North Central Texas Council of Governments

BICYCLE AND PEDESTRIAN ADVISORY COMMITTEE

North Central Texas Council of Governments
Virtual Teams Meeting
November 18, 2020
2:00 p.m. - 4:00 p.m.

2:00 – 2:05 (5 min)	**1. Welcome – Introductions** ▪ Introduction of Committee and leadership. ▪ Discussion of the August 19, 2020 BPAC meeting summary, as necessary	Jessica Shutt, City of Richardson
2:05 – 2:50 (45 min)	**2. Local Community Updates** A. Denton's First Protected Bike Lane – Chandra Muruganandham, City of Denton B. TxDOT Research Project: Green Pavement Markings – Katie Kam, UTA, with an introduction from Wade Odell, TxDOT C. Complete Streets Planning and Projects in Duncanville – Greg Ramey, City of Duncanville D. Trail Etiquette Campaign in Grapevine – Kathy Nelson, City of Grapevine E. Upcoming Events – Kathy Nelson, Vice-Chair, City of Grapevine	Various BPAC Members and Guests
2:50 – 3:15 (25 min)	**3. NCTCOG Updates** A. Transit-Oriented Development Survey: Bicyclists and Pedestrians – Travis Liska B. Regional Veloweb Trail Implementation: Highlights of efforts to advance the planning and engineering of regionally significant trail corridors – Kevin Kokes C. Requests for 2020 Highlighted Regional Trails Brochures – Matt Fall	NCTCOG Staff
3:15– 3:35 (20 min)	**4. Trail and Shared Bicycle Use in 2020** Update and overview about changes in the usage of the region's trail network in 2020, and recent trends in bike share ridership in the Fort Worth Bike Share program.	Daniel Snyder, NCTCOG, and Jennifer Grissom, Fort Worth Bike Share
3:35 – 3:45 (10 min)	**5. Blue-Green-Grey Transit Stops in Farmers Branch** Enhancing bus stops to improve the health and safety of active users through crosswalks, traffic-calming techniques, and efforts to increase comfort during first/last mile connectivity.	Renee Esses, City of Farmers Branch
3:45 – 3:55 (10 min)	**6. Trails as an Employee Attractor for Businesses** Overview about perspectives related to the benefits trails and bikeways provide for the region's quality of life and business development efforts.	Mike Rosa, Dallas Regional Chamber
3:55 – 4:00 (5 min)	**7. Other Business/Open Discussion** This item provides an opportunity to bring items of interest before the Committee or propose future agenda items.	Jessica Shutt, City of Richardson

Next BPAC Meeting

The next meeting of the Bicycle and Pedestrian Advisory Committee is scheduled for **February 17, 2021**, at **2:00 p.m**.

Bicycle and Pedestrian Advisory Committee – 2020 Roster

Agency Representing	Name
Town of Addison	Janna Tidwell
City of Allen	Krishan Patel
City of Arlington	Anthony Cisneros
City of Bedford	Michele Wilson
City of Burleson	Heather Houseman
City of Carrollton	Marcos Fernandez
City of Cedar Hill	Shawn Ray
City of Cleburne	Aaron Dobson
City of Colleyville	Lisa Escobedo
City of Coppell	John Elias
City of Dallas	G. "Gus" Khankarli
City of Denton	Chandra Muruganandham
City of DeSoto	Tony Irvin
City of Duncanville	Athena Seaton
City of Euless	Alexander Harvey
City of Farmers Branch	Mitzi Davis
Town of Flower Mound	Kari Biddix
City of Fort Worth	Jeremy Williams
City of Frisco	Robert Caskey
City of Garland	Josue De la Vega
City of Grand Prairie	Brett Huntsman
City of Grapevine	Kathy Nelson
City of Greenville	Letora Anderson
City of Haltom City	Melissa Eckert
City of Irving	Cody Owen
City of Keller	Cody Maberry
City of Lancaster	Emma Chetuya
City of Lewisville	Stacie Anaya
City of Mansfield	Chris Ray
City of McKinney	Robyn Root
City of Mesquite	Wes McClure
City of Midlothian	Heather Dowell
City of North Richland Hills	Joe Pack
City of Plano	Christina Sebastian
City of Richardson	Jessica Shutt
City of Rowlett	Carlos Monsalve
City of Southlake	Stephanie Taylor
City of The Colony	Eve Morgan
City of Waxahachie	Colby Collins
City of Weatherford	Chad Marbut
City of Wylie	Robert Diaz
Dallas County	Minesha Reese
Ellis County	Joseph Jackson
Hood County	Scott Sopchak
Hunt County	Kevin St. Jacques
Rockwall County	Lee Gilbert
Tarrant County	Kristen Camareno
Wise County	Chad Davis
Dallas Area Rapid Transit	Patricio Gallo
Denton County Transportation Authority	Tim Palermo
North Texas Tollway Authority	Lori Shelton
Trinity Metro	Sandip Sen
TXDOT Dallas District	Melissa Meyer
TXDOT Fort Worth District	Phillip Hays

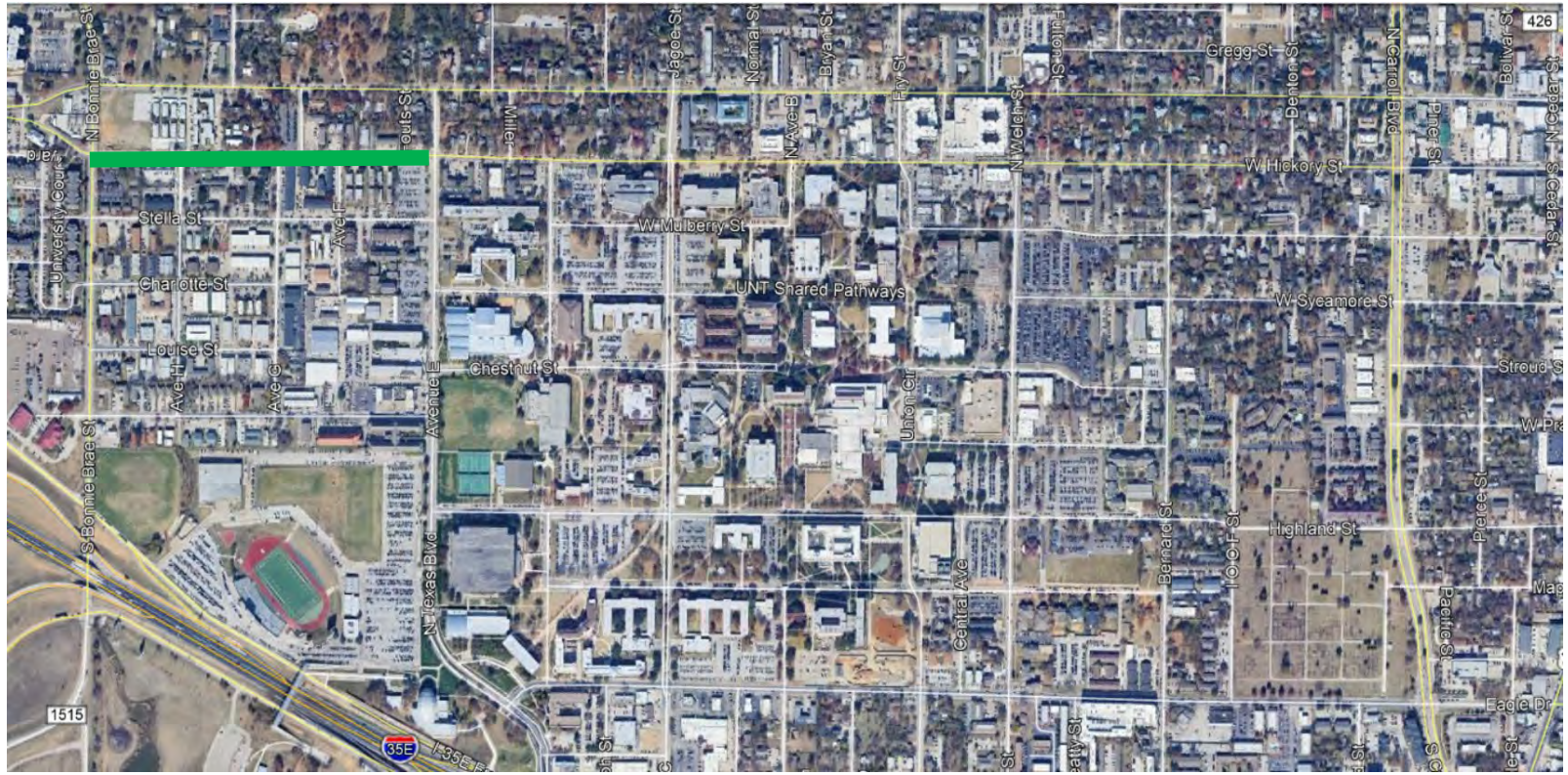
Bike Denton:
Buffered Bike Lane Project Update

CAPITAL PROJECTS -TRAFFIC

Existing Project Location Map

W Hickory Street

- **Bonnie Brae St to North Texas Blvd (approx. 1,900 l.f.)**
- **One-way EB**
- **Speed limit 30 MPH**
- **Bollard Spacing 30’**
- **6’ bike lane and 5.5 ‘ buffer**



IMPROVING DENTON

Existing Project Location Map

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- One-way EB
- Speed limit 30 MPH
- Bollard Spacing 30’
- 6’ bike lane and 5.5 ‘ buffer

W Hickory Street

- Avenue B to Welch Street (approx. 1,200 l.f.)
- One-way EB
- Speed limit 20 MPH
- Bollard Spacing 40’
- 6’ bike lane and 3’ buffer

Existing Project Location Map

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- Bonnie Brae St to North Texas Blvd (approx. 1,900 l.f.)
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W Hickory Street

- Avenue B to Welch Street (approx. 1,200 l.f.)
- One-way EB
- Speed limit 20 MPH
- Bollard Spacing 40’
- 6’ bike lane and 3’ buffer

Welch Street

- Eagle Blvd. to Highland St. (approx. 1,800 l.f.)
- Separate NB and SB bike lanes
- Speed limit 20 MPH
- Bollard Spacing 40’
- 5.5’ bike lane and 3’ buffer

IMPROVING DENTON

W Hickory Street
Bonnie Brae Street to North Texas Boulevard

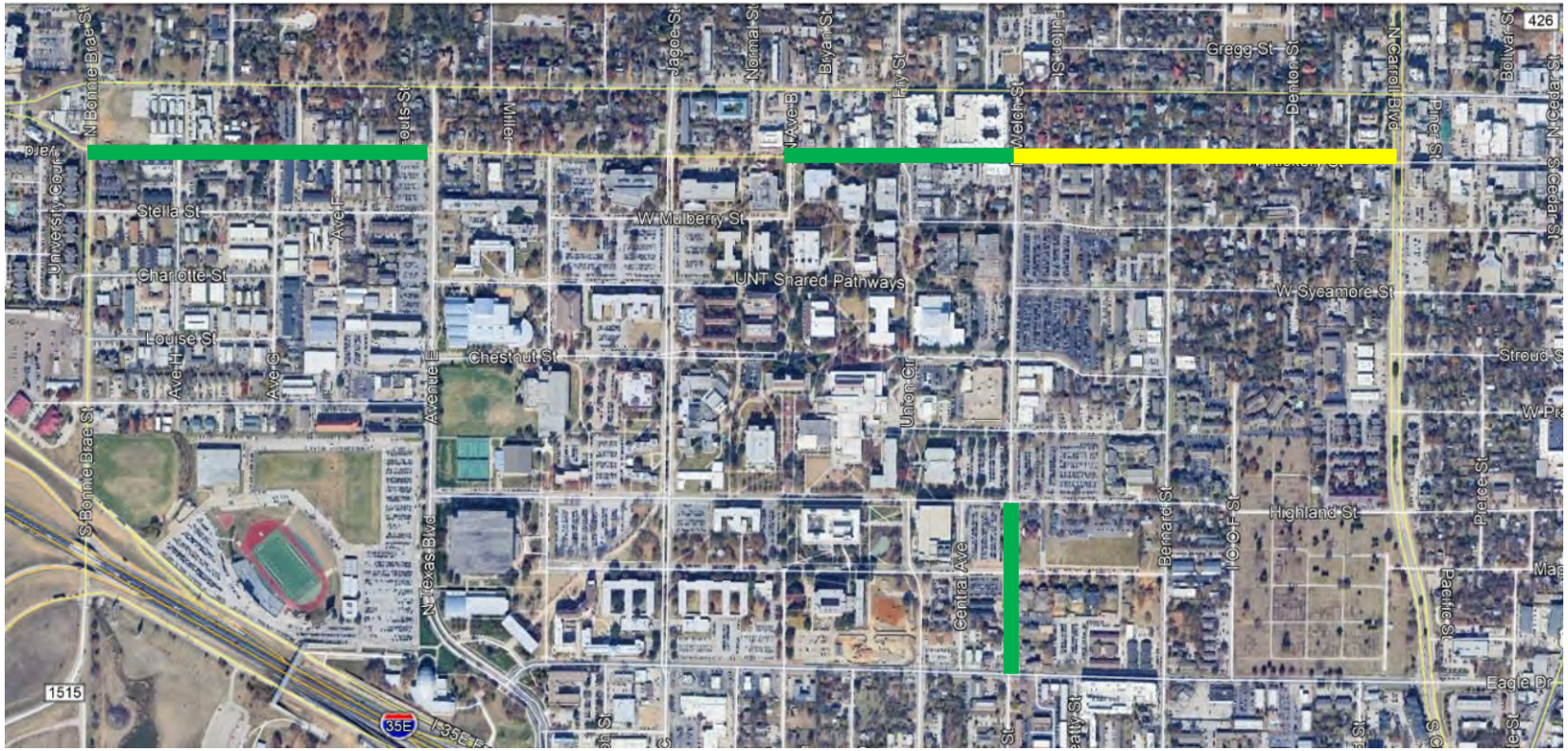
W Hickory Street
Avenue B to Welch Street

Welch Street
Eagle Boulevard to Highland Street

Future Buffered Bike Lane Expansion

W Hickory Street

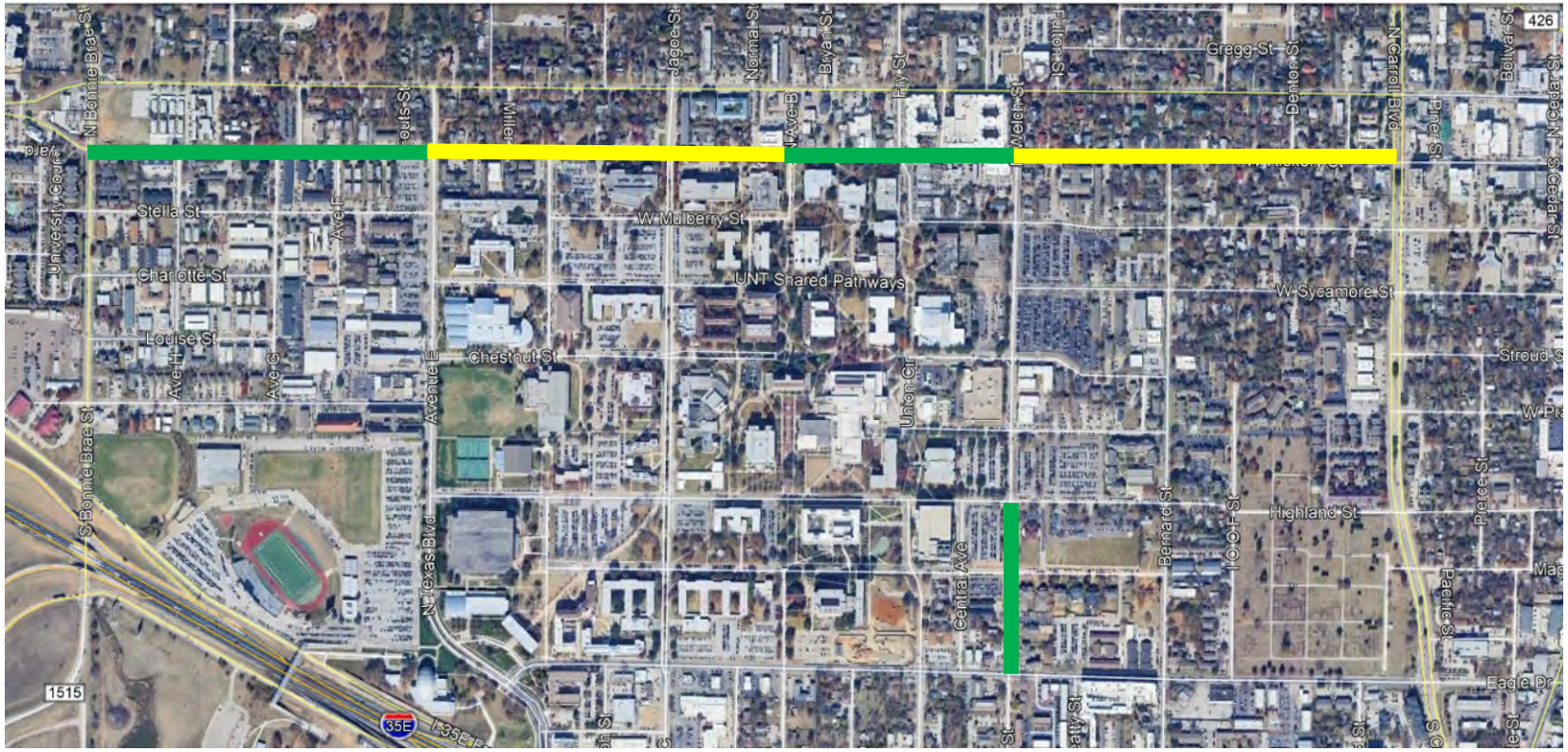
- **Welch Street to Carroll Boulevard (approx. 2,100 linear feet)**



Future Buffered Bike Lane Expansion

W Hickory Street

- **Welch Street to Carroll Boulevard (approx. 2,100 linear feet)**
- **North Texas Boulevard to Avenue B (approx. 2,000 linear feet)**



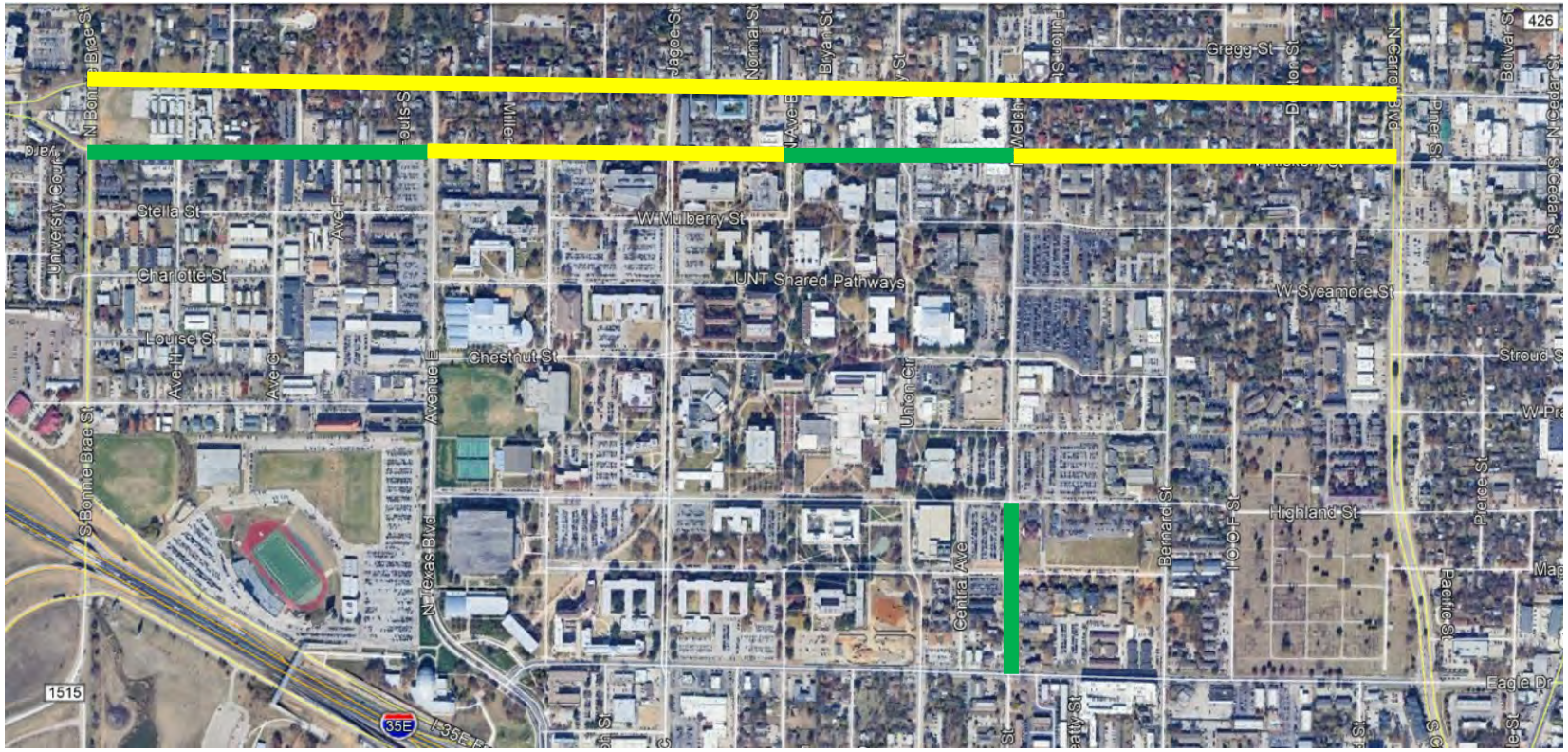
Future Buffered Bike Lane Expansion

W Hickory Street

- **Welch Street to Carroll Boulevard (approx. 2,100 linear feet)**
- **North Texas Boulevard to Avenue B (approx. 2,000 linear feet)**

W Oak Street

- **Carroll Boulevard to Bonnie Brae Street (approx. 7,400 linear feet)**



Future Buffered Bike Lane Expansion

W Hickory Street

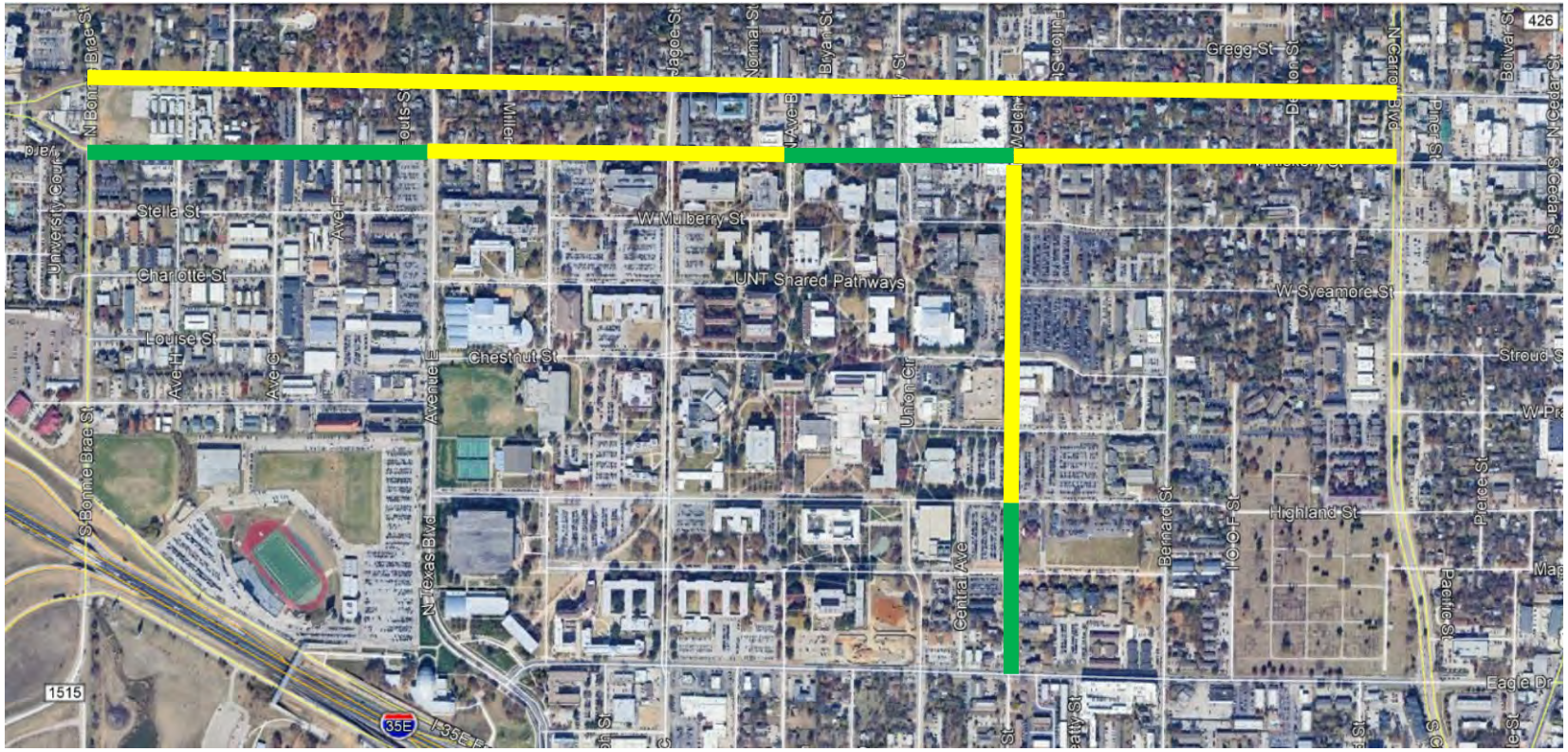
- Welch Street to Carroll Boulevard (approx. 2,100 linear feet)
- North Texas Boulevard to Avenue B (approx. 2,000 linear feet)

W Oak Street

- Carroll Boulevard to Bonnie Brae Street (approx. 7,400 linear feet)

Welch Street

- Highland Street to W. Hickory Street (approx. 1,900 linear feet)



IMPROVING DENTON

QUESTIONS?
COMMENTS?

