Improving Multi-Modal Last Mile Connections to Transit *and* Parking Management

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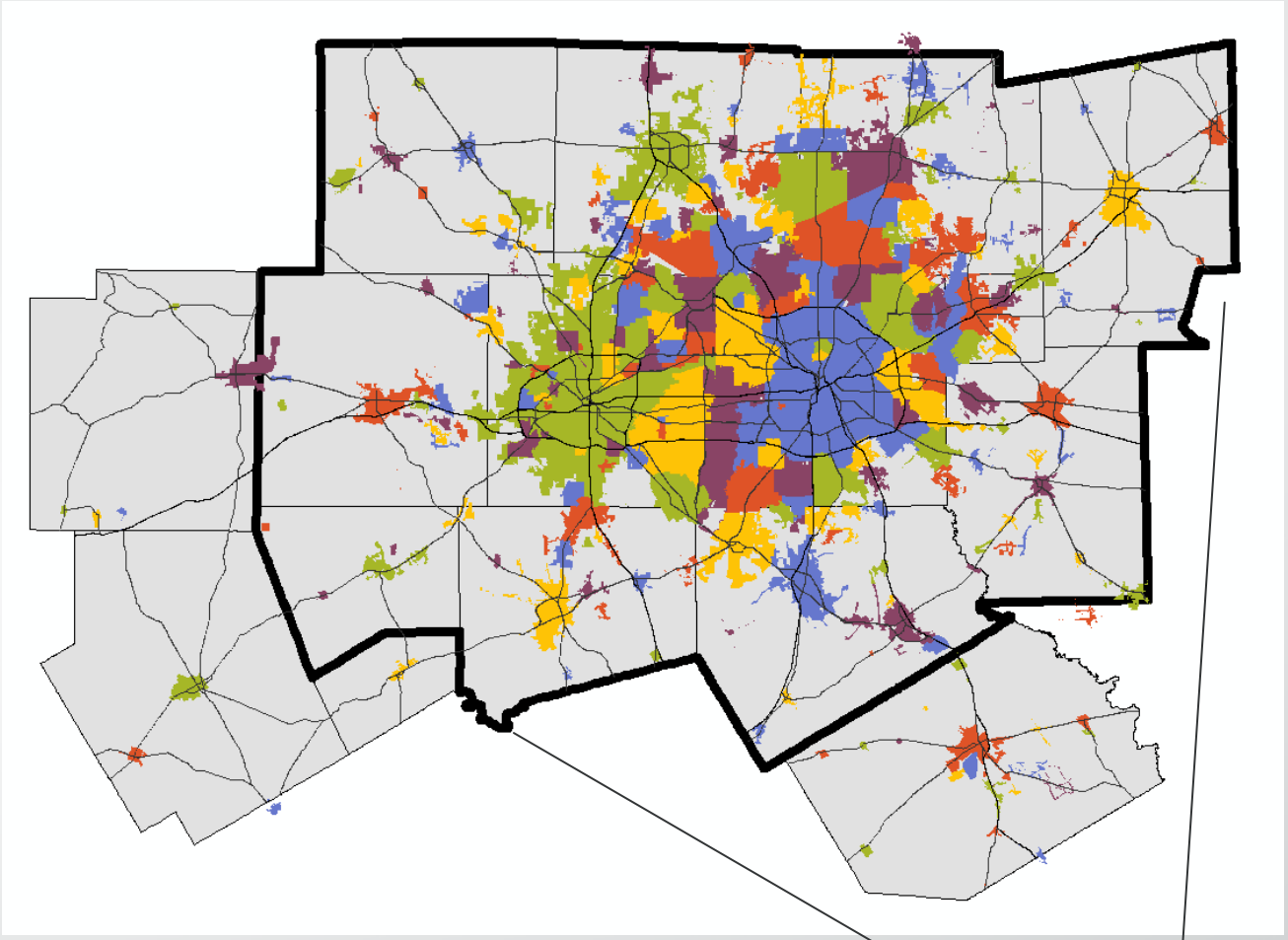
TexITE
Greater Fort Worth Section

North Central Texas Council of Governments

MPO for the
Dallas-Fort Worth Region



Metropolitan Planning Area (MPA)

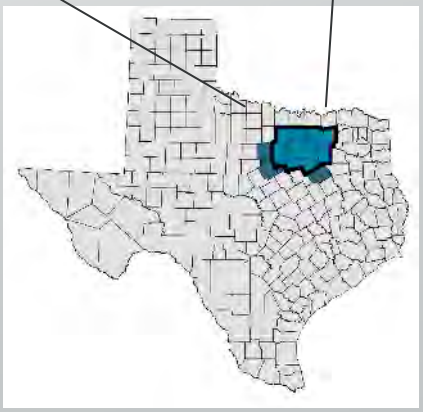
209 cities

13 cities larger than 100,000 pop.

MPA Population

2018 Estimate = 7.4 million

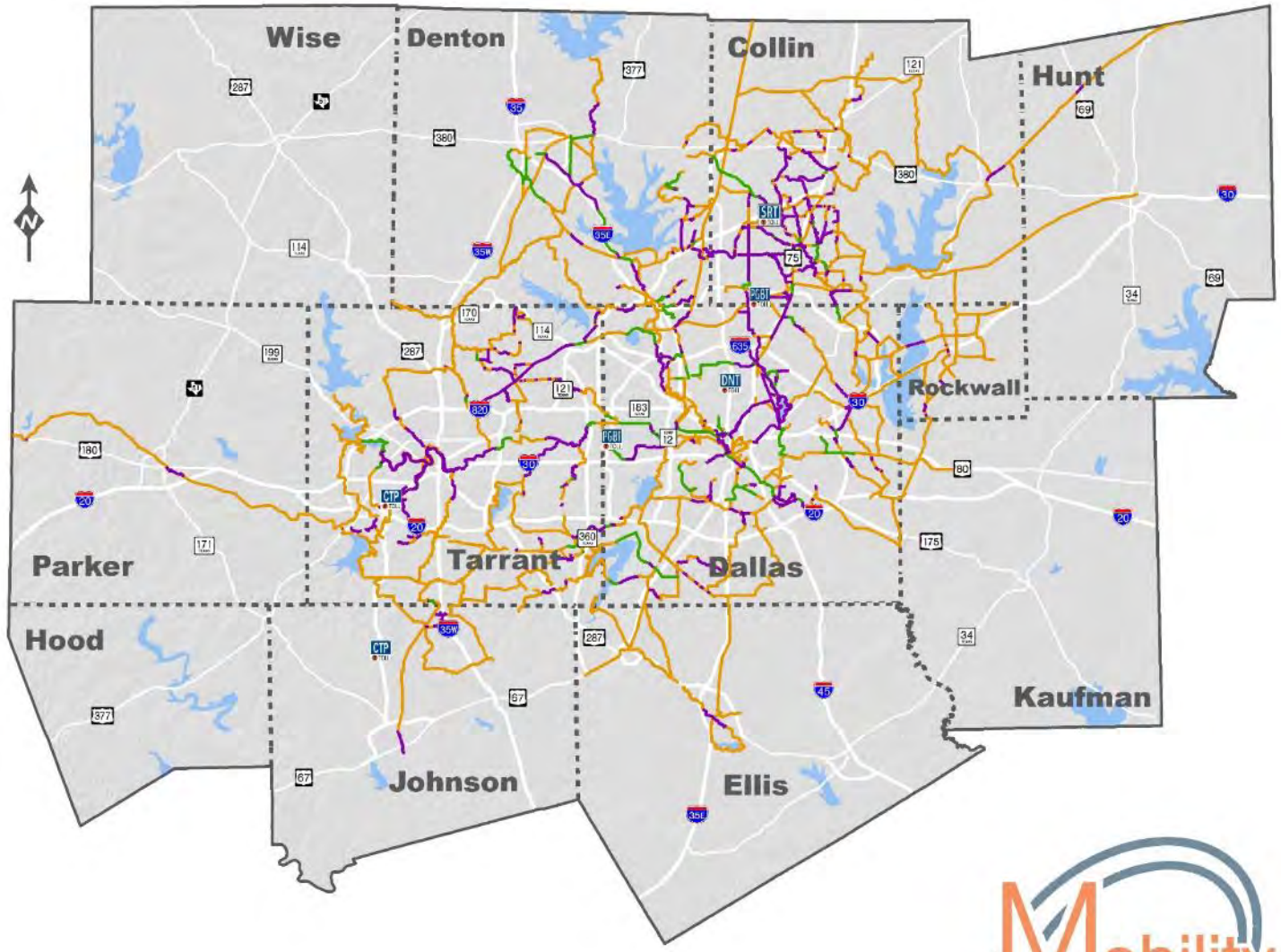
2045 Forecast = 11.2 million



Regional Veloweb

- Existing 455 Miles
- Funded 143 Miles
- Planned 1,285 Miles

Total 1,883 Miles



Dallas CBD

Fort Worth CBD

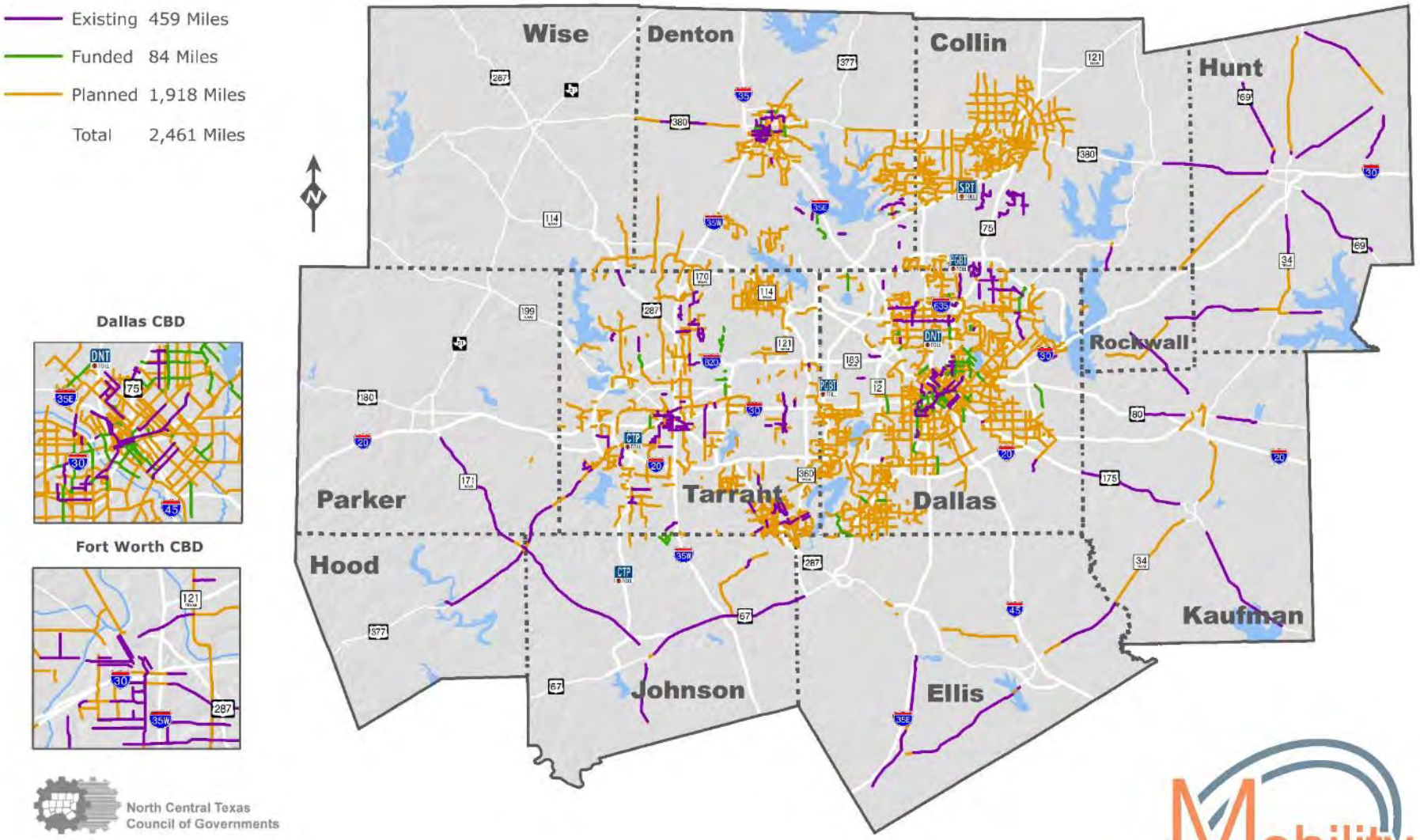
North Central Texas Council of Governments

