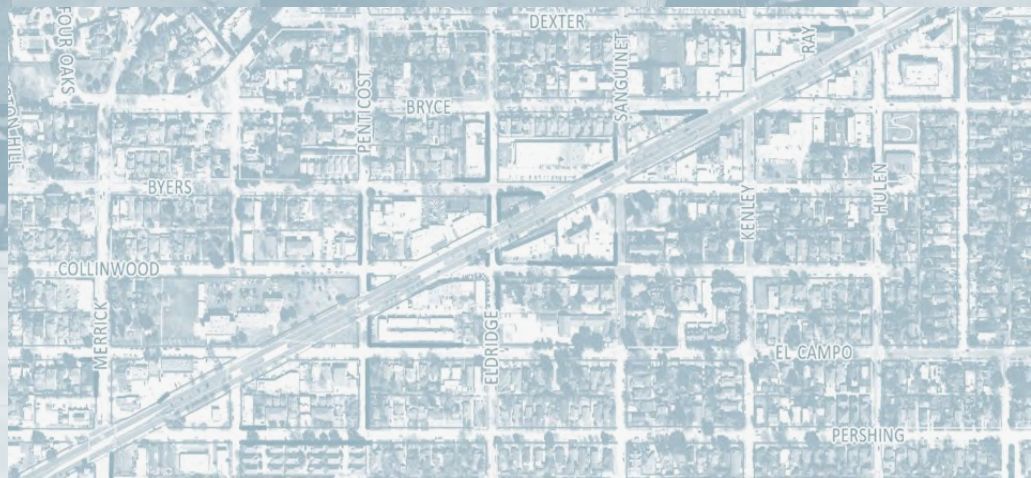
Pedestrian Access to Trinity Metro's High-Frequency Bus Route Study (Camp Bowie Bus Route 002)

September 2024
Final



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What is NCTCOG?

The **North Central Texas Council of Governments** (NCTCOG) is a voluntary association of, by, and for **local governments** within the 16-county North Central Texas Region. The agency was established by state enabling legislation in 1966 to assist local governments in **planning** for common needs, **cooperating** for mutual benefit, and **coordinating** for sound regional development. Its purpose is to strengthen both the individual and collective power of local governments, and to help them recognize regional opportunities, resolve regional problems, eliminate unnecessary duplication, and make joint regional decisions – as well as to develop the means to implement those decisions.

North Central Texas is a 16-county **metropolitan region** centered around Dallas and Fort Worth. The region has a population of more than 7 million (which is larger than 38 states), and an area of approximately 12,800 square miles (which is larger than nine states). NCTCOG has 235 member governments, including all 16 counties, 170 cities, 20 independent school districts, and 29 special districts.

NCTCOG's **structure** is relatively simple. An elected or appointed public official from each member government makes up the **General Assembly** which annually elects NCTCOG's **Executive Board**. The Executive Board is composed of 17 locally elected officials and one ex-officio non-voting member of the legislature. The Executive Board is the policy-making body for all activities undertaken by NCTCOG, including program activities and decisions, regional plans, and fiscal and budgetary policies. The Board is supported by policy development, technical advisory and study **committees** – and a professional staff led by **R. Michael Eastland**, Executive Director.

NCTCOG's offices are located in Arlington in the Centerpoint Two Building at 616 Six Flags Drive (approximately one-half mile south of the main entrance to Six Flags Over Texas).

North Central Texas Council of Governments
P. O. Box 5888
Arlington, Texas 76005-5888
(817) 640-3300

NCTCOG's Department of Transportation

Since 1974 NCTCOG has served as the Metropolitan Planning Organization (MPO) for transportation for the Dallas-Fort Worth area. NCTCOG's Department of Transportation is responsible for the regional planning process for all modes of transportation. The department provides technical support and staff assistance to the Regional Transportation Council and its technical committees, which compose the MPO policy-making structure. In addition, the department provides technical assistance to the local governments of North Central Texas in planning, coordinating, and implementing transportation decisions.

Prepared in cooperation with the Federal Highway Administration, US Department of Transportation, and the Texas Department of Transportation.

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September 2024

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Objective

The purpose of the ***Pedestrian Access to Trinity Metro's High-Frequency Bus Route Study*** (Study) is to identify gaps and barriers in the pedestrian network (sidewalks, multi-use paths, and crossings) within a quarter mile of the Camp Bowie Bus Route 002 corridor. The Study includes inventories of missing curb ramps, marked crosswalks, and spacing of marked crossings along the bus route. Additionally, the Study recommends pedestrian network improvements and includes an opinion of probable construction cost for related sidewalk projects.

This Study was prepared by North Central Texas Council of Governments (NCTCOG) staff and is intended to serve as a resource for Trinity Metro, the City of Fort Worth, and other stakeholders to plan for infrastructure improvements, and associated planning level costs, which will provide improved accessibility and safety for transit riders to access bus stops in the study area.

Introduction

Most transit riders have pedestrian trips before and after making a transit trip.[1] A complete, robust pedestrian network around the transit stop, amenities, and on-route destinations is essential for pedestrian safety, accessibility, and comfort.[2] Camp Bowie Bus Route 002 is one of Trinity Metro's high-frequency bus routes with buses every 15 minutes. Route 002 serves about 17 passengers per hour, nearly two passengers per mile, and is designated a route servicing low-income populations.[3] Due to Route 002 designation and frequency, it is a good candidate for sidewalk, crossing, and curb ramp evaluation to ensure transit riders, especially those who rely on transit, have pedestrian facilities so they complete their trips safely and comfortably.

This Study is supported by goals identified in the ***Draft Transit Moves | Fort Worth plan*** and the ***Fort Worth Active Transportation Plan (2019) (ATP).*** A goal of the ***Draft Transit Moves | Fort Worth*** plan is to improve access to transit. The Plan includes a strategy to implement pedestrian improvements that complete first- and last-mile connections to service stops, stations, and major destinations. The ***ATP*** further supports this goal as it identifies connections to transit as a network priority.

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[1] North Central Texas Council of Governments. 2023. *Regional Transit Onboard Origin Destination Survey 2022-2023*. https://www.nctcog.org/getmedia/fa685fde-cf5c-46ff-a57d-740880d3905d/NCT_Regional_2023Survey_FinalReport_Nov2123.pdf

[2] Federal Highway Administration. 2008. *Pedestrian Safety Guide for Transit Agencies*. https://safety.fhwa.dot.gov/ped_bike/ped_transit/ped_transguide/transit_guide.pdf

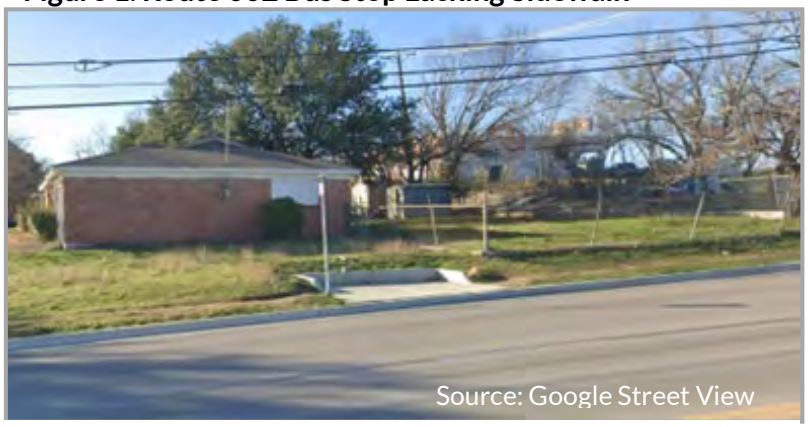
[3] Trinity Metro. 2023. *2023-2026. Title VI Program & Report*. https://ridetrinitymetro.org/wp-content/uploads/2023/01/2023-2026_TitleVI_Program__2020-2023_Report-20230120-min.pdf

In these Plans, Trinity Metro and the City of Fort Worth acknowledge that current transit services and active transportation networks surrounding these services must be improved to meet the growing demand. To help address these concerns, this Study is intended to identify gaps in pedestrian infrastructure (see example in **Figure 1**) and flag areas along Trinity Metro's Camp Bowie Bus Route 002 that may require further study to address challenges for existing and potential transit riders to safely access bus stops in the corridor.

Camp Bowie Bus Route Corridor

Camp Bowie Bus Route 002 traverses through downtown Fort Worth, the historic Camp Bowie Boulevard[4] west of downtown, US 377, Lackland Road, Calmont Avenue, Las Vegas Trail, and Laredo Drive in western Fort Worth. The western terminus is on Las Vegas Trail and the eastern terminus is on Jones Street in downtown Fort Worth. Along the route, there are stops located at many recreational, retail, residential, and employment destinations. The eastern portion of the corridor passes through the historic Arlington Heights neighborhood, Cultural District, and Downtown. The western portion of the corridor is more suburban in nature and passes through the neighborhoods of Como, Ridglea Hills, Ridglea North, Western Hills north, and adjacent to North Z Boaz Park.

Figure 1. Route 002 Bus Stop Lacking Sidewalk



This bus stop along Calmont Ave. near the intersection of Rio Vista, lacks a sidewalk connection. A "goat path" is visible in the grass from riders walking to access the bus stop.

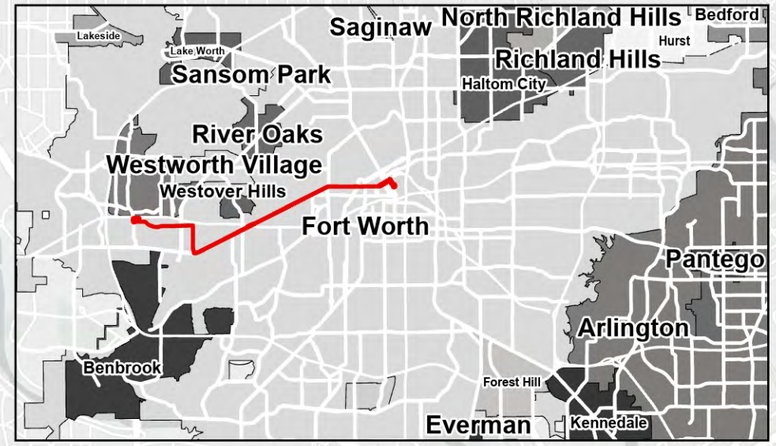
The historic character of the corridor and appealing cultural destinations present unique opportunities and challenges for pedestrian improvements. Improving pedestrian infrastructure and safe access to bus stops and major destinations could lead to increased transit ridership. Further, improvements could enhance the experience for those who rely on transit as a mode of transportation. However, due to the corridor location within an existing built environment, retrofitting existing roadways with new pedestrian infrastructure (i.e. sidewalks and curb ramps) often has more challenges and costs to implement compared to new roadway projects due to existing utilities and right-of-way constraints.

Study Area

The study area consists of a quarter mile walkshed buffer surrounding the high-frequency bus route corridor. **Figure 2 (Study Area)** identifies the bus route, bus stops, and quarter-mile walkshed included in this study.

[4] Historical Marker Database. 2023. https://www.hmdb.org/m.asp?m=30025

Figure 2. Study Area: Walkshed Surrounding Trinity Metro Camp Bowie High Frequency Bus Route 002



CALHOUN
HOUSTON
7TH
6TH
THROCKMORTON
JONES
FOREST PARK
UNIVERSITY
CAMP BOWIE
LAS VEGAS
LAREDO
CALMONT
GREEN OAKS
LACKLAND
HULEN
HORNE
Chisholm Trail Parkway
183
820
30
280
180
35W
580
377
121

Legend

- Bus Stops
- Camp Bowie Bus Route 002 (14 Miles)
- 1/4-Mile Walkshed Study Area

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0 1 Miles

Study Methodology

This study is based on methodology developed by NCTCOG as part of previous studies examining pedestrian access to rail stations operated by Dallas Area Rapid Transit (DART) and Denton County Transportation Authority (DCTA). The ***DART Red & Blue Line Corridors Last Mile Connections Project*** completed in 2021 provided a base framework for data collection and established recommendations for prioritizing future pedestrian infrastructure improvements around rail stations. A similar approach was used for this study to document and examine existing gaps in pedestrian infrastructure and prepare recommendations for priority improvements. This methodology served as a template for analysis to improve access to bus stops along the Trinity Metro high-frequency bus route.

Source: NCTCOG

Sidewalk Inventory Base Data Collection

Existing sidewalk data was provided from the ***Fort Worth Active Transportation Plan*** completed in 2019. NCTCOG aerial imagery and Google Street View were used to review roadways within a quarter mile radius of Camp Bowie Bus Route 002 to identify/update existing sidewalks, sidewalk gaps, and curb ramps. All identified infrastructure was digitized in Geographic Information System (GIS) to create an active transportation network dataset that could be used to identify locations in the network that need improvement.

Population and Employment Base Data Collection

The study developed a population density database at the property parcel level to estimate the maximum potential number of people in the study area at any given time, including the number of residents, employees, and daily visitors on each parcel. Data is based on the reported size and use of each building. Base data was derived from the 2021 Tarrant Appraisal District Annual Report and the NCTCOG 2020 Land Use data developed by NCTCOG's Research and Information Services Department. NCTCOG staff updated and quality-controlled building size and land use data using aerial imagery, Google Street View, and other development data.

The property level density estimates were used to help prioritize the sidewalk gaps and to calculate the total number of potential transit riders at the street block level. Emphasis was placed on identifying sidewalk gaps that, if improved with new sidewalks, could maximize the number of potential transit riders who could access existing bus stops.

Prioritization of Improvements for Implementation

Prioritization of Improvements for Implementation Methodology

Sidewalk gaps located directly along the Camp Bowie Bus Route 002 corridor were designated as the highest priority for improvement since implementing a sidewalk project directly on the corridor would result in direct access to the route and major destinations along the route. Sidewalk gaps along streets within the study area that were not located directly on the bus route corridor were prioritized using the criteria of:

- Population Density: project-group population and employment data, and
- Proximity: distance to bus route.

Existing sidewalk gaps within the bus route quarter-mile buffer were grouped on a block-by-block basis into a "project group". For this analysis, a project group is defined by its limits between street intersections and includes sidewalk gap segments on both sides of the roadway. Project groups, therefore, consider the total number of people that would benefit if a sidewalk was constructed. Project group population and employment density were calculated by determining the routes people would likely take to reach the bus stop from their respective parcel and assigning the parcel population numbers to the sidewalk gaps used to complete this trip.

Sidewalk gaps located along the bus route corridor were classified as highest priority for implementation. Other sidewalk gaps not directly located along the bus route corridor were scored based on the number of people (project group population and employment) that would benefit if a sidewalk was constructed and the distance the gap is located from the nearest bus stop.

Sidewalk gap block groups were scored using the criteria outlined in **Table 1 (Sidewalk Gap Priority Improvement Matrix).**

Table 1. Sidewalk Gap Priority Improvement Matrix

Distance from Bus Route (ft)	Number of People (Population/Employment) on Surrounding Parcel(s)			
	501+	251 - 500	51 - 250	0 - 50
Along or directly connecting to the Bus Route Corridor	**High Priority**	**High Priority**	**High Priority**	**High Priority**
1-330 feet	**High Priority**	**High Priority**	**High Priority**	**Medium Priority**
331-660 feet	**High Priority**	**High Priority**	**Medium Priority**	**Low Priority**
661+ feet	**High Priority**	**Medium Priority**	**Low Priority**	**Low Priority**

Opinion of Probable Construction Cost

Table 2 (Opinion of Probable Construction Cost) identifies the assumptions for planning level opinions of probable construction cost (OPCC) identified to implement improvements associated with each high-, medium-, and low-priority block in the study area. A base opinion of probable construction cost of an average of $386 per linear foot was used for sidewalk construction based on the 2024 planning level costs used by the City of Fort Worth for comparable sidewalk projects. This base cost provides a high-level engineering cost estimate for items such as survey and design, right-of-way, community engagement, and the city's Transportation and Public Works Capital Delivery Division project management for identified blocks needing improvement within the study area.