THANK YOU

Chandra Muruganandham
Senior Engineer - City of Denton
Chandra@cityofdenton.com
Ph-940-349-8402.

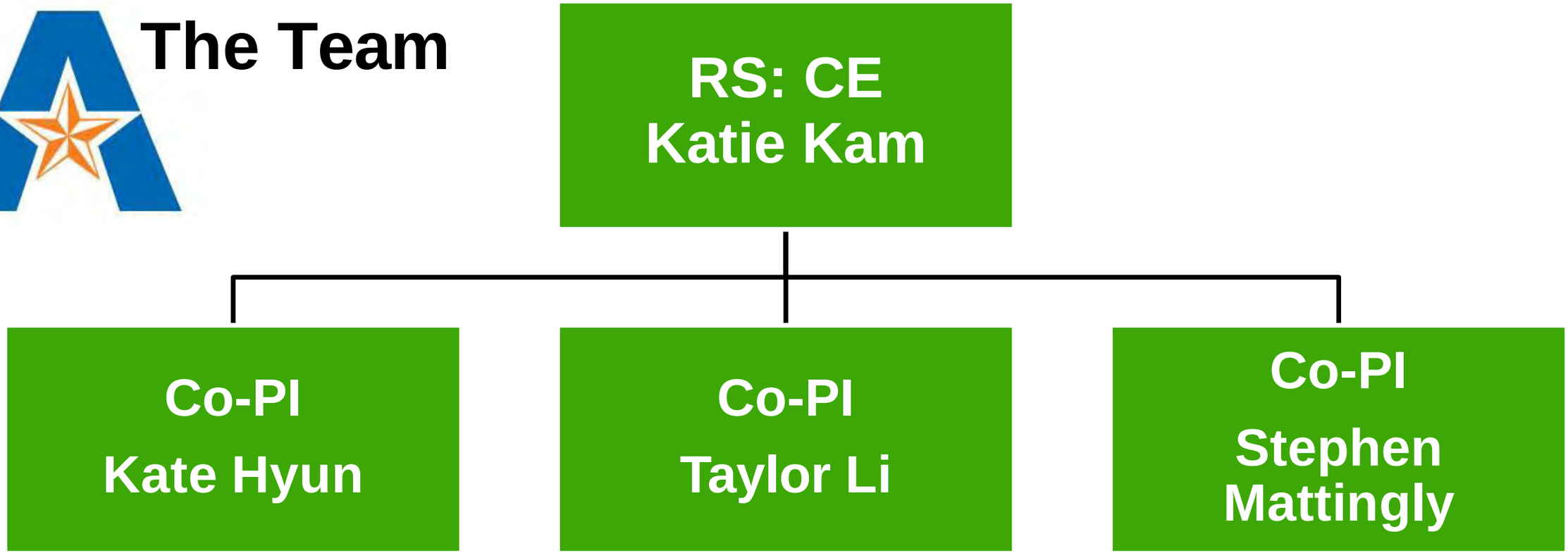
IMPROVING DENTON

UNIVERSITY OF TEXAS ARLINGTON

Analyze the Use of Green Pavement Markings-Intersection Safety for Non-Motorized Users

TxDOT Project 0-7045

The Team

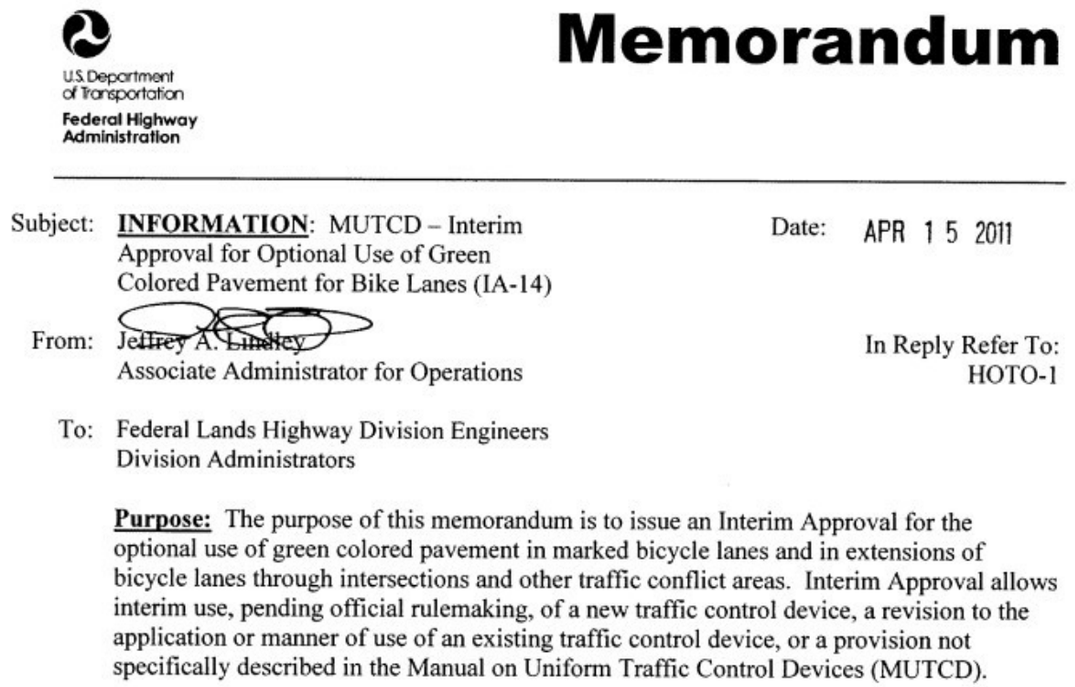


Civil Engineering Grad Students

Jobaidul Alam Boni and Mdmintu Miah

Project Inspiration

- Increase in Texas communities using green pavement
- FHWA gave interim approval in 2011 (for MUTCD)
- To inform TxDOT's position re: use of green pavement



U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: **INFORMATION**: MUTCD – Interim Approval for Optional Use of Green Colored Pavement for Bike Lanes (IA-14)

Date: APR 15 2011

From: Jeffrey A. Lindley
Associate Administrator for Operations

In Reply Refer To: HOTO-1

To: Federal Lands Highway Division Engineers
Division Administrators

Purpose: The purpose of this memorandum is to issue an Interim Approval for the optional use of green colored pavement in marked bicycle lanes and in extensions of bicycle lanes through intersections and other traffic conflict areas. Interim Approval allows interim use, pending official rulemaking, of a new traffic control device, a revision to the application or manner of use of an existing traffic control device, or a provision not specifically described in the Manual on Uniform Traffic Control Devices (MUTCD).

Task: State of the Practice

- Why Green
- Studies of Green Bike Facilities
- Green Pavement Marking Materials
- Texas Cities

Future Tasks

- Develop Green Bike Facility Evaluation Plan
- Test Locations (Before/After, Compare)
- Develop Guidance on Green Bike Facilities

Why Green?

An Overview

Markings Around the World

Madison, Wisconsin

The Netherlands

USA

Lyngby, Denmark

New Zealand

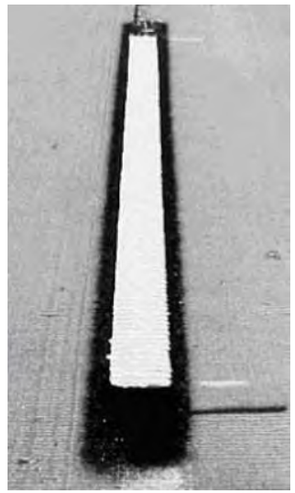
Oakland, California

Thisted, Denmark

Colors Reserved by MUTCD

YELLOW

BLACK



PURPLE

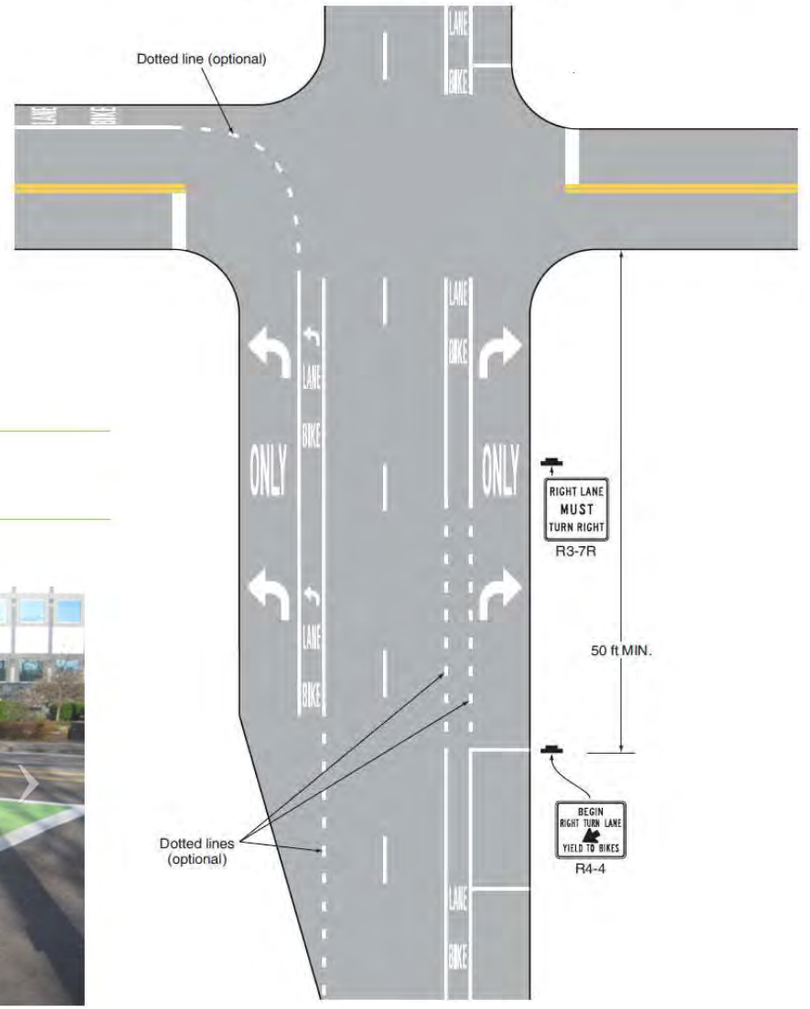
RED

BLUE

MUTCD Bike Facility Design

White Only

Figure 9C-1. Example of Intersection Pavement Markings—Designated Bicycle Lane with Left-Turn Area, Heavy Turn Volumes, Parking, One-Way Traffic, or Divided Highway



NACTO Urban Bikeway Design Guide

Go Green

Urban Bikeway Design Guide

Colored Bike Facilities

Bike Box - Portland, OR

Facility Design Research

Literature Review

Preferred Colors

1. Red
2. Blue
3. Yellow
4. Green, White

Fig 1. Pictures of the fully painted intersections.

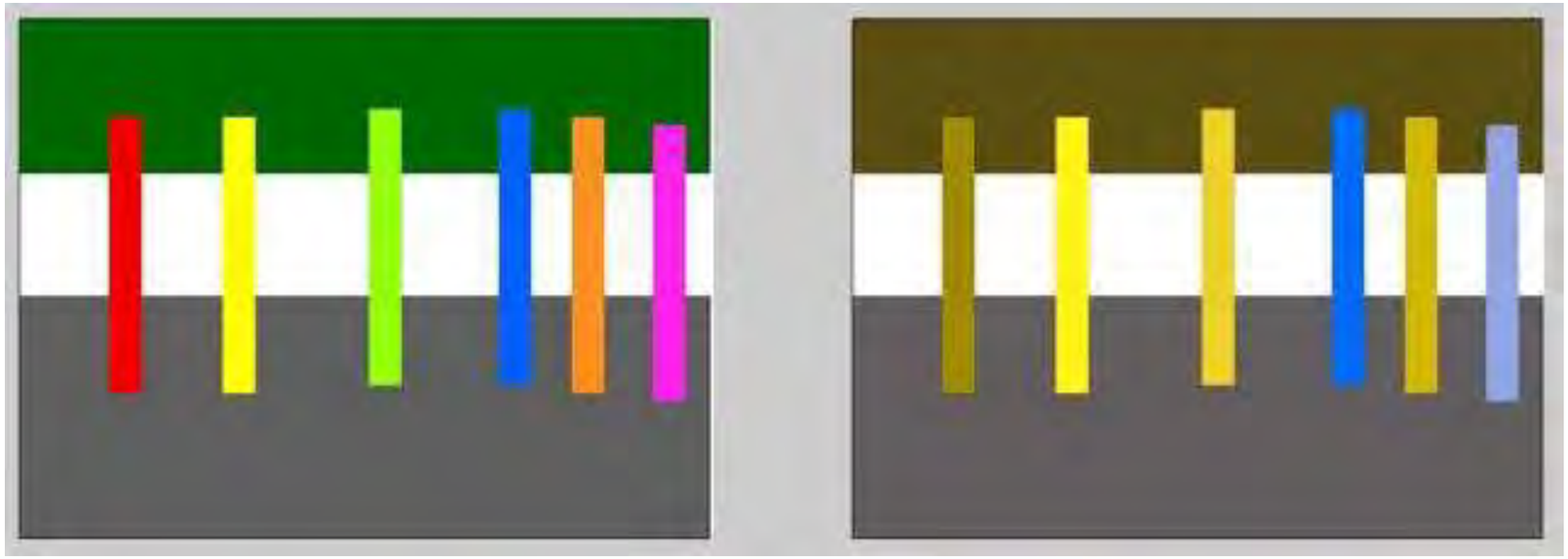
Fig 3. Pictures of the partially painted intersections.

Fig 2. Pictures of the line-delimited intersections.

(Vera-Villarroel, et al., 2019)

Color Vision

Red at night



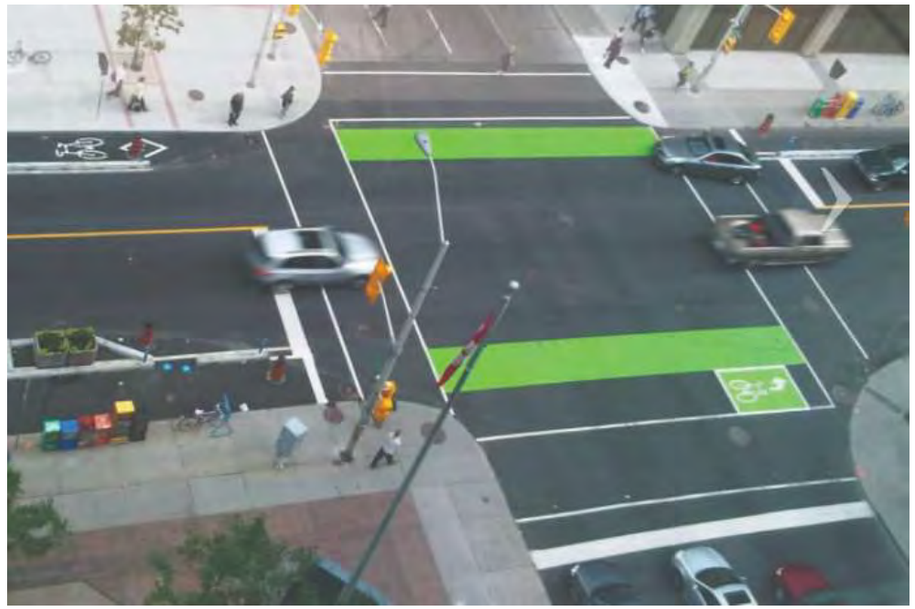
Colorblindness

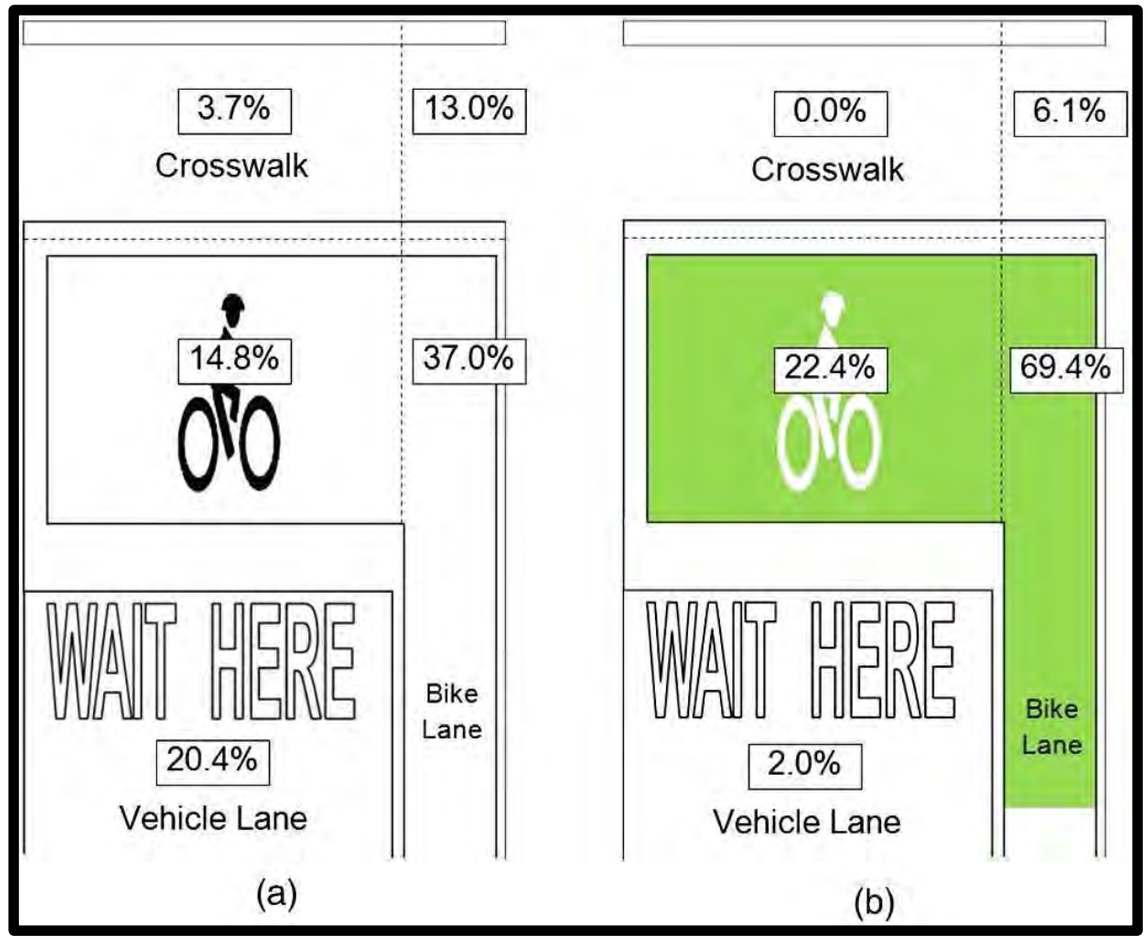
Conflict Areas

Copenhagen, Denmark

St. Petersburg, Florida

Bike Boxes





Austin, Texas

Shared Lanes

Salt Lake City, UT

Minneapolis, MN

Center Bicycle Lanes
(1994-Fall 2009)

Shared Bicycle, Bus, and Right Turn Lanes
(Fall 2009-Summer 2010)

Green Shared Lane
(Installed Summer 2010)

Bike Lanes

New York City, NY

Fig. 2. George Street Cycleway.

Materials

Literature Review & Product Inventory

Pavement Marking Options

Preformed Thermoplastic VS. Other Marking Materials

It looks better and lasts longer.

- Durable enough to last 6 to 8 times longer than paint
- At-a-glance recognition of uniform markings along a specified bike route
- Crisp edges and consistent appearance
- In compliance with Federal and local regulations
- Apply at any time of the year with a propane heat torch
- Retroreflective and anti-skid elements are added at the time of manufacturing to meet specifications and consistent quality control

Paint typically used with a stencil leaves a broken image and wears much quicker.

Cold plastic tape's bond performance is minimized in cold weather climates.

Hot-applied thermoplastic is cumbersome to apply when using stencils for symbols and legends and often results in "alligator" cracks with roughness around the edges.

Cold plastic tape tends to shear with heavy turning traffic at near-intersection applications subjected to vehicular use.

Pavement Marking Options

Durability

Transpo's Color-Safe MMA marking material is not only one of the most durable markings in the industry, but it can be applied in cold weather, extending the marking season. Due to their high durability, color stability, and high-definition colors, MMA road markings cost less in maintenance and material costs over the extended lifecycle of the markings. Color-Safe is capable of full cure in a wide range of temperatures, down to 40°F, and adheres to both concrete and asphalt surfaces. MMA symbols and striping develop a strong bond to existing MMA; another reason that Color-Safe is a viable, superior alternative to thermoplastic markings.

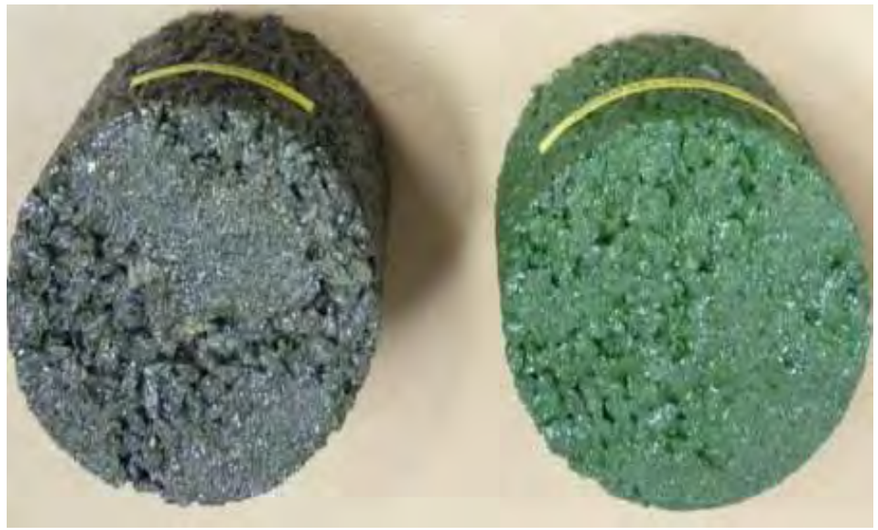
This increased functionality makes Color-Safe MMA a preferred choice of transportation and safety officials as the optimal material for special-use lane marking material.

Color-Safe MMA

Applied Thermoplastic

Pavement Marking Options

Colored Glass Aggregate Installed with Epoxy Binder

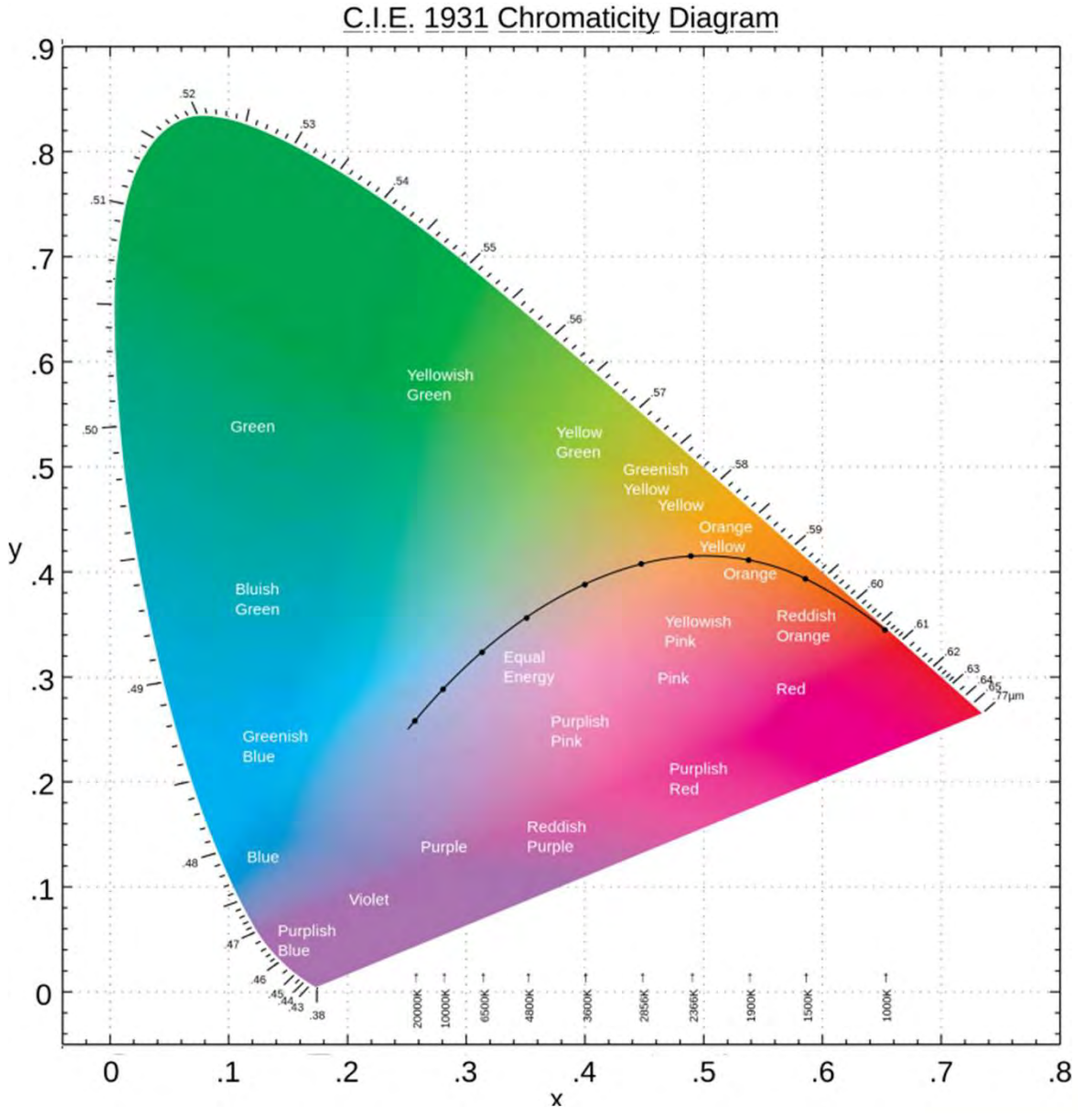


Asphalt with Green Pigment Added

Pavement Marking Options

Texas A&M University, College Station

Pruszkow, Poland



What is Green?