June 2018

Facility recommendations indicate transportation need. Corridor-specific alignment, design, and operational characteristics for the Regional Veloweb system will be determined through ongoing project development.

Mobility 2045

On-Street Bikeway Network

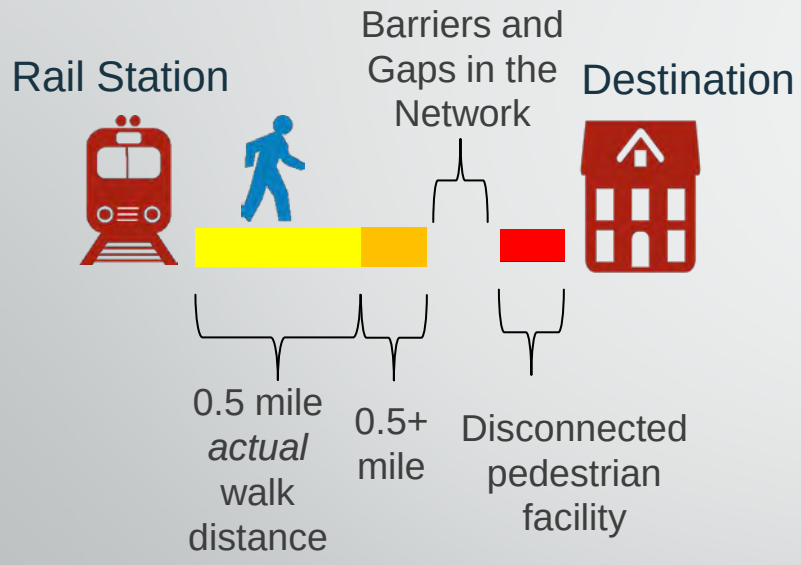


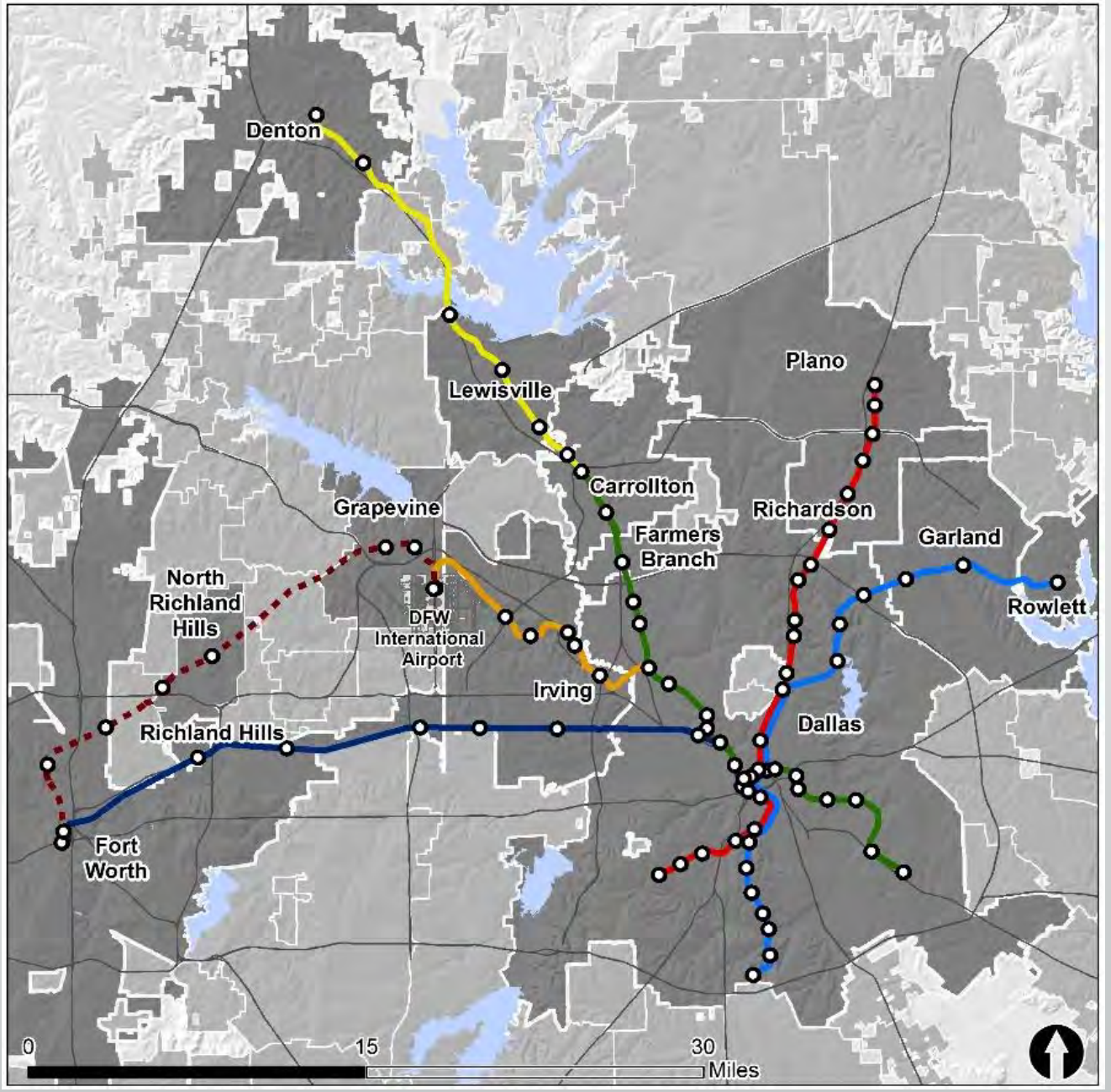
On-street bikeways in the urbanized area include: separated or protected bike lanes/cycle tracks, bike lanes, marked shared lanes, and marked bicycle boulevards. On-street bikeways in the urbanized area do not include: signed bike "routes", signed "share the road", unmarked wide outside lanes, or signed wide shoulders. The use of wide shoulders is included on various roadways linking rural communities outside of the urbanized area.
Facility recommendations indicate transportation need. Corridor-specific alignment, design, and operational characteristics will be determined through ongoing project development.

June 2018

Mobility 2045

Pedestrian and Bicycle Routes to Rail Stations



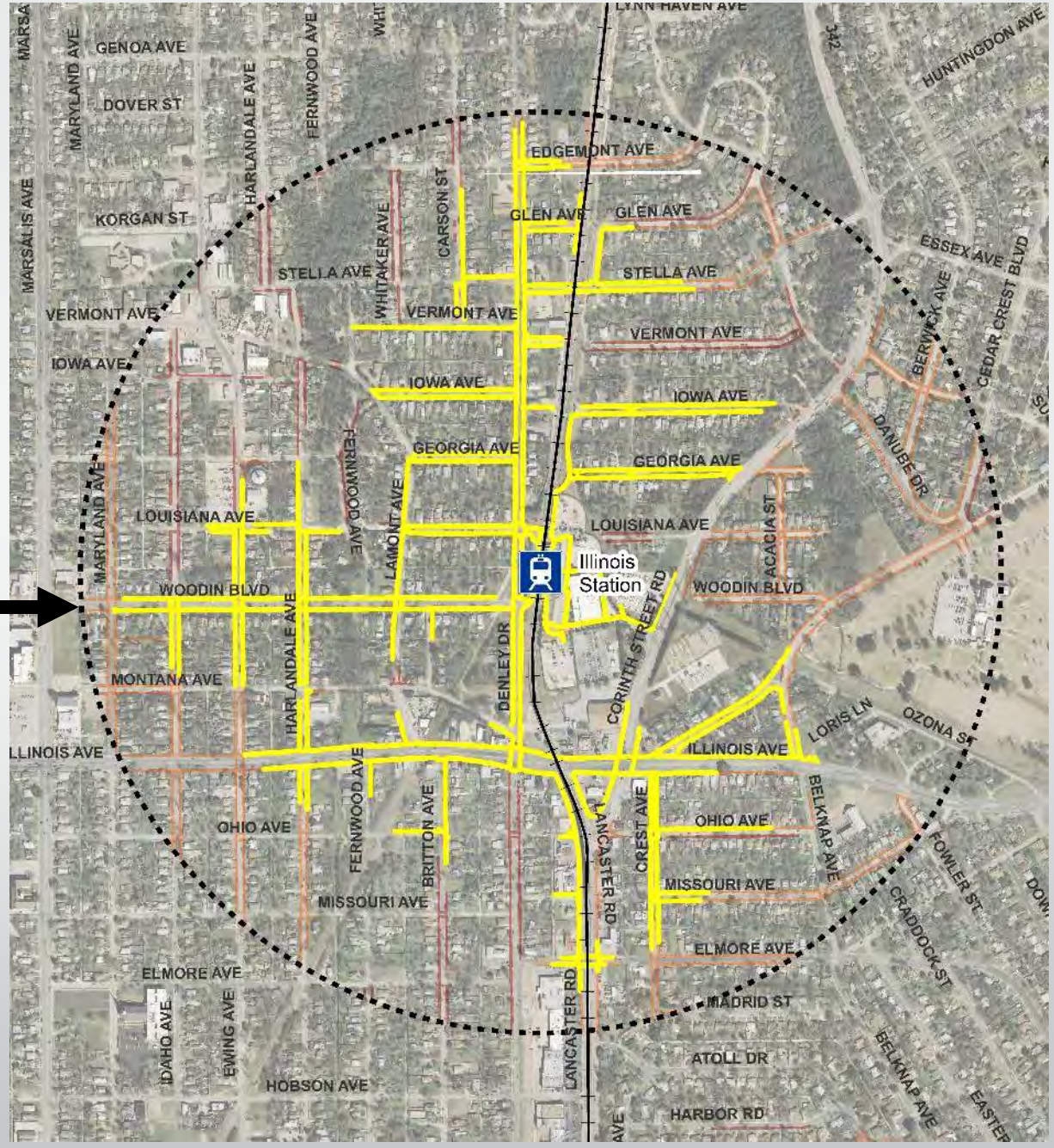



Facility Disconnected From Network
S. Denley Dr
E. Illinois Ave.
Illinois
1300 S
1200 E
YIELD
ONLY
4 ft
© 2015 Google
© 2015 Google
© 2015 Europa Technologies
Google earth