The OPCC does not include specialty construction items that could be included in a project based on the context of the project area, such as: utility relocation (lines, poles, boxes); railroad crossings; traffic signals (Rectangular Rapid Flashing Beacon (RRFB), Pedestrian Hybrid Beacon, Accessible Pedestrian Signal (APS)/ Pedestrian Countdown Signal); illumination; retaining walls; driveway reconstruction; drainage culverts; and reinforced concrete pipe (RCP). Thus, a more detailed engineering cost estimate should be developed for each improvement area before finalizing funding needed for project implementation.

Table 2. Opinion of Probable Construction Cost

Construction Items Included in Base Cost	
Sidewalk (5 ft. width)	
Pedestrian Ramps	
Curb and Gutter Repair	
Drainage Inlet (modify)	
Pavement Markings (crosswalks)	
Utility Adjustments (fire hydrant, manholes)	
Signage Adjustments	
Engineering Design	20%
Inflation	4%
General Landscaping	4%
SWPPP	2%
Traffic Control	3%
Mobilization	4%
Federal Contingency	2%
Base Cost per Linear Foot	**$ 386.00**

Prioritization of Improvements for Implementation Findings

As shown in the map series included with **Figure 3 (Recommended Sidewalk Construction)**, within the quarter mile radius of Camp Bowie Bus Route 002, there are 617 blocks with various amounts of sidewalk gaps. Overall, a total of 64 miles of sidewalk gaps were identified. Pedestrian facilities in the public right-of-way should be constructed following guidelines established in the ***Public Right-of-Way Accessibility Guidelines*** (PROWAG). Constructing sidewalks following PROWAG will increase accessibility to bus stops and destinations for those with disabilities. Additionally, constructing sidewalk improvements to remove gaps in the sidewalk network provides connections to existing sidewalk facilities which would significantly improve the number of people with access to the bus stops along Route 002. These improvements to the sidewalk network would also provide better access to major destinations throughout the corridor thus improving access for both residents and visitors.

Opinion of probable construction cost identified more than $130 million in base construction costs (2024 dollars) is needed to implement all identified sidewalk gaps within the quarter mile radius of Camp Bowie Bus Route 002 corridor, not including specialty construction items or engineering that may be necessary within the project area. **Table 3 (Sidewalk Gap Construction Prioritization and Probable Cost)** identifies the total linear feet and the associated planning level costs for the identified sidewalk gaps.

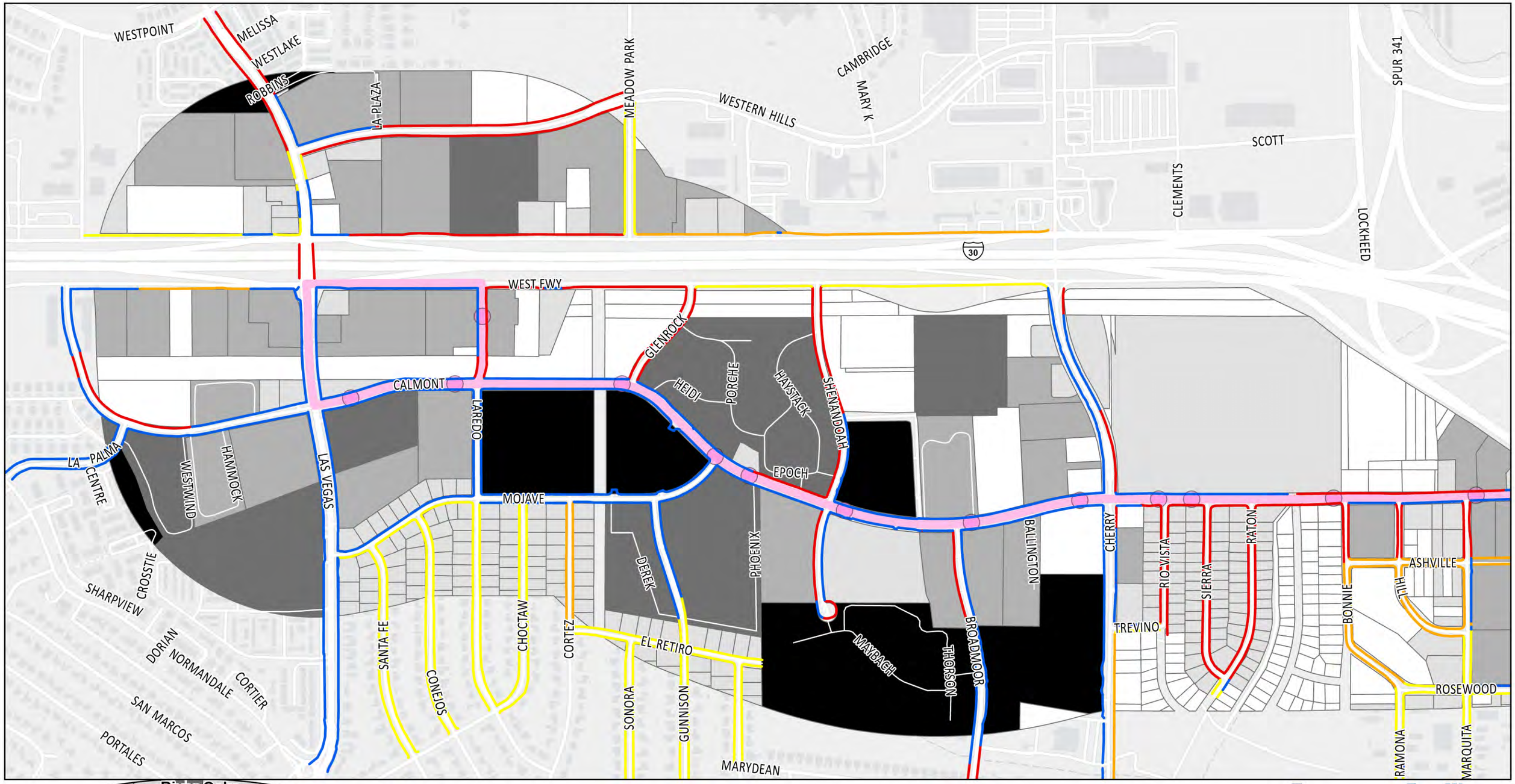
Table 3. Sidewalk Gap Construction Prioritization and Probable Cost

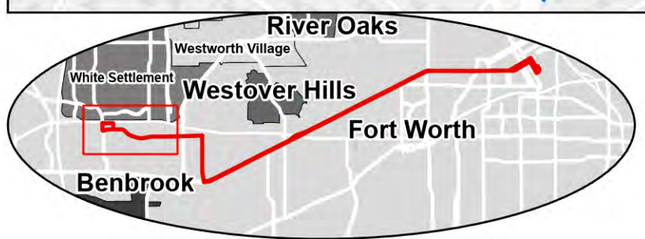
Recommended Sidewalk Construction Priority	Number of Sidewalk Gap Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	207	99,354	19	$38,350,548.50
Medium	123	73,250	14	$28,274,347.48
Low	287	166,852	32	$64,404,737.57
Total	**617**	**339,455**	**64**	**$131,029,633.55**

Given the magnitude of need identified in the study area, sidewalk gap project groups were further subdivided into subareas to assist with strategically prioritizing infrastructure improvements around the corridor with the greatest need as funding is available. Subareas were determined considering 1) Council District boundaries, 2) major thoroughfare or arterial crossings, and 3) the magnitude of sidewalk needs. **Figure 4 (Recommended Sidewalk Construction Priority by Subarea)** illustrates the subareas with the recommend prioritization of project groups. **Table 4 (Sidewalk Gap Construction Prioritization and Probable Cost by Subarea)** identifies the planning level cost and environmental justice areas.

Figure 3. Recommended Sidewalk Construction

along Camp Bowie Bus Route 002





Sidewalk Gaps Recommended Improvement Priority

- High
- Medium
- Low

Population Density

Ranges represent estimated potential number of people per parcel

8

- 0
- 1-50
- 51-250
- 251-500
- 501+

- Existing
- Route 002
- Bus Stops

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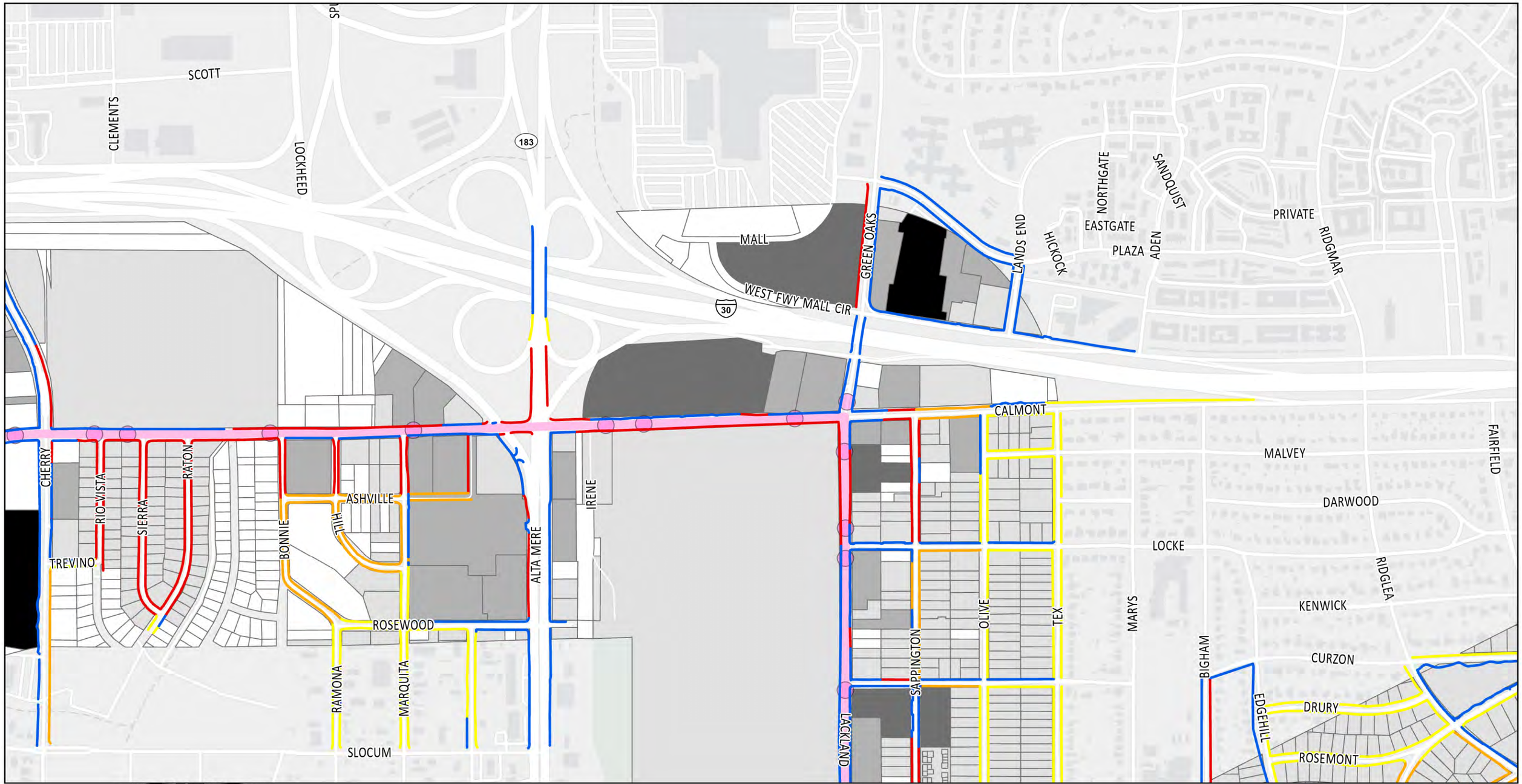
0 0.25 Miles

Figure 3. Recommended Sidewalk Construction

along Camp Bowie Bus Route 002



Sidewalk Gaps Recommended Improvement Priority

- High
- Medium
- Low

Population Density

Ranges represent estimated potential number of people per parcel

9

0	
1-50	
51-250	
251-500	
501+	

- Existing
- Route 002
- Bus Stops

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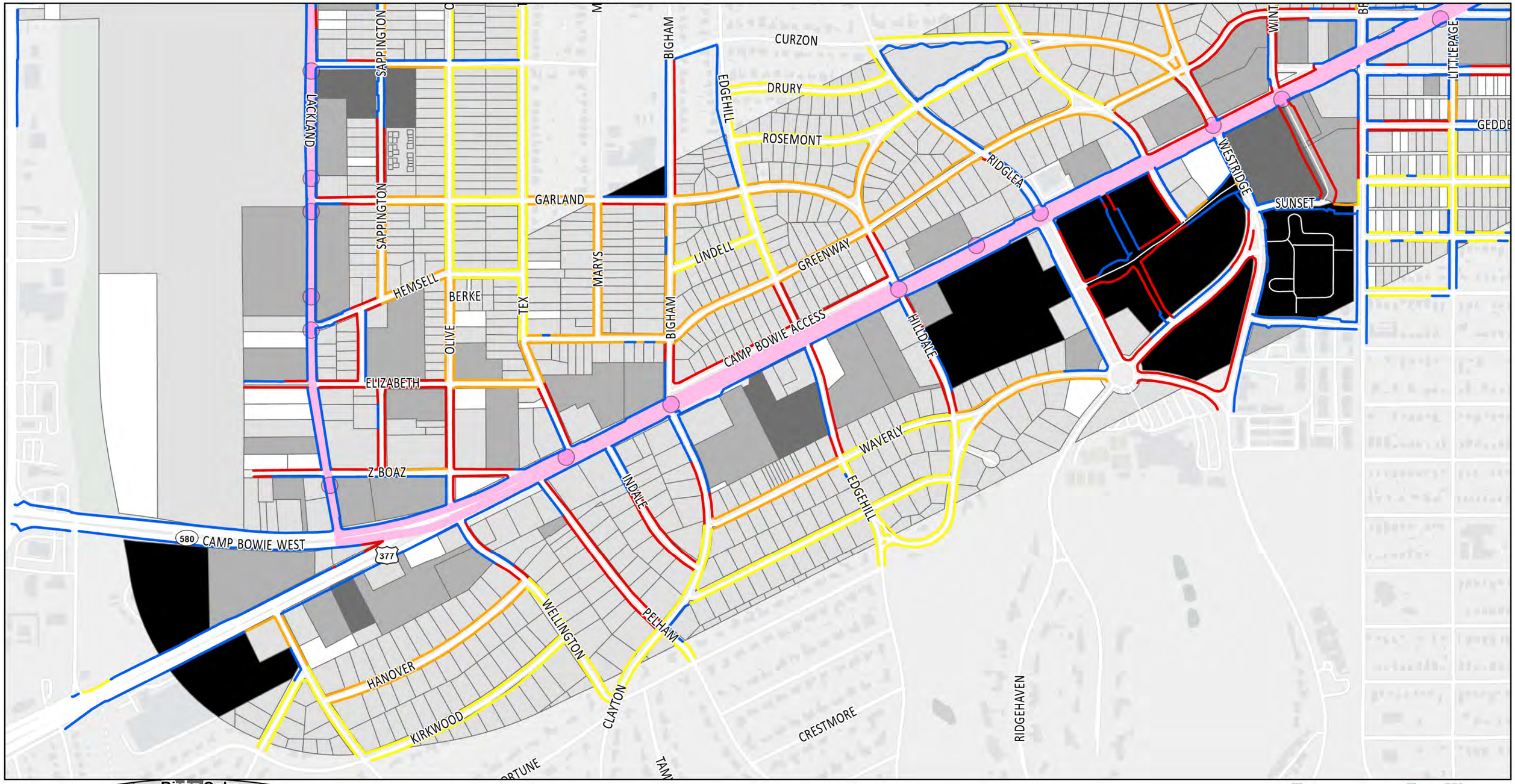