1. The daytime chromaticity coordinates for the color used for green-colored pavement shall be as follows:

1		2		3		4	
X	Y	X	Y	X	Y	X	Y
0.230	0.754	0.266	0.460	0.367	0.480	0.444	0.583

These coordinates include the original published color box plus the additional area in the revised color box.

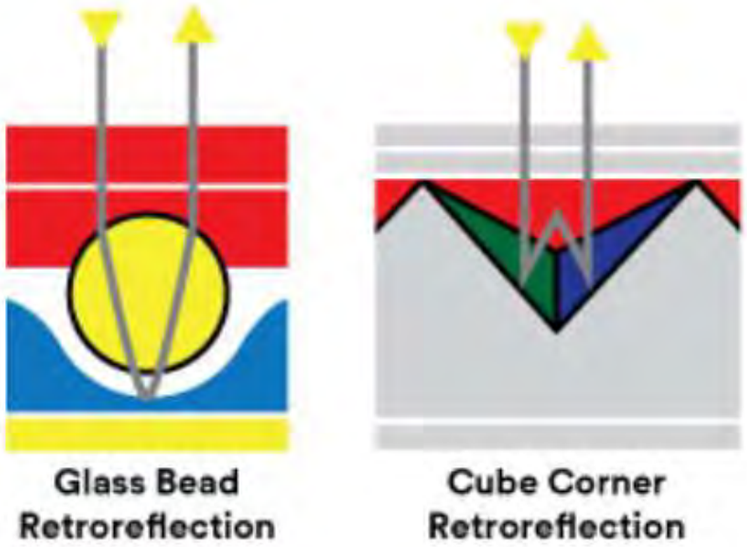
2. The nighttime chromaticity requirements provided in Interim Approval 14 are rescinded. There will be no nighttime chromaticity requirement for green-colored pavement. All installations must still meet the daytime requirement.

While this revision allows for the published color box to remain while adding new range to accommodate in-service wear, it is likely that future editions of the MUTCD will restrict the color box to better reflect the range of products available. At this time, the future daytime chromaticity requirements are expected to be as suggested in the revised color box:

1		2		3		4	
X	Y	X	Y	X	Y	X	Y
0.230	0.714	0.266	0.460	0.367	0.480	0.367	0.583

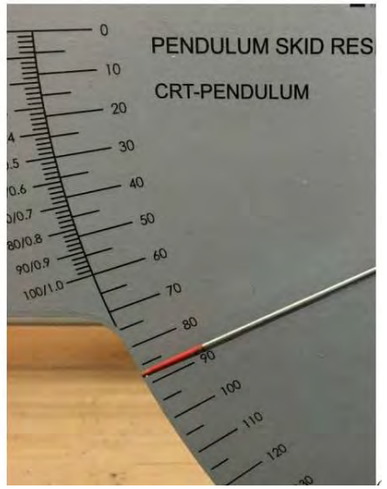
FHWA Interim Approval

Marking Properties



Retroreflectivity
Required of white, not green

Skid
Resistance



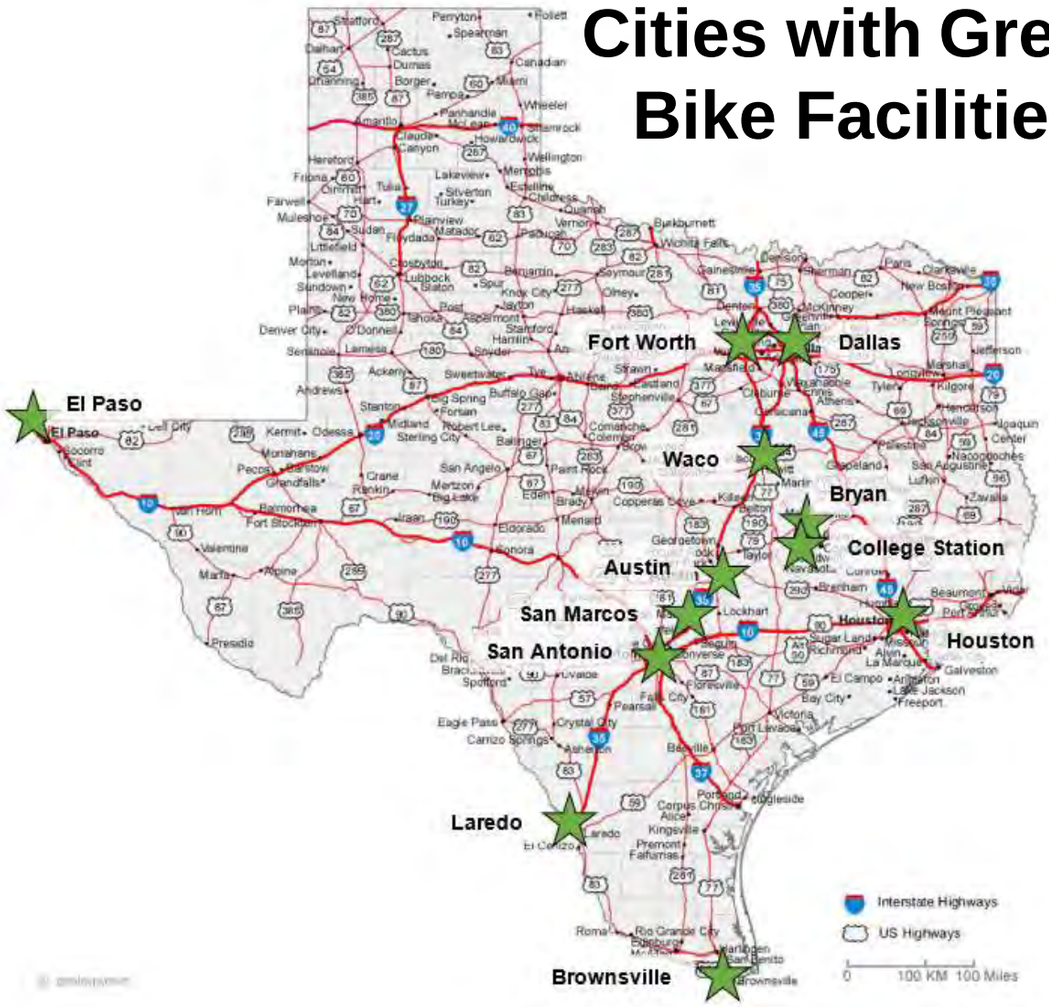
Marking Product Inventory

	A	B	C	D	E	F	G	H	I
1	Brand Name	Type of Green Pavement Marking Material	Company Name	Low VOC <100 g/L	Enhanced skid Resistance? (BPN)	Retroreflective	UV Protection	Installation Locations	Website
2	PreMark Bike Lane Green	preformed thermoplastic	Ennis-Flint		no	yes			https://www.ennisflintamericas.com/catalog/product/view/id/944/category/60
3	PreMark Bike Lane Green with Vizigrip	preformed thermoplastic with skid resistance enhancement	Ennis-Flint		yes	yes			https://www.ennisflintamericas.com/catalog/product/view/id/944/category/60
4	Hot Tape	preformed thermoplastic	Ennis-Flint						https://www.ennisflintamericas.com/catalog/product/view/id/927/category/71
5	Ride-A-Way	epoxy-modified, acrylic, waterborne coating	Ennis-Flint		no	no			https://www.ennisflintamericas.com/catalog/product/view/id/1032/category/81
6	MMAX	MMA	Ennis-Flint		no	no	yes		https://www.ennisflintamericas.com/catalog/product/view/id/1048/category/81
7	High-Performance Glass Beads	glass beads for enhanced retroreflectivity	Ennis-Flint			yes			https://www.ennisflintapac.com/glass-beads
8	RAE Preformed Thermoplastic	preformed thermoplastic	RAE						https://www.raepaint.com/Preformed_Thermoplastic_s/1820.htm
9	Roadzilla MMA	MMA	Aexcel						https://www.aexcelcorp.com/products/traffic-paint/products/roadzilla-mma-two-comp
10	Glass Beads	glass beads for enhanced retroreflectivity	Swarco						
11	TuffMark	preformed thermoplastic	Crown Technology, LLC		no	yes			http://crownthermo.com/tuff-mark/
12	TuffMark with Tuff-Mark	preformed thermoplastic with skid resistance	Crown Technology, LLC		yes	yes			http://crownthermo.com/tuff-mark-with-tuff-grip/
13	Color-Safe	MMA	Transpo Industries, Inc		yes	no	yes	Syracuse, NY; Denver, CO; Portland, OR; Las Vegas, NV; Madison, WI; Northampton, MA	https://www.transpo.com/roads-highways/materials/pavement-marking-material/color
14	Aexcel waterborne traffic paint	paint	Aexcel	yes					https://www.aexcelcorp.com/products/traffic-paint/products/durable-waterborne-traff
15	Toughline Low VOC traffic paint	paint	Aexcel	yes					https://www.aexcelcorp.com/products/traffic-paint/products/toughline-low-voc-acrylic
16	Limboroute K815	paint	Swarco						https://www.swarco.com/sites/default/files/public/documents/2019-10/RMS_TI_Limbo
17	Roller Plastic RP 15	two-component (basic component + hardener)	Swarco						https://www.swarco.com/sites/default/files/public/documents/2019-10/RMS_TI_Roller
18	Limboplast KSP	two-component (basic component + hardener)	Swarco						https://www.swarco.com/sites/default/files/public/documents/2019-10/RMS_TI_Limbo
19	Cold plastic	two-component (basic component + hardener)	Swarco						https://www.swarco.com/sites/default/files/public/documents/2019-10/RMS_TI_Cold_
20	Coldplastic D485	two-component (basic component + hardener)	Swarco		yes				https://www.swarco.com/sites/default/files/public/documents/2019-10/RMS_TI_Coldpl
21	1190 Series	acrylic latex traffic paint	Swarco	yes					https://www.swarco.com/products/road-markings/waterborne-paints/1190-series
22	Endurablend	polymer cement slurry surfacing	Pavement Surface Coatings		yes			Los Angeles, CA; New York City, NY; Jersey City, NJ; South Africa; Canada	https://www.pavementsurfacecoatings.com/bike-bus-lanes/
23	Ruby Lake color coated glass aggregate	color coated glass aggregate used with epoxy glass binder	Ruby Lake		80 BPN			Norman, OK; Tucson, AZ; Philadelphia, PA; Google Campus California; Brooklyn, NY; Ogden, UT; Sammamish, WA	https://www.rubylakeglass.com/pavement-markers-2
24	Safe-T-Grip 1:1	epoxy liquid binder (to use with color aggregate), with amine co-reactant	Epoplex		yes				https://www.epoplex.com/products/epoxy-overlay/
25	Safe-T-Grip 2:1	epoxy liquid binder (to use with color aggregate), with amine co-reactant	Epoplex		yes				https://www.epoplex.com/products/epoxy-overlay/
26	Surface Bond	epoxy-modified, acrylic, waterborne coating	Armorpoxy	yes				New York	https://armorpoxy.com/acrylic-coatings/surface-bond/
27	Pathway Perceptions (Color-Safe)	MMA	Angco Striping		98.5 BPN		yes	Orlando, FL	
28	VANTAC Max-Line Spray Cold Plastic 982	MMA	Vantac		yes	yes			https://www.vantacgroup.com/wp-content/uploads/2018/08/MMA.pdf
29	PlastiRoute	cold plastic (two- and three-component options)	Geveko Markings						https://www.geveko-markings.com/products/
30	AquaRoute	water-based paint	Geveko Markings						https://www.geveko-markings.com/products/
31	ViaTherm	thermoplastic	Geveko Markings						https://www.geveko-markings.com/products/hot-applied-thermoplastics/viatherm/
32	ThermLite	thermoplastic	Geveko Markings						
33	FastTrac CE 330	low modulus epoxy polymer binder (for use with color aggregate)	FastTrac						http://www.fastracproducts.com/fastrac-ce330-epoxy-binder/
34	FastTrac CE 330 Demarc Pro	low modulus epoxy polymer binder with color aggregate	FastTrac						http://www.fastracproducts.com/fastrac-ce330-demarc-pro/
35	Hotline	latex paint	Sherwin Williams	yes					https://images.sherwin-williams.com/content_images/PDF-TRAFFIC-PAINT-INFO.pdf
36	Fast Dry Latex Supreme	latex paint	RAE						https://www.raepaint.com/Traffic_Marking_Paint_s/1818.htm
37	Hi-Build Latex "Liquid Thermoplastic"	latex paint	RAE						https://www.raepaint.com/Traffic_Marking_Paint_s/1818.htm
38	Chlorinated Rubber Low VOC	paint	RAE	yes					https://www.raepaint.com/Traffic_Marking_Paint_s/1818.htm
39	Acetone Acrylic	acetone acrylic paint	RAE						https://www.raepaint.com/Traffic_Marking_Paint_s/1818.htm
40	On-Line Flat Traffic Paint	acrylic, waterborne paint	Vista Paint						https://www.vistapaint.com/products/6700
41	Plastec	liquid thermoplastic paint with glass beads (water and solvent-based)	USCC						http://www.usspecialtycoatings.com/Products/Thermoplastic-Traffic-Paint.aspx
42	Techline	water-based paint	USCC						http://www.usspecialtycoatings.com/Products/Traffic-Paint.aspx
43	High Performance 2300 System Traffic Zone	semi-glass bike lane green paint	Rust-oleum	yes					https://www.rustoleum.com/product-catalog/industrial-brands/high-performance/strip
44	Hydrophast	acrylic, waterborne paint	Franklin Paint	yes					http://www.franklinpaint.com/traffic.html

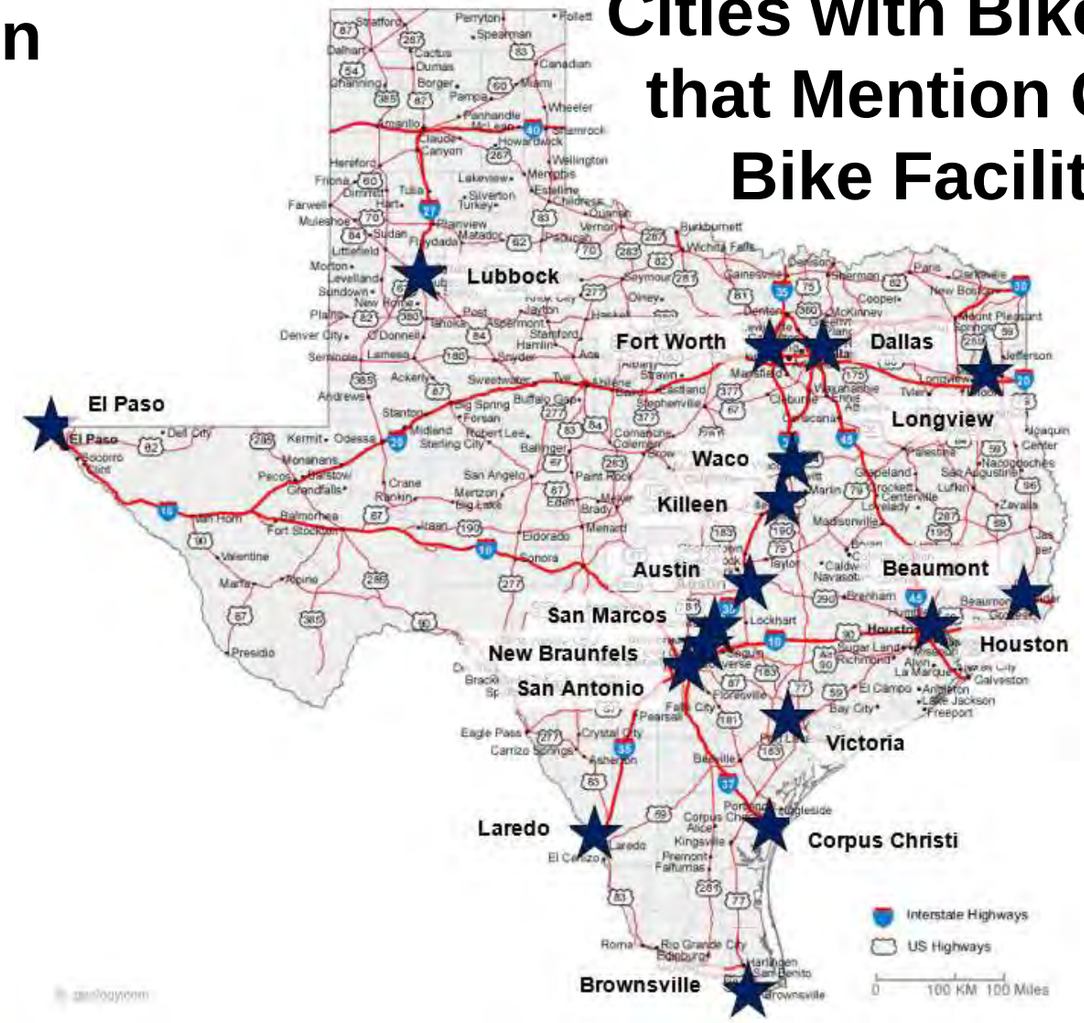
Texas Cities

With and Without Green Pavement Markings

Cities with Green Bike Facilities



Cities with Bike Plans that Mention Green Bike Facilities



Texas GIS Inventory

Florida Department of TRANSPORTATION

Improve Safety, Enhance Mobility, Inspire Innovation

E-Updates | FL511 | Site Map | Translate

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Transportation Technology / CIM / GIS / BIM / Green Colored Pavement Markings

Green Colored Pavement Markings

Provided below is guidance and procedures required for submitting files to be included in the statewide Green Colored Pavement Marking GIS feature class (used where there are bicycle conflict areas).

What the District Has to Deliver

GIS is the preferred deliverable

- Set the coordinate system as State Plane Coordinate System of 1983.
- Provide this information: FIN (FPID or Project Number), Location Description describing the project limits, and whether or not it is a LAP project (Local Agency Program).

Provide this information in the attribute table (see below):

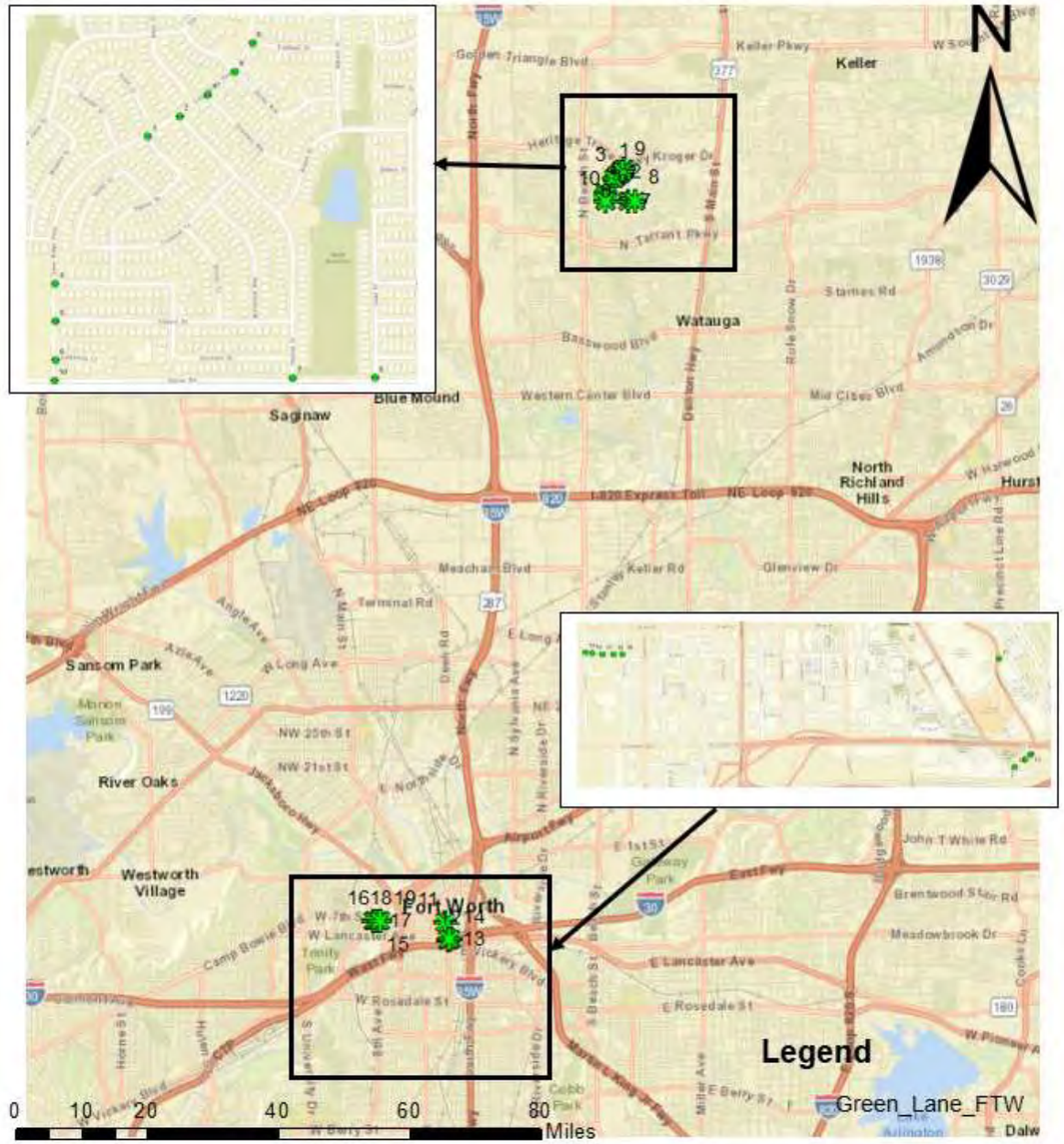
Shapefile - **Template** (.ZIP file, 12 kb)
or
Geodatabase - **Template** (.ZIP file, 25 kb)

Line Features:
- Keyhole Lane.
- Conflict area within a bicycle lane.

Point Features:
- Intersection Bicycle Box.
- Two-Stage Bicycle Turn Boxes.
- Back of Sharrow (shared lane) Pavement Marking.
- Back of Bicycle Lane Pavement Marking.

Austin, implemented

Fort Worth, implemented



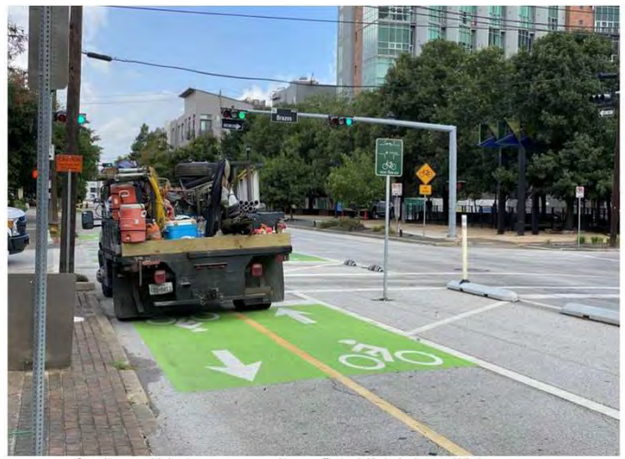
Corpus Christi, in plan, implemented

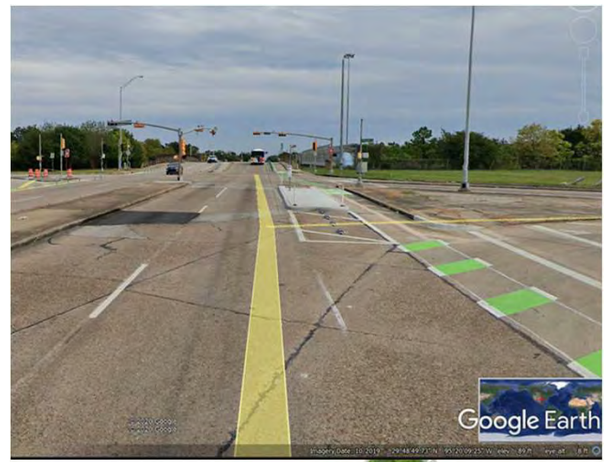
Brownsville, in plan, implemented

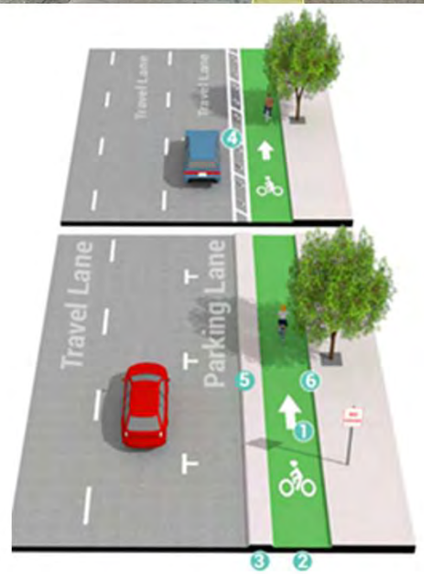
- **Enhanced painted symbols at intersection crossings** - Additional dashed bicycle lane striping and bicycle symbols may be used across intersections to guide bicycles and to further alert motorists as to the direction of bicycle traffic.
- **Transition from on-street to off-street facility** - In some instances, an on-street bicycle lane may need to transition to an off-street sidepath or shared use path. Figure 3-15 illustrates the use of a curb ramp to smooth that transition.
- **Green Lanes** - Green painted bicycle lanes can be used to mark bicycle lanes or mark the extension of a bicycle lane through intersections and other traffic conflict areas (see Figure 3-16).