Actual Walkshed

0.5 mile walkshed on a connected sidewalk route

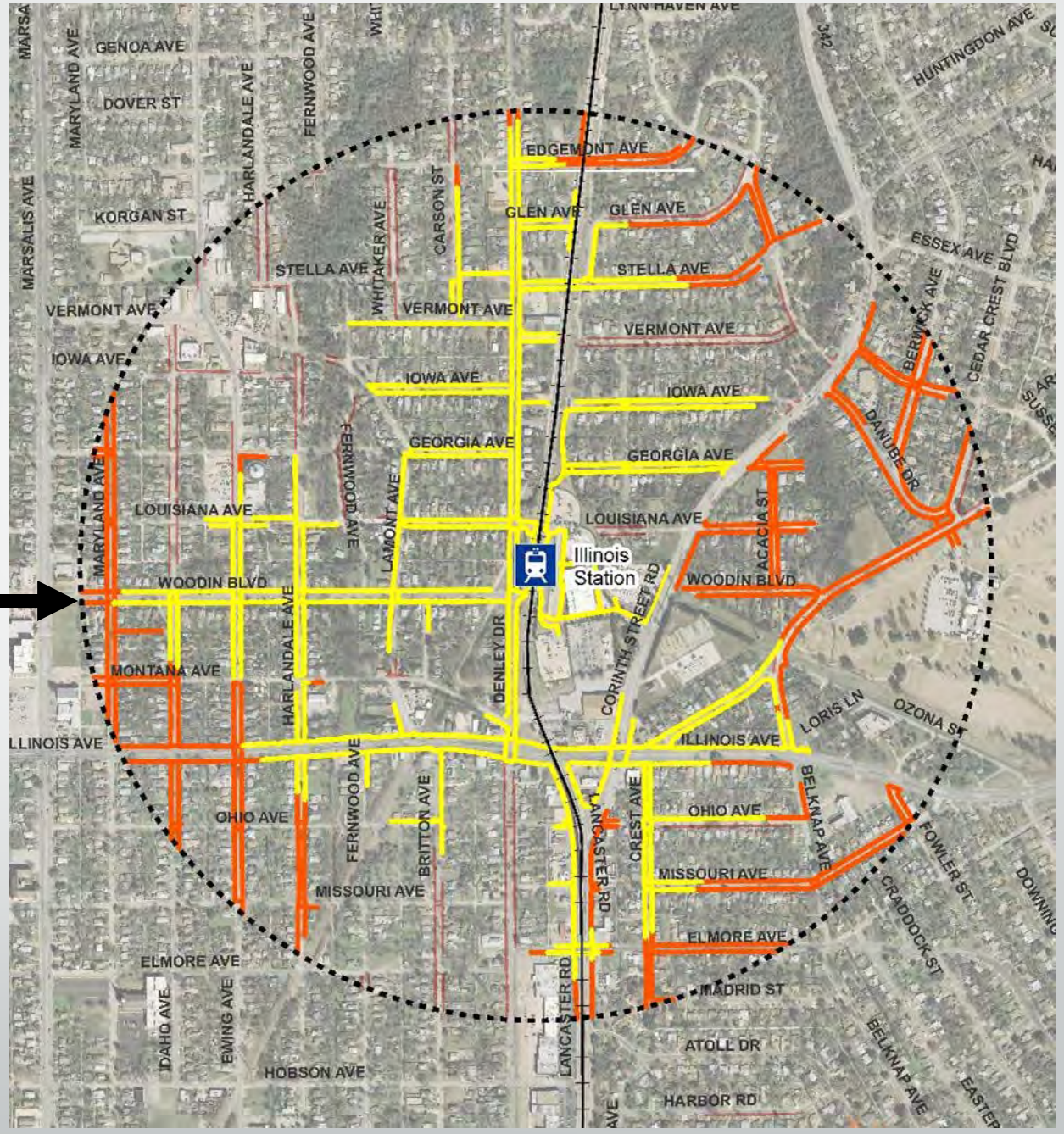
The actual 0.5 mile walkshed is often much less coverage than the 0.5 mile radius



Actual Walkshed

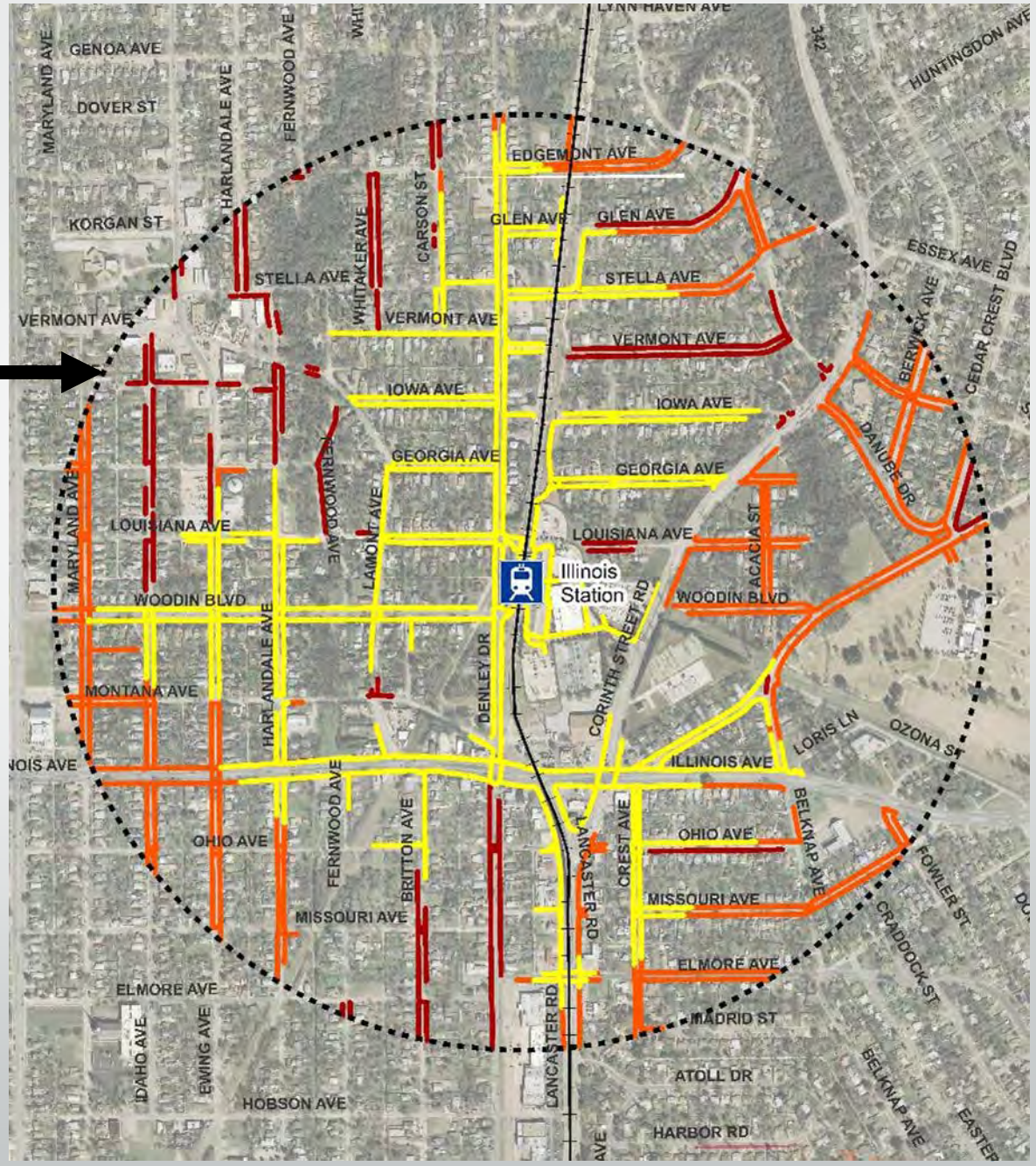
0.5+ mile walkshed on a connected sidewalk route

The 0.5 mile radius may require a much further actual walking distance on existing sidewalks.