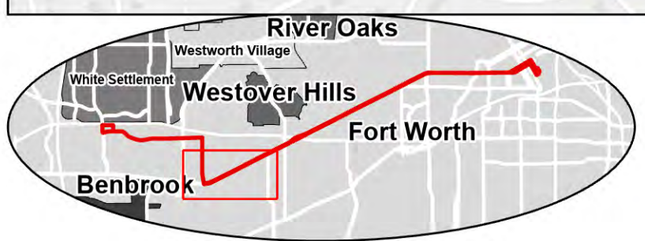

Sidewalk Gaps Recommended Improvement Priority

- High
- Medium
- Low

Population Density

Ranges represent estimated potential number of people per parcel

10

0	
1-50	
51-250	
251-500	
501+	

- Existing
- Route 002
- Bus Stops

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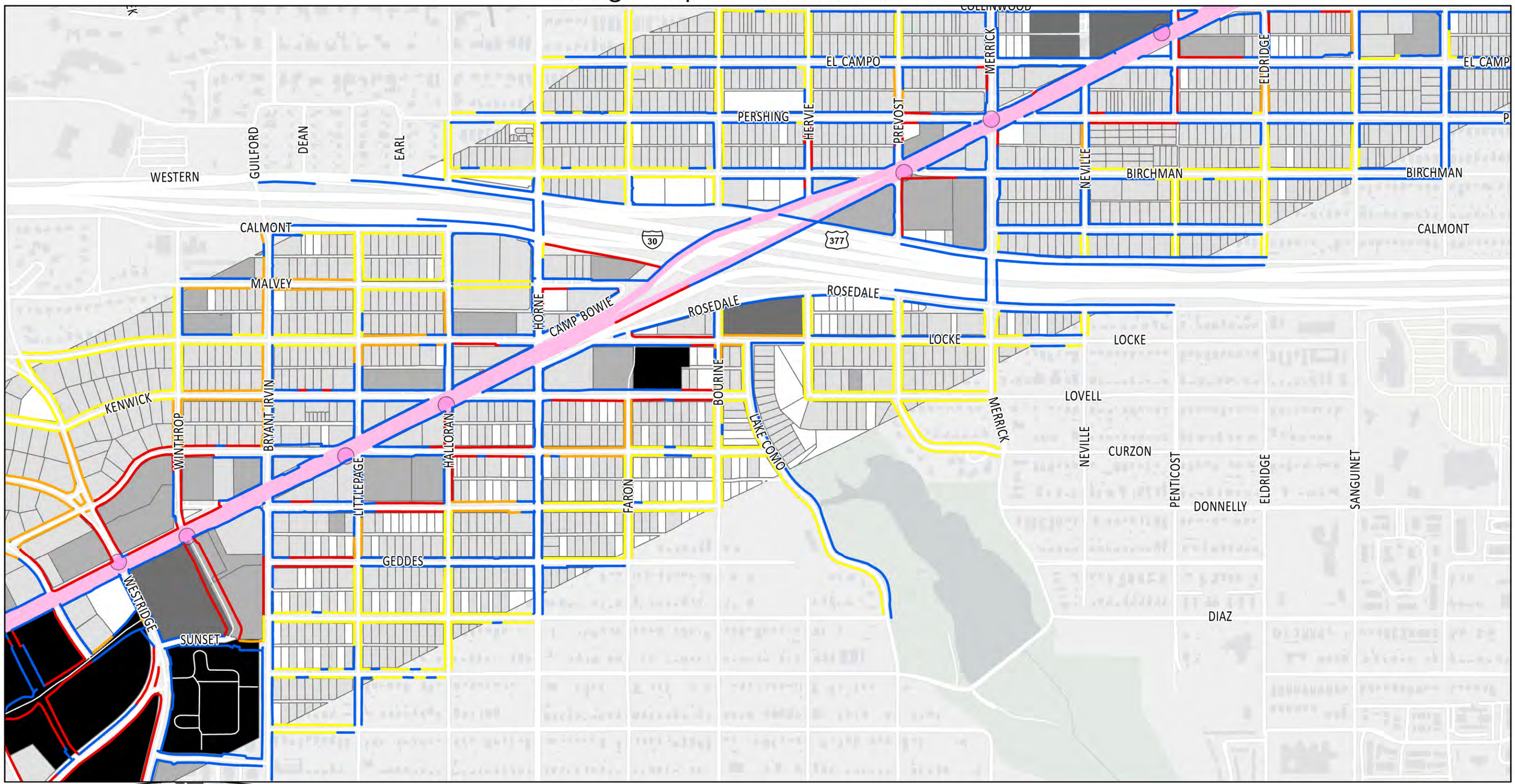
0 0.25 Miles

Figure 3. Recommended Sidewalk Construction

along Camp Bowie Bus Route 002



Sidewalk Gaps Recommended Improvement Priority
- High
- Medium
- Low

Population Density
Ranges represent estimated potential number of people per parcel
11

0	
1-50	
51-250	
251-500	
501+	

- Existing
- Route 002
- Bus Stops

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0 0.25 Miles

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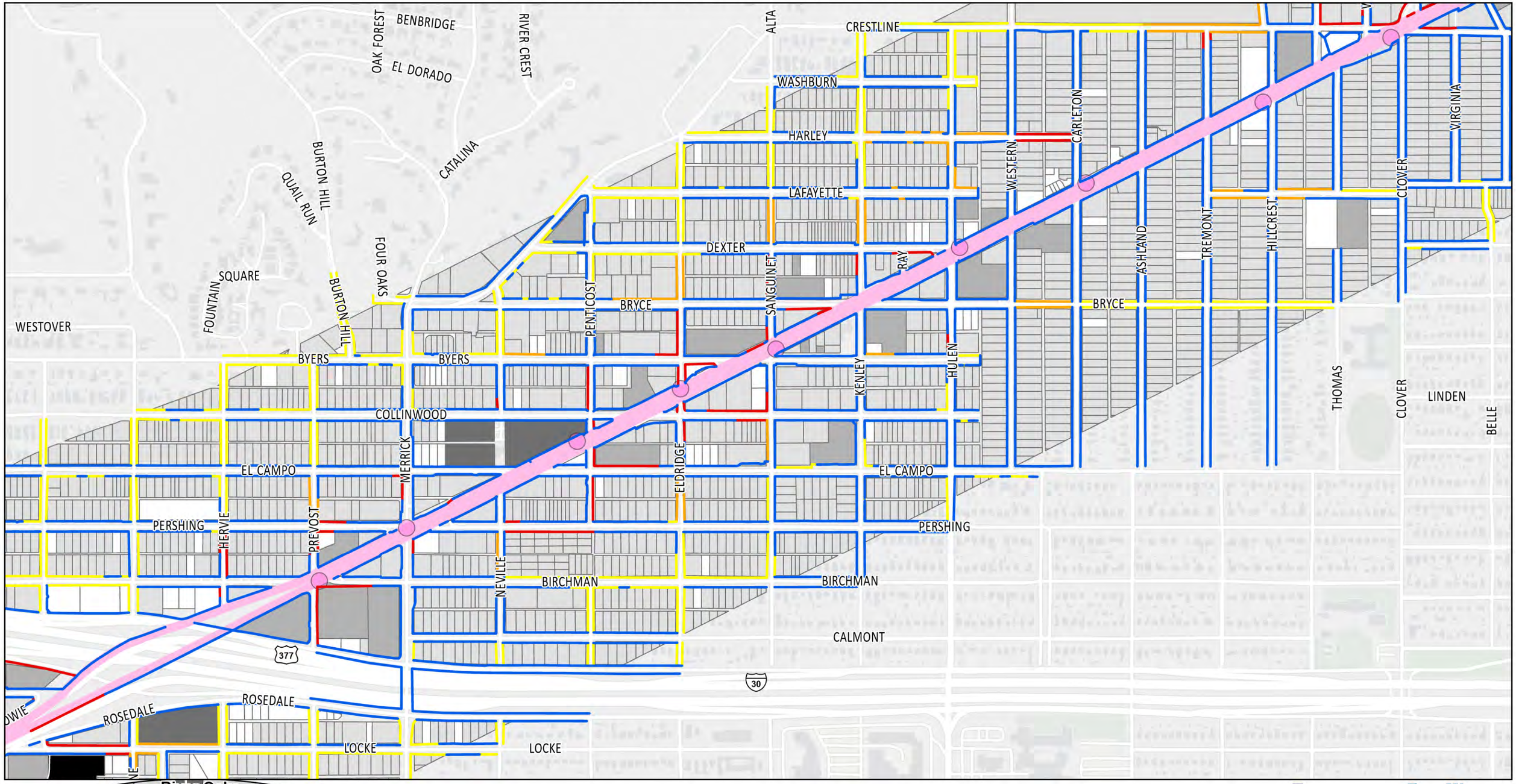
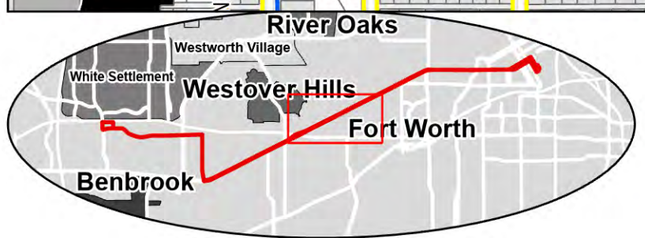
along Camp Bowie Bus Route 002





Sidewalk Gaps Recommended Improvement Priority

- High
- Medium
- Low

Population Density

Ranges represent estimated potential number of people per parcel

12

0	
1-50	
51-250	
251-500	
501+	

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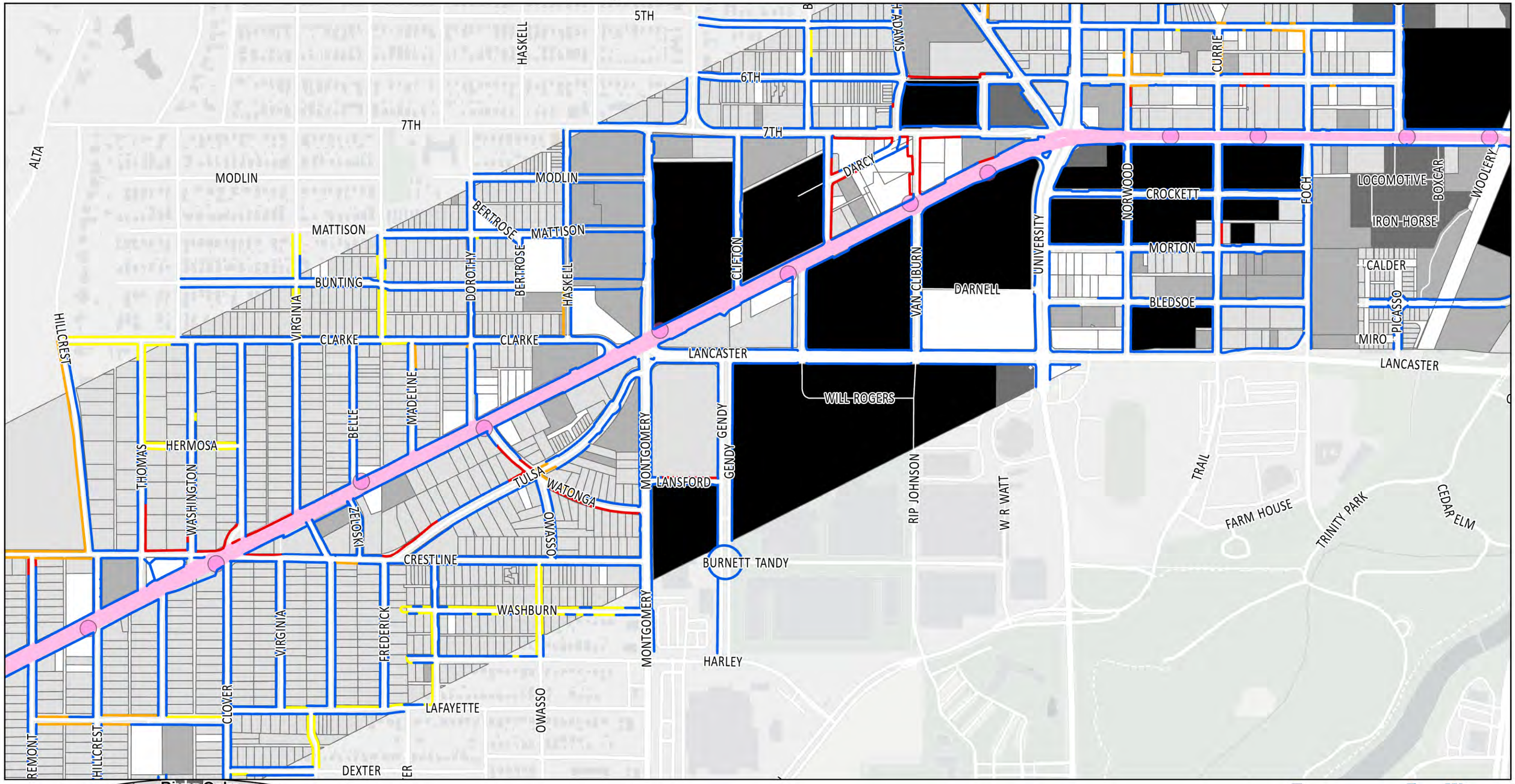

