also indicate where additional bike lanes are feasible.

SHARED-USE LANES

Shared-use lanes can be easily implemented and require little change to the existing roadway. A majority of the bikeway facilities on the east side of Town are shared-use lanes due to existing constraints. These routes are on local roads or collectors with low volumes and speeds, which are more ideal for creating a comfortable riding experience for users of all ages and abilities. These routes connect residents to the trail system, bike lanes, and destinations throughout the Town.

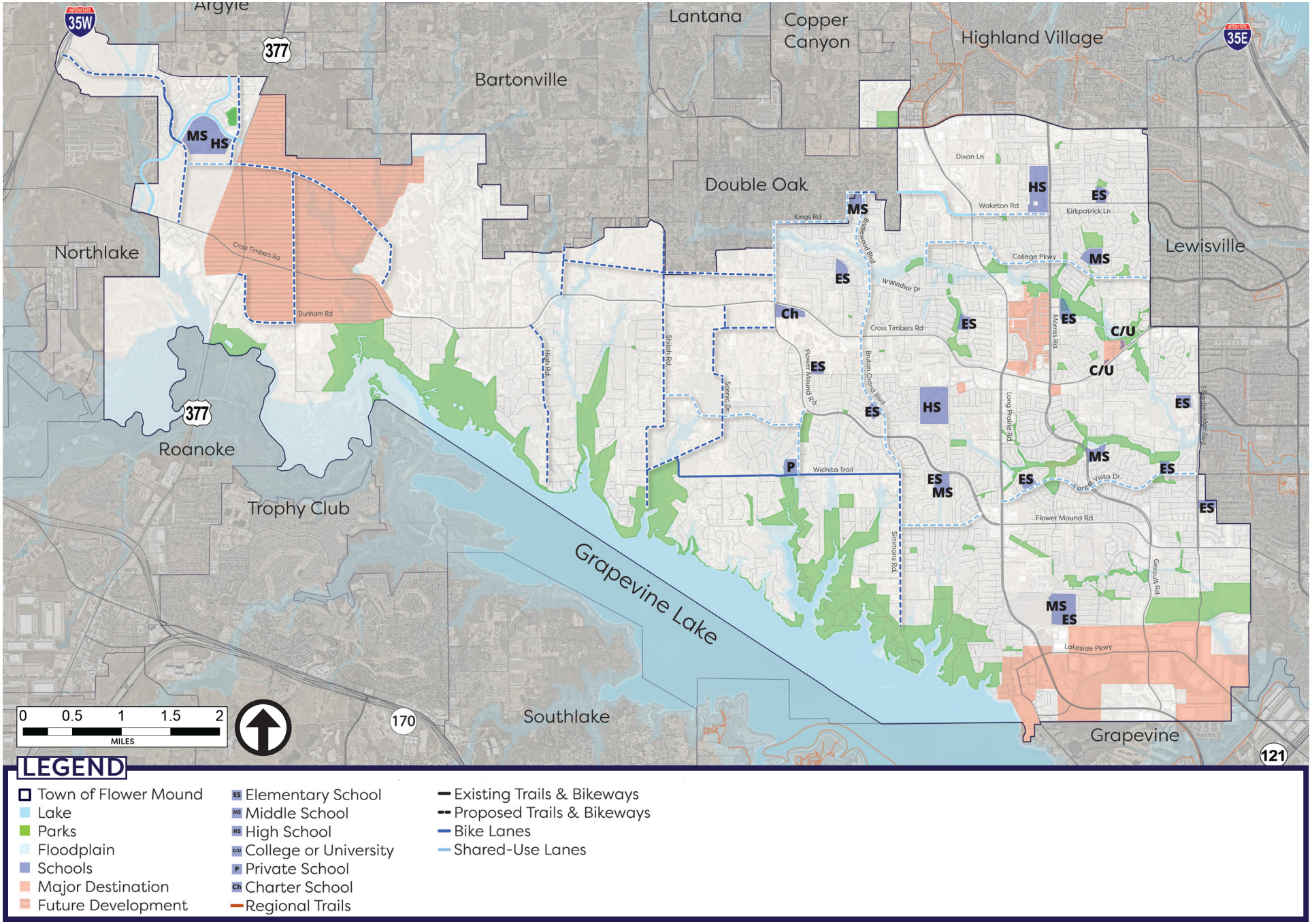
WICHITA TRAIL ROAD

TABLE 4.4: ON-STREET BIKEWAYS RECOMMENDATION SUMMARY

Facility Type	Existing Mileage	Recommended Mileage	Total Mileage
Bike Lanes	5.0	15.8	20.8
Shared-Use Lanes	1.3	18.3	19.6
Total	**6.3**	**34.1**	**40.4**

BIKE & PED SIGN IN LAKESIDE

FIGURE 4.4: ON-STREET BIKEWAYS RECOMMENDATIONS MAP



OTHER TRAILS RECOMMENDATIONS

Other trails include the USACE soft-surface trails along Grapevine Lake and paddling trails in Grapevine Lake. These are diverse trails intended to serve a variety of users.

USACE TRAILS

USACE Trails are soft-surface trails located along Grapevine Lake and are maintained by DORBA and CTETA. This plan does not propose any additional trails on USACE property; additional trails would need to be planned by the USACE based on their requirements. These trails primarily serve mountain bikers, hikers, and equestrian users and attract people from around the DFW region.

PADDLING TRAILS

Paddling Trails are shown with proposed and existing launch points. These trails are intended to serve water users, including kayakers, canoers, and paddle boarders, exclusively. This plan proposes using the existing Twin Coves Launch point and a new launch point further south to create a 2.3 mile paddle route, as shown in **Figure 4.5**. The Town can work with the cities along Grapevine Lake to create a broader network of paddling trails in the future.

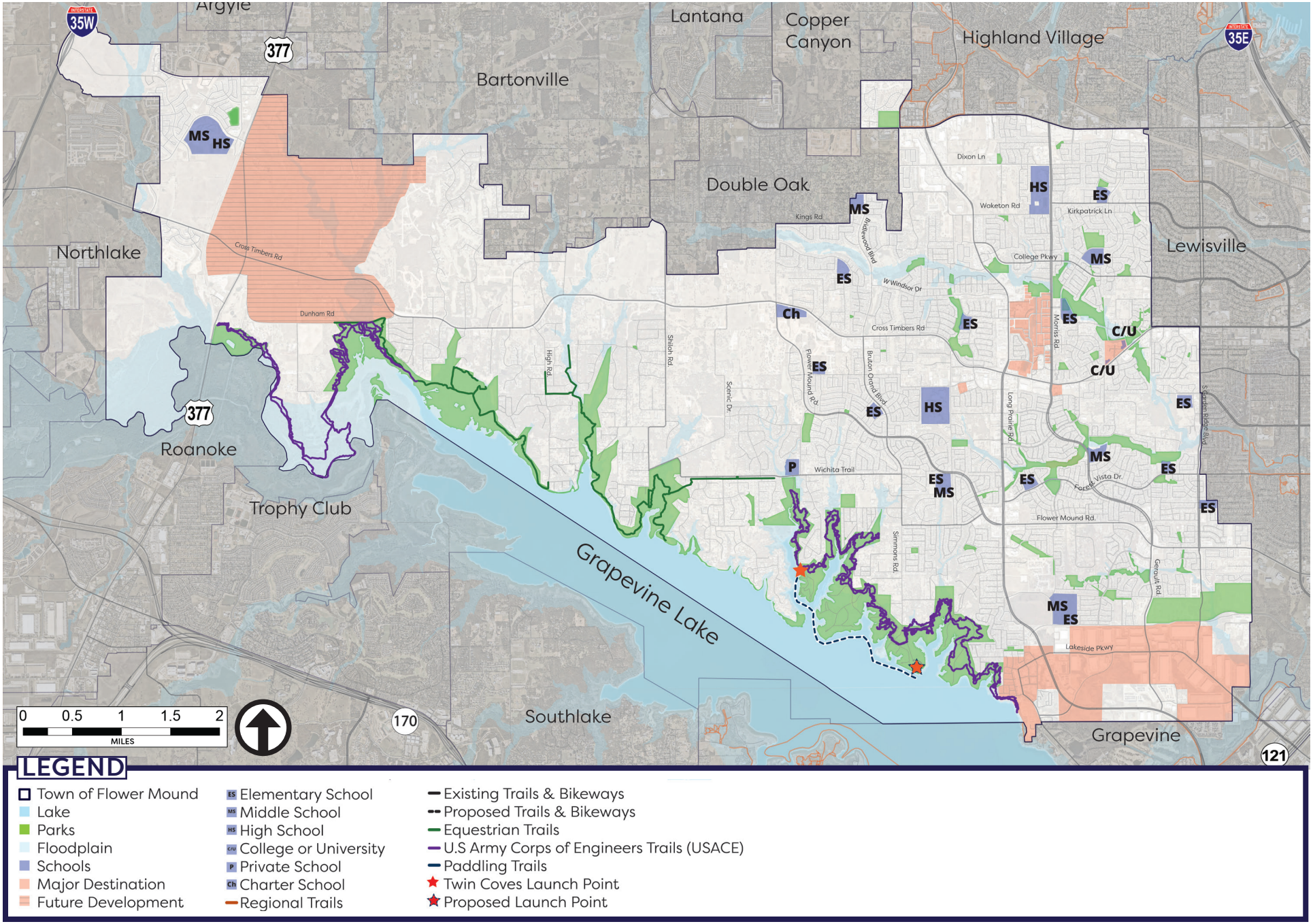
GRAPEVINE LAKE

TABLE 4.5: OTHER TRAILS RECOMMENDATION SUMMARY

Facility Type	Existing Mileage	Recommended Mileage	Total Mileage
USACE Trails	34.5	0	34.5
Paddling Trails	0	2.3	2.3
Total	**34.5**	**2.3**	**36.8**

CYCLIST AT KNOB HILLS

FIGURE 4.5: OTHER TRAILS RECOMMENDATIONS MAP



TRAILHEADS AND THE PRIMARY TRAIL NETWORK

TRAILHEADS

Key entrances to the trail system should be designated by trailheads. They should be distributed throughout the town at major destinations, such as at community parks and entertainment centers. While Figure 4.6 identifies proposed locations for trailheads, it does not limit the Town's ability to construct trailheads at other locations Design considerations for trailheads are provided in Chapter 5.

Equestrian Trailheads

Equestrian trailheads are located at major entry points to the equestrian trail system. These should include a variety of amenities including informational signage, parking, and tie ups. **This plan does not propose any new equestrian trailheads, however it does propose enhancing existing trailheads. The new trailheads for equestrian trails are identified as multi purpose trailheads.** Existing trailheads should be evaluated and enhanced in order to provide the necessary amenities for horseback riding and accessing eixsting equestrian trails.

Multi Purpose Trailheads

Multi purpose trailheads are located in locations where multi-use trails and equestrian trails converge. Due to their location and anticipated user demand, a wider range of amenities should be provided, including parking areas with trailer parking and automobile parking, lighting, seating, signage, waste receptacles, bike amenities, shade, and similiar amenities. The location of horse tie-ups should be away from the bike and pedestrian entry to the trail system to reduce user conflict. Signage should include a map, directional, safety percautions, and rules and regulations for using the trail for the various users. **This plan proposes 5 new multi purpose trailheads.**

Multi-Use Trailheads

Multi-use trail trailheads are located where trails converge, or at trail entry points for pedestrians and bicyclists. The anticipated user volume, space limitiations, and similiar elements may determine the classification of trailhead. Existing trailheads are used to mark entry of trails from neighborhoods, but may not include recommended amenities to enhance access and usability of the trail. **The plan proposes 12 new or enhanced multi-use trailheads.**

PRIMARY TRAILS

Primary trails, shown in Figure 4.6, are characterized by their accessibility though the Town. They are major east/west and north/south trails through Flower Mound, primarily located on major roadways like Long Prairie, Cross Timbers, and US-377. Many of these longer corridors are also part of the Regional Veloweb, which provide regional and local connectivity and can support major trailheads at main trail junctions. Primary trails can also be located through greenways and off major corridors to create loops and linkages to parks, schools, and destinations.

Primary trails provide residents with continual corridors for walking, jogging, or general exercise purposes. In contrast, intersecting loop trails bring diversity to the system and create various mileage for trail users. Loops create scenic or relaxing experiences by connecting to off-road trail segments, improving shade along trails, and providing access to nature and exploration. These corridors are candidates for regional funding opportunities and should be prioritized in the overall system.

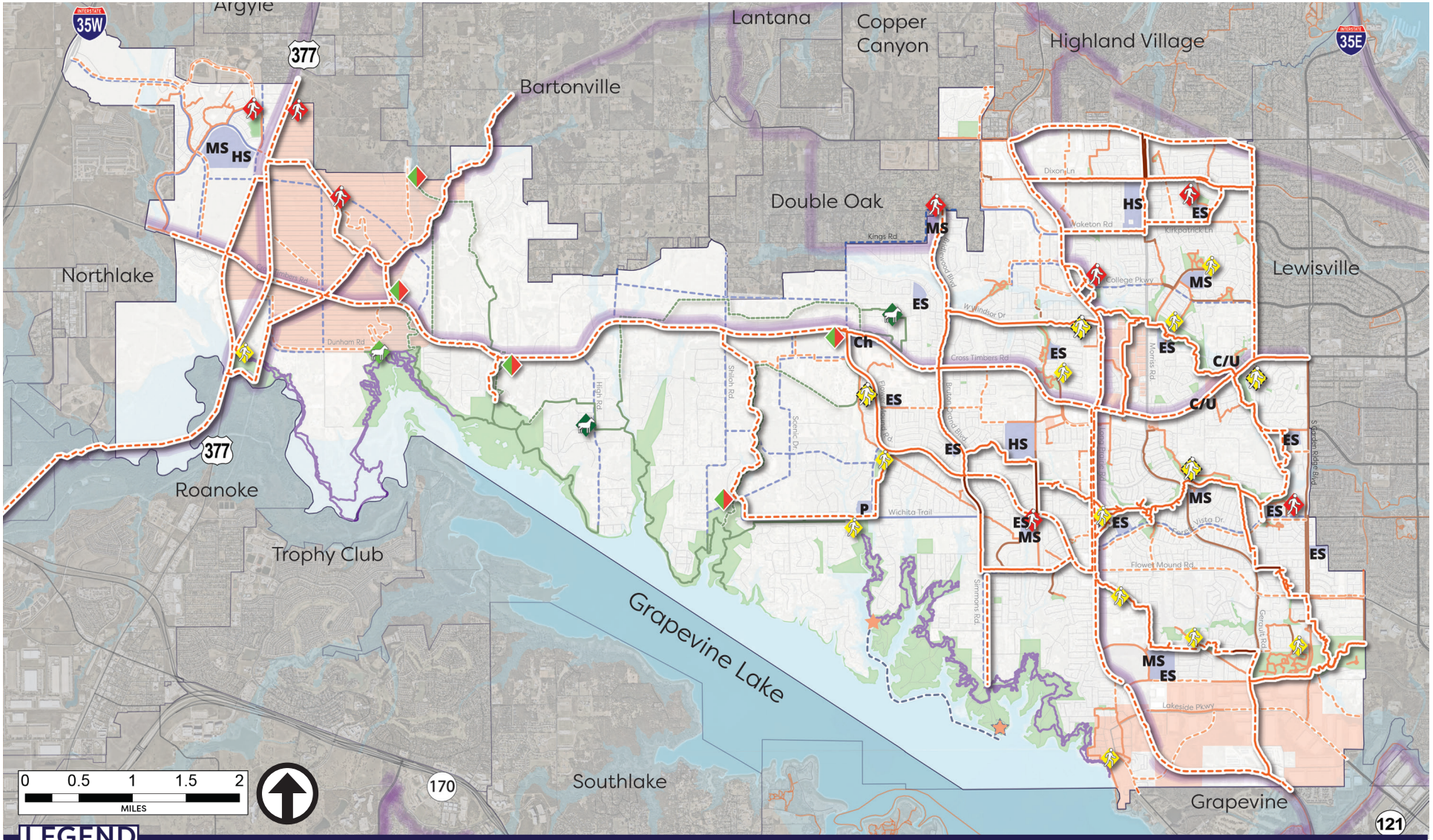
SECONDARY CORRIDORS

Secondary corridors are smaller segments that connect to residential neighborhoods. These smaller segments of trails are still important for creating accessibility throughout the entire system. These smaller trail segments are candidates for Town funding sources. The secondary trail system may be used more for recreation and access to schools and parks that are not located in major destinations.

INTERJURISDICTIONAL CONNECTIONS

The recommended network should take advantage of opportunities to connect residents to surroundings trails and bikeways in communities like Double Oak, Argyle, Highland Village, Grapevine, and Lewisville. Interjurisdictional connections and the Regional Veloweb allow Flower Mound residents to access amenities and entertainment throughout the DFW Metroplex. Interjurisdictional connections are shown in Figure 4.2 (page 80). The regional veloweb alignment through Flower Mound is shown on Figure 4.6.

FIGURE 4.6: TRAILHEADS AND PRIMARY TRAILS SYSTEM



SAFETY CONCERNS

MAJOR PEDESTRIAN CROSSINGS

Safety concerns were identified along the existing trails system. These include roadway crossings, blind spots, and existing slopes and drop-offs. General safety concerns are shown in **Figure 4.7**, however, this does not limit the Town's ability to address additional concerns that may be identified in the future. Design considerations for safety concerns are provided in Chapter 5.

Addressing the existing safety concerns should be a priority for the Town. In order to determine which intersections should be looked at more closely for improvements, all intersections where the trail network currently crosses were reviewed from the planning level. This high level analysis included:

- Completeness of crosswalks through the intersection;
- Quality of pavement markings;
- Number of lanes trail users have to cross; and,
- The speed of the roadway trail users have to cross.

ROADWAY INTERSECTIONS

Intersections are an important design consideration when creating a trails and bikeway system. Major roadways crossings are a barrier to connectivity in Flower Mound. Intersections design to enhance pedestrian crossings include signage, high emphasis pavement markings, and signalization, compliant with the TMUTCD. **Figure 4.7** shows existing controlled and uncontrolled intersections with the degree of priority.

MID-BLOCK CROSSINGS

Mid-block crossings are where facilities cross a road at a location between intersections. They should be designed to alert drivers to trail users crossing the road through signage, rectangular rapid flashing beacons, and pavement markings relative to the roadway the trails are crossing. Existing mid-block crossings are shown in **Figure 4.7** shows existing mid-block and neighborhood crossings with the degree of priority.

NEIGHBORHOOD CROSSINGS

While neighborhood streets are typically less traveled and have lower speeds, it is important to provide warning of a trail crossing where the trail crosses mid-block, or there are visibility concerns for frequently used branded trails. This may include signage or standard striping. It is recommnded that entrances to neighborhoods include crosswalk striping where there is a trail crossing.

BLIND SPOTS AND SAFETY CONCERNS

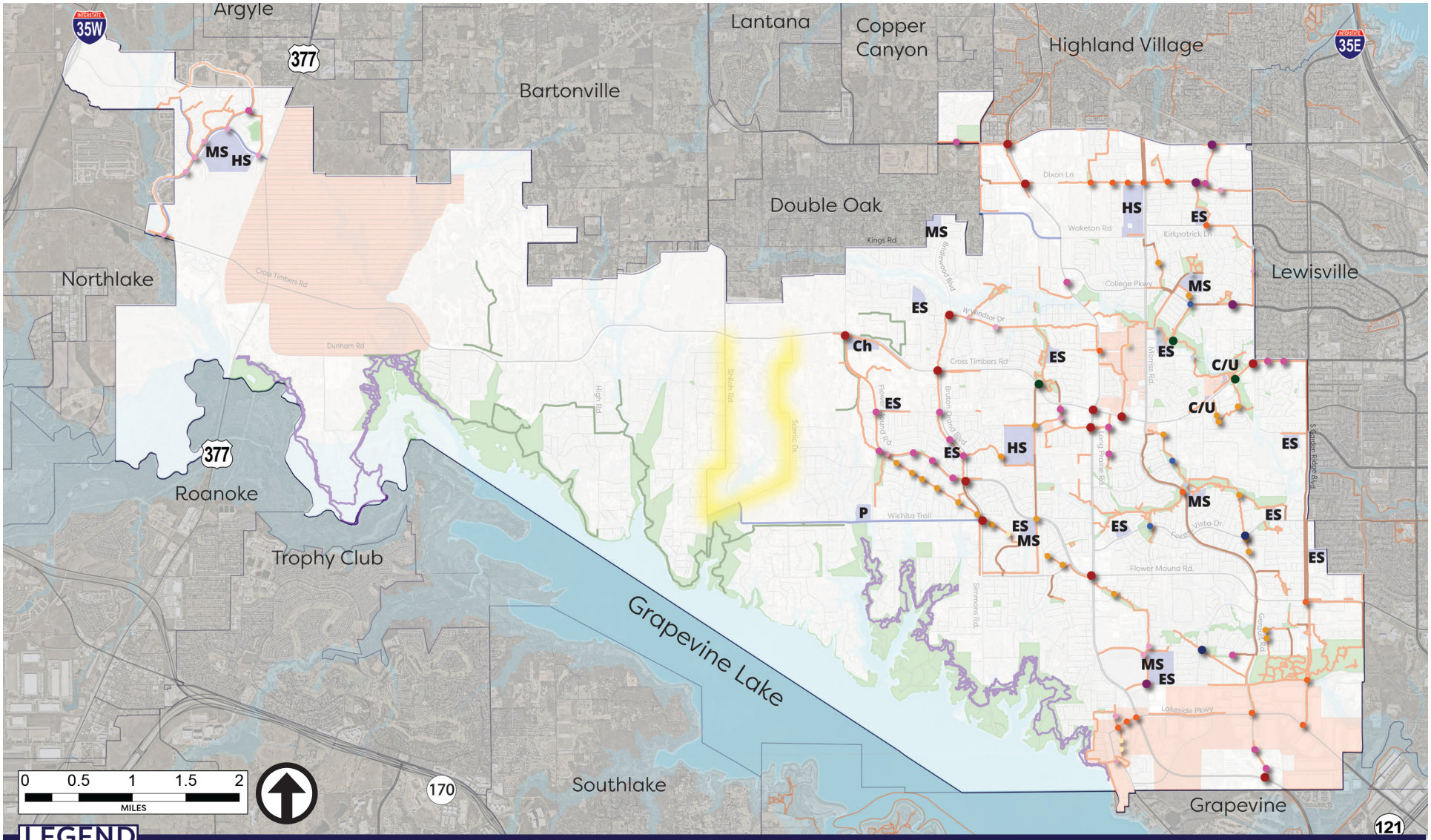
Blind spots exist where a trail makes a 90 degree or extreme curve where trail users cannot see around the curve. This creates conflict points between different users.

Routine maintenace is needed along the existing trail system to ensure there are not drop-offs or slope issues which create an unsafe atmosphere. This includes the removal of vegetation that may encroach onto the surface of a trail or overhanging over the trail creating clearance hazards. This also includes cracks, breakages, uneven trail surfaces, or drop-offs.

Other safety concerns include enhancing signage along highly used bicycle routes to alert drivers of potential conflicts along Shiloh Road and Scenic Drive. Temporary measures such as this can be implemented relatively low cost in the near term, while the reconstruction of the road may be a longer-term action.

Note: All design standards and placement of crossings shall comply with the TMUCD and Town design guidelines.

FIGURE 4.7: SAFETY CONCERNS



Design Guidelines Toolbox
Using the Toolbox

05 TRAILS & BIKEWAYS DESIGN STANDARDS

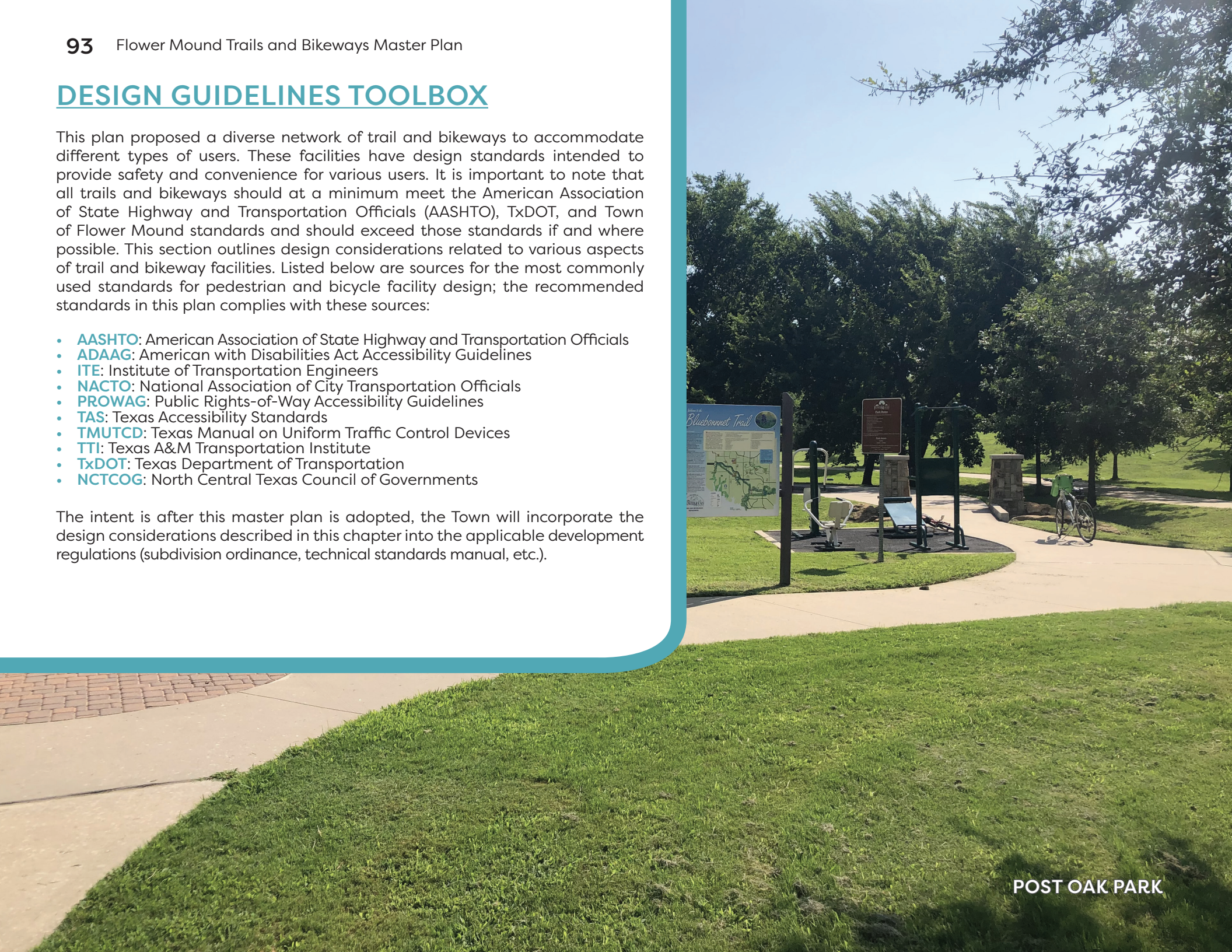
HERITAGE PARK NATURE TRAIL

DESIGN GUIDELINES TOOLBOX

This plan proposed a diverse network of trail and bikeways to accommodate different types of users. These facilities have design standards intended to provide safety and convenience for various users. It is important to note that all trails and bikeways should at a minimum meet the American Association of State Highway and Transportation Officials (AASHTO), TxDOT, and Town of Flower Mound standards and should exceed those standards if and where possible. This section outlines design considerations related to various aspects of trail and bikeway facilities. Listed below are sources for the most commonly used standards for pedestrian and bicycle facility design; the recommended standards in this plan complies with these sources:

- **AASHTO**: American Association of State Highway and Transportation Officials
- **ADAAG**: American with Disabilities Act Accessibility Guidelines
- **ITE**: Institute of Transportation Engineers
- **NACTO**: National Association of City Transportation Officials
- **PROWAG**: Public Rights-of-Way Accessibility Guidelines
- **TAS**: Texas Accessibility Standards
- **TMUTCD**: Texas Manual on Uniform Traffic Control Devices
- **TTI**: Texas A&M Transportation Institute
- **TxDOT**: Texas Department of Transportation
- **NCTCOG**: North Central Texas Council of Governments

The intent is after this master plan is adopted, the Town will incorporate the design considerations described in this chapter into the applicable development regulations (subdivision ordinance, technical standards manual, etc.).



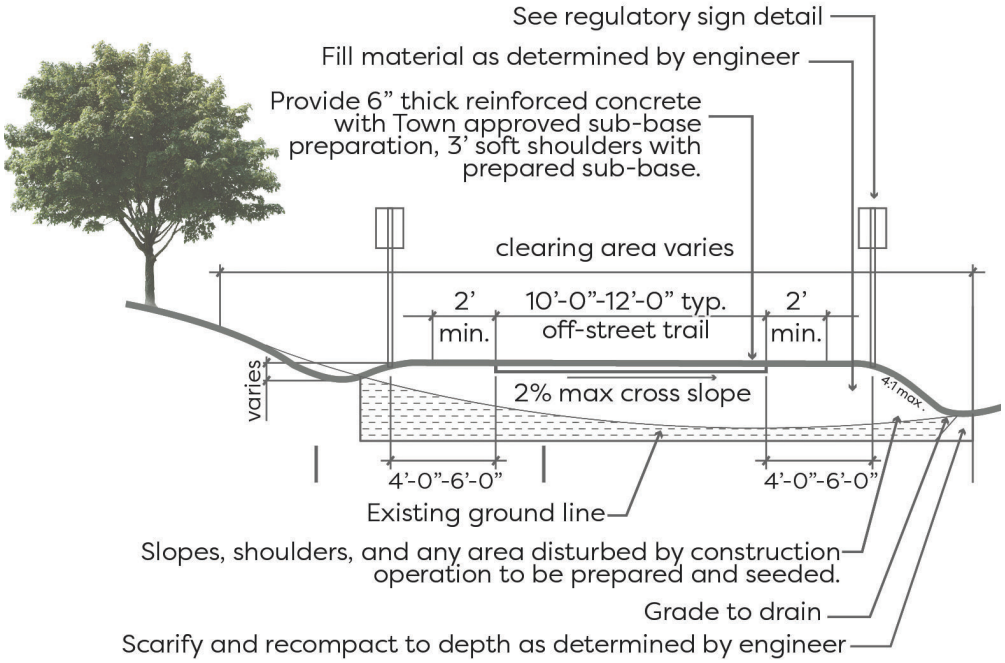
POST OAK PARK

PAVED MULTI-USE TRAILS

Paved multi-use trails include trails located off-street and adjacent to the roadway. This first section outlines design features for paved multi-use trails:

- Utilize guidelines to protect existing natural features along the trails. Canopy trees should be protected where feasible, and natural drainage patterns should be supported to reduce any impacts to the existing water systems. They should follow the natural topography.
- Alignment of trails should provide visual and experiential diversity. Extreme curves or long straight segments should be avoided where possible, except where tree preservation or other obstructions necessitate such an alignment.
- Intersections with trails and roadways should be located where sight lines are not obstructed, trail users are clearly visible, and should occur in locations that are strategic and necessary for the circulation of the trail system.
- Trails should align with all crosswalks and incorporate accessible ramps that meet the ADAAG, PROWAG, and TAS standards.

FIGURE 5.1: TYPICAL TRAIL CROSS-SECTION



TRAIL WIDTH

Paved multi-use trails include existing and future Town trails as well as Veloweb trails. While the existing trails mainly are 8', where feasible they should be widened to 10' – 12'. All newly constructed multi-use trails should be a minimum of 12' in width, unless there are existing ROW constraints, then 10' may be considered. Figure 5.1 illustrates a typical off-street trail cross-section.

As discussed in previous chapters, there are several gaps that exist in the existing trail system. Where a gap in the trail system is being filled, the Town should reserve the right to determine the required width to fill the gap in the system based on the following criteria. All trail segments do not have to meet all the criteria, the Town has the ability to determine feasibility on a case-by-case basis.

- Distance of the gap to be filled, for example it may not make sense to have a 100' stretch of 12' trail when the adjacent segments are 8'.
- Available right-of-way or easement constraints.
- Location of existing utilities and the inability to relocate them.
- Presence of environmentally sensitive resources.
- Other property constraints, such as existing infrastructure.
- Signage constraints.

WIDE TRAILS PROVIDE GREATER COMFORT

PAVEMENT STRUCTURE

Paved multi-use trail pavement should be six inches thick reinforced concrete with a heavy broom finish. Expansion joints should be placed in the trail at an interval of 40' for 10' wide trails and 50' to 60' for 12' wide trails. Expansion joints should be topped and sealed with a self-leveling elastomeric joint compound and should be flush with the top surface of pavement on both sides of the joint. Control joints should be placed at intervals equal to the trail width and the depth should be one-fourth of the pavement thickness. The joints should be saw-cut and 1/4" wide. In order to provide the most user comfort, the finished surface of trails should not vary more than 1/4" from the lower edge of an 8' long straight edge when laid on the surface in any direction.

INTERSECTION TREATMENTS

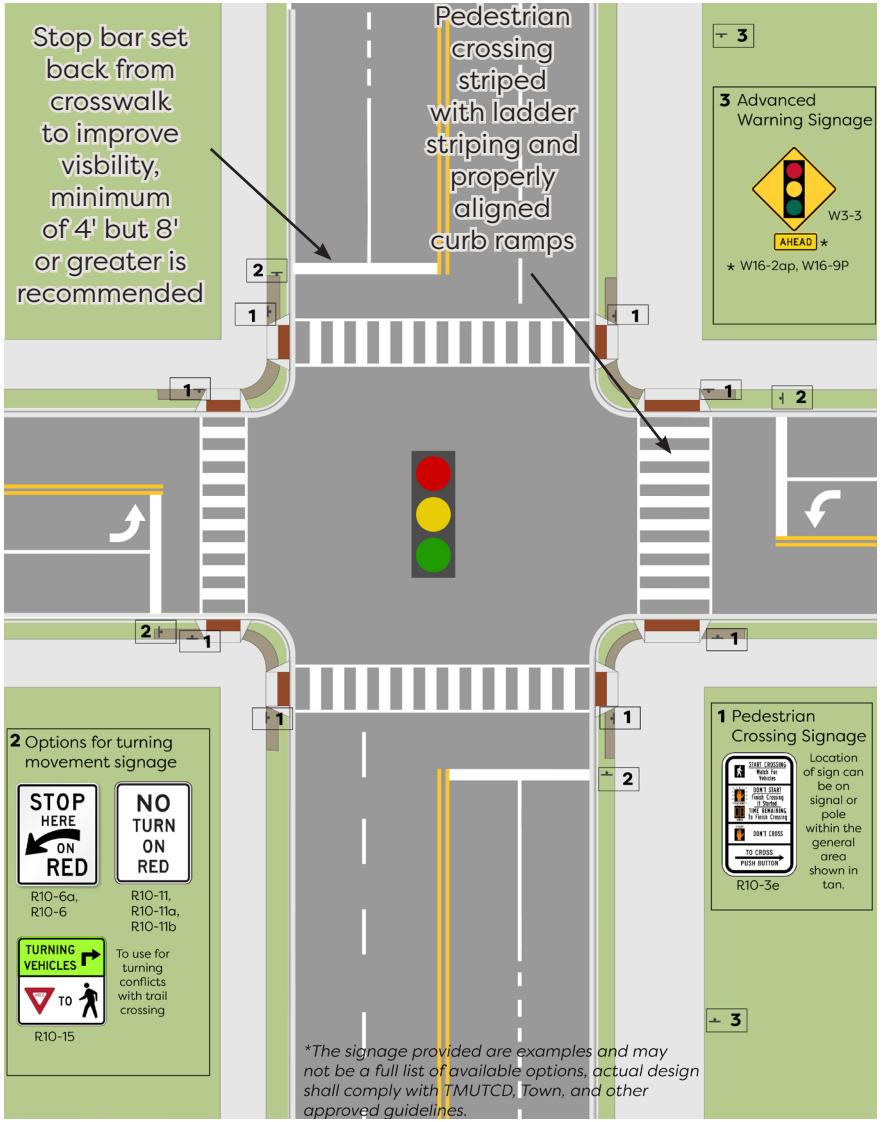
Proper intersection treatments are important to reduce potential conflicts between trail users and motorists. In order to reduce crossing distances, improve visibility, and properly align curb ramps, the turning radii should be designed as tightly as possible.

Trail crossings should include the appropriate signage, crosswalk markings, and pedestrian signals as generally depicted in Figure 5.2. An alternative, more expensive option for crossing roadways is to construct a pedestrian bridge or tunnel to provide a fully separated roadway crossing experience without conflicts from automobiles. There are several examples of trail underpasses in Flower Mound today that avoid an at-grade crossing for trail users.

Additional intersection crossing considerations are provided later in this section.

RECTANGULAR RAPID FLASHING BEACONS AND MEDIAN REFUGE ISLANDS ENHANCE SAFETY AT UNSIGNALIZED INTERSECTIONS

FIGURE 5.2: TYPICAL SIGNALIZED INTERSECTION TREATMENT



EASEMENTS

When a trail is located away from a roadway, such as in a utility easement or adjacent to natural features, a 50' minimum easement is required. This is to ensure there is enough room to align trails away from creeks where erosion could impact the usability of the trail. For trails adjacent to a railroad, an easement of 20' outside of the railway foul zone, or 25' from the nearest track center line, is needed to ensure there is enough room for track maintenance.

TRAIL CLEARANCE

Vertical Clearance

Vertical clearance refers to the area above a trail that is to remain clear from obstructions. The recommended vertical clearance over a trail is 10' or higher; this height accommodates maintenance, patrol, and emergency vehicle access. All underpasses and tunnels should be a minimum of 8' in height and where there are vertical clearances less than 10', warning signage should be posted. In order to meet clearance standards for safety and visibility along trails, tree removal or pruning may be necessary in some areas. The trail evaluation section in Chapter 3 identified areas along existing trails that need to have vegetation scaled back; some of these areas are along trails that are not maintained by the Town so coordination with the HOA or other entity is needed.

Horizontal Clearance

The recommended horizontal clearance is the area on each side of the trail to remain free of obstructions. This area enhances the aesthetics, function, and safety for trail users. The desired horizontal clearance is two feet to five feet on each side of trail for heavily used trails. When a trail is adjacent to a roadway, the greatest separation in the form of a landscaped buffer, should be provided between trail users and vehicular travel lanes, where space exists. According to AASHTO, a five foot buffer from the trail facility and the roadway is recommended for optimum user comfort and safety.

Visual Clearance

Trails should be designed to prevent blindspots. Blindspots create conflicts between users, creating safety concerns. Where blindspots and blind curves exist, the trail should be widened or relocated, striped, and signed to provide the greatest awareness of oncoming trail traffic. Advanced warning can improve awareness and reduce potential conflicts.

OTHER CONSIDERATIONS

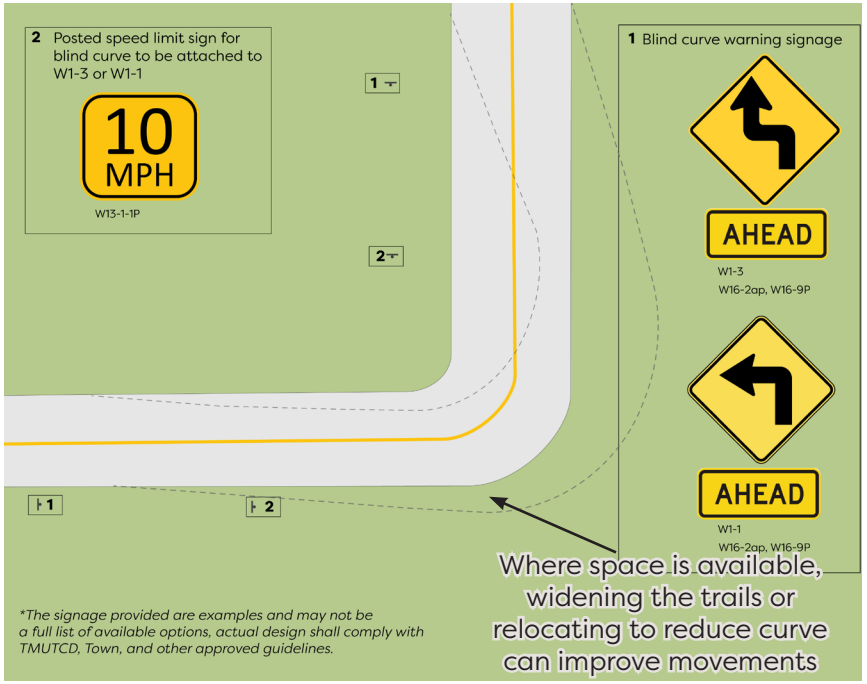
Design Speed

Design speed refers to the preferred speed of the fastest common user, so on multi-use trail, that would be an experienced cyclist. For paved multi-use trails, a minimum design speed of 20 mph should generally be used if the trail grade is less than 5 percent slope. In areas where strong prevailing winds exist or the trail grade exceeds 5 percent, a trail design speed of 30 mph is recommended.

Trail Drainage

Trail drainage should be designed to have adequate drainage away from the trail to mitigate flooding and debris after rain events. This requires the cross-slope of areas adjacent to trail shoulders to have at least a 2 percent minimum slope away from the trail and for the trail surfaces themselves to have a cross slope of 1 percent. Greater cross slope along the trail can make it difficult for some users to safely navigate the trail.

FIGURE 5.3: TYPICAL BLIND CURVE DESIGN



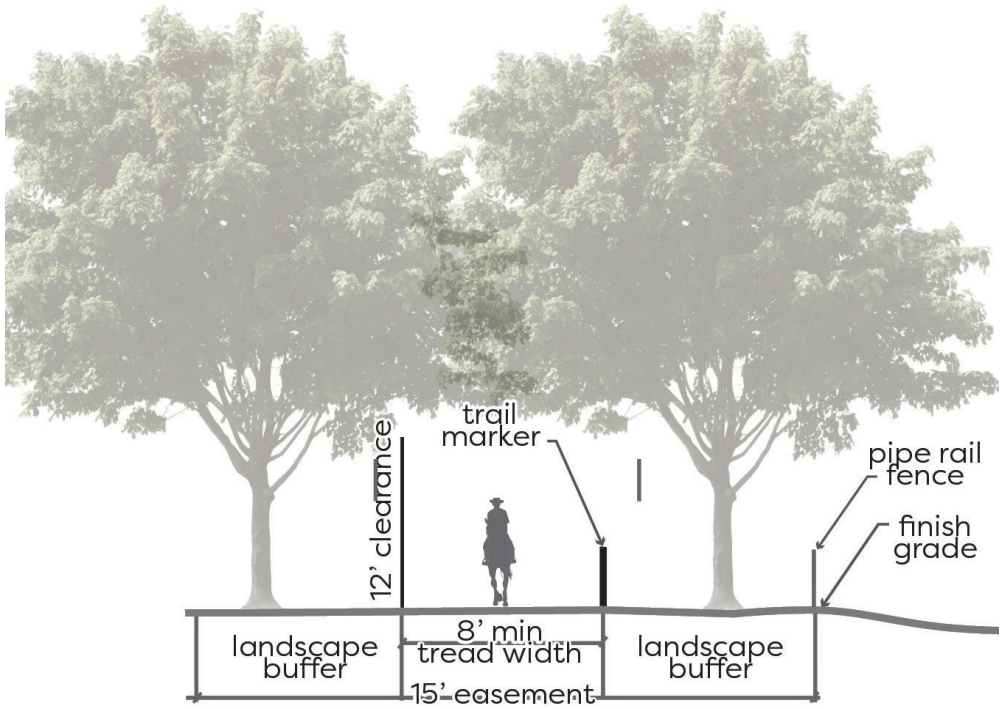
SOFT SURFACE TRAILS

EQUESTRIAN TRAILS

Equestrian trails are designed to provide outdoor experiences to people on horseback in rural or urban settings. Trails should be designed to be comfortable for users and provide space and buffers for multiple users, regardless of location. They should create safe loops with variety of amenities to ensure they are usable and safe.

In Flower Mound, the Town maintains several miles of equestrian trail and there is additional mileage located on the USACE land by Grapevine Lake. The recommended design considerations in this section only refers to the equestrian trails maintained by the Town.

FIGURE 5.4: TYPICAL EQUESTRIAN TRAIL CROSS-SECTION



Equestrian Trail Widths

Equestrian trails should be a minimum of 8' within a 15' easement. The trail surface within the easement should be a minimum of 8' in width, this provides space for passing. The vertical clearance for equestrian trails should be 12' to allow for space for a person on horseback. Trees may need to be pruned or removed in some cases to meet vertical clearance requirements

Surface Materials

Trails should generally be native materials, such as compacted dirt. In rural and preserve settings, they may include rivers or creek crossings, hills, woods, and other natural features. In urban areas, where multiple users are intended, the trails may be more compact, and comprised of crushed granite, dirt, or other accessible surfaces.

Amenities

Amenities along the trail may differ based on the intended purpose and user of the trail. If the trail is designed to be challenging and provide jumps, they may be offset from the trail to allow for more novice users to not encounter obstacles. Trails should also be marked by trailheads, provide adequate parking for vehicles and trailers, and informational signage with information about trail length, amenities, and etiquette. Posts should be provided to allow for the temporary tie up of horses.