Actual Walkshed

Other sidewalks disconnected from the network



FTA Planning Pilot Program for Transit-Oriented Development

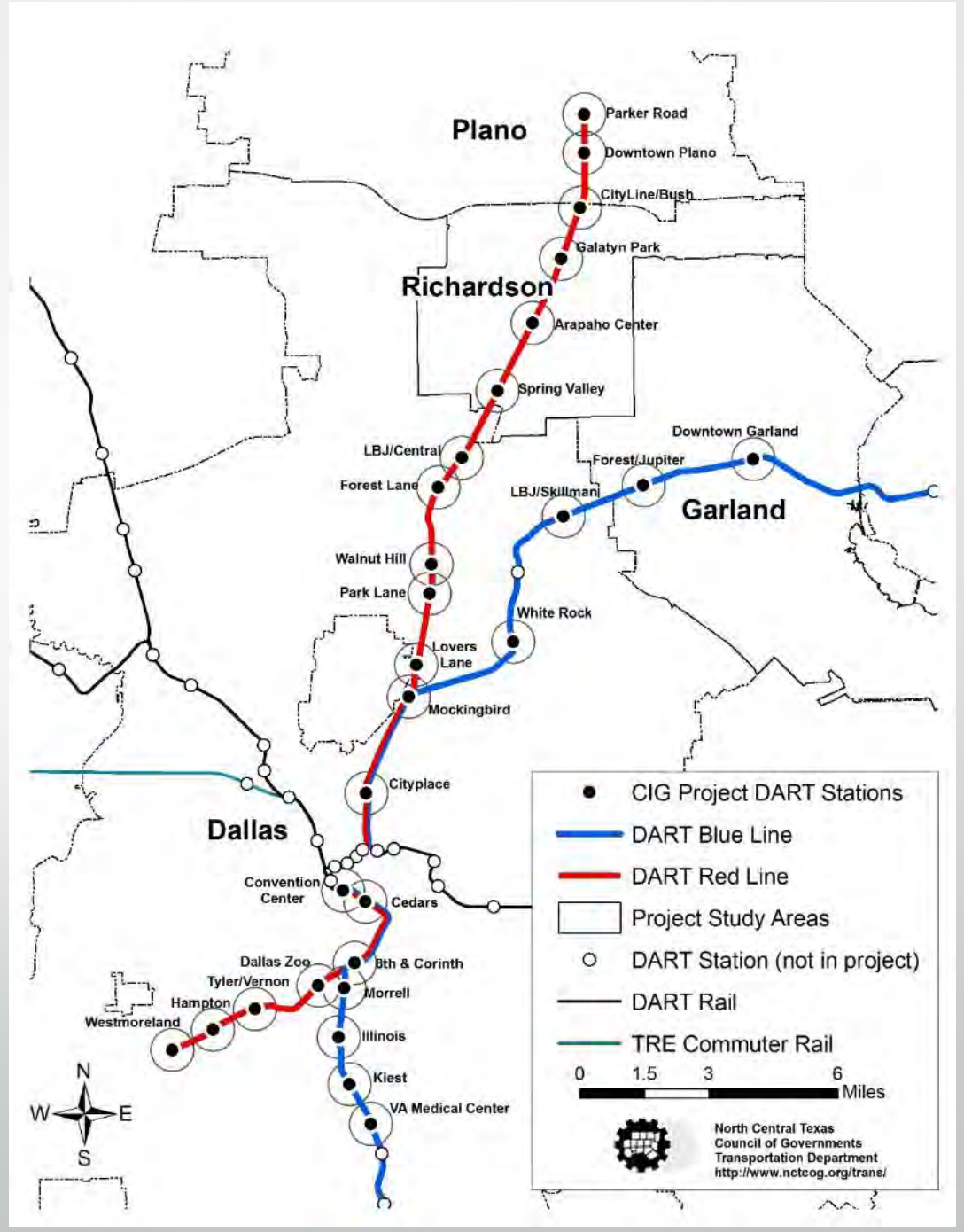
Federal Transit Administration

Partnership

NCTCOG, DART,
Cities of: Dallas, Garland, Plano, and Richardson

Transit Project

DART Red and Blue Lines Platform Extensions (28 stations built before 2004)



FTA Planning Pilot Program Scope of Work

Task 1. Routes to Rail Stations Connectivity

Task 2. TOD Parking Utilization Study

Task 3. TOD Resident / Employee Survey

FTA Planning Pilot Program Scope of Work

Task 1. Routes to Rail Stations Connectivity

Goal:
Identify sidewalks and sidewalk improvements to maximize access for potential transit riders

Menu of Improvements for the Access and Safety of Potential Riders

Recommended Improvements and preliminary cost estimates

Preliminary Engineering

FTA DART Stations
Last Mile Connections
Parker Rd Station

April, 2019

DRAFT

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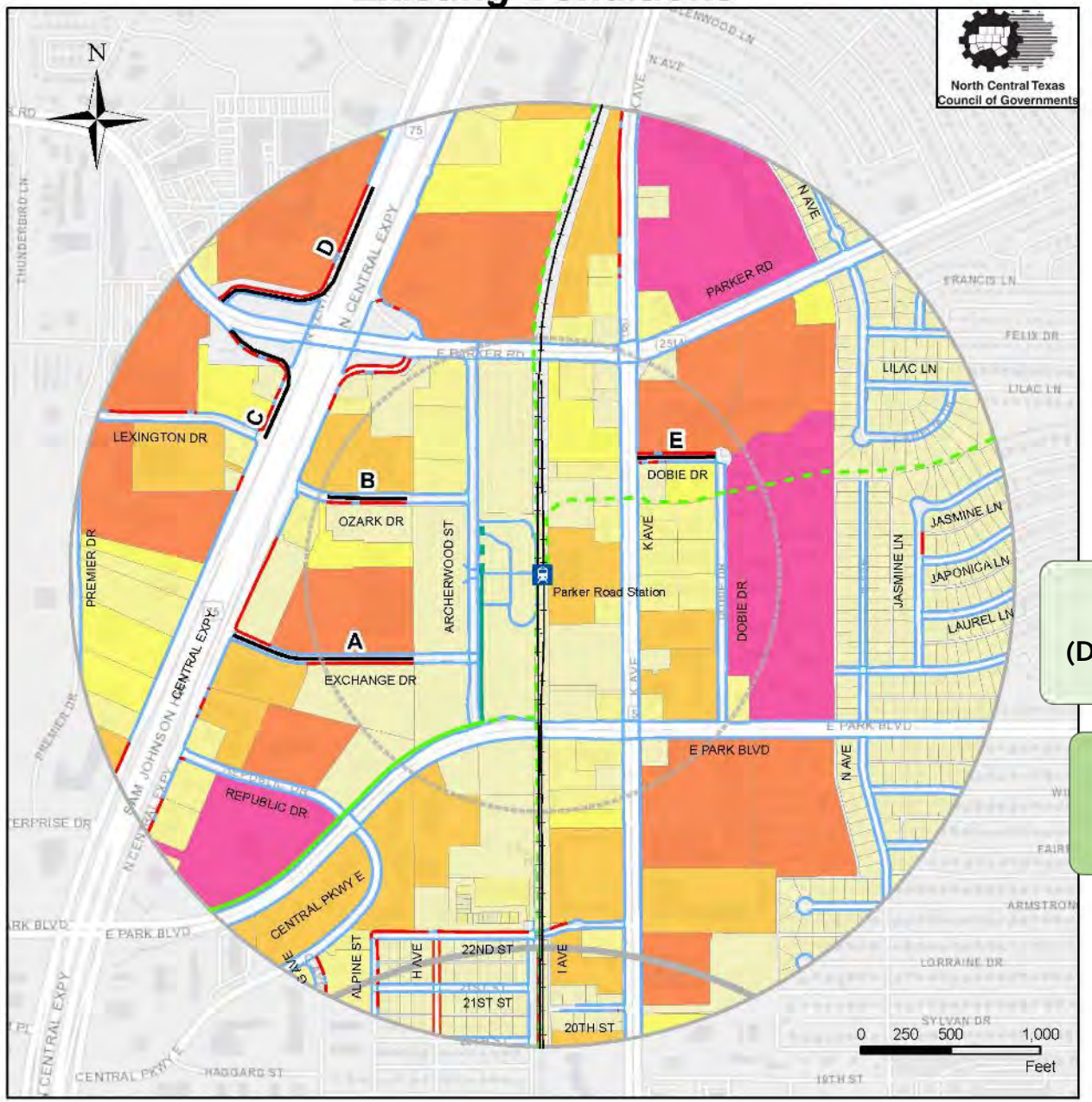
DART Red & Blue Line Corridors Last Mile Connections

Existing Conditions



Legend

- DART Rail Station
- Railroad Track

Segment Category

- Existing Sidewalk/Crosswalk
- Sidewalk/Crosswalk Gap

Regional Veloweb (Mobility 2045)

- Regional Existing
- Regional Funded
- Regional Planned

Local Shared Use Paths

- Local Existing
- Local Funded
- Local Planned

Local On-Street Bikeways

- Local Existing Bicycle Facilities
- Local Funded Bicycle Facilities
- Local Planned Bicycle Facilities

DISPLAY

- 0.5 Mile Buffer
- 0.25 Mile Buffer
- Primary Routes

Existing Residential and Employment Population (Number of People)

- 0 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 578
- 579 - 1000
- 1001 - 1500
- 1501 - 2500
- 2501 - 5000
- 5001 - 24170

Primary Routes

Route	Street Name
A	Exchange Dr
B	Ozark Dr
C	Central Expy
D	Central Expy
E	Dobie Drive

Appraisal district parcel data
(Dallas, Collin, Denton, Tarrant Co.)

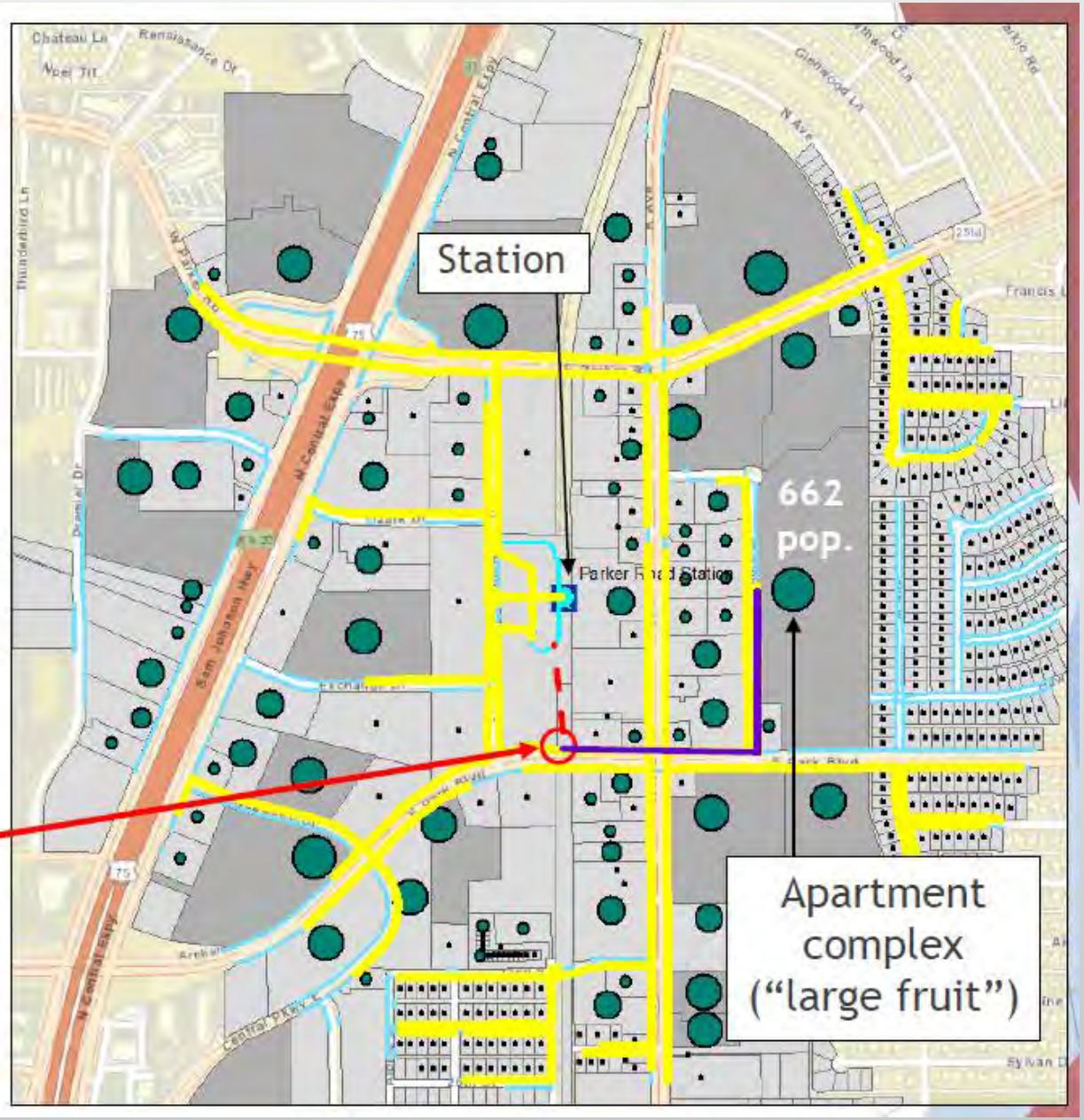
SQFT, land use, and parcel geometry

Calculate parcel population
e.g. 300 SQFT office = 1 person

Criteria And Weighting
Proposed Improvements

Criteria	Weight
Employment and Population Density (Number of potential riders connected by the improvement's catchment area)	50
Distance / Proximity of Improvements to the Station	25
Walkshed Trip Length Reduction (Catchment area benefitting from a reduced walk distance to the station)	5
Land Use Types and Key Destinations (e.g. schools, government buildings, social services, hospitals, large shopping centers, parks)	5
Crash History (Number of crashes in the general area of the project improvement)	5
Safety Benefit (Speed limit as a surrogate for systemic safety of the project improvement)	5
Equity / Transit Dependent Populations (Minority households, % below poverty line)	5