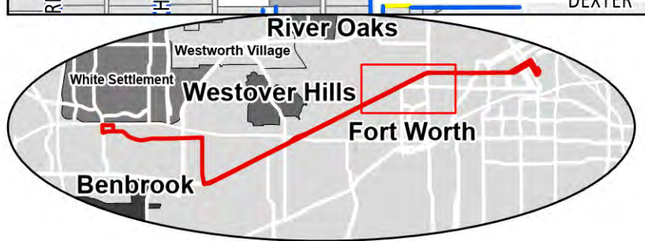

Sidewalk Gaps Recommended Improvement Priority

- High
- Medium
- Low

Population Density

Ranges represent estimated potential number of people per parcel

13

0	
1-50	
51-250	
251-500	
501+	

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- Route 002
- Bus Stops

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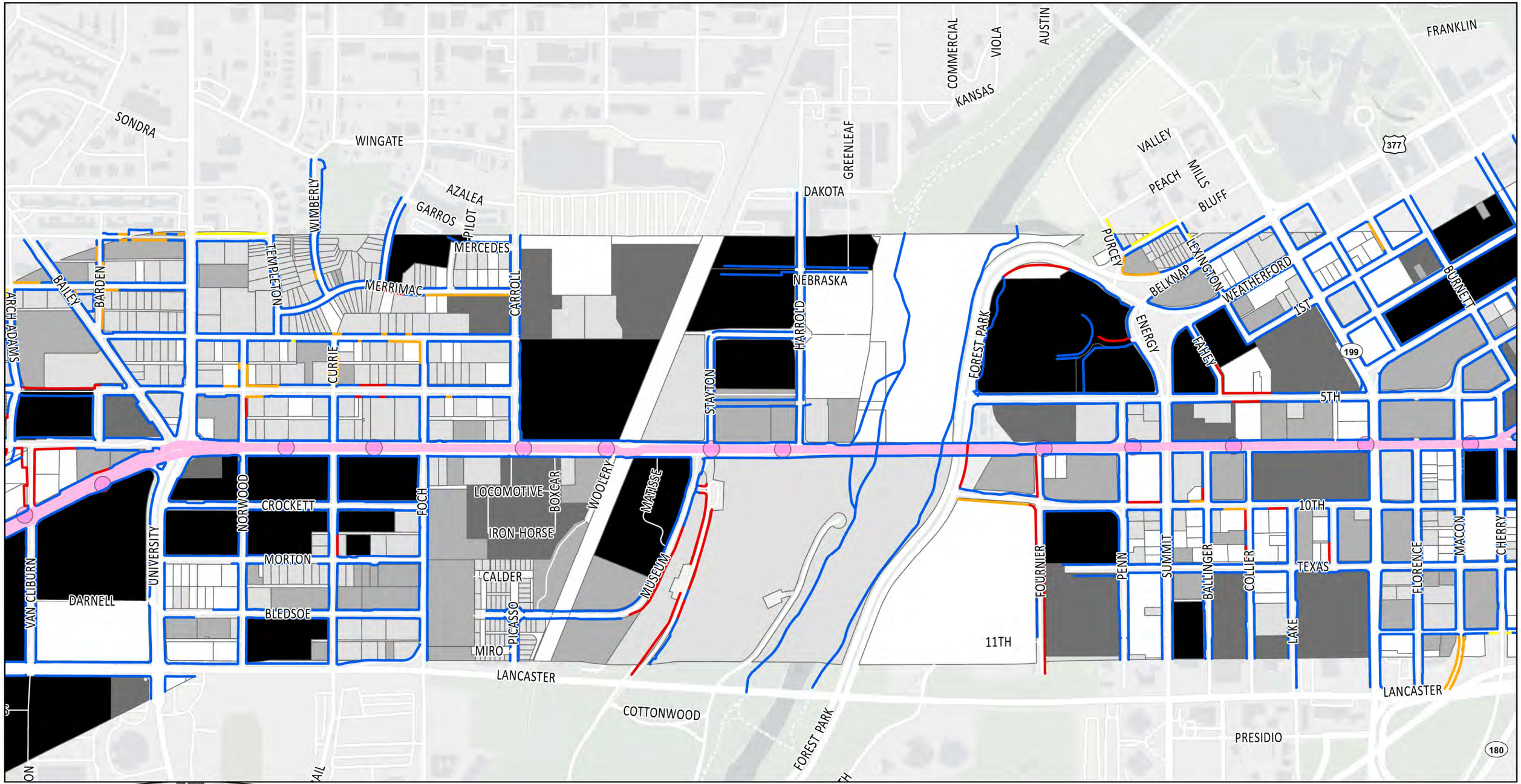
0 0.25 Miles

Figure 3. Recommended Sidewalk Construction

along Camp Bowie Bus Route 002



Sidewalk Gaps Recommended Improvement Priority

- High
- Medium
- Low

Population Density

Ranges represent estimated potential number of people per parcel

14

0	
1-50	
51-250	
251-500	
501+	

- Existing
- Route 002
- Bus Stops

TRINITY METRO

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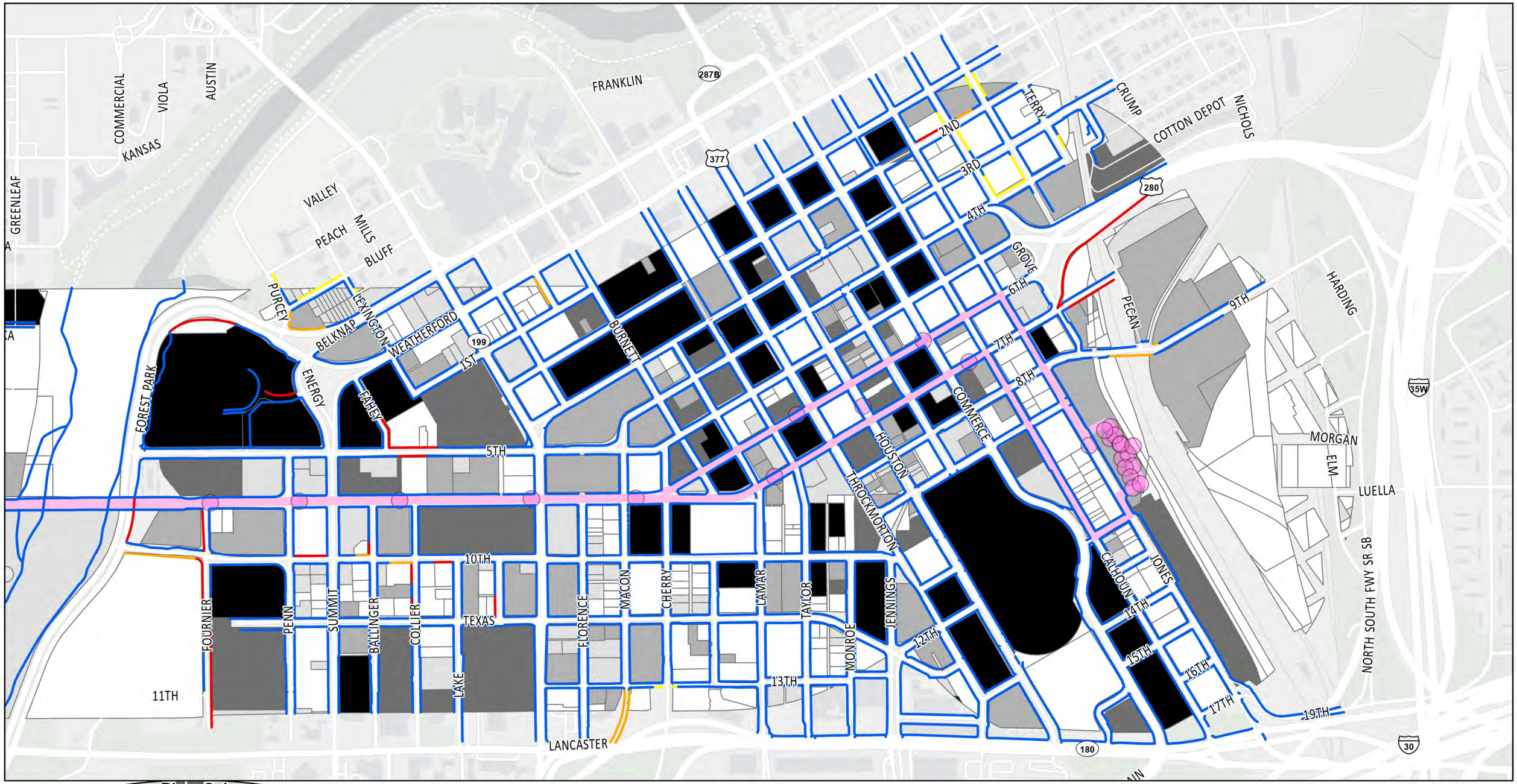
North Central Texas Council of Governments

0 0.25 Miles

Figure 3. Recommended Sidewalk Construction

along Camp Bowie Bus Route 002



Sidewalk Gaps Recommended Improvement Priority

- High
- Medium
- Low

Population Density

Ranges represent estimated potential number of people per parcel

15

0	
1-50	
51-250	
251-500	
501+	

- Existing
- Route 002
- Bus Stops

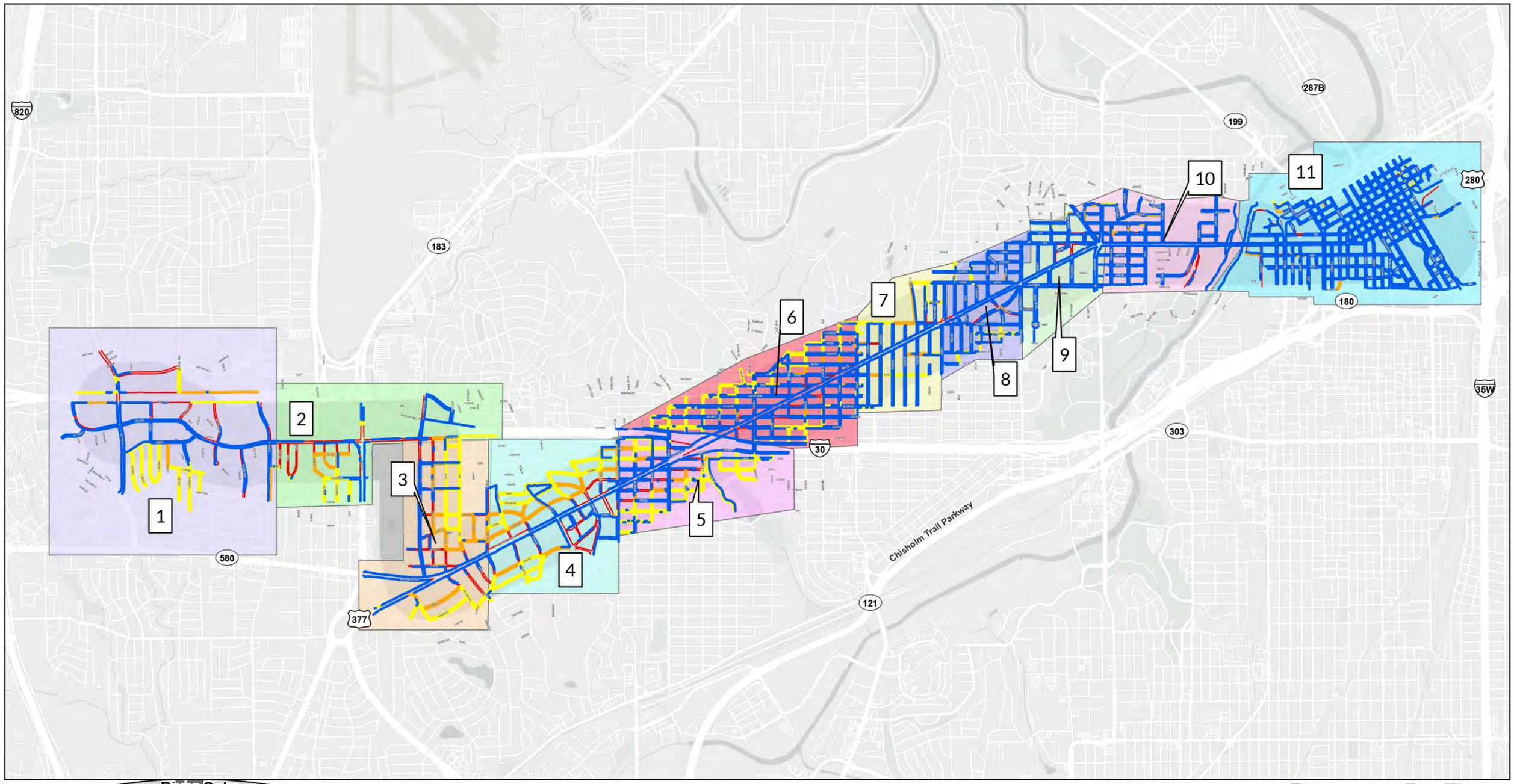
TRINITY METRO

FORT WORTH

North Central Texas Council of Governments

0 0.25 Miles

Figure 4. Recommended Sidewalk Construction Priority by Subarea



Sidewalk Gaps Recommended Improvement Priority

- High
- Medium
- Low

Subarea

1 2 3 4 5 6 7 8 9 10 11

- Existing
- Walkshed (1/4-mile)