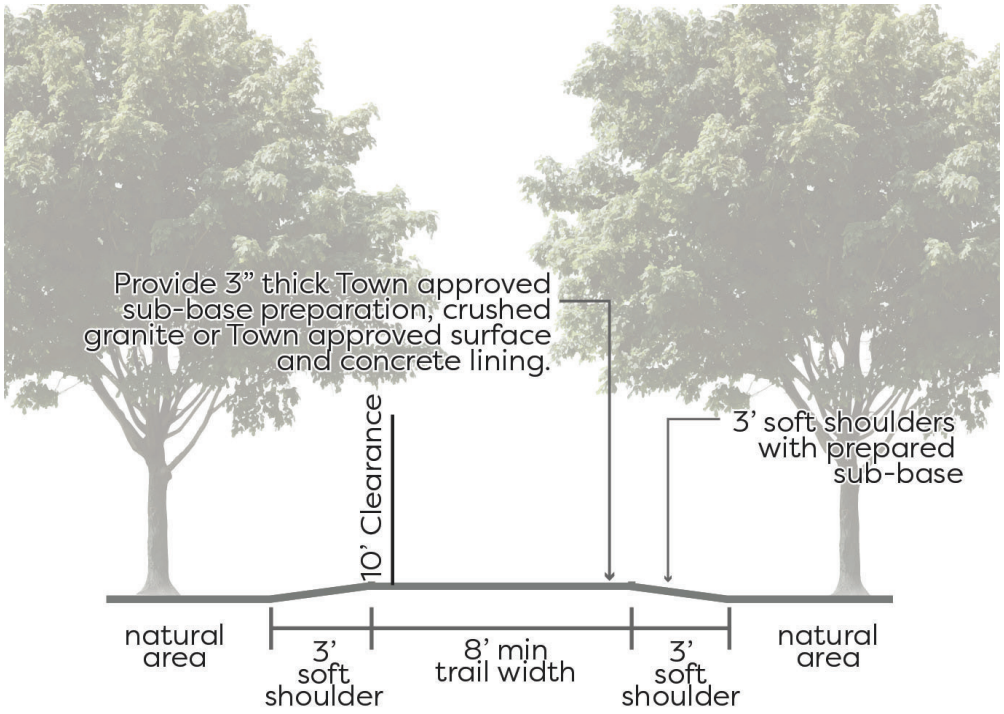
OTHER SOFT-SURFACE TRAILS

Other soft-surface trails may include natural trails through nature preserves, such as the USACE trails along Grapevine Lake, and town maintained soft-surface trails through parks and adjacent to roadways. Soft-surface trails are typically designed for hikers, mountain bikers, and equestrian users. Soft surface trails maintained by DORBA do not have provided standards.

Town Maintained Soft-Surface Trails

Town maintained soft-surface trails should be a minimum of 8' in width. They should include a clear zone of at least 3' on each side and a vertical clearance of at least 10' in height. Trees may need to be cut down or pruned to ensure proper vertical clearance. The trails should be a firm, stable surface such as decomposed granite. In order to maintain form, the trail should be lined by concrete, metal, or a similar hard lining.

FIGURE 5.5: TYPICAL SOFT SURFACE TRAIL CROSS-SECTION



ON-STREET BIKEWAYS

Two types of on-street bikeways are identified on the recommended network: bike lanes and shared-use lanes. This section outlines key considerations for each type of facility in order to:

- Determine appropriate facility types based on roadway travel speeds, traffic volumes, available pavement widths, and roadway functional classification.
- Identify continuous bicycle routes through high demand corridors to provide connections throughout the Town and to adjacent communities.
- Provide guidance on pavement markings, signage, or a combination along identified and future routes to communicate safety procedures and provide wayfinding.

BIKE LANES

Bike lanes are a portion of the travel lane marked for the exclusive use by people on bicycles. This space is separated from travel lanes by striping and signage. Benefits of bike lanes include: enabling people to ride at a constant speed; making bicycles and their space physically visible; and, encouraging people on bicycles to use the street rather than sidewalks where the conflicts with pedestrians are greater. Bike lanes are typically implemented on roadways with relatively higher speeds and traffic volumes.

Width

Width is important to consider when designing your system. The minimum width for a standard one-direction bike lane is 5' from the face of curb or on an open shoulder to allow people on bicycles to be far enough from the curb to avoid debris and drainage grates.

Bike lanes can either be standard bike lanes or separated bike lanes as shown in Figures 5.6 and 5.7. Standard bike lanes have a painted stripe that separates the bicycle traffic from vehicles while the buffered bike lanes have a minimum 3' painted or physical buffer between the bike lane and the travel lane. A physical buffer can include bollards, planters, zebra cycle protectors, or similar barriers, and should be spaced at regular intervals to prohibit automobiles from entering the protected bike lane.

Markings

Markings should follow the TMUTCD, including a one-way directional arrow, bike lane marking, and a solid white stripe. They should be placed at regular intervals in accordance with guidance from the TMUTCD, AASHTO, and NACTO. Where a buffer exists, additional striping is needed, reference Figure 5.7. When the bike lane is between on-street parking and vehicular travel lanes, the lane should be lined on each side with a white stripe so vehicles that are parking are aware of the boundaries.

Signage

Signage required for bike lanes include those that state the bike lane is for cyclist use only. 'Bike Lane' signs should generally be provided adjacent to lane markings but not at all markings to avoid overuse, unless otherwise noted by national or Town standards. Signage, along with the pavement markings, can improve visibility and awareness of people on bicycles for motorists.

FIGURE 5.6: TYPICAL STANDARD BIKE LANE

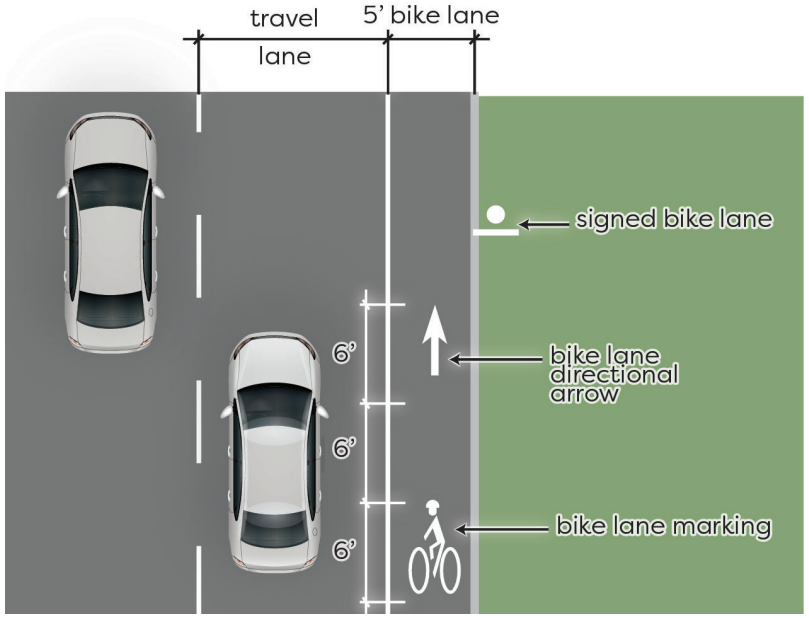


FIGURE 5.7: TYPICAL BUFFERED BIKE LANE

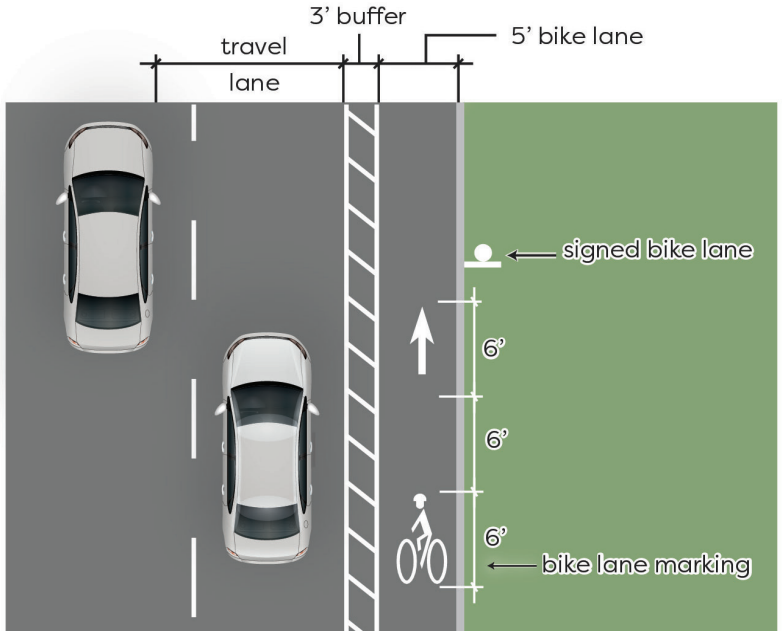
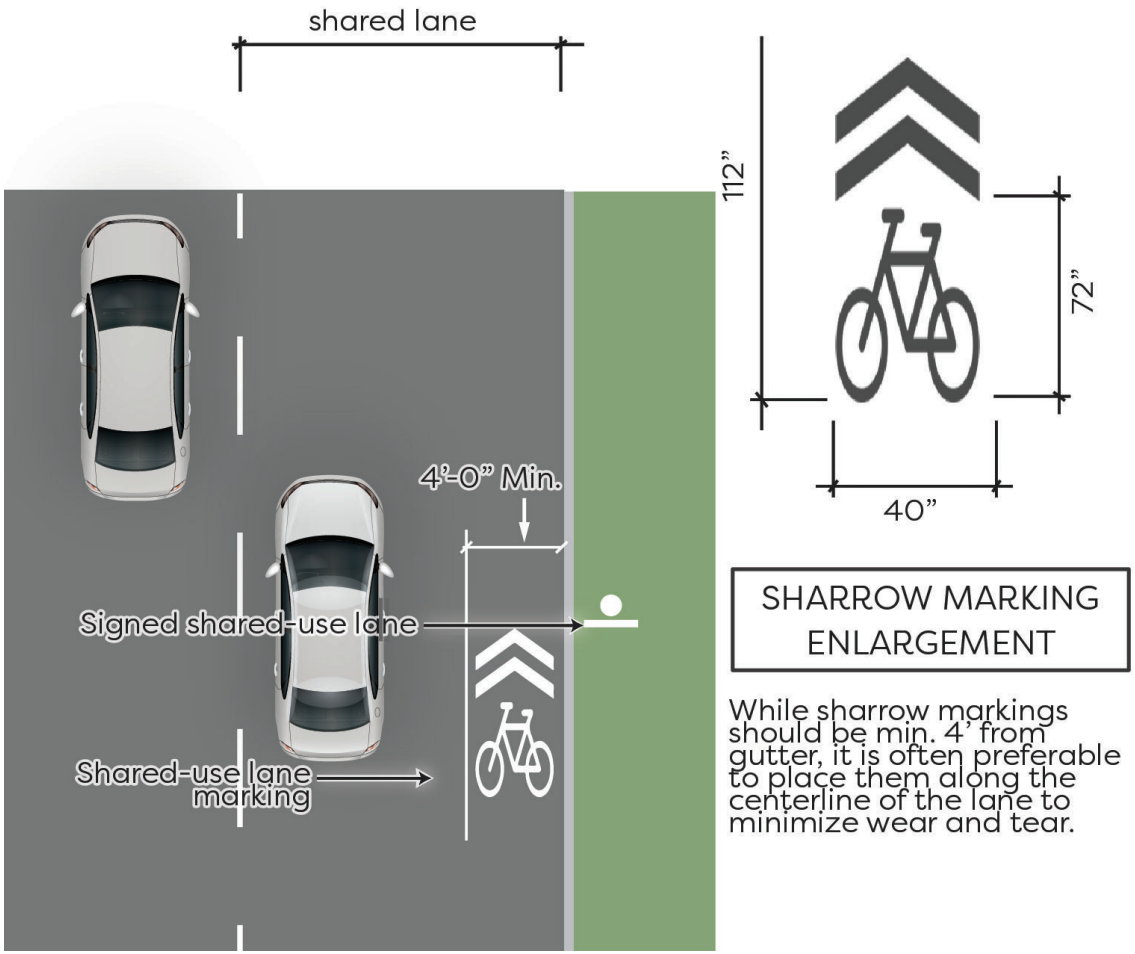


FIGURE 5.8: TYPICAL SHARED-USE LANE



SHARED-USE LANES

Shared-use lanes are when a lane on a street is designed for both drivers and people on bicycles. The designation is usually shown by pavement markings and/or signage. This accommodation is typically used on a street with a relatively low travel speeds (less than 35 mph) and relatively low volumes since there is no physical separation between the cyclists and motor vehicles.

Roadway Lane Width

Bike lane width that supports shared-use should meet or exceed 14', not including the curb and gutter where they exist. If the lane is less than 14', then cyclists may ride in the middle of the lane. If the lane is 14' or greater, state law dictates that the cyclist must ride near the curb.

Shared-Use Markings

Shared-use lane markings should be located a minimum of 4' from the curb on roadways without on-street parking and a minimum of 5' from the outside of the parking lane on roads with on-street parking. Markings should occur immediately after intersections and at intervals of not greater than 250' unless otherwise required by the Town.

Signage

Signage should be provided along shared-use lanes. Required signage includes 'Share the Road' and 'Bicycle May Use Full Lane' signs, which alert motorists that they may encounter people on bicycles and encourage respectful shared use of the roadway.

Signed Route Considerations

Signed route considerations for residential streets with low speeds and low volumes should have signage without accompanying pavement markings. This would include 'Share The Road' and 'Bicycle May Use Full Lane' signage.

BIKEWAY INTERSECTION TREATMENTS

Intersections are the point where multiples modes of transportation meet, facilities overlap, and should be designed in a safe and efficient matter. At a minimum, intersections should clearly imply how to navigate the intersection for all users through signalization, pavement markings, aligning turning movements, and providing logical routes. Intersection treatment best practices are discussed below.

Bike Boxes

Bike boxes can be used at intersections where there is not enough width to continue a separate bike facility and a designated right-turn lane. An example of bike box configuration and pavement markings are shown in **Figure 5.9.** Bike boxes are defined spaces at the head of signalized intersections which provide safe, comfortable, and visible spaces for people on bicycles at intersections. To effectively communicate the purpose of the bike box, appropriate signage and pavement markings are required.

An ingress lane within the bike lane, defined by colored pavement, should be provided as cyclists approach the bike box at intersections. Change in pavement color alerts riders of approaching intersections and community cyclists' priority to motorists. Signage such as 'Stop Here on Red', 'Yield to Bikes' and 'No Turn on Red' are examples of informative signage directing users how to share the roadway at these types of intersections.

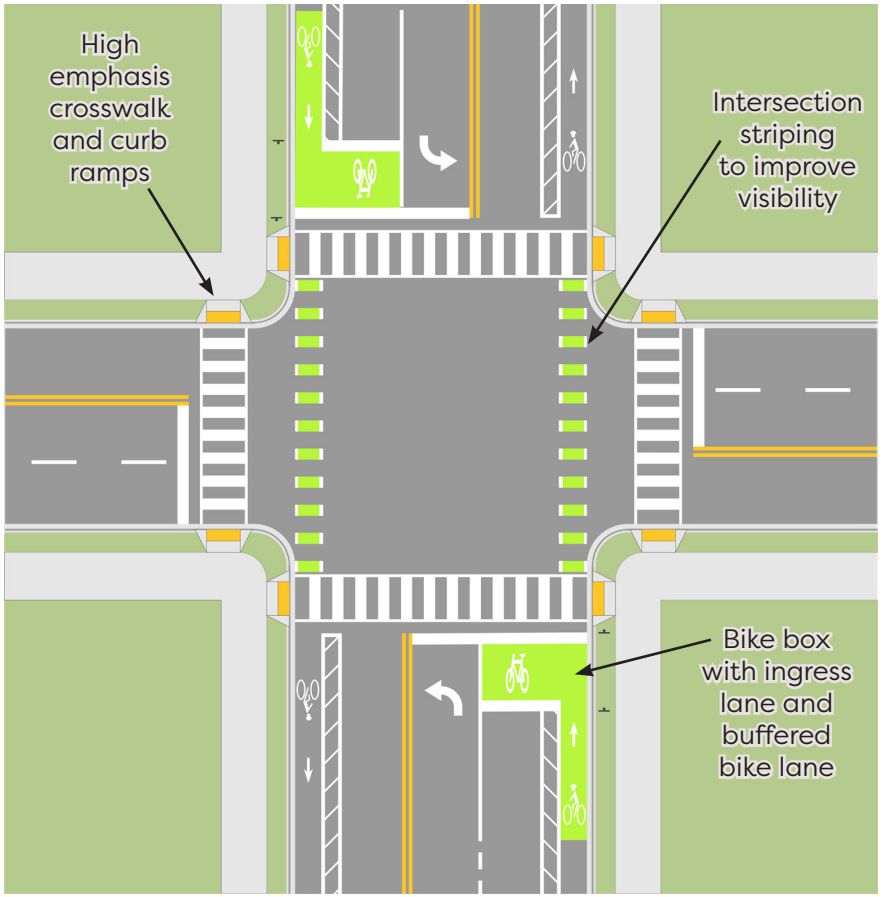
Driveway Crossings

Driveway crossings may include additional elements such as color, signs, signalization, and pavement markings. Continuing marked bicycle facilities at driveway intersections ensures that separation, positioning, and awareness is maintained through the intersection conflict areas.

OTHER CONSIDERATIONS

On-street bikeways should be safe and usable; they should have a smooth surface, uniform width, and should be free of encroachments and bumps such as utility lids, wide cracks, and longitudinal joints. Grates should be bicycle-safe without longitudinal openings to avoid tires being stuck. The use of uneven surfaces such as brick, pavers, or stamped concrete is not recommended along on-street bikeways.

FIGURE 5.9: TYPICAL BIKE BOX TREATMENT



PADDLING TRAILS

A well-designed paddling trail network should include consistent signage and branding, various launch points, and amenities for users of various skill levels, interests, and comforts.

LAUNCH POINTS

Launch points should take into consideration cost, topography, and accommodate expected volume of users. Launch points can be unimproved locations on shallow beaches or easily accessible creeks. Using this type of launch point can increase access quickly, however, may lack formal amenities that draw users to the site, such as parking and restrooms. More formal launch points can also be installed where there are existing motorized boat launches, however, special consideration should be given to the location of these launches to best reduce conflicts between paddle users and motorized boats. An informational kiosk should be provided at all launch points. Each kiosk should include information regarding waterway conservation, ethics, route guidance (including length and difficulty), and rules for paddling. Signage directing people to the launch points should be provided to increase awareness of the facility.

SIGNAGE/MARKERS

Signage and markers are important for a waterway system. Signage should guide paddle trail users, provide information for all waterway users to inform them of potential conflicts, and guide people on the water to other launch points and destinations. Signage at launch points can provide safety information, encourage the use of personal flotation devices, and provide emergency information. The TPWD has paddling trail markers that can be installed along the route. Trail markers can be installed on posts along the shore, or in the water attached to buoys.

TPWD PADDLING TRAIL TYPICAL SIGNAGE

Image Source: Texas Parks and Wildlife

CONNECTORS

As presented in Chapter 4, connectors are sidewalks that fill a gap in the trail network where limitations for a wider facility exist. This section describes the design objectives for pedestrian facilities, such as connectors, including:

- Location of the sidewalk to be within, or parallel to the right-of-way within a pedestrian easement, with a buffer from vehicular traffic, preferably at least 2' wide.
- Crossings at intersections should be given priority considerations to improve safety and reduce potential conflicts.
- ADA compliant ramps shall be placed at intersections, driveways, and roadway crossings.

WIDTH

Connector width is important when designing Town Connectors. Because connectors are used to improve system connectivity and higher pedestrian volumes are anticipated, the desired width is 8'. The minimum acceptable width for a connector is 6' where there are existing constraints such as right-of-ways or utilities. All new connectors and improvements to existing connectors should be widened to the greatest extent possible.

INTERSECTION TREATMENTS

Intersection treatments are needed to ensure safety at conflict points. It is recommended that pedestrian crossings at roadway intersections and driveways be designed in a manner that reinforces the right-of-way of pedestrians and prioritizes their safety. To reduce conflicts at intersections, the corner radius for a 90-degree intersection should be designed to be as tight as possible. Curb extensions can better align crossings at intersections, force vehicles to make slower turns by reducing turning radii, and improve visibility for pedestrians crossing the street.

STANDARD PEDESTRIAN CROSSINGS

Standard pedestrian crossings use a combination of pavement markings, signals, and accessible ramps to cross intersecting streets with two-way traffic. Highly visible 'zebra' pavement striping is recommended as they better alert motor vehicles to yield to pedestrians. Routine maintenance of the crosswalk striping is recommended to ensure they are visible.

ENHANCED CROSSWALKS

Enhanced crosswalks may use a combination of pavement markings, pavement materials, mid-block crossing islands, and pedestrian signals such as rapid flashing beacons or pedestrian hybrid beacons to increase driver awareness of pedestrian activity and increase comfort of walkers.

DRIVEWAY CROSSINGS

Driveway crossings along major and minor thoroughfares should be designed to provide safety for pedestrians. Sidewalks and sidepaths should be set back from the back of curb at a sufficient distance to avoid crossing driveway aprons to maintain existing cross slopes and meet ADA accessibility standards. The Town should evaluate its driveway spacing and access management standards in order to improve the pedestrian realm and reduce conflicts between pedestrians, bicyclists, and motor vehicles.

ENHANCED CROSSWALKS

INTERSECTION CONSIDERATIONS

A well-designed intersection facilitates the movements in a safe and efficient manner. Conflicts between uses should be reduced by heightened visibility, denoting clear roadway use through signage and pavement markings, and by ensuring users are aware of each other.

MEDIAN REFUGE ISLANDS

Median refuge islands are protected spaces positioned in the center of the roadway used to facilitate bicycle and pedestrian crossings by having an additional protected stop when crossing at an intersection. This treatment is most appropriate for roadways with higher volumes, faster speeds, and wider pavement widths. Refuge medians reduce crossing lengths, increase visibility of crossing movements, calm traffic through physical design, and prioritize crossing movements. Medians should be a minimum of 6' in width, be well lit, and if any vegetation is included it should be low to improve visibility. Median refuge islands are preferred at signalized intersections, however they can also be a treatment for mid-block crossings.

MEDIAN REFUGE ISLANDS

CURB RAMPS

Curb ramps shall be designed for the use of mobility devices (including scooters, walkers, and crutches), provide direction and guidance for roadway crossings, and meet all ADA, TAS, and PROWAG standards. One curb ramp should be provided for each crosswalk, which usually translates to two per corner, and one on each side of the crosswalk. This provides direction and reduces crossing distances as opposed to when there is one crosswalk per corner. Curb ramps shall be sloped to provide a smooth transition from sidewalk to crosswalk. In some cases, curb extensions can be installed to better align crosswalks, reduce crossing distances, and slow turning movements for vehicles.

CURB RAMPS

TRAFFIC CONTROL SIGNAGE

Traffic control signage should indicate crossing features for all roadway users based on guidance from the TMUTCD. Signage should be highly visible and capture the attention of all users approaching the crossing area. Intersections can be further enhanced by flashing beacons, pavement markings, or change in pavement material. It is important to note that placing too many traffic control devices at one crossing can be overwhelming and may result in the loss of impact.

CROSSWALKS

Crosswalks should be clearly marked and highly visible. Where a crosswalk is signalized, leading pedestrian signals and longer walk signal times can improve accessibility for pedestrians. To minimize conflicts, other pedestrian crossing tools can include exclusive only left-turn phases, prohibiting right turns on red where sight lines may be reduced or where a leading pedestrian interval is used, and signage to remind drivers to yield to pedestrians. Intersections can include raised crosswalks to slow vehicles and improve visibility of pedestrians. Additional considerations shall be included for pedestrians that are visually or hearing impaired. Implementing elements such as Accessible Pedestrian Signals (APS) with integrated audio devices, detectable warning surfaces, and flashing lights can aid in creating a safe and comfortable pedestrian crossing environment.

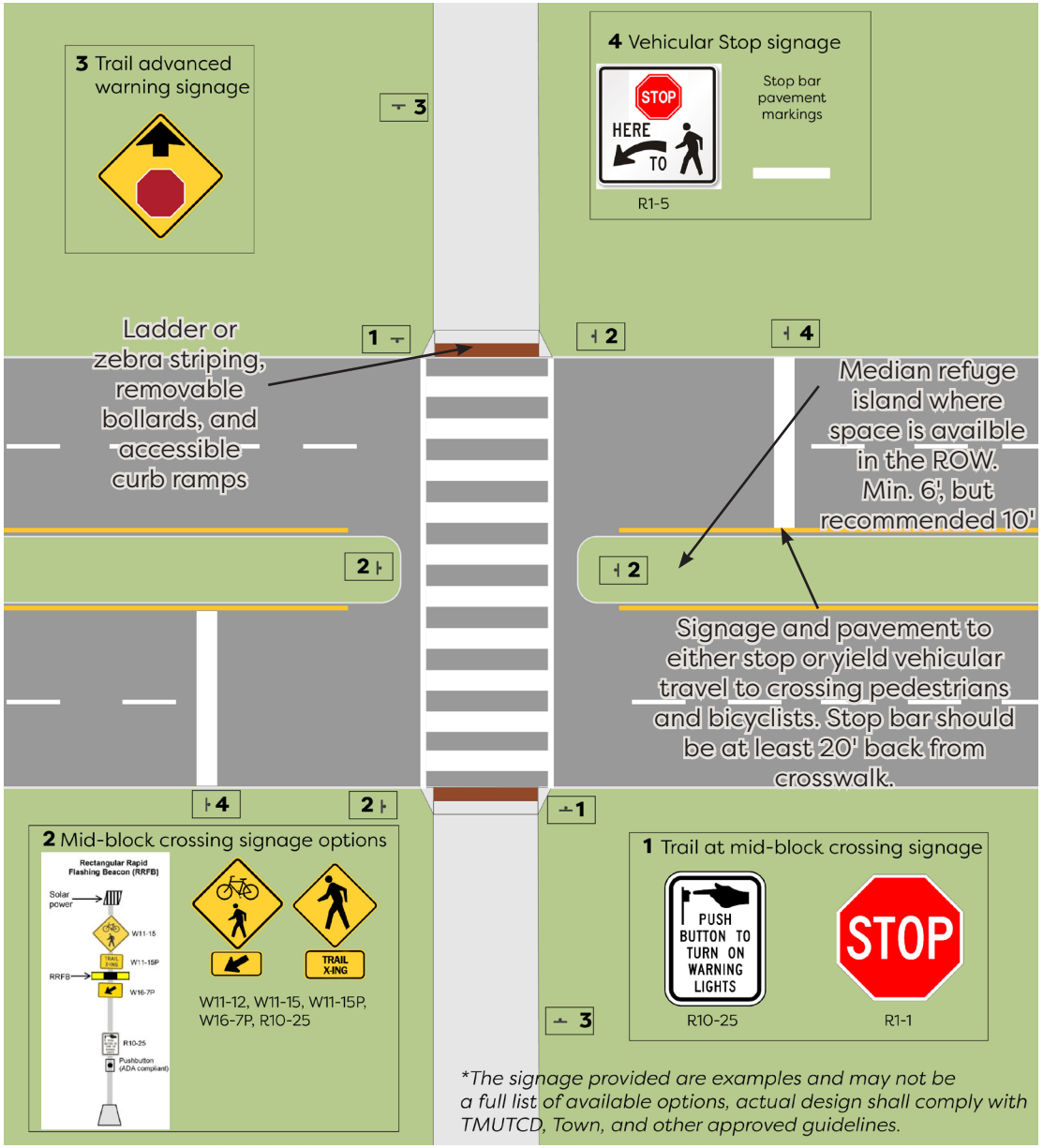
MID-BLOCK CROSSINGS

Where a trail crosses a roadway, not at an intersection, special consideration should be given to inform drivers that someone may cross the road. Figure 5.10 shows typical treatments for mid-block crossings, including rectangular rapid flashing beacons (RRFB), pavement markings, and signage. Local roads may not require a RRFB due to lower roadway speed and volumes. In some cases, the mid-block crossing area can be raised in order to provide a flat crossing surface and slow automobiles at the crossing area.

RECTANGULAR RAPID FLASHING BEACONS

Rectangular Rapid Flashing Beacons (RRFB) are highly visible traffic control devices that help alert motor vehicles of mid-block crossings. RRFB's include rectangular lights that flash at an irregular pattern when pressed by pedestrians crossing the street. These lights are positioned below a crossing sign and above a crosswalk arrow. The sign is pedestrian activated, typically by using a push button. The crossings can be accompanied by advanced signage and stop lines on each side of the intersection to alert drivers to the upcoming mid-block crossing.

FIGURE 5.10: TYPICAL MID-BLOCK CROSSING



TRAIL FEATURES

Trail features can enhance the overall user experience of a trail. This includes improved access, signage, and amenities to support users along the trails. This section details trail amenity features to be considered when designing trails throughout the town. The Parks and Recreation Department will need to determine the placement of each amenity type throughout the network based on the intended goals of each trail.

TRAILHEADS

Trailheads are located at key entrances to the trail system allowing users to access a trail, including within community parks and major destinations. Features typically found at a trailhead include:

- Parking: A minimum of 10 spaces for major trailheads and five spaces at minor trailheads. Shared parking should be encouraged where appropriate. All parking areas shall meet ADA requirements.
- Restrooms are appropriate at major trailheads.
- Informational Signage should include a larger kiosk with a map, rules and regulations, and contact information
- Lighting promotes safety and accessibility.
- Amenities should be provided at all trailheads, such as benches, trash receptacles, bike rack, drinking fountains, and bike repair stations.

The typical trailhead amenities described here are appropriate for enhancing existing trailheads as well as to guide required amenities for future trailheads. Figures 5.11 and 5.12 show how major and minor trailheads can be designed.

TRAIL ACCESS POINTS

Trail access points are locations along an off-street trail where users can access the trails system. Access points can be found at parks, intersections, or minor destinations. Typically, they consist of a brief, paved spur that connects to an existing sidewalk. Trail markers and directional signage should aid users in wayfinding. Additional amenities at access points are not required.

TRAIL SIGNAGE

The trail network should be identified by consistent signage. Branding is covered in more detail later in this section.

FIGURE 5.11: EXAMPLE MAJOR TRAILHEAD

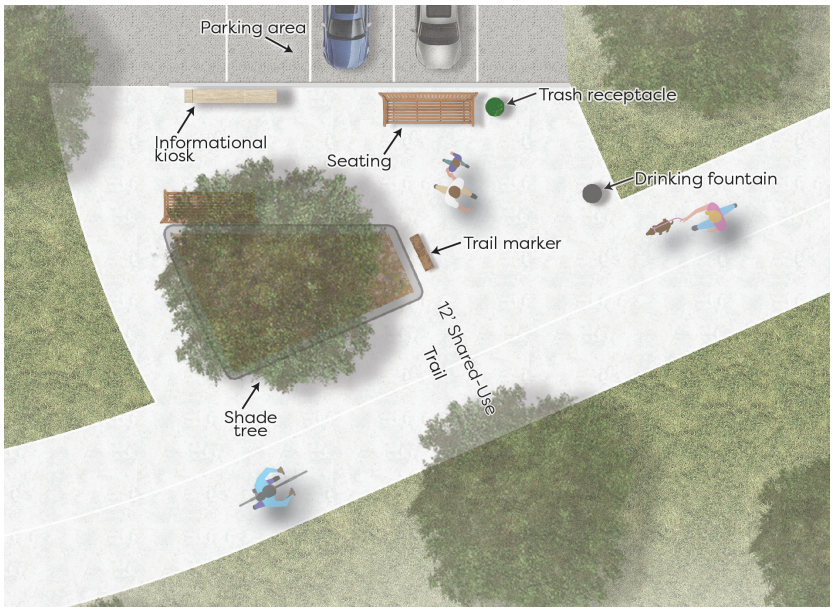
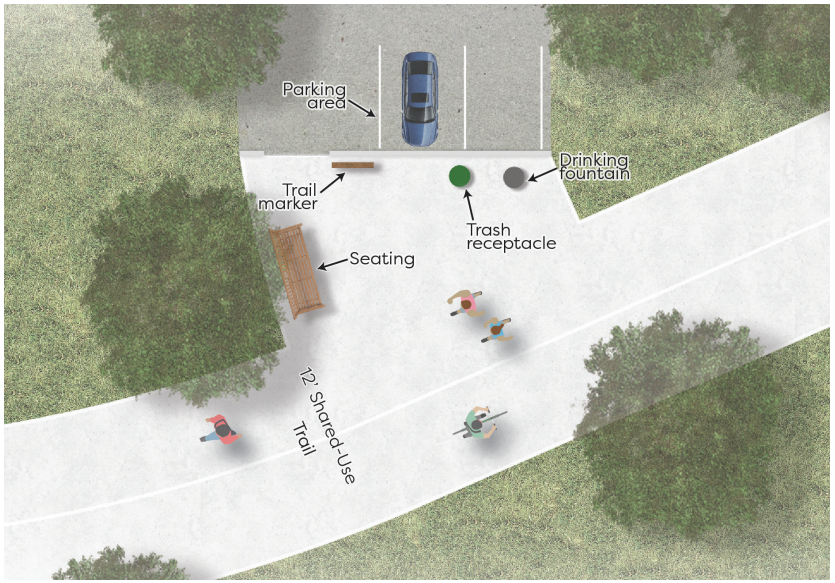


FIGURE 5.12: EXAMPLE MINOR TRAILHEAD



TRAIL AMENITIES

BIKE RACKS

Bike racks allow trail users to safely secure their bicycles while stopping at destinations along the trail, such as parks and entertainment centers. Bike racks should be located at trailheads and where the trail intersects with key destinations.

BIKE REPAIR STATIONS

Bike repair stations are self-service stations that include tools to perform basic repairs and maintenance to bicycles, including filling deflated tires or changing a flat tire. Such stations should be placed near bicycle parking found at key destinations like parks, schools, and commercial areas.

PARKING

Parking should be provided at all trailheads, with a minimum of 10 spaces. Providing parking allows residents who cannot walk or bike to the trail network the ability to utilize the trail system. Alternative ADA accessible parking surfaces, such as permeable pavement or pavers can be considered where appropriate for parking areas.

TRASH RECEPTACLES

Trash receptacles improve the overall cleanliness of the trail system. They allow users of the trail to dispose of trash in areas where there is a demonstrated need. Typically, these are found only at trailheads. Pet waste stations should be provided along the trail at regular intervals for the easy disposal and collection of pet waste. These amenities shall be placed so they are ADA accessible.

SEATING

Seating such as benches, provide respite points along the trails. They should be placed at regular intervals along trails along with other amenities such as hydration stations and trash receptacles. Each bench shall have accessible companion seating outside of the pavement trail.

BIKE RACK

WASTE RECEPTACLES

BIKE REPAIR STATION

SHADE

Shade should be provided where possible along the trail to provide comfort and cooling along the trail during the summer months. Shade trees should be placed along trails at regular intervals, but it is important that they remained trimmed to maintain at least ten feet vertical clearance from the trail. Where shade trees cannot be placed due to constraints, shade structures can be included near benches, trail markers, scenic veiwing points, and other resting places along the trail.

HYDRATION STATIONS

Drinking fountains or water bottle fill stations provide trail users and their pets hydration opportunities while using the trail. Hydration stations should be located at trailheads where there is existing water infrastructure to connect to, such as at parks. Otherwise, there is a risk that the water can become stagnate with little use.

FITNESS STATIONS

Fitness stations placed along trails are particularly useful for joggers and cyclists seeking to stretch, warm up, and cool down before or after a run or bike ride. Similar to those located within a park, a fitness station offers trail users an opportunity to engage with static exercise equipment and further their health goals.

INFORMATIONAL KIOSKS

Information kiosks should provide information on amenity locations, trail rules, trail distances, and regulations. They should be placed at all trailheads to convey trail information and provide a sense of place and safety for trail users.

INFORMATIONAL KIOSK

HYDRATION STATIONS

FITNESS STATIONS

TRAIL BRANDING

SIGNAGE

Signage is typically provided at trailheads and at key decision-making points along a trail. Signage can mark access points to the trail, provide directional and distance guidance for trail users, direct users to locations of key amenities along the trails, and provide brand recognition of the trail system. Signage can help identify and brand a trail for users.

FIGURE 5.13: BRANDING CONSIDERATIONS

WAYFINDING

Wayfinding helps trail users identify their location on a trail or bikeway, distance to key destinations, and provides directional and distance guidance for preferred routes. Wayfinding can be provided along trails or bikeways by using TMUTCD approved signage. Wayfinding includes maps, directional signage, mile markers, and trailhead markers.

MAP

Maps should be included at all major and minor trailheads to help identify the trail network and branded segments.

DIRECTIONAL

Directional signage guides users of the trail system. It provides them with mileage, location information, and directions. These should be placed at trailheads and major trail access points to help guide trail goers along the trail.

TRAILHEAD MARKERS

Trailhead markers are located at trail access points. They can also be located where a trail meets a street right-of-way, where an access point into the trail system is located. They should include the trail and intended users of the trail.

MILE MARKERS

Trail markers should be placed at regular intervals along the trail to identify mileage, provide direction, and provide location information for emergency situations. They can help users be informed as to how far they've traveled. At a minimum, trail markers should be installed at every trailhead, trail access point, and trail intersection, however, trail markers should ideally be placed along the trail at ¼ to ½ mile intervals.

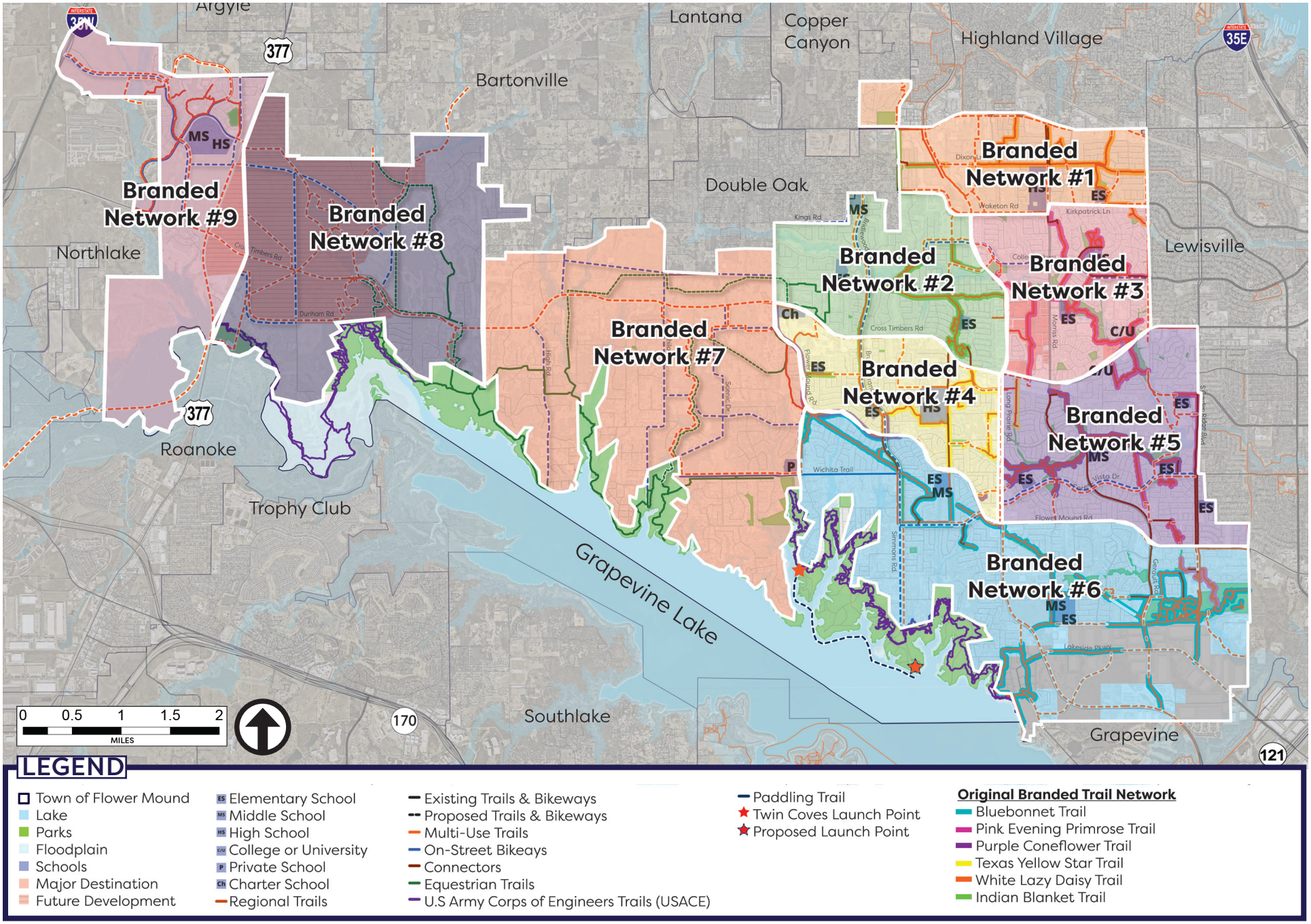
DIGITAL SIGNAGE CONSIDERATIONS

A quick response (QR) code can be included on all signage, which can take a trail user to a website to track where they are located on the trail network. A QR code is a matrix that is readable by a phone camera, and is linked to a specific website.

KIOSK

Kisoks can be provided in place of a map at major and minor trailheads. Kiosks provide more details on rules and regultations for trail users, information on the trail system, and provide a map with directional guidance.

FIGURE 5.14: RECOMMENDED TRAIL REGIONS OF FLOWER MOUND



FUTURE BRANDING NAMES

The current branding system for the Flower Mound trails system is based on North Texas wildflowers. To help facilitate clear wayfinding while on the trails, Figure 5.14 (page 109) represents new proposed networks for branded trails in Flower Mound. As Flower Mound grows and more trails are constructed, this will help create clear guidelines on which branded system new trails would fall into. These networks are based off of major roadways and geographies. Using this system to identify new branded trail corridors and rename existing ones helps with overall branding and placemaking along each trail segment and maintenance needs.

Additional trail names need to be considered as more trails are constructed in rural and undeveloped areas of the Town.

New branded networks can build on the Texas wildflower theme. A list of potential trails include:

- Goldenrod
- Winecup
- Sunflower
- Basketflower
- Rain Lily
- Prickly Pear Cactus

Another option for new networks can enhance the nature theme by using plants found in the natural environment. Examples include:

- Texas Sage (shrub)
- Trumpet Vine (vines)
- Post Oak (tree)

RAIN LILY

BASKET FLOWER

SUNFLOWER

SAFETY AND SECURITY

LIGHTING

Lighting is important to consider when designing trails. Properly installing and maintaining lighting along a trail improves safety for trail users at dawn and dusk and in dark spaces such as densely wooded areas and underneath roadway overpasses. Lighting can improve visibility, increase access and convenience, and give trail users a sense of safety when using trails outside of daylight hours. Because nighttime etiquette is not always followed, proper lighting can help to increase visibility of trail users and reduce the likelihood of crashes. AASHTO recommends lighting to be installed in tunnels or overpasses, at trailheads, at bridge entrances and exits, at public gathering places, along streets, at crosswalks, at path intersections, and to illuminate key signage.

BRIDGES & LOW WATER CROSSINGS

Bridges and low water crossings should be designed by a Texas Professional Engineer and meet all Town or State established engineering standards. Low water crossings should not exceed four feet from the path to the waterway flowline unless otherwise approved by the Town Engineer. Any crossing exceeding this separation will require a bridge to ensure the trail meets all accessibility requirements. For creek crossings that require a short span, box culverts can be used with handrails.

TRAIL SAFETY RAILINGS

Safety railings should be provided where there is significant topography changes within five feet of the trail shoulder. The top of the railing should be a minimum of four feet higher than the trail surface. Railing should be horizontal to avoid catching bicycle handlebars and should be constructed in accordance with the latest International Building Code regulations and ADA standards.

WEB BASED TRAIL SAFETY

Web based trail safety is when there is a downloadable smart phone application (app) that can help a resident track their location on the trail system. The app can be used in tandum with trail signage to allow a trail user to identify their location in case of emergency. In addition to the app, QR codes to connect users to websites and maps to identify where they are on the trail system. There may be strategic locations to provide wireless internet services for trail users, such as in parks or at major trailheads.

LIGHTING ALONG TRAILS

RAILINGS AND CREEK CROSSINGS

MAINTENANCE

Trails and bikeways shall be regularly maintained to ensure they meet vertical and horizontal clearance requirements, are safe for users, and that they are free of debris, and maintain their integrity.

MOWING AND LANDSCAPING

In order to ensure there is no debris or obstructions encroaching on trail surfaces, routine mowing and string trimming is recommended. Removal or "cutting back" of vegetation in the clearance zones is required to maintain a safe environment along the trails.

SOFT SURFACE TRAILS

Soft surface trails shall be maintained regularly to ensure they meet ADA requirements, have a compact surface, and are free from debris and animals, such as snakes. This may need to be done more frequently than for paved trails due to envrionmental conditions, such as heavy rainfall or high winds.

VOLUNTEER GROUPS

Volunteer groups can be utilized to support the Town's maintenance program. The Town can support “Adopt a Trail” or “Friends of the Trail” groups that help with litter clean-up, tree planting, and raising funds for trail amenities. Trail volunteer groups can help with security patrolling along trails and identify maintenance concerns to Town staff.

VOLUNTEERING GROUP PROGRAMS

SOFT SURFACE TRAILS

USING THE TOOLBOX

UPDATING STANDARDS

The design considerations included in this chapter represent guidance for future updates to the Town's development ordinances. Upon adoption of the overall Trails and Bikeways Master Plan, these recommendations should be codified into the Town of Flower Mound Code of Ordinances and the Design Criteria and Construction Manual where applicable. The ordinances should be updated, including width of sidewalks and trails, and trail classifications. An audit of the existing regulations can identify other necessary amendments to implement this plan. A brief audit is provided below.