Pedestrian “Trees”



FTA DART Stations
Last Mile Connections
Parker Rd Station

June, 2019

DRAFT

North Central Texas Council of Governments

DART Red & Blue Line Corridors Last Mile Connections

Recommended Improvements

Legend

- DART Rail Station
- Railroad Track

Sidewalk

- Existing Sidewalk/Crosswalk
- Proposed Sidewalk/ Crosswalk by Priority 1
  - High
  - Medium
  - Low
  - Gap to Remain

Regional Veloweb (Mobility 2045)

- Regional Existing
- Regional Planned/Funnded

Local Shared Use Paths

- Local Existing
- Local Planned/Funded

Buffers

- 0.5 Mile Buffer
- 0.25 Mile Buffer
- Primary Routes

Existing Residential and Employment Population (Number of People)

Ppl

- 0 - 234
- 235 - 1049
- 1050 - 2586
- 2587 - 5364
- 5365 - 10339

Improvement Code Legend (See Matrix)

1A-PR-SW-01

- 1A ← Station Number
- PR ← Station Abbreviation
- SW ← Sidewalk (or CW for Crosswalk)
- 01 ← Improvement Number (Matches 1 on Map)

Possible Pedestrian Safety Countermeasures

Unsignalized Crosswalk Improvements

1. Crosswalk Signs, Markings & Lighting
2. Raised Crosswalk
3. Advance "Yield Here" Sign
4. In-Street Pedestrian Crossing
5. Curb Extension
6. Pedestrian Refuge Island
7. Rectangular Rapid Flashing Beacon
8. Road Diet
9. Pedestrian Hybrid Beacon

Signalized Crosswalk Improvements

10. Add Marked Crosswalks & Provide Countdown, Accessible Pedestrian Signals
11. Traffic Signal

Primary Routes

Route	Street Name
A	Exchange Dr
B	Ozark Dr
C	Central Expy
D	Central Expy
E	Dobie Drive

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Station Recommendations Matrix

Station Improvements Matrix

Parker Road Station

Improvement Code Legend
ID: 1A-PR-ST-01
1A ← Station Number
ST ← Station Improvement
PR ← Station Abbreviation
01 ← Improvement Number (matches 1 on Map)

North Central Texas Council of Governments
DART Red & Blue Line Corridors Last Mile Connections

Location ID	Ownership	Project Type	Description	Opinion of Probable Cost
1A-PR-ST-01	DART	Lighting	Add pedestrian lighting for area where tree cover makes for dark nighttime conditions.	$ 68,100
1A-PR-ST-02	DART	Fencing	Close gap in hedges that appears to imply this as a valid location for crossing the bus loop. Consider fencing to redirect pedestrians. The lack of ramps or a crosswalk across the bus loop here makes this an inappropriate location for a crossing. A fire hydrant here is likely the reason for the gap in the hedges, so fire hydrant access from the bus loop should be preserved.	$ 700
1A-PR-ST-03	DART	Multi-Use Trail	Add Regional Veloweb shared use path to connect platform more directly to Parker Road to the north. Will require grading, new fence between parking lot and tracks, and drainage modifications. Concrete drainage swales drain parking lot downhill toward the east at several locations across proposed path alignment, so additional study will be required.	Separate Project
1A-PR-ST-04	DART	Bicycle Parking Signing	Add educational signing at all covered bike parking locations regarding rules of use. Existing covered bike parking lids were locked. Several of the locked lids were empty without bikes inside or were storing personal belongings. The locking of empty lids indicates a shortage of available covered bike parking.	$ 700
1A-PR-ST-05				$ 700
1A-PR-ST-06	DART	Bicycle Parking	Add additional covered bike parking, preferably closer to train platform (at Location 4).	$ 17,400
1A-PR-ST-07	DART	ADA Ramp or Relocate ADA Parking	Relocate ADA parking from Location 7 closer to the north crosswalk to the train platform (near Location 3). Reasons for this change are: • Ramps are absent for crossing the southbound tracks east of the bus loop (near Location 6). • Much of the ADA parking for the station is in the small parking lot immediately west of the bus loop (Location 7 and southwest of Location 10). Some ADA parking is already located southwest of the platform near Location 14. • The lack of ramps near Location 6 requires passengers in wheelchairs to travel to the compliant crosswalks at the north or south ends of the platform (Locations 7a or 7b) rather than the more direct route via the central crosswalk.	$ 32,600
1A-PR-ST-08	DART	Crosswalk Markings	Add 12" white markings on each side of brick paver crosswalks. Bus loop crosswalks are stop-controlled, but need white markings outside the brick area to be legal crosswalks.	$ 1,100
1A-PR-ST-09				
1A-PR-ST-10	DART	Crosswalk Signs and Markings	Add pedestrian warning signs and 12" white markings outside brick pavers for Kiss & Ride crosswalk. (Crosswalk is raised to slow drivers but not signed or marked.)	$ 1,900
1A-PR-ST-11	DART	Sidewalk Repair	Correct trip hazard on sidewalk.	$ 700
1A-PR-ST-12	DART	Landscaping	Trim hedges or replace with easier maintenance plants so they don't encroach on sidewalk.	$ 6,900
1A-PR-ST-13	DART	Landscaping	Close hedge gap that provides access to existing covered bike parking (at Location 5). Gap in hedges is convenient for bicycle access to existing covered parking, but lacks ramps and conflicts with bus loop. Provide bike parking closer to platform as indicated at Location 4 above.	$ 400
1A-PR-ST-14	DART	Multi-Use Trail	Add new shared use path connecting platform more directly to Park Blvd to the south on planned Regional Veloweb alignment. May require relocation of utilities or removal of trees and/or parking spaces.	Separate Project
Opinion of Probable Cost - DART Subtotal				$ 131,200

Unsignalized Crosswalk Improvements

Nine options considered per FHWA's "***Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations***" (2018)

Options to consider vary based on:

- Number of lanes to cross
- AADT
- Speed

Table 1. Application of pedestrian crash countermeasures by roadway feature.

Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	❶ 2 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6 7 9	① 5 6 7 9	① 5 6 ❾
3 lanes with raised median (1 lane in each direction)	❶ 2 3 4 5	❶ ❸ 5 7 9	① ❸ 5 ❼ ❾	① 3 4 5 7 9	① ❸ 5 ❼ ❾	① ❸ 5 ❼ ❾	① ❸ 4 5 7 9	① ❸ 5 7 ❾	① ❸ 5 ❾
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	❶ 2 3 4 5 6 7 9	❶ ❸ 5 6 7 9	① ❸ 5 6 ❾	① 3 4 5 6 7 9	① ❸ 5 6 ❼ ❾	① ❸ 5 6 ❾	① ❸ 4 5 6 7 9	① ❸ 5 6 ❾	① ❸ 5 6 ❾
4+ lanes with raised median (2 or more lanes in each direction)	❶ ❸ 5 7 8 9	❶ ❸ 5 7 8 9	① ❸ 5 8 ❾	① ❸ 5 7 8 9	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 8 ❾
4+ lanes w/o raised median (2 or more lanes in each direction)	❶ ❸ 5 6 7 8 9	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 8 ❾

Given the set of conditions in a cell,

- # Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.
- ● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.
- ○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1. High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2. Raised crosswalk
3. Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4. In-Street Pedestrian Crossing sign
5. Curb extension
6. Pedestrian refuge island
7. Rectangular Rapid-Flashing Beacon (RRFB)**
8. Road Diet
9. Pedestrian Hybrid Beacon (PHB)**

*Refer to Chapter 4, 'Using Table 1 and Table 2 to Select Countermeasures,' for more information about using multiple countermeasures.

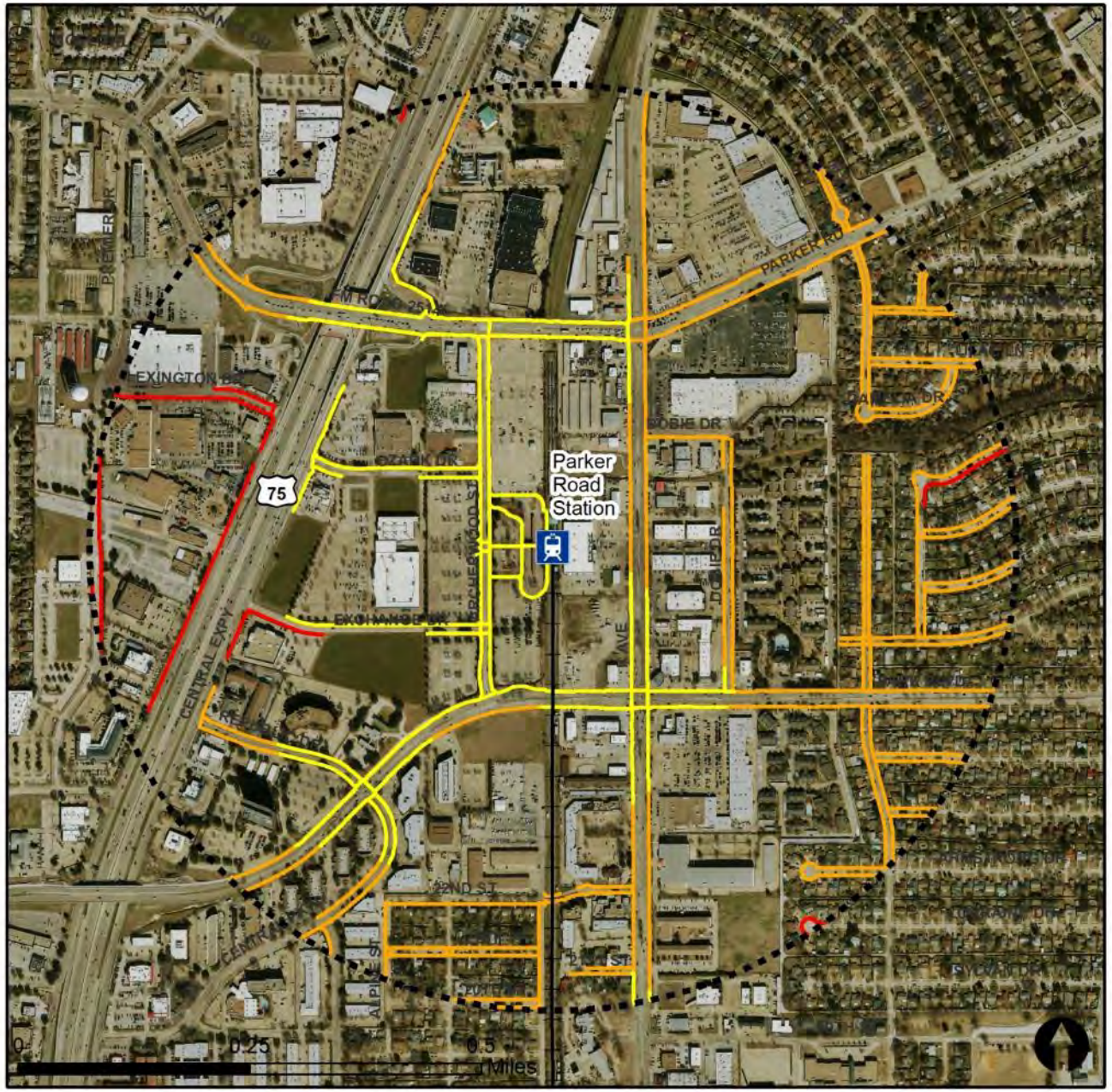
**It should be noted that the PHB and RRFB are not both installed at the same crossing location.