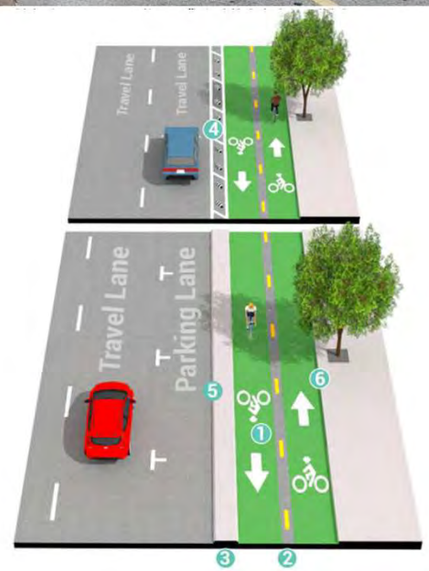
Figure 3-16 Example of a green bike lane being used at a conflict area where the bike lane crosses the right turn lane; Source: Halff Associates, Inc.

Houston, implemented









Lubbock, mentioned in plan, being considered

INTERSECTION TREATMENTS

Description

The configuration of bicycle facilities at intersections should be given extra consideration given the variety of turning movements and potential conflicts with motor vehicles. When bicycle intersection treatments are implemented appropriately, both motorists and bicyclists should be able to clearly understand how to navigate through facility transitions and intersection turning movements. Intersection improvements may include elements such as pavement markings, pavement color, medians and signage.

Typical Use

- Bicycle facilities should avoid being abruptly ended prior to an intersection
- Intersection treatments should be routinely maintained since the visibility of markings and signage enhances their effectiveness and rider safety

Facility Benefits

- Designing bicycle treatments at intersections allows travel to be direct and logical for both bicycles and motorists.
- Appropriate intersection design increases visibility of bicyclists, helps all road users anticipate travel movements and informs when travel is mixed or separated.
- Treatments are recommended for transitioning from one bicycle facility type to another

Design Elements

Intersection crossing markings

- Markings may be used to help guide bicyclists on a safe path through intersections and across driveways.
- Both shared lanes and bicycle lanes may be marked through an intersection with dotted lines. Crossing markings should match the width of the bike lane.
- Directional chevrons, bike symbols or colored pavement may be included with the dotted lines to increase visibility

INTERSECTION TREATMENTS

Design Elements

Bike Boxes

- Bike boxes may be used at signalized intersections to designate an area for bicyclists to wait ahead of traffic during red signal phases. Bike boxes are typically 10 - 16" deep, and stop lines should be used to indicate where motor vehicles should stop during a red signal.
- A "No Turn on Red" sign should be used with bike boxes to prevent vehicles from entering the bike box area.
- Bike boxes may be appropriate at intersections of major roadways where a separate right-turn lane is not present. Positioning bicycles ahead of traffic can reduce "right-hook" conflicts of turning vehicles.
- A "two-stage turn queue box" may be used to turn left at multi-lane roadways.

Two-Stage Turn Queue Box

- Turn queue boxes provide a space for bicyclists to make a left turn across an intersection with multiple lanes.
- The queue box should be placed in a protected area, typically between the bike lane and the pedestrian crossing. It may also be placed within the sidewalk space to allow turns at midblock locations.
- Colored pavement should be used in the queue box to increase visibility of the space.

Median Refuge Island

- Median refuge islands allow bicyclists to cross a two-way street one direction at a time.
- The desirable width of a median refuge is 10 feet or greater, with an area large enough to accommodate two-way bicycle travel.
- This treatment is recommended where bikeways cross streets with higher volumes and higher speeds, particularly at unsignalized intersections.
- Median refuge islands may be used to connect routes at an off-set intersection.

Bike Lanes at Intersections

- When an intersection approach has a right-turn only lane, a through bike lane should be provided to allow bicyclists to position themselves to the left of the right turn lane.
- A dotted bike lane transition area should be striped at least 50 feet before an intersection, and 100 feet before on higher speed roadways. This indicates where motor vehicles should merge into the turn lane and alerts motorists to yield to bicyclists.
- Right-turn only lanes should be as short as possible to prevent high speed traffic on both sides of the through bike lane.
- When an intersection cannot accommodate a through bike lane, bicycle travel may transition to a shared right-turn only lane. Signage and pavement markings should indicate the shared lane and that bicyclists may continue straight at the intersection.

Laredo, implemented

Odessa, Waco, Bryan, trial markings

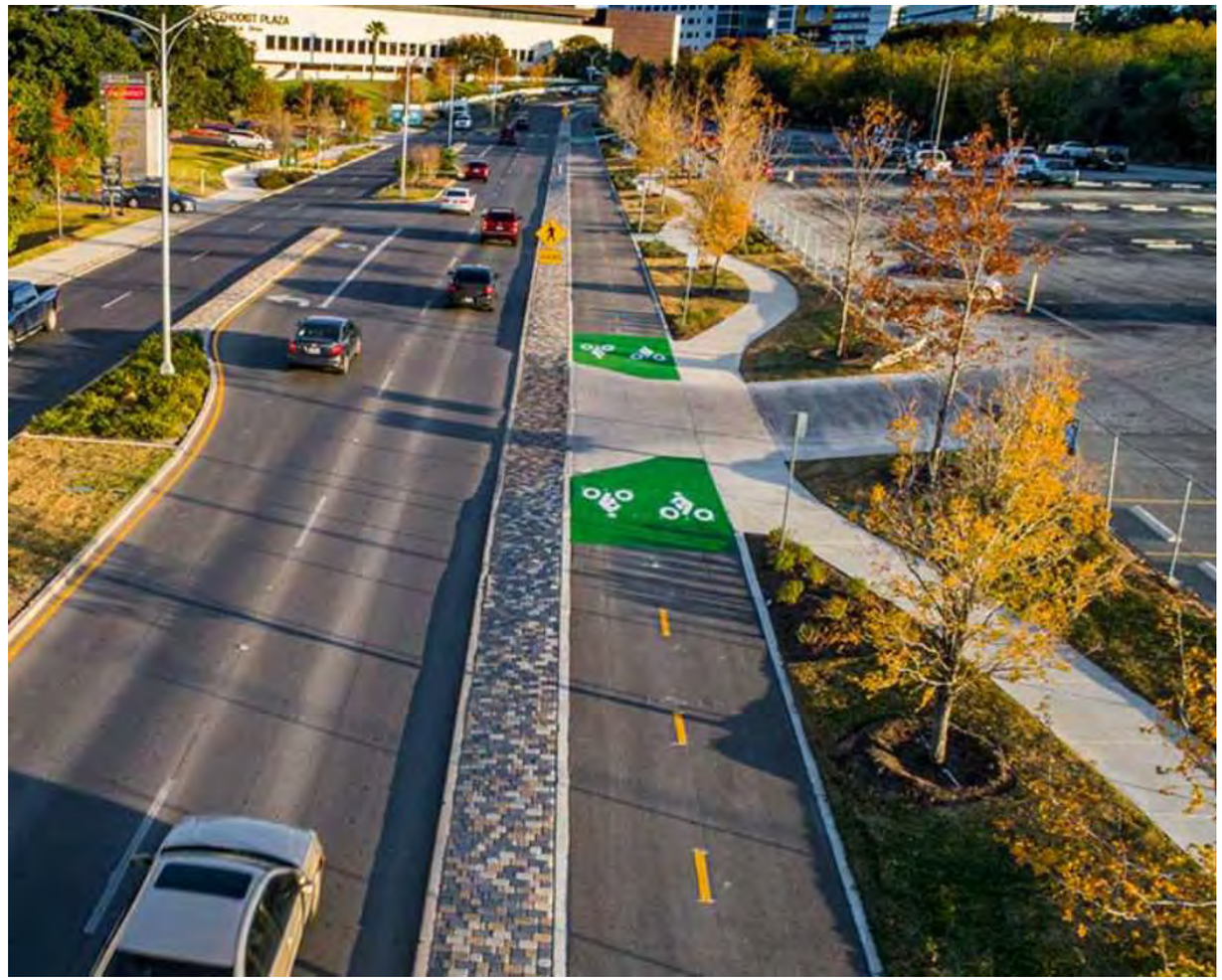
Odessa

Waco

Bryan

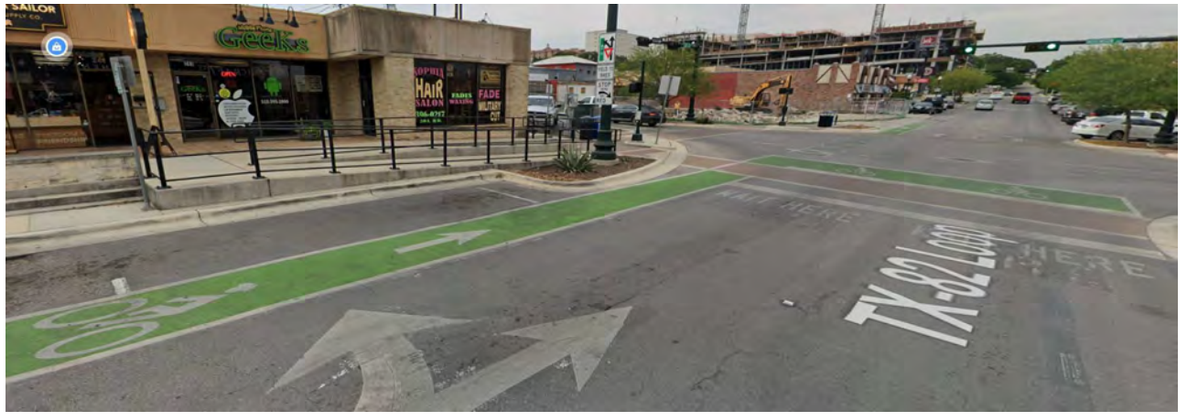
San Antonio, implemented

Iowa Street



Floyd Curl Street

San Marcos, implemented



Bike Boxes

Bike boxes downtown provide increased bicycle safety

Several intersections downtown feature "bike boxes" to help increase bicyclist safety. The green areas on N. LBJ at the intersections of Hopkins, Hutchison and University are designated areas where bicyclists can stop at the intersection before proceeding through or turning. The bike boxes provide cyclists with space in designated intersections to stop and safely turn.

What is a bike box?
Bike boxes are a new kind of on-street marking that help motorists and cyclists share the road. Bike boxes are used at intersections to designate a space for cyclists to wait in front of cars at the red light, and to proceed first when the light turns green.

What do bike boxes mean for motorists?
At red lights, drivers must stop at the stop line behind the bike box and allow cyclists to go first through the intersection once the light turns green. When turning right on a green light, the driver should remember to check for cyclists before making the turn.

What do bike boxes mean for cyclists?
When the traffic signal is red, cyclists enter the bike box from the bike lane. As a cyclist, you should position yourself at the right, left, or center of the bike box, depending on the direction you want to travel. If you are turning, remember to signal.

Why is the City painting bike boxes on our roadways?
Bike boxes make intersections better for everyone. When bikes clear the intersection ahead of cars, they are more visible and less likely to get stuck squeezing around a right-turning vehicle.

Bike box at intersection of Hutchison and N LBJ

Contact Info

Katie Kam, PhD, PE
Assistant Research Professor
UT-Arlington
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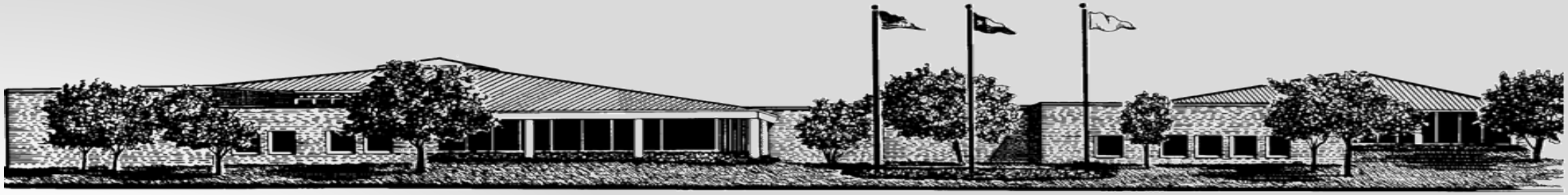
512-820-0070

UNIVERSITY OF TEXAS  ARLINGTON



City of Duncanville

DANIELDALE RD CORRIDOR STUDY

NOVEMBER 18, 2020

BRYAN G. RAMEY II, P.E., DIRECTOR, PUBLIC WORKS

We are building a vibrant, inclusive community, driven by a commitment to democratic principles and service above self

Background

09/19/2017, Council approved Comprehensive Plan which recommended bike and pedestrian facilities along Danieldale Rd

11/06/2018, Bond Election– Proposition B

- $6.6M for Streets
- $3.1M budgeted for improvements at Danieldale Rd between Main St and US-67

05/07/2019, Council approved Danieldale Rd CIP design; requested Corridor Study before finalizing street cross-section.

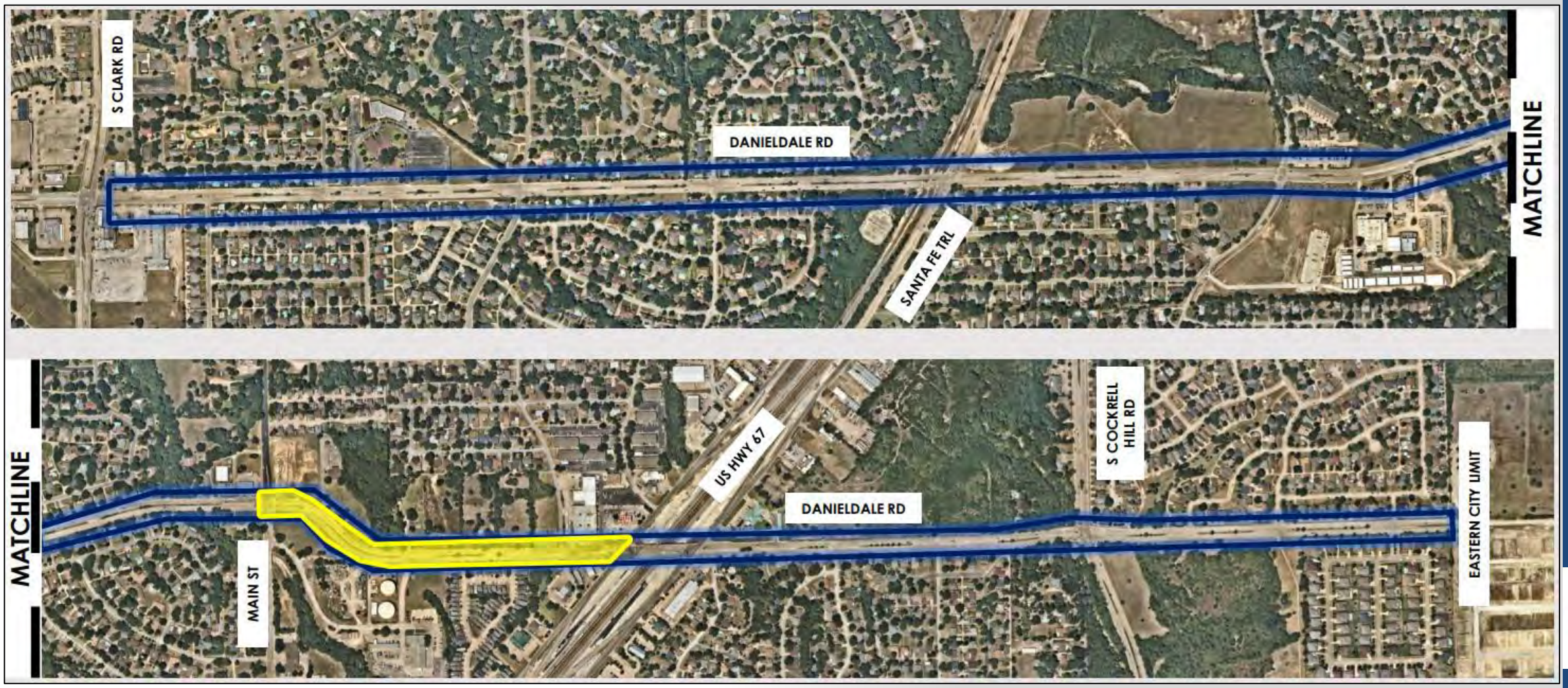
07/16/2019, Council approved contract for Danieldale Rd Corridor Study

11/05/2019, Council approved recommendations of Danieldale Rd Corridor Study

- 4-lane divided road
- Bike/Hike Trails on both sides of road

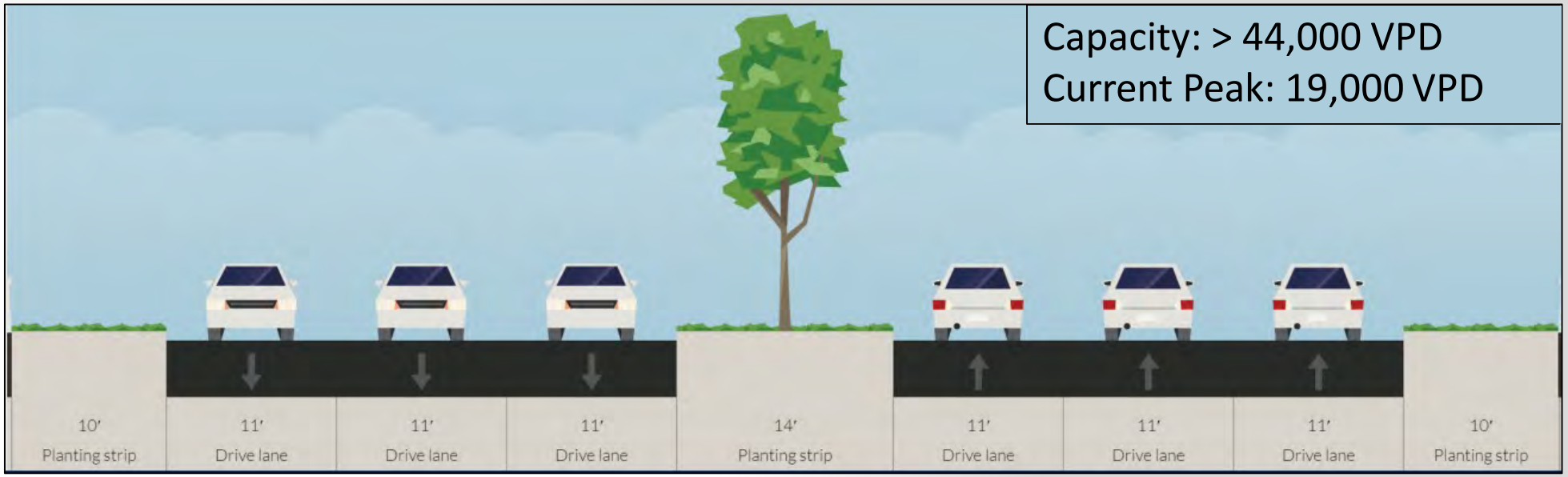
12/05/2019, Council approved Park Master Plan which supported bike and pedestrian facilities along Danieldale Rd