GENERAL ORDINANCES

Chapter 58 - Streets, Sidewalks, and Other Public Places

This section of the general ordiances should be updated to reflect new trail and sidewalk terminology, widths, and design guidance. Replacement standards should include the replacement of sidewalk with new standards or trails where a trail is depicted in the master plan.

LAND DEVELOPMENT REGULATIONS

Article V: Landscaping and Screening

Division 2.- Section 82-232 can include language which allows trail and sidewalk placement within required street landscape buffers to allow greater separation between the trail and roadway, and improve level of comfort for trail users.
Division 5. - Sidewalk width should match the proposed cross-sections.

Chapter 90 - Subdivisions

Article 6 Division 8: Parks and Recreational Areas.
(Design criteria should be provided for subdivision development to place trails within common open spaces and integrate the trail as a recreational component of the community).
Sec. 90-310. - Culs-de-sac should explore opportunities for residential developments to connect to the trail system where a culs-de-sac terminates in proximity to the trail system.

Sec. 90-311. - Street design standards will need to be updated to ensure there is consistency between the plan, engineering design standards, and Master Thoroughfare Plan.

Sec. 90-443. - Character and minimum dedication will need to reflect the the trail classifications and information from the plan.

Sec. 90-445. - Payment of cash in lieu of dedication references the "primary trail network", the reference to "primary" should be removed.

Sec. 90-449. - Park credit option. It is a recommendation of this plan to require that trails be 10-12' in width. This section references trails being 8' around stormwater ponds, this should be updated.

General Recommendations for the Development Regulations

The development standards should ensure the references to trail types, widths, and design are consistent throughout the different regulations and zoning.

There should be guidance provided for the development of trails in new residential development. Generally, it is recommended that the trail system within new development be incorporated into the overall design of the community, with the trails being placed generally in open spaces, around stormwater ponds, and within greenways to enhance the user experience and provide separation between trail users and residences. Where able, all new developments should connect to the existing or proposed trail network and provide for access points.

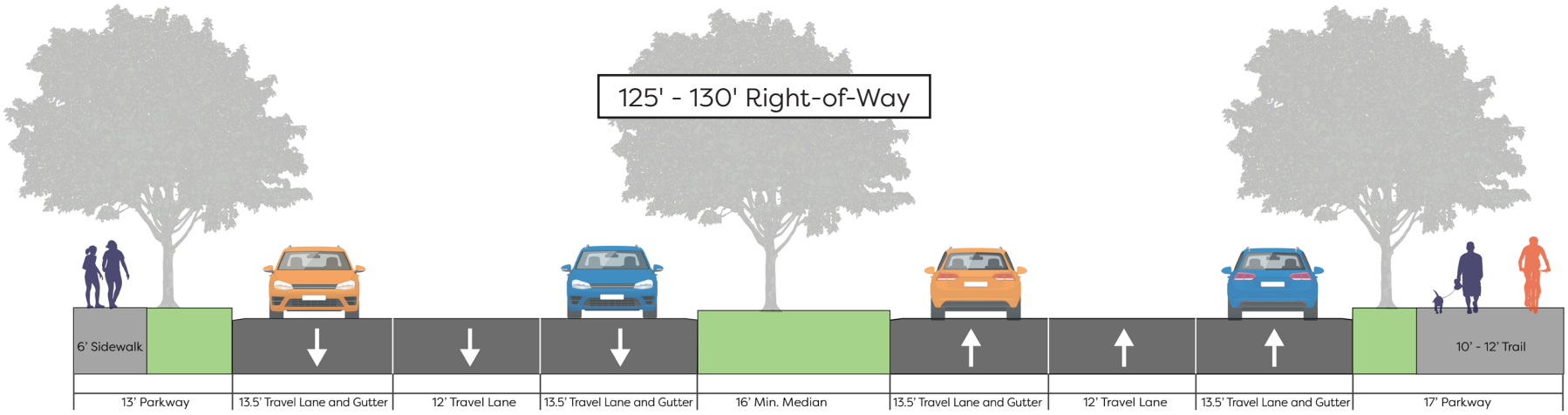
INTEGRATION WITH THOROUGHFARE PLAN

The last major update to the Town Thoroughfare Plan's was in 2009, however several minor amendments have occurred since then. The plan specifies a variety of thoroughfare types, each with its own function and typical cross-section. Some of the cross-sections include specifications on the type and width of trail, pedestrian, or bikeway facility, but not all of the cross-sections address these multi-modal facilities. In order to better accommodate trail and bikeway facilities into future updates of the thoroughfare plan, modifications to the roadway cross-sections should be considered. **Figures 5.15 - 5.26,** on the following pages, depict possible updates to the cross-sections as they exist today to more fully integrate trail and bikeway accommodations as recommended in this master plan. The following cross-sections are proposed modifications to the cross-sections from the Town Thoroughfare Plan. These recommendations may need to be modified as necessary to account for existing conditions and constraints. Nothing in this plan should prohibit or limit the use easements or landscape buffers outside of the right-of-ways to enhance or improve the location of trails along roadway corridors.

ENGINEERING DESIGN STANDARDS

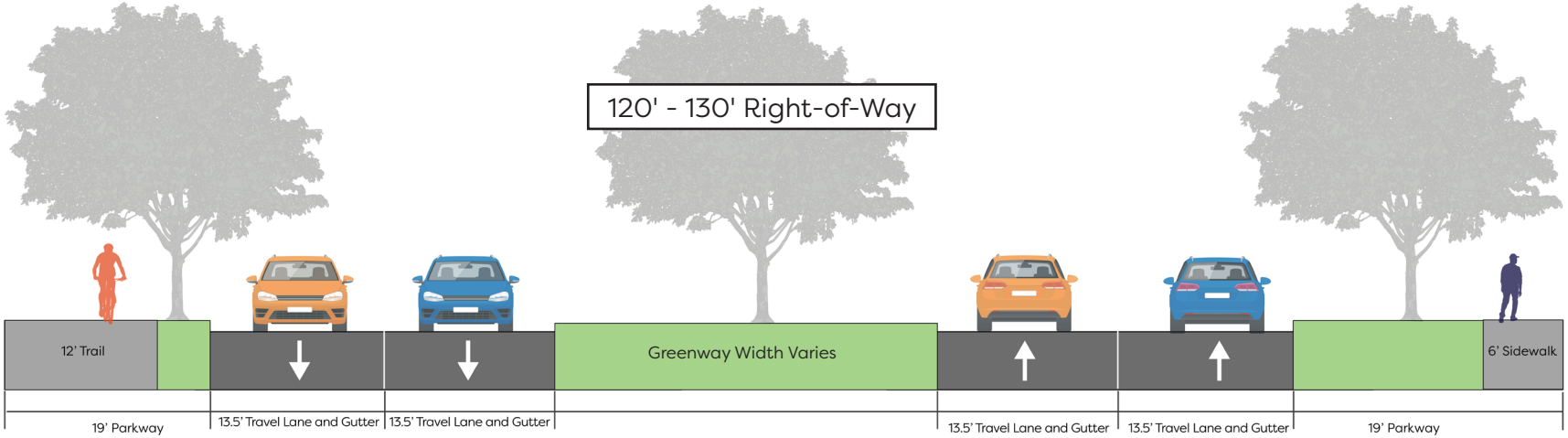
The Thoroughfare Plan is codified through the master plan process and the Engineering Design Standards (EDS). The EDS should be updated to reflect recommendations outlined in this plan, including any lane widths, right-of-ways widths, design speeds considerations, driveway spacing to improve the pedestrian realm, and similar topics. As the EDS is updated, it should be checked against the subdivision regulations to ensure there are consistencies between the two documents.

FIGURE 5.15: MAJOR ARTERIAL PROPOSED CROSS-SECTION



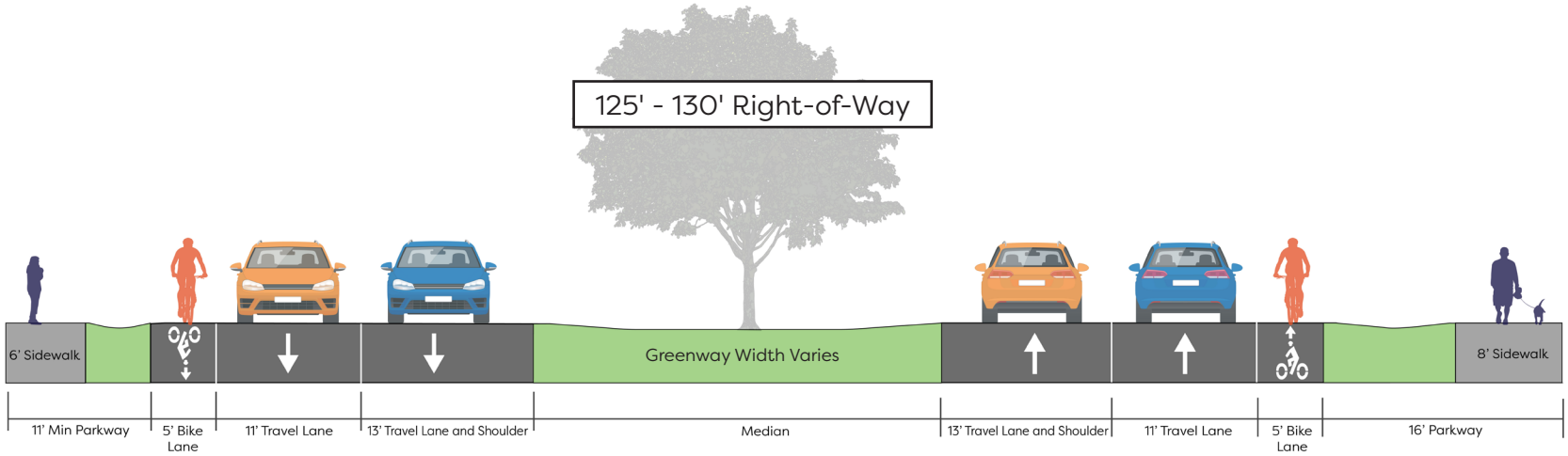
Major arterials include roads such as FM 1171, US HWY 377 and FM 2499. While these roads are mostly built-out, any new construction or reconstruction should consider minimizing the median in order to increase the buffer between pedestrian zones and motor vehicles. The road should also include a 6' wide sidewalk and 12' wide multi-use trail where able.

FIGURE 5.16: GREENWAY URBAN ARTERIAL PROPOSED CROSS-SECTION



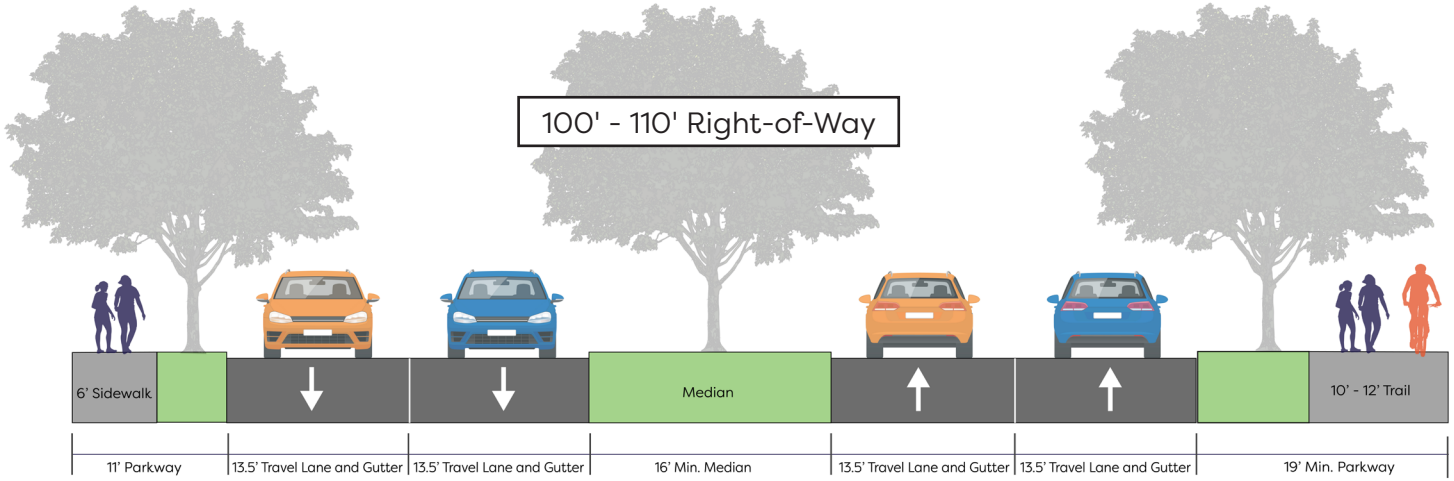
Greenway urban arterials include roads such as Garden Ridge Boulevard. This corridor includes a 12' wide multi-use trail where possible in order to create a comfortable shared realm. If the corridor is redeveloped, the median should be reduced in order to increase the width of the landscape buffer.

FIGURE 5.17: GREENWAY RURAL ARTERIAL PROPOSED CROSS-SECTION



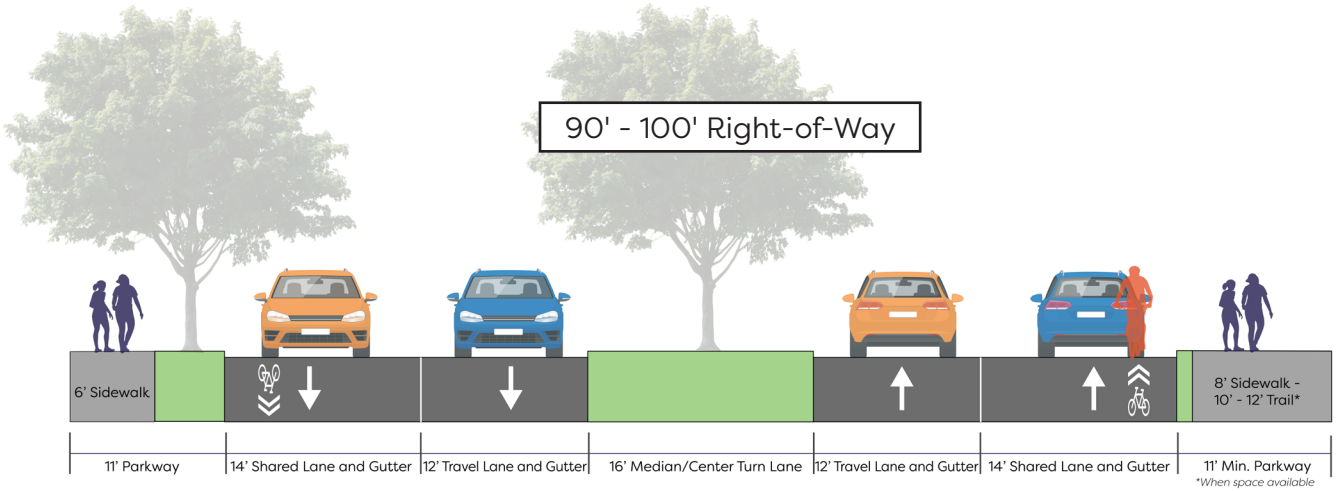
Greenway rural arterials are a future roadway classification in west Flower Mound. This roadway includes a landscaped median/center turn lane, bike lanes on each side of the road, and sidewalks with a minimum width of 6' on each side. If possible, the center turn lane should be reduced to the minimum necessary width in order to widen the parkways for landscape buffers between the sidewalk and motor vehicle lanes.

FIGURE 5.18: URBAN MINOR ARTERIAL PROPOSED CROSS-SECTION



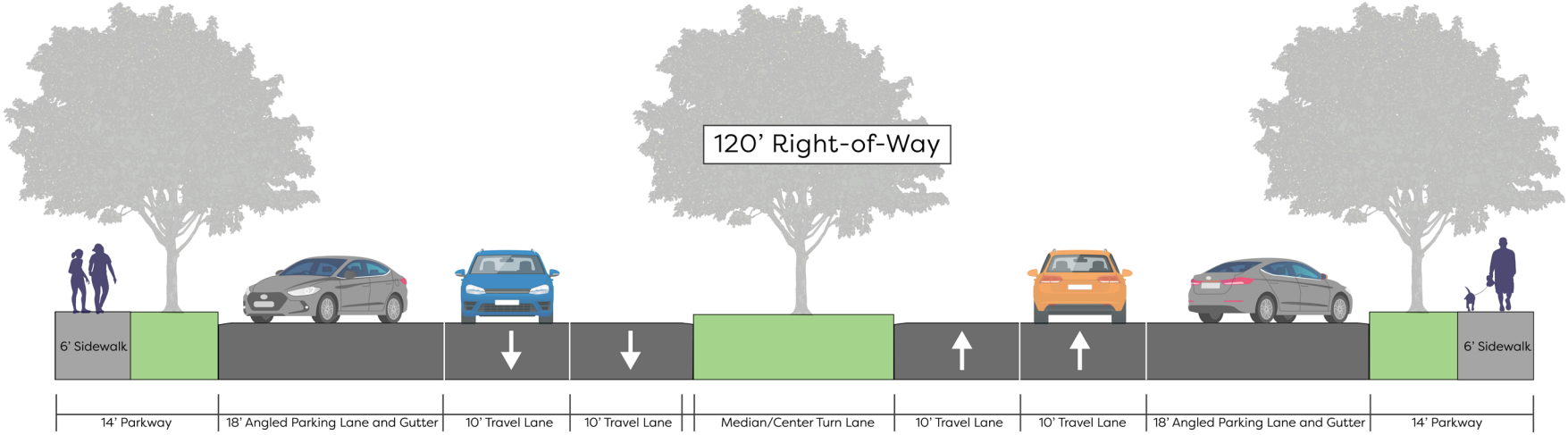
Urban minor arterials include a majority of the built roads in eastern Flower Mound, such as Flower Mound Road and Morriss Road which move people and vehicles to destinations throughout the Town. Where able, this roadway cross-section should include a 10'-12' multi-use trail, a 6' sidewalk, and landscaped medians. It is recommended that when redevelopment of minor arterials occurs, the median be reduced in order to increase buffers and landscaped areas between the pedestrian ways and travel lanes. All new minor arterials should include 100' right-of-ways to ensure there adequate space to accommodate all facilities.

FIGURE 5.19: URBAN MINOR ARTERIAL WITH SHARED LANE PROPOSED CROSS-SECTION



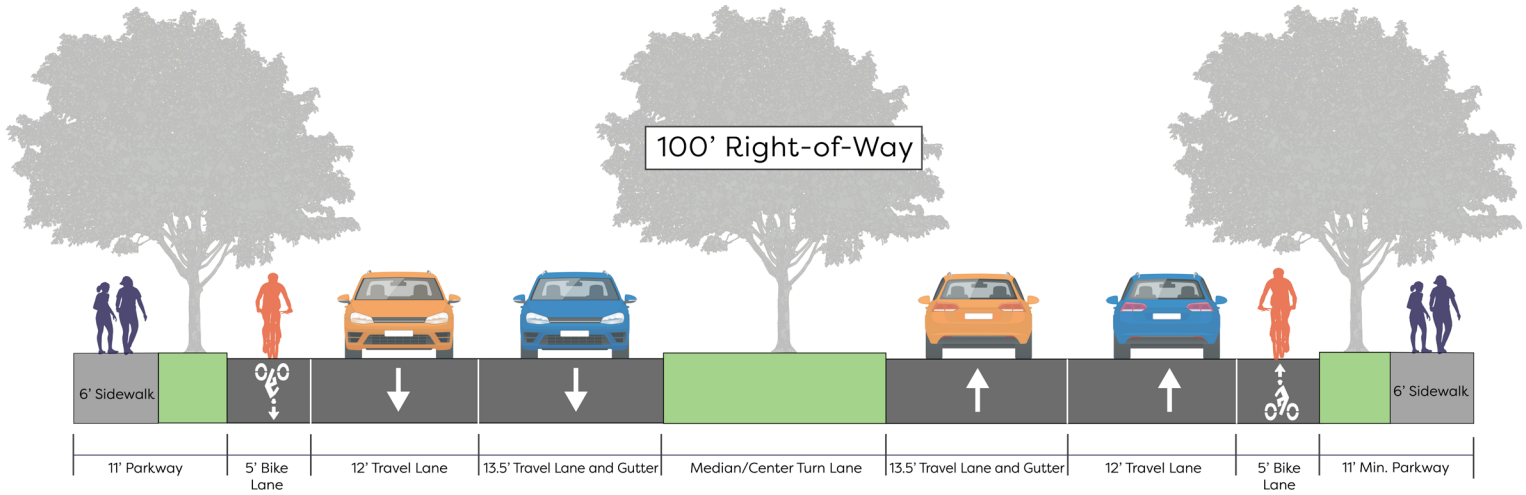
Urban minor arterials with shared-use lane is a new subclassifications of the urban minor arterial. In order to facilitate bicycle movement throughout the town, this roadway can include a shared-use lane by reducing the internal lane width. This cross-section should include a 6' sidewalk and a 10'-12' multi-use trail where space is available. All new urban minor arterials should have a 100' right-of-way.

FIGURE 5.20: URBAN MINOR ARTERIAL WITH ON-STREET PARKING PROPOSED CROSS-SECTION



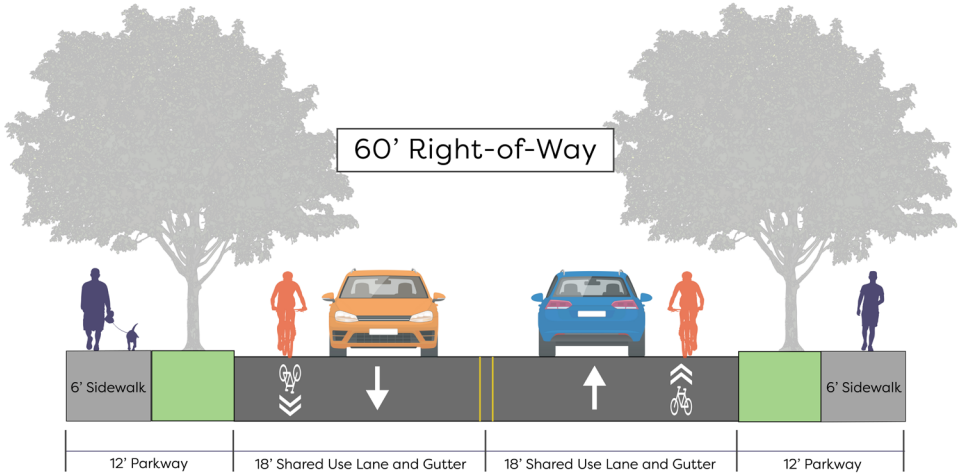
Urban minor arterials with on-street parking are found within the Lakeside Development. These roads are intended to provide parking for the shops and restaurants and provide wide sidewalks to encourage walking throughout the community. No changes have been proposed to this cross-section. Any new roadway segments should consider providing enhanced sidewalks where pedestrian volumes are expected to be higher.

FIGURE 5.21: URBAN MINOR ARTERIAL WITH BIKE LANES PROPOSED CROSS-SECTION



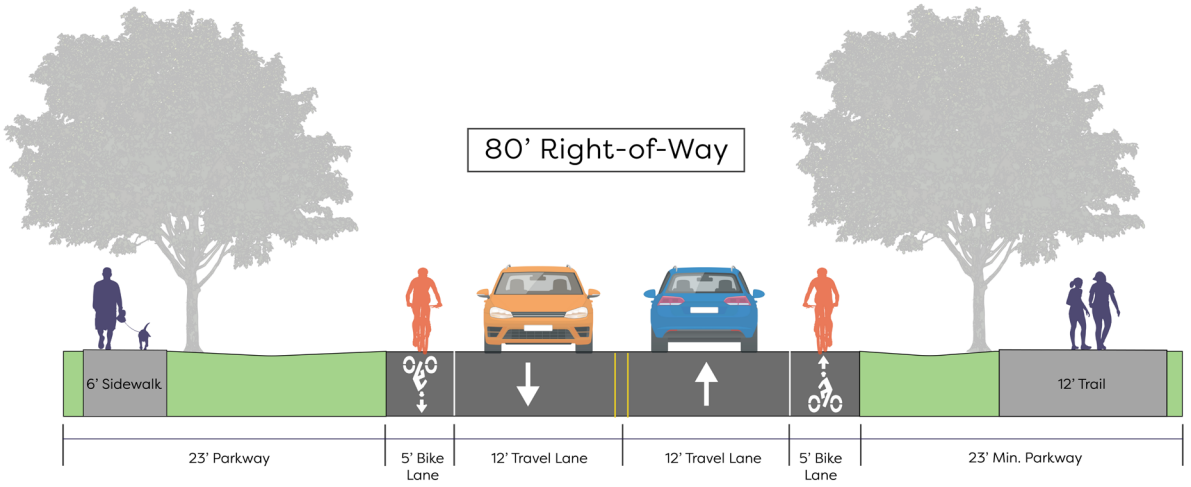
Urban minor arterials with bike lanes include roadways in west Flower Mound, including Canyon Falls Drive and other future corridors in the Canyon Falls Development. This cross-section provides 5' wide dedicated bike lanes, and 6' wide sidewalks on each side of the road. It would be appropriate to consider 8' sidewalks on these roads.

FIGURE 5.22: URBAN COLLECTOR PROPOSED CROSS-SECTION



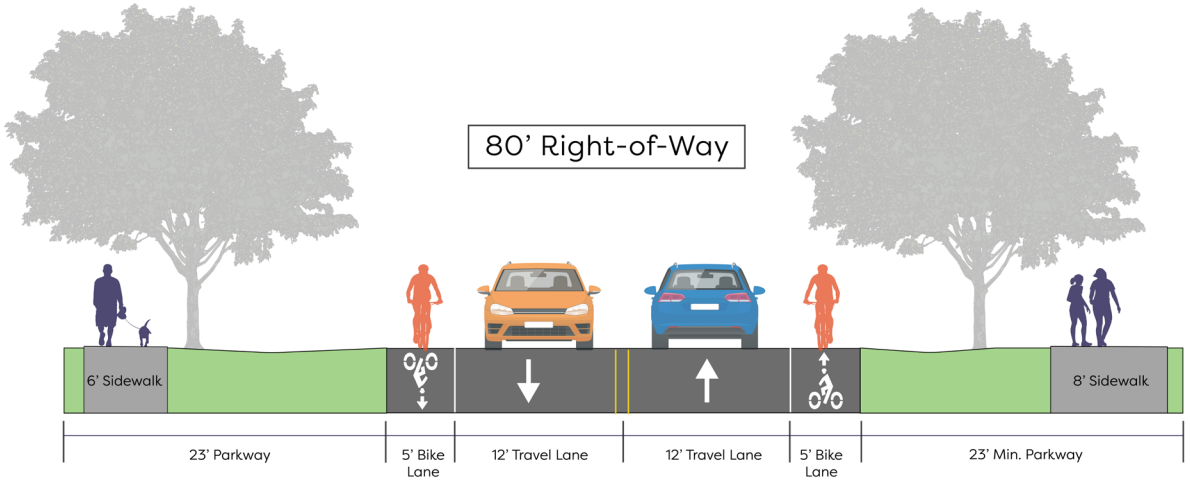
Urban collectors are roads in Flower Mound connect residents to arterial roadways. These include roads like Quail Run, Kirkpatrick Lane, and Lake Forest Boulevard. This cross-section should include shared-use lanes, and 6' wide sidewalks buffered by landscaping. It would be appropriate to consider 5' bike lanes on urban collectors in place of the shared-use lane markings.

FIGURE 5.23: RURAL COLLECTOR PROPOSED CROSS-SECTION - A



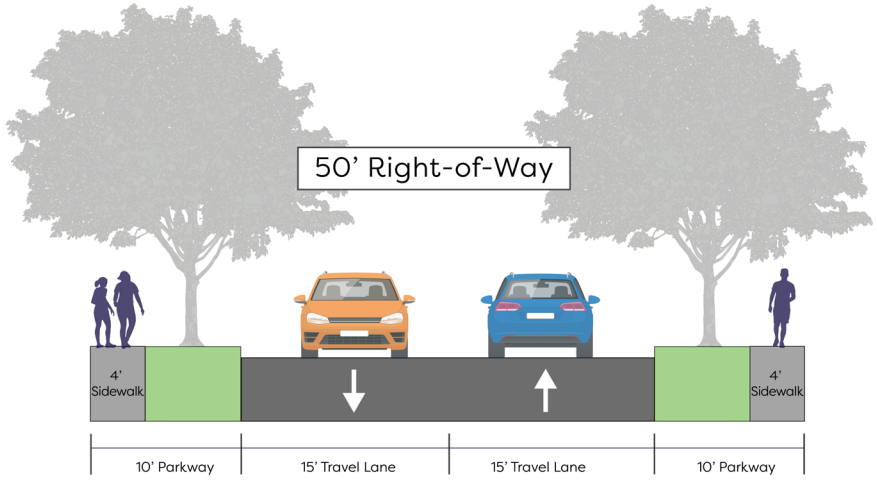
Rural collectors are roads in Flower Mound mainly found on the rural and undeveloped areas of the Town. These corridors should bike lanes and 6' wide sidewalks. Where identified on the trails master plan, they should also include a 12' wide shared-use path.

FIGURE 5.24: RURAL COLLECTOR PROPOSED CROSS-SECTION - B



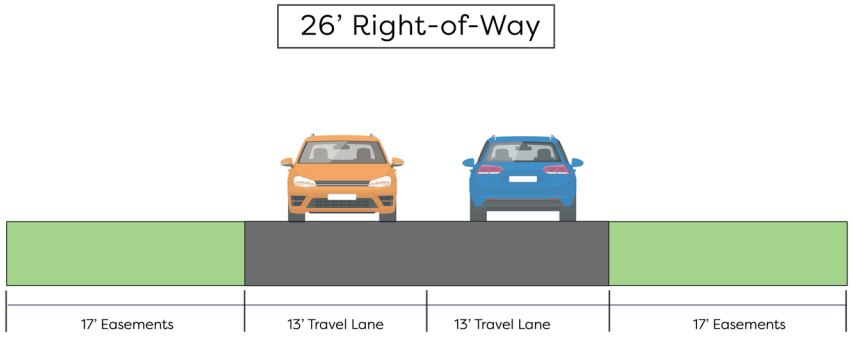
Rural collectors are roads in Flower Mound mainly found on the rural and undeveloped areas of the Town. These corridors include bike lanes and 6' - 8' wide sidewalks.

FIGURE 5.25: LOCAL RESIDENTIAL URBAN PROPOSED CROSS-SECTION



Local residential urban roads are primarily residential roadways. There are no recommended changes to this cross-section. These roads can be considered for shared-use path signage due to the lower speeds and volumes. There should be connectivity from residential streets to the town-wide trails and bikeways system.

FIGURE 5.26: LOCAL RESIDENTIAL ESTATE PROPOSED CROSS-SECTION



Local residential estate roads are mainly local roads within large lot subdivisions. There are no recommended changes to this cross-section.

Corridor Prioritization Implementation Plan Conclusion

06 IMPLEMENTATION

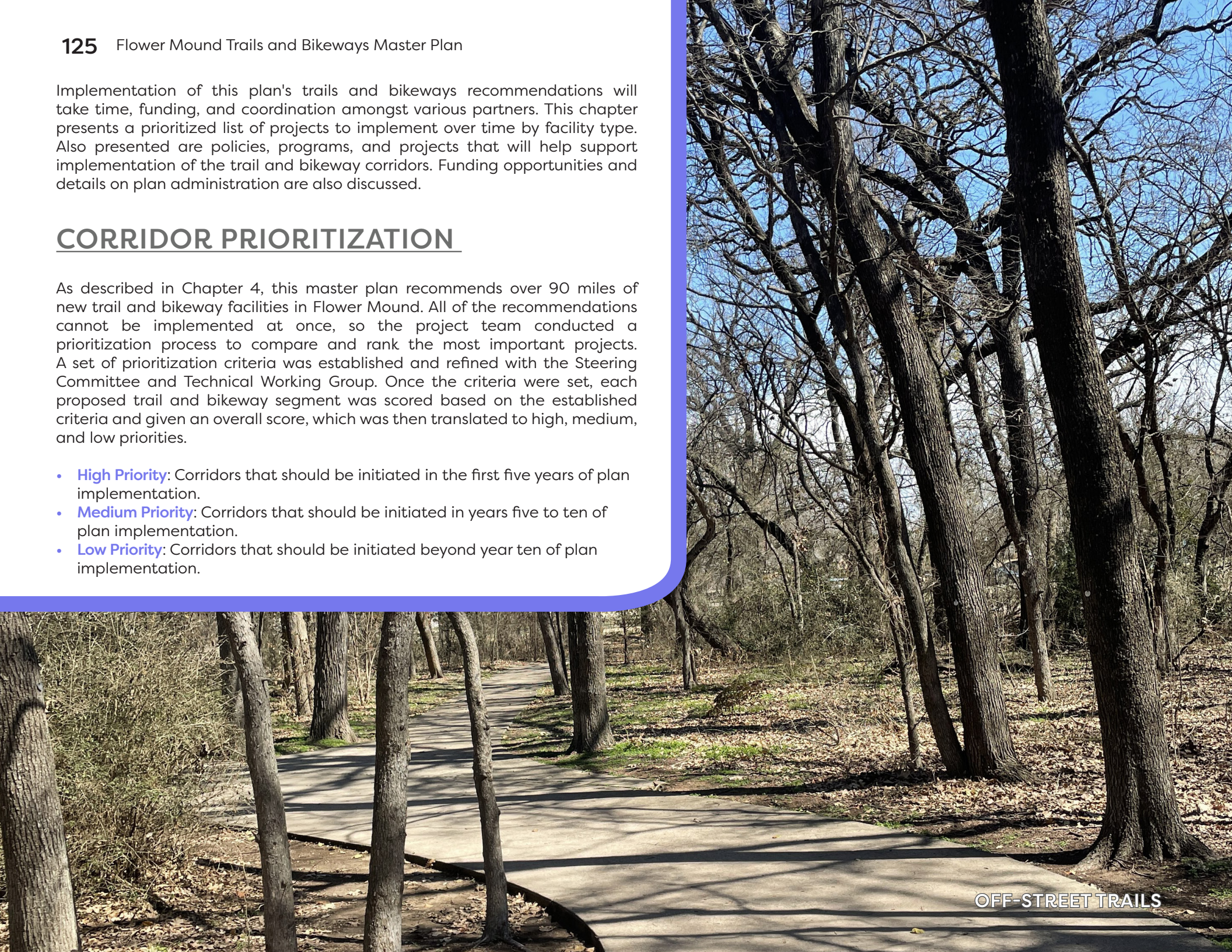
PINK EVENING PRIMROSE TRAIL

Implementation of this plan's trails and bikeways recommendations will take time, funding, and coordination amongst various partners. This chapter presents a prioritized list of projects to implement over time by facility type. Also presented are policies, programs, and projects that will help support implementation of the trail and bikeway corridors. Funding opportunities and details on plan administration are also discussed.

CORRIDOR PRIORITIZATION

As described in Chapter 4, this master plan recommends over 90 miles of new trail and bikeway facilities in Flower Mound. All of the recommendations cannot be implemented at once, so the project team conducted a prioritization process to compare and rank the most important projects. A set of prioritization criteria was established and refined with the Steering Committee and Technical Working Group. Once the criteria were set, each proposed trail and bikeway segment was scored based on the established criteria and given an overall score, which was then translated to high, medium, and low priorities.

- **High Priority**: Corridors that should be initiated in the first five years of plan implementation.
- **Medium Priority**: Corridors that should be initiated in years five to ten of plan implementation.
- **Low Priority**: Corridors that should be initiated beyond year ten of plan implementation.



TOWN MULTI-USE TRAILS

The Town's multi-use trail network, including off-street trails and sidepaths, will provide critical connections, improve exsiting corridors and facilities, and enhance safety for trail users. This section includes the action program for the Town to consider investmest over the planning horizon.

CRITERIA

The criteria in Table 6.1 were used to score each of the town paved multi-use trail segments in order to determine the proposed timing for implementation. In order to determine the weighted score for each project, the criteria were assigned a weight based on the level of importance determined by the Steering Committee, Technical Working Group, and planning team.

TABLE 6.1: TOWN MULTI-USE TRAIL CRITERIA DESCRIPTIONS

Criteria	Description
Connects to key destinations	The trail segment connects residents to parks, schools, major shopping centers, or employment centers.
Connects to the existing trail/bikeway network	The trail segment provides a connection to the existing trail/bikeway network to create loops, primary routes, and high connectivity throughout the system.
Creates an interjurisdictional connection	The trail segment connects residents to surrounding communities and improves regional connectivity.
Located on the designated Regional Veloweb	The trail segment is part of the designated Regional Veloweb and connects residents to the greater DFW Metroplex. The Regional Veloweb provides funding opportunities through NCTCOG.
Solves a safety issue or overcomes a barrier	The trail segment addresses an identified safety issue or barrier.
Fills a gap in the existing system	The trail segment fills a gap in the existing system by connecting two segments of existing trail.
Improves an existing trail	The trail segment widens an existing facility to enhance the comfort along the trail.
Ease of implementation	The trail segment is feasible to construct. Factors considered for this criterion include property ownership, topography, floodplain, and barriers.
Amount of environmentally sensitive areas disturbed	The trail segment provides the least disruption of natural areas.
Facilitates bicycling/walking to school	The trail segment provides safe, off-street routes for students of all ages to get to school from their homes.
Population density	The trail segment provides access to higher population densities.
Primary Trail	The trail segment is located on the primary trail or loop trail, as discussed in Chapter 4..

TOWN OFF-STREET TRAIL NETWORK ACTION PLAN

There are a total of 82.1 miles of recommended off-street trails, 21 percent of which are designated as high priority, 24 percent as medium priority, and 55 percent as low priority, as shown in Figure 6.1. Figure 6.2 and Table 6.2 represent the action plan for the Town's multi-use trail network.

Table 6.2 provides the **Corridor ID** for the trail projects shown from north to south; the **Facility Type** to determine if it's a multi-use trail, part of the Regional Veloweb, or one of the more detailed feasiblity corridors; the **Corridor** to describe where the segment is located; the **Length** of each project; and the **Priority** of the project based on the weighted criteria.

In eastern Flower Mound, most trail corridors recommend filling gaps in the existing system and upgrading existing trails and sidewalks to reflect the recommendations of this plan. New trail segments include trails along greenways, easements, and undeveloped land.

In western Flower Mound, new trail segments are recommended through undeveloped land and along major corridors. It is anticipated that many of these trail segments will be constructed by private developers in conjunction with property development.

FIGURE 6.1: TOWN MULTI-USE TRAIL PRIORITY BREAKDOWN

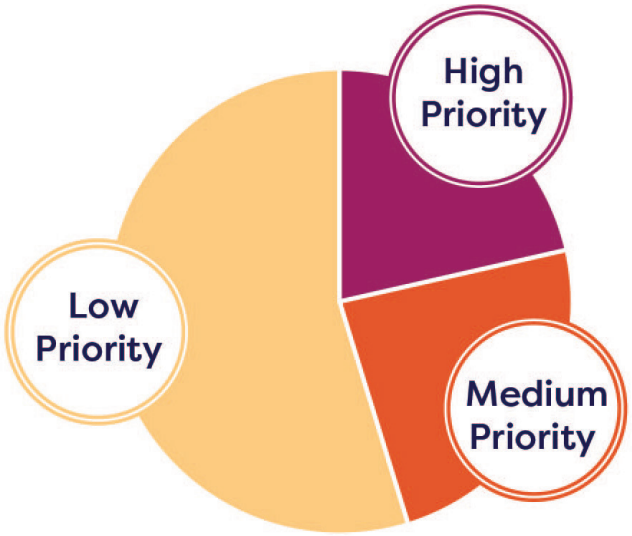


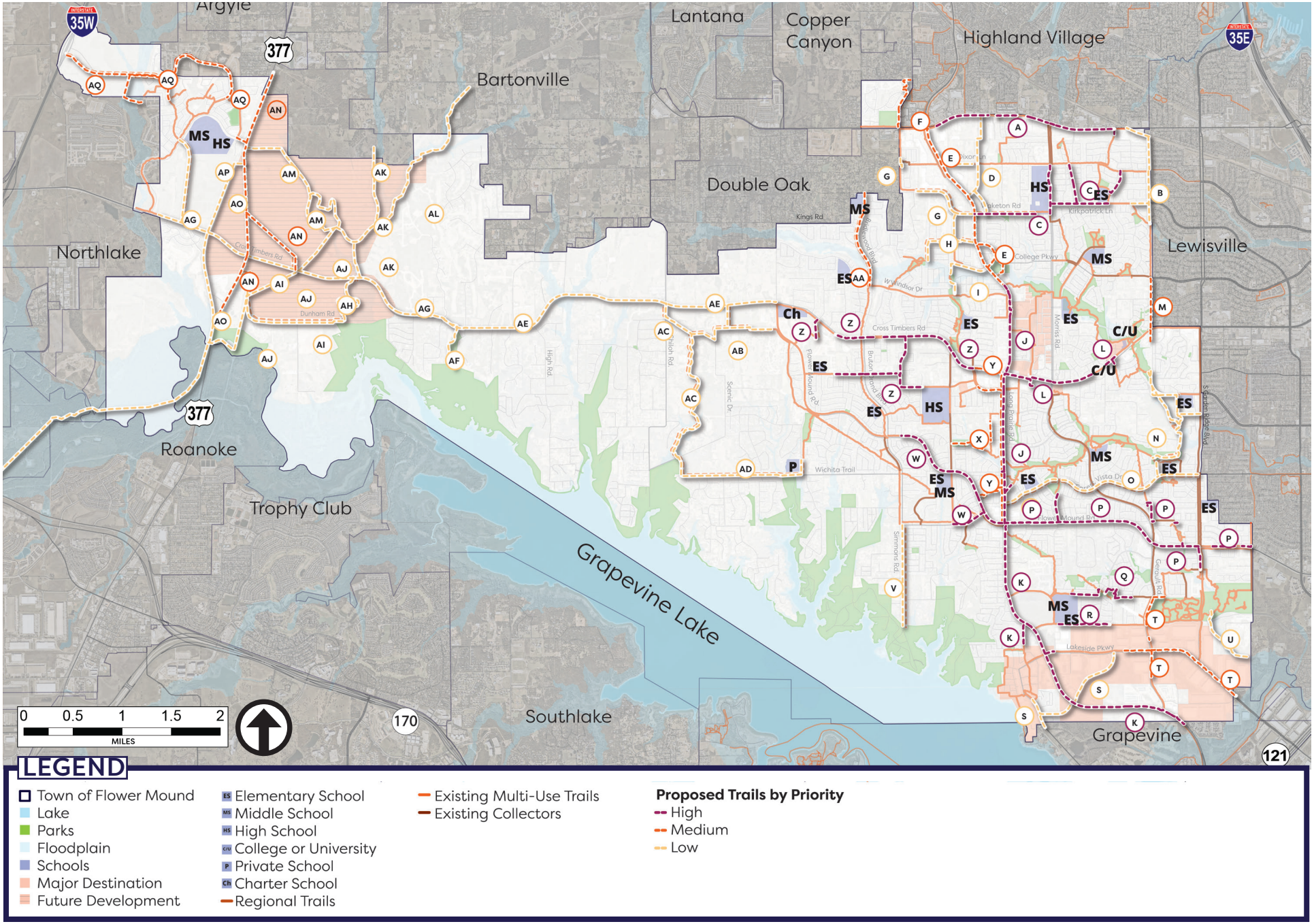
TABLE 6.2: TOWN MULTI-USE TRAILS RECOMMENDATION SUMMARY

Corridor ID	Facility Type	Corridor	Length (miles)	Priority
A	Multi-Use	Justin Rd	1.70	High
B	Multi-Use	Lone Buck Dr	2.23	Low
C	Multi-Use	Waketon/Morriss/Kirkpatrick Ln	2.34	High
D	Multi-Use	Easement/Dixon Ln	1.38	Low
E	Proposed Veloweb	Long Prarie Rd/College Pkwy	2.87	Medium
F	Multi-Use	Chinn Chapel Rd	0.65	Medium
G	Multi-Use	Chinn Chapel Rd/Waketon Rd	0.80	Low
H	Multi-Use	Rippy Rd/Pecan Meadows	0.94	Low
I	Multi-Use/Connector	Rippy Rd/Birch St	0.61	Low
J	Proposed Veloweb	Long Prairie Rd	2.54	High
K	Proposed Veloweb	Long Prairie Rd	3.50	High
L	Proposed Veloweb	Cross Timbers Rd	1.12	High

TABLE 6.2: TOWN MULTI-USE TRAILS RECOMMENDATION SUMMARY

Corridor ID	Facility Type	Corridor	Length (miles)	Priority
M	Multi-Use	Kirkpatrick Ln	2.26	Medium
N	Feasibility Corridor	Kirkpatrick Ln/Timber Creek Easement	2.76	Low
O	Multi-Use	Forest Vista Dr	2.20	Low
P	Multi-Use	Flower Mound Rd./Garden Ridge Blvd	3.18	High
Q	Mutli-Use	Shadow Ridge Park/Sweetwater Ln	0.77	High
R	Multi-Use	Spinks Rd	0.53	High
S	Multi-Use	Lakeside Pkwy/Lakeside Village Pkwy	1.36	Low
T	Multi-Use	Lakeside Pkwy/Gerault Rd	2.01	Medium
U	Multi-Use	Easement by Water Treatment Plant	0.69	Low
V	Multi-Use	Simmons Rd	1.01	Low
W	Multi-Use	Flower Mound Rd/McKamy Creek	1.81	High
X	Multi-Use	Peacock Park	0.53	Medium
Y	Multi-Use	Long Prairie Rd	2.28	Medium
Z	Multi-Use	Cross Timbers Rd/Auburn Dr/Quail Rn/Peters Colony	2.98	High
AA	Multi-Use	Bridlewood Blvd	1.00	Medium
AB	Multi-Use	Walsingham/Scenic	1.18	Low
AC	Proposed Veloweb	Shiloh Easement	2.00	Low
AD	Multi-Use	Wichita Trail	1.56	Low
AE	Proposed Veloweb	1171 - Cross Timbers	3.55	Low
AF	Feasibility Corridor	Floodplain	0.55	Low
AG	Feasibility Corridor	1171 - Cross Timbers	3.20	Low
AH	Multi-Use	Floodplain	1.02	Low
AI	Multi-Use	Dunham Rd	1.37	Low
AJ	Proposed Veloweb	Future Corridor	2.00	Low
AK	Multi-Use	Floodplain	1.70	Low
AL	Proposed Veloweb	Floodplain	1.37	Low
AM	Multi-Use	Furst Ranch (Future Development)	2.24	Medium
AN	Proposed Veloweb	377	3.55	Medium
AO	Multi-Use	Railroad Corridor	4.97	Low
AP	Multi-Use	Future Corridor	0.87	Low
AQ	Multi-Use	Prairie Ridge Rd/Denton Creek Blvd	3.16	Medium

FIGURE 6.2: TOWN MULTI-USE TRAILS RECOMMENDED NETWORK



ON-STREET BIKEWAYS

On-street bikeways include bike lanes and shared-use lanes to improve active transportation town-wide. Many of the identified routes are frequently used by bicyclists, and connect residents to destinations and the region. On-street facilities can provide critical connections where other facilities may be constrained.