This table was developed using information from: Zegeer, C.V., J.R. Stewart, H.H. Huang, P.A. Lagerway, J. Feaganes, and B.J. Campbell. (2005). Safety effects of marked versus unmarked crosswalks at uncontrolled locations: Final report and recommended guidelines. FHWA, No. FHWA-HRT-04-100, Washington, D.C.; FHWA. Manual on Uniform Traffic Control Devices, 2009 Edition, (revised 2012). Chapter 4F, Pedestrian Hybrid Beacons. FHWA, Washington, D.C.; FHWA. Crash Modification Factors (CMF) Clearinghouse. http://www.cmfclearinghouse.org/; FHWA. Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE). http://www.pedbikesafe.org/PEDSAFE/; Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N.J. Thirsk, J. Zegeer, C. Lyon, E. Ferguson, and R. Van Houten. (2017). NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.; Thomas, Thirsk, and Zegeer. (2016). NCHRP Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways. Transportation Research Board, Washington, D.C.; and personal interviews with selected pedestrian safety practitioners.

Pedestrian Routes to Rail - Parker Road Station

Last Updated: February 2015

North Central Texas Council of Governments

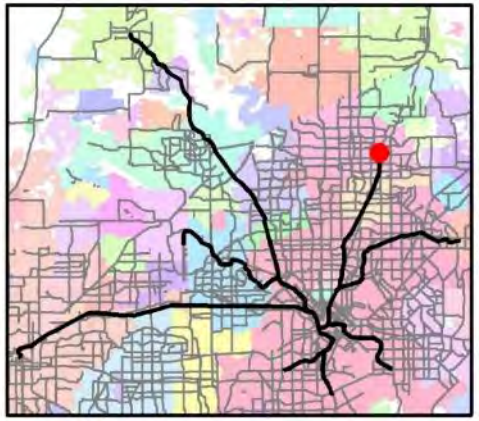


Legend

- Rail Stations
- 0.5 Mile Station Buffer
- Railroads
- Existing sidewalk facilities within a 0.5 mile walk distance
- Existing sidewalk facilities greater than a 0.5 mile walk distance
- Existing sidewalk facilites that are disconnected due to a gap in the network

Project Overview

The Pedestrian Routes to Rail study identifies all existing pedestrian facilities within a half-mile radius of existing light rail and commuter rail stations in the Dallas-Fort Worth region based on 2014 data. ArcGIS Network Analyst tool was used to identify continuous facilities that are less than or greater than a half-mile actual walking distance to a station. The maps also reflect existing facilities that are disconnected due to gaps or other barriers not allowing a continuous pedestrian route to a station. The maps do not reflect the condition or ADA compliance of the existing infrastructure. More information on the Routes to Rail study and methodology is available at:



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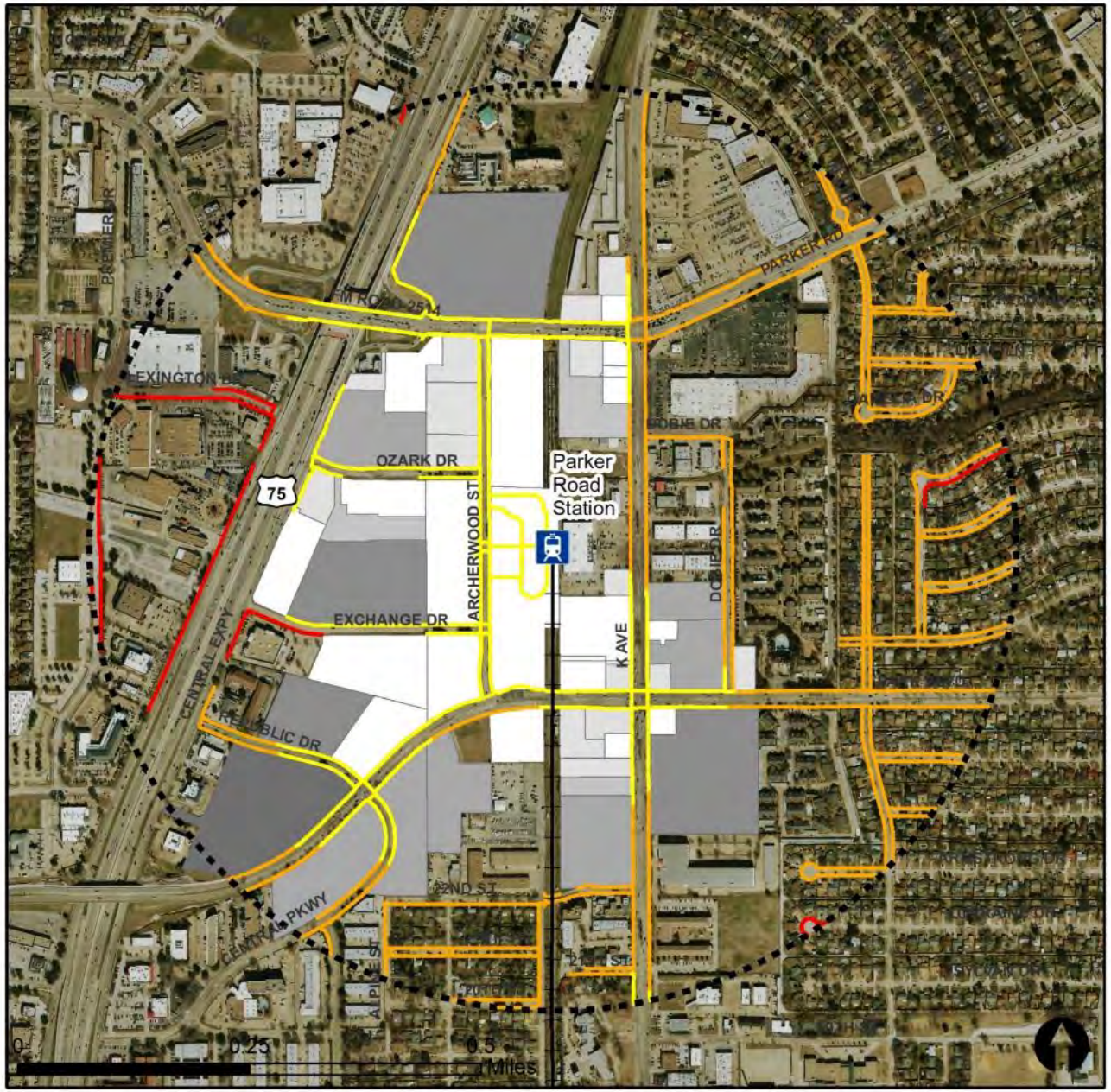

North Central Texas Council of Governments

Legend

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- Railroads
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- Existing sidewalk facilities greater than a 0.5 mile walk distance
- Existing sidewalk facilites that are disconnected due to a gap in the network

Legend

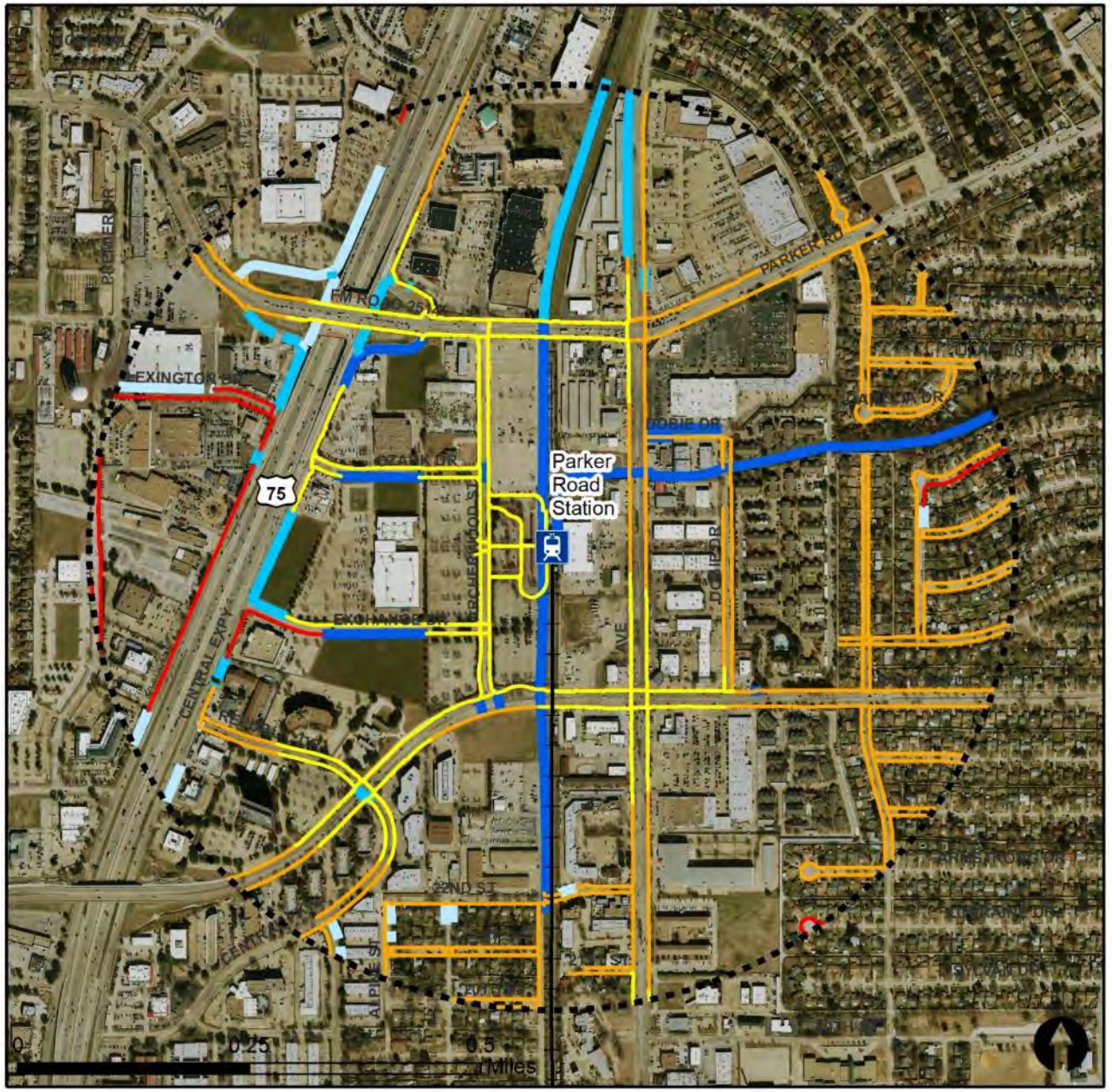
Half Mile Population and Employment Connected (4,240)