Project Limits

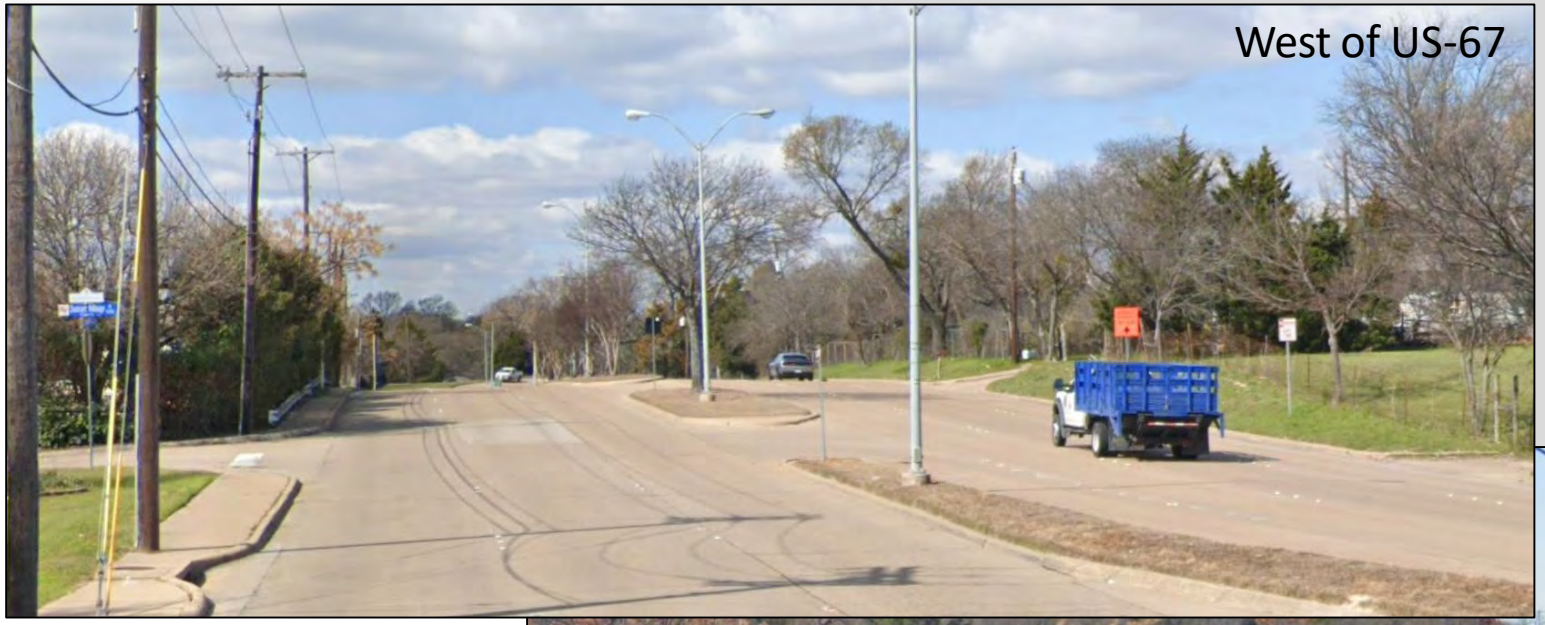


City of Duncanville

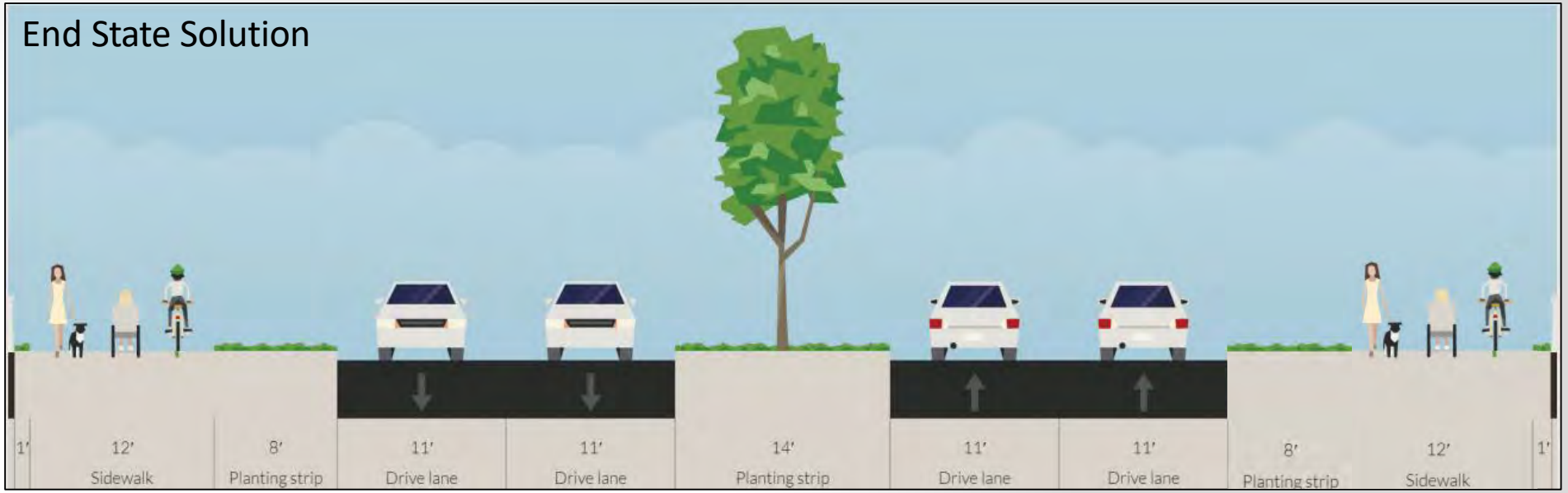
Existing Conditions

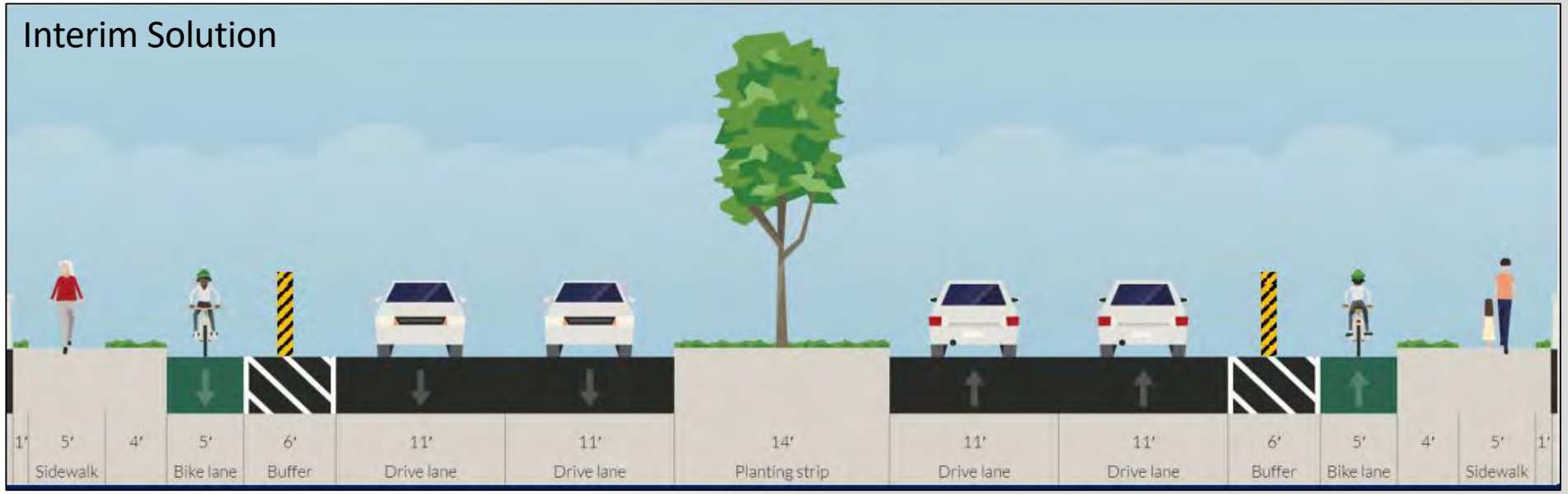


Existing Conditions



Recommendations





City of Duncanville

Key Observations

- Council and resident support is essential
  - Council approved contract to perform study
  - Council approved resolution adopting study recommendations
  - Avid bicyclists and runners as well as Park Board members supported
- Connect initiative to other planning documents, i.e. Comprehensive Plan, Park Master Plan
- Design the road to meet desired speed limit
- Compare actual peak traffic volume with design traffic volume
- Tie-in to initiatives in adjacent Cities
  - Dallas: 4-lane w/ bike & pedestrian facilities along Mountain Creek Pkwy
  - DeSoto: Plans to upgrade Danieldale Rd from 2-lane to 4-lane w/ bike & pedestrian facilities

Questions?

GRAPEVINE PARKS & REC

Share the Trails Campaign

Timeline

June-July

- Increase in Trail Users
- Decrease in Trail Etiquette

Aug-Sept

- Develop Etiquette Campaign – “Share the Trails”
- Installed Signage along Trails Accompanied by Video Release

Oct

- Social Media Posts of Campaign
- Promotion of Pedestrian Safety Month

Share the Trails Campaign

Nine Tips to be Safe and Respectful

- Slow Down
- Warn Others when Passing
- Yield to Pedestrians
- Keep Right
- Do Not Block the Trail
- Stay in a Line
- Keep Dogs on a 6ft. Leash
- Keep Dogs Close
- Keep Dogs under Control

Graphic Artwork

MOCK UP _ FINAL
Share the Trail Campaign

Width: 18 inches
Height: 36 inches

Graphic Artwork

MOCK UP _FINAL
Share the Trail Campaign

Width: 18 inches
Height: 36 inches

Video


GRAPEVINE
PARKS & REC

Questions?

Kathy Nelson, AICP, RLA
Capital Improvement Projects Manager
Grapevine Parks & Recreation Department
knelson@grapevinetexas.gov
817-410-3394

GRAPEVINE PARKS & REC

UPCOMING EVENTS AND TRAINING

Bicycle and Pedestrian Advisory Committee

November 18, 2020

North Central Texas Council of Governments

Designing for Pedestrian Safety 201

ONLINE WORKSHOPS: 2 REMAINING VIRTUAL OPTIONS OFFERED

More information and registration at the COG website:

nctcog.org/pedsafety

- **Option 2 (Dec 1-2): Dec. 1**, 8:30-11am, & 1-3pm; **Dec. 2**, 8:30-11:00am
- **Option 3 (Dec 9-10): Dec. 9**, 8:30-11am, & 1-3pm; **Dec. 10**, 8:30-11:00am

ONLINE EVENT!

FHWA

FREE WEBINAR

Moving *FoRRRwD with Safety Action Plans: Statewide, Regional, and Local

*FoRRRwD: Focus on Reducing Rural Roadway Departures

Dec. 17, 2020, 1-3PM

https://collaboration.fhwa.dot.gov/dot/fhwa/WC/Lists/Seminars/DispForm.aspx?ID=2562

saferoutespartnership.org/
healthy-communities/
saferoutestoparks/2021-application

Applications for
Safe Routes to Parks Grants
Due December 18, 2020

Safe Routes
PARTNERSHIP
Active Paths for Equity & Health

Upcoming **LIVE** Events

- **Dec. 9, 2020:** Impaired Driving: Emerging Trends & the Occupational Arena
- **Jan. 7, 2021:** Alcohol & Inhalants: A DITTE Deep Dive
- **Jan. 13, 2021:** Our Driving Concern Fast Pass
- **Jan. 20, 2021:** Backing Up: Tips to Get 100% of Your Employees on Board with Prevention

txdrivingconcern.org

SAVE THE DATE

2021 National Bike Summit

BIKES: OUR VEHICLE FOR CHANGE

February 28 - March 3, 2021 | Online

NATIONAL BIKE SUMMIT

THE LEAGUE OF AMERICAN BICYCLISTS since 1880

bikeleague.org/summit

American Planning Association

May 3-7, 2021

Planning.org/conference

Indianapolis June 15–18, 2021

walkbikeplaces.org

APBP 2021 Conference

ASSOCIATION OF PEDESTRIAN & BICYCLE PROFESSIONALS

August 23-26, 2021

VIRTUAL EVENT
SAVE THE DATE!

More details about the virtual event will be shared in the coming months!

apbp.org

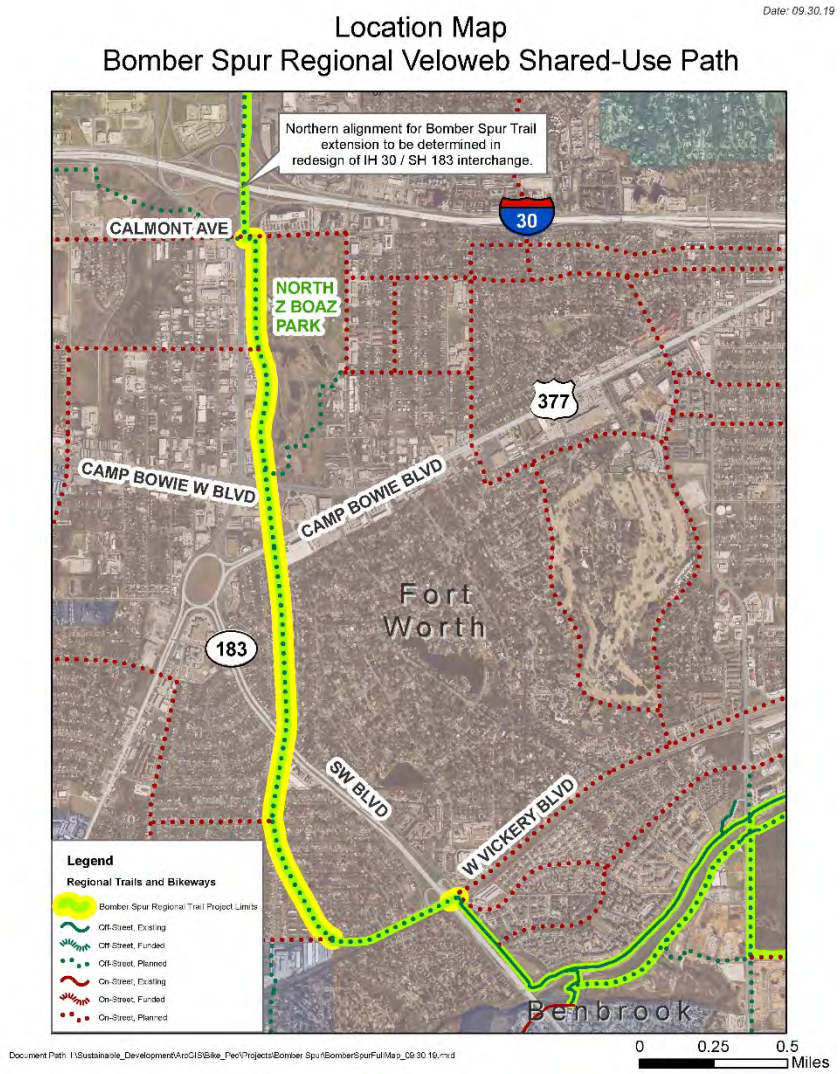
Master Plans Underway or Anticipated in 2021

- Dallas County Mobility Plan
- Flower Mound Parks and Trails Master Plan
- Grand Prairie Parks and Trails Master Plan Update
- Northlake Comprehensive Plan
- McKinney Parks and Trails Master Plan
- Rowlett Hike and Bike Trail Plan
- Rowlett Trails and Open Space Master Plan Update
- DeSoto Trails Master Plan Citywide Master Plan
- Carrollton Trails Master Plan (early 2021)
- Cedar Hill Trails Master Plan Update (2021)
- Weatherford Bicycle Master Plan (2021)

Plans and Projects Underway cont….

Regional Projects

- **Fort Worth**
  Bomber Spur Regional Trail Preliminary Engineering: (SH 183/Calmont Ave. on the north to SH 183/ Vickery Blvd on the south)



Any events or training opportunities to add?

Any suggestions/topics for future training opportunities that NCTCOG could coordinate?

Contact:

Matt Fall
mfall@nctcog.org

OR

Bobby Kozub
bkozub@nctcog.org

DART Red & Blue Lines Transit-Oriented Development Survey Results

Bicycle and Pedestrian Advisory Committee | November 11, 2020

North Central Texas Council of Governments

Background

Are TODs influencing travel behavior, demographics, and location choice preferences?

Three populations

- Residents
- Businesses
- Employees

Report and data online:

www.nctcog.org/TOD (FTA Pilot)

Part of Federal Transit Administration TOD Planning Pilot Grant

Transit-Oriented Development (TOD)

Higher density with a mix of uses designed for convenient walk and bike access from a high-frequency transit station.

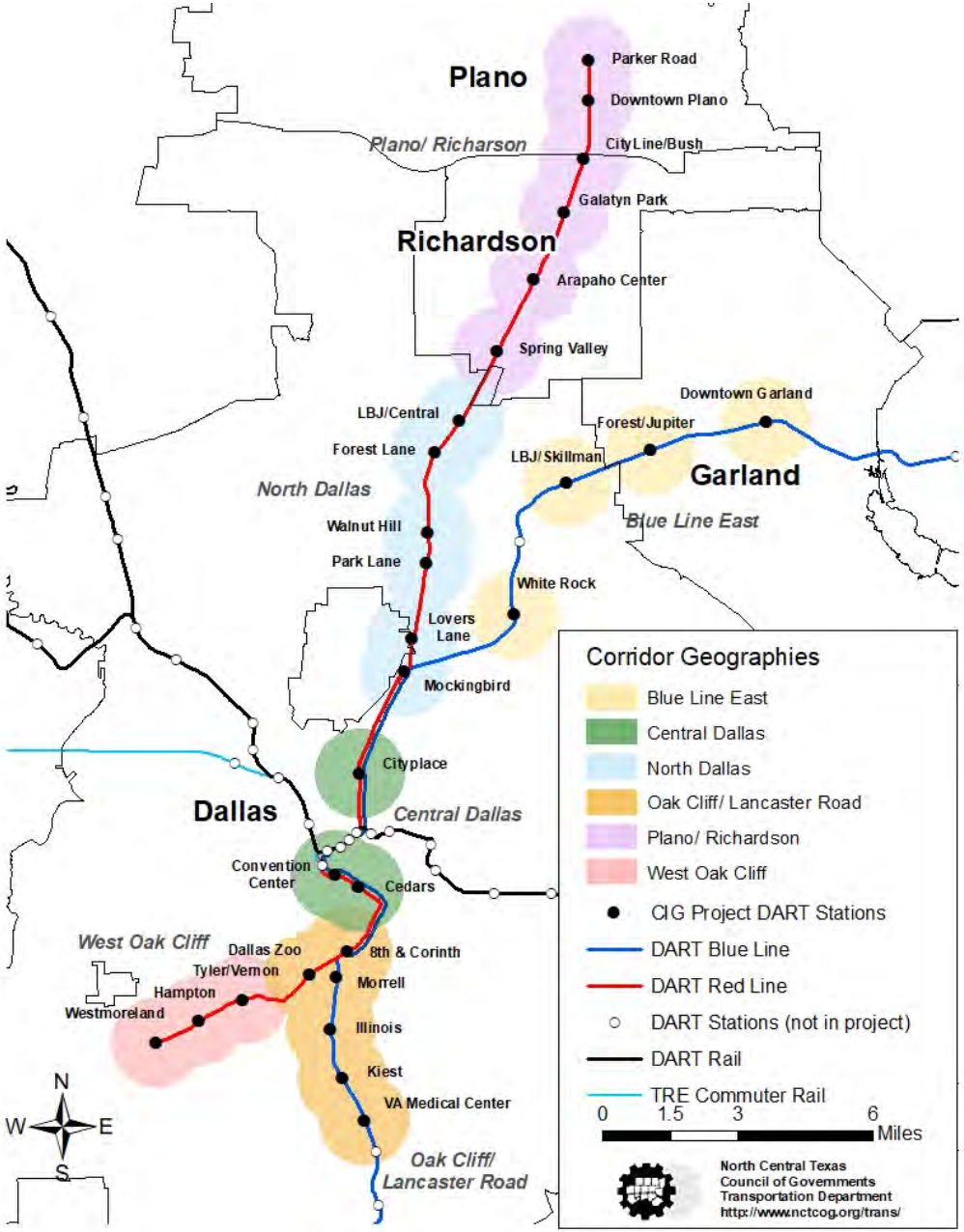
Study Area

28 DART Stations on Red and Blue Line (FTA TOD Planning Pilot Grant)

Cities of Dallas, Richardson, Garland, and Plano

1-mile radius around stations

Data collected August 2019 – February 2020



Sampling and Response

		Random Sampling	Responses
Residents		Source:146,196 addresses from USPS database Sample:15,198 mailed packets (online option) and 51,877 calls	1,540 complete
Businesses		Source:16,596 addresses InfoUSA database Sample:12,853 Mailed packets (online option) and called 10,231 w/ valid phone numbers	1,039 complete
Employees		Source: Subset of business data Sample: 389 businesses distributed to employees by email or paper	550 completed

TOD Survey Content

Today's walking/biking focus:

Travel behavior and preferences

Influence on location choice

Travel Demand Management

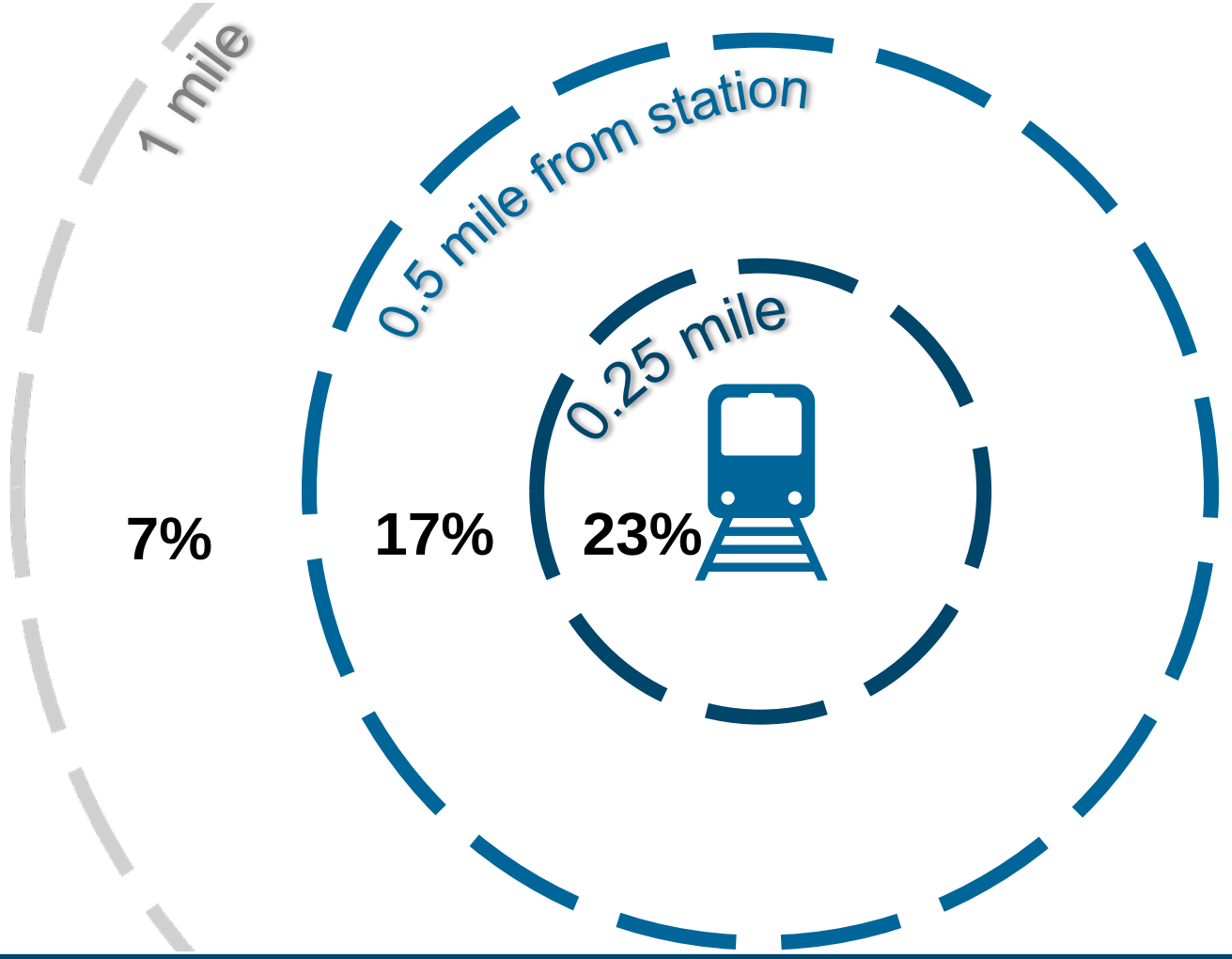
Survey Topics

- Travel patterns and behaviors
- Travel preferences and hypothetical improvements
- Location preferences
- Housing characteristics
- Demographics
- Parking perceptions and availability
- Travel Demand Management programs
- Business characteristics

TOD Residents' Transit Use

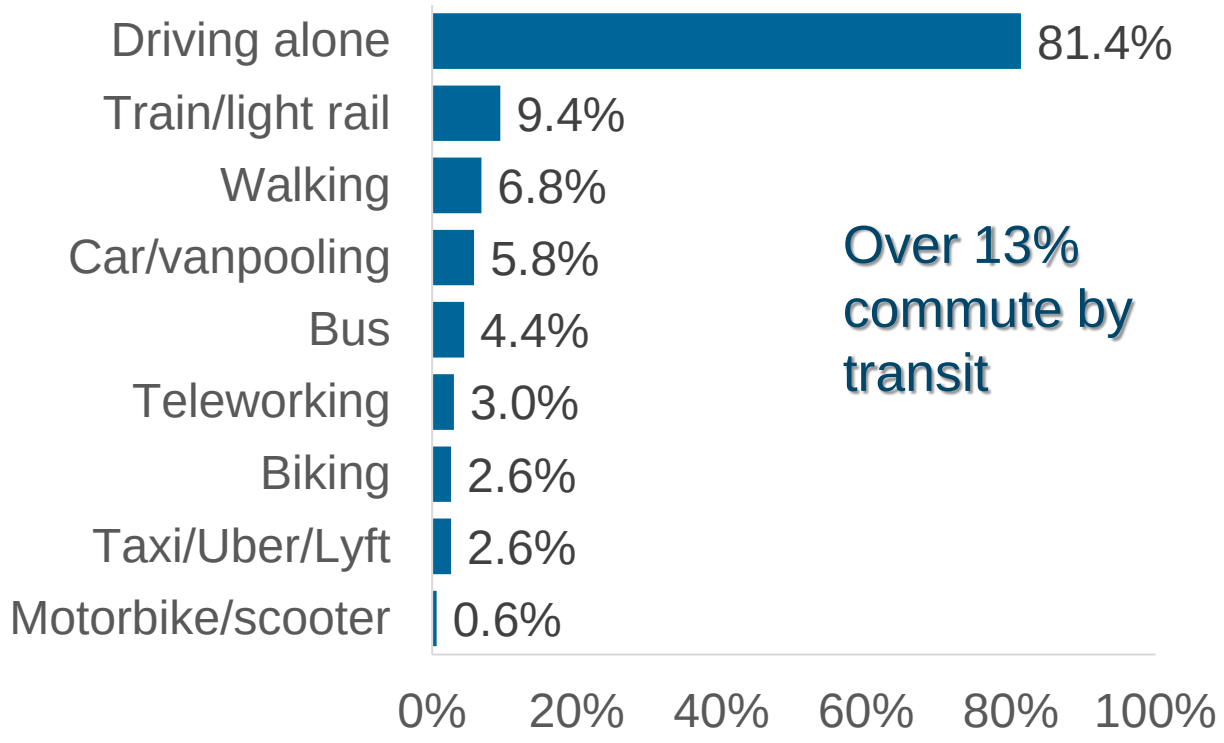
Respondents who live closer to DART rail stations are more likely to commute by transit

Percent who commute using a train or bus



Resident Travel Mode Split

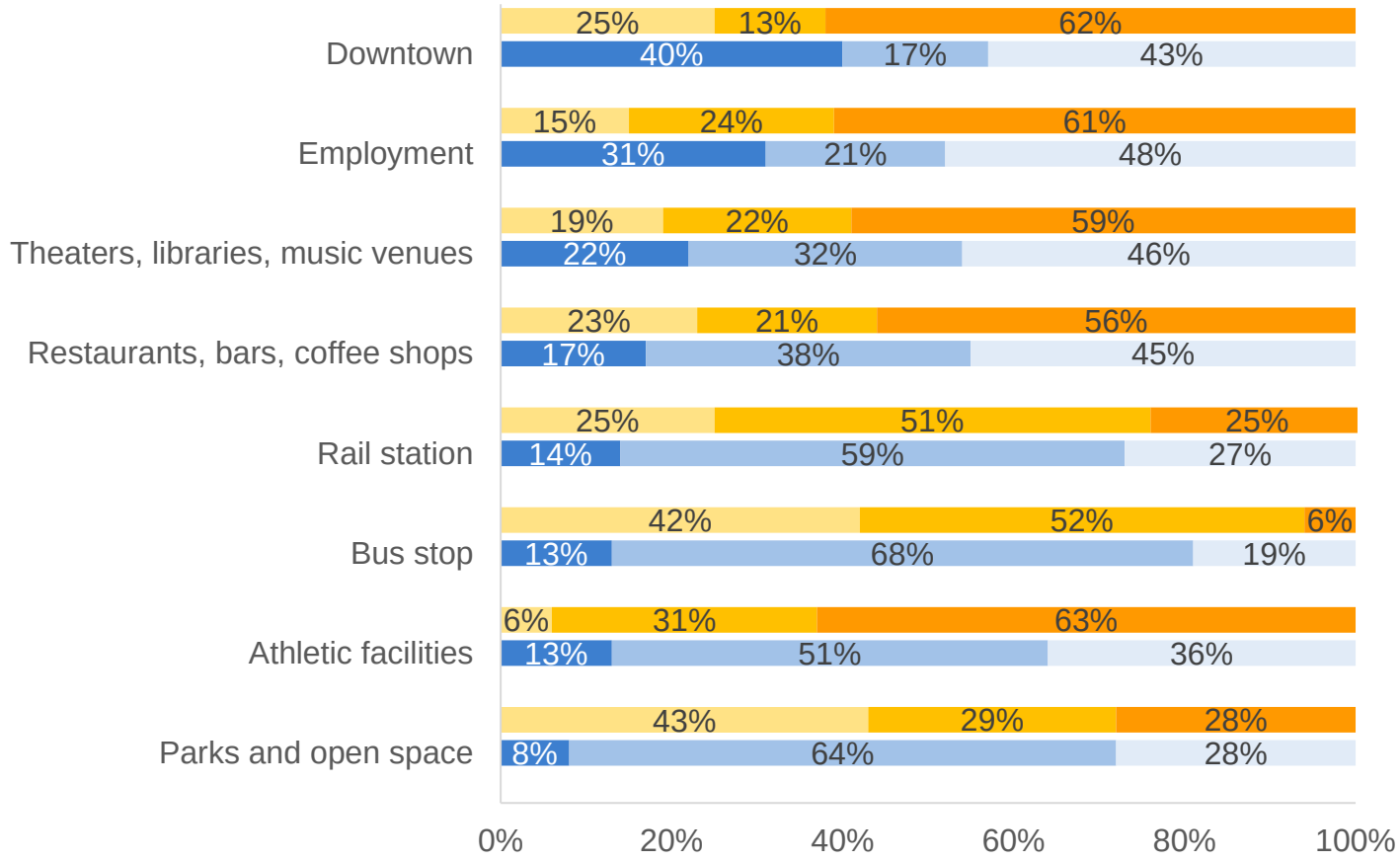
Thinking about last week, how did you get to and from work or school each day?