CRITERIA

The following criteria in Table 6.3 were used to score each of the on-street bikeway segments in order to determine the proposed timing for implementation. In order to determine the weighted score for each project, the criteria were assigned a weight based on the level of importance determined by the Steering Committee, Technical Working Group, and planning team. Many of the critera are similiar to the trails, as they help to create a complete network. Level of comfort and level of coordination are specific to the bikeways in order to evaluate rights-of-way constraints and user preference.

TABLE 6.3: ON-STREET BIKEWAYS CRITERIA

Criteria	Description
Connects to the existing trail/ bikeway network	The bikeway segment provides a connection to the existing trail/bikeway network to create loops, primary routes, and high connectivity throughout the system.
Creates an interjurisdictional connection	The bikeway segment connects residents to surrounding communities and improves regional connectivity.
Solves a safety issue or overcomes a barrier	The bikeway segment addresses an identified safety issue or barrier.
Level of Comfort	The bikeway segment provides a high level of comfort. Comfort is a critical factor for the development of bikeways; the more comfortable a facility is perceived, the greater chance the facility will be utilized by users of all ages and abilities. The level of comfort of a roadway takes into consideration traffic volumes, speeds, and pavement widths.
Fills a gap in the existing system	The bikeway segment fills gap in the existing system by connecting two segments of existing bikeways. The existing system is relatively disjointed, filling in gaps will help improve connectivity, particularly on the east side of the Town.
Improves an existing facility	The bikeway segment improves a facility that cyclists currently use.
Ease of implementation	The bikeway segement is feasible to construct. Factors considered for this criterion include rights-of-way widths, speed of roadway, pavement widths, and roadway constraints.
Level of coordination needed with other entities	The bikeway segment requires little coordination with other entities. Bikeways are easier to implement when less coordination is needed. Entities that may need to be coordinated with include TxDOT, railroads, utility companies, and the USACE.
Population Density	The bikeway segment provides access to higher population densities.

ON-STREET BIKEWAYS NETWORK ACTION PLAN

There are a total of 39.5 miles of recommended on-street bikeways, 41 percent of which are designated as high priority, 18 percent as medium priority, and 41 percent as low priority, as shown in Figure 6.3. Figure 6.4 (page 132) and Table 6.4 represent the action plan for on-street bikeways in Flower Mound.

Table 6.4 provides the **Corridor ID** for the bikeway projects shown from north to south; the **Facility Type** to determine if it's a shared-use lane or bike lane; the **Corridor** to describe where the segment is located; the **Length** of each project; and the **Priority** of the project based on the weighted criteria.

In eastern Flower Mound, bikeways provide connections to surrounding communities, and connect to parks, schools, and destinations.

In western Flower Mound, bikeways connect residents to the USACE trails, are proposed with future roadways, and connect residents to parks and schools.

FIGURE 6.3: ON-STREET BIKEWAYS PRIORITY BREAKDOWN

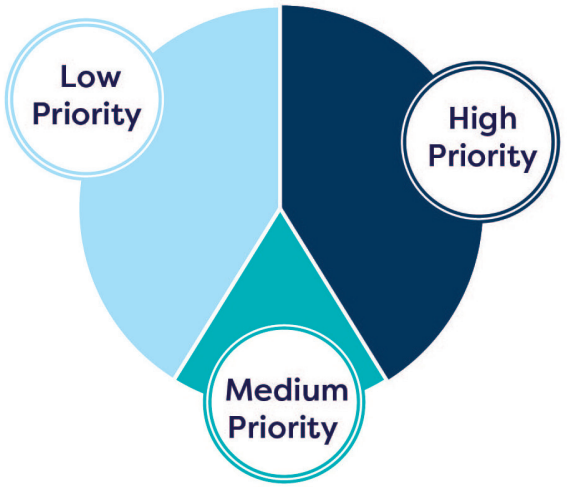
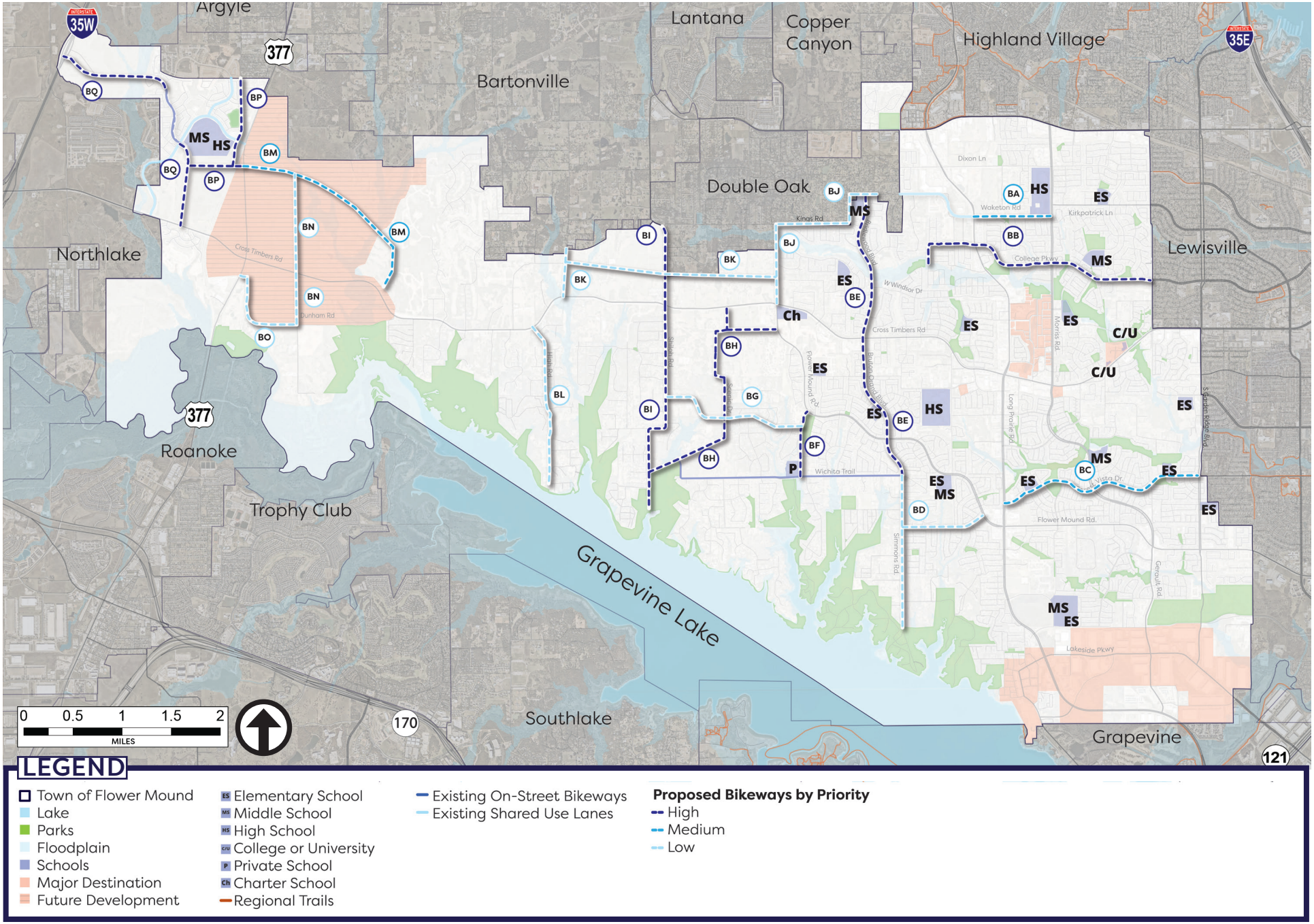


TABLE 6.4: ON-STREET BIKEWAYS RECOMMENDATION SUMMARY

Corridor ID	Facility Type	Corridor	Length (miles)	Priority
BA	Shared-Use Lane	Waketon Rd	1.65	Medium
BB	Shared-Use Lane	College Pkwy	2.57	High
BC	Shared-Use Lane	Forest Vista Dr	2.13	Medium
BD	Shared-Use Lane	Simmons Rd	2.37	Low
BE	Shared-Use Lane	Bridlewood Blvd/Burton Orand Blvd	3.01	High
BF	Shared-Use Lane	Skillern Rd	0.67	High
BG	Shared-Use Lane	River Hill Dr	1.52	Low
BH	Bike Lane/Shared-Use Lane	Scenic Dr	2.80	High
BI	Bike Lane	Shiloh Rd	3.00	High
BJ	Shared-Use Lane/Bike Lane	Lusk Ln/Kings Rd/Waketon Rd	2.10	Low
BK	Bike Lane	Red Rock Ln/Future Corridor	2.61	Low
BL	Bike Lane	High Rd	1.64	Low
BM	Bike Lane	Future Corridor	2.20	Medium
BN	Bike Lane	Future Corridor	1.50	Low
BO	Bike Lane	Dunham Rd	1.00	Low
BP	Shared-Use Lane/Bike Lane	Future Corridor/Stonecrest Dr	0.90	High
BQ	Bike Lane	Denton Creek Blvd	1.73	High

FIGURE 6.4: ON-STREET BIKEWAYS RECOMMENDED NETWORK



NON-TRADITIONAL TRAIL FACILITIES

For the non-traditional trails, including town equestrian trails and paddling trails, 25 percent are high priority trails, 63 percent are medium priority trails, and 12 percent are low priority trails, as shown in Figure 6.5. Figure 6.6 (page 134) and Table 6.5 represent the action plan for non-traditional trail facilities, including equestrian trails and paddling trails.

TOWN EQUESTRIAN TRAILS

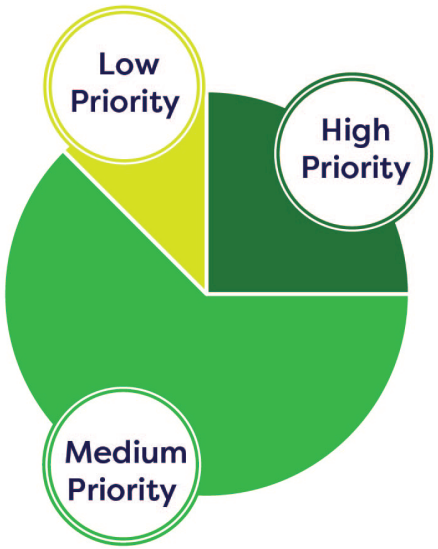
There are a total of 10.9 miles of equestrian trails recommended in this master plan. While there is not a set of established prioritization criteria for equestrian trails specifically, based on feedback from citizens and stakeholders, the most important components were:

- Completing existing equestrian trail loops
- Providing more connections to the existing USACE equestrian trails

OTHER TRAILS - PADDLING TRAILS

There are 2 miles of paddling trails recommended in this master plan. Similar to equestrian trails, there is not a set of established prioritization criteria for paddling trails. Given that there is only one primary recommended segment, this corridor was given a prioritization of medium priority based on the anticipated complexity to complete.

FIGURE 6.5: NON-TRADITIONAL TRAILS PRIORITY BREAKDOWN



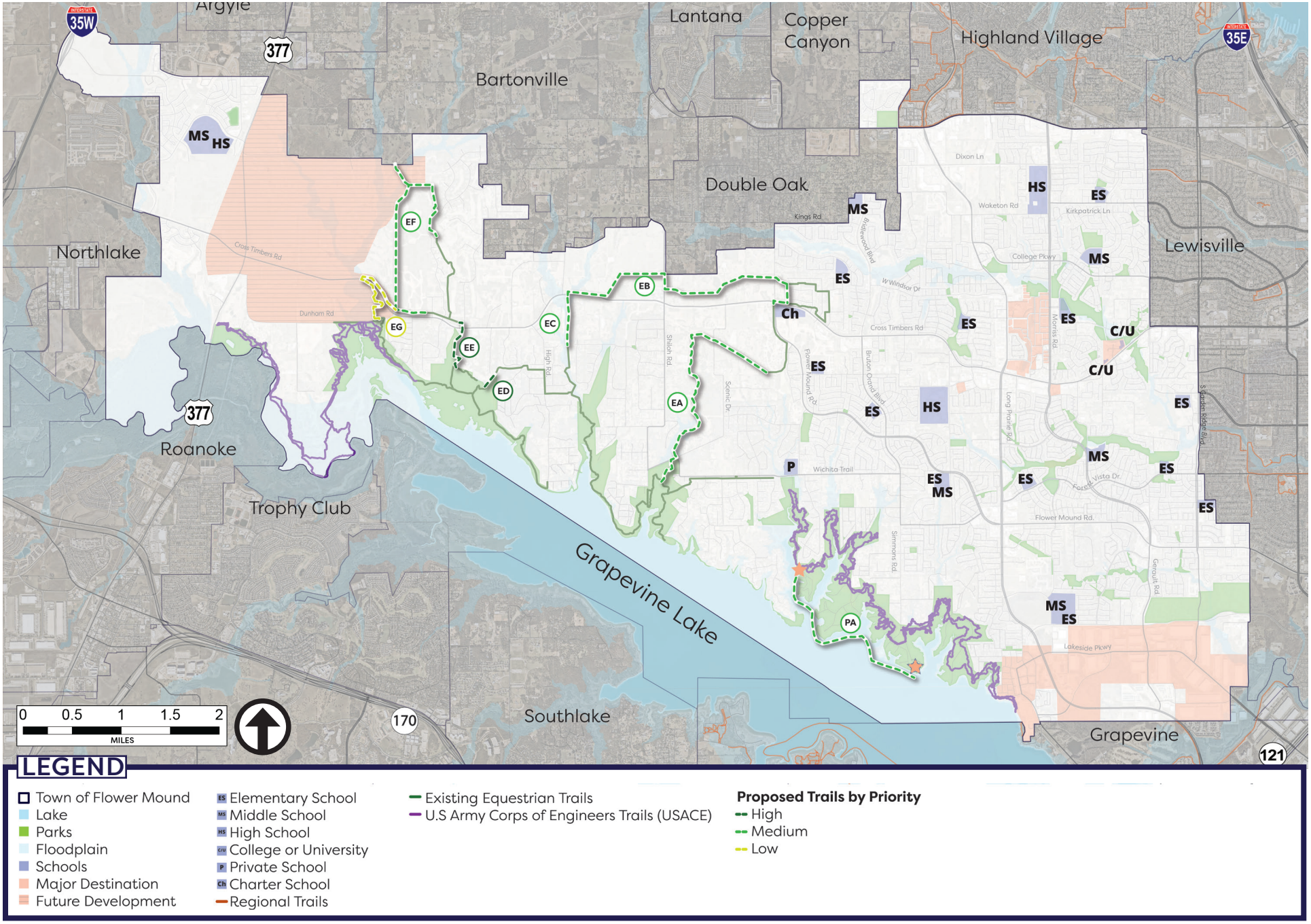
OTHER TRAILS - USACE TRAILS

This plan does not recommend additional USACE soft surface trails. Important considerations include implementing cautionary signage to reduce potential conflict from different users.

TABLE 6.5: NON-TRADITIONAL TRAILS RECOMMENDATION SUMMARY

Corridor ID	Facility Type	From	To	Length (Miles)	Priority
EA	Equestrian	Melville Cir	Rocky Point	2.71	Medium
EB	Equestrian	Brindle Wy	Cross Timbers	3.02	Medium
EC	Equestrian	Cross Timbers	Raintree Pl	0.48	Medium
ED	Equestrian	Hidden Brook Farm		0.16	High
EE	Equestrian	Cross Timbers	Hidden Ridge Dr	2.70	High
EF	Equestrian	Cross Timbers	Montalcino	0.58	Medium
EG	Equestrian	Cross Timbers		1.21	Low
PA	Paddling	Twin Coves	Murrel Park	1.95	Medium

FIGURE 6.6: NON-TRADITIONAL TRAIL PRIORITIZATION



PLAN IMPLEMENTATION

TYPICAL FACILITY COSTS

While implementing each corridor will pose different challenges, it is beneficial to establish typical facility costs to help with planning and budgeting. Table 6.6 represents the typical planning level cost range for all of the facility types recommended in this master plan.

These cost ranges are based on recent project bids, current market trends, and engineering standards and design methods. Each estimate considers general cost elements, demolition, transportation, and grading costs based on simliar projects. *It is important to note that these cost estimate ranges are at a pre-design level and will likely change as additional planning, design, and engineering occurs for each project.*

TABLE 6.6: TYPICAL PROJECT COSTS BY FACILITY

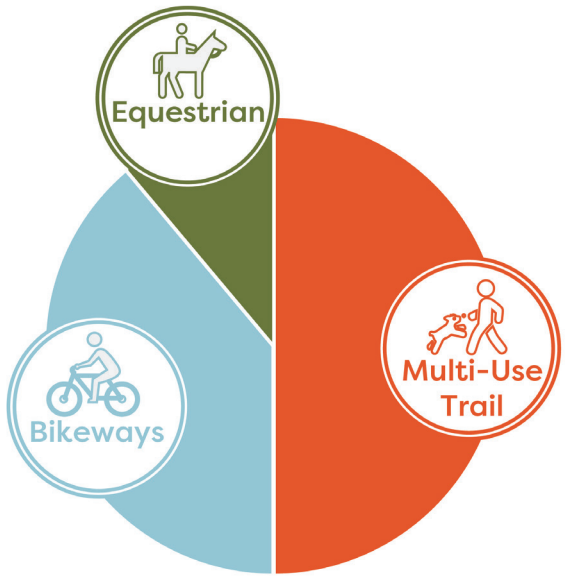
Facility Type	Parameters	Typical Cost Range
Paved Multi-Use Trail	12' paved trail	$1.35 – $1.9M per mile
Paved Multi-Use Trail	10' paved trail	$1.35 – $1.9M per mile
Connector	8' paved wide sidewalk	$1.0M - $1.4M per mile
Soft-Surface Trail	8' decomposed granite trail with grading	$600,000 – $900,000 per mile
Equestrian Trail	8' natural surface trail with grading	$250,000 – $400,000 per mile
Bike Lane	Lane striping, signage, and pavement markings on both sides of the street	$95,000 per mile (existing street surface)
Shared-Use Lane	Signage, pavement markings	$75,000 per mile (existing street surface)
Shared-Use Lane	Signage	$3,000 per mile
Paddling Trail	Signage	$2,000 - $10,000 per mile
Sidewalk	6' sidewalk	$900,000 - $1.6M per mile

Note: Costs for a specific trail or bikeway facility will vary based on site conditions and as additional planning, design, and engineering occurs. An inflation rate of 3% per year should be factored into any project cost. Chapter 5 includes typical cross-sections and additional design considerations for these facility types. Souce of cost estimates is Halff Associates, Inc. based on similar projects.

PRIORITY PROJECTS

Figure 6.8 illustrates the percentage of the high priority projects by facility type. Overall, 50 percent of the high priority projects are for Town multi-use trails, 39 percent are for bikeways, and 11 percent are for equestrian trails. All high priority projects are combined into a single systemwide prioritization map and table, shown in Figure 6.9 (page 136) and Table 6.7 (page 135).

FIGURE 6.7: PRIORITY BREAKDOWN



Most high priority Town multi-use trails are located in eastern Flower Mound. These corridors can be implemented as one project with voter approved bonds or grant programs, or they can be divided into smaller segments to be included in the Town's annual budget.

High priority bikeway corridors are located throughout Flower Mound. These can be constructed through Town funding sources or through development requirements.

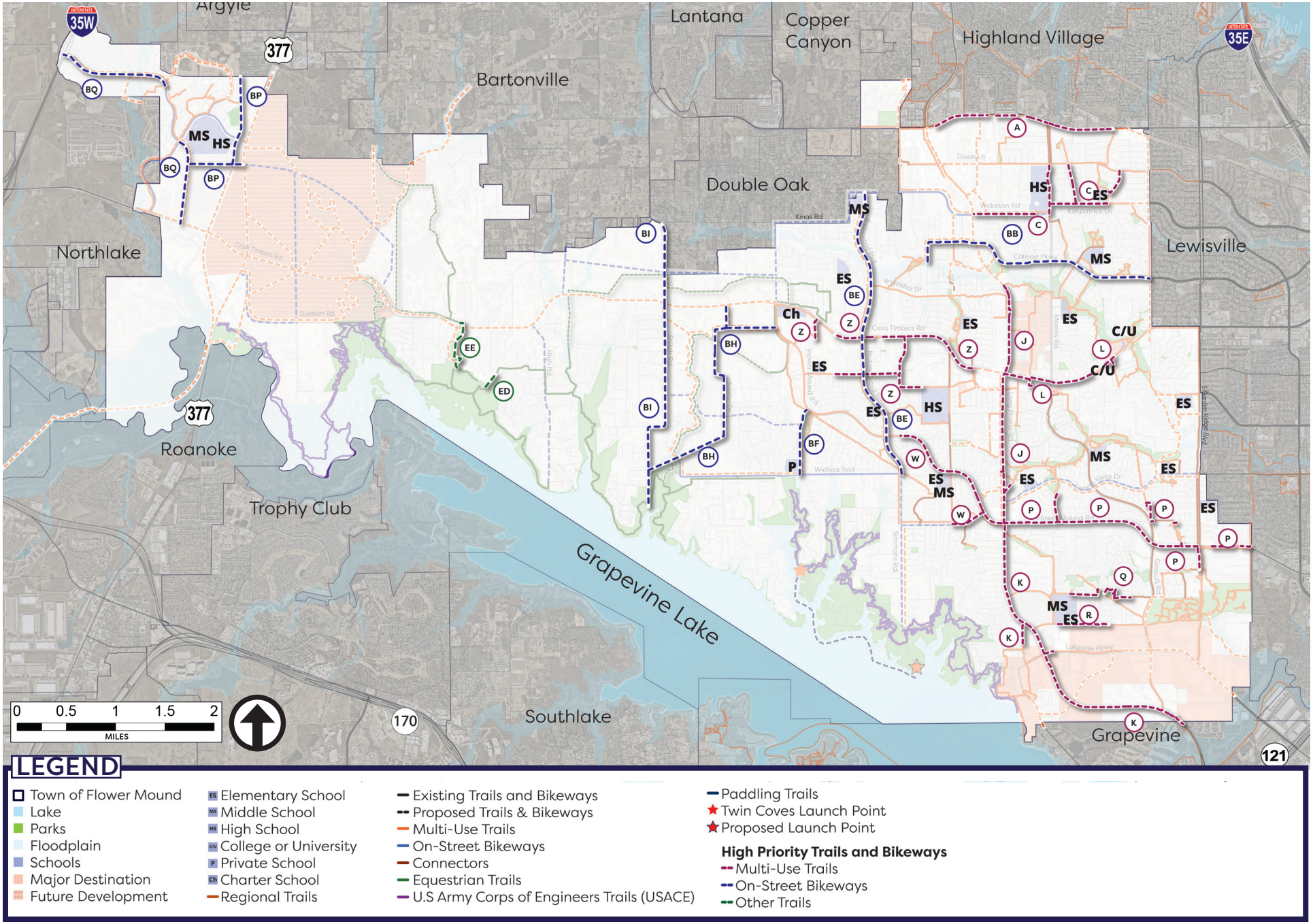
Table 6.7 (page 136) provides the **Corridor ID** for the high priority projects; the **Facility Type** to determine if it's a multi-use trail, bikeway, or equestrian trail; the **Corridor** to describe where the segment is located; the **Length** of each project; and the **Cost Estimate Range** of the project based on the average of the planning level typical project costs; and **Partnerships** to identify potential funding partners for the construction of the system. Due to the length of many of the prioritized trail and bikeway segments, a variety of funding mechanisms may need to be utilized in order to complete the network, including private developer funds, Town funds, or grants. **Estimated Public/Private Contribution** provides a high level percentage estimate for the burden of construction. t is important to note that if the Town is considering constructing a project, they should include filling in gaps or enhancing existing facilities where trails may already exist or there is vacant land to create a complete network.

TABLE 6.7: PRIORITY TRAILS RECOMMENDATION SUMMARY

Corridor ID	Corridor	Facility Type	Length (miles)	Average Cost Estimate	Funding Partnerships	Estimate Public/ Private Contribution (%)
A	Justin Rd	Multi-Use	1.7	$2,763,600	Developer, Town, Grants	90/10
C	Waketon/Morriss/Kirkpatrick Ln	Multi-Use	2.3	$3,802,653	Town	100/0
J	Long Prairie Rd	Proposed Veloweb	2.5	$4,119,589	Developer, Town, Grants	50/50
K	Long Prairie Rd	Proposed Veloweb	3.5	$5,696,871	Developer, Town, Grants	100/0
L	Cross Timbers Rd	Proposed Veloweb	1.12	$1,824,699	Developer, Town, Grants	95/5
P	Flower Mound Rd/Garden Ridge Blvd	Multi-Use	3.18	$5,169,875	Developer, Town, Grants	100/0
Q	Shadow Ridge Park/Sweewater Ln	Multi-Use	0.77	$1,255,926	Developer, Town	100/0
R	Spinks Rd	Multi-Use	0.53	$856,482	Developer, Town	100/0
W	Flower Mound Rd/McKamy Creek	Multi-Use	1.87	$2,953,822	DDeveloper, Town	100/0
Z	Cross Timbers Rd/Auburn Dr/ Quail Rn/Peters Colony	Multi-Use, Proposed Veloweb	2.98	$4,837,647	Developer, Town, Grants	70/30
BB	College Pkwy	Shared-Use Lane	2.57	$192,649	Town, Grants	100/0
BE	Bridlewood Blvd/Burton Orand Blvd	Shared-Use Lane	3.01	$225,985	Town, Grants	100/0
BF	Skillern Rd	Shared-Use Lane	0.67	$50,034	Town, Grants	100/0
BH	Scenic Dr	Bike Lane/Shared-Use Lane	2.80	$226,775	Town, Grants	100/0
BI	Shiloh Rd	Bike Lane	3.01	$285,904	Town, Grants	100/0
BP	Future Corridor/Stonecrest Dr	Shared-Use Lane/Bike Lane	0.90	$85,667	Town, Developer	0/100
BQ	Denton Creek Blvd	Bike Lane	1.73	$163,998	Town, Developer	0/100
ED	Hidden Brook Farm	Equestrian	0.58	$363,736	Developer, Town	100/0
EE	Cross Timbers	Equestrian	0.16	$100,288	Developer, Town	50/50
Priority Project Totals			**35.88**	**$34,976,200**		

*Corridor ID is based on the Action Plan for each facility type (see pages 125-132)
Town funds may include: CIP, Transportation funds, voter approved bond projects, 4B funding, recreation funds, general fund, or similiar funding mechanisms through the Town.

FIGURE 6.8: HIGH PRIORITY TRAIL AND BIKEWAY CORRIDORS



OTHER PRIORITY PROJECT CONSIDERATIONS

OFF-STREET CORRIDORS

Off-street corridors for recreational purposes were identified as a priority by Town Council. Off-street trails that can be priority projects in East Flower Mound, that are not already identified as a priority project include portions of Corridor E, Corridor N, Corridor U, and Corridor X.

Corridor E Cost Estimate:
$3,861,000 - $5,450,000 (approximately 2.9 miles of trail)
Corridor N Cost Estimate:
$3,730,000 - $5,250,000 (approximately 2.8 miles of trail)
Corridor U Cost Estimate:
$931,000 - $1,311,000 (approximately 0.7 miles)
Corridor X Cost Estimate:
$712,000 - $1,000,000 (approximately 0.5 miles)

TRAILHEADS

It is a recommendation of this plan to first enhance the existing trailhead improvements. This can be done in the near term while other trails are being designed and constructed. These are shown in Figure 6.10.

Trailheads should include a variety of amenities and facilities based on if it's a major or minor trailhead. Estimated avearage cost for signage, amenities, general landscaping, and parking areas:
$350,000 - $850,000 per trailhead (depending on if a bathroom facility is included)
Note: *Costs for a specific project will vary based on site conditions and as additional planning, design, and engineering occurs. An inflation rate of 3% per year should be factored into any project cost.*

MAJOR CONFLICT POINTS

This is intended to provide gudiance on which intersections should be further analyzed to determine the level of recommended improvements. High priority intersections are shown in Figure 6.10, and are broken into three categories, controlled, uncontrolled, and mid-block. As new trails are designed and constructed, major roadway crossings should be evaluated during the design phase of the project. All pavement markings and signage guidance shall comply with the TMUCD and Town standards.

Major Intersections

Improvements to existing intersections where trail crossings are located should be prioritized. Future trail development should include roadway crossings in the design of the project.

Estimated avearage cost for signage, striping, bulb-out, and ADA ramps:
$153,000 per intersection
Note: *Costs for a specific project will vary based on site conditions and as additional planning, design, and engineering occurs. An inflation rate of 3% per year should be factored into any project cost.*

Mid-Block Crossings

Improvements to existing mid-block crossings should be proritized to ensure there is proper signage, striping, and other advanced warning. New trails should include mid-block crossings in the design of the project.

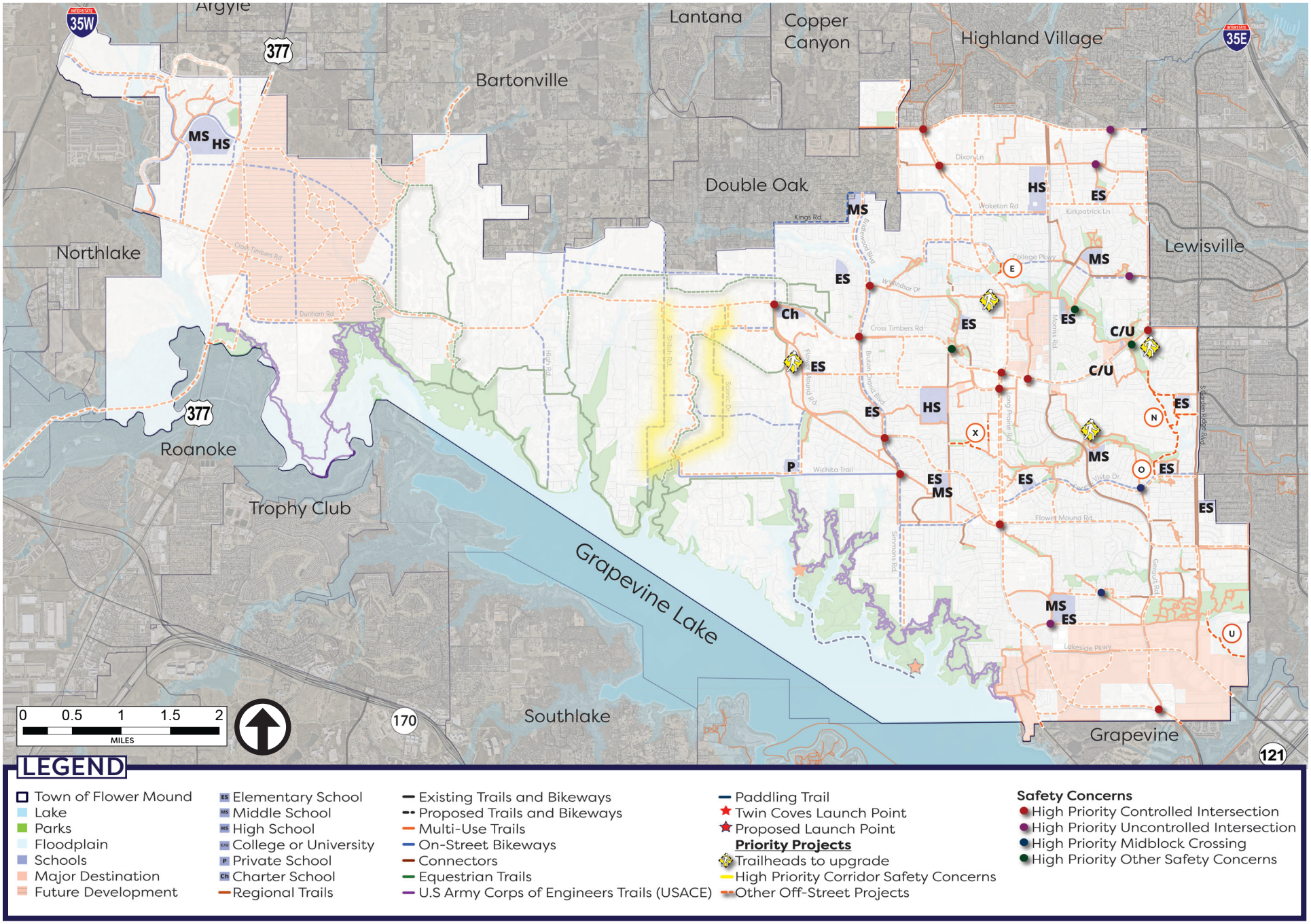
Estimated average cost range for signage, striping, and other improvements including RRFB's:
$75,500 per crossing
Note: *Costs for a specific project will vary based on site conditions and as additional planning, design, and engineering occurs. An inflation rate of 3% per year should be factored into any project cost.*

Existing Trail Improvements

During the assessment, various maintenance and safety concerns were analyzed. Concerns to be evaluated include blindspots, where there is a 90 degree turn in the trail, bridge replacement needs, and low hanging vegetation. While some concerns can be fixed relatively easily, some need further investigation.

Estimated average cost range for signage, striping, and other improvements for blind curves:
$25,800 per curve improvement
Note: *Costs for a specific project will vary based on site conditions and as additional planning, design, and engineering occurs. An inflation rate of 3% per year should be factored into any project cost.*

FIGURE 6.9: RECOMMENDED OTHER PROJECTS



POLICIES, PROGRAMS, AND PROJECTS

There are various policy changes, programs, and projects that can be completed to support the implementation of Flower Mound's recommended trails and bikeways network. The master plan goals and objectives spreviously presented in Chapter 1 identifies initiatives that should be considered to help with overall plan implementation, and proposes metrics for tracking the plan's implementation.

GOAL 1: CONNECTED COMMUNITY

Create a complete trails and bikeways system that connects the community with active transportation options.

OBJECTIVES:

- **1.1:** Increase trail level of service.
- **1.2:** Provide trail and bikeway connections to key destinations.
- **1.3:** Fill in gaps in the existing trail system.

INITIATIVES:

- **Policy:** Attain a target level of service for trails of 1 mile per 1,000 residents.
- **Project:** Undergo design of the feasibility and high priority corridors.

METRICS:

- Increased levels level of service:
  - Mileage of off-street trails within Flower Mound
  - Mileage of on-street bikeways in Flower Mound
  - Mileage of new and improved connectors in Flower Mound
  - Mileage of equestrian trails in Flower Mound
- Greater percentage of bicycle and pedestrian mode share counts from the Census
- Number of interjurisdictional connections made

GOAL 2: SAFE & ACCESSIBLE SYSTEM

Ensure the trails and bikeway system is safe, comfortable, and accessible for users of all abilities and ages.

OBJECTIVES:

- **2.1:** Provide a variety of facility types appropriate for users of different abilities.
- **2.2:** Improve overall safety and comfort of existing facilities.
- **2.3:** Address areas identified as barriers within the existing trail system.

INITIATIVES:

- **Project:** Implement additional roadway crossing improvements.
- **Project:** Tie trail markers and system branding to the EMS system.
- **Policy:** Incorporate the design standards included in this master plan into the Town's standards.
- **Policy:** Implement blindspot and safety improvements on existing trails.
- **Project:** Evaluate high-frequency crash locations on an annual basis.

METRICS:

- Number of crashes involving bicyclists
- Number of crashes involving pedestrian
- Number of roadway crossings improved (at intersections or mid-block)
- Number of blindspots improved

GOAL 3: USER FRIENDLY

Improve awareness, signage, and usability of the trails and bikeways system.

OBJECTIVES:

- **3.1:** Increase awareness of the existing trail and bikeway system.
- **3.2:** Create a consistent brand across the trails system so it is easily recognizable.
- **3.3:** Install wayfinding signage to direct users to destinations along the trails.

INITIATIVES:

- **Program:** Implement the systemwide wayfinding and branding plan for the trails and bikeways system.
- **Program:** Develop a bicycle etiquette/awareness program that addresses cyclist and motor vehicle etiquette.
- **Project:** Install trail counters along the system to determine areas with most usage.
- **Project:** Create a smart phone application that links to a GPS system to provide guidance and assistance on the trail.
- **Policy:** Adopt a Vision Zero policy.

METRICS:

- Number of new trailhead installations
- Facility usage from trail counters and Strava data
- Number of new amenities along the trail including:
  - Amenities (benches, trash receptacles, bike racks, bike repair stations, and similar)
  - Parking areas
  - Wayfinding features

GOAL 4: UNIQUE SYSTEM

Design and construct trails that support the health and wellness of the community and natural environment.

OBJECTIVES:

- **4.1:** Provide trails through natural areas, parks, and open space.
- **4.2:** Provide for interpretative and educational opportunities along trails.
- **4.3:** Utilize an environmentally-friendly and context-sensitive approach to developing and maintaining trails.

INITIATIVES:

- **Project:** Install interpretative signage that educates users on historic, cultural, and natural resources.
- **Project/Program:** Install new shade trees and explore additional shade opportunities along the trails.
- **Policy:** Encourage trails around stormwater ponds and through natural areas.

METRICS:

- Miles of trail constructed in greenways
- Number of new shade trees planted along trails
- Number of interpretive signage installations

GOAL 5: PARTNERSHIPS

Leverage partnerships between the Town and the community, internal and external organizations, and outside agencies to achieve a connected trails and bikeways system.

OBJECTIVES:

- **5.1:** Pursue joint projects with surrounding cities, the County, NCTCOG, TxDOT, TPWD, USACE, and utility providers.
- **5.2:** Maintain relationships with user groups to solicit feedback on the trails and bikeways system.
- **5.3:** Work with other departments to incorporate bicycle and pedestrian accommodations into ongoing or upcoming projects.

INITIATIVES:

- **Policy:** Provide NCTCOG with updated trail files so they can update their regional maps.
- **Project:** Update the Town's thoroughfare plan to include the additional bicycle/pedestrian accommodations recommended in this plan.
- **Program/Policy:** Work with the City of Grapevine to identify future kayak/canoe launch points to apply for TPWD Trail funding.
- **Program/Policy:** Work with adjacent cities to identify interjurisdictional trail opportunities and funding options.

METRICS:

- Miles of trail completed on the Regional Veloweb
- Miles of trail completed on USACE lands
- Number of meetings with outside entities regarding trail and bikeway planning, design, and construction with the construction and reconstruction of roadways
- Number of joint meetings held between the Town's appointed and elected officials
- Number of 'Adopt a Spot' spaces adopted along trails
- Miles of paddle trails completed in Flower Mound and connecting to other cities on Grapevine Lake

GOAL 6: FUNDING

Pursue a variety of funding sources for trails and bikeway development.

OBJECTIVES:

- **6.1:** Apply for grant funding to implement trail and bikeway projects.
- **6.2:** Continue to work with developers to ensure trails and bikeways are included with new development.
- **6.3:** Coordinate with user and volunteer groups to help fund improvements to trails and bikeways.

INITIATIVES:

- **Policy:** Utilize the prioritization criteria developed for this master plan to prioritize future CIP projects for trails and bikeways.
- **Policy:** Utilize 4B Sales Tax funds for trail infrastructure projects.
- **Project:** Submit applications for Transportation Alternative, Safe Routes to School, and Texas Parks and Wildlife funding where applicable.
- **Project:** Explore the opportunity for crowd sourcing for funding trails and bikeways development.

METRICS:

- Amount of grant funding received for trail and bikeway implementation
- Percent of Town's budget dedicated to trail and bikeway implementation

PLAN ADMINISTRATION

IMPLEMENTATION ROLES

There are various public and private entities that will have roles in the implementation and maintenance of the Trails and Bikeways Master Plan.

TOWN OF FLOWER MOUND IMPLEMENTATION ROLES

- The **Parks and Recreation Department** will incorporate trails into park facilities, maintain the trail infrastructure, and track the progress of the plan.
- The **Transportation Services Department** will prioritize bicycle facilities in the design and implementation of roadway construction projects and coordinate thoroughfare plan updates consistent with this plan.
- The **Planning Department** will continue to coordinate the construction of trails identified within the plan with new development projects and provide updates to the land development code and subdivision regulations.
- **Elected and Appointed Officials** are responsible for supporting the plan and determining funding eligibility for projects.

OTHER PUBLIC ENTITY IMPLEMENTATION ROLES

- **TxDOT** will coordinate the construction of trails and bikeways in construction or improvement projects, provide facility types which are consistent with the plan, and support bikeway designation efforts.
- **Denton County** will partner with the Town to identify and develop the bicycle and pedestrian network.
- **Utility Companies** will continue to support the development of off-street trails within utility easements given appropriate design measures for the trails are followed.

PRIVATE ENTITY ROLES

- **Developers** will be responsible for the construction of trails and bikeways within development projects consistent with this plan to enhance connectivity and user experience for the overall network.
- **Foundations/Non-Profits** will continue to support the construction, maintenance, and implementation of trails and bikeways.
- **Homeowners Associations** will continue to maintain trails within their neighborhoods and support the implementation of the plan.

FUNDING OPPORTUNITIES

There are a variety of funding opportunities to implement the vision of this plan. This section outlines typical funding opportunities at local, state, and federal levels but does not represent a comprehensive list of funding sources.

TOWN OF FLOWER MOUND FUNDING SOURCES

- The **General Fund** is used for smaller repair and replacement efforts and routine maintenance for existing parks and facilities. It also funds the administration and services provided by the Town of Flower Mound. The general fund provides funds for routine pavement and sidewalk maintenance.
- The **Special Revenue Fund** are funds from special revenue sources to support the development of new facilities. In Flower Mound, these include:
  - Park Development Fund
  - Street Maintenance Tax
  - 4B Parks Sales Tax funding
- **Capital Improvement Program (CIP)** expenditures provide funding for significant public improvements, such as the construction of new parks, replacement of park equipment, new trail construction, and street construction and maintenance projects which can include on and off-street bicycle facilities.

DEVELOPMENT FUNDING MECHANISMS

- The Town requires new development to install trails within the development and along rights-of-way where the trail network is defined. Developer funding can greatly reduce the burden on the Town's funding sources for the construction of trails. It can genearlly be assumed that the trails within undeveloped parcels of land, and those fronting undevelopment parcels will be developer funded.

REGIONAL FUNDING SOURCES

The North Central Texas Council of Governments (NCTCOG) appropriates funds for transportation improvement projects from the Federal Government and TxDOT. NCTCOG then administers the funds to local jurisdictions for the construction of projects which improve mobility and air quality throughout the region. **They administer the following funds:**

- **The Transportation Alternatives Program (TAP)** are funds for the construction of on- and off-road bicycle and pedestrian facilities, shared-use paths, similar bicycle and pedestrian safety measures, and Safe Routes to School (SRTS) projects. These projects focus on interconnectivity within communities, to destinations such as schools and employment centers, and connections to the region.
- **Transportation Improvement Program (TIP)** is a short-term planning document for various transportation related projects in the DFW region. This plan is updated every two years and is created in concert with TxDOT, local governments, and transportation authorities. The program implements projects identified in the Master Transportation Plan (MTP) through 2045.

STATE FUNDING SOURCES

- **Transportation Alternatives Set-Aside Program** are funds administered by TxDOT for bicycle and pedestrian infrastructure projects in communities with less than 200,000 people. These projects focus on interconnectivity within communities, to destinations such as schools and employment centers, and connections to the region.
- **National Recreational Trails Grants** are administered by the Texas Parks and Wildlife Division (TPWD) for the construction of new recreational trails, to improve existing trails, to develop trailheads and amenities, and to acquire land for trail construction. The reimbursable grants can be up to 80 percent of the project cost for non-motorized trail projects up to $300,000.
- **Outdoor Recreation Grants** provide 50 percent matching grant funds to cities, counties, Municipal Utility Districts (MUDs), and other special districts with a population less than 500,000 to acquire and develop parkland or to renovate existing public recreation areas. There are two funding cycles per year with a maximum award of $750,000. Projects must be completed within three years of approval. Application deadlines are October 1st of each year (the master plans submission deadline is 60 days prior to application deadline). Award notifications occur 6 months after deadlines.

FEDERAL FUNDING SOURCES

- **Rebuilding American Infrastructure with Sustainability and Equity (RAISE)** Discretionary Grants are available on a competitive basis for projects that will have a significant impact on local and regional travel. The Department of Transportation administers funding. Projects can include roadway, rail, and alternative transportation.
- **Congestion and Air Quality Improvement Program (CMAQ)** funds are for projects that help improve air quality. Bicycle and pedestrian facilities are eligible for these funds because they act as an alternative mode of transportation and reduce emissions from automobiles.
- **Surface Transportation Block Grant Program (STBG)** funds are for projects that address mobility needs for bicycle and pedestrian improvement projects. Federal funds are allocated to TxDOT to distribute. TxDOT works with MPO's to administer the funds for eligible and prioritized projects.