Ppl

- 0 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 578
- 579 - 1000
- 1001 - 1500
- 1501 - 2500
- 2501 - 5000
- 5001 - 24170

*Per NCTCOG Calculation

Pedestrian Routes to Rail - Parker Road Station
Proposed Improvements



North Central Texas Council of Governments

Legend

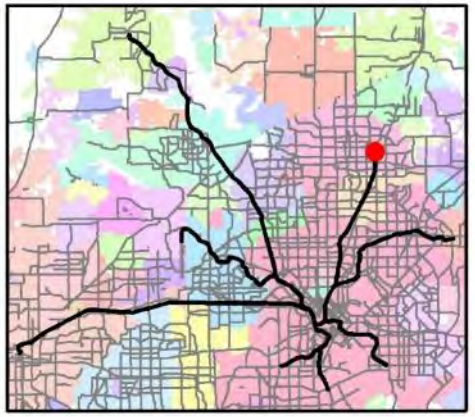
- Rail Stations
- 0.5 Mile Station Buffer
- Railroads
- Existing sidewalk facilities within a 0.5 mile walk distance
- Existing sidewalk facilities greater than a 0.5 mile walk distance
- Existing sidewalk facilites that are disconnected due to a gap in the network

Legend

Parker Rd. Improvements

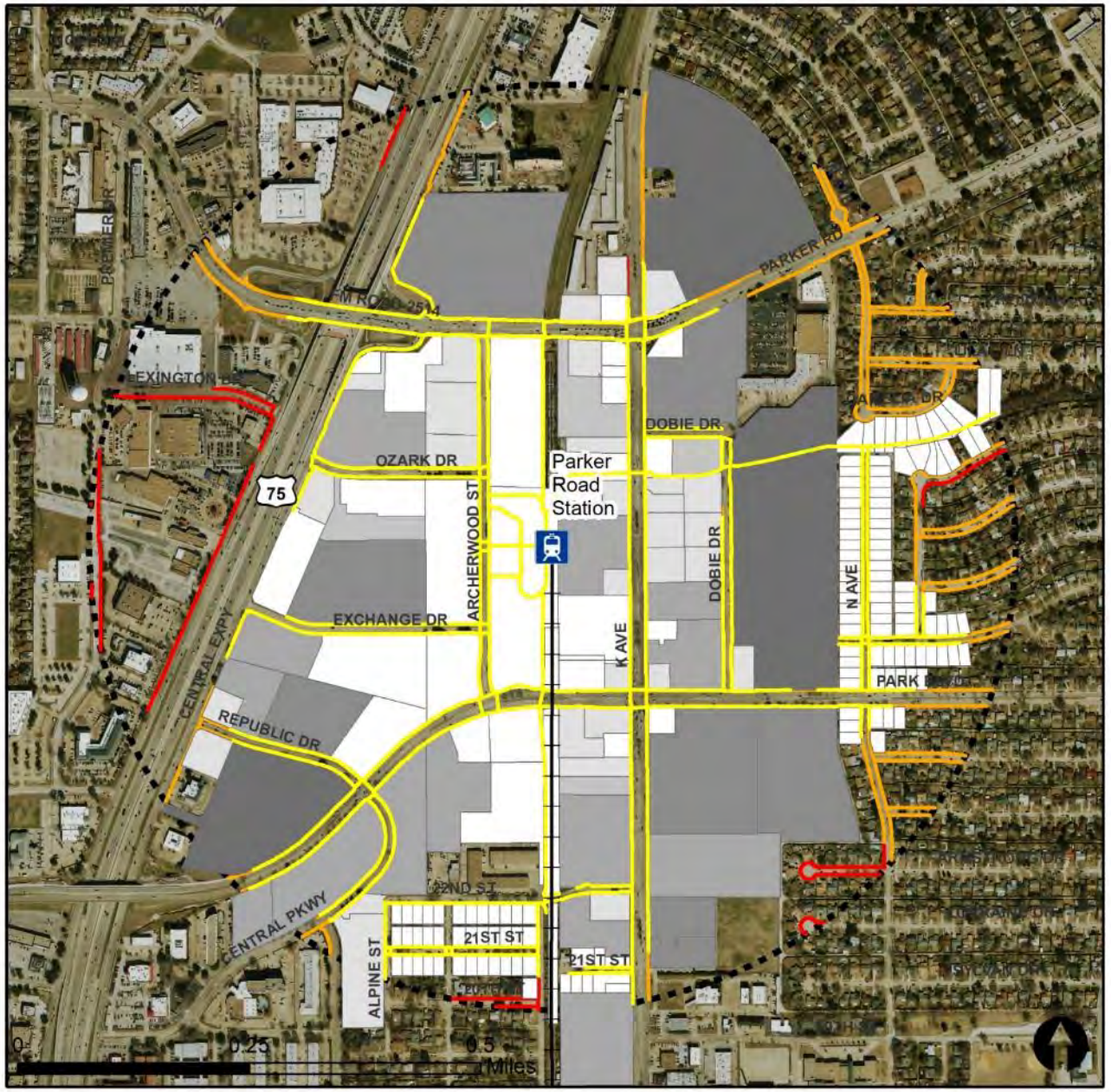
Priority

- High
- Medium
- Low



High Priority
Parker Rd. Routes to Rail Analysis

North Central Texas Council of Governments



Legend

- Rail Stations
- 0.5 Mile Station Buffer
- Railroads
- Existing sidewalk facilities within a 0.5 mile walk distance
- Existing sidewalk facilities greater than a 0.5 mile walk distance
- Existing sidewalk facilites that are disconnected due to a gap in the network

Legend

Half Mile Population and Employment Connected (8,562)

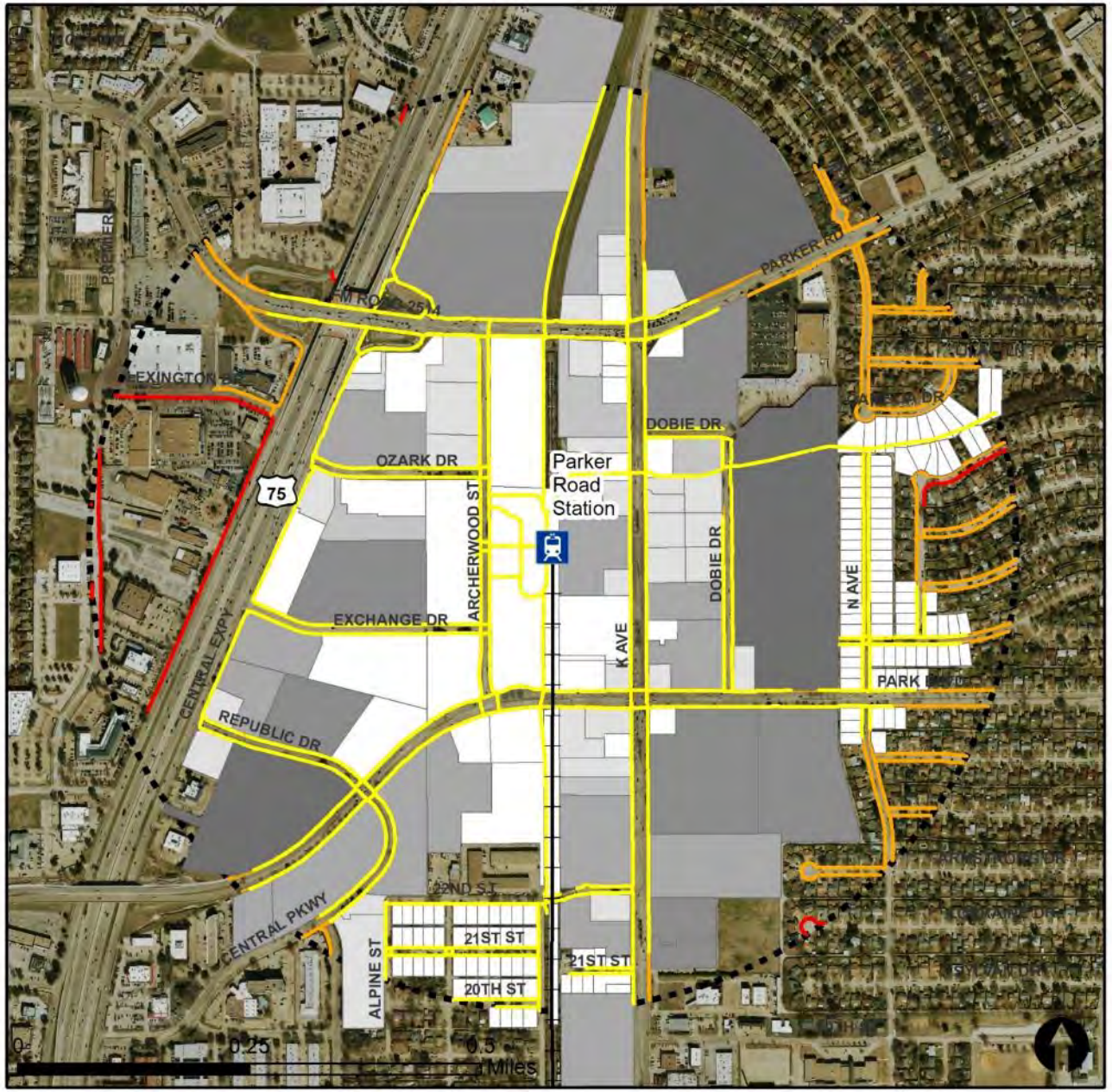
- 0 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 578
- 579 - 1000
- 1001 - 1500
- 1501 - 2500
- 2501 - 5000
- 5001 - 24170

+ 4,322

*Per NCTCOG Calculation

High and Medium Priority
Parker Rd. Routes to Rail Analysis

North Central Texas Council of Governments



Legend

- Rail Stations
- 0.5 Mile Station Buffer
- Railroads
- Existing sidewalk facilities within a 0.5 mile walk distance
- Existing sidewalk facilities greater than a 0.5 mile walk distance
- Existing sidewalk facilites that are disconnected due to a gap in the network

Legend

Half Mile Population and Employment Connected (9,026)