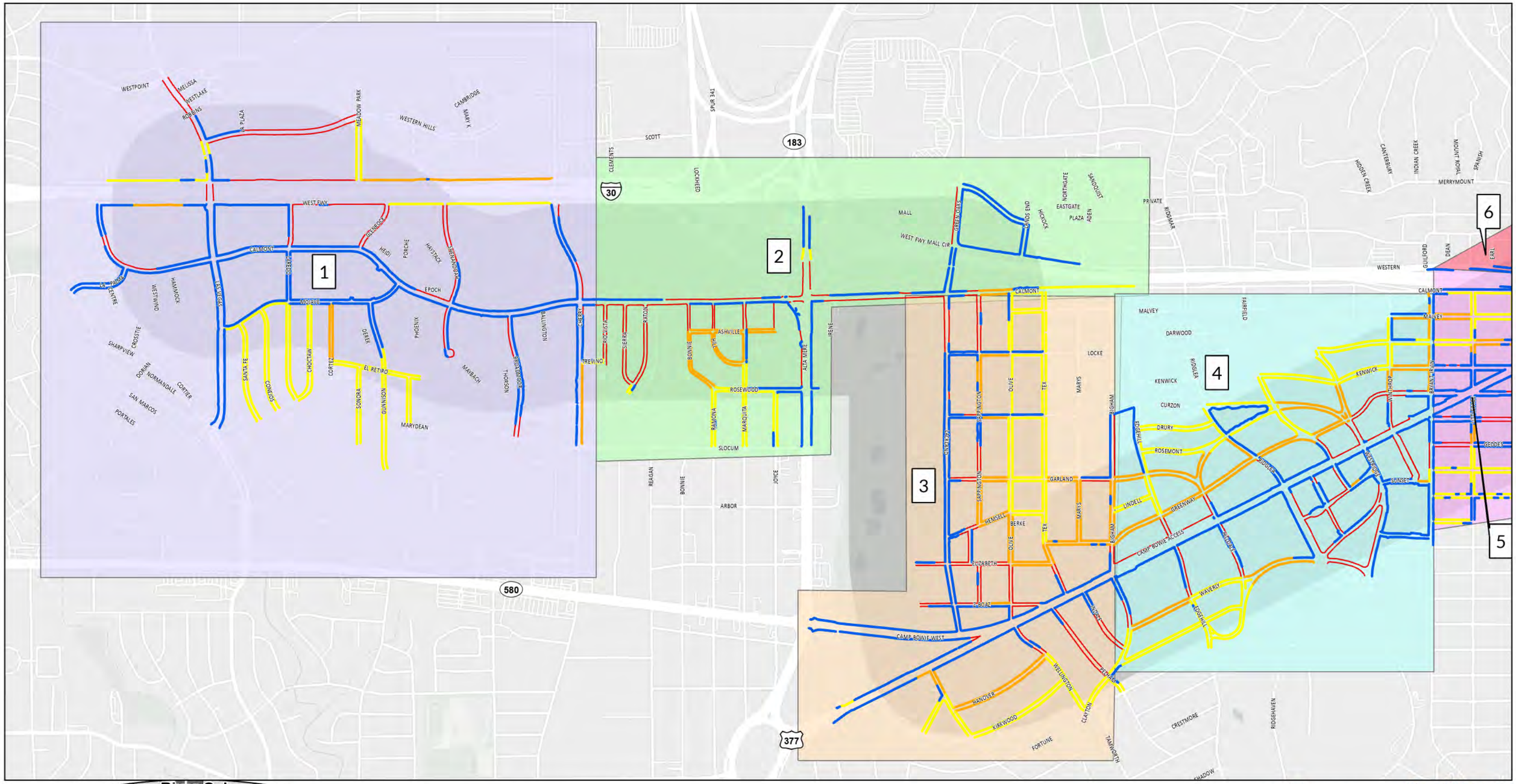
TRINITY METRO

FORT WORTH

North Central Texas Council of Governments

0 0.5 1 1.5 Miles

Figure 4. Recommended Sidewalk Construction Priority by Subarea



Sidewalk Gaps Recommended Improvement Priority
- High
- Medium
- Low

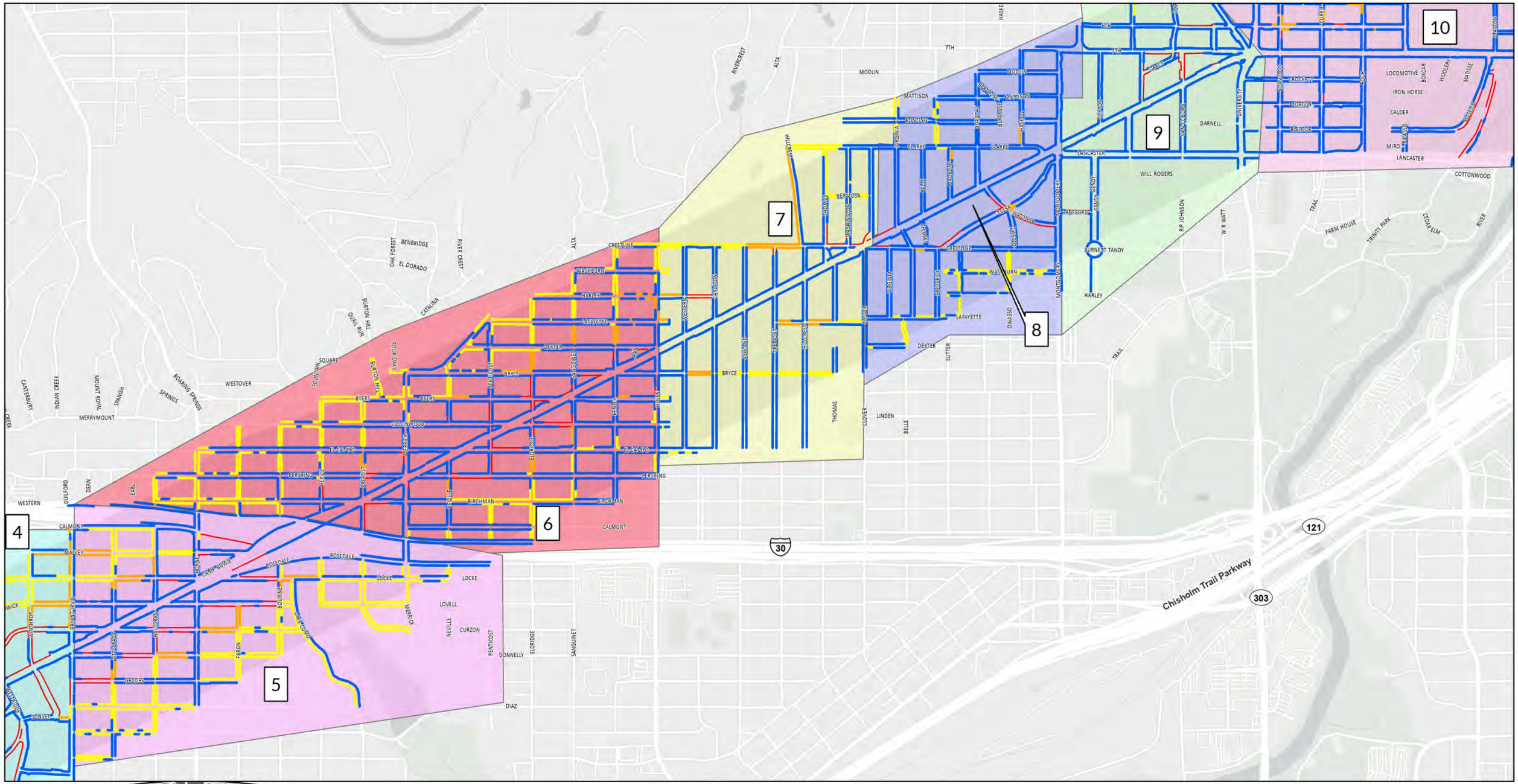
Subarea
1 2 3 4 5 6 7 8 9 10 11

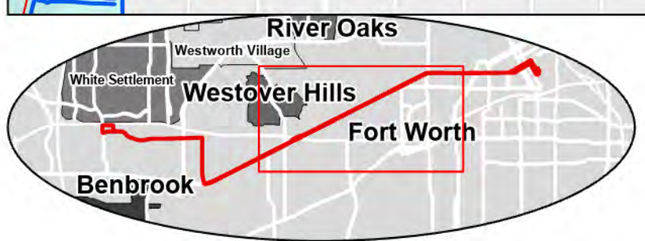
- Existing
- Walkshed (1/4-mile)

TRINITY METRO
FORT WORTH
North Central Texas Council of Governments

0 0.5 Miles

Figure 4. Recommended Sidewalk Construction Priority by Subarea





Sidewalk Gaps Recommended Improvement Priority
- High
- Medium
- Low

Subarea

1	4	7	10
2	5	8	11
3	6	9	

- Existing
- Walkshed (1/4-mile)

TRINITY METRO

FORT WORTH

North Central Texas Council of Governments

0 0.5 Miles

Figure 4. Recommended Sidewalk Construction Priority by Subarea

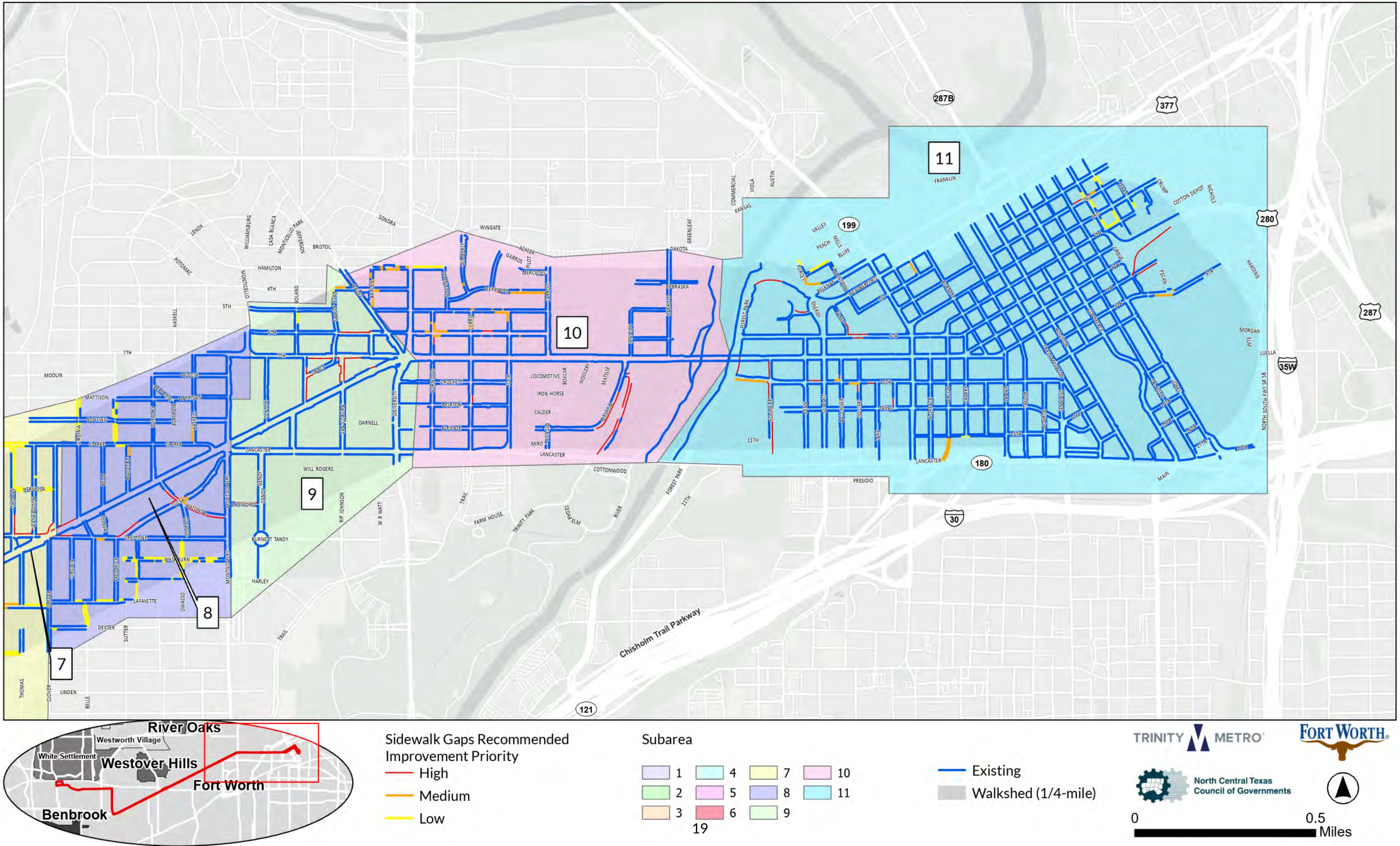


Table 4. Sidewalk Gap Construction Prioritization and Probable Cost by Subarea[5]

Subarea	High	Medium	Low	Total
1	$6,625,699.15	$2,293,524.04	$10,078,961.42	$18,998,184.61
2	$6,163,329.54	$2,501,095.47	$3,262,827.27	$11,927,252.27
3	$6,940,435.86	$6,623,423.74	$8,928,896.28	$22,492,755.87
4	$6,865,693.54	$7,724,841.90	$10,398,399.40	$24,988,934.83
5	$2,837,142.95	$2,437,790.08	$11,689,925.26	$16,964,858.30
6	$2,748,313.01	$2,027,167.92	$12,988,476.78	$17,763,957.71
7	$742,031.47	$1,948,174.47	$3,392,163.78	$6,082,369.71
8	$807,270.24	$430,084.97	$2,674,387.80	$3,911,743.01
9	$1,249,789.42	$84,527.33	$113,357.64	$1,447,674.38
10	$1,247,127.09	$1,299,921.23	$182,209.52	$2,729,257.84
11	$2,123,716.25	$903,796.34	$695,132.42	$3,722,645.01
Total	**$38,350,548.50**	**$28,274,347.48**	**$64,404,737.57**	**$131,029,633.55**

These subareas were further reviewed to identify the percentage of project groups located in a census tract considered to have low-income population, minority population, or both above the regional percentage based on NCTCOG 2024 data.[6] Subareas were designated as an environmental justice area if the majority of the sidewalk gap project groups were located in census tracts exceeding the regional average of minority or low-income populations.

Appendix A: Camp Bowie Route 002 Environmental Justice Areas illustrates the census tracts exceeding the regional average of minority or low-income populations. **Appendix B: Sidewalk Gap Construction Prioritization and Probable Cost by Subarea** details the length of sidewalk gap project groups, OPCC for each subarea based on priority, and the number of project groups within an environmental justice area.

[5] All Environmental Justice subareas are identified in green.

[6] North Central Texas Council of Governments. 2024. *Environmental Justice & Title VI* https://www.nctcog.org/trans/involve/ej

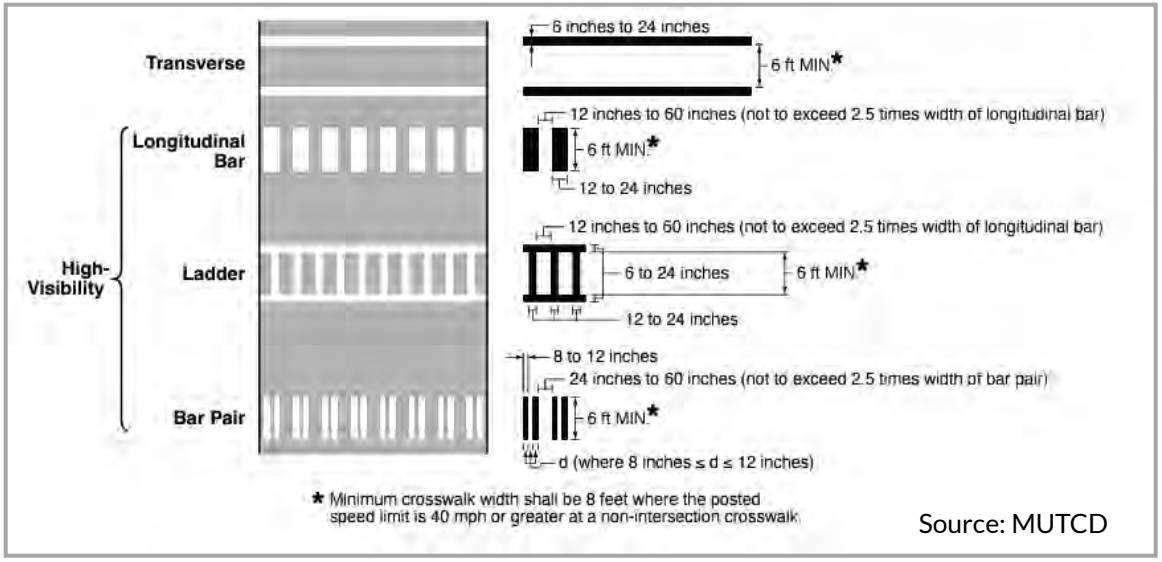
Marked Crosswalk Inventory

Marked Crosswalk Inventory Methodology

Using NCTCOG aerial data and Google Street View, the locations of marked crosswalks as designated pedestrian roadway crossings were identified along the corridor (Camp Bowie Boulevard, Camp Bowie W. Boulevard, Las Vegas Trail, Laredo Drive, Calmont Avenue, Lackland Road, 6th Street, 7th Street, Calhoun Street, and Jones Street) to evaluate areas where crossing improvements were necessary for safer and more efficient bus route access. Only designated marked crosswalks were digitized following standards outlined in the Manual on Uniform Traffic Control Devices (MUTCD) as shown in **Figure 5 (MUTCD 11th Edition Crosswalk Markings)**. Signalized pedestrian crossings without pavement markers, such as the brick paver crossing at the intersection at Camp Bowie Boulevard, West 7th Street, and University Drive illustrated **in Figure 6 (Brick Paved Crosswalk)** were not digitized.

Levels of safety and efficiency were determined by the distance a pedestrian must walk along the corridor before encountering the nearest crosswalk to access nearby land uses and bus stops on the opposite side of the roadway. These distances were established using historical block lengths (approximately 260 – 330 feet) within urban grids, which represent the preferred and manageable walking distances before pedestrians seek alternate routes to cross the

Figure 5. MUTCD 11th Edition Crosswalk Markings



Source: MUTCD

roadway or take risky actions of crossing the roadway in locations without a crosswalk.[7, 8]

Table 5 (Distance Between Marked Crosswalks Classifications) identifies the criteria used to designate these existing crossing distances of acceptable (less than 330 feet); inadequate (distances between 331 to 660 feet) and may necessitate enhancements depending on street context; and poor (greater than 661 feet).

Figure 6. Brick Paved Crosswalk (*West 7th St. at Camp Bowie Blvd. and University Dr.)*

Image of brick paved crosswalk without designated crosswalk markings, located on West 7th St. at Camp Bowie Blvd. and University Dr. intersection.

Some areas where crosswalk spacing distances are greater than 330 feet are classified as "acceptable" due to feasibility constraints, such as long distances on bridges or highways. For example, as shown in the last map of the **Figure 7 (Spacing Between Marked Crosswalks)** map series, there is not a need to add a marked crosswalk on the bridge located on West 7th Street which crosses over the Trinity River and Forest Park Boulevard and thus this segment spacing was classified as acceptable.

[7] National Association of City Transportation Officials. *Crosswalks and Crossings*. https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/crosswalks-and-crossings/#:~:text=They%20should%20typically%20be%20permitted%20at%20a%20minimum,foot%20spacing%20%28or%20approximately%20one%20short%20city%20block%29.