CONCLUSION

The Flower Mound Trails and Bikeways Master Plan is a community-driven vision for creating a comprehensive and diverse network of trails and bikeways. When the recommendations from this plan are implemented, the Town will have a safe, well-connected, and accessible trails and bikeways network for users of all ages and abilities.

The Town strives to provide healthy transportation and recreation options for its residents. The diverse trail system will be one of the most unique in the DFW region and provide residents with access to parks, schools, diverse transportation options, and destinations.

HERTIAGE PARK

Appendix A: Glossary of Terms
Appendix B: Commonly Used Signage
Appendix C: Detailed Community Input
Appendix D: Trail Corridor Feasibility Assessments
Appendix E: Detailed Maps

07 APPENDIX

PINK EVENING PRIMROSE TRAIL

APPENDIX A - GLOSSARY OF TERMS

Bicycle: Every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices. The term “bicycle” in this planning process also includes three and four-wheeled human-powered vehicles, but not tricycles for children.

Bicycle Accommodations/Facilities: A general term denoting a variety of improvements and provisions that are made by public agencies to accommodate or encourage bicycling, including bike lanes, sharedOuse pathways, signed bike routes, and bicycle parking and storage facilities.

Bicycle Boulevard: A roadway designated for the mix of bicycle and motor vehicle traffic, which creates a comfortable shared-use environment through a combination of traffic calming measures, pavement markings, and signage.

Bike Lane: A portion of a roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists.

Bikeway: A generic term for any road, street, path, trail, or way that, in some manner, is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Buffer: The portion of the a highway, road or street between the curb-face or edge of the pavement and the sidewalk that provides a spatial buffer between vehicular traffic and pedestrians on sidewalks. Buffers often include landscape plantings such as grass, trees or shrubs, or utility poles, and may also be referred to as the “planting strip,” “landscape buffer,” “tree buffer,” or “tree box.” Buffers can also include barriers such as highway guide rails (guardrails) or bollards. In rural or suburban areas the buffer may be a grassy swale or drainage ditch. In urban areas, downtowns, the buffer may also include street furniture, street signs, fire hydrants, vending boxes, lighting poles, etc.

Cross-Slope: Defined as the slope measured perpendicular to the direction of travel. Cross-slope must be measured at specific points. The average cross-slope is the average of cross-slopes measures at regular intervals along the trail. Running crossslope is defined as the average cross-slope of a contiguous section of trail. The running cross-slope can be determined by taking periodic measurements throughout a section of trail and then averaging the values.

Crosswalk: The horizontal portion of roadways, usually at intersections, reserved for pedestrian crossing; it may be marked or unmarked. Three marking patterns using white striping are most common: 1) Double parallel lines, 2) “zebra Stripes:” white cross hatches perpendicular to the pedestrian direction of travel, or 3) “Ladder:” perpendicular white cross hatches combined with double parallel lines on the outside edges.

Enhanced Sidewalks: These are sidewalks that are wider than the standard sidewalk at 8’ wide. This facility specifically serves pedestrians connecting to
key destinations and allowing for bi-directional foot traffic.

Intersection Treatment: The design of intersections to reduce conflict between pedestrians, cyclists, and motorists that occurs at roadway and trail intersections. The purpose of these treatments is to Increase awareness for all users, achieved through the implementation of visual or physical indicators such as specialized signals, changes in pavement material, pavement markings, and the addition of refuge medians on wide roadways.

Major Thoroughfares: Roadways designated for large traffic volumes, higher speeds, and intended for long-distance travel. Typically, this type of thoroughfare creates interjurisdictional connections and is part of a regional roadway network.

Mid-Block Crossing: Pedestrian or bicyclist crossings located in between signalized intersections. Midblock crossings have marked crosswalks on the pavement and may also include a pedestrian signal. These crossings can offer a more convenient option for crossing roadways, especially ones with long distances in between intersections.

Minor Thoroughfares: Roadways with lower traffic volumes, slower speeds, and intended for local travel needs. Typically, these thoroughfares creates key cross-town connections and connects to major thoroughfares.

Pedestrian: A person walking or traveling by means of a wheelchair, electric scooter, crutches, or other walking devices or mobility aids. Use of the term pedestrian is meant to include all disabled individuals regardless of which equipment they may use to assist their self-directed locomotion (unless they are using a bicycle). It also includes runner, joggers, those pulling or pushing strollers, carriages,
carts and wagons, and those walking bicycles.

Pedestrian Activated Signal: A traffic control device used to indicate the presence of a pedestrian to allow for a safe crossing away from a signalized intersection. Once the signal is activated, flashing lights appear to signal their presence and vehicles are required to stop.

Rest Area: Defined as level portions of a trail wide enough to provide wheelchair users and others a place to rest and gain relief from prevailing grade and cross-slope demands. Users can benefit from
rest stops on steep or very exposed trails to pause from their exertions and enjoy the environment. Rest areas are most effective when placed at intermediate points, scenic lookouts, or near trail amenities. Rest areas located of the trail allow stopped trail users to
move out of the way of continuing traffic. The most inviting rest areas have a bench, shade, a place to rest bicycles, and a trash receptacle.

Sidepaths: This type of multi-use trail provides connections for pedestrians and bicyclists, and are typically located adjacent to roadways. They should provide wide spaces that are comfortable for users, when on the primary system and there is right-of-way available they should be 12', other trails can be 10'.

Shared-Use Lane: A roadway that is open to both bicycle and motor vehicle travel. Unless bicycle travel is explicitly prohibited, all highways, roads, and streets are “share lanes.” Some shared lands may have wide curb lanes or paved shoulders, to increase comfort for bicyclists; however in most cases these roads do not have sufficient width to accommodated a designated bike lane.

Shared-Use Path: A bicycle and pedestrian path separated from motorized vehicular traffic by an open space barrier or curb, also called a **multi-use trail**. Shared-use paths may be within the highway right-of-way (often termed “sidepaths”) or within an independent right-of-way, such as on an abandoned railroad bed or along a stream valley park. Shared use paths typically accommodate two-way travel and are open to pedestrians, in-line skaters, wheelchair users, joggers and other non-motorized path users. They are typically surfaced in asphalt or concrete, but may have hard-packed/all weather gravel or dirt surfaces as well.

Sharrow: A pavement marking with two inverted ‘V’ shapes above a bicycle indicating that the entire lane is meant to be shared by motor vehicles and bicyclists. Often times sharrows will be accompanied by a “Bicycle May Use Full Lane” sign.

Shoulder: Any pavement of a roadway to the right of the right-most travel lane, but not including curbs, planting buffers, and sidewalks. Shoulders can have variety of surface treatments including pavement, gravel, or grass. Depending on their width and surface, they serve a variety of purposes, including providing space for vehicles to slow and turn right, accommodation of stopped of brokendown vehicles, to allow emergency vehicles to pass, for structural support of the roadbed, or for bicycle and pedestrian travel

Sidewalk: That portion of a highway, road or street specifically constructed for the use of pedestrians on the outside edge of the vehicular travel way. Sidewalks are typically, but not always, curbseparated from the roadway and made of concrete, brick, asphalt or another hard surface material.

Primary Trail: These multi-use trail facilities serve a variety of users and are typically 12’ or wider to accommodate high volumes of users. These trails are primary east/west and north/south routes throughout the Town that provide access to various locations and destinations.

Texas Accessibility Standards (TAS): Standards for developing ADA accessible public facilities in Texas The TAS are regulated by the Texas Department of Licensing and Regulations (TDLR).

Trail: The word “trail” has come to mean a wide variety of facilities types, including everything from a “marked or beaten path, as through woods or wilderness” to a paved “multi-use trail.” For this reason, this planning process will not use the word “trail” to reference a facility intended for bicycle transportation. We urge use of the term shareduse path in place of multi-use trail. Note: Several of these definitions are taken from the American Association of State Highway and Transportation Officials (AASHTO) “Guide for the Development of Bicycle Facilities,” 1999 Edition.

Trailhead: A trailhead is a place where a trail begins, generally they are maked by signage and include a variety of amenities for trail users, including parking, lighting, signage, benches, waste receptacles, bike racks, and similar amenities. Usually, they will be located within parks and major destinations. Trailheads can be located at equestrian trails, multi-use trails, or mutli purpose where multiple trail types intersect.

Veloweb: An expansive network of multi-use trails established by NCTCOG's Mobility 2045 plan. This off-street trail network has existing, funded, and planned routes throughout the DFW Metroplex and accommodates a variety of user groups including bicyclists, pedestrians, and other non-motorized modes of transportation. Routes are established through collaborative efforts between NCTCOG and local jurisdictions.

Wayfinding: Define wayfinding

APPENDIX B - COMMONLY USED SIGNAGE

R9-7

THE SHARED-USE PATH RESTRICTION

Location: Installed on facilities that are to be shared by pedestrians and bicyclists

R9-6

BICYCLE YIELD TO PEDESTRIAN

Location: At crosswalk
Size: 12” x 18” (min. for trails)

D4-3

BICYCLE PARKING AREA

Location: Installed where it is desirable to show the direction to a designated bicycle parking area. The arrow may be reversed as appropriate

D11-1

BIKE ROUTE

Location: At beginning of each route and at intersections
Size: 24” x 18” (min. for trails)

R9-5

USED PEDESTRIAN SIGNAL

Location: At crosswalk
Size: 12” x 18” (min. for trails)

R3-17

BIKE LANE

Location: Sign spacing should be determined by engineering judgment based on prevailing speed of bicycle and other traffic, block length, distances from adjacent intersections, and other considerations.

R3-17A

AHEAD

Location: Should be mounted directly below a R3-17 sign in advance of the beginning of a marked bicycle lane

M4-11, 12, 13, M7-1, 2, 3, 4, 5, 6, 7

BIKE ROUTE SUPPLEMENTAL PLAQUES

Location: Where bike lanes begin, end, or change direction
Size: 12"x4", 12"x9" (min. for trails)

R3-17B

ENDS

Location: Should be mounted directly below a R3-17 sign at the end of a marked bicycle lane

BIKE MAY USE FULL LANE

Location: Where shared use lanes begin and along the designated route

D1-1B, D3-1

DIRECTIONAL SIGNS

Location: At intersections where access to destinations are available
Size: 24"x6" (min. for trails)

R5-3

NO MOTOR VEHICLE

Location: Entrance to trail
Size: 24"x24" (min. for trails)

W16-1

SHARE THE ROAD

Location: Where there is a need to warn motorists to watch for bicyclists traveling along the highway

R1-1

STOP

Location: At trail intersections and crossings
Size: 18"x18" (min. for trails)

W11-1

BICYCLE WARNING

Location: Orientated toward motorists at trail crossing
Size: 18"x18" (min. for trails)

W11-2

PEDESTRIAN WARNING

Location: Orientated toward motorists at trail crossing
Size: 18"x18" (min. for trails)

W3-2

YIELD AHEAD

Location: Where yield sign visibility is obscured
Size: 18"x18" (min. for trails)

W3-3

SIGNAL AHEAD

Location: Where traffic signal visibility is obscured
Size: 18"x18" (min. for trails)

R1-2

YIELD

Location: At trail intersections and crossings
Size: 18"x18"x18" (min. for trails)

W3-1

STOP AHEAD

Location: Where stop sign visibility is obscured
Size: 18"x18" (min. for trails)

W2-1,2,3,4,5

TRAIL INTERSECTION WARNING

Location: At trail intersections where no stop or yield sign is required; locations with limited sight lines
Size: 18"x18" (min. for trails)

PLEASE STAY ON TRAIL

Location: In environmentally-sensitive areas of where the trail travels near wildlife and heavy vegetation
Size: 12" x 18" (minimum dimensions for trails)

W1-1,2,3,4,5

TURN & CURVE WARNING

Location: At turns and curves which exceed design speed criteria
Size: 18"x18" (min. for trails)

W11-15, W11-15B

TRAIL CROSSING SIGNAGE

Location: At mid-block or unsignalized, uncontrolled movement, trail crossing locations.
Size: 18"x18" (min. for trails), 18"x12"

R10-15

TURNING VEHICLES YIELD

Location: At intersections to remind drivers who are making turns to yield to pedestrians
Size: 30"x30"

TRAIL CLOSED: NO ENTRY UNTIL MADE ACCESSIBLE & SAFE FOR PUBLIC USE

Location: Where trail or access points are closed due to hazardous conditions or construction
Size : 18" x 18" (minimum dimensions for trails)

TRAIL REGULATIONS/RULES OF THE TRAIL

Location: Entrances to trail
Size : 18" x 18" (minimum dimensions for trails)

APPENDIX C - DETAILED COMMUNITY INPUT

MEETINGS AND ENGAGEMENT

Event	Date	Topic
Visioning		
Stakeholder Groups Visioning Sessions	May 4 and 5, 2021	Visioning
Technical Working Group #1	May 4, 2021	Visioning
Steering Committee #1,	May 4, 2021	Visioning
Public Open House #1 (in person and virtual)	May 5, 2021	Visioning
Public Survey #1	May - June 2021	Visioning
Virtual Enagement Room	May 2021	Visioning
Arts in the Park	May 8, 2021	Visioning
Music in the Park	May 14, 2021	Visioning
Parks Board Meeting	June 3, 2021	Visioning, engagement results
Mid-Point Briefings and Network Recommendations		
Steering Committee Meeting #2	August 25, 2021	Needs Assessment, Engagement Results, Prioritization Criteria
Technical Working Group #2	August 26, 2022	Needs Assessment, Engagement Results, Prioritization Criteria
Steering Committe #3	January 19, 2022	Recommended Network
Public Open House #2 and Parks Board Briefing	February 3, 2022	Recommended Network and Design Guidelines
Prioritization Work Sessions		
Parks Board and Transportation Comission Joint Work Session	April 7, 2022	Recommended Network, Design Guidlines, Prioritization
Town Council Work Session	April 21, 2022	Recommended Network and Design Guidelines
Planning and Zoning Commission Work Session	April 25, 2022	Recommended Network, Design Guidlines, Prioritization

Approval Meetings		
Parks Board Approval Meeting	June 2, 2022	Plan Approval
Transportation Commission Approval Meeting	June 14, 2022	Plan Approval
Planning and Zoning Commission Approval Meeting	June 27, 2022	Plan Approval
Town Council Approval Meeting	July 18, 2022	Plan Approval

Engagement Key Findings

Community Engagement

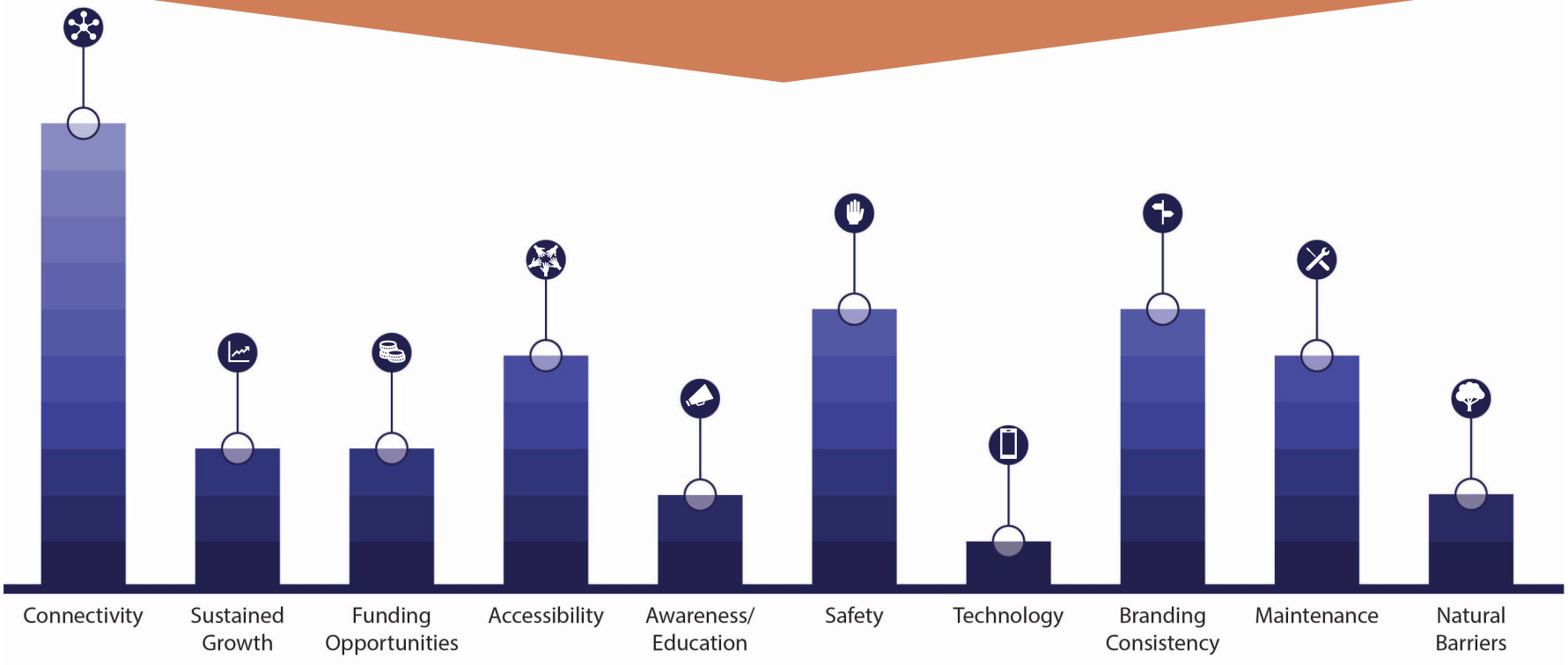
- Steering Committee
- Technical Working Group
- Stakeholder Listening Sessions
- Elected & Appointed Officials Briefings
- Public Open Houses
- Project Website www.flowermoundtrailsplan.com
- Community Input Survey
- Virtual Engagement Room

Engagement Results

Steering Committee, Technical Working Group, Stakeholder Listening Sessions

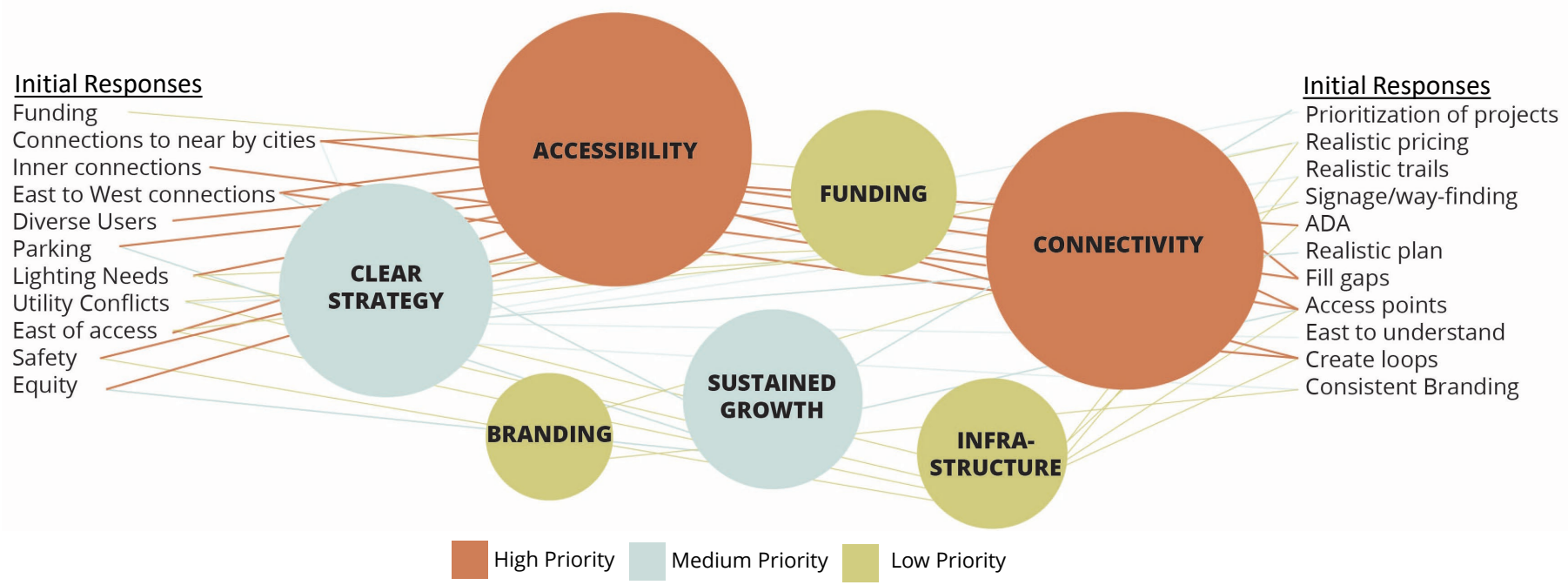
What is your vision for the future of trails and bikeways in Flower Mound?

What are some of the challenges related to trails and bikeways in Flower Mound today?



In your opinion, what is the most important action item that should result from this plan?

MAIN THEMES



Engagement Results

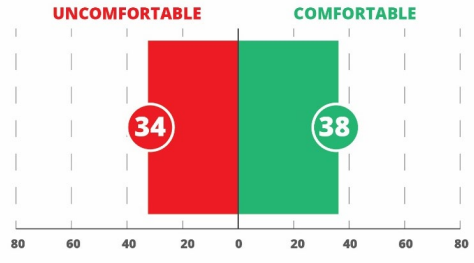
Public Open House & Virtual Open House

What one word would you use to describe Trails and Bikeways in Flower Mound Today?

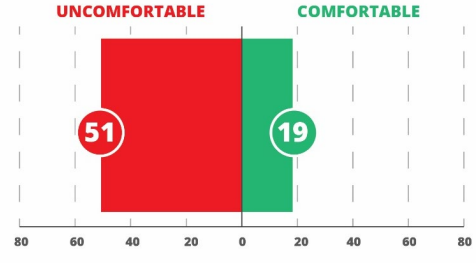
What one word would you use to describe how you envision Trails and Bikeways in Flower Mound in the Future?

What is your level of comfort with the following types of on-street bicycle facilities?

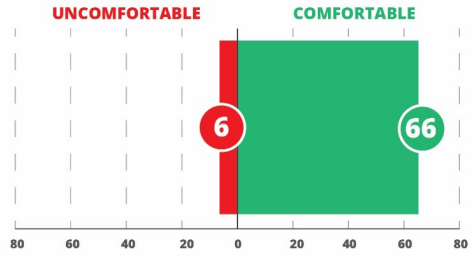
BIKE LANE



SHARED LANE

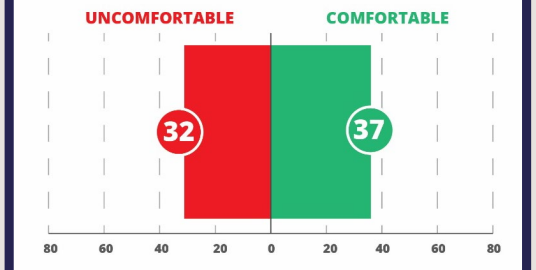


BUFFERED BIKE LANE



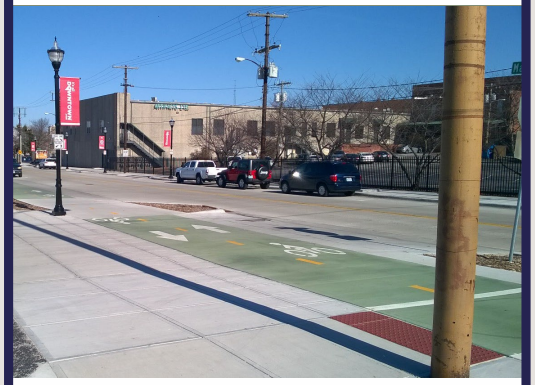
What is your level of comfort with the following types of on-street bicycle facilities?

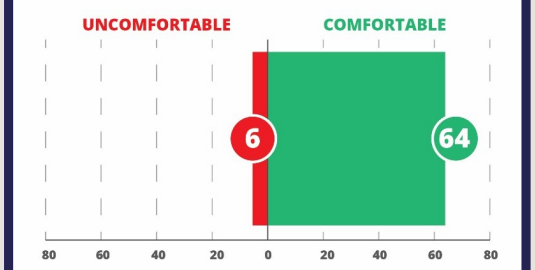
WIDE SHOULDER



BICYCLE BOULEVARD

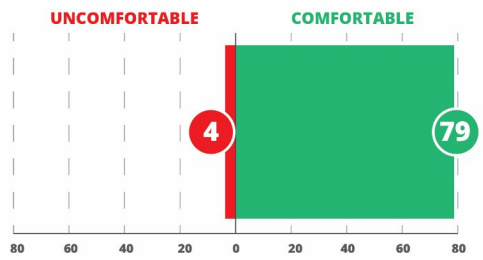
CYCLE TRACK



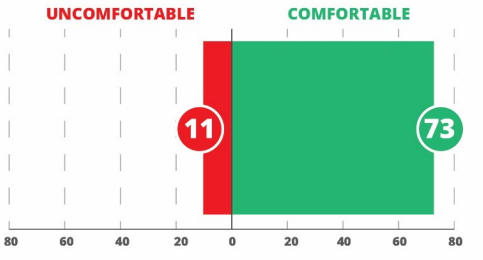


What is your level of comfort with the following types of off-street trails?

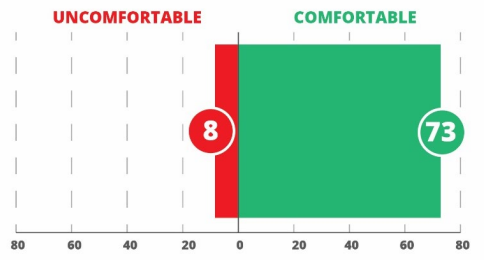
SHARED-USE PATH



SIDEPATH

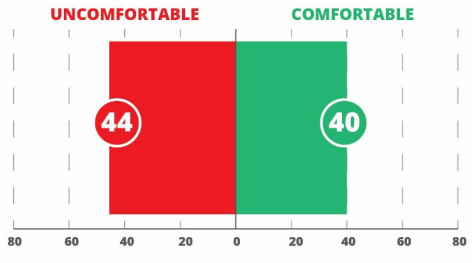


SHARED-USE PATH
(SOFT SURFACE)

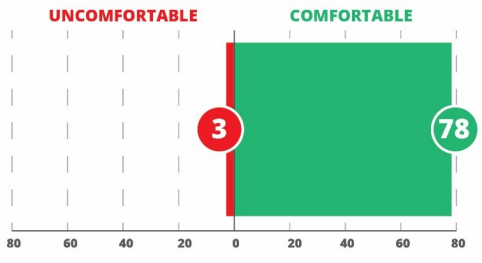


What is your level of comfort with the following types of off-street trails?

SIDEPATH



SHARED-USE PATH



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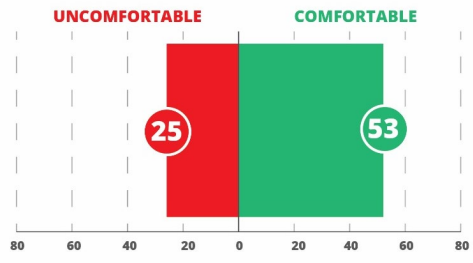
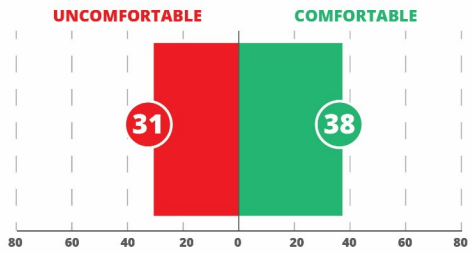


What is your level of comfort with the following types of Equestrian Paths?

EQUESTRIAN PATH

EQUESTRIAN SIDEPATH

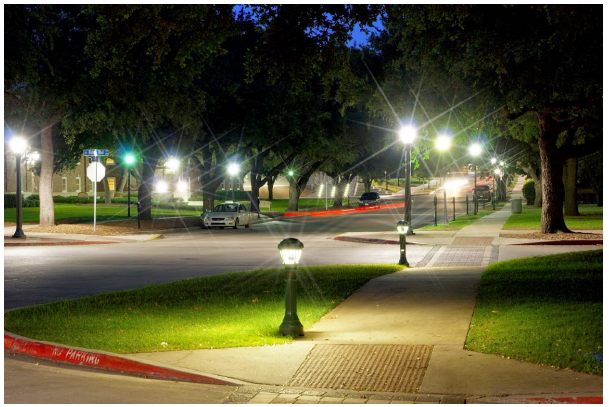


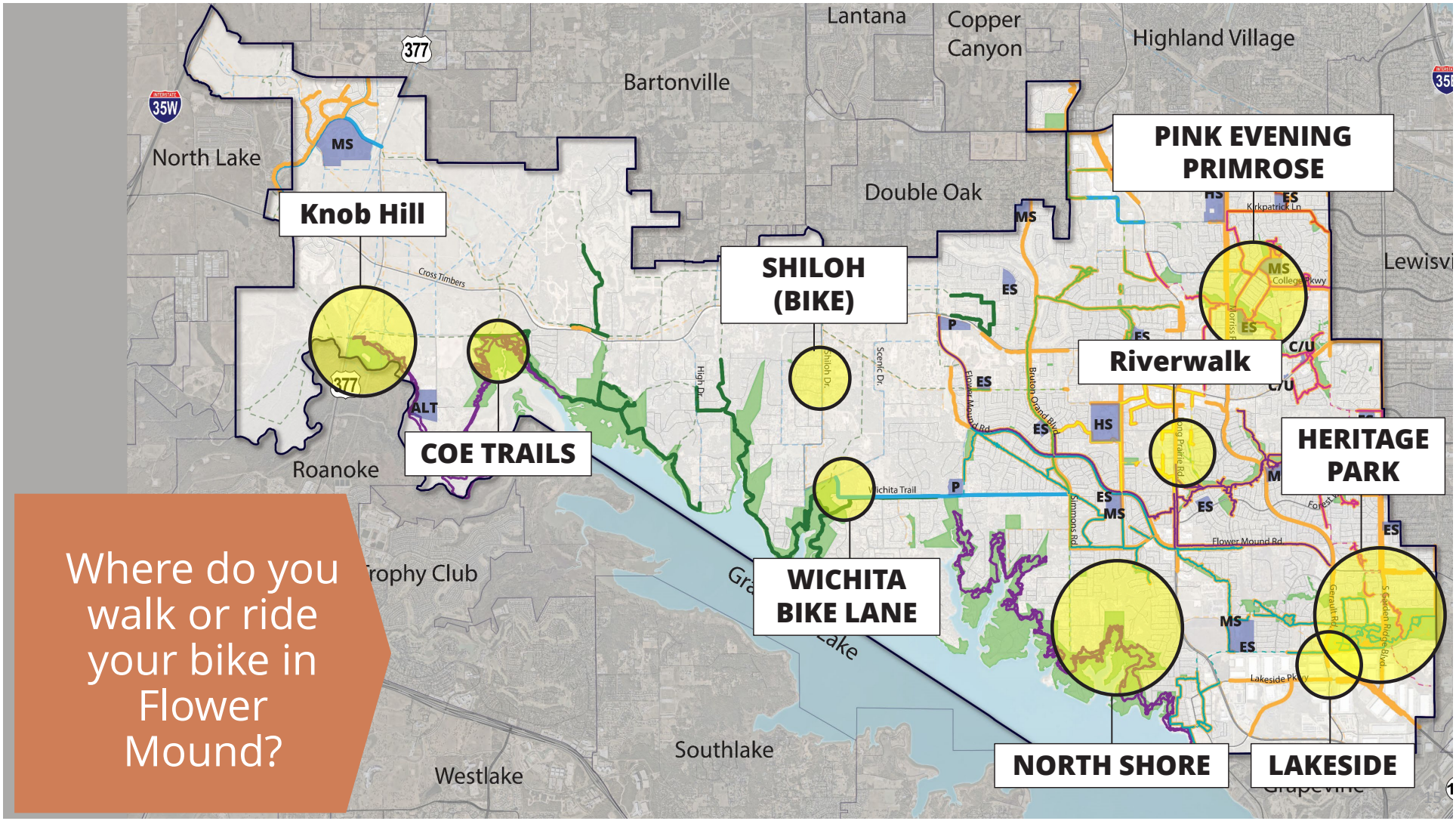
What are your top three preferred trail amenities that you would like to see along trails in Flower Mound?

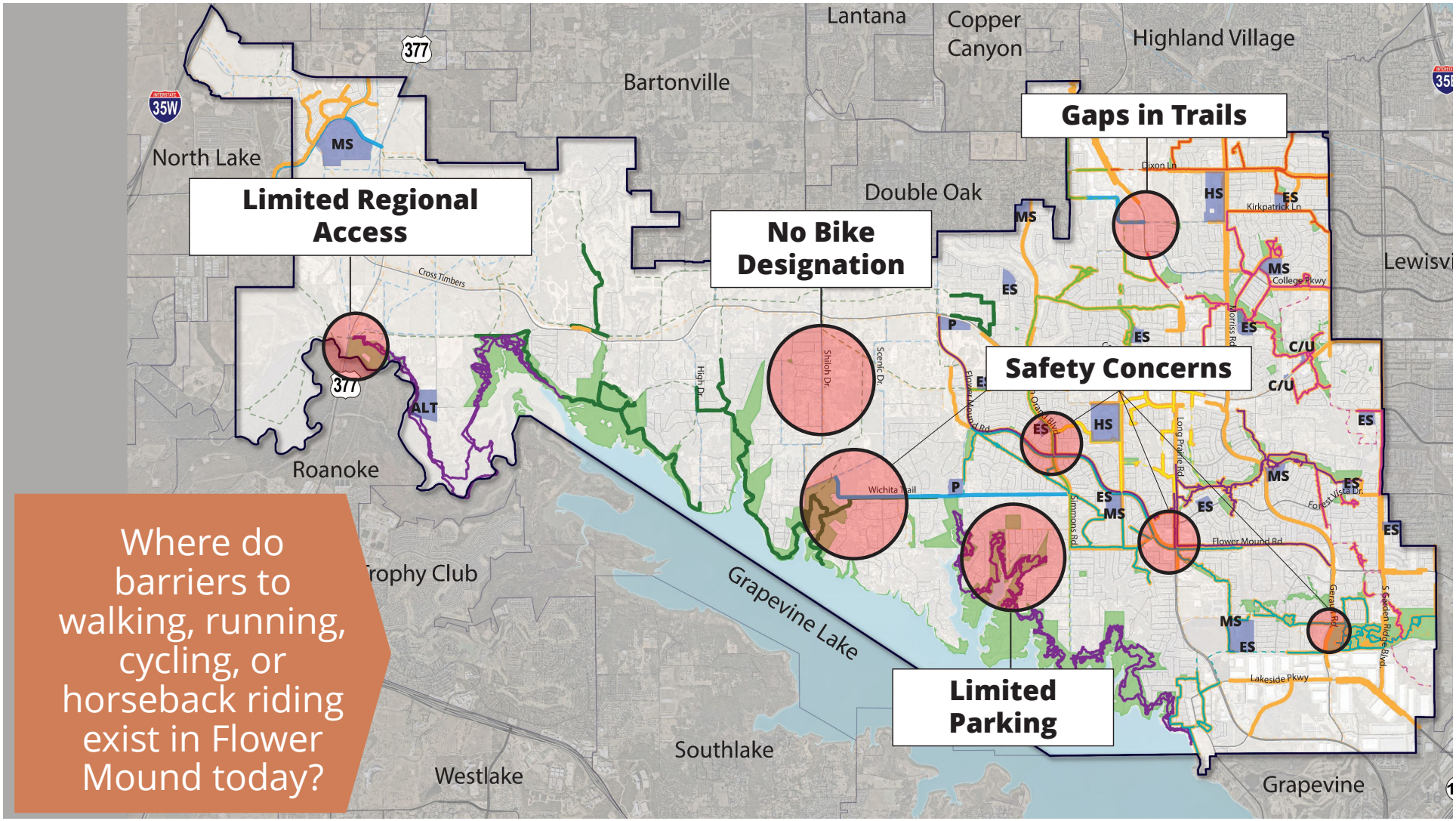
WAYFINDING SIGNAGE

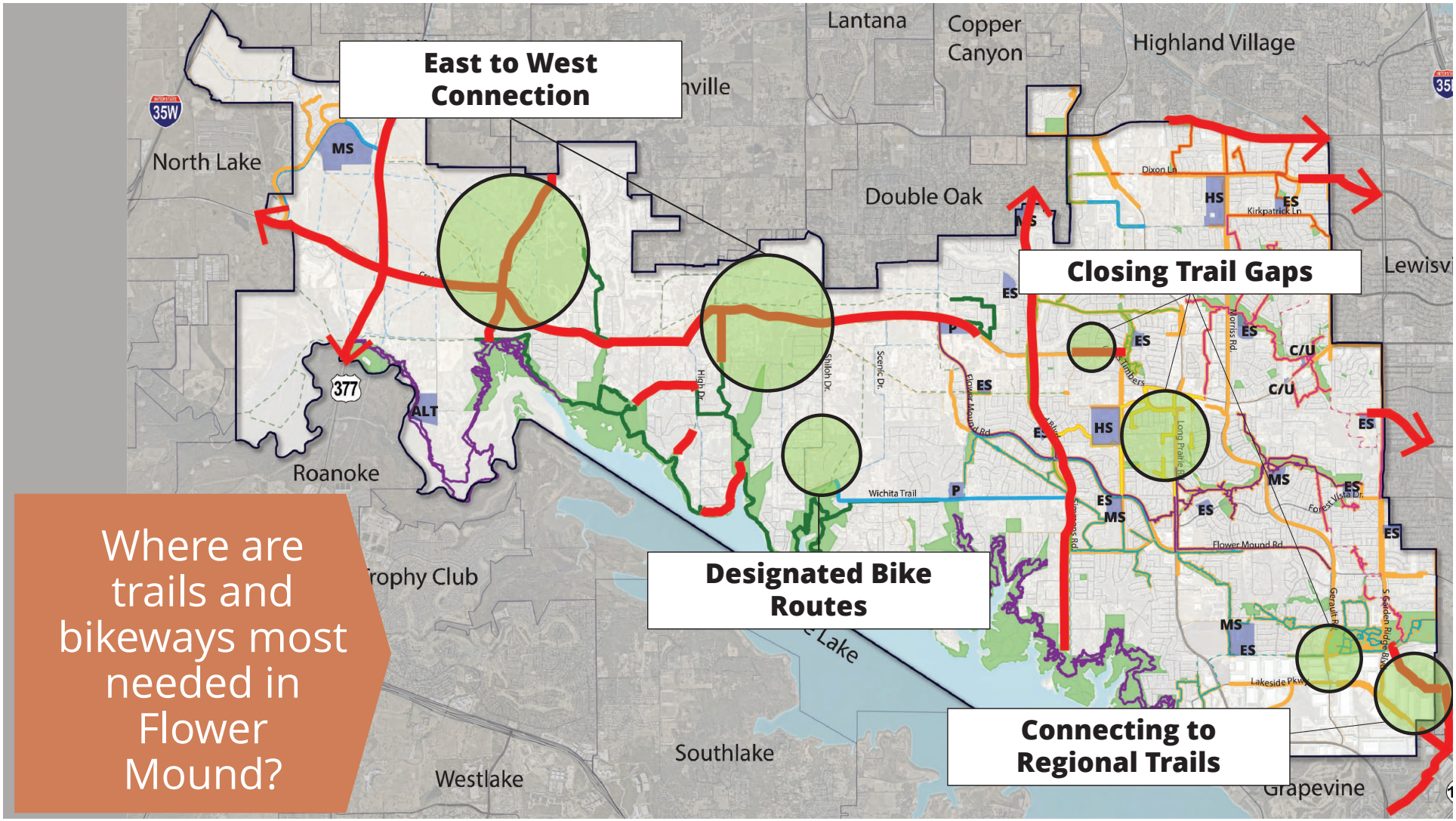
PARKING

LIGHTING

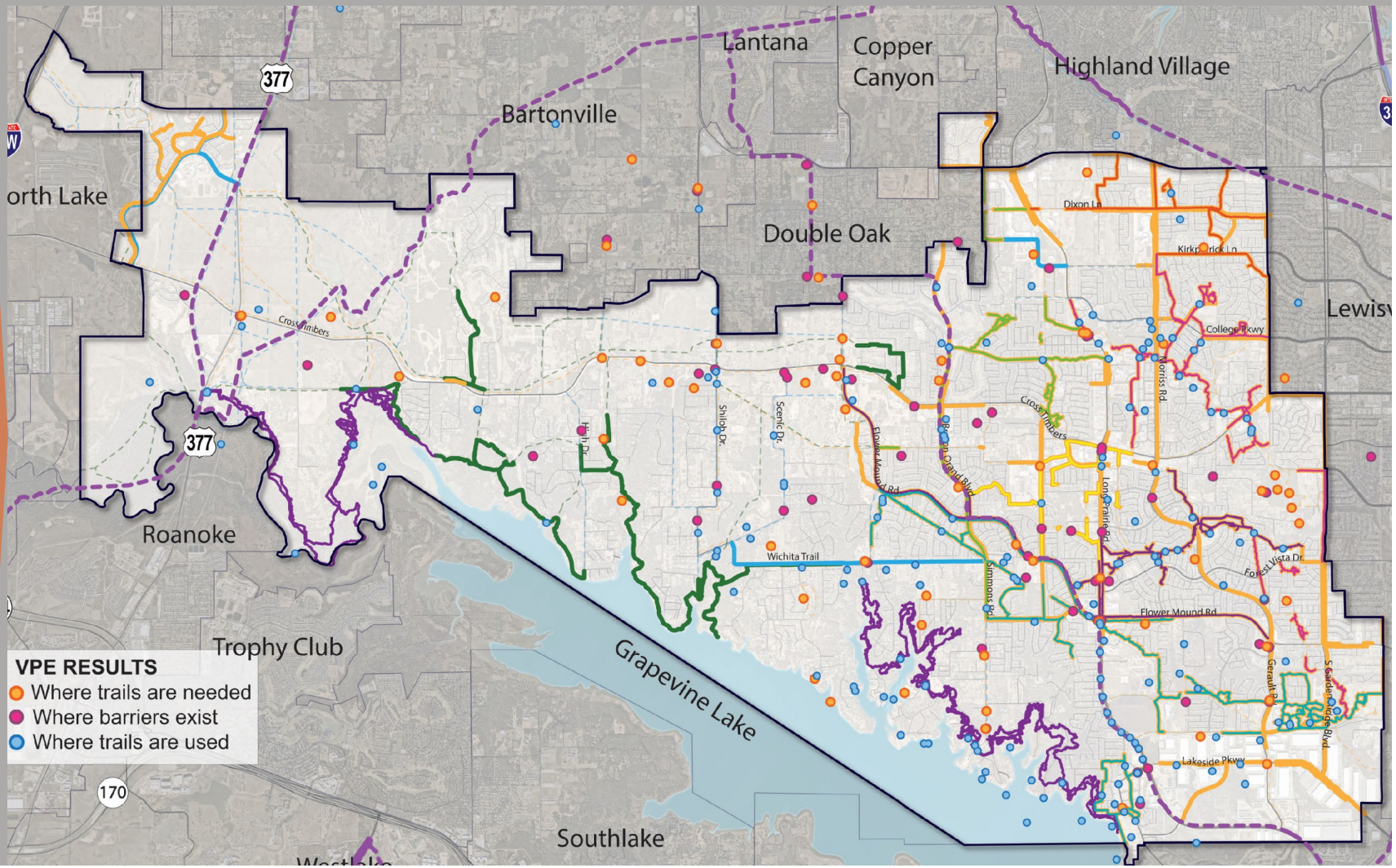



Where do you walk or ride your bike in Flower Mound?
Knob Hill
COE TRAILS
SHILOH (BIKE)
WICHITA BIKE LANE
PINK EVENING PRIMROSE
Riverwalk
HERITAGE PARK
NORTH SHORE
LAKESIDE
Lantana
Copper Canyon
Highland Village
Bartonville
North Lake
Double Oak
Roanoke
Trophy Club
Southlake
Westlake
Cross Timbers
Wichita Trail
Flower Mound Rd
Lakeside Pkwy
377
35W
ALT
MS
ES
HS
P
C/U


Lantana
Copper Canyon
Highland Village
Bartonville
North Lake
Double Oak
Roanoke
Trophy Club
Grapevine Lake
Southlake
Westlake
Grapevine
Lewisville
Limited Regional Access
No Bike Designation
Gaps in Trails
Safety Concerns
Limited Parking
Where do barriers to walking, running, cycling, or horseback riding exist in Flower Mound today?