DFW Metro Area (Census ACS 2018 5-yr)	
Mode	**Percent**
Drove Alone	80.8%
Carpooled	9.5%
Public Transit	**1.3%**
Walked	1.3%
Bicycle	0.1%
Taxicab, Motorcycle, other	1.2%
Worked at home	5.8%

Resident's Non-Commuting Trips

When you go to each of these places, how do you currently get there? **Showing 8 of 20 categories*



Current mode choice

Use DART Walk or Bike Drive

Preferred mode choice

Use DART Walk or Bike Drive

North Central Texas Council of Governments

TOD Challenges

TOD residents still use cars more than transit

- **81%** of residents commute by driving alone
- **23%** of residents stated their place of employment was within walking distance but only **6%** reported a walk commute

Residents cite need for frequent stops, long trips, too many transfers, as barriers to transit use

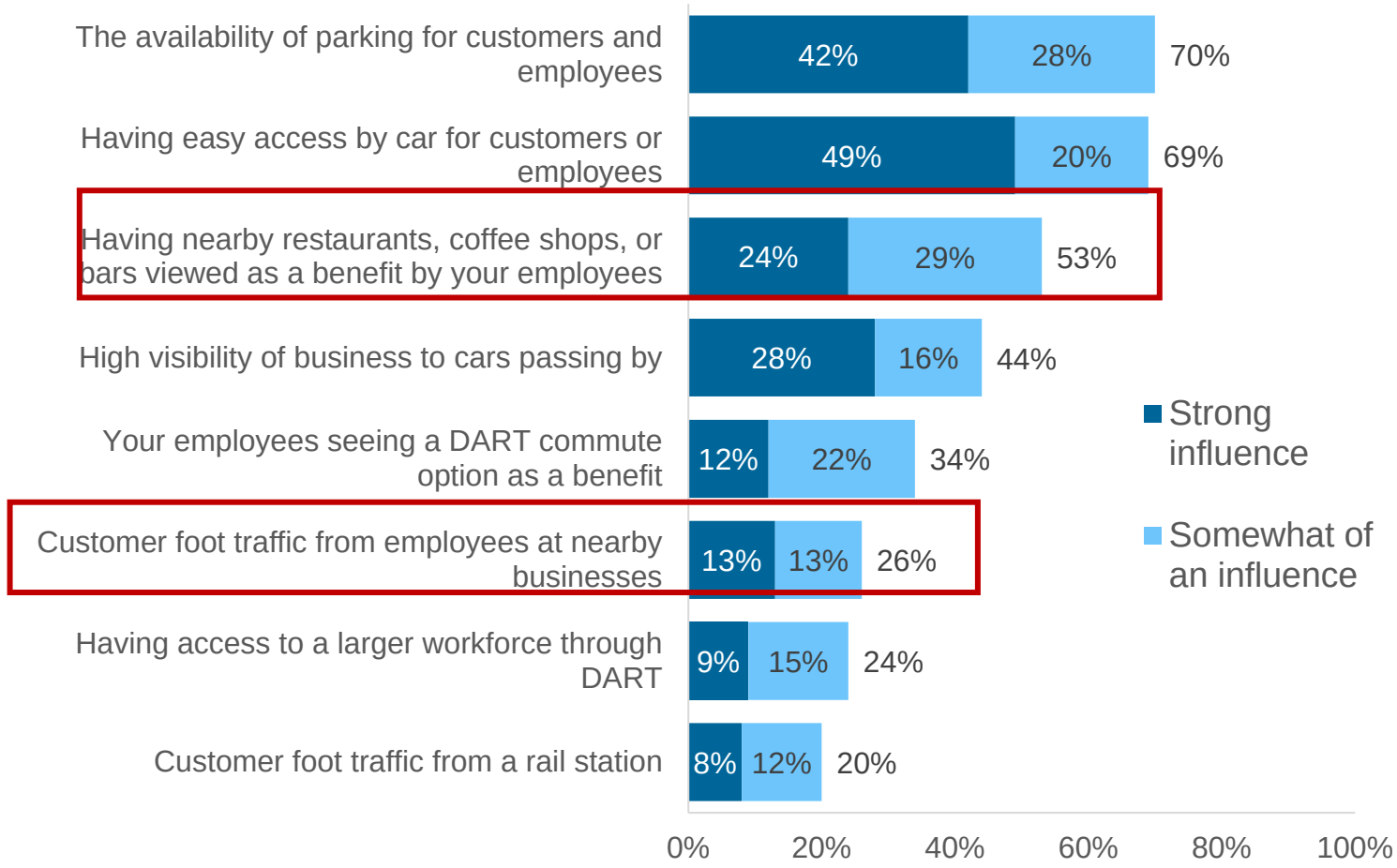
Business and Employees see transit as less influential

- **70%** of businesses said easy parking and access by car was a strong or somewhat strong influence in location versus only **34%** saying the same for DART access
- **55%** of Employees said they are highly unlikely to ever use DART

Business Location Choice Factors

Please think back to when your organization made the decision to locate here and tell us whether each item listed had a strong influence, somewhat of an influence, or was not an influence in choosing this location.

(showing 8 of 13)



Locations for Active Transportation

Employers within a half-mile of DART stations are more likely to report customer foot traffic as an influence on their location decision

16% of high-density station areas (57-305 people per acre) residents report commuting by walking or bicycling while only **6%** report the same at lower densities

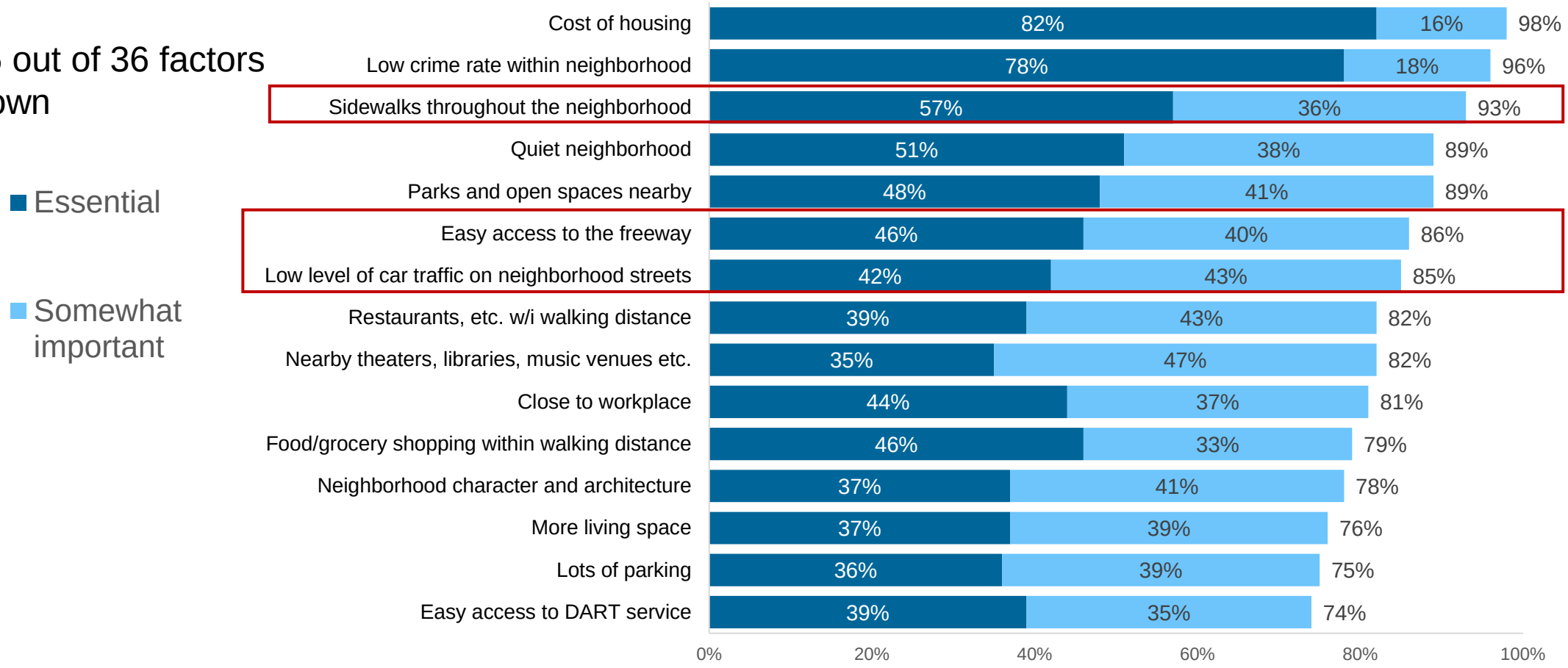
Likelihood of a walk or bicycle commute by housing type:

- **12%** for majority multi-family housing areas
- **9%** for mixed housing areas
- **4%** for majority single-family housing areas

Factors in Home Choice

What were the factors most important to you when you were looking for a home?

*15 out of 36 factors shown



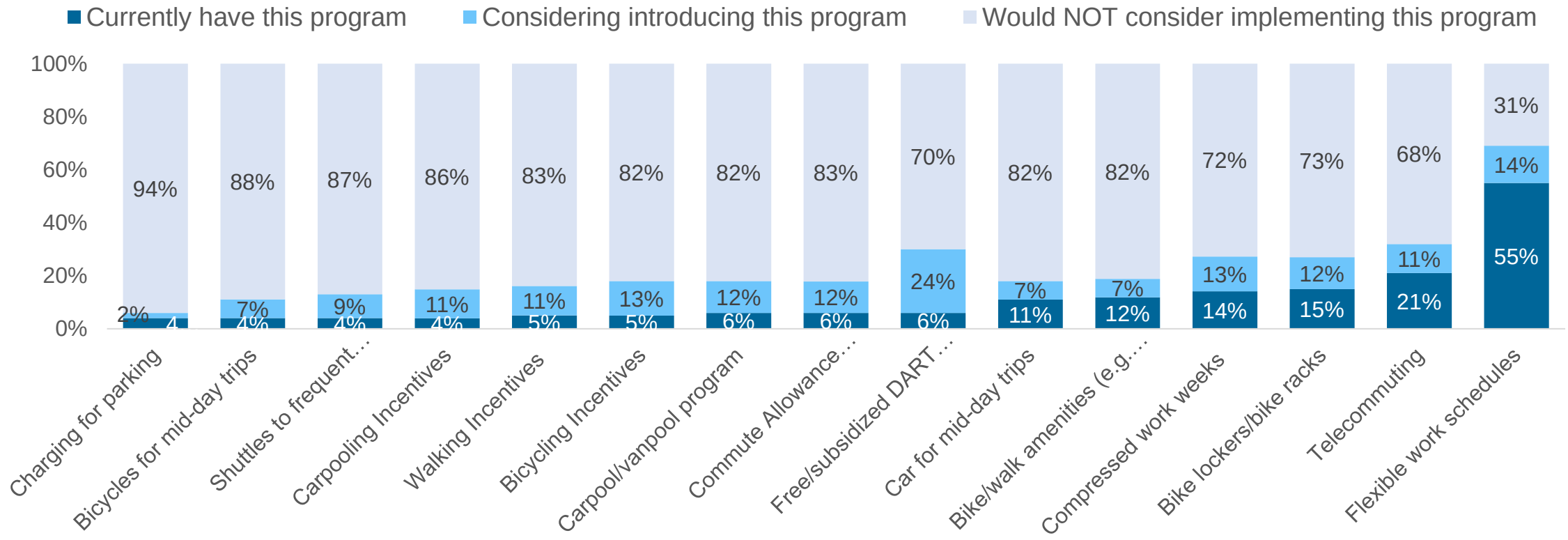
Demographics Insights

27% of those aged 18-34 report typically walking or biking to restaurants/bars/coffee shops whereas only 18% of older groups report the same

Younger employees (less than 35 years old) were more likely to use transit or to walk or bike for their commute than were older people.

Employer Travel Demand Management programs

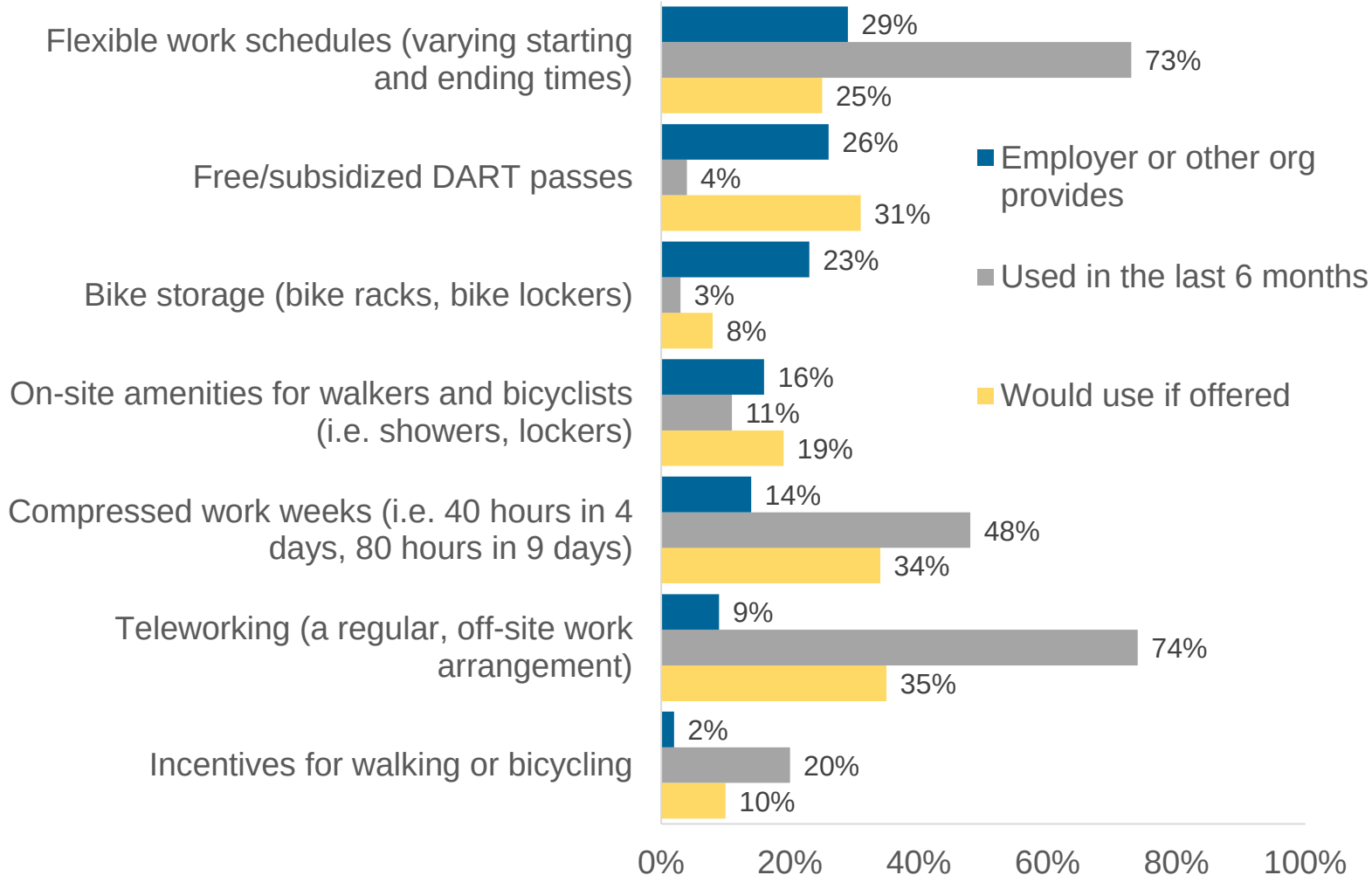
For each one listed below, indicate whether this program is currently available at your workplace, you are considering introducing this program, or you would not consider implementing it.:



Employee Use of TDM

- Which TDM services are available to you?
- Have you used them in the last six months?
- Would you use them if they were available?

(showing 7 of 11 options)



Summary

- Opportunity to increase DART use and bicycling for commute and non-work trips
- Walkable areas popular with residents
- Business respondents less focused on walkability

Full report online: www.nctcog.org/TOD (FTA Pilot)

Contact

Travis Liska, AICP

Senior Transportation Planner

tliska@nctcog.org

2020 Highlighted Regional Trails Brochures are Available!

- Can contact **bwalsh@nctcog.org** to schedule a pick-up
- Typical request is for 150-350 brochures

Highlighted Regional Trails

Learn more about regionally significant trails in North Texas.

2020 Highlighted Regional Trails of North Texas - Brochure [PDF]

Fort Worth to Dallas Regional Trail

Dallas to McKinney Regional Trail

Cotton Belt Trail Corridor

2020 Highlighted Regional Trails Brochures are Available!

Can also viewed/printed online at:

nctcog.org/veloweb

COVID-19 Impacts on Active Transportation

Pedestrian and Bicycle Travel on Trails in North Texas

Dallas Morning News

Dallas Business Journal

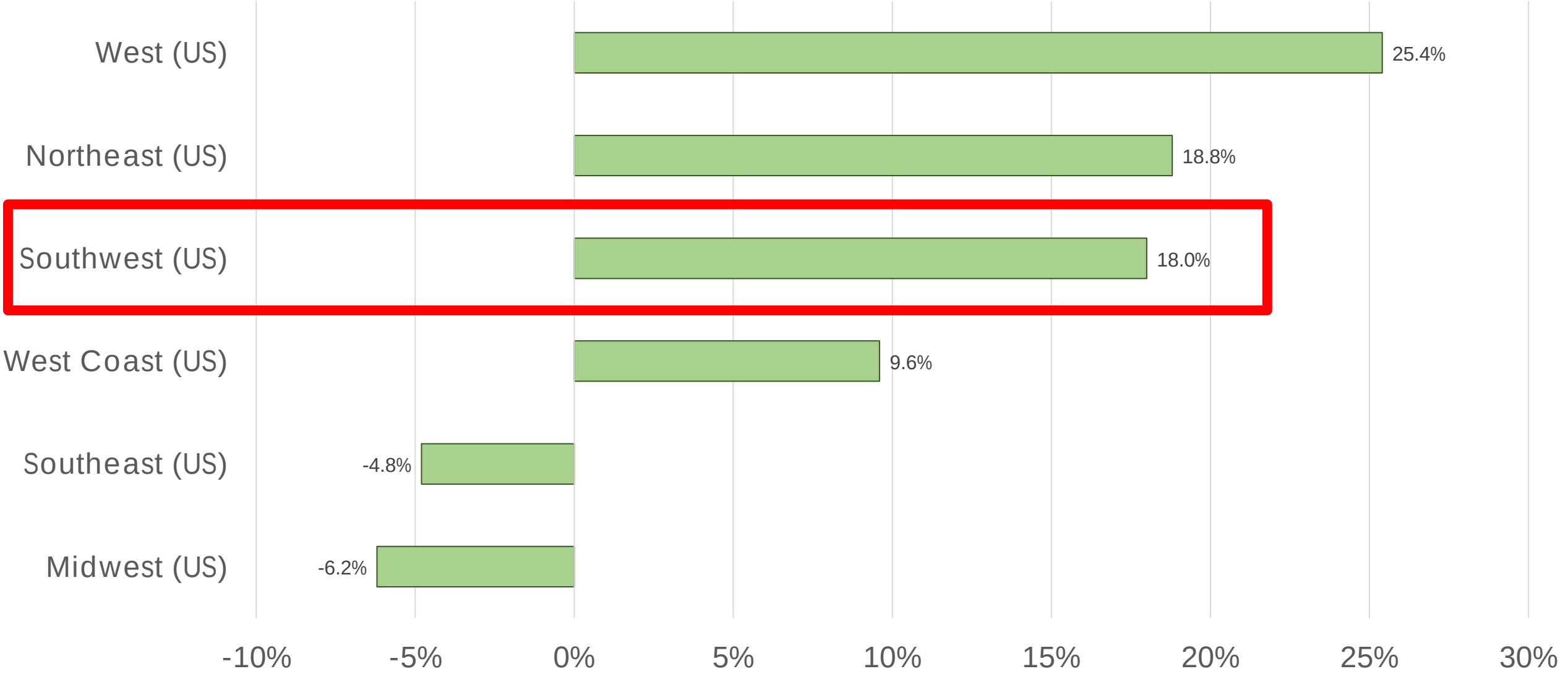
November 18, 2020

Daniel Snyder

North Central Texas Council of Governments

Bicycle Count Trends by Region

(Percent Change Oct 2020 vs Oct 2019)



Source: Eco-Counter. The “Southwest” region includes Texas, New Mexico, and Arizona.

Selected Bike and Pedestrian Count Sites

The Dallas Morning News

NEWS / PUBLIC HEALTH

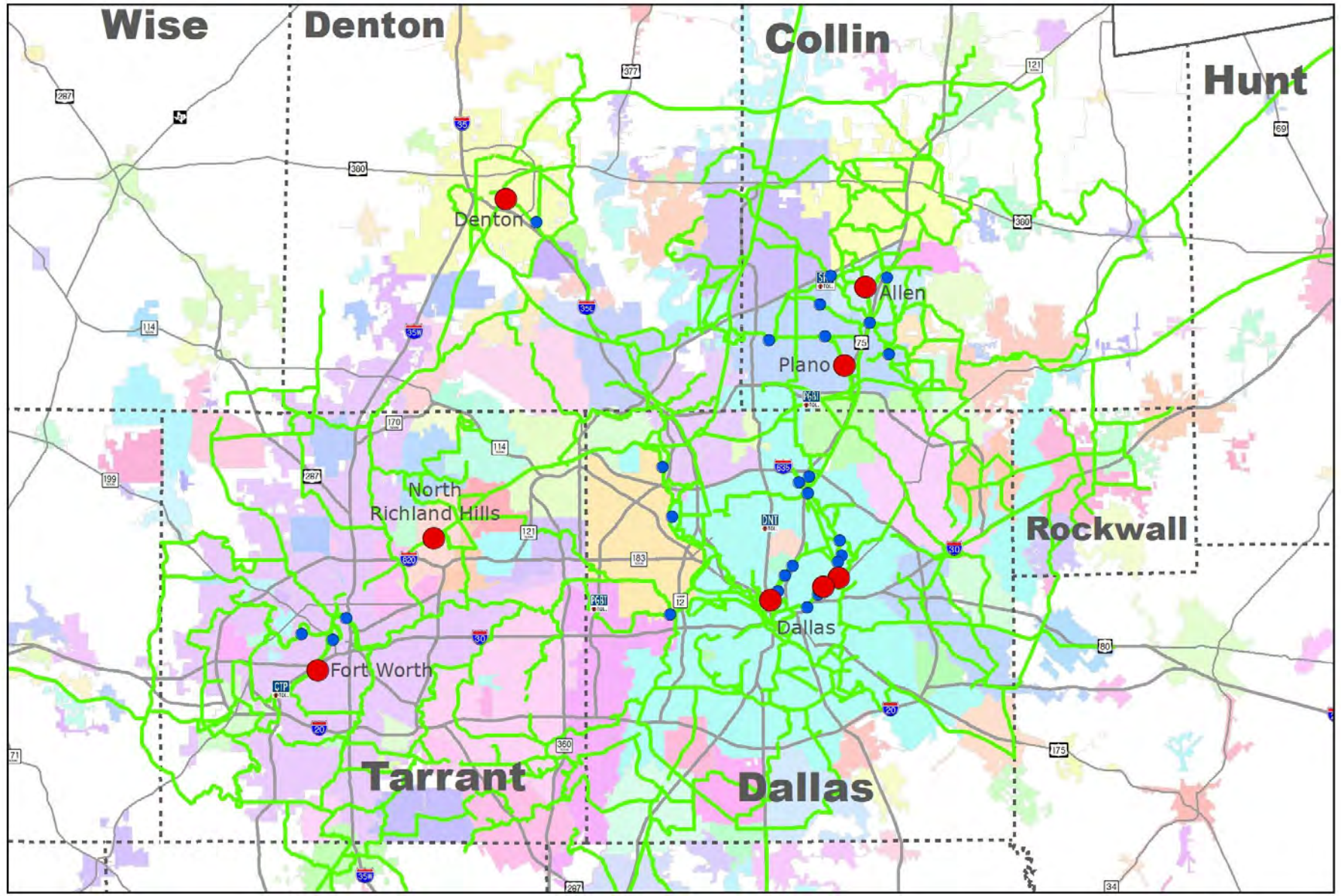
Where your last name falls in the alphabet will determine when you can use the Katy Trail

For four days of the week, residents can only use the trail on specific days, but it's open to all from Monday through Wednesday.