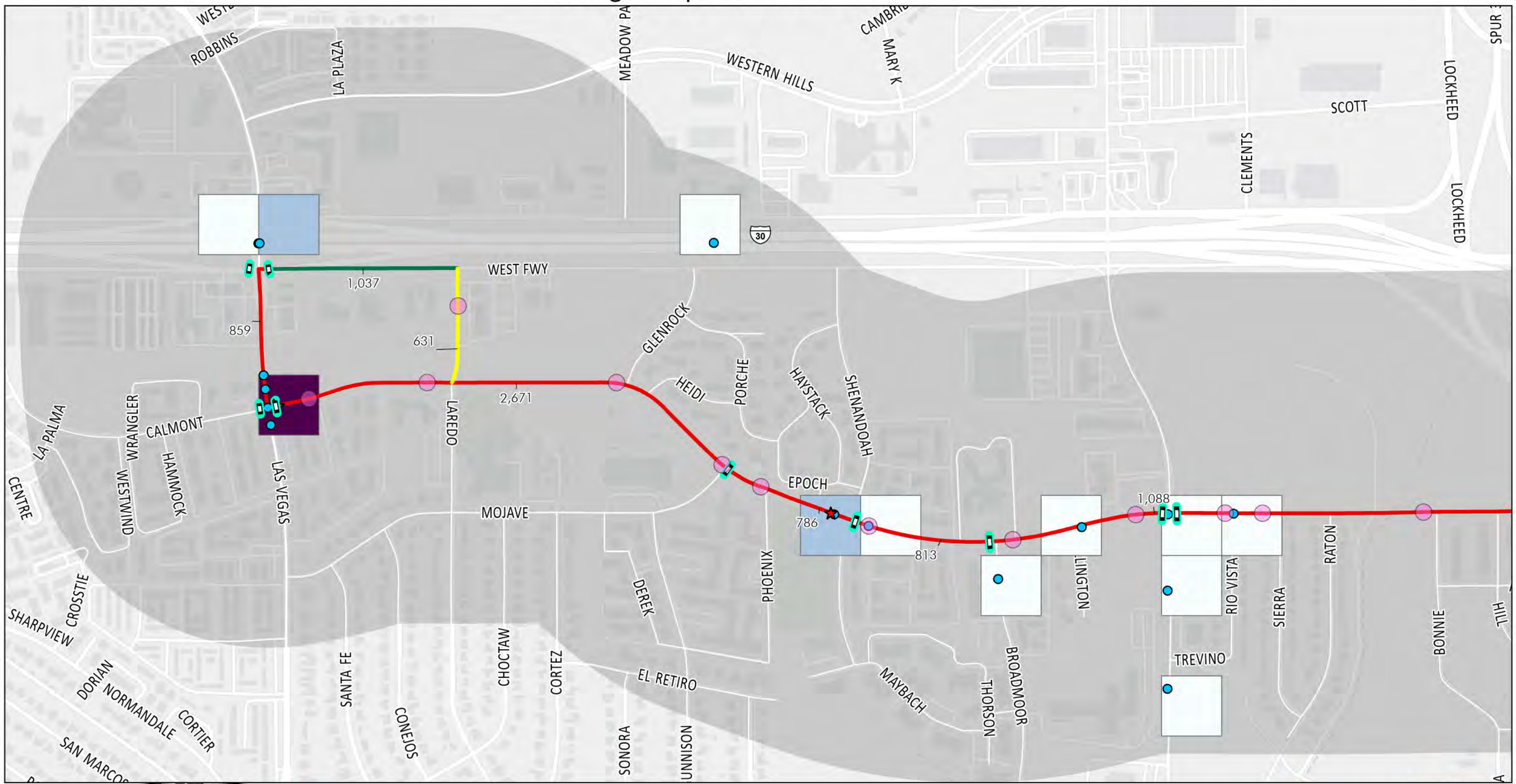
[8] Global Streets Design Guide. *Pedestrian Crossings*. https://globaldesigningcities.org/publication/global-street-design-guide/designing-streets-people/designing-for-pedestrians/pedestrian-crossings/.

Table 5. Distance Between Marked Crosswalks Classifications

Distance between existing crosswalks	Classification	Definition
1 – 330 ft	Acceptable	Distance between crosswalks is convenient, resulting in pedestrians more likely to safely cross the street at marked and predictable locations.
331 – 660 ft (up to one-eighth mile)	Inadequate	Distance between crosswalks is inconvenient, potentially resulting in pedestrians taking risky actions to cross the street mid-block at unmarked locations where they are at high risk of being involved in a crash with motor vehicle traffic.
661+ ft	Poor	Long distances between crosswalks are inconvenient, thus a greater probability of pedestrians taking risky actions to cross the street mid-block at unmarked locations where they are at high risk of being involved in a crash with motor vehicle traffic.

Figure 7. Spacing Between Marked Crosswalks

along Camp Bowie Bus Route 002



Crosswalks
Walkshed (1/4-mile)
Bus Stops

Acceptable Spacing (0-330 ft)
Inadequate Spacing (331-660 ft)
Poor Spacing (660+ ft)

Fatal Pedestrian Crash
Non-Fatal Pedestrian Crash

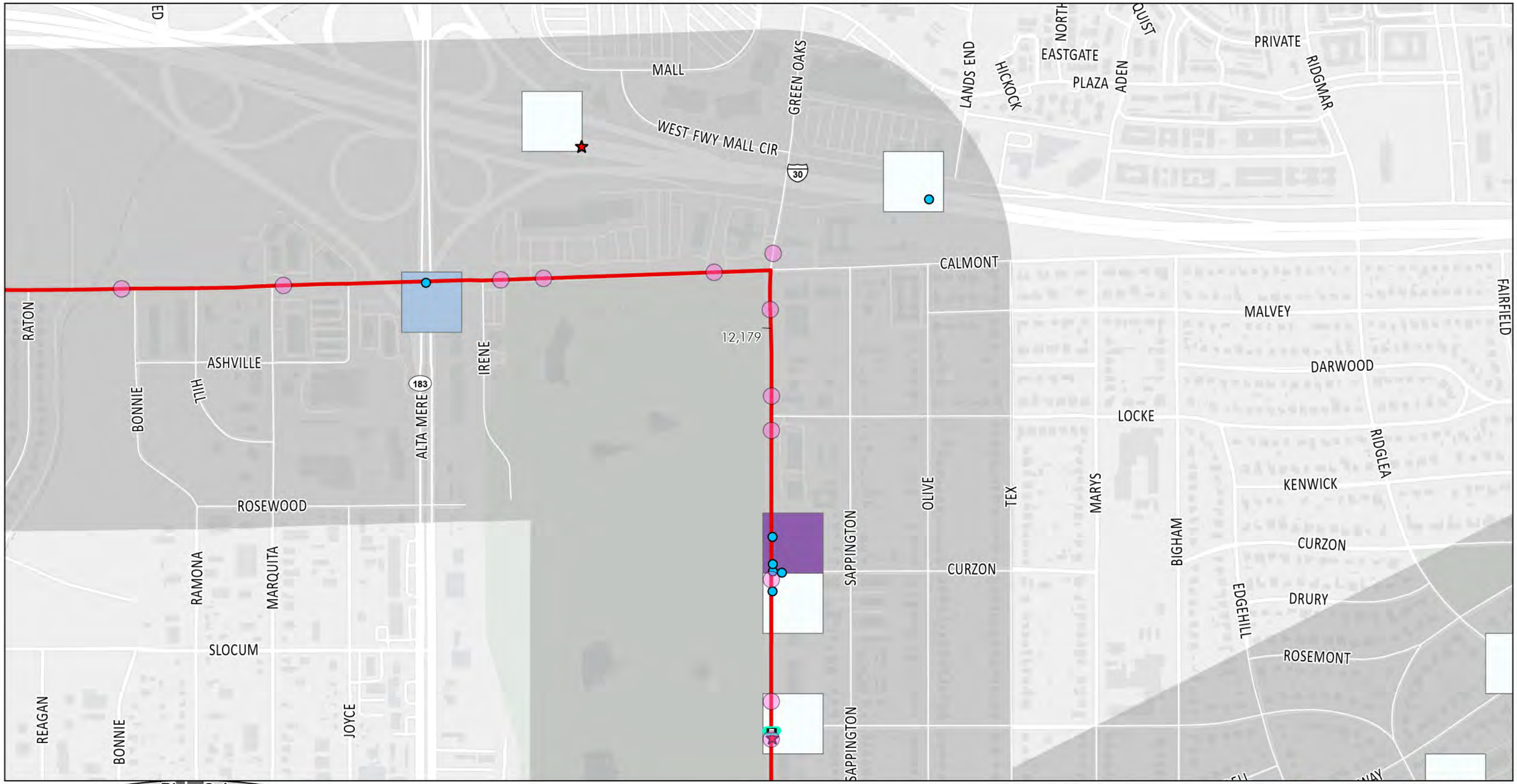
Crashes Per
330 x 330 Ft Block Grid
1
2 - 3
4 - 5
6 - 7

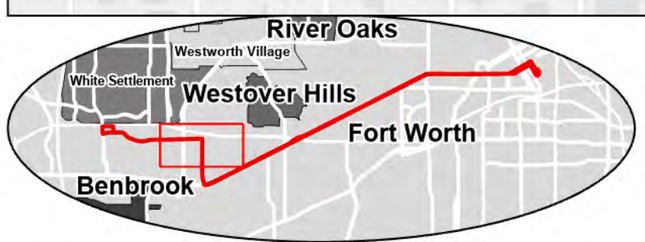
TRINITY METRO
FORT WORTH
North Central Texas Council of Governments

0 0.25 Miles

Figure 7. Spacing Between Marked Crosswalks

along Camp Bowie Bus Route 002





Crosswalks
Walkshed (1/4-mile)
Bus Stops
Acceptable Spacing (0-330 ft)
Inadequate Spacing (331-660 ft)
Poor Spacing (660+ ft)
Fatal Pedestrian Crash
Non-Fatal Pedestrian Crash

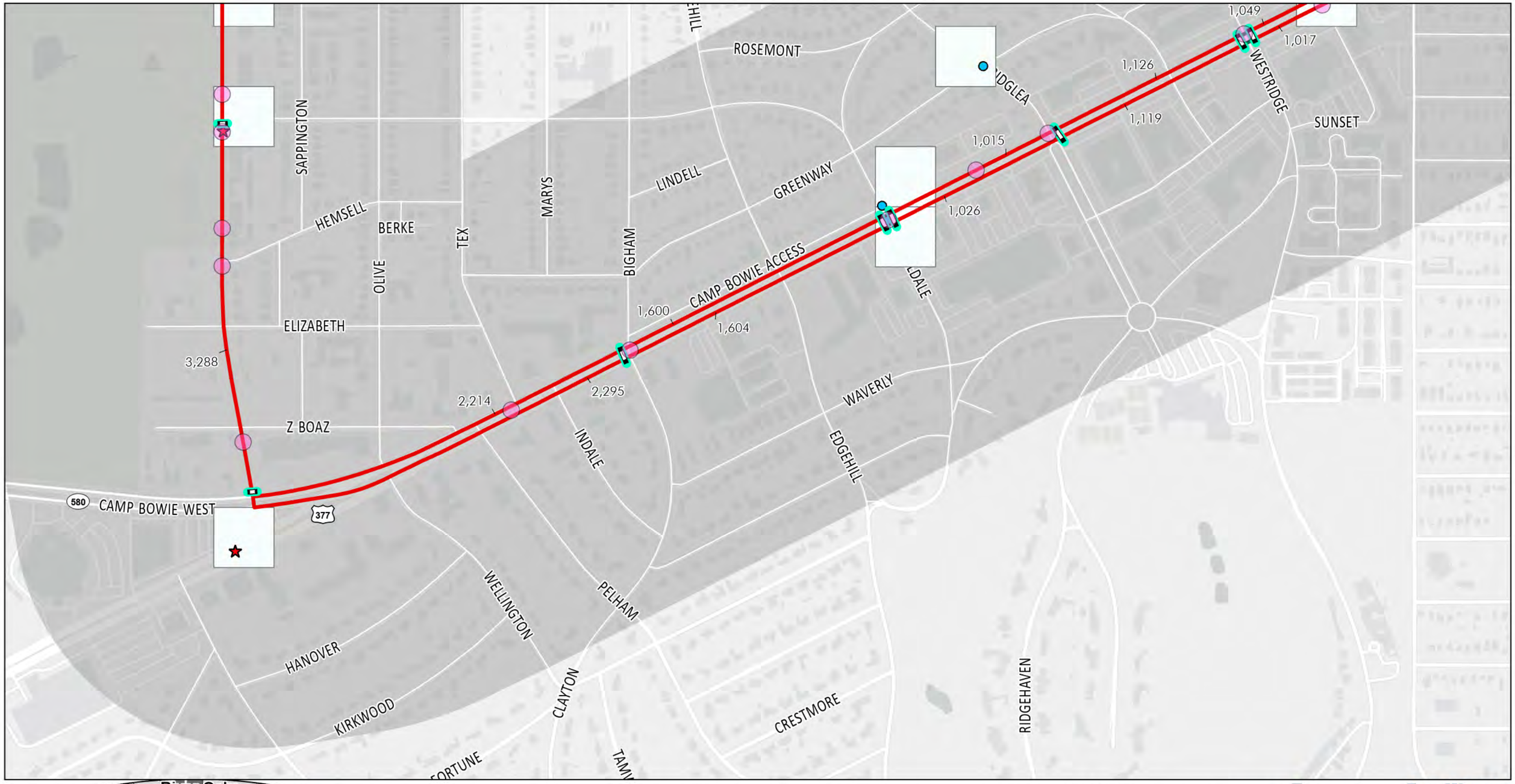
Crashes Per
330 x 330 Ft Block Grid
1
2 - 3
4 - 5
6 - 7

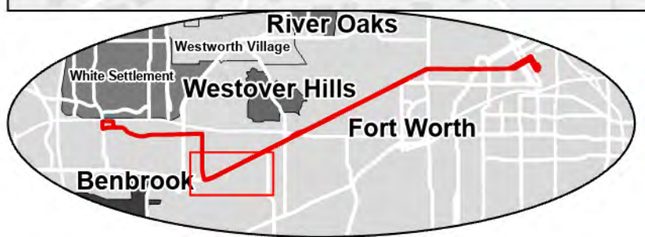
TRINITY METRO
FORT WORTH
North Central Texas Council of Governments

0 0.25 Miles

Figure 7. Spacing Between Marked Crosswalks

along Camp Bowie Bus Route 002





Crosswalks
Walkshed (1/4-mile)
Bus Stops
Acceptable Spacing (0-330 ft)
Inadequate Spacing (331-660 ft)
Poor Spacing (660+ ft)
Fatal Pedestrian Crash
Non-Fatal Pedestrian Crash

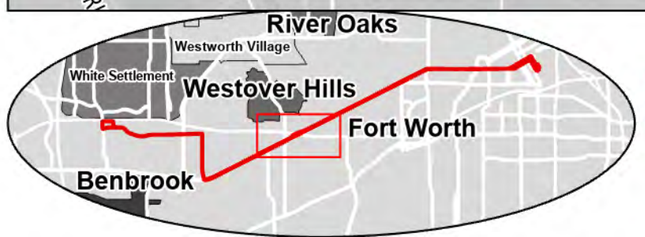
Crashes Per
330 x 330 Ft Block Grid
1
2 - 3
4 - 5
6 - 7

TRINITY METRO
FORT WORTH
North Central Texas Council of Governments

0 0.25 Miles

Figure 7. Spacing Between Marked Crosswalks

along Camp Bowie Bus Route 002



Crosswalks
Walkshed (1/4-mile)
Bus Stops

Acceptable Spacing (0-330 ft)
Inadequate Spacing (331-660 ft)
Poor Spacing (660+ ft)