East to West Connection
Closing Trail Gaps
Designated Bike Routes
Connecting to Regional Trails
Where are trails and bikeways most needed in Flower Mound?
Lantana
Copper Canyon
Highland Village
North Lake
Double Oak
Roanoke
Southlake
Westlake
Grapevine
Lewisv
Wichita Trail
Flower Mound Rd
Dixon Ln
Kirkpatrick Ln
Lakeside Pkwy
Forest Vista Dr
Long Prairie Rd
Morriss Rd
Shiloh Dr.
Scenic Dr.
High Dr.
Gerault Rd
S Garden Ridge Blvd
35W
377
ALT
MS
HS
ES
C/U
P

Virtual Public Open House Results

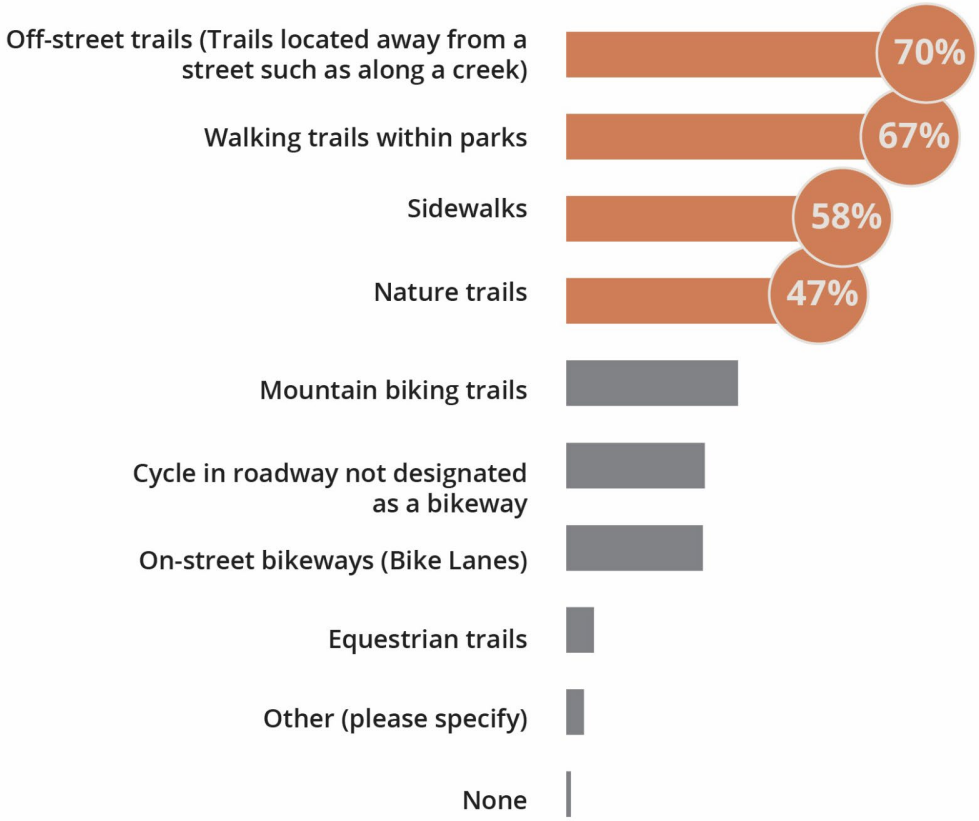


Engagement Results

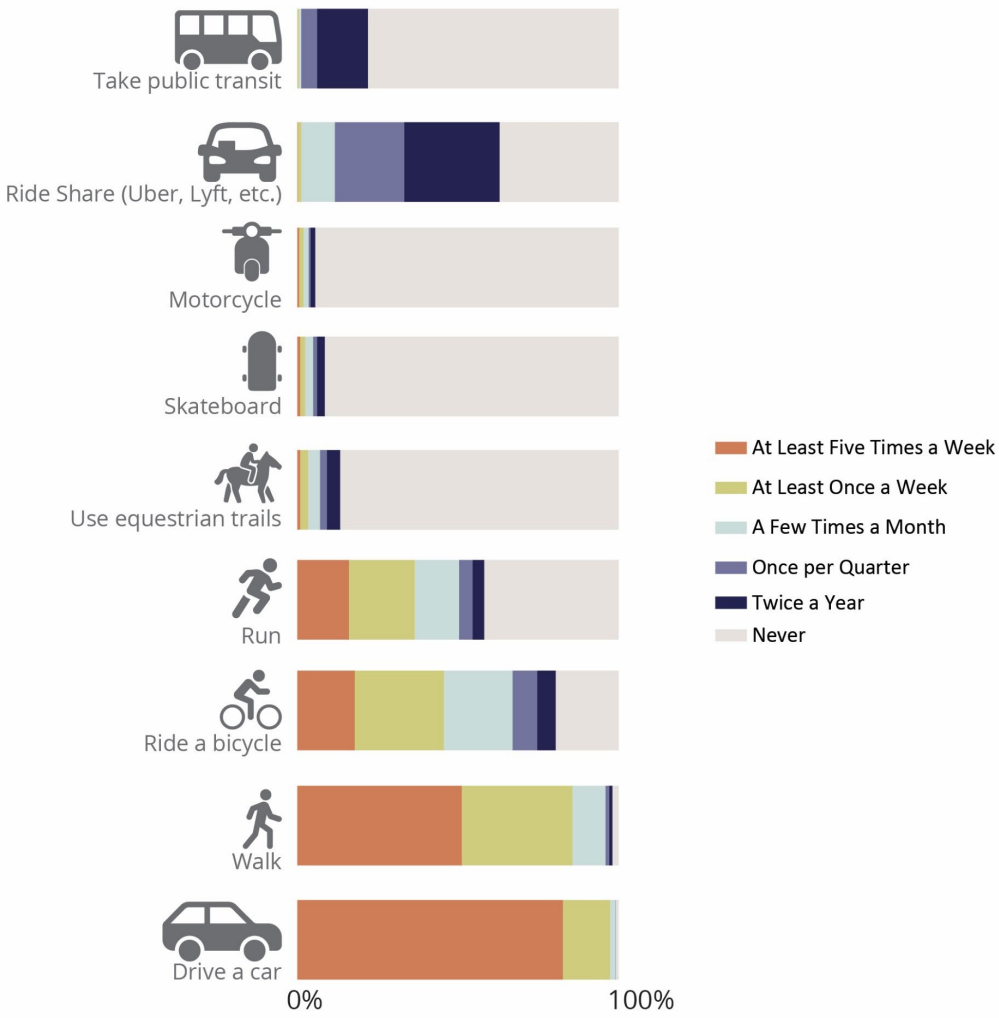
Online Community Survey

A total of 947 responses
Available from Early May to Mid June 2021

What type of trail or bikeway in Flower Mound do you generally use? (Select all that apply)



How often do you...



Please indicate to what extent you agree with the following statements.

81% Strongly agree or agree they would like to walk more than they do now.

I would like to walk more than I do now

78% Strongly agree or agree they would like to cycle more than they do now.

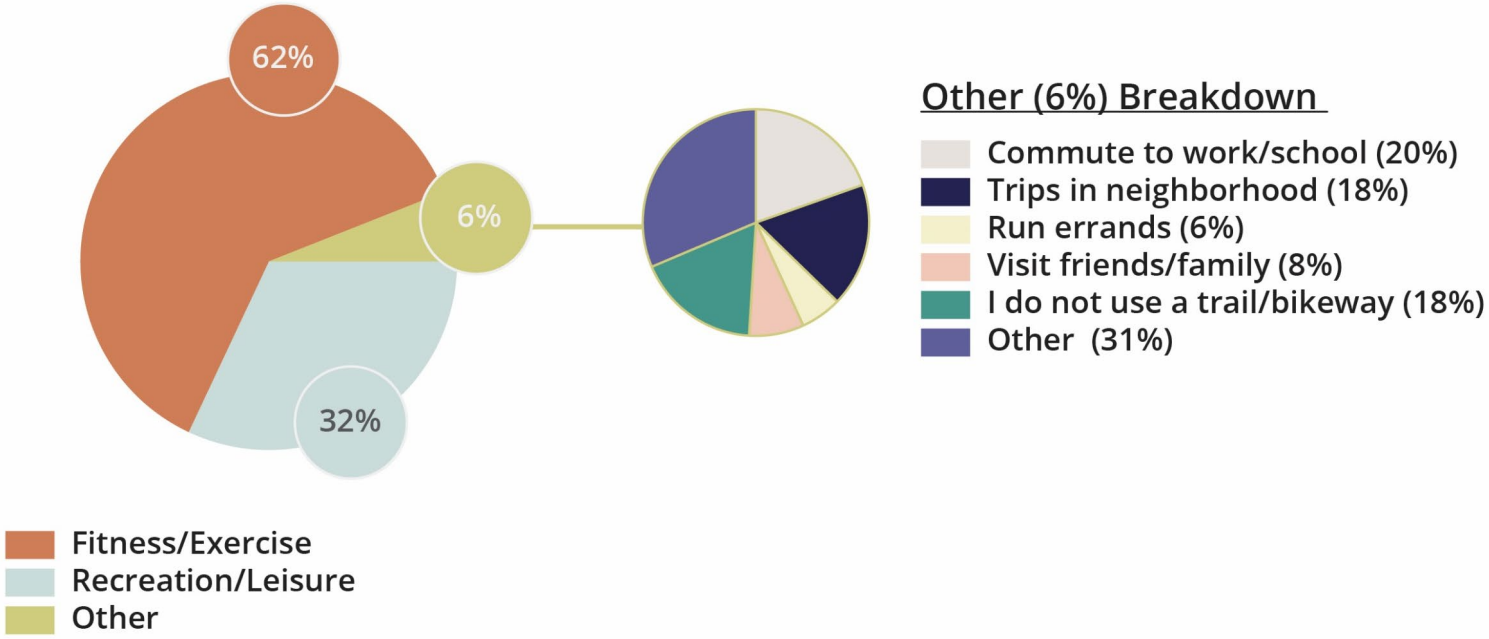
I would like to cycle more than I do now

I would like to rely on my car less

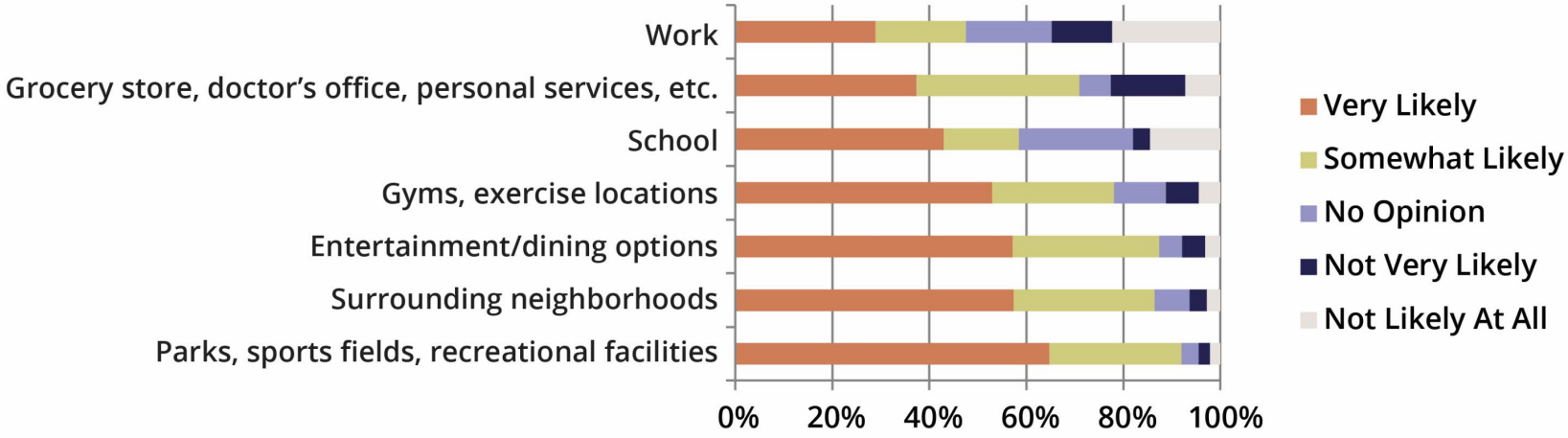
- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

65% Strongly agree or agree they would like to rely on their car less.

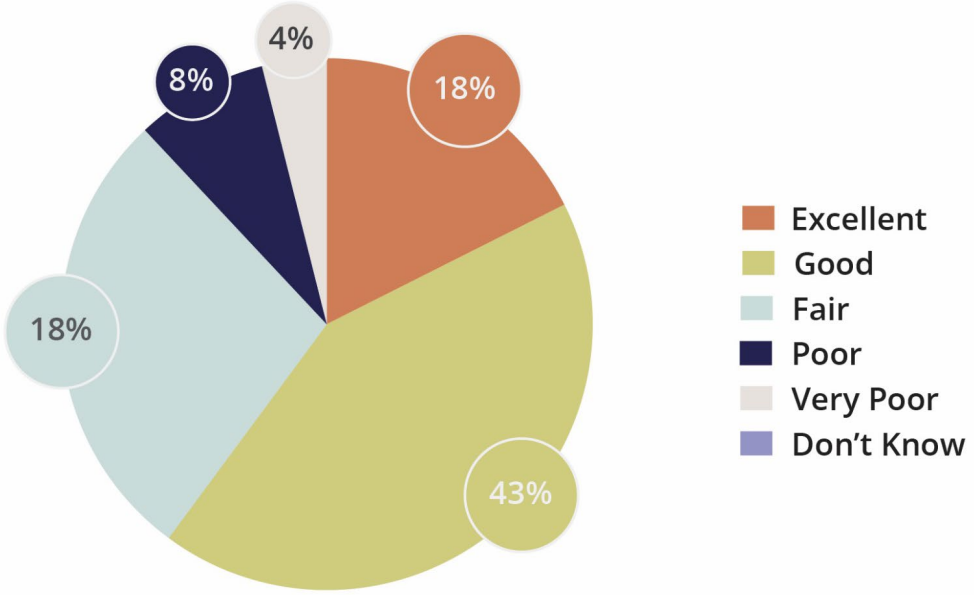
What is your primary purpose for using a trail or bikeway in Flower Mound?



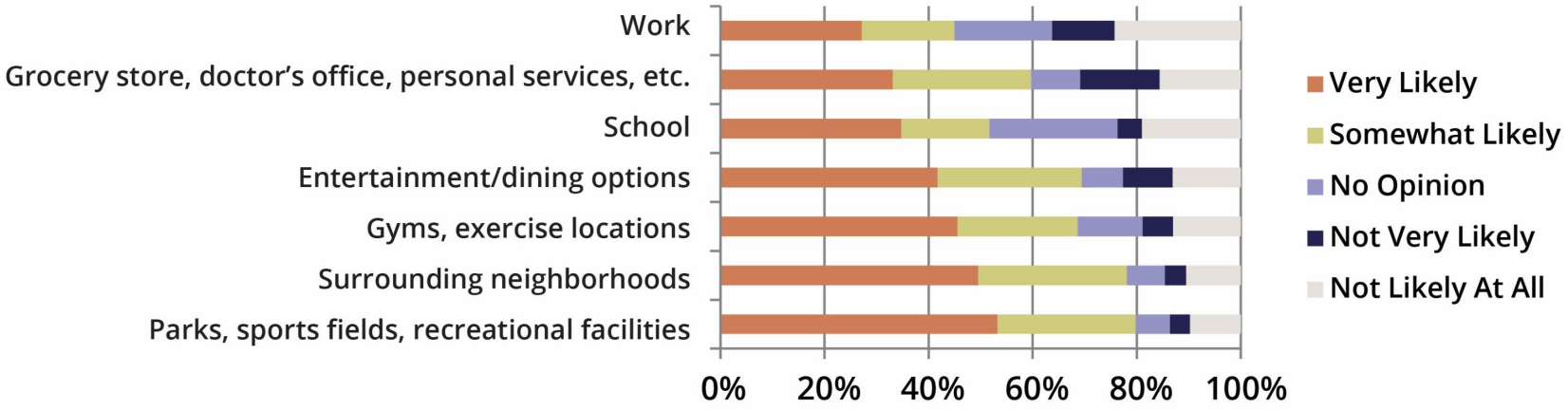
If sidewalks or trails connected your residence to the following destinations, what is the likelihood that you would **walk** to each for at least some of your trips?



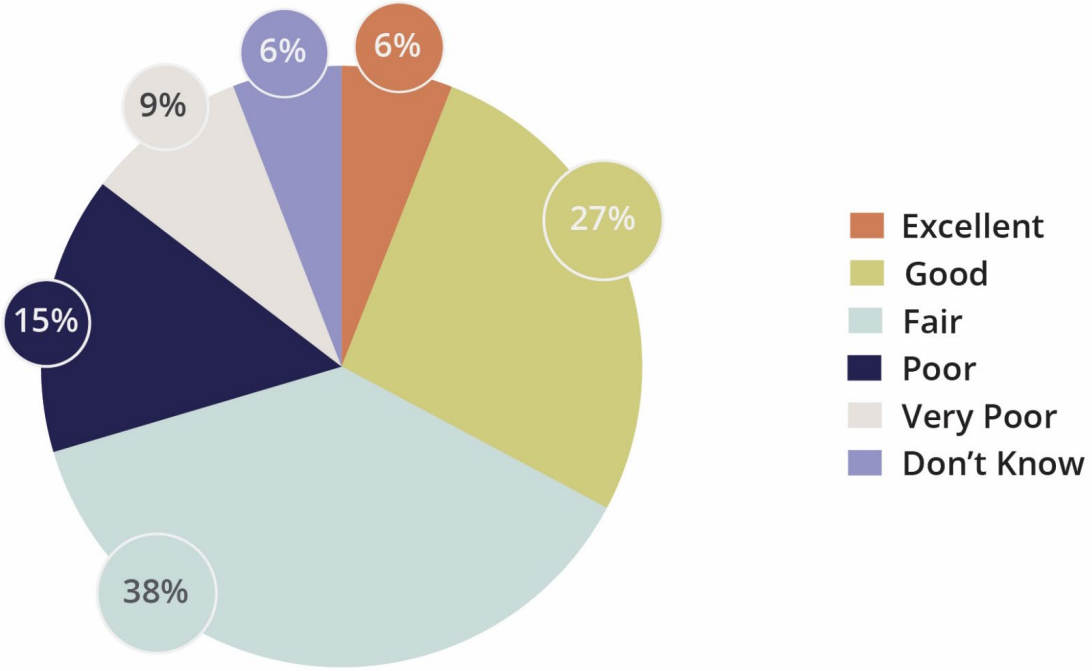
Overall, how would you rate where you live as a place to **walk**?



If on-street bike facilities or trails connected your residence to the following destinations, what is the likelihood that you would **cycle** to each for at least some of your trips?

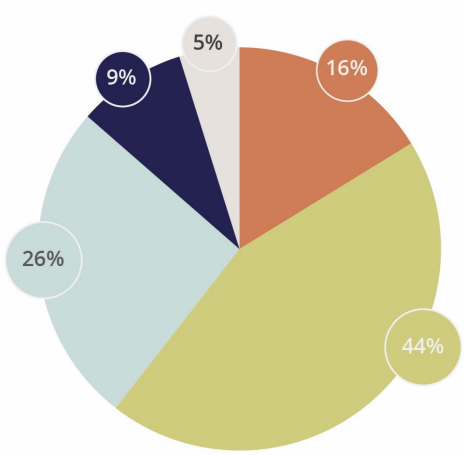


Overall, how would you rate where you live as a place to ride a **bicycle**?

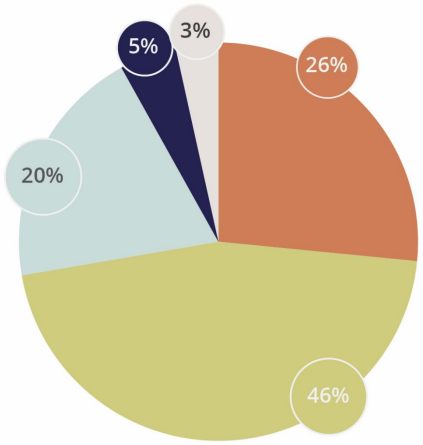


How often did you use trails or bikeways in Flower Mound...

PRE-COVID



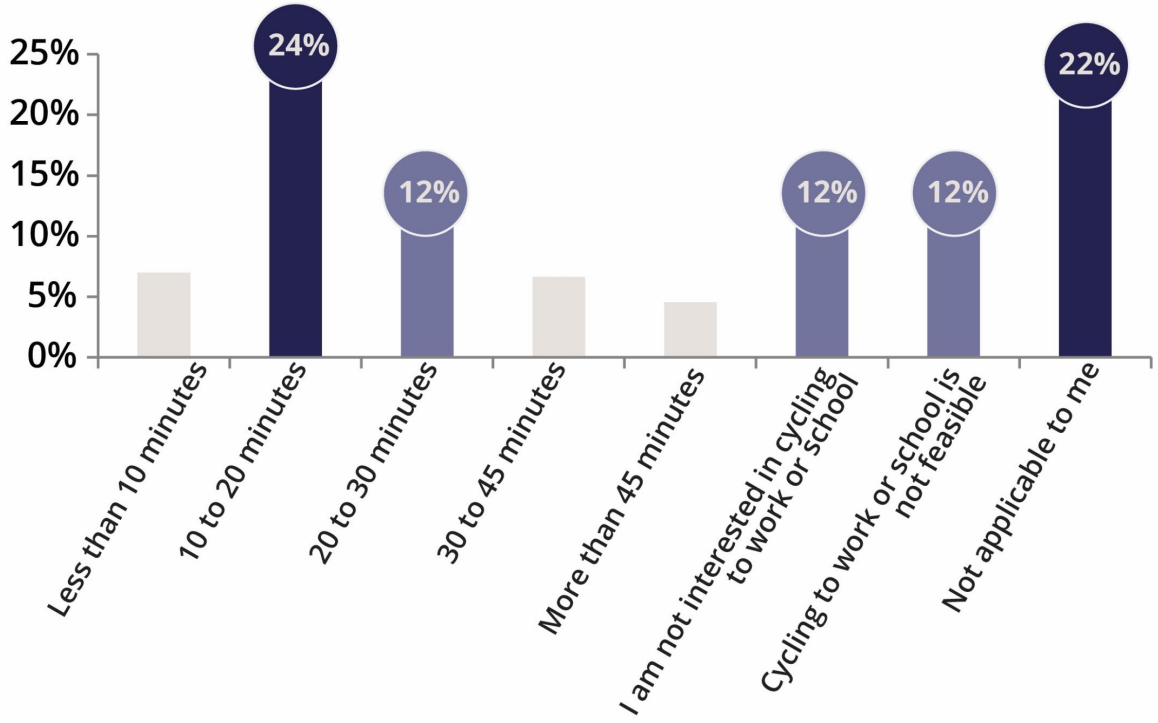
POST-COVID



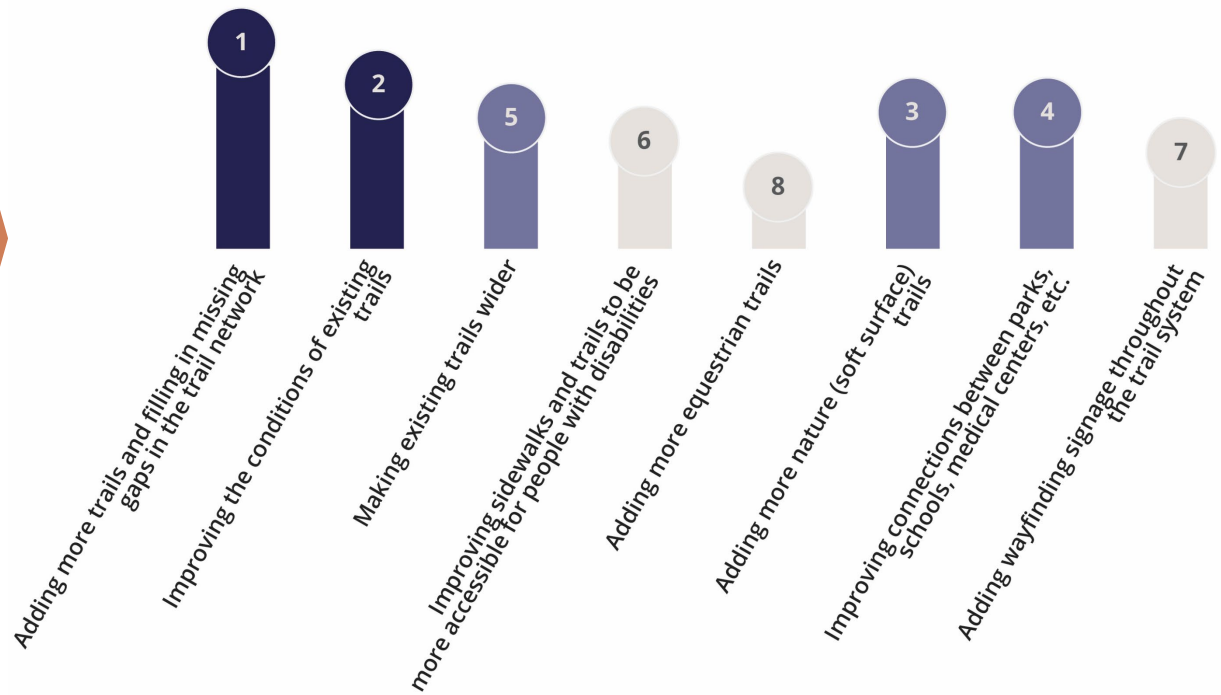
Daily | A few times a week | A few times a month | A few times a year | Never

Do any of the following prevent you from riding a bicycle more often than you currently do? (Select all that apply)

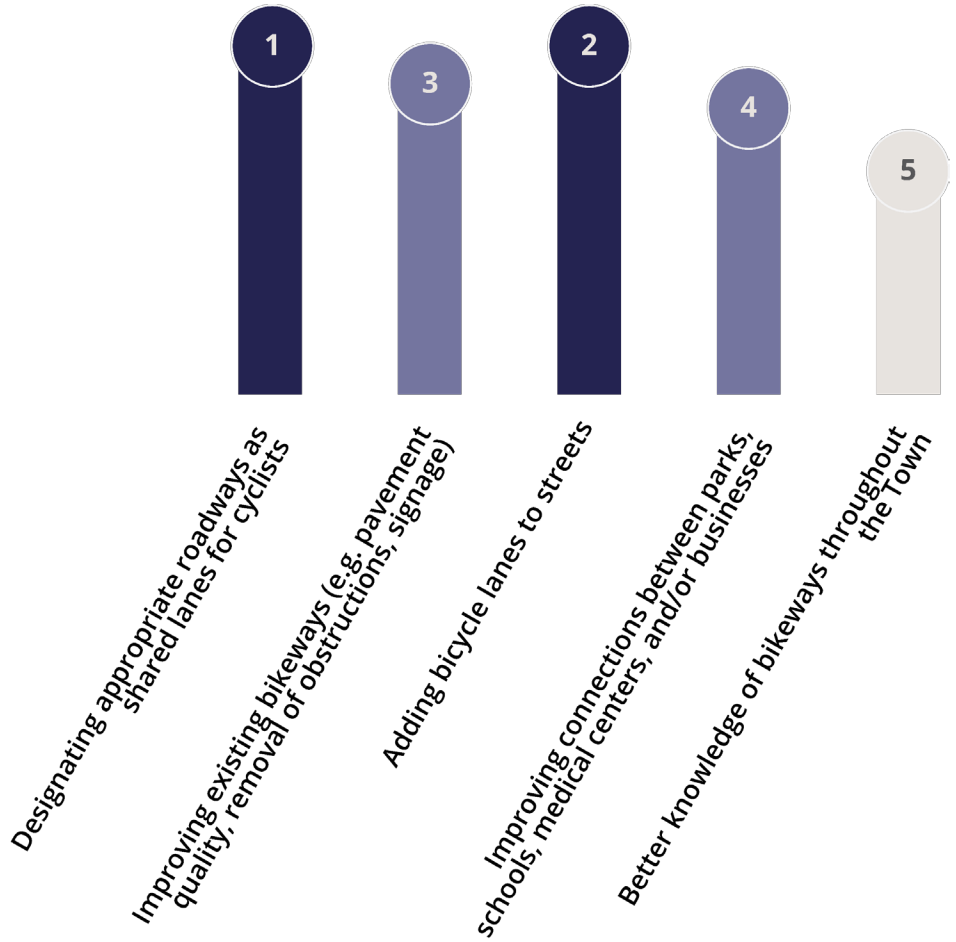
How much time would you be willing to spend cycling on your commute to work or school?



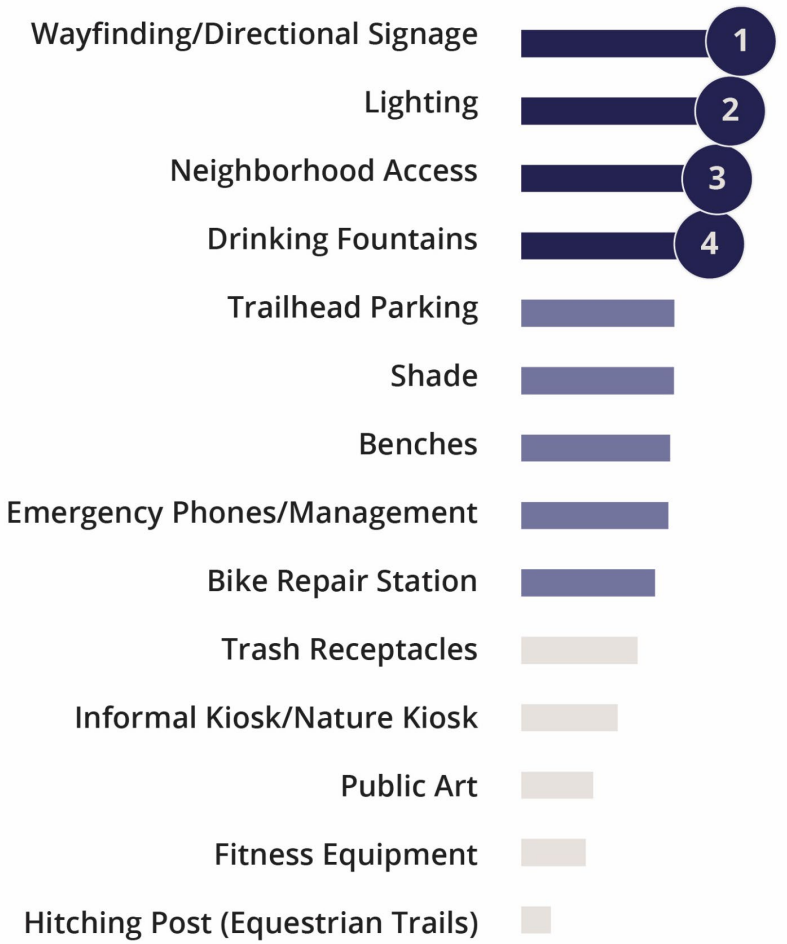
Please rank the following potential improvements to **trails** in Flower Mound. (1 is most important, 8 is least important).



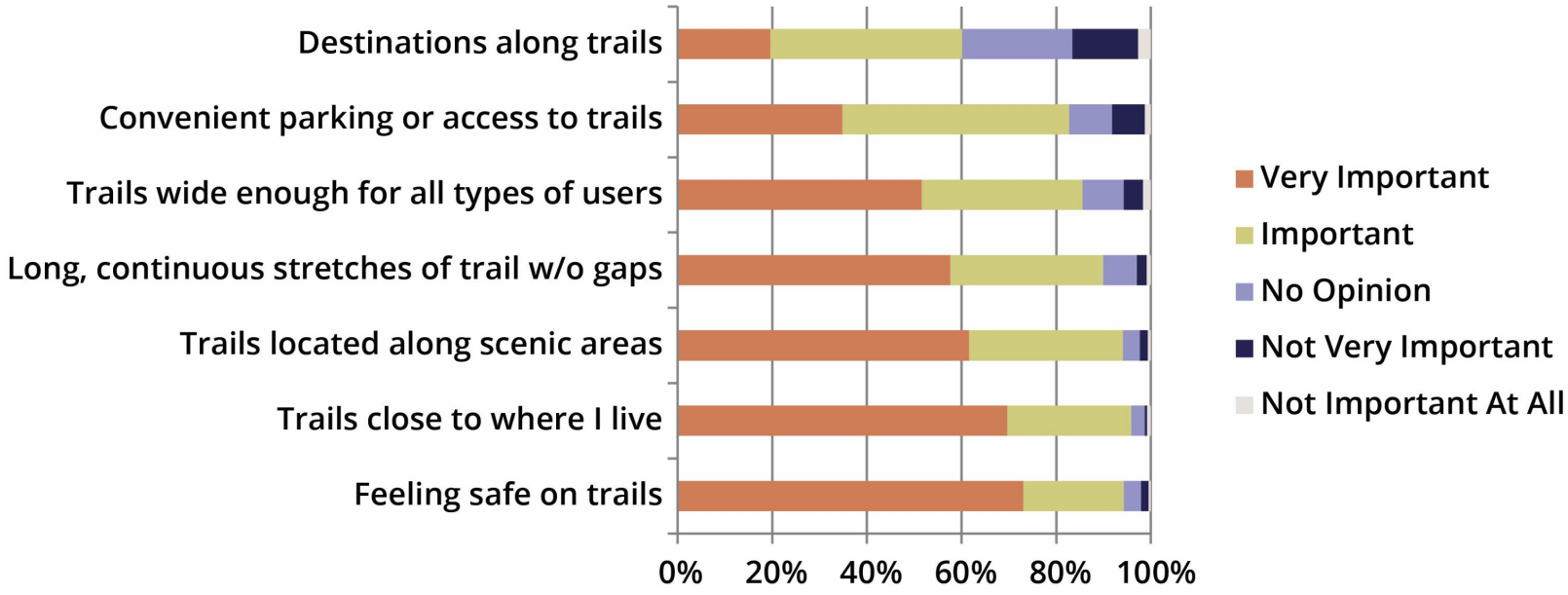
Please rank the following potential improvements to **bikeways** in Flower Mound. (1 is most important, 5 is least important).



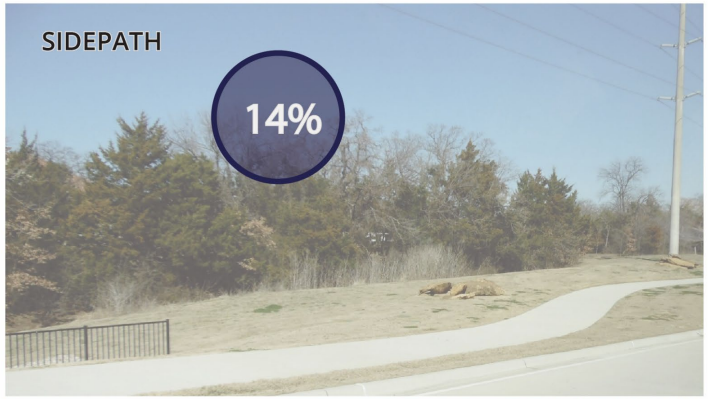
Trail amenity ranking (1 is most important)

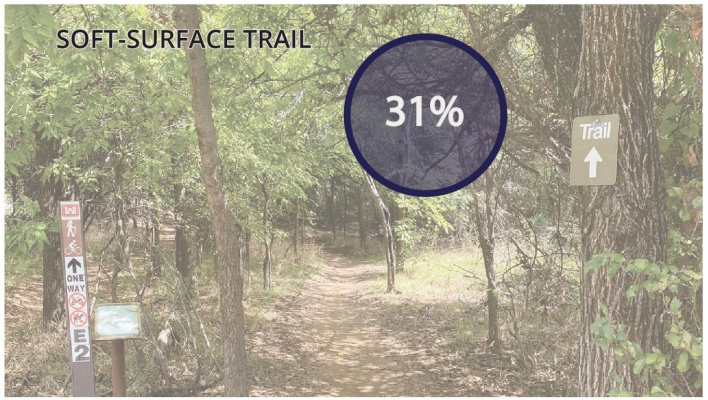


How important are each of the following features of trail facilities?

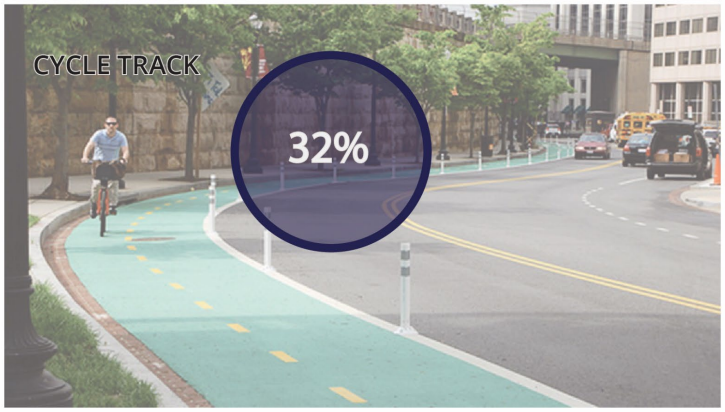


In your opinion, what type of trail is most needed in Flower Mound?

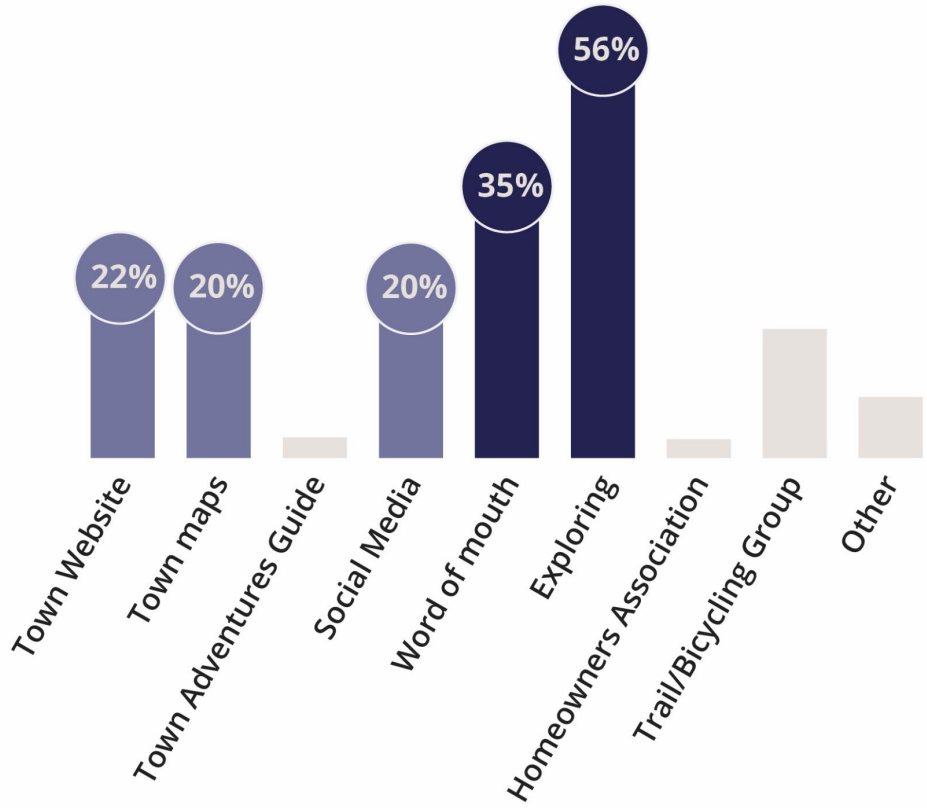




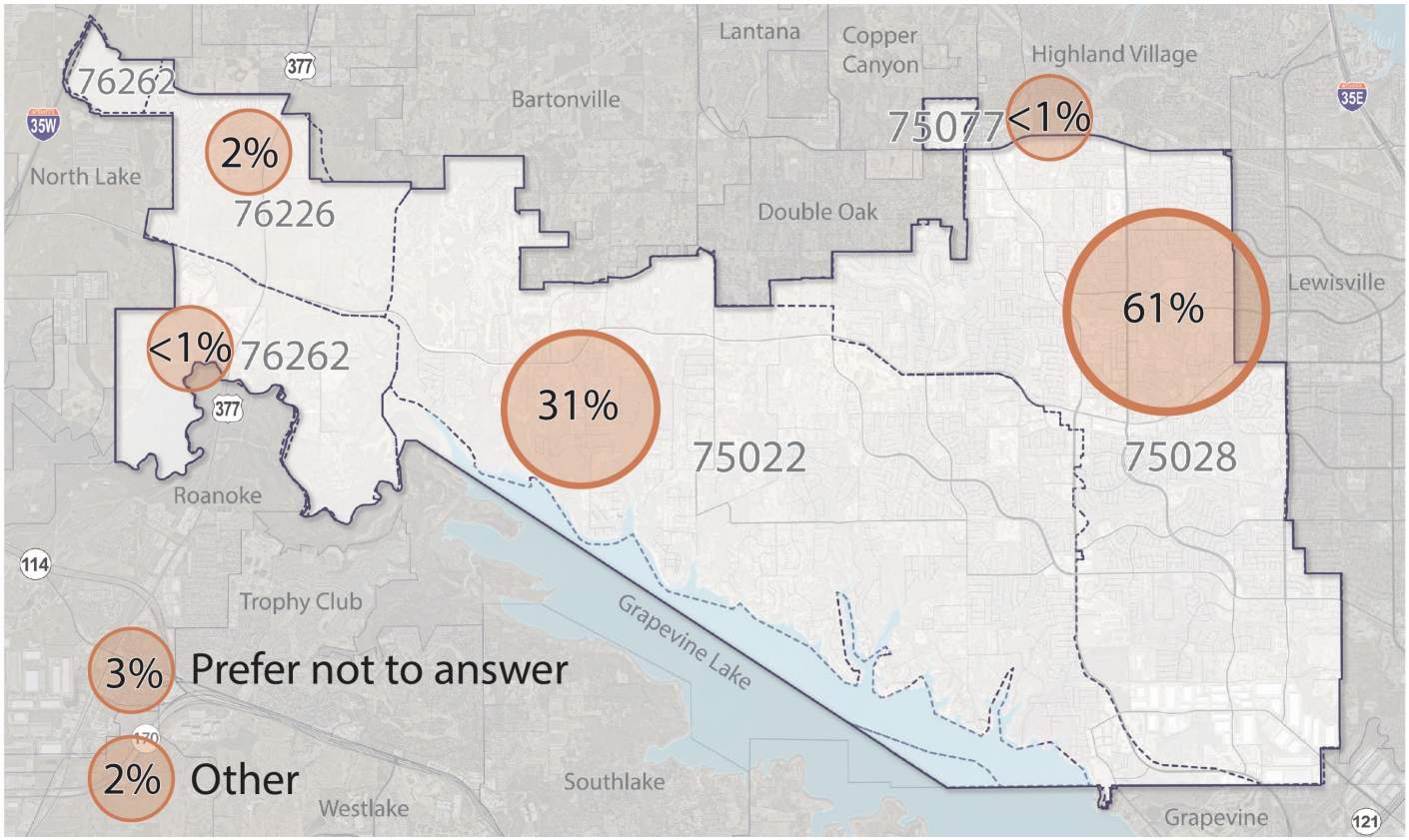
In your opinion, what type of on-street bikeway is most needed in Flower Mound?



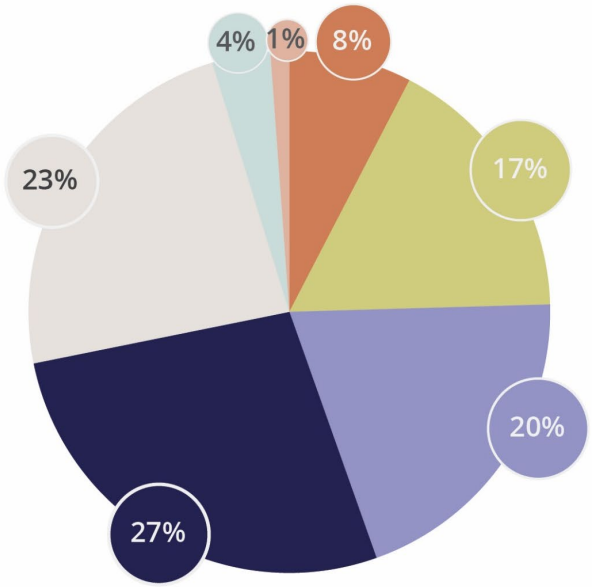
How did you learn about the trails and bikeways that you currently use in Flower Mound? (Select all that apply)



In which zip code do you live?



How long have you been a resident of Flower Mound?



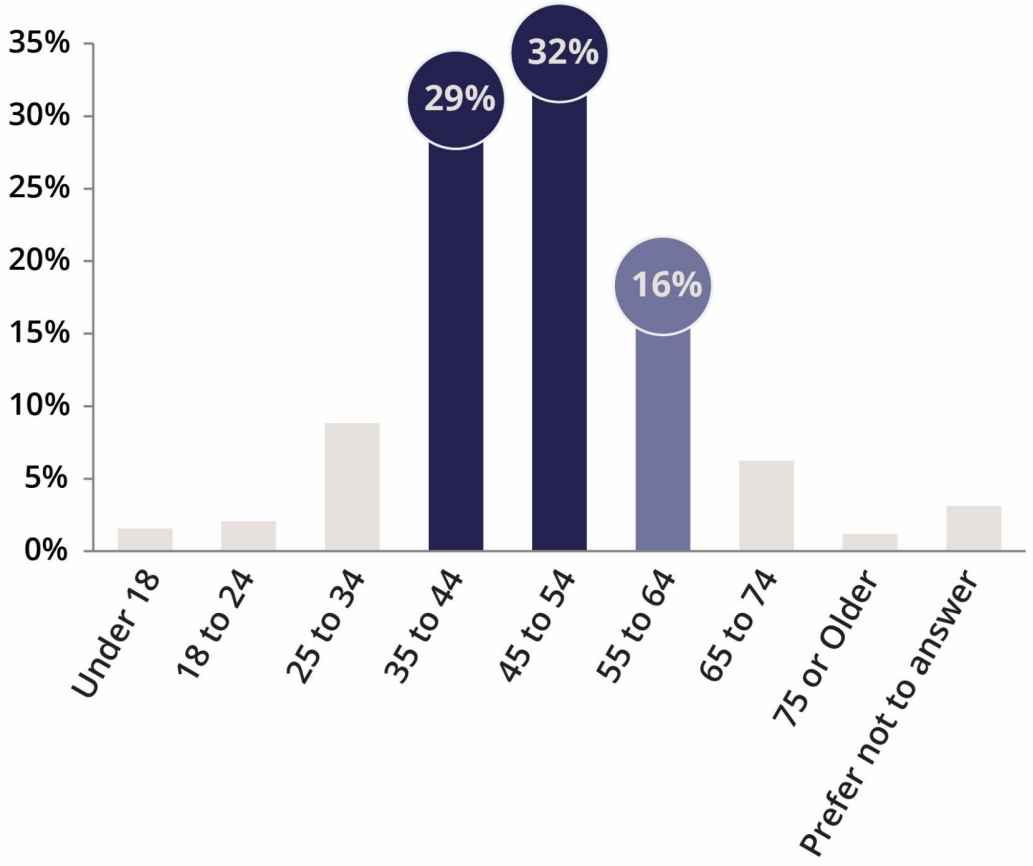
What is your gender?