CBS DFW

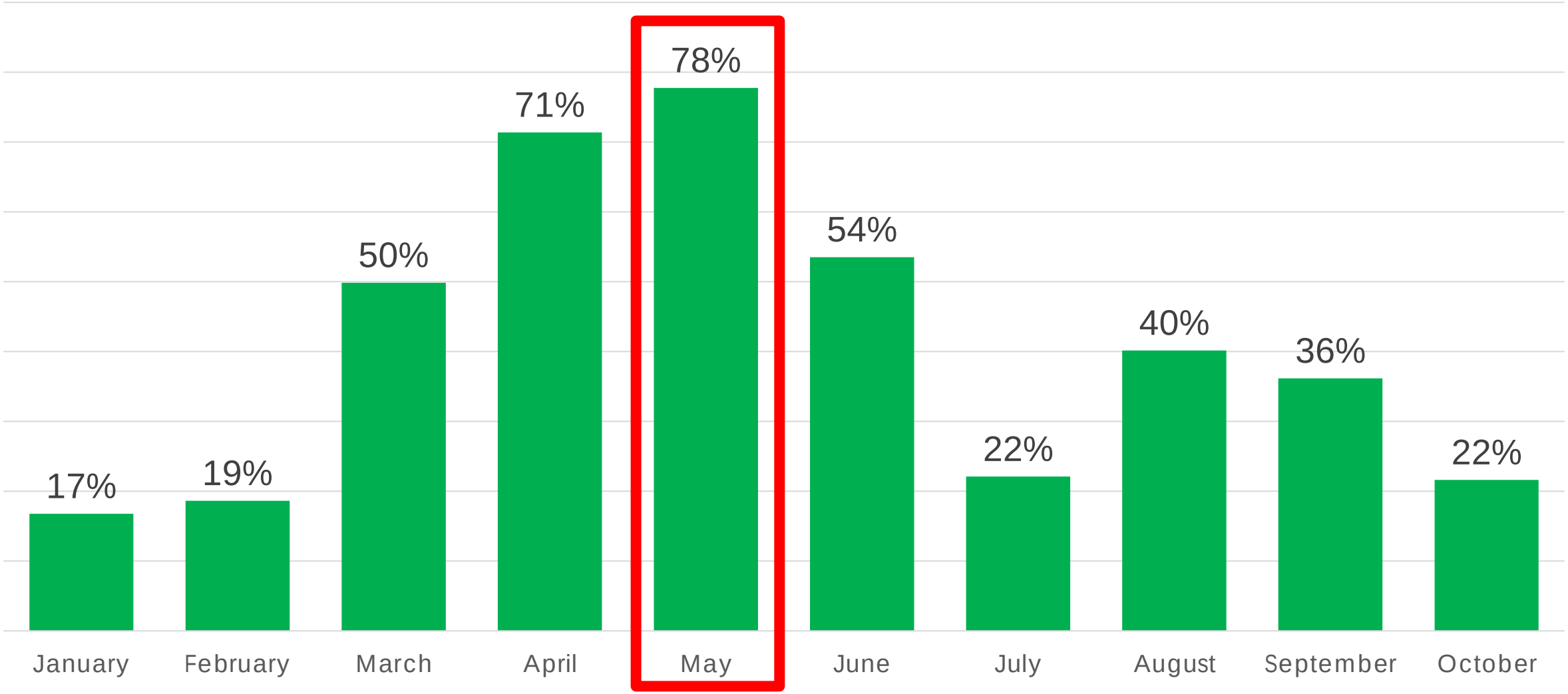
Bicycle Sales Booming During Coronavirus Pandemic

By Brooke Rogers May 26, 2020 at 4:55 pm Filed Under: Bike, Business Booming, Coronavirus, deadly virus, News, Pandemic, People Outside, sales, Social Distancing, Trails



Monthly Trail Usage

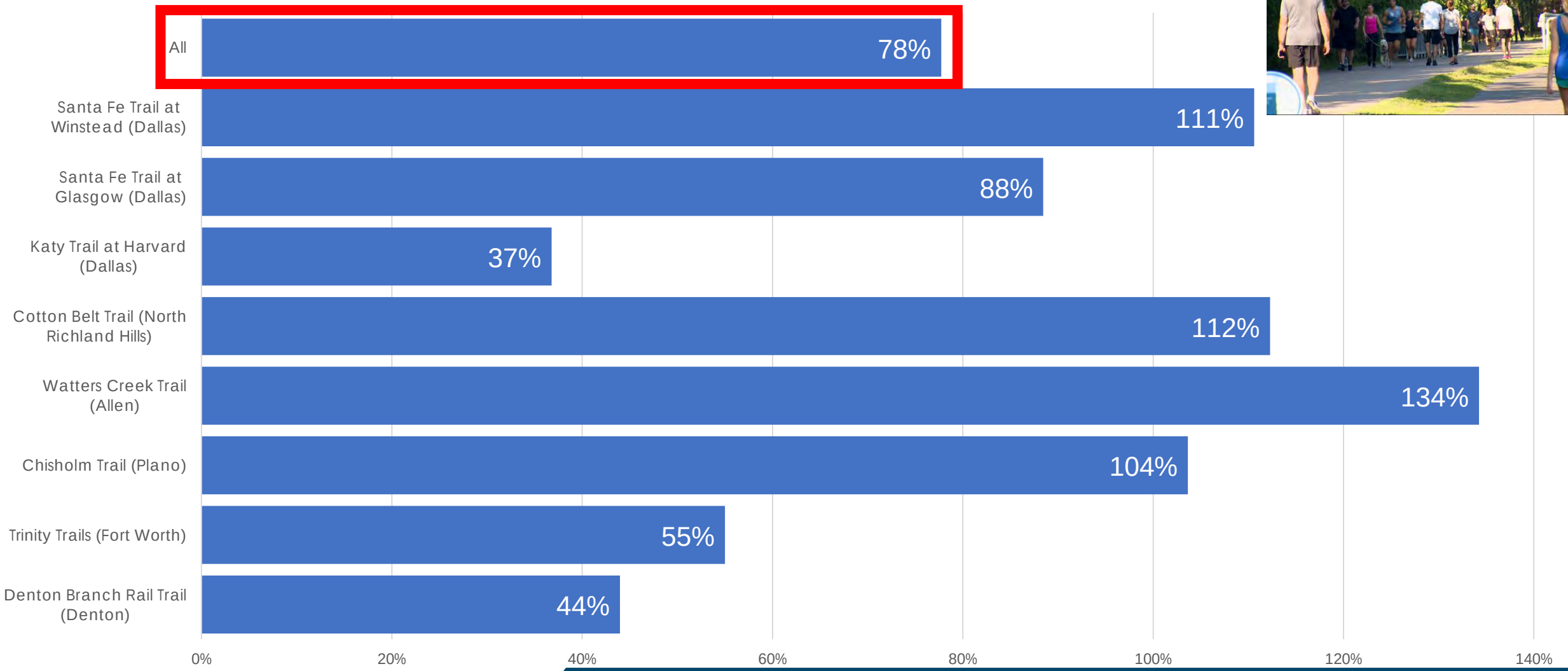
(Percent Change 2019 vs 2020)



Source: NCTCOG - collected at 8 sites located in Plano, North Richland Hills, Denton, Dallas, Fort Worth, and Allen.
Note: No adjustments for weather were applied.

Full Week Trail Volumes by Location

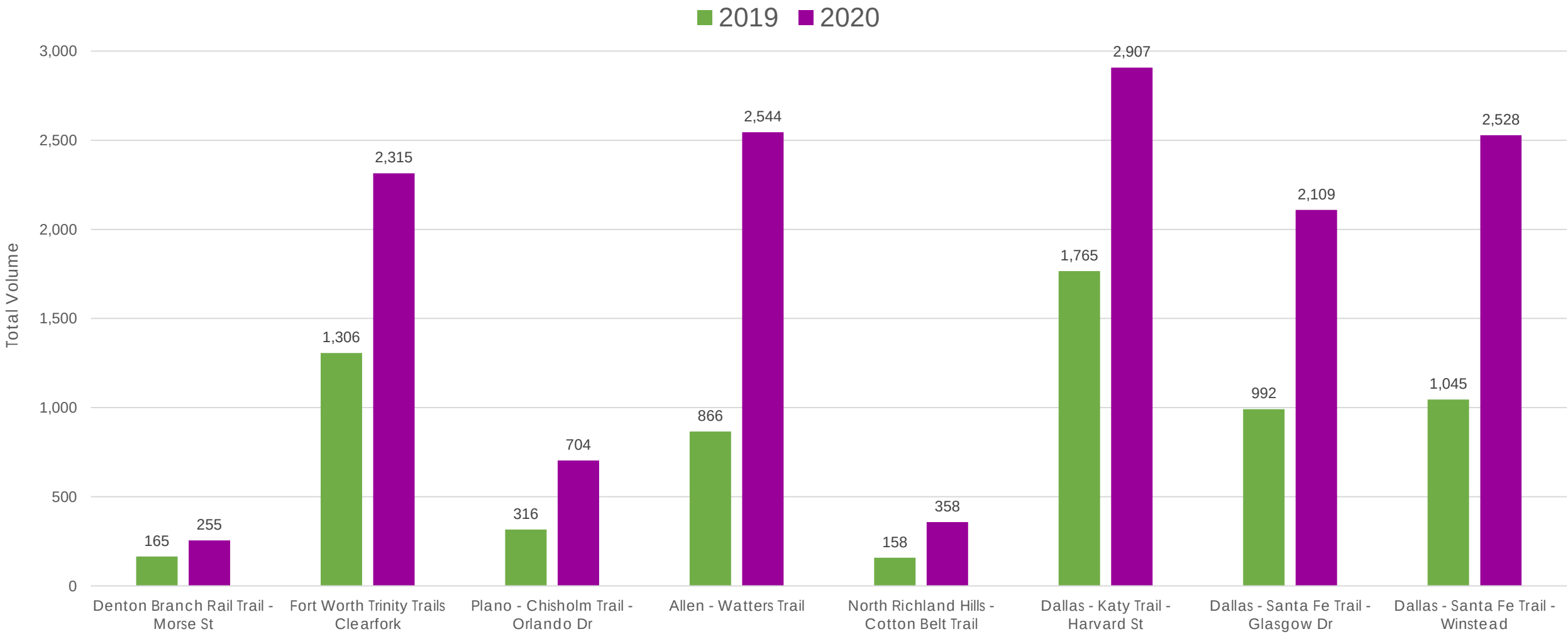
(Percent Change May 2019 vs May 2020)



North Central Texas Council of Governments

Source: NCTCOG - collected at 8 sites located in Plano, North Richland Hills, Denton, Dallas, Fort Worth, and Allen.
Note: No adjustments for weather were applied.

Daily Average Trail Volumes
(May 2019 vs May 2020)



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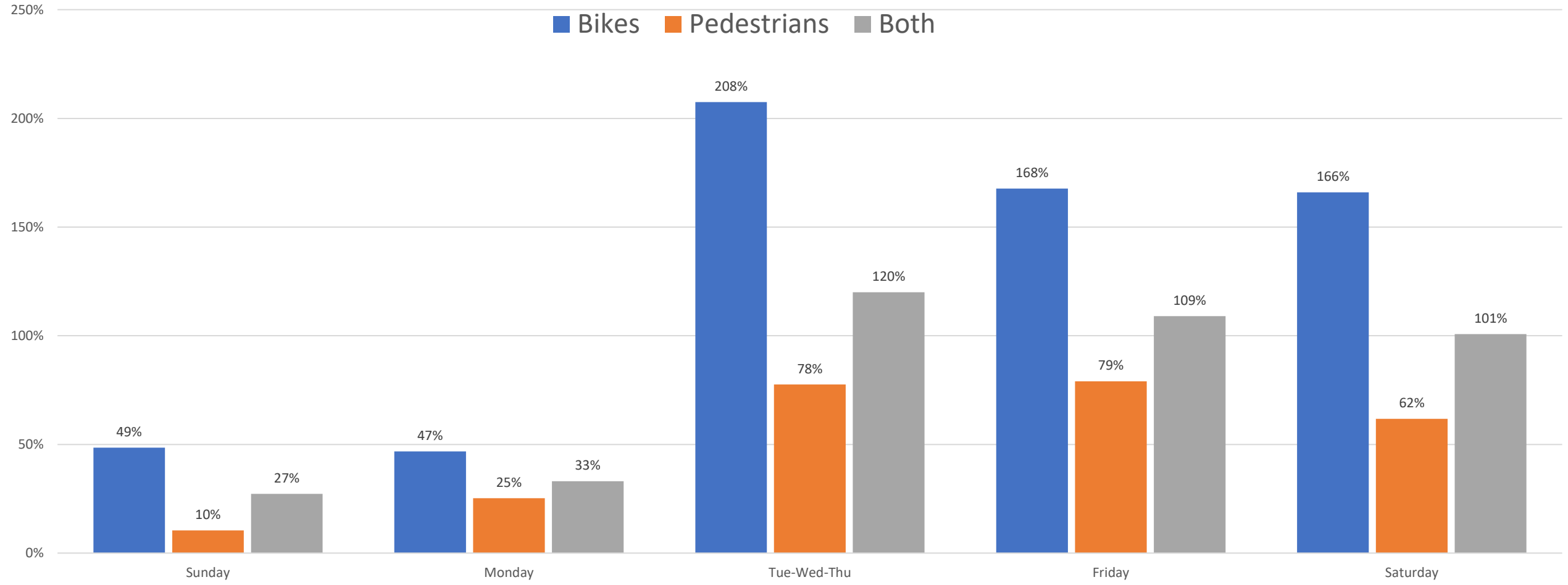
Source: NCTCOG - collected at 8 sites located in Plano, North Richland Hills, Denton, Dallas, Fort Worth, and Allen.
Note: No adjustments for weather were applied.

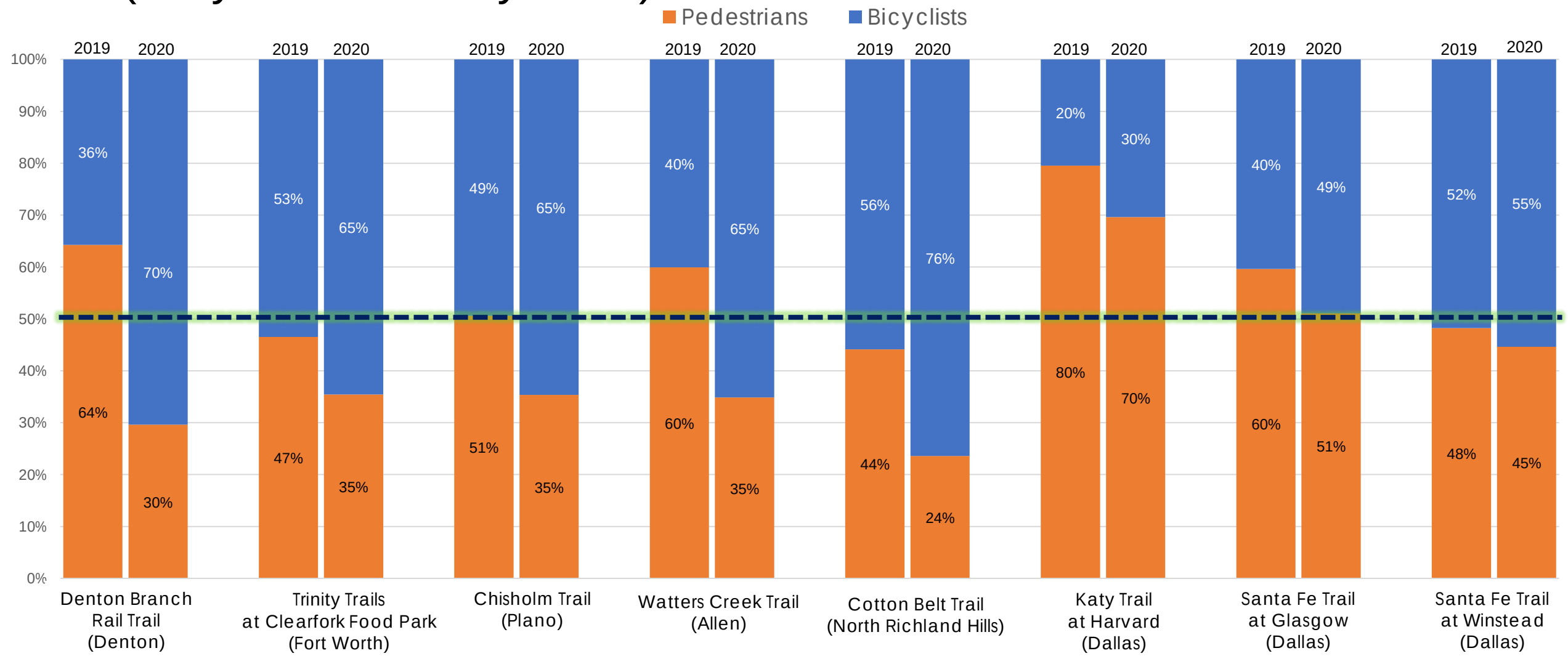
Day of Week
(Percent Change May 2019 vs May 2020)



North Central Texas Council of Governments

Source: NCTCOG - collected at 8 sites located in Plano, North Richland Hills, Denton, Dallas, Fort Worth, and Allen.
Note: No adjustments for weather were applied.

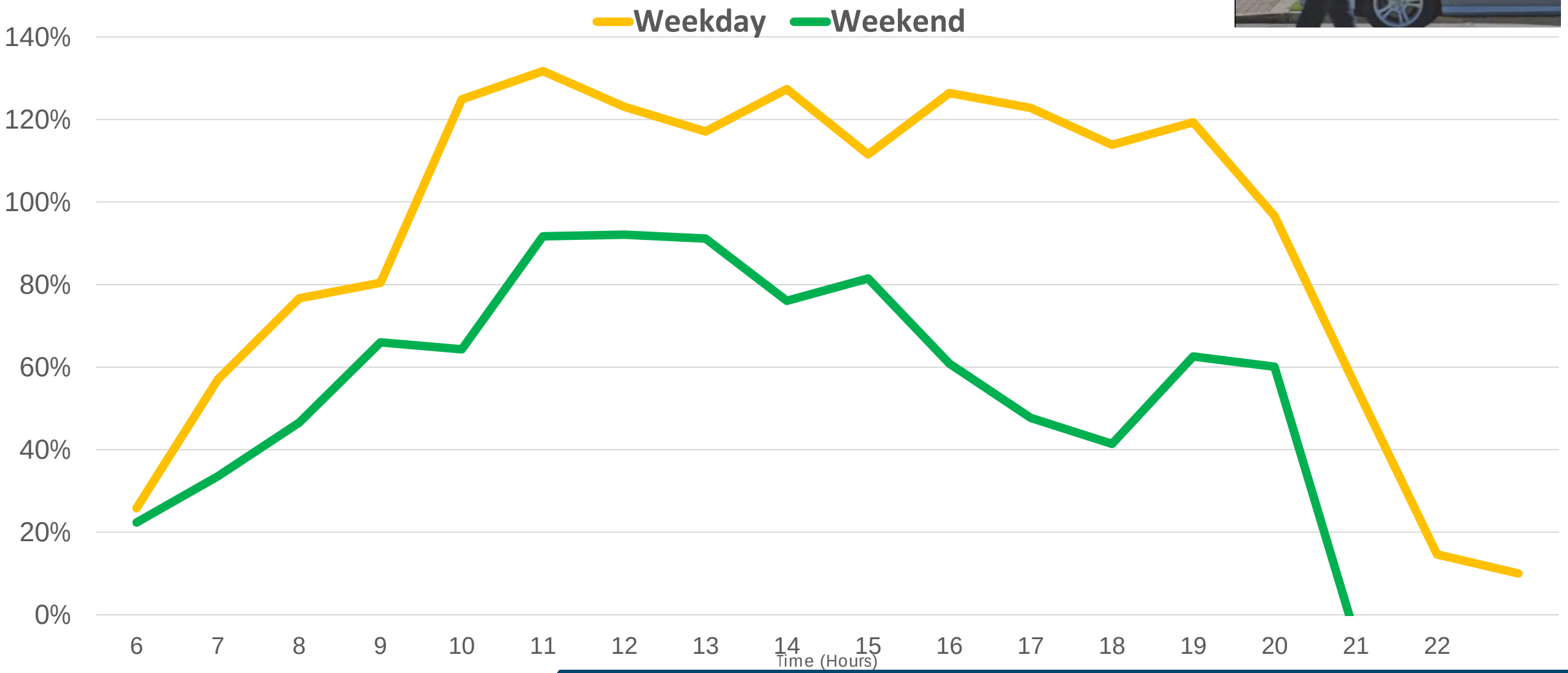
Mode Share
(May 2019 vs May 2020)



North Central Texas Council of Governments

Source: NCTCOG - collected at 8 sites located in Plano, North Richland Hills, Denton, Dallas, Fort Worth, and Allen.
Note: No adjustments for weather were applied.

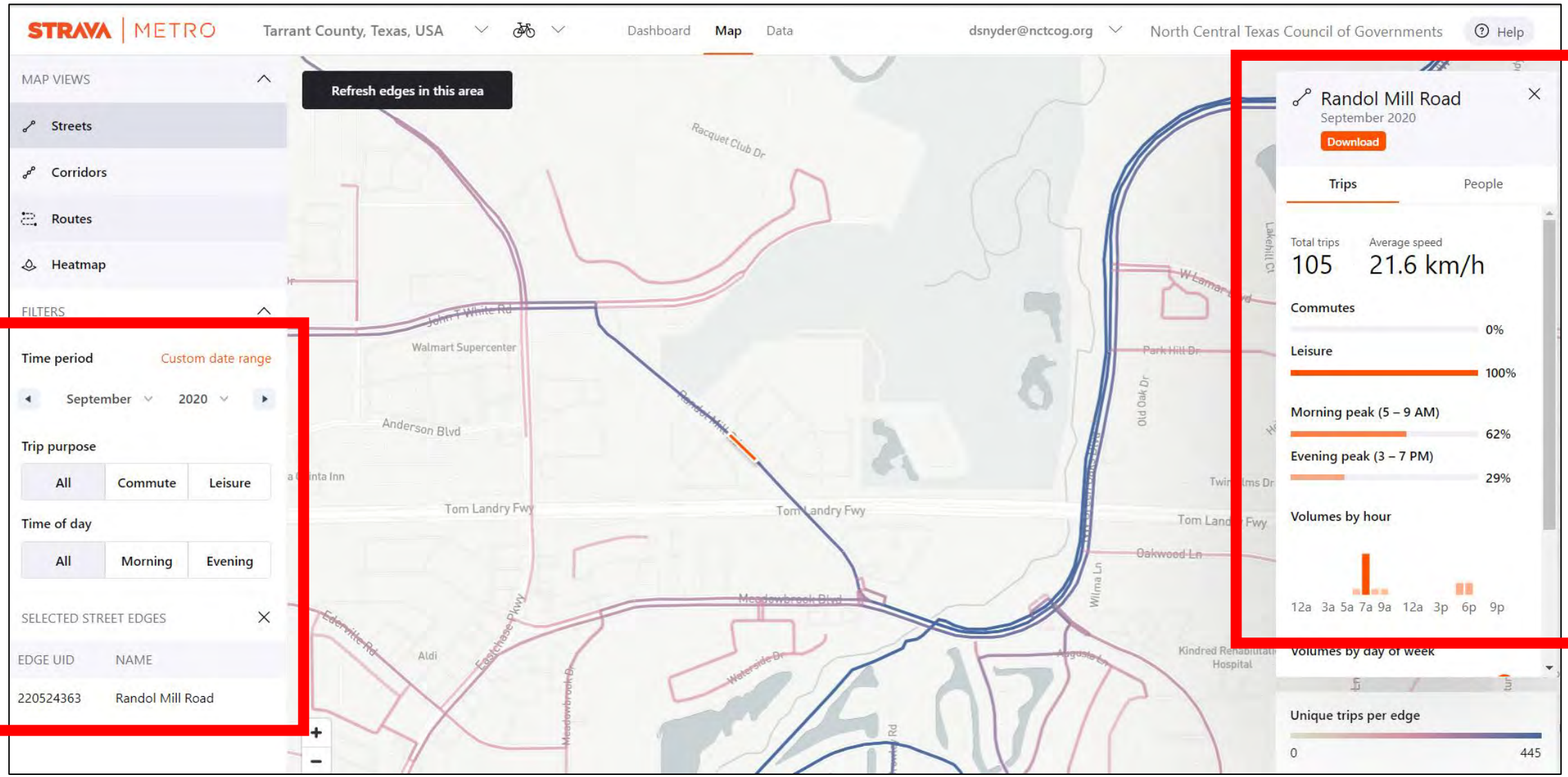
Hourly Profile
(Percent Change May 2019 vs May 2020)



North Central Texas Council of Governments

Source: NCTCOG - collected at 8 sites located in Plano, North Richland Hills, Denton, Dallas, Fort Worth, and Allen.
Note: No adjustments for weather were applied.