Fatal Pedestrian Crash
Non-Fatal Pedestrian Crash

Crashes Per
330 x 330 Ft Block Grid
1
2 - 3
4 - 5
6 - 7

TRINITY METRO
FORT WORTH
North Central Texas Council of Governments

0 0.25 Miles

Figure 7. Spacing Between Marked Crosswalks

along Camp Bowie Bus Route 002

Crosswalks
Walkshed (1/4-mile)
Bus Stops
Acceptable Spacing (0-330 ft)
Inadequate Spacing (331-660 ft)
Poor Spacing (660+ ft)
Fatal Pedestrian Crash
Non-Fatal Pedestrian Crash

Crashes Per
330 x 330 Ft Block Grid
1
2 - 3
4 - 5
6 - 7

TRINITY METRO
FORT WORTH
North Central Texas Council of Governments

0 0.25 Miles

Figure 7. Spacing Between Marked Crosswalks

along Camp Bowie Bus Route 002

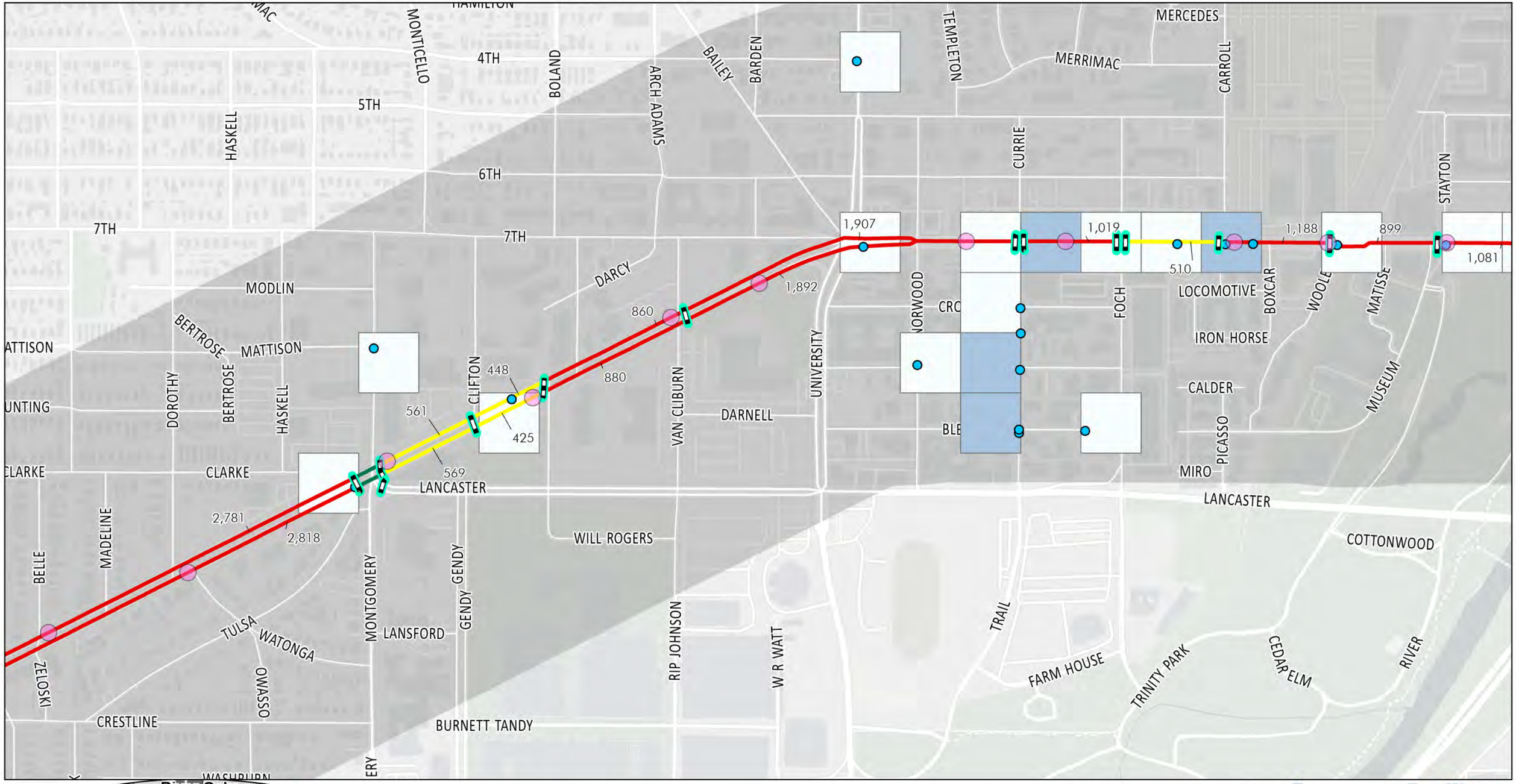
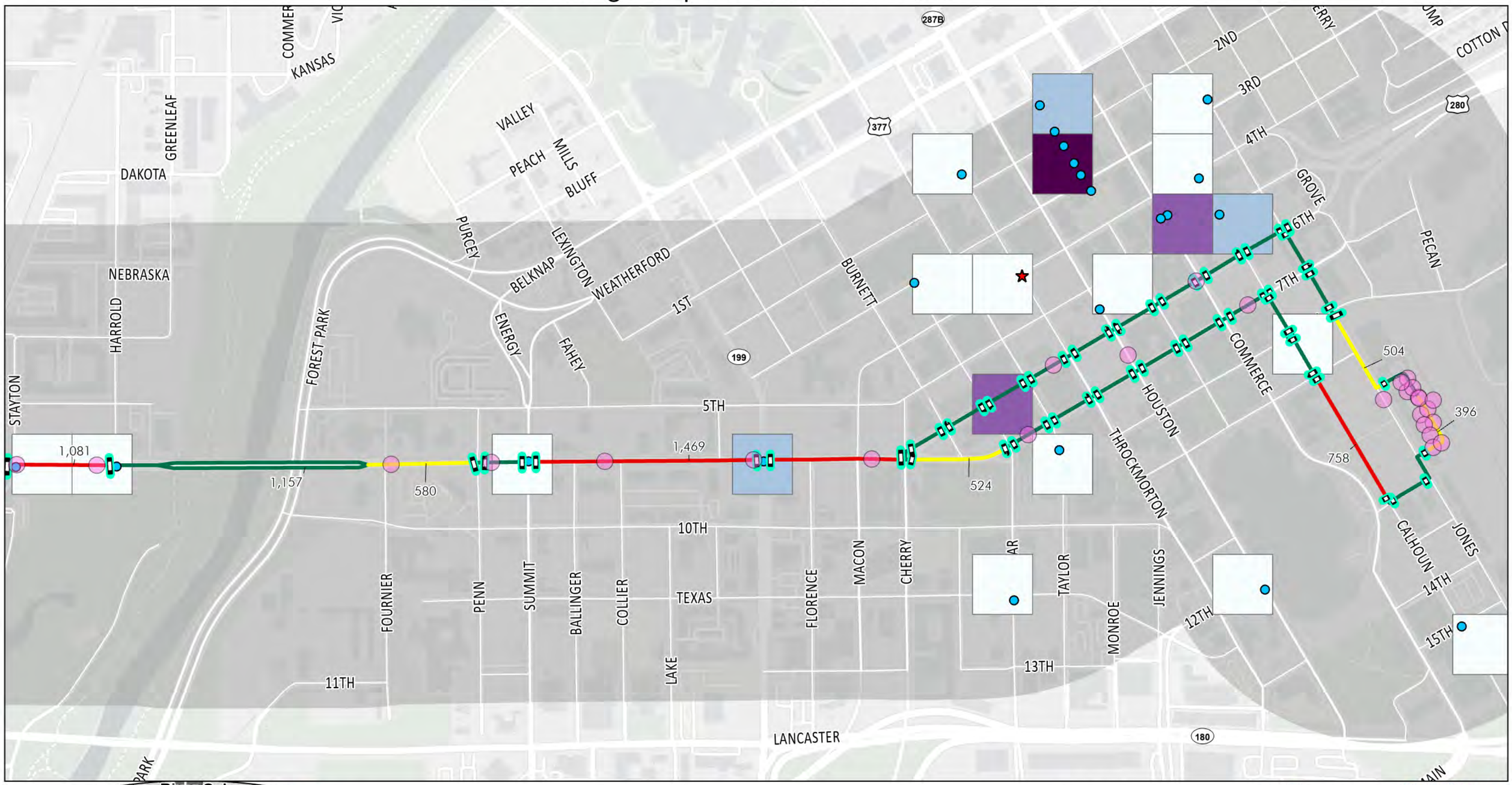


Figure 7. Spacing Between Marked Crosswalks

along Camp Bowie Bus Route 002



Crosswalks
Walkshed (1/4-mile)
Bus Stops

Acceptable Spacing (0-330 ft)
Inadequate Spacing (331-660 ft)
Poor Spacing (660+ ft)

Fatal Pedestrian Crash
Non-Fatal Pedestrian Crash

Crashes Per
330 x 330 Ft Block Grid
1
2 - 3
4 - 5
6 - 7

TRINITY METRO
FORT WORTH
North Central Texas Council of Governments

0 0.25 Miles

Crash History

Pedestrian crash locations were included on the **Figure 7 (Spacing Between Marked Crosswalks)** map series to provide further context related to safety and accessibility of pedestrian infrastructure. Crash data is from Texas Department of Transportation's Crash Record Information System (CRIS) for a five-year period from 2018-2022 and provided in **Table 6 (2018-2022 Bicycle and Pedestrian Crashes within the Quarter Mile Buffer)**. This data consists of pedestrian crash records involving a motor vehicle that have occurred within the study area buffer. This data reflects crash severity (fatal or non-fatal) and the location where pedestrian crashes involving a motor vehicle have occurred. From 2018-2022 there were 100 pedestrian crash locations within the study area quarter-mile buffer, of which six pedestrian crashes were fatal.

Crash clusters are present in areas with long distances between marked crosswalks with major destinations located on both sides of the roadway. For example, along Lackland Avenue, there is a crash cluster located near the intersection of Curzon Avenue with nearby North Z Boaz Park, multi-family apartment complexes, and a bus stop. There is no safe or convenient crosswalk at this intersection. The nearest marked crossing is approximately 880 feet south of the intersection. This area would be a good candidate for consideration of a crosswalk warrant study. Crash locations can be viewed on the **Figure 7 (Spacing Between Marked Crosswalks)** map series which includes spacing between designated crosswalks.

Table 6. 2018-2022 Bicycle and Pedestrian Crashes within the Quarter Mile Buffer

Crash Severity	Pedestrian
Non-fatal	94
Fatal	6
Total	**100**

Marked Crosswalk Inventory Findings

Of the 14 miles of the bus route, this Study identified 11 miles of roadway with poor to inadequate crosswalk spacing. The areas of most inadequate to poor crosswalk spacing are at the western portion of the Camp Bowie bus route between Las Vegas Trail and Horne Street.

This analysis is intended to prompt further context-specific investigations into each roadway segment with existing crosswalk spacing distances falling within the moderate and high-distance range. These areas are flagged as high risk to pedestrians.

Missing Curb Ramp Inventory

Missing Curb Ramp Inventory Methodology

Using Google Street View and NCTCOG aerial imagery, the general locations of missing curb ramps were identified in the study area and digitized in GIS. The quality and physical conditions of curb ramps or Americans with Disabilities Act (ADA) compliance were not evaluated in this study.

Missing Curb Ramp Inventory Findings

Within the Camp Bowie Bus Route 002 study buffer area, 90 missing curb ramps were identified on existing sidewalk segments. Fortunately, most of the existing sidewalk segments (approximately 122 miles) have curb ramps. Many sidewalk segments without curb ramps are in residential areas north of Camp Bowie Boulevard in historic neighborhoods such as West Byers and Crestline Area. Missing curb ramp locations can be seen in **Figure 8 (Missing Curb Ramps)**.

Figure 8. Missing Curb Ramps

along Camp Bowie Bus Route 002

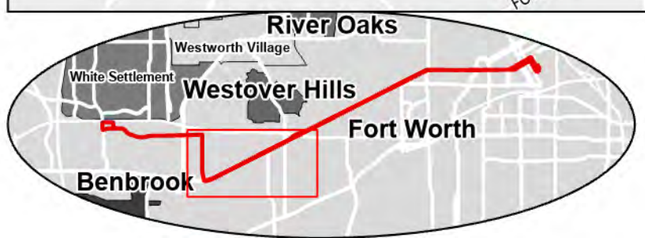
Missing Curb Ramps
Bus Stops
Route 002
Walkshed (1/4-mile)

TRINITY METRO
FORT WORTH
North Central Texas Council of Governments

0 0.5 Miles

Figure 8. Missing Curb Ramps

along Camp Bowie Bus Route 002



Missing Curb Ramps
Bus Stops
Route 002
Walkshed (1/4-mile)

TRINITY METRO
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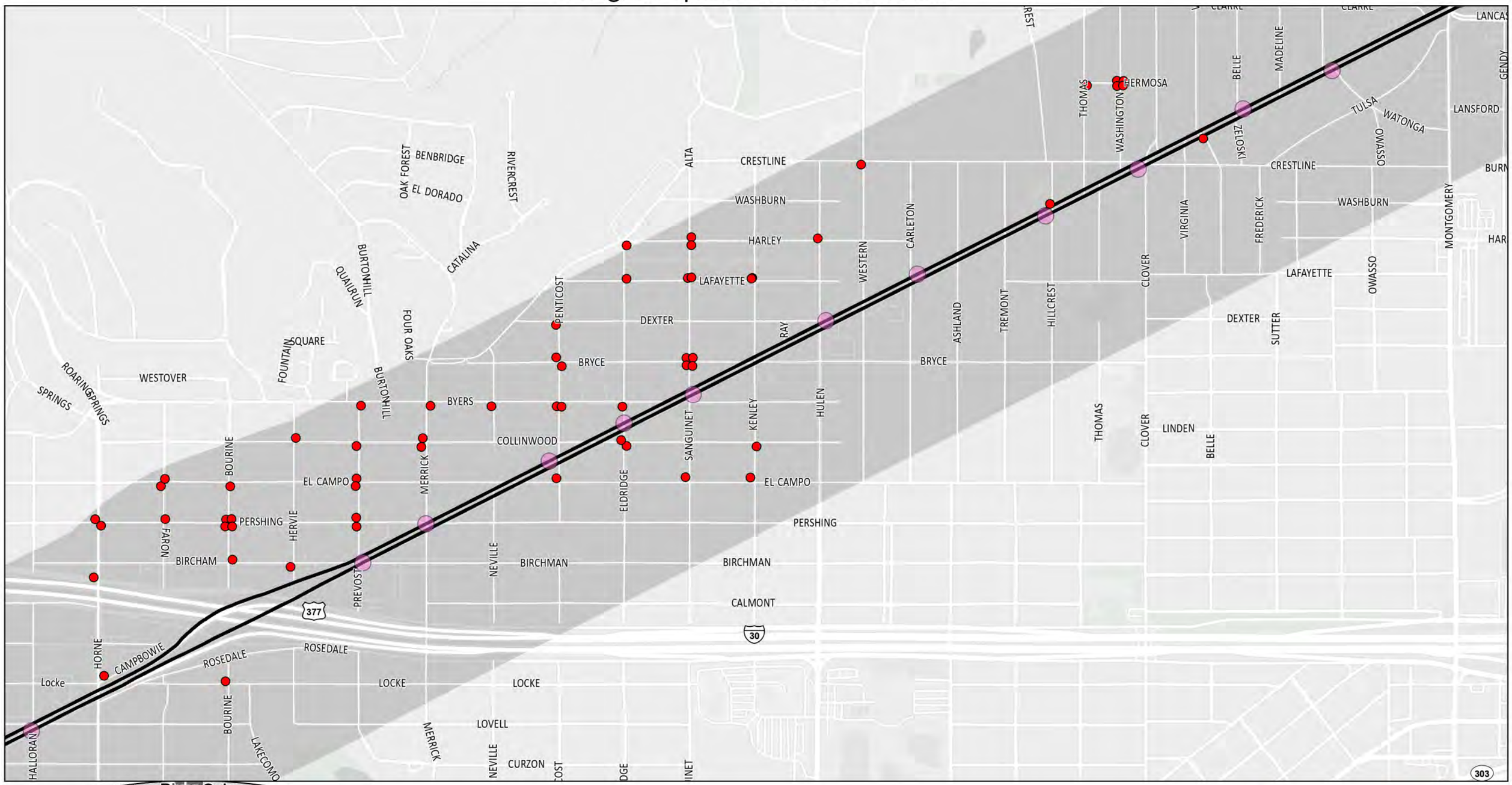
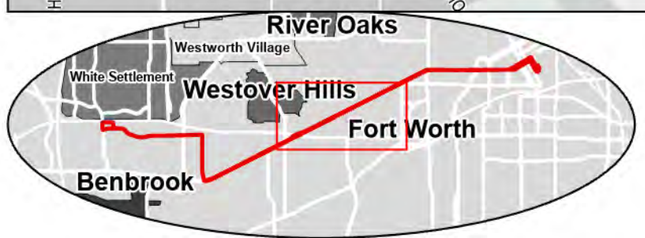
0 0.5 Miles