Male

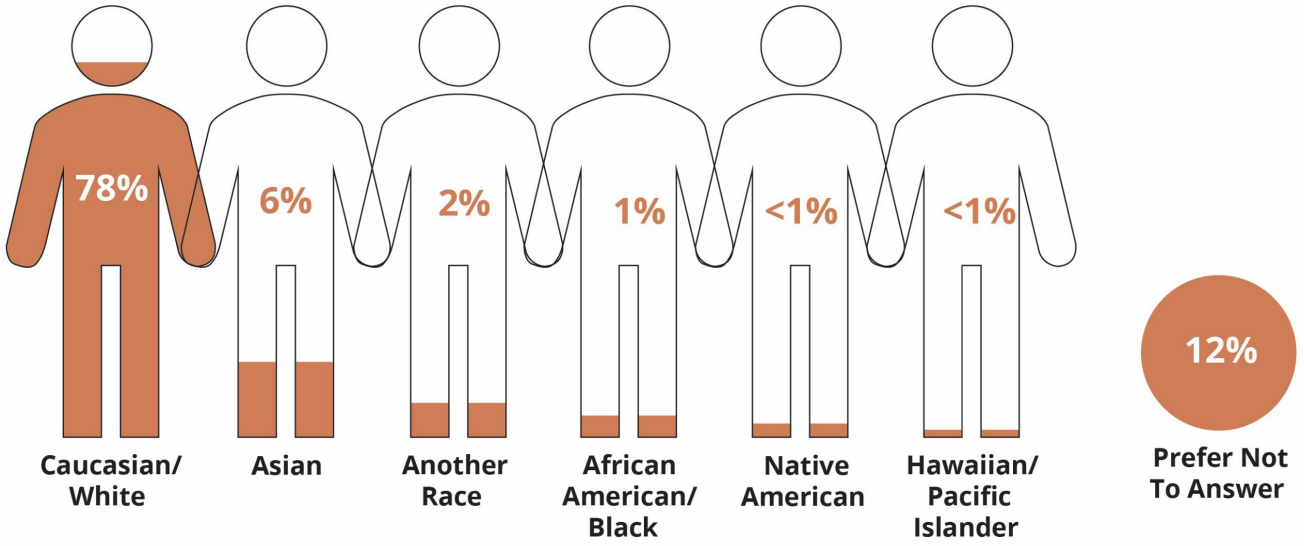
Female

4% Prefer not to answer

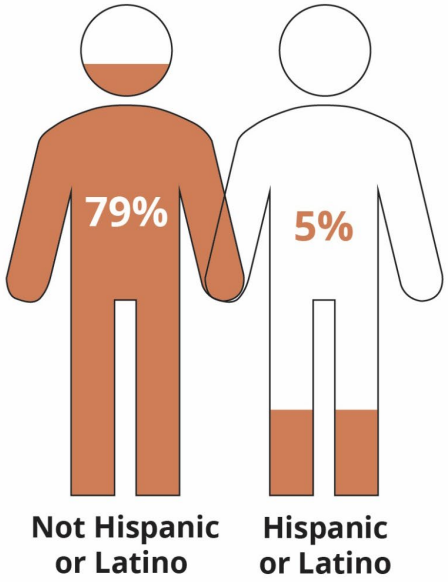
In what age group do you fall?



What is your race?



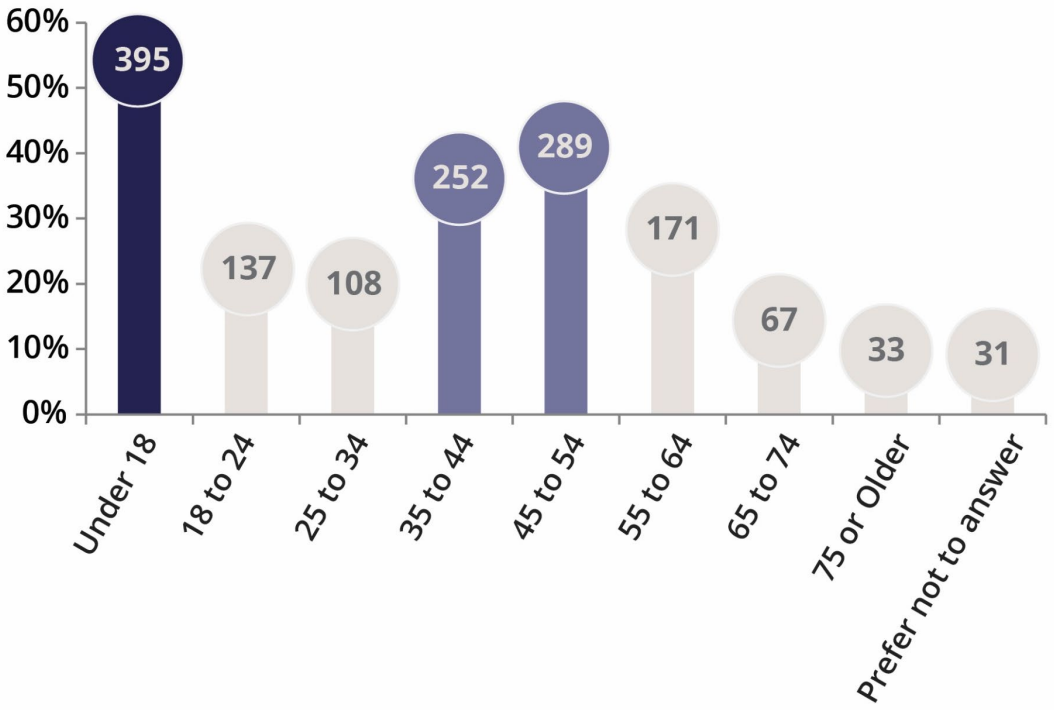
What is your ethnicity?



Prefer Not To Answer

Including yourself, how many people live in your household?

Including yourself, what age groups are represented in your household?



APPENDIX D - FEASIBILITY CORRIDORS

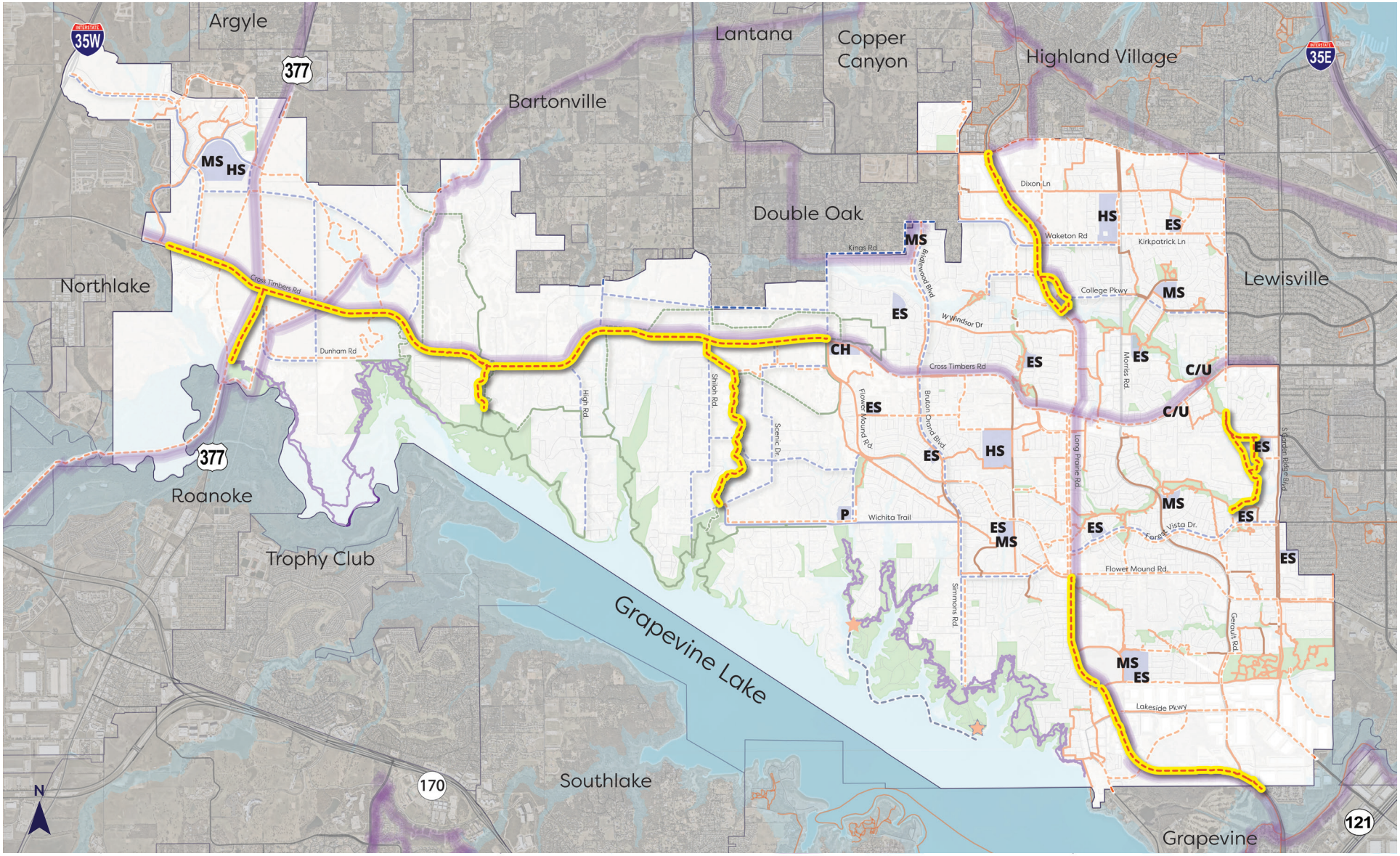
INTRODUCTION

As part of the master plan assessment, a series of key corridors were assessed in greater detail to determine if a trail or bikeway accommodation would be feasible in the future.

- Corridor 1: Cross Timbers East/West Connection
- Corridor 2: Shiloh Drive
- Corridor 3: Long Prairie Road
- Corridor 4: Gaston Park/Long Prairie Road
- Corridor 5: Timber Creek

Based on the existing conditions, need for connectivity, and considerations for implementation, a conceptual alignment and associated cost estimates were developed for each of the five corridors. The intent is that upon adoption of this master plan, the Town can move forward on design, securing funding, and implementation of these corridors.

FIGURE 7.1: TRAIL FEASIBILITY CORRIDORS



CORRIDOR 1: CROSS TIMBERS EAST/WEST CONNECTION

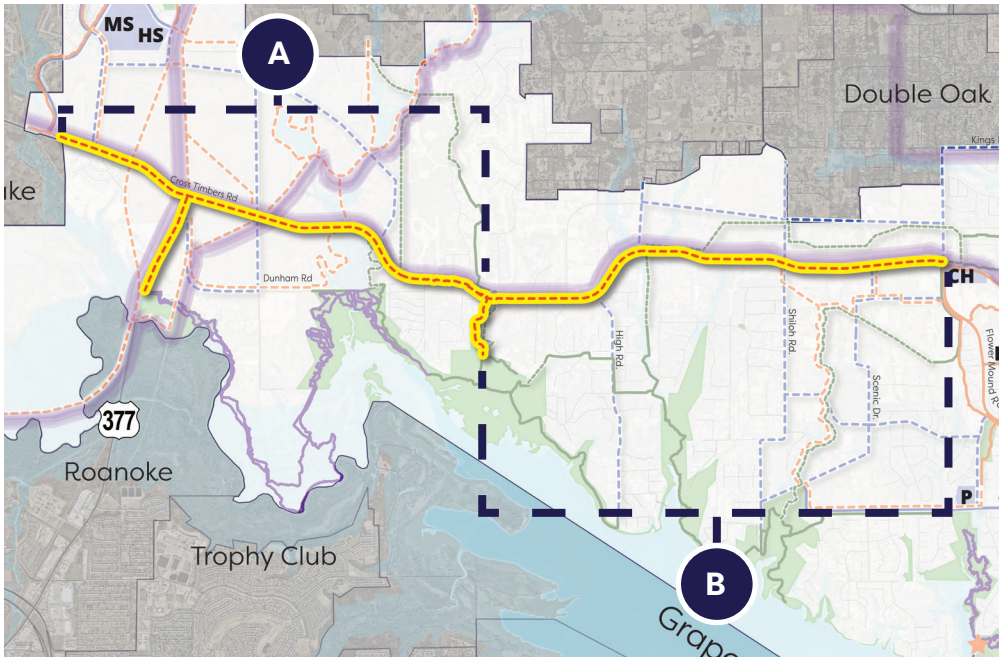
1171 corridor from Flower Mound Road to western town boundary

8.3 total miles

CORRIDOR NEED

The majority of existing development in Flower Mound is in the eastern part of the Town, with the central portion being primarily sparsely developed. There has been some recent development in the far western portion including some large master development plans. Therefore, as that area continues to grow, it is important to provide a connection from the east to the west. This corridor area would provide a critical east-west connection for the Town, create an inter-jurisdictional connection to Northlake, connect to Argyle and Roanoke via the Regional Veloweb, and connect to the North Shore trailhead.

FIGURE 7.2: CROSS TIMBERS EAST/WEST CONNECTION KEY MAP



EXISTING CONDITIONS

In order to determine whether a trail is feasible for the entirety of the corridor, on-the-ground assessments were conducted as well as a desktop review of pertinent corridor conditions data.

Property Ownership:
Through this part of Flower Mound, FM 1171 is a six-lane divided major arterial that is owned and maintained by TxDOT. The right-of-way (ROW) width varies but, in most areas, ends at the curb on either side of the roadway. Therefore, there are a multitude of privately held parcels that abut the roadway. Some parcels have been developed as single-family subdivisions with trails along FM 1171 as required by the current trails master plan. Developing a continuous trail along the roadway will be difficult to do all at once given the different ownership along the corridor and the timing of development.

Topography:
There are changes in topography along the corridor that may pose challenges for trail implementation. Elevations are higher on the eastern and western ends of the corridor; elevations vary from approximately 550' to 670' above sea level. There are also more steep elevation changes associated with the creeks that traverse the corridor.

Floodplain:
Only a limited amount of area within the corridor study boundary is located within the 100-year floodplain. These areas are located within the Sharps Branch and Whites Branch creek corridors. Floodplain areas do not necessarily preclude a trail from being constructed, there are just other considerations such as elevated trail segments and routine maintenance after flood events that need to be addressed in the design of the trail.

Vegetation:
Immediately adjacent to the corridor there is not much tree canopy coverage, which makes trail construction more feasible. However, along US 377 headed to the Knob Hill trail head there is more vegetation present. There is also more dense vegetation located near the two creeks that intersect with the corridor area.

IMPLEMENTATION CONSIDERATIONS

As shown in the conceptual alignment maps on the following pages, a continuous trail is recommended for the north side of FM 1171 and the east side of US 377 to connect to the Knob Hill trailhead. Given that this is such an extensive corridor, there are several considerations related to conflict points, bridge crossings, and the environment that should be considered if and when this corridor is moved to implementation.

Conflict Points:
Conflict points are areas along the corridor that would make it more difficult for trail implementation. **Figures 7.3** and **7.4** depicts the various conflict points located along this first corridor. There are some sections where there is limited ROW along the corridor, which may necessitate acquiring an easement from adjacent property owners. Other areas along the trail need an extension to the existing culvert to be able to accommodate a trail. There are also some areas along the corridor with grading challenges that would need to be addressed before a trail can be constructed. Finally, on the far western part of the corridor there is a railroad crossing; significant coordination is needed with the railroad operator to ensure a safe crossing that is compliant with the railroad standards. The transition from the FM 1171 east/west corridor to the US 377 north/south corridor is also a conflict point as safe intersection crossings features would be needed and coordination with TxDOT will be important.

Bridge Crossings:
As shown in **Figures 7.3** and **7.4**, a total of three bridge crossings are likely needed along the corridor. There are other areas along the corridor where extending the culvert would suffice. Bridge structures are a significant cost but help to make an overall continuous trail corridor possible.

Environmental Considerations:
In a preliminary review of environmental features, it was determined that there are no designated historic structures and no critical habitats for threatened or endangered species located within the corridor area. There is one historical cemetery (Shiloh Cemetery) located just to the west of Shiloh Road on the north side of the corridor. Additional coordination with various environmental agencies is likely needed before the project can move forward.

BRIDGE UNDERPASS

BRIDGE CROSSING ALONG 1171

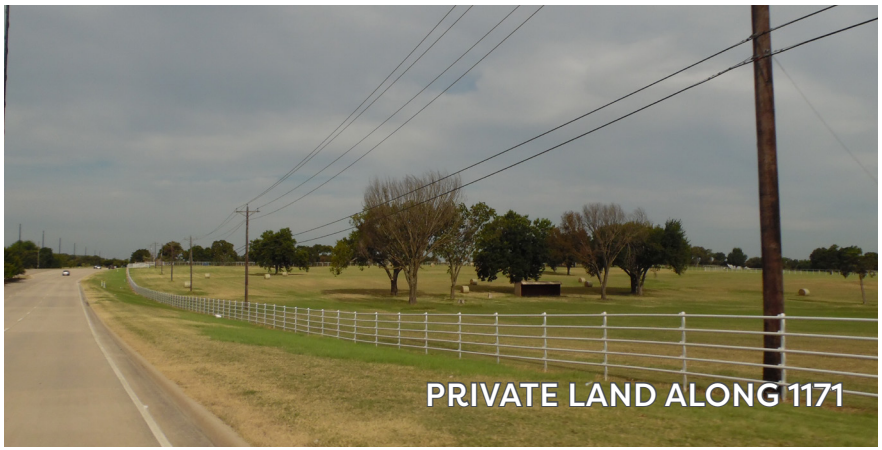
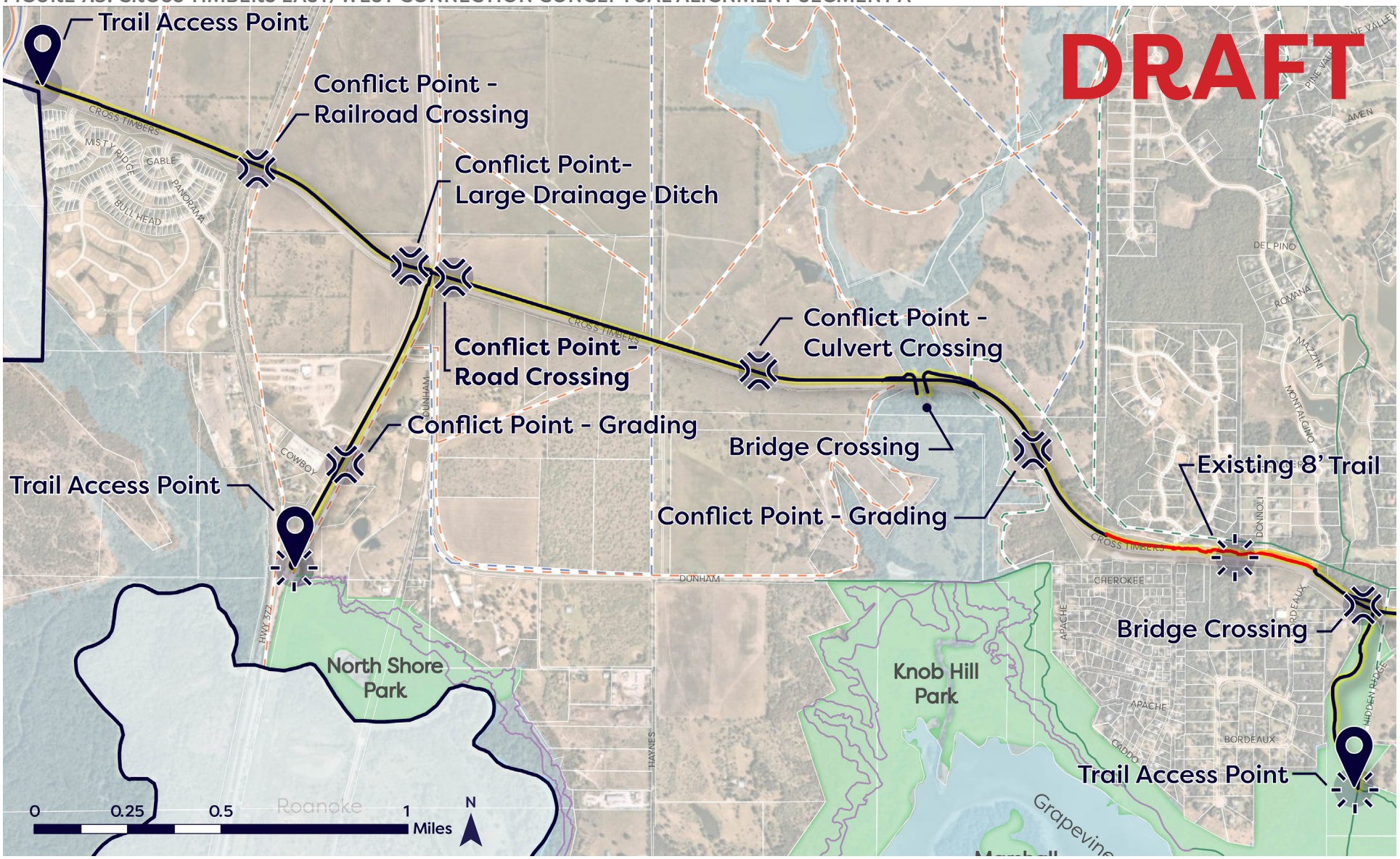

PRIVATE LAND ALONG 1171

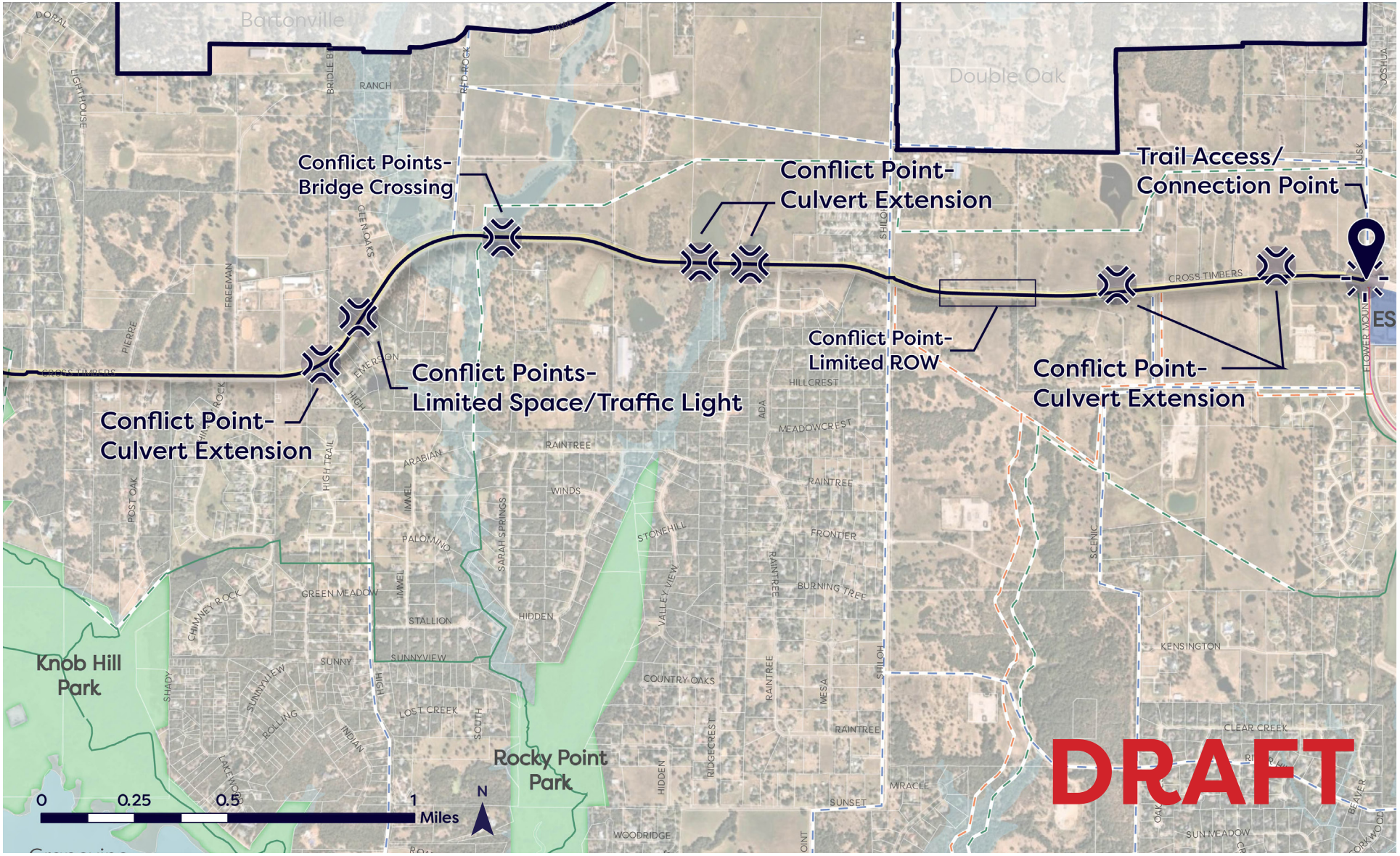
FIGURE 7.3: CROSS TIMBERS EAST/WEST CONNECTION CONCEPTUAL ALIGNMENT SEGMENT A



LEGEND

- Flower Mound town limits
- Parks
- Floodplain
- Schools
- Existing Trails and Bikeways
- Proposed Trails and Bikeways
- Multi-Use Trails
- On-Street Bikeways
- U.S Army Corps of Engineers (USACE)
- Equestrian
- Corridor Study Area
- Access Points
- Opportunities
- Conflict Points
- 8'-10' Trail

FIGURE 7.4: CROSS TIMBERS EAST/WEST CONNECTION SEGMENT CONCEPTUAL ALIGNMENT SEGMENT B



LEGEND

- Flower Mound town limits
- Parks
- Floodplain
- Schools
- Existing Trails and Bikeways
- Proposed Trails and Bikeways
- Multi-Use Trails
- On-Street Bikeways
- U.S Army Corps of Engineers (USACE)
- Equestrian
- Corridor Study Area
- Access Points
- Opportunities
- Conflict Points
- 8'-10' Trail

ESTIMATES OF PROBABLE COST

The costs shown in **Table X.1** are at a pre-design and engineering level and are intended to be used as preliminary budgeting estimates. As additional details are determined in future planning, design, and engineering phases, these costs will likely change. See page 226 for a description of each of the categories.

Table 7.1: Corridor 1, Cross Timbers East/West Connection Estimate of Probable Cost

Category	Estimate of Probable Cost
General	$622,300
Demolition	$1,436,600
Utilities	$129,500
Transportation	$148,000
Grading and Earthwork*	$116,300
Paving	$2,974,700
Structures	$1,593,800
Erosion Control	$101,300
Landscaping	$486,600
Lighting and Electric	$46,600
Irrigation	$185,200
Subtotal	**$7,840,900**
Contingency (20%)	**$1,568,200**
Base Bid Total	**$9,409,100**
Estimated Annual Trail Maintenance (2%)	**$188,200**

Notes: Represents a preliminary cost estimate. Amounts are subject to change with additional planning, design, and engineering. Costs do not include land acquisition or site amenities.

**Grading and Earthwork are preliminary and subject to change based on future performance of in-field survey.*

KNOB HILL TRAIL CONNECTION

CORRIDOR 2: SHILOH ROAD

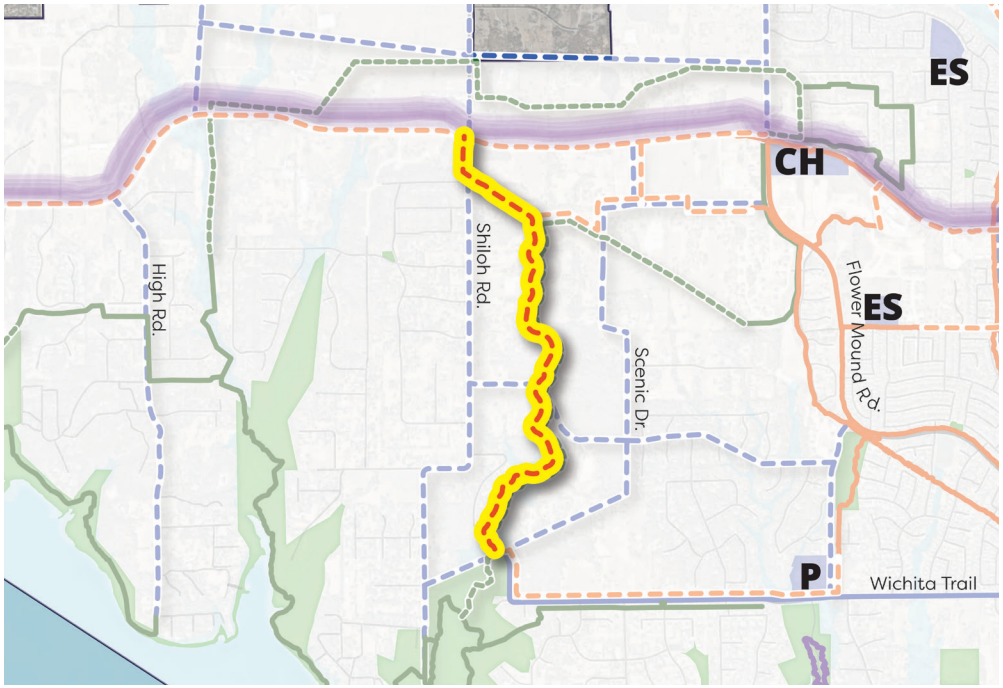
Shiloh Road from Wichita Trail to northern town boundary

2.5 total miles

CORRIDOR NEED

During the public engagement process, Shiloh Road was noted as a well-traveled corridor by avid cyclists but that the existing conditions are dangerous due to hills and lack of visibility. The corridor connects to the existing bike lane on Wichita Trail and travels north to the town boundary with Double Oak. In order to establish this corridor as a preferred bikeway corridor, the potential for an on-street bikeway accommodation or trail was evaluated as part of this feasibility corridor assessment. This would create a safer route for cyclists already using the corridor and potentially encourage less experienced riders to use the corridor. This corridor would also provide connectivity to the major east/west corridor along Cross Timbers (Corridor 1).

FIGURE 7.5: SHILOH ROAD KEY MAP



EXISTING CONDITIONS

In order to determine whether a pathway is feasible for the entirety of the corridor, on-the-ground assessments were conducted as well as a desktop review of pertinent corridor conditions data.

Property Ownership:
Shiloh Road is a two-lane undivided roadway without curb and gutters. The proposed trail alignment utilizes an existing utility easement before turning south through private property. Due to the property not being owned by the Town, challenges to development of the trail exist unless an easement is acquired or until the property is developed.

Topography:
The topography along the corridor is relatively flat, which makes the corridor ideal for cyclists commuting or recreating.

Floodplain:
The southern extent of the trail, where it connects to Cardinal Rd is within the 100-year floodplain.

Vegetation:
While the trail alignment is generally located through undeveloped land, the vegtation is limited due to the existing land use.

IMPLEMENTATION CONSIDERATIONS

After evaluation of the corridor, it was determined that there was not enough pavement to add a designated bike lane today, and in order to provide a better experience, the trail location is proposed through the undeveloped property on the east side of Shiloh Road. However, if the roadway is reconstructed in the future, a bike lane should be included to provide more separation between cyclists and other trail users, along with a connector sidewalk. There are several considerations related to conflict points and the environment that should be considered if and when this trail is moved to implementation.

Conflict Points:
Conflict points are areas along the corridor that would make it more difficult for trail implementation. **Figure 7.4** depicts the various conflict points located along the Shiloh Road corridor. There are some utility obstructions located along the corridor that would make it difficult to widen the roadway in parts. Additionally, where Sunset Trail turns into Shiloh Road there is a 90 degree turn with limited space on either side of the roadway. Finally, there are a couple of culvert crossings and a drainage swale pipe on the eastern side of the corridor.

Bridge Crossings:
There are no bridge crossings recommended for this corridor as part of the conceptual alignment.

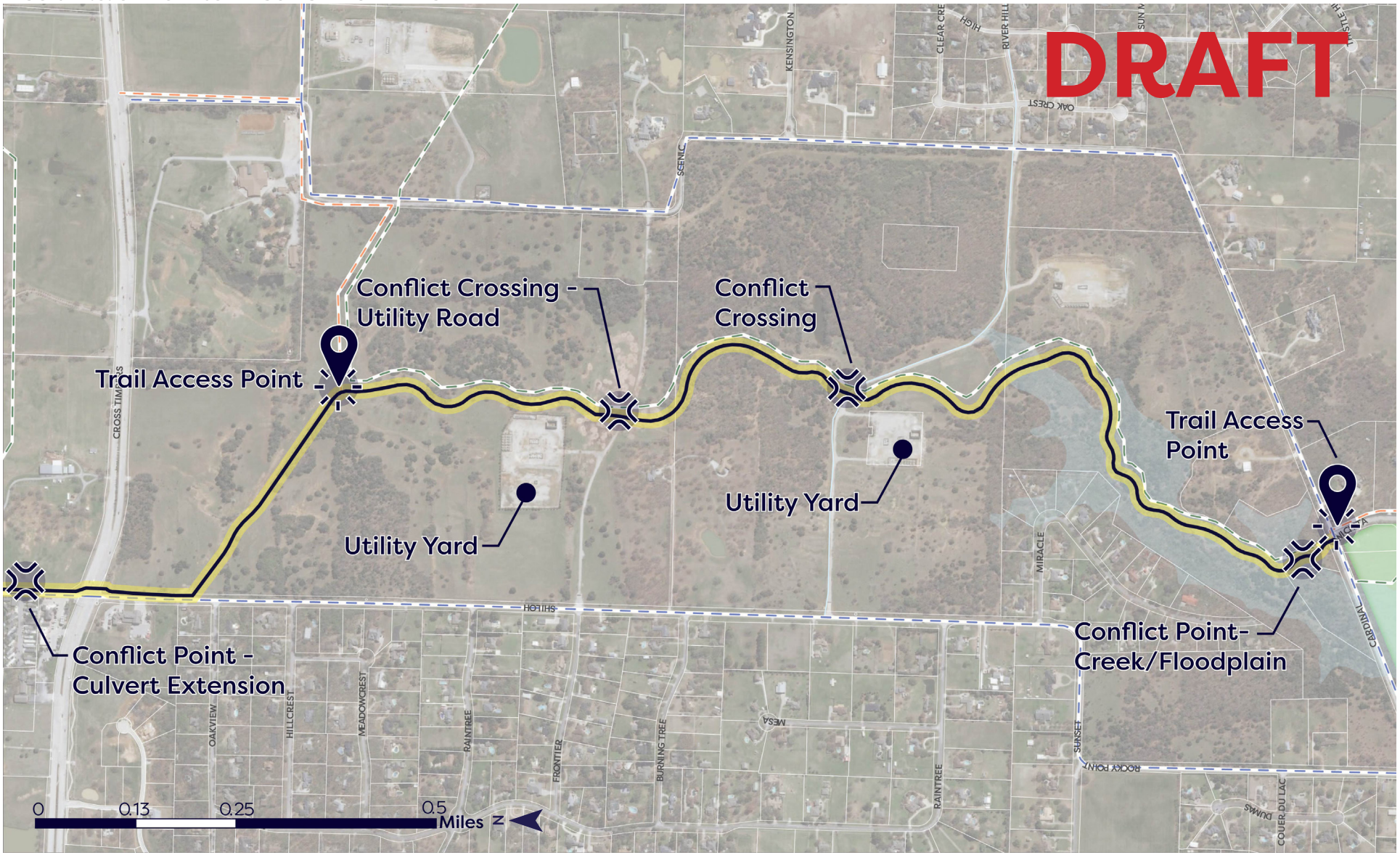
Environmental Considerations:
In a preliminary review of environmental features, it was determined that there are no designated historic structures, no historical cemeteries, and no critical habitats for threatened or endangered species located within the corridor area.

CULVERT CROSSING

UNDEVELOPED LAND ON SHILOH RD

SHARE THE ROAD SIGN

FIGURE 7.6: SHILOH ROAD CONCEPTUAL ALIGNMENT



ESTIMATES OF PROBABLE COST

The costs shown in **Table 7.2** are at a pre-design and engineering level and are intended to be used as preliminary budgeting estimates. As additional details are determined in future planning, design, and engineering phases, these costs will likely change. See page 226 for a description of each of the categories.

Table 7.2: Corridor 2, Shiloh Road Estimate of Probable Cost

Category	Estimate of Probable Cost
General	$256,500
Demolition	$446,800
Utilities	$220,800
Transportation	$27,300
Grading and Earthwork*	$86,500
Paving	$880,200
Erosion Control	$30,600
Landscaping	$153,900
Irrigation	$54,800
Subtotal	**$2,157,400**
Contingency (20%)	**$431,500**
Base Bid Total	**$2,588,900**
Estimated Annual Trail Maintenance (2%)	**$51,800**

Notes: Represents a preliminary cost estimate. Amounts are subject to change with additional planning, design, and engineering. Costs do not include land acquisition or site amenities.

**Grading and Earthwork are preliminary and subject to change based on future performance of in-field survey.*

CORRIDOR 3: LONG PRAIRIE ROAD

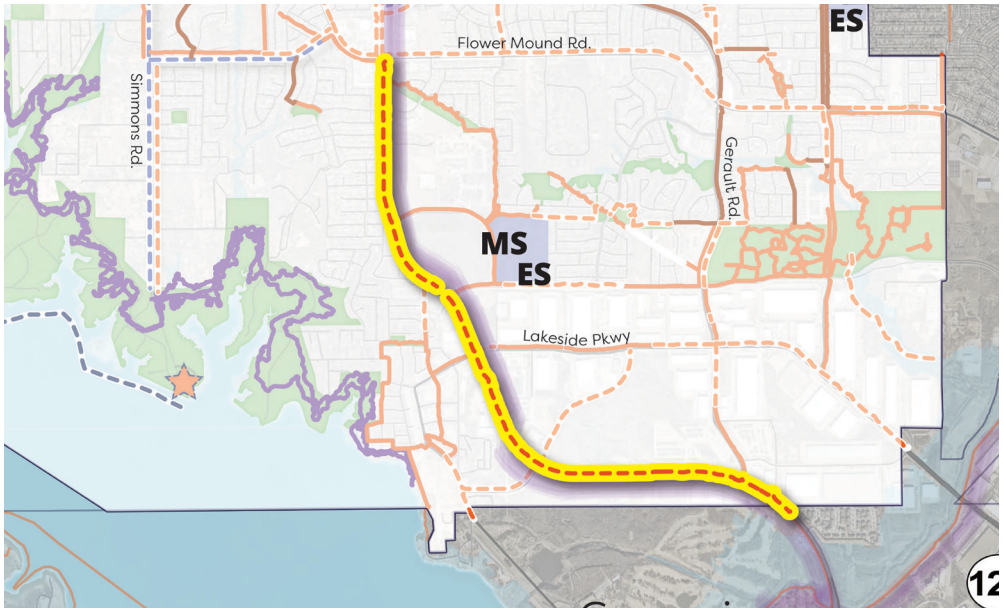
Long Prairie Road from border with Grapevine to Flower Mound Road

3.2 total miles

CORRIDOR NEED

Long Prairie Road is identified on NCTCOG's Regional Veloweb, so it has already been identified as an important regional connection to connect Flower Mound with Grapevine and other communities to the south. This corridor segment also travels by the Lakeside DFW mixed-use area and a major employment hub. Both are destinations for Flower Mound residents and visitors from outside the community. Regional standards stipulate that corridors along the Veloweb should be at least 12' in width to allow for multiple user types in a safe manner. Existing trail segments along this corridor have been built in conjunction with new development but the width of these segments is only 8'. Therefore, this corridor evaluation considered whether there was enough right-of-way throughout the corridor to be able to construct a wider trail as stipulated by the Regional Veloweb.

FIGURE 7.7: LONG PRAIRIE ROAD KEY MAP



EXISTING CONDITIONS

In order to determine whether a trail is feasible for the entirety of the corridor, on-the-ground assessments were conducted as well as a desktop review of pertinent corridor conditions data.

Property Ownership:
Long Prairie Road is a six-lane divided road with curb and gutter that runs north – south. There is an existing sidewalk on the west side of Long Prairie Road that backs up to existing subdivisions and development so there is limited ROW for expanding the sidewalk. From Sherri Lane to Aberdeen Drive on the east side of the corridor there is a privately owned parcel of land. Future standards regarding trail and sidewalk width will help create a continuous trail through the corridor. However, most of the east side of the corridor has excessive public ROW making it the ideal side for a future trail.

Topography:
The northern section of this corridor is flat. However, on the west side of Long Prairie Road starting at Spinks Road and moving south there are some challenges with topography. Elevations vary from approximately 530' to 600' above sea level. Although the terrain in this section of the corridor has more elevation than the others, the east side of Long Prairie Road is still the ideal opportunity for a trail.

Floodplain:
None of the corridor is located within the 100-year floodplain.

Vegetation:
The most northern portion of the corridor has little to no vegetation. Most of this section has trees along existing sidepaths. In the southern portion of the corridor where development does not exist starting from Aberdeen Drive there is dense brush, however it is located at least 20 feet away from the road.

IMPLEMENTATION CONSIDERATIONS

As shown in the conceptual alignment map, a trail is recommended on the north and east side of Long Prairie Road to fill in existing trail gaps in the southern part of the corridor and to connect up to Flower Mound Road. There are several considerations related to conflict points, bridge crossings, and the environment that should be considered if and when this corridor is moved to implementation.

Conflict Points:
Conflict points are areas along the corridor that would make it more difficult for trail implementation. **Figure 7.8** depicts the various conflict points located along the Long Prairie Road corridor. There are some utility lines located along the northern portion of the corridor that would make it difficult to build a new trail or expand the existing sidepath. Also, limited ROW that is privately owned contribute to barriers for future implementation. Additionally, the intersection of Long Prairie Road and Lakeside Parkway is a large road crossing that acts as a barrier for a continuous safe trail.

Bridge Crossings:
There are no bridge crossings recommended for this corridor as part of the conceptual alignment.

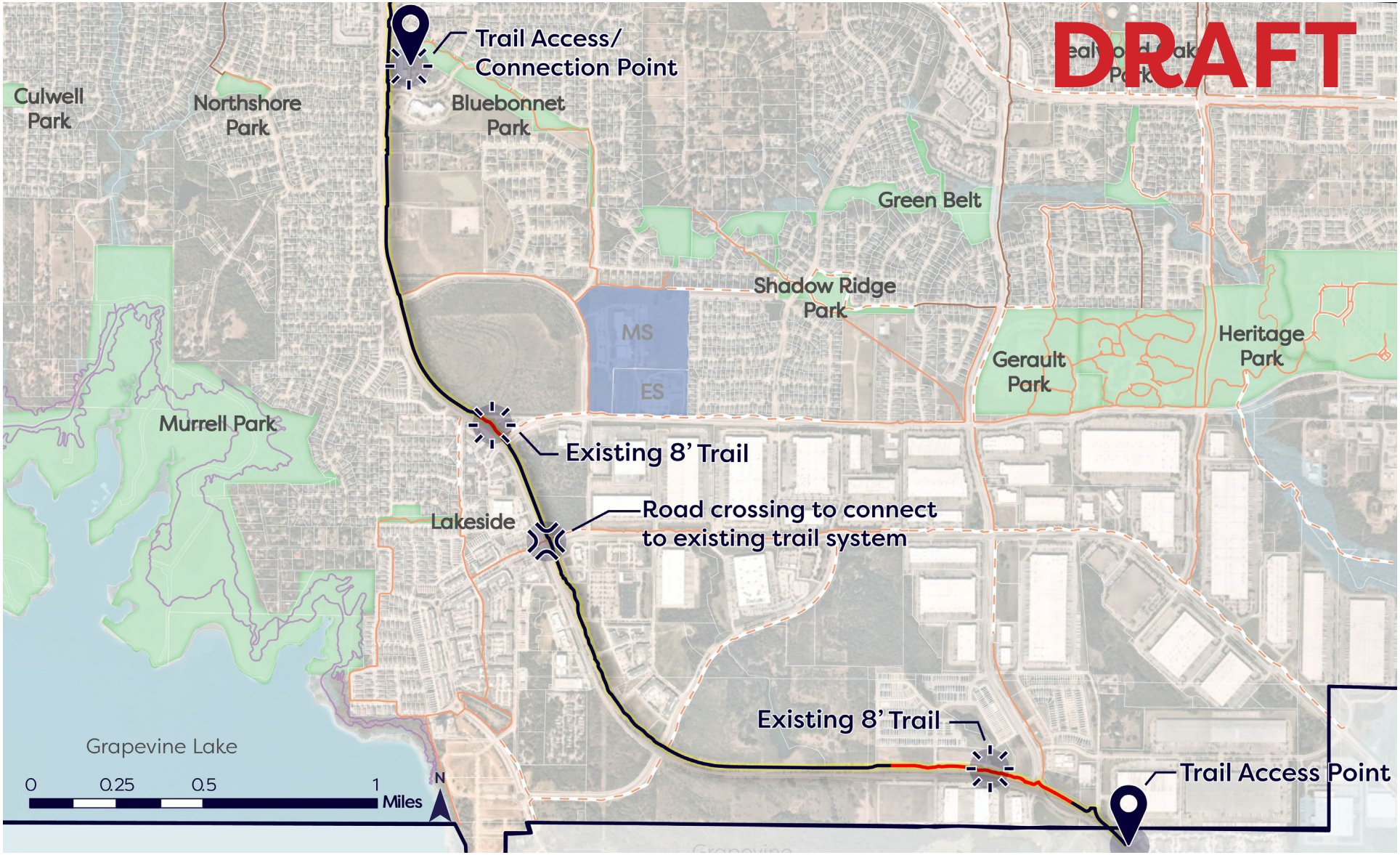
Environmental Considerations:
In a preliminary review of environmental features, it was determined that there are no designated historic structures, no historical cemeteries, and no critical habitats for threatened or endangered species located within the corridor area.