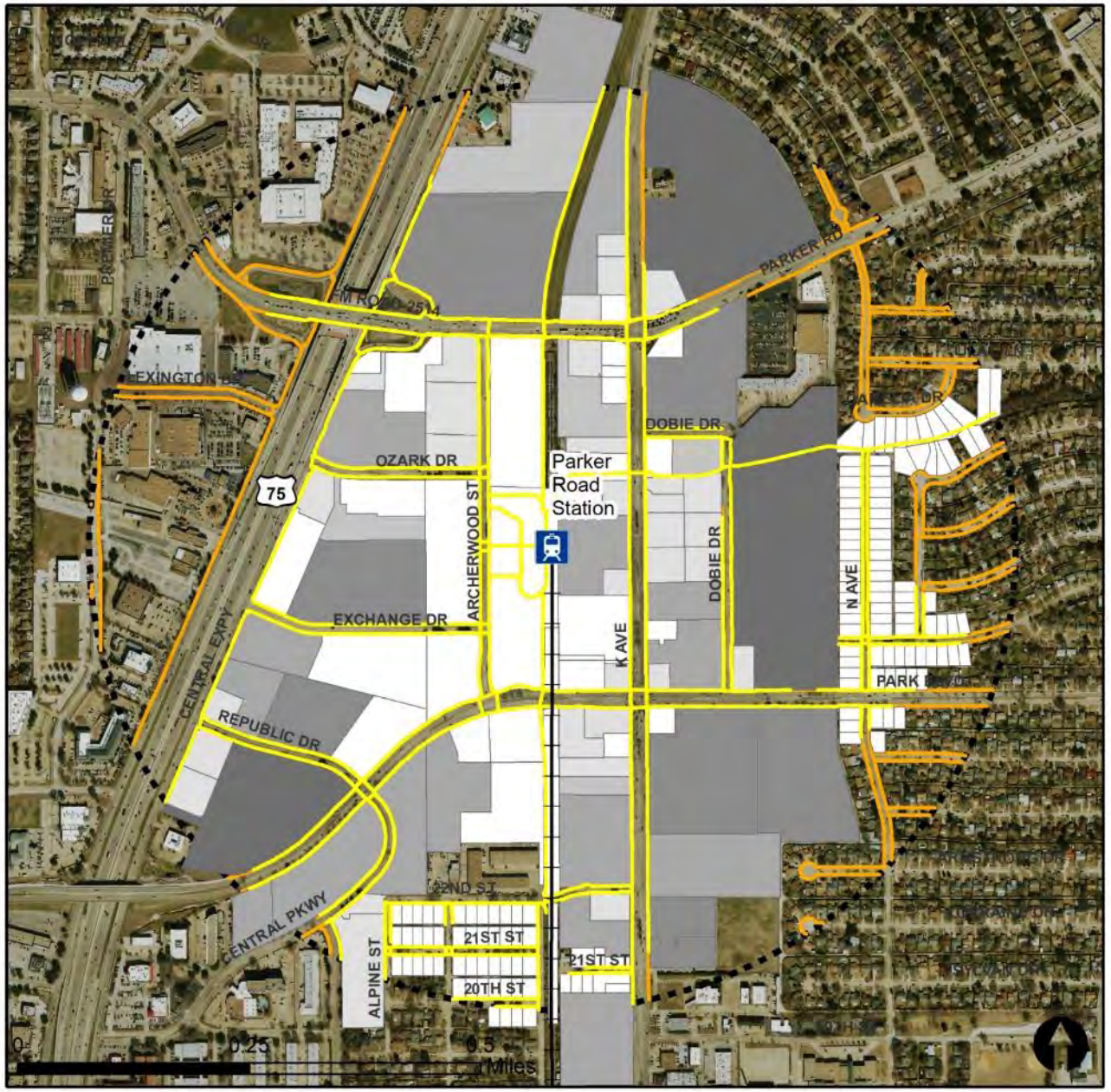
- 0 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 578
- 579 - 1000
- 1001 - 1500
- 1501 - 2500
- 2501 - 5000
- 5001 - 24170

+ 492

*Per NCTCOG Calculation

High, Medium and Low Priority
Parker Rd. Routes to Rail Analysis

North Central Texas Council of Governments



Legend

- Rail Stations
- 0.5 Mile Station Buffer
- Railroads
- Existing sidewalk facilities within a 0.5 mile walk distance
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Legend

Half Mile Population and Employment Connected (9,054)

- 0 - 10
- 11 - 50
- 51 - 100
- 101 - 250
- 251 - 578
- 579 - 1000
- 1001 - 1500
- 1501 - 2500
- 2501 - 5000
- 5001 - 24170

+ 28

*Per NCTCOG Calculation

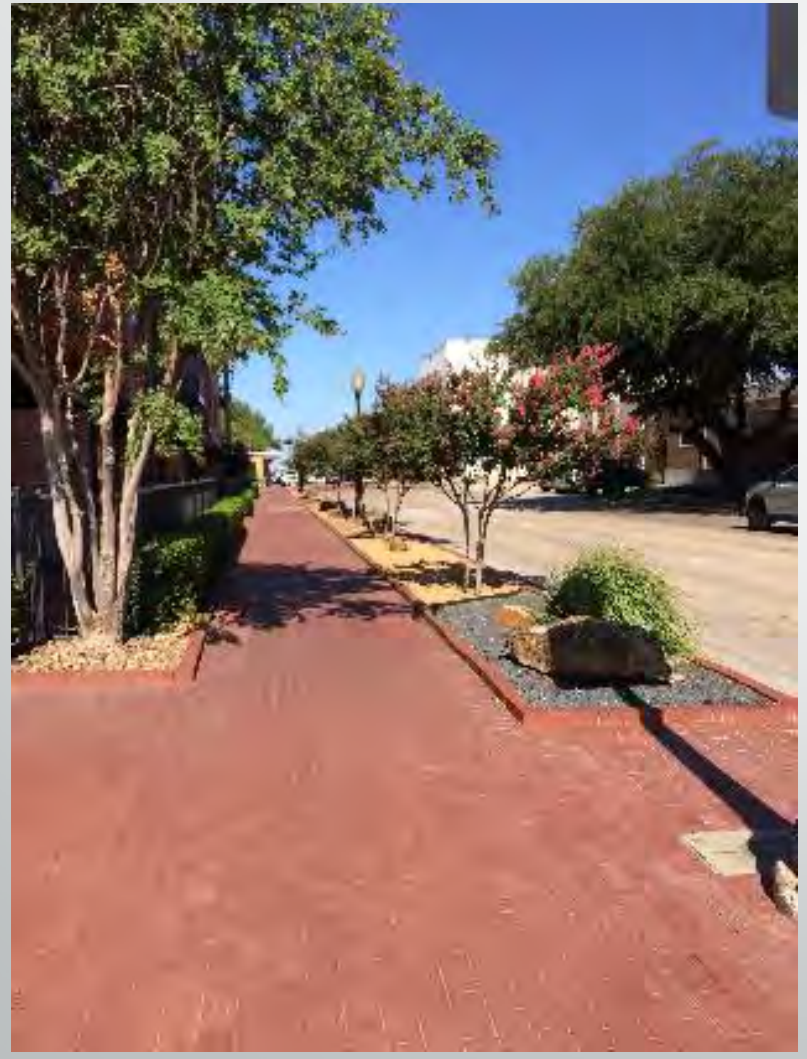
Other Considerations

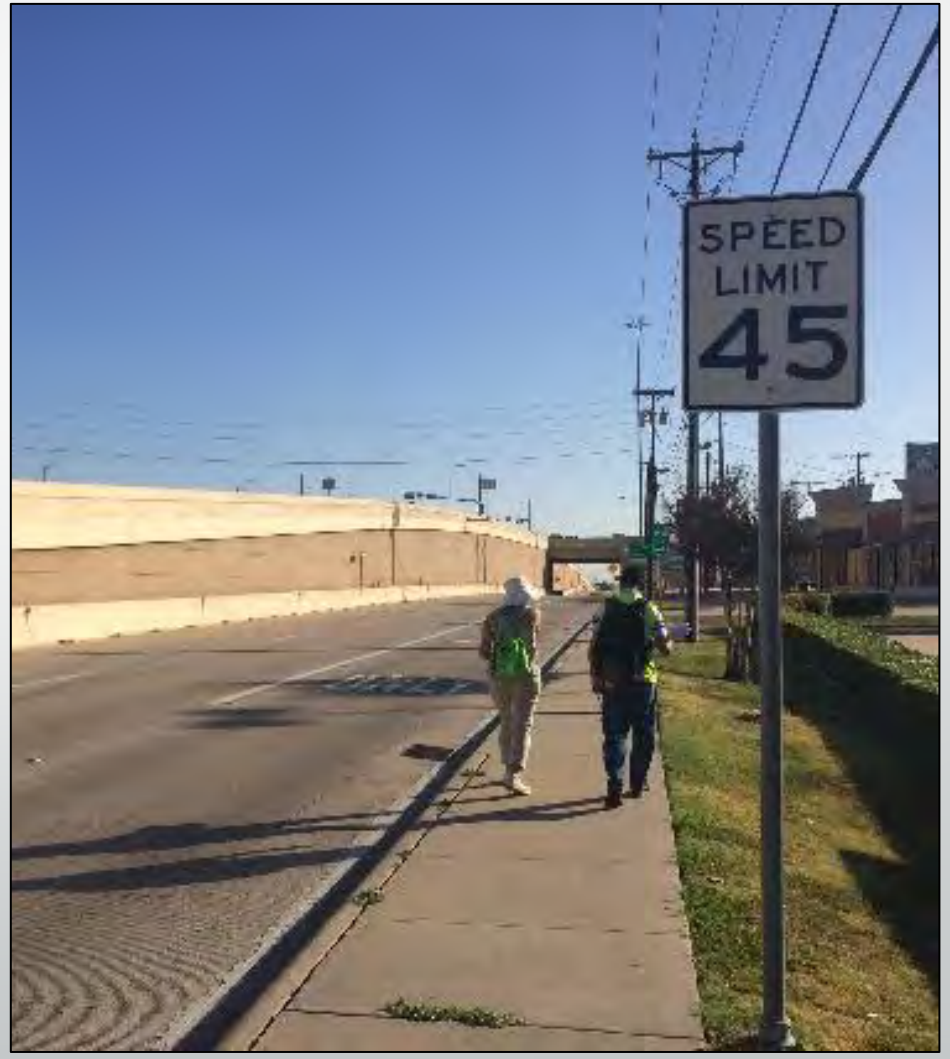
- Adjacent Land Uses
- Future Development / Redevelopment Impacts
- Existing Conditions and ADA
- Roadway and Intersection Characteristics

Other Considerations

- Basic Improvements
  vs.
  Other Desired Streetscape Enhancements
- Implementation Agency
  (City, TxDOT, DART)
- Local vs. Regional vs. Transit Agency Priorities
- Funding Availability

Which accommodation is more comfortable?





Next Steps /Lessons Learned

- Logical Construction Packages
- We can build it. *But will they come?*
  - ✓ TOD Survey of Residents and Employers
  - ✓ Must Address Other Issues Impacting Perceptions of Safety
  - ✓ Weather

› Tell The Story (Media, Elected Officials, Public At-Large)

- Benefits vs. Cost
- Safety
- Economic Development
- 4M more residents in the region = increased vehicle congestion

Improving Multimodal Last Mile Connections to Transit *and* Managing Parking

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North Central Texas
Council of Governments

Greenville Ave.
DART Arapaho Center Station
Source: City of Richardson