Figure 8. Missing Curb Ramps

along Camp Bowie Bus Route 002





Missing Curb Ramps
Bus Stops
Route 002
Walkshed (1/4-mile)

TRINITY METRO
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0 0.5 Miles

Figure 8. Missing Curb Ramps

along Camp Bowie Bus Route 002

Missing Curb Ramps
Bus Stops
Route 002
Walshed (1/4-mile)

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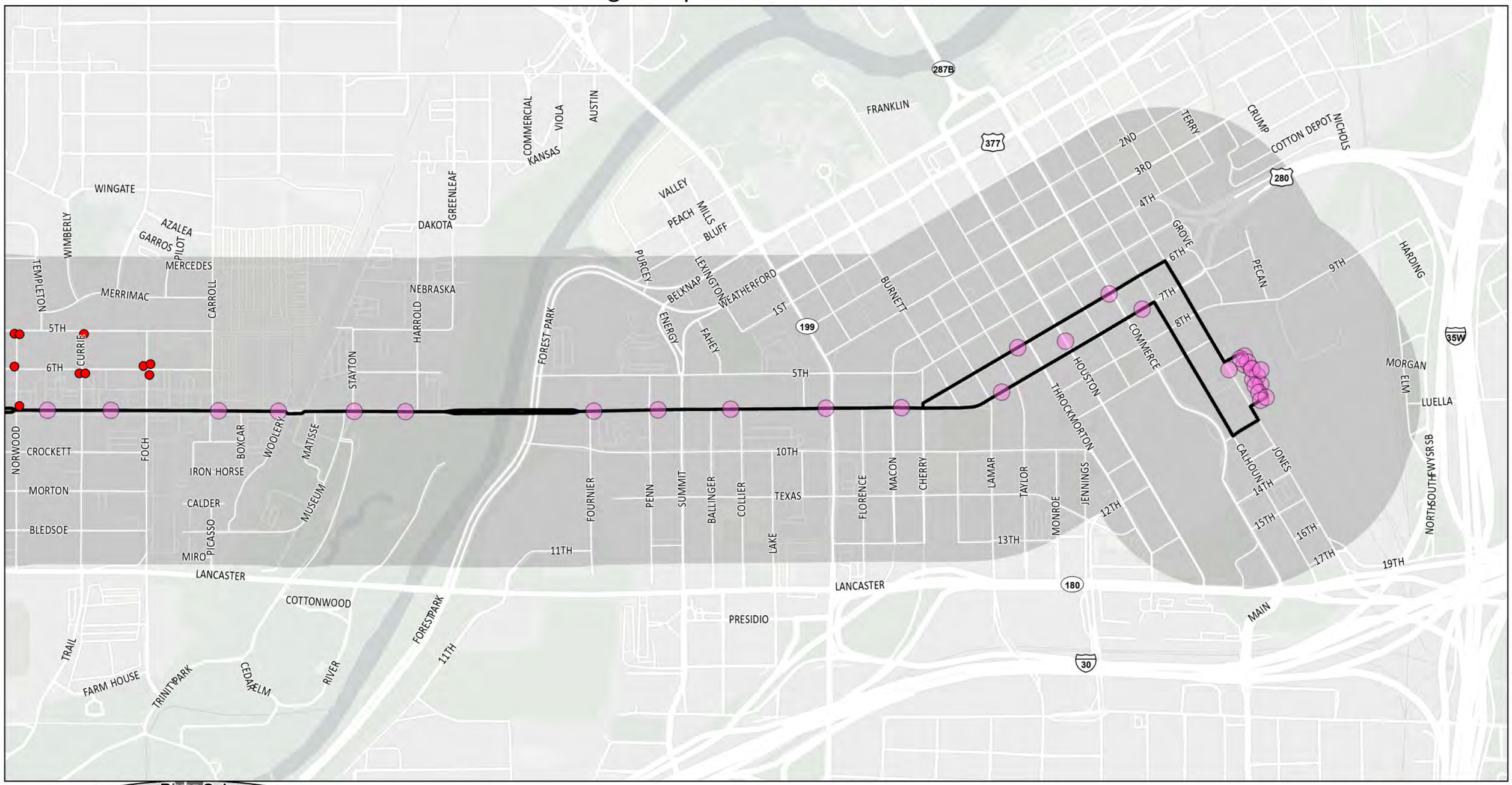
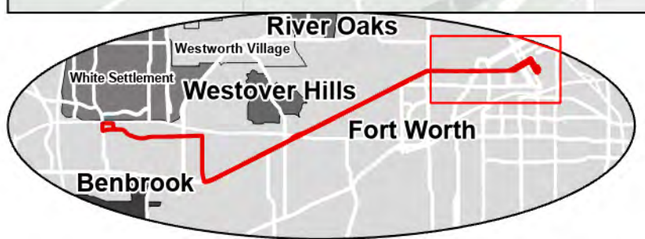
0 0.5 Miles

Figure 8. Missing Curb Ramps

along Camp Bowie Bus Route 002





Missing Curb Ramps
Bus Stops
Route 002
Walkshed (1/4-mile)

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0 0.5 Miles

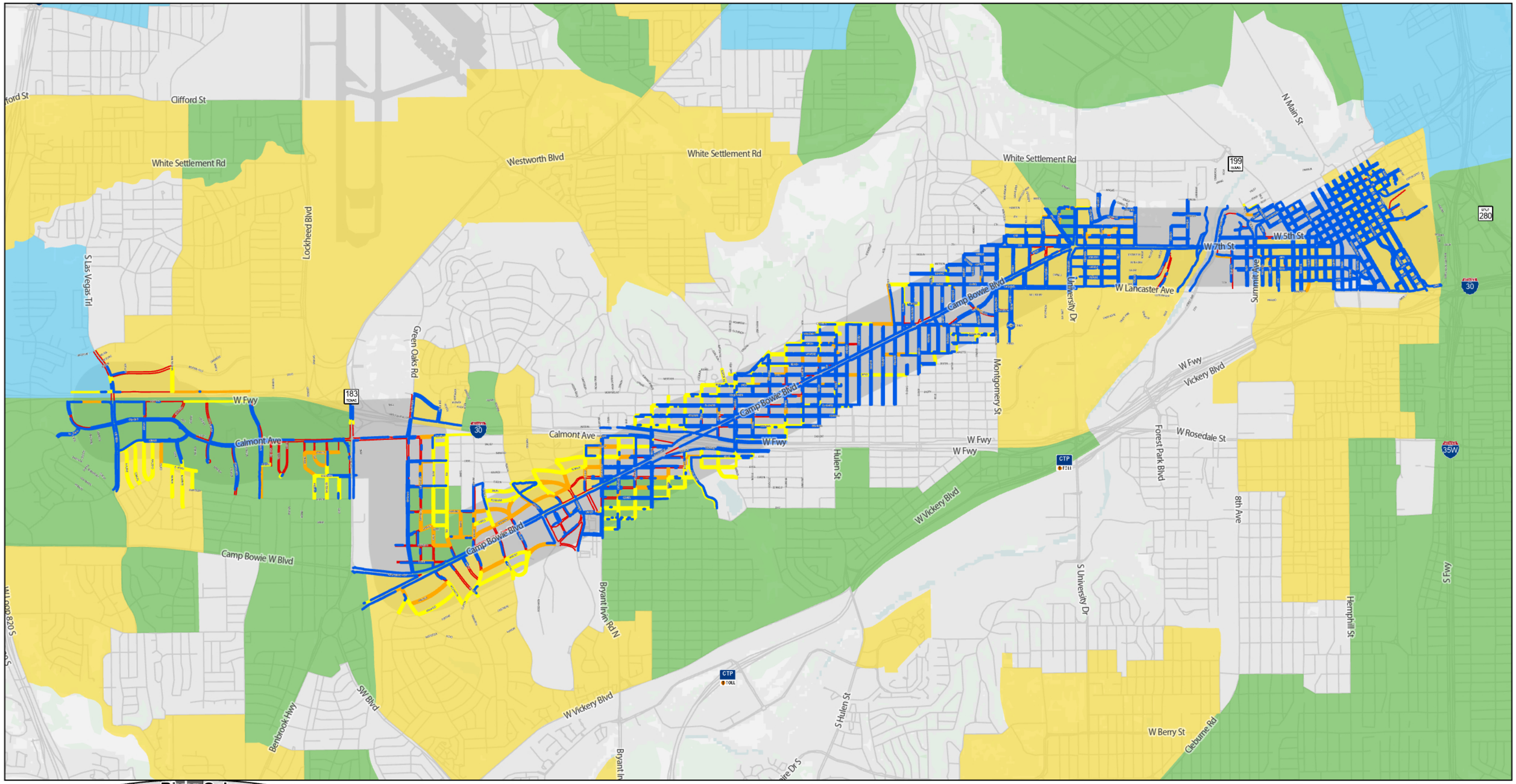
Conclusion

This Study provides an inventory of pedestrian infrastructure and prioritizes sidewalk gaps for construction with associated high-level Opinion of Probable Cost totaling more than $130 million to construct all missing sidewalks in the study area (based on 2024 costs). Nearly $40 million is needed to construct high priority sidewalk gaps, with nearly $30 million to construct the medium priority sidewalk gaps, and more than $60 million to construct the low priority sidewalk gaps.

Future Capital Improvement Programs by the City of Fort Worth and Trinity Metro, and other federal transportation funding options, may be opportunities to strategically fund the implementation of sidewalks identified as areas of need.

The methodology of this study can be used as a framework for the City of Fort Worth, Trinity Metro, and other stakeholders to evaluate other high frequency bus route corridors to improve pedestrian safety and accessibility to bus stops.

Appendix A: Camp Bowie Route 002 Environmental Justice Census Tracts



Sidewalk Gaps Recommended Improvement Priority

- High
- Medium
- Low

Minority and/or Low Income Population Above the Regional Percentage

- Census Tracts Above Regional Percentage: Low Income
- Census Tracts Above Regional Percentage: Minority
- Census Tracts Above Regional Percentage: Low Income and Minority

- Existing
- Walkshed (1/4-mile)

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0 0.5 1 1.5 Miles

Appendix B: Sidewalk Gap Construction Prioritization and Probable Cost by Section

Cost per Linear Foot	$386.00
Feet in a Mile	5,280

Section 1: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	18	17,165	3.25	$6,625,699.15
Medium	4	5,942	1.13	$2,293,524.04
Low	20	26,111	4.95	$10,078,961.42
Total	**42**	**49,218**	**9.32**	**$18,998,184.61**

Section 2: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	22	15,967	3.02	$6,163,329.54
Moderate	7	6,480	1.23	$2,501,095.47
Low	12	8,453	1.60	$3,262,827.27
Total	**41**	**30,900**	**5.85**	**$11,927,252.27**

Section 3: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	30	17,980	3.41	$6,940,435.86
Moderate	18	17,159	3.25	$6,623,423.74
Low	28	23,132	4.38	$8,928,896.28
Total	**76**	**58,271**	**11.04**	**$22,492,755.87**

Section 4: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	32	17,787	3.37	$6,865,693.54
Moderate	25	20,013	3.79	$7,724,841.90
Low	35	26,939	5.10	$10,398,399.40
Total	**92**	**64,738**	**12.26**	**$24,988,934.83**

Section 5: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	19	7,350	1.39	$2,837,142.95
Moderate	11	6,316	1.20	$2,437,790.08
Low	47	30,285	5.74	$11,689,925.26
Total	**77**	**43,950**	**8.32**	**$16,964,858.30**

Section 6: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	34	7,120	1.35	$2,748,313.01
Moderate	16	5,252	0.99	$2,027,167.92
Low	87	33,649	6.37	$12,988,476.78
Total	**137**	**46,021**	**8.72**	**$17,763,957.71**

Section 7: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	8	1,922	0.36	$742,031.47
Moderate	8	5,047	0.96	$1,948,174.47
Low	20	8,788	1.66	$3,392,163.78
Total	**36**	**15,757**	**2.98**	**$6,082,369.71**

Section 8: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	7	2,091	0.40	$807,270.24
Moderate	8	1,114	0.21	$430,084.97
Low	21	6,928	1.31	$2,674,387.80
Total	**36**	**10,134**	**1.92**	**$3,911,743.01**

Section 9: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	11	3,238	0.61	$1,249,789.42
Moderate	2	219	0.04	$84,527.33
Low	2	294	0.06	$113,357.64
Total	**15**	**3,750**	**0.71**	**$1,447,674.38**

Section 10: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	7	3,231	0.61	$1,247,127.09
Moderate	14	3,368	0.64	$1,299,921.23
Low	2	472	0.09	$182,209.52
Total	**23**	**7,071**	**1.34**	**$2,729,257.84**

Section 11: Recommended Sidewalk Construction Priorty	Project Groups	Linear Feet	Miles	Opinion of Probable Construction Cost (2024 $)
High	19	5,502	1.04	$2,123,716.25
Moderate	10	2,341	0.44	$903,796.34
Low	13	1,801	0.34	$695,132.42
Total	**42**	**9,644**	**1.83**	**$3,722,645.01**

Section Number	Project Groups in Census Tracts Above Low Income Regional Percentage	Project Groups in Census Tracts Above Minority Population Regional Percentage	Project Groups in Census Tracts Above Low Income and Minority Population Regional Percentage	Project Groups With No Designation	Total	Percentage of Project Group with Environmental Justice Area	Section Environmental Justice Area Designation (Yes/No)
1	13	1	19	9	42	79%	Yes
2			33	8	41	80%	Yes
3	20		35	21	76	72%	Yes
4	36			56	92	39%	No
5			24	53	77	31%	No
6				137	137	0%	No
7				36	36	0%	No
8				36	36	0%	No
9	14		1		15	100%	Yes
10	14		4	5	23	78%	Yes
11	25			17	42	60%	Yes
Total	**122**	**1**	**116**	**378**	**617**	**39%**	