EXISTING PATHWAY ON LONG PRAIRIE ROAD

TRAIL MARKER BY FOUNDERS SQUARE

RIGHT-OF-WAY ALONG LONG PRAIRIE ROAD

FIGURE 7.8: LONG PRAIRIE ROAD CONCEPTUAL ALIGNMENT



ESTIMATES OF PROBABLE COST

The costs shown in **Table 7.3** are at a pre-design and engineering level and are intended to be used as preliminary budgeting estimates. As additional details are determined in future planning, design, and engineering phases, these costs will likely change. See page 226 for a description of each of the categories.

Table 7.3: Corridor 3, Long Prairie Road Estimate of Probable Cost

Category	Estimate of Probable Cost
General	$281,700
Demolition	$605,700
Transportation	$93,100
Grading and Earthwork*	$46,800
Paving	$1,374,400
Erosion Control	$38,600
Landscaping	$194,400
Irrigation	$71,900
Subtotal	**$2,706,600**
Contingency (20%)	**$541,300**
Base Bid Total	**$3,247,900**
Estimated Annual Trail Maintenance (2%)	**$65,000**

Notes: Represents a preliminary cost estimate. Amounts are subject to change with additional planning, design, and engineering. Costs do not include land acquisition or site amenities.

**Grading and Earthwork are preliminary and subject to change based on future performance of in-field survey.*

PEDESTRIAN CROSSING AT LAKESIDE

CORRIDOR 4: GASTON PARK/LONG PRAIRIE ROAD

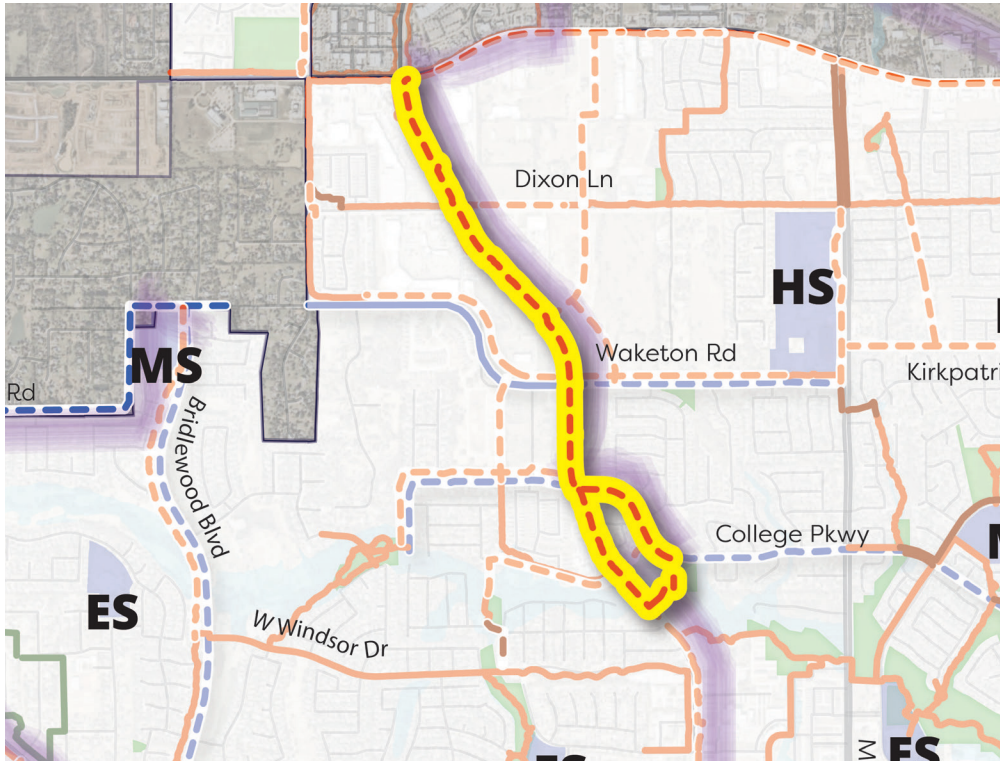
Long Prairie Road from Gaston Park to Justin Road

2.3 total miles

CORRIDOR NEED

The Town is currently in the process of constructing a pedestrian bridge over Timber Creek within Gaston Park. This proposed corridor would provide a connection from that future bridge to Long Prairie Road, which connects to the Riverwalk development to the south and to Highland Village to the north. There are quite a few residential and commercial areas adjacent to the corridor that would benefit from additional bicycle/pedestrian connectivity.

FIGURE 7.9: GASTON PARK/LONG PRAIRIE ROAD KEY MAP



EXISTING CONDITIONS

In order to determine whether a trail is feasible for the entirety of the corridor, on-the-ground assessments were conducted as well as a desktop review of pertinent corridor conditions data.

Property Ownership:
Long Prairie Road is a six-lane divided road with curb and gutter that runs north – south. Part of this corridor also includes a segment of College Parkway that starts at the intersection of Long Prairie Road to Gaston Park. This segment of College Parkway is divided four-lane road with curb and gutter. Most of the northern section of the corridor has development on both sides of the road; the east side of the road has more public ROW for expansion of the existing pathway and opportunities for a new trail making it more ideal than the west side. Near Gaston Park between Long Prairie Road and College Parkway is publicly owned land which makes it ideal for a future trail connection.

Topography:
The corridor along the east side of Long Prairie Road poses little to no grading issues. The areas that do have some changes in elevation are gentle slope changes. Additionally, the segment along College Parkway is primarily flat. The segment between College Parkway and Long Prairie Road has the most changes in elevation, however it is generally gentle slope change. Elevations vary from approximately 530' to 600' above sea level.

Floodplain:
There is a very small portion of the corridor segment located off of College Parkway that is located in the 100-year floodplain. Otherwise, the majority of the corridor is located outside of the 100-year floodplain.

Vegetation:
There is little vegetation located on the Long Prairie Road and College Parkway segments of this corridor. Where existing sidepaths exist, there are some trees. The segment between College Parkway and Long Prairie Road has dense vegetation.

IMPLEMENTATION CONSIDERATIONS

As shown in the conceptual alignment map, a trail is recommended for the east side of Long Prairie Road from Justin Road to Gaston Park to connect to the future bridge to the RiverWalk Flats. There are several considerations related to conflict points, bridge crossings, and the environment that should be considered if and when this corridor is moved to implementation.

Conflict Points:
Conflict points are areas along the corridor that would make it more difficult for trail implementation. **Figure 7.10** depicts the various conflict points located along the corridor. There are some sections where there is limited ROW on Long Prairie Road, which may require additional easements from adjacent property owners. The north side of the corridor along Long Prairie road near the commercial development is a drainage swale that could provide a barrier to future expansion of the existing pathway. Moving south along Long Prairie Road there are few conflict points which make it an ideal location for a future trail. The segment along College Parkway has few conflicts points other than vegetation near the existing pathway and the vegetation that covers the future connection between College Parkway and Long Prairie Road.

Bridge Crossings:
As shown in **Figure 7.10**, there are a total of two bridge crossings that are likely needed along the corridor. While bridge structures are costly, they ultimately help to make an overall continuous trail corridor possible. Near the RiverWalk Flats, additional considerations for the bridge include retaining walls to ensure safe crossing for trail users.

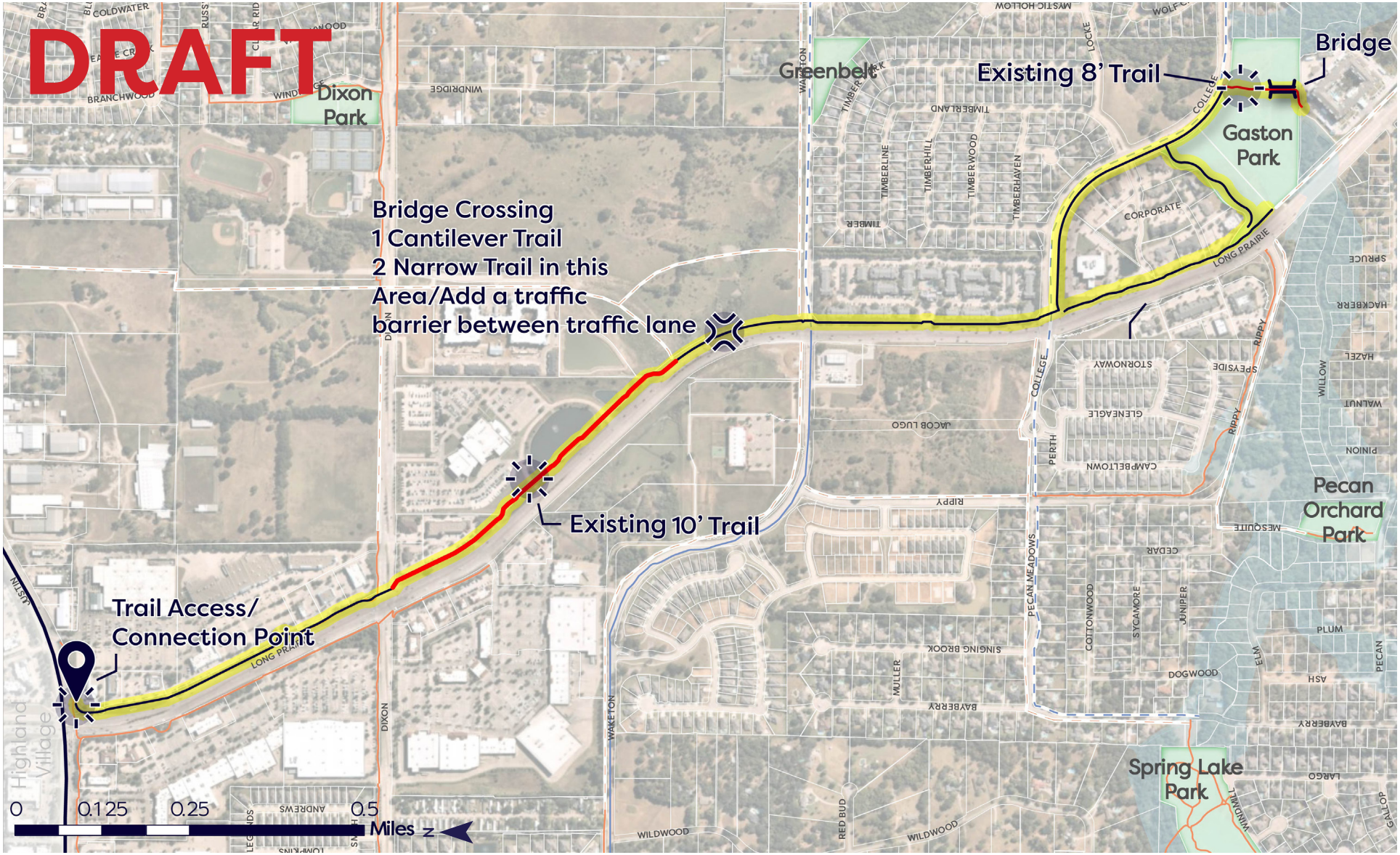
Environmental Considerations:
In a preliminary review of environmental features, it was determined that there are no designated historic structures, no historical cemeteries, and no critical habitats for threatened or endangered species located within the corridor area.

GASTON PARK SIGNAGE

VEHICLE BRIDGE ON LONG PRAIRIE ROAD

FUTURE CONNECTION POINT

FIGURE 7.10: GASTON PARK/LONG PRAIRIE ROAD CONCEPTUAL ALIGNMENT



LEGEND

- Flower Mound town limits
- Parks
- Floodplain
- Schools
- Existing Trails and Bikeways
- Proposed Trails and Bikeways
- Multi-Use Trails
- On-Street Bikeways
- U.S Army Corps of Engineers (USACE)
- Equestrian
- Corridor Study Area
- Access Points
- Opportunities
- Conflict Points
- 8'-10' Trail

ESTIMATES OF PROBABLE COST

The costs shown in **Table 7.4** are at a pre-design and engineering level and are intended to be used as preliminary budgeting estimates. As additional details are determined in future planning, design, and engineering phases, these costs will likely change. See page 226 for a description of each of the categories.

Table 7.4: Corridor 4, Gaston Park/Long Prairie Road Estimate of Probable Cost

Category	Estimate of Probable Cost
General	$173,200
Demolition	$399,900
Grading and Earthwork*	$132,00
Paving	$608,100
Structures	$610,000
Erosion Control	$22,500
Landscaping	$114,000
Irrigation	$38,000
Subtotal	**$2,097,700**
Contingency (20%)	**$419,500**
Base Bid Total	**$2,517,200**
Estimated Annual Trail Maintenance (2%)	**$50,300**

Notes: Represents a preliminary cost estimate. Amounts are subject to change with additional planning, design, and engineering. Costs do not include land acquisition or site amenities.

**Grading and Earthwork are preliminary and subject to change based on future performance of in-field survey.*

PATHWAY BY HIGHLAND RANCH SHOPPING CENTER

CORRIDOR 5: TIMBER CREEK

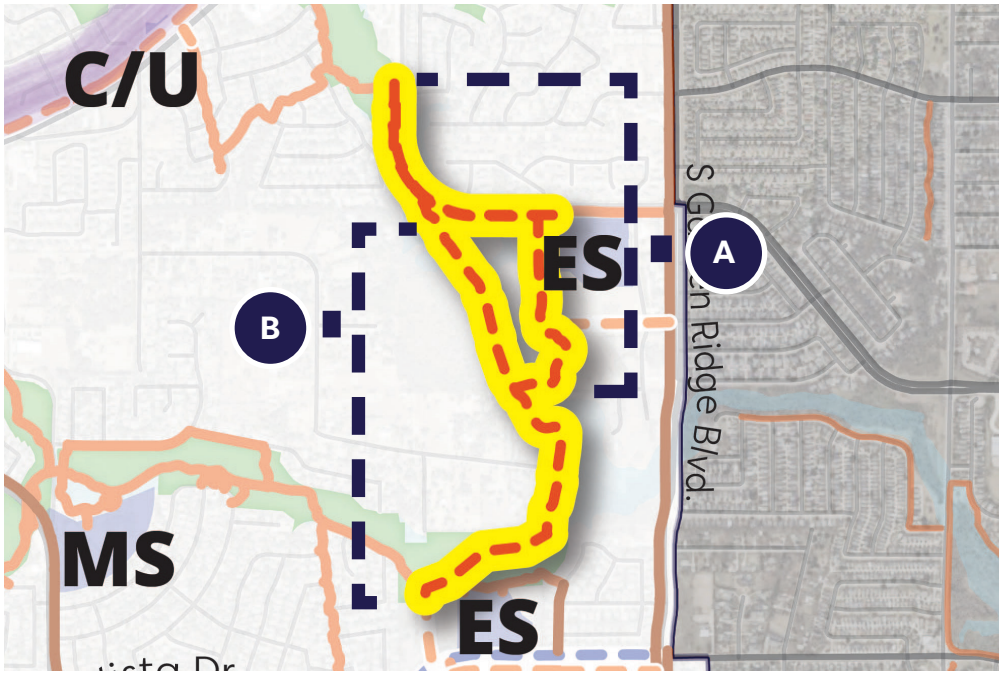
Rustic Timbers Park to Lawson Park

1.8 total miles

CORRIDOR NEED

Overall, the Pink Evening Primrose Trail in Flower Mound is fairly disjointed. There are some connected segments in the north but then several disjointed segments in the south. The Timber Creek corridor area would provide a connection from Rustic Timbers Park to the north, along the future Kirkpatrick Lane extension, through a utility easement, through the Flower Mound Tree Farm, and end at Lawson Park. This connection would create a much more continuous stretch of trail along the Pink Evening Primrose and also connect two elementary schools and several parks. There are also opportunities to connect into the Lewisville trail system along this corridor. Option A would follow more closely to the elementary school and Option B would follow the utility easement to the south. Only one option would be necessary to make the connection.

FIGURE 7.11: TIMBER CREEK KEY MAP



EXISTING CONDITIONS

In order to determine whether a trail is feasible for the entirety of the corridor, on-the-ground assessments were conducted as well as a desktop review of pertinent corridor conditions data.

Property Ownership:
This corridor is located near Timber Creek on the east side of Flower Mound and is located away from any roadways. The parcels this corridor would run through are a mix of public and privately owned. Due to not all the land being publicly owned, it poses a challenge for development of this corridor unless easements are acquired.

Topography:
The topography along the corridor map poses challenges for future trail implementation. Near Vickery Elementary School there is some gentle elevation change. Elevations vary from approximately 520' to 540' above sea level. There are peak rings dispersed throughout that represent more steep elevation changes. Most of these elevation changes are near Timber Creek that runs through the corridor.

Floodplain:
Most of this corridor is located in the 100-year floodplain since it is adjacent to Timber Creek. The segment that starts at Kirkpatrick Lane near the elementary school is the only segment that is not within the 100-year floodplain.

Vegetation:
Majority of this corridor has dense vegetation as much of the area is undeveloped.

IMPLEMENTATION CONSIDERATIONS

As shown in the conceptual alignment map, Option A shows a trail along the west side of the future Kirkpatrick Lane extension and then through the utility easement on the western side of the creek. Connections will be made to Rustic Timbers Park, Vickery Elementary School, and Lawson Park. Option B goes behind Vickery Elementary School and connects to Garden Ridge and Forest Vista Drive to connect back to the tree farm. There are several considerations related to conflict points, bridge crossings, and the environment that should be considered if and when this corridor is moved to implementation.

Conflict Points:
Conflict points are areas along the corridor that would make it more difficult for trail implementation. **Figure 7.12** depicts the various conflict points located along the Timber Creek Corridor. The new road extension on Kirkpatrick Lane in the northern part of the trail corridor could result in a bridge connection for users. The rest of the conflict areas include the corridor near Timber Creek that has existing dense vegetation, steep slopes, parcels that are privately owned, and parcels that are located in the 100-year floodplain.

Bridge Crossings:
As shown in **Figure 7.12**, one bridge is needed in Option A and one bridge is needed in Option B. Bridge structures in this corridor are necessary to ensure a safe continuous trail corridor that is comfortable for users. Although bridges are a costly amenity, they are necessary for the success of this corridor.

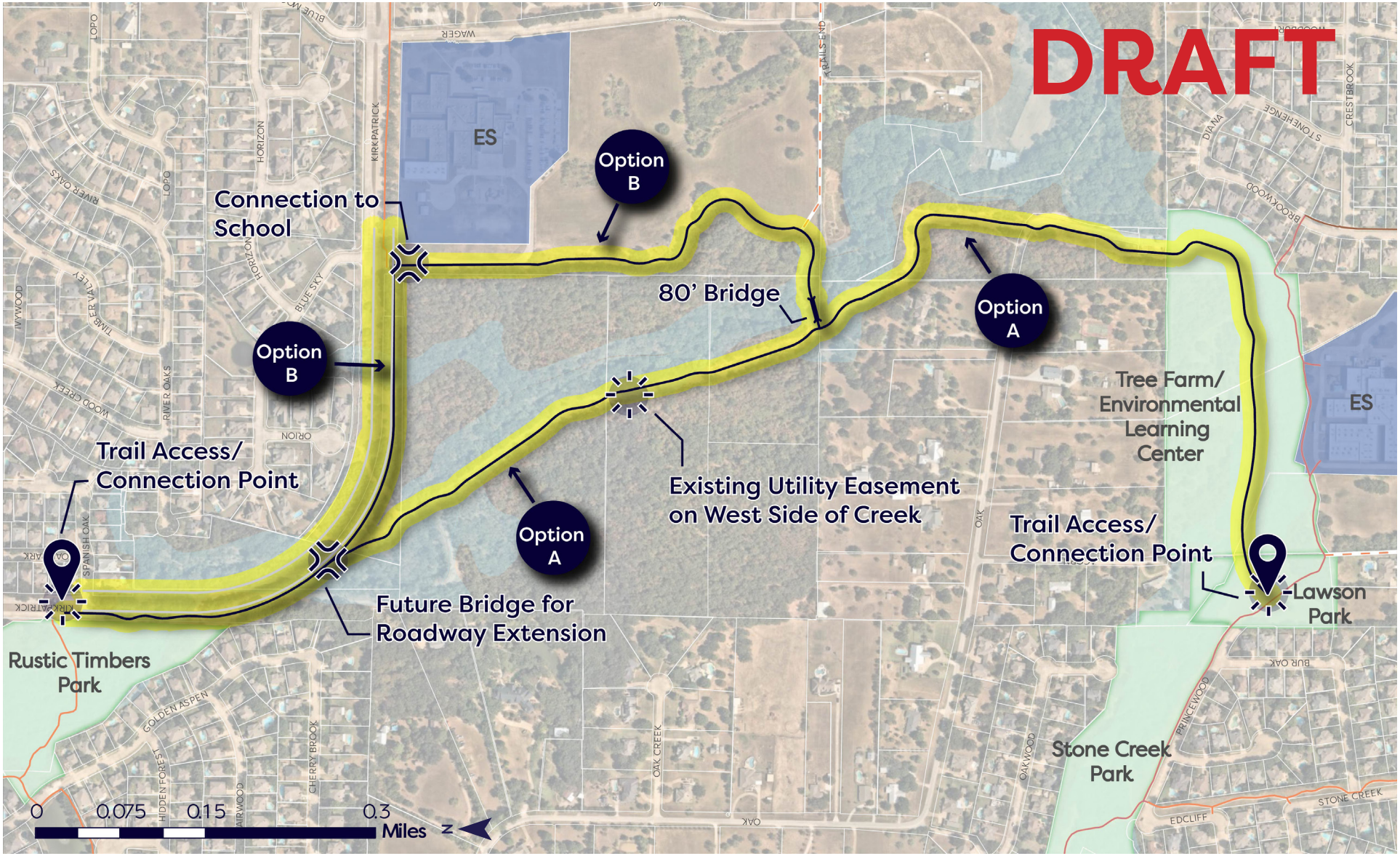
Environmental Considerations:
In a preliminary review of environmental features, it was determined that there are no designated historic structures, no historical cemeteries, and no critical habitats for threatened or endangered species located within the corridor area.

UPPER TIMBER CREEK

VEGETATION IN OPTION B

VIEW OF EASEMENT IN OPTION B

FIGURE 7.12: TIMBER CREEK CONCEPTUAL ALIGNMENT



LEGEND

- Flower Mound town limits
- Parks
- Floodplain
- Schools
- Existing Trails and Bikeways
- Proposed Trails and Bikeways
- Multi-Use Trails
- On-Street Bikeways
- U.S Army Corps of Engineers (USACE)
- Equestrian
- Corridor Study Area
- Access Points
- Opportunities
- Conflict Points
- 8'-10' Trail

ESTIMATES OF PROBABLE COST

The costs shown in **Table 7.5** are at a pre-design and engineering level and are intended to be used as preliminary budgeting estimates. As additional details are determined in future planning, design, and engineering phases, these costs will likely change. See page 226 for a description of each of the categories.

Table 7.5: Corridor 5, Timber Creek Estimate of Probable Cost

Category	Estimate of Probable Cost	
	Option A	**Option B**
General	$141,000	$141,000
Demolition	$201,500	$241,800
Transportation	n/a	$2,500
Grading and Earthwork*	$92,200	$92,200
Paving	$440,600	$523,600
Structures	n/a	$245,000
Erosion Control	$35,000	$40,000
Landscaping	$89,200	$101,500
Irrigation	$27,500	$32,700
Subtotal	**$1,027,000**	**$1,420,300**
Contingency (20%)	**$205,400**	**$284,000**
Base Bid Total	**$1,232,400**	**$1,704,300**
Estimated Annual Trail Maintenance (2%)	**$24,600**	**$34,100**

Notes: Represents a preliminary cost estimate. Amounts are subject to change with additional planning, design, and engineering. Costs do not include land acquisition or site amenities.

**Grading and Earthwork are preliminary and subject to change based on future performance of in-field survey.*

ESTIMATES OF PROBABLE COST CATEGORY DESCRIPTIONS

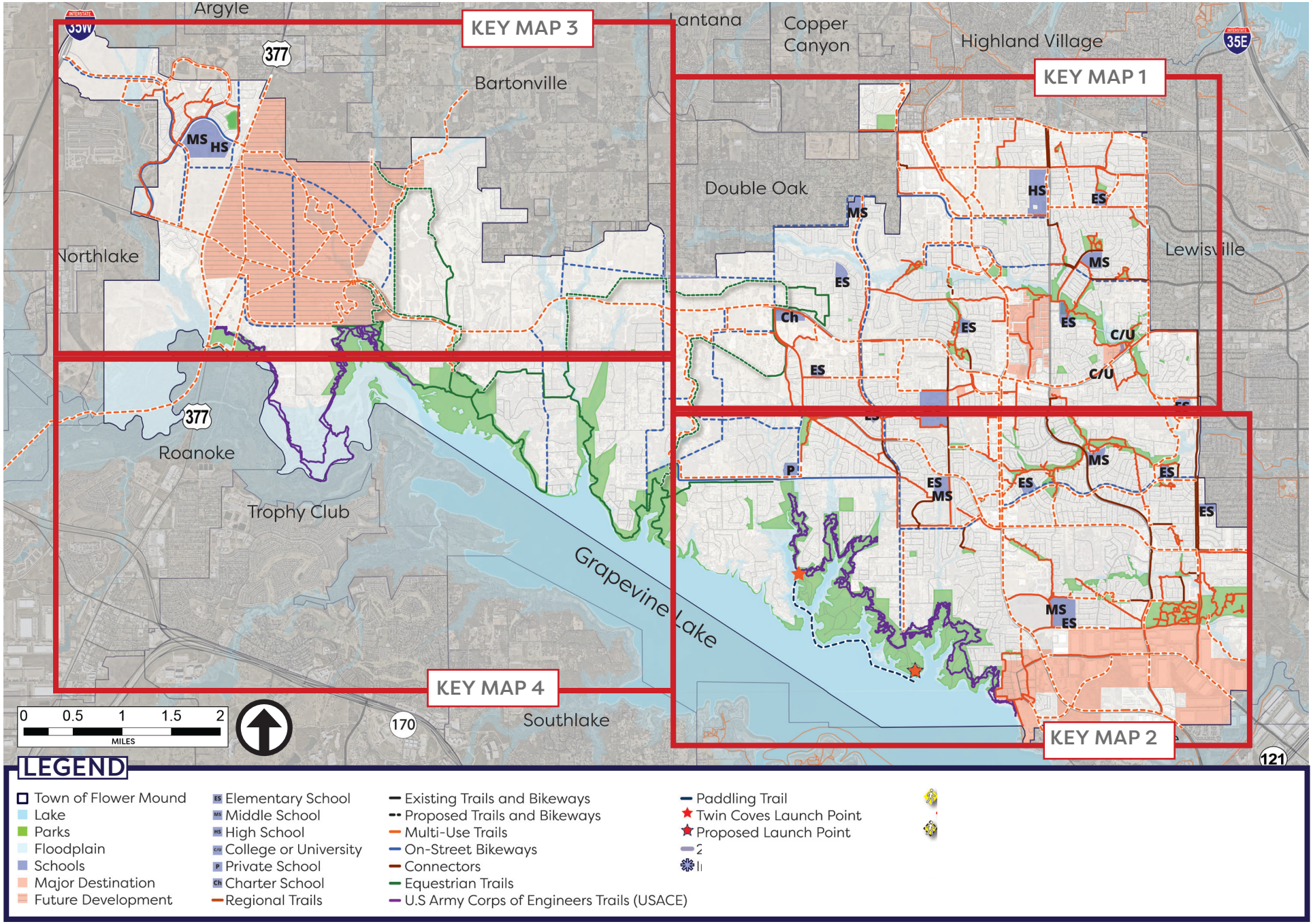
The following table includes descriptions of each of the categories included in the feasibility corridor estimates of probable cost. Not all of the elements listed in each category are applicable for each corridor.

Cost Estimate Category Descriptions

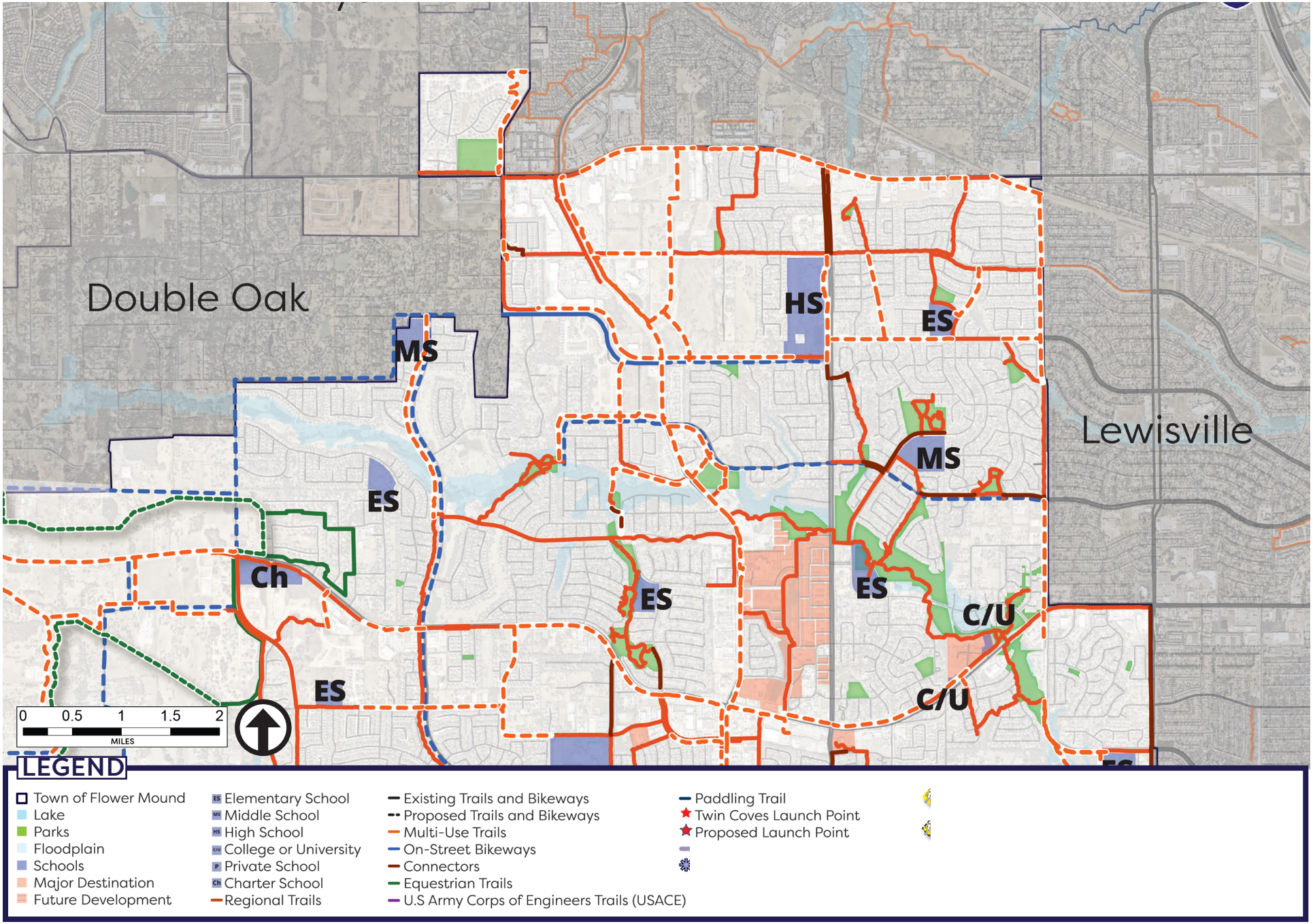
Category	Description
General	Mobilization, SWPPP Controls and Maintenance, Barricades, Signs and Traffic Handling, Aluminum Trail Signage and Posts, Emergency Signage (1/4 mile increments)
Demolition	Tree Protection, Preparing ROW, Removal of Concrete/Gravel/Concrete Embankment, Debris Removal, Relocate Small or Large Utility, Adjust Small or Large Utility, Relocate Existing Signs
Utilities	Culvert Pipe, Box Culvert Pipe, Headwalls
Transportation	Crosswalks, ADA Curb Ramps, Signage
Grading and Earthwork	Excavation, Embankment, Import/Export of Fill, Floodplain Mitigation Excavation, Backfilling Pavement Edges
Paving	Concrete Paving (6” Thickness), Concrete Curb and Gutter (6” Reinforced), 4” Solid White Pavement Markings (Surface Preparation, Sealer, Complete in Place)
Structures	Prefabricated Steel Truss Span Bridge, Cast-in-Place Cantilever Retaining Wall, Pedestrian Bridge Concrete Abutment, Boardwalk Concrete Abutment, Permatrak Precast Concrete Boardwalk, Permatrak Concrete Drill Shaft Boardwalk Piers
Erosion Control	Silt Fence (Install and Remove), Erosion Control Logs, Temporary Construction Entrance/Exit (Install and Remove)
Landscaping	Enhanced Planting Areas (Shade Trees, Ornamental Trees, and Shrubs), Area of Revegetation, Plant Maintenance
Lighting and Electric	Type B Solar Collector, Battery, Pole, Type B Remote Luminaire, Ground Box with Apron, Wiring, Disconnect Switch
Irrigation	Temporary/Permanent Irrigation

APPENDIX E: DETAILED MAPS

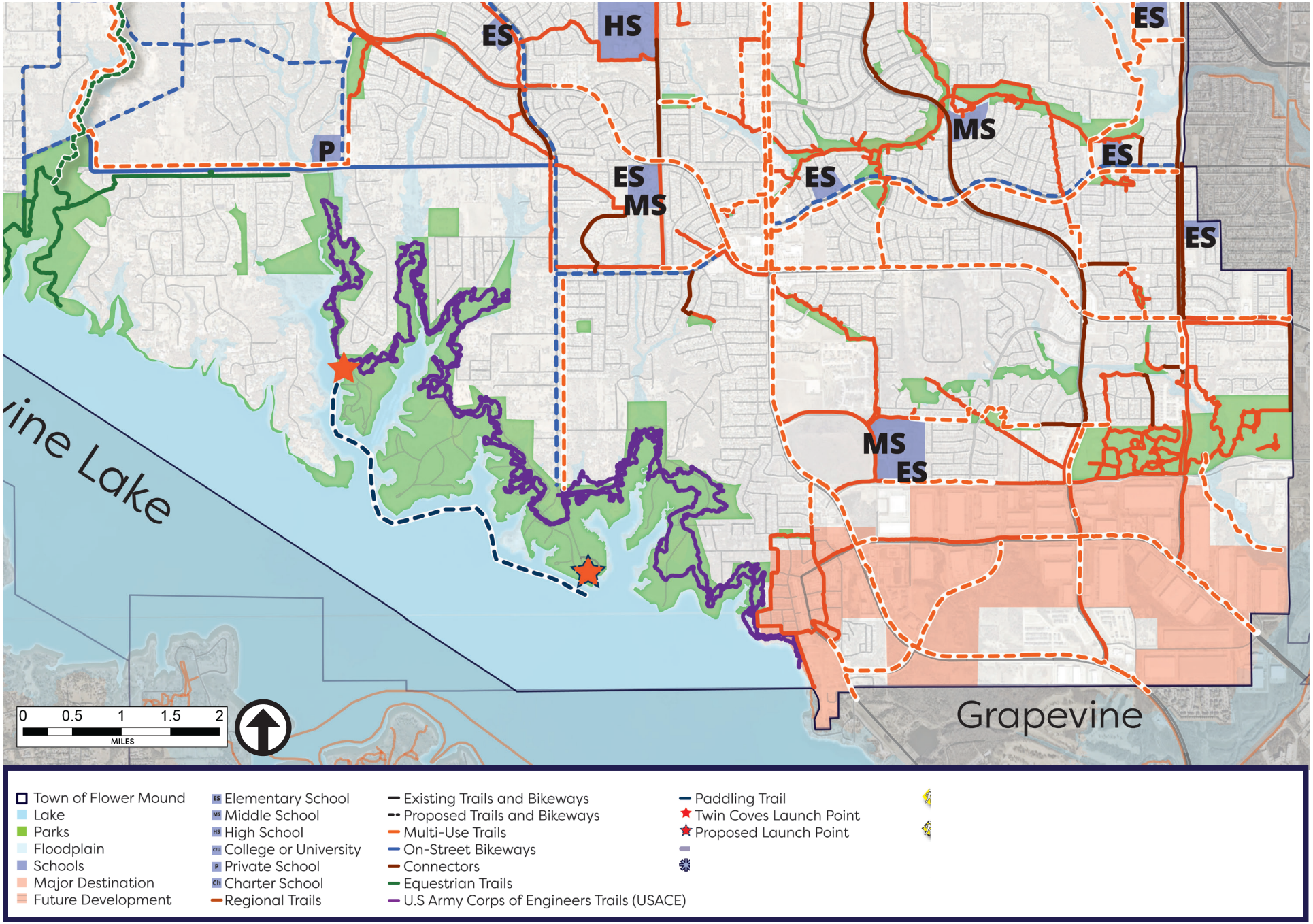
FLOWER MOUND EXISTING AND PROPOSED KEY MAP



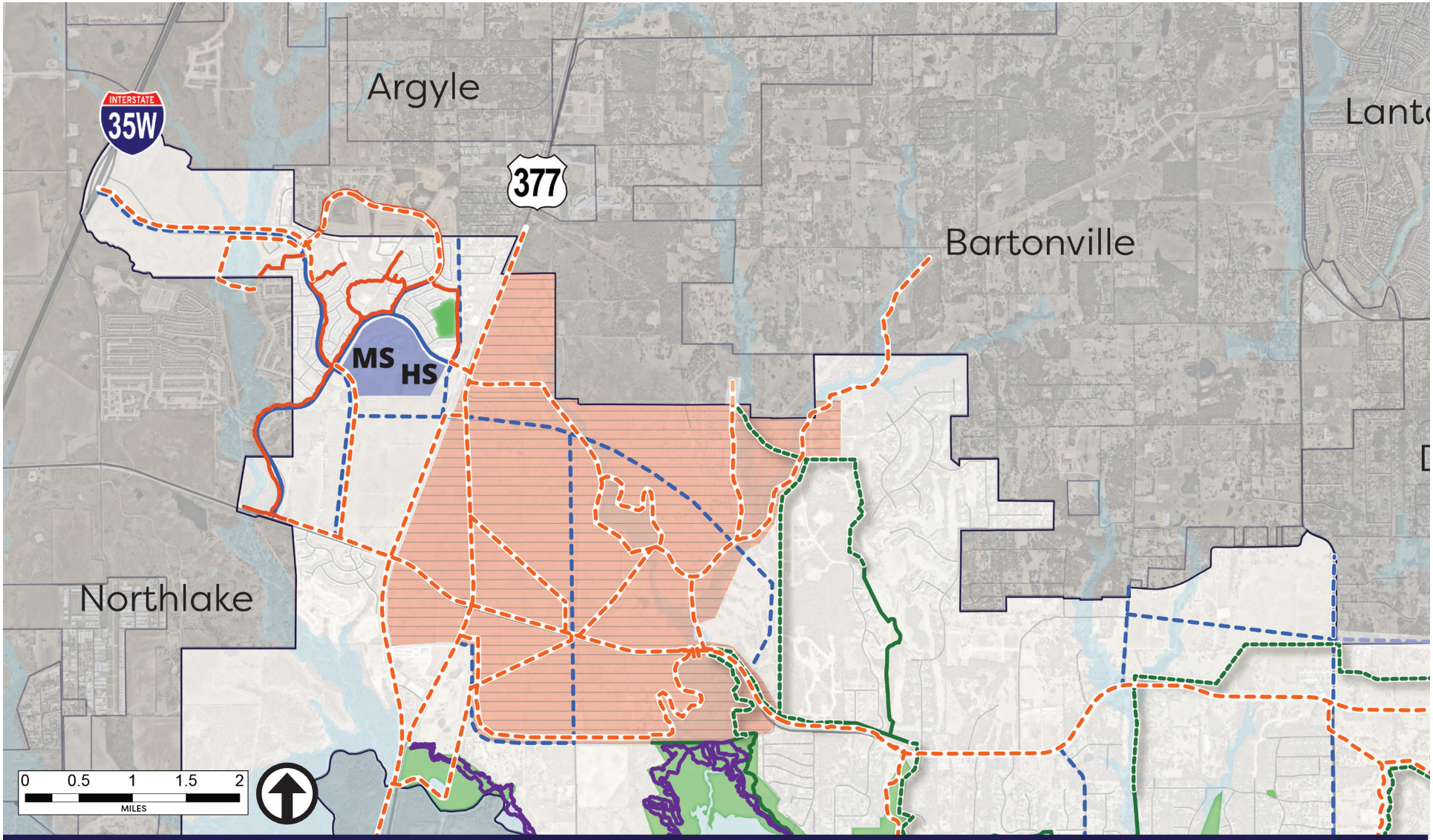
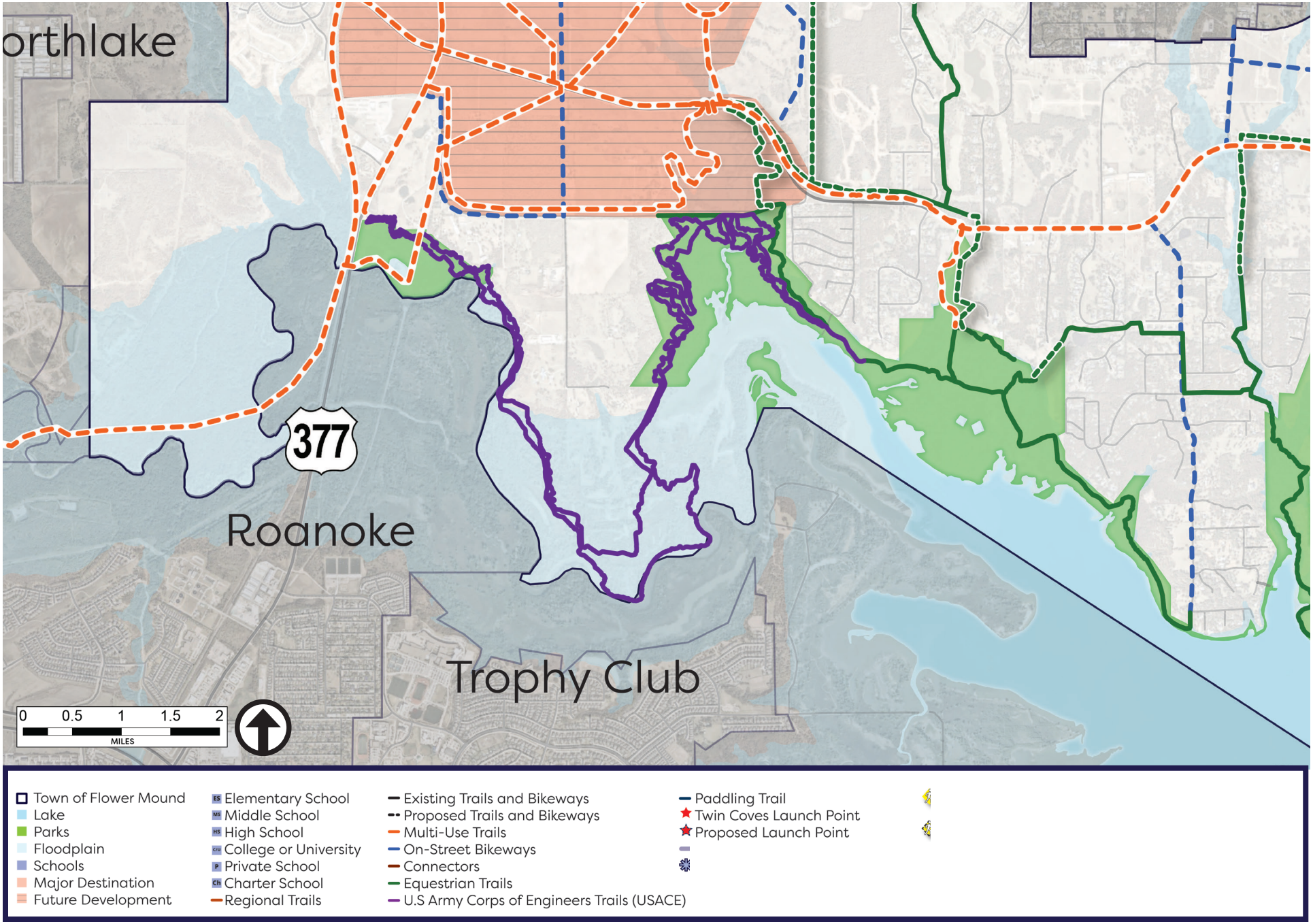
FLOWER MOUND EXISTING AND PROPOSED NETOWRK: KEY MAP 1



FLOWER MOUND EXISTING AND PROPOSED NETOWRK: KEY MAP 2



FLOWER MOUND EXISTING AND PROPOSED NETOWRK: KEY MAP 3



FLOWER MOUND EXISTING AND PROPOSED NETOWRK: KEY MAP 2