From Planning to Design: How to Know When Your Relationship with Complete Streets Needs to Move to the Next Level

Presented by:
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Complete Streets

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What is it &
Why is it important?

What are Complete Streets?

Benefit All Users.

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What are Complete Streets?

Safe. Comfortable. Convenient.

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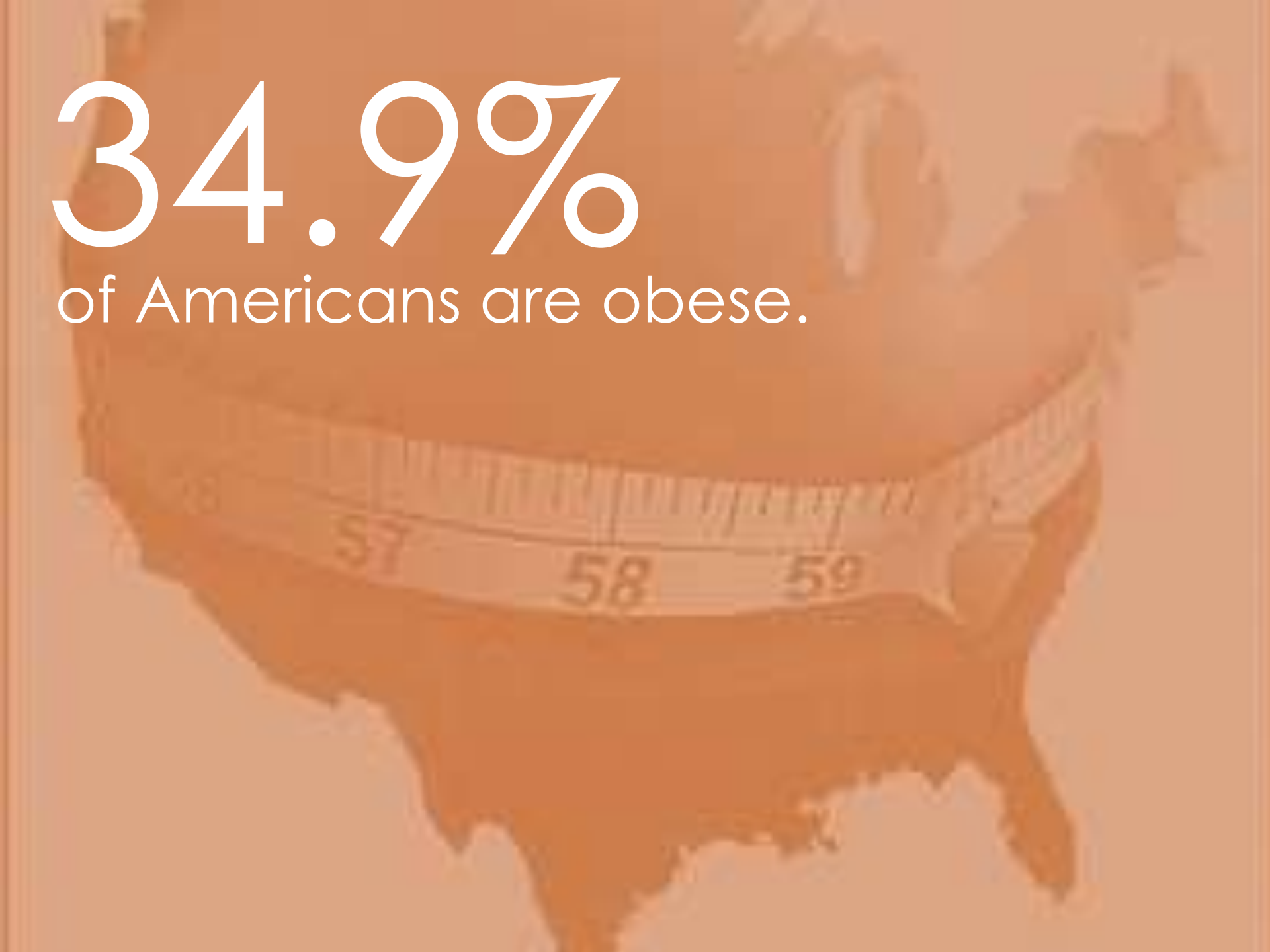