Strava Metro Data (metro.strava.com)



Contact Information:

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Transportation Planner
dsnyder@nctcog.org

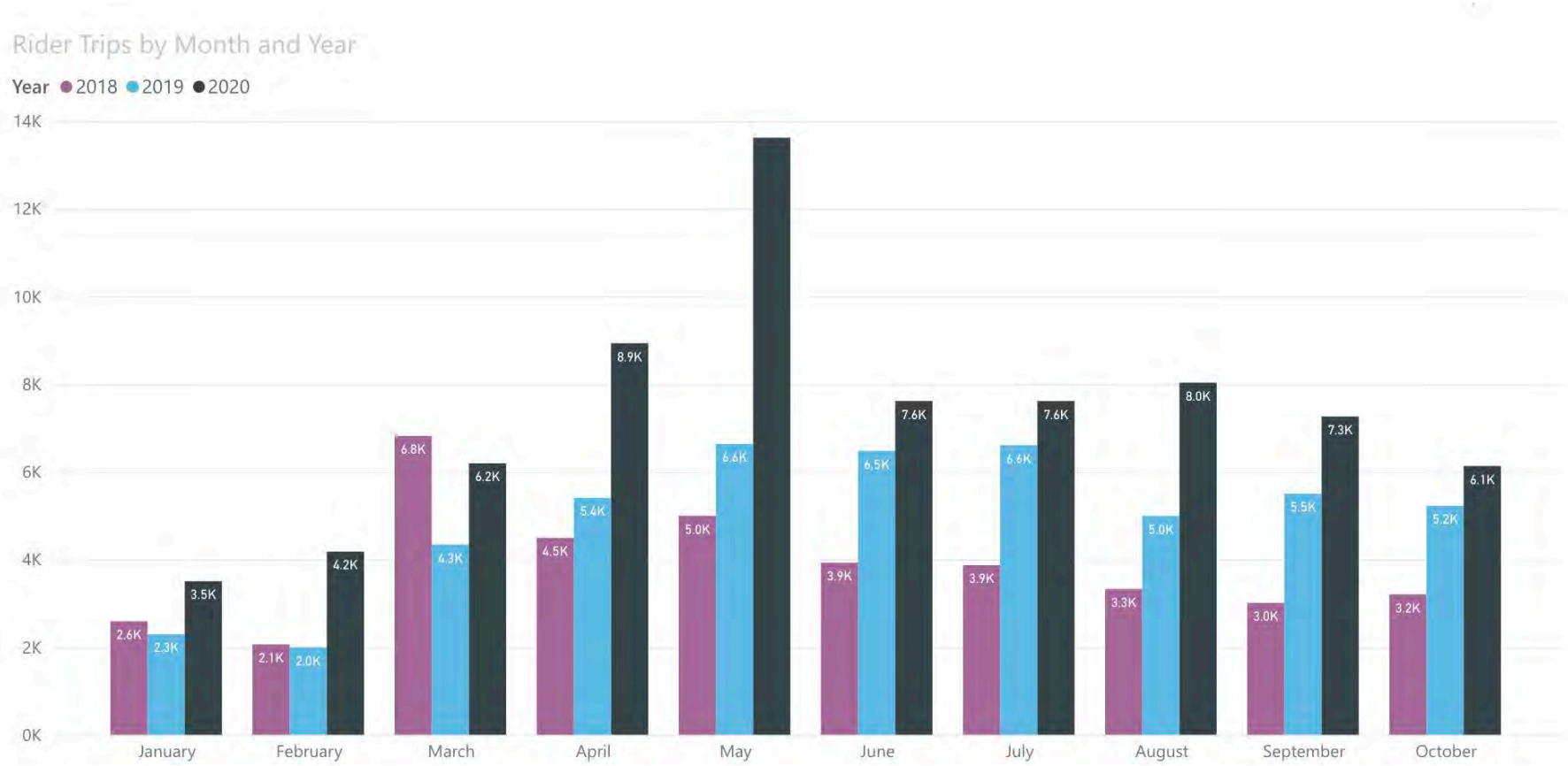
Would you like this presentation to be shared with your local committee?

Let us know and we can help!

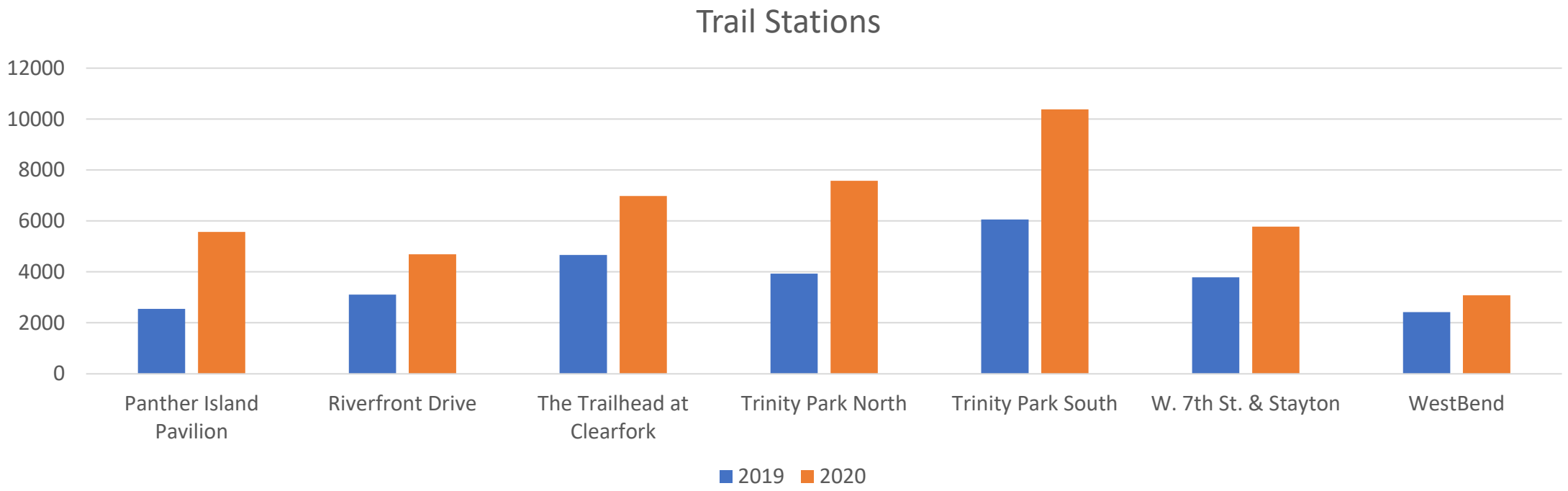

FORT WORTH
B
BIKE SHARING

So. Many. Riders!

Ridership Continues to Beat Comps from Previous Years

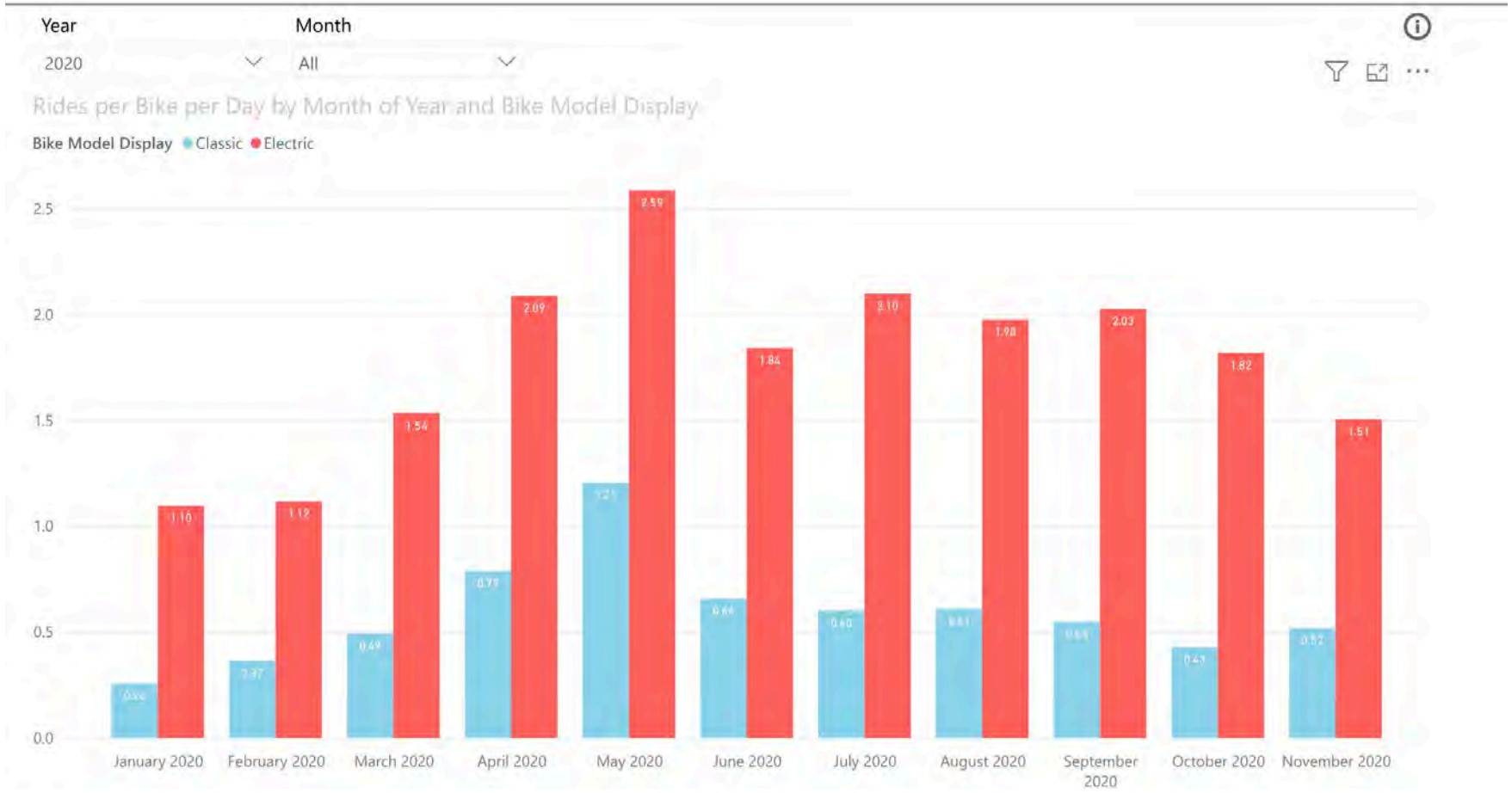


Increase in Trail Station Use 2019 -2020



Additional 2020 Trail Stations:
Gateway Park, Martin house, Waterside, River East

Ebike Use Continues to Rise In Popularity



Murals, Miles and Melt Tour

Monthly group ride highlighting murals along the Trinity River while educating participants about the rules of the trail.

Looking Ahead: 2021 New (to us) Stations

Some of these will be placed at Trailheads along the trinity trails, moving primarily east and north, encouraging the use of the trails for both recreation AND transportation.

GREEN BUS STOP GUIDE

RENEE ESSES, AICP, CFM

FARMERS BRANCH

SUSTAINABILITY & PUBLIC HEALTH

SILO BUSTING

NCTCOG GRANT

WATER (BLUE)

ENVIRONMENT (GREEN)

TRANSPORTATION INFRASTRUCTURE

(GRAY)

SUBMITTED TWO PROPOSALS:

- BROOKHAVEN EAST TRAIL – ENHANCE RIPARIAN AREA ADJACENT TO TRAIL NEXT TO BROOKHAVEN COLLEGE

- "GREEN" BUS STOP DESIGN GUIDELINES
  - HIGHLIGHT OPPORTUNITIES FOR GREEN INFRASTRUCTURE EVEN WHEN THERE ARE COMPETING NEEDS IN R.O.W
  - CREATE A GUIDE TO HIGHLIGHT HOW GREEN INFRASTRUCTURE CAN COMPLEMENT VS COMPETE WITH BUS STOPS

INNOVATIVE IDEAS?
UGH!
I LOVE CREEKS, TREES & BUSES BUT.....

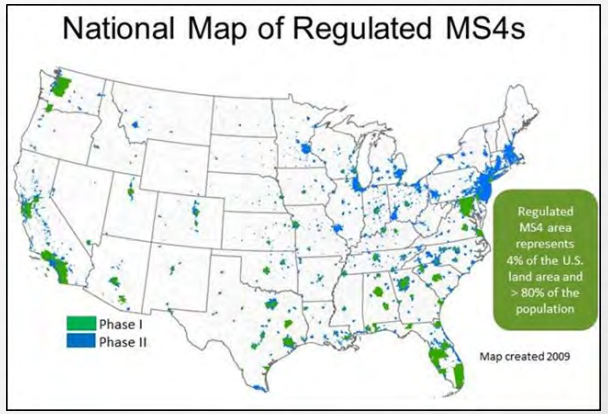
- JUST SIT AT MY DESK WITH THE ORANGE NACTO BOOK AND NOT TALK TO ANYONE!

-OR-

- START THE CONVERSATION!
- IS IT REALLY "JUST" ABOUT MAINTENANCE?

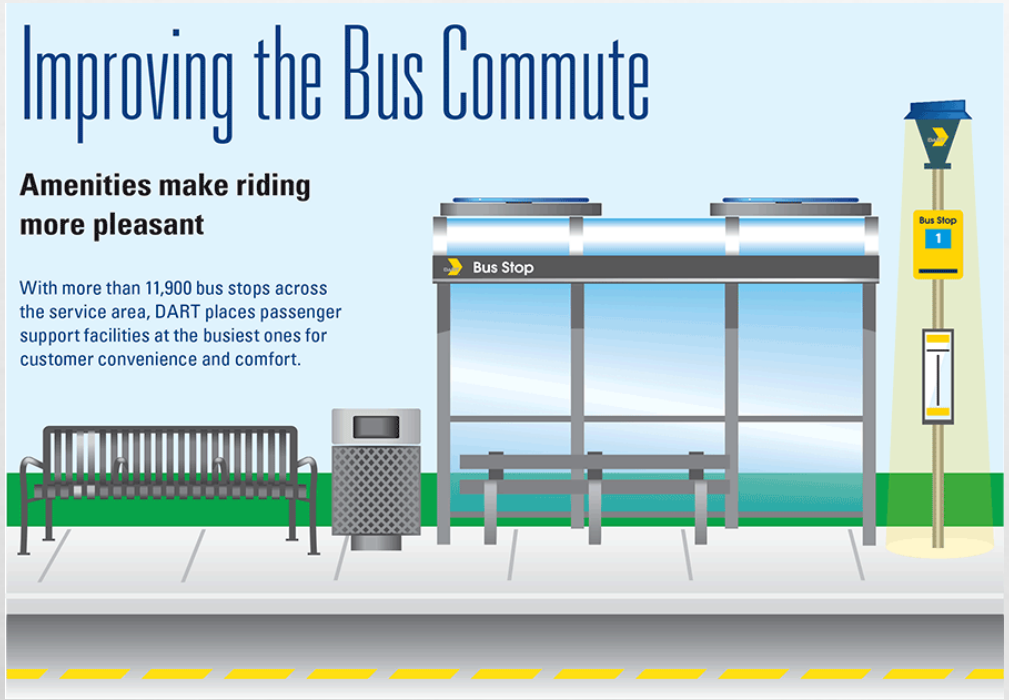
- LA TERRA STUDIO & URBAN ECOPLAN
- EVALUATE 10 BUS STOPS - DISCUSS AND CREATE DESIGNS
- ENCOURAGE COLLABORATION & DISCUSSION AT THE LOCAL LEVEL
  - CITY STAFF – PARKS, PUBLIC WORKS, PLANNING, SUSTAINABILITY & PUBLIC HEALTH
  - DART STAFF – PLANNING & MAINTENANCE
  - NCTCOG STAFF
- FIND THE OPPORTUNITIES –LEARN FROM EACH OTHER
  - POTENTIAL FUNDING OPPORTUNITIES
  - POTENTIAL PUBLIC/PRIVATE PARTNERSHIPS

WHY GREEN BUS STOPS?



- SILOS EXIST
- MANY BUS STOPS DON'T MEET ADA REQUIREMENTS
- SIDEWALKS MISSING OR NEED REPAIRS
- STORMWATER MANAGEMENT IS CHANGING – SLOW IT DOWN, SPREAD IT OUT AND SOAK IT IN
- ARE THERE OPPORTUNITIES TO USE GREEN INFRASTRUCTURE, IMPROVE WATER QUALITY AND PROVIDE BETTER BUS STOPS?
  - NOT A ONE SIZE FITS ALL SOLUTION FOR TRANSIT OR DRAINAGE/STORMWATER MANAGEMENT

BUS STOP IMPROVEMENTS



GREEN INFRASTRUCTURE

Figure 6-19 Bio-Swale Placed in Bus Passenger Alighting Area

RESEARCH & GUIDELINES

- TCRP REPORT 19 – GUIDELINES FOR THE LOCATION AND DESIGN OF BUS STOPS
  HTTPS://NACTO.ORG/DOCS/USDG/TCRP_REPORT_19.PDF
- TCRP TRANSIT COOPERATIVE RESEARCH PROGRAM SYNTHESIS 117 - BETTER ON-STREET BUS STOPS
  HTTP://WWW.TRB.ORG/PUBLICATIONS/BLURBS/172376.ASPX
- *TRANSFORT BUS STOP DESIGN STANDARDS & GUIDELINES JULY 21, 2015*

THREE CONCEPTUAL DESIGNS

NEW DEVELOPMENT

PUBLIC SPACE

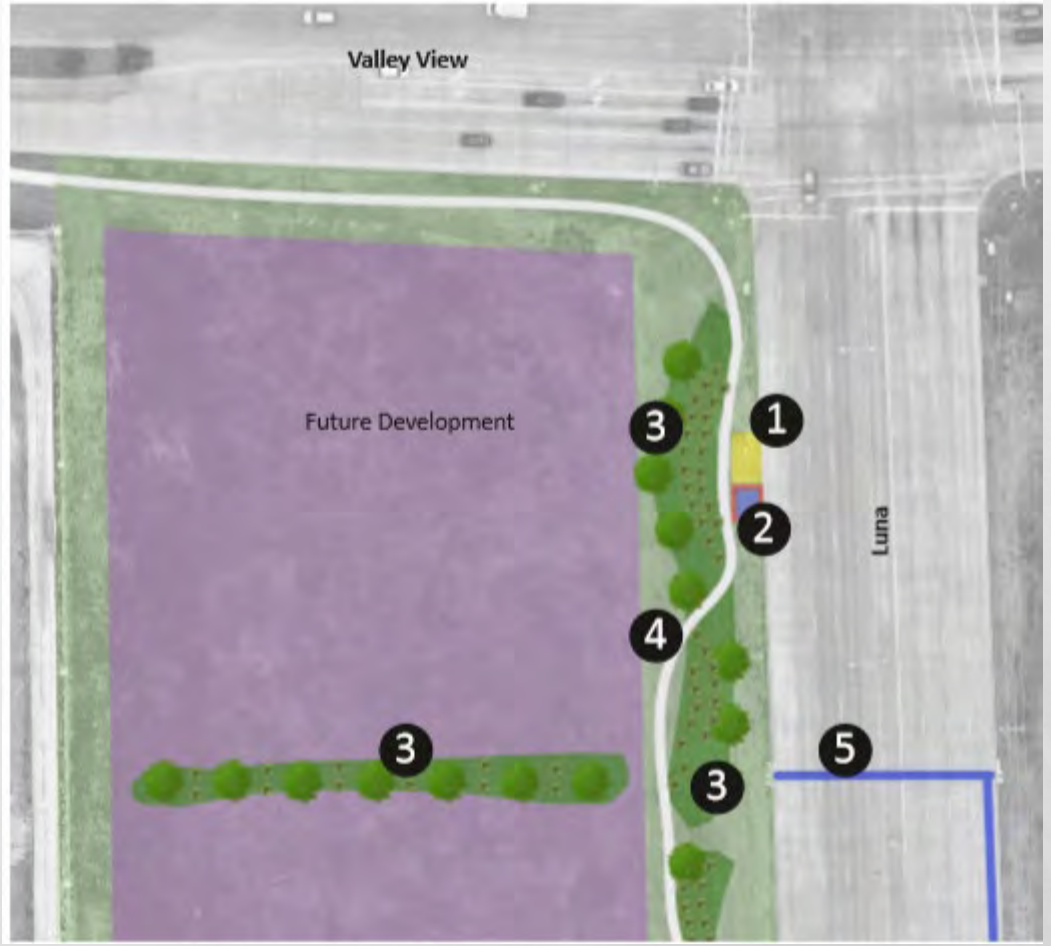
EXISTING DEVELOPMENT

EXISTING DEVELOPMENT – ENHANCED BUS STOP

COST ESMTIMATES FOR WATER QUALITY INLET, BIOSWALE & ENHANCED LANSCAPE

POTENTIAL RETURN ON INVESTMENT

NOTE THIS IS NOT A DART BENCH



groundwater. Bioswales are typically vegetated, mulched, or xeriscaped.

Cornell University

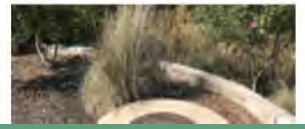
4 *Trail/Sidewalk*

Integrating a trail/sidewalk adjacent to the bus stops is key for connectivity for users. Considerations should be taken when possible to design bus stops and sidewalks as separate facilities to avoid conflicts with circulation.

NACTO

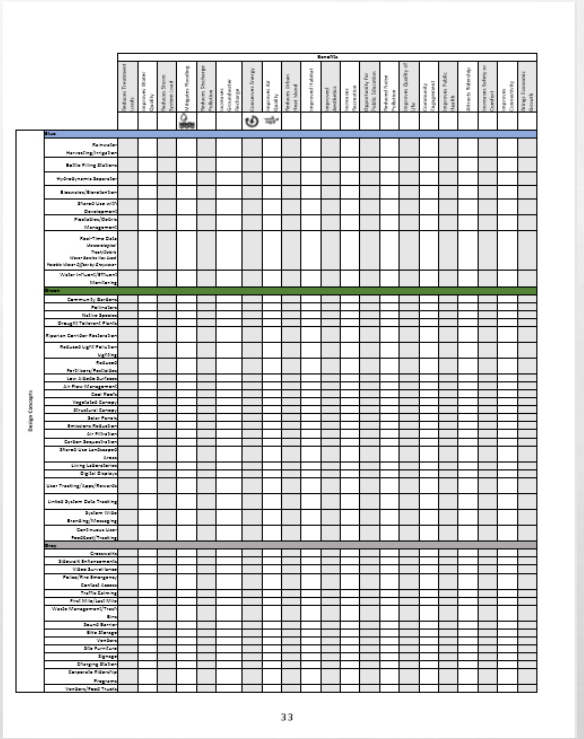
5 *Existing Infrastructure*

When implementing enhanced bus stops existing infrastructure should be considered and tied into when possible. It is not the intent of this strategy to replace existing infrastructure, rather enhance it and improve the efficiencies of its use. Coordination with transit operators



DISCUSSION OF GREEN BUS STOPS

- CONSULTANT MET WITH DART & CITY STAFF
  - MEETING NOTES IN THE APPENDIX
- GREAT DISCUSSION AND INPUT FROM ALL STAFF
  - SAFETY & MAINTENANCE
- RANGE OF RESOURCES AND INFORMATION



"GREEN" BUS STOP DESIGN GUIDELINES

- ✓ HIGHLIGHT OPPORTUNITIES FOR GREEN INFRASTRUCTURE EVEN WHEN THERE ARE COMPETING NEEDS IN R.O.W
- ✓ CREATE A GUIDE TO HIGHLIGHT HOW GREEN INFRASTRUCTURE CAN COMPLEMENT VS COMPETE WITH BUS STOPS
- ❑ PILOT PROJECT? START THE CONVERSATION & LEARN FROM EACH OTHER
  - ✓ GROW ZONES IN FARMERS BRANCH A SUCCESS!
- ❑ VALUABLE TO INCLUDE BUS STOPS IN PLANNING & DEVELOPMENT REVIEW
  - ❖ GREEN BUS STOP GUIDELINES ARE BUS STOP DESIGN GUIDELINES, USE THEM AND PLAN FOR BUS STOPS!

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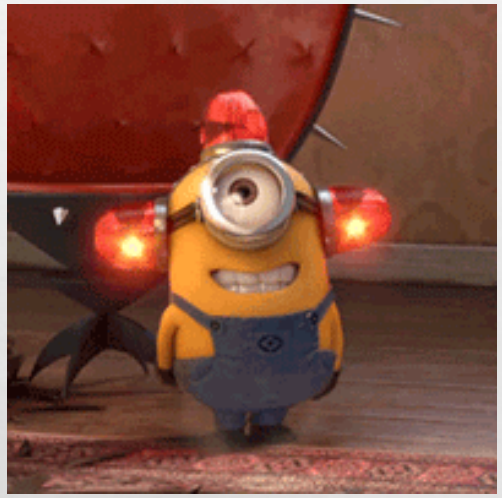

QUESTIONS?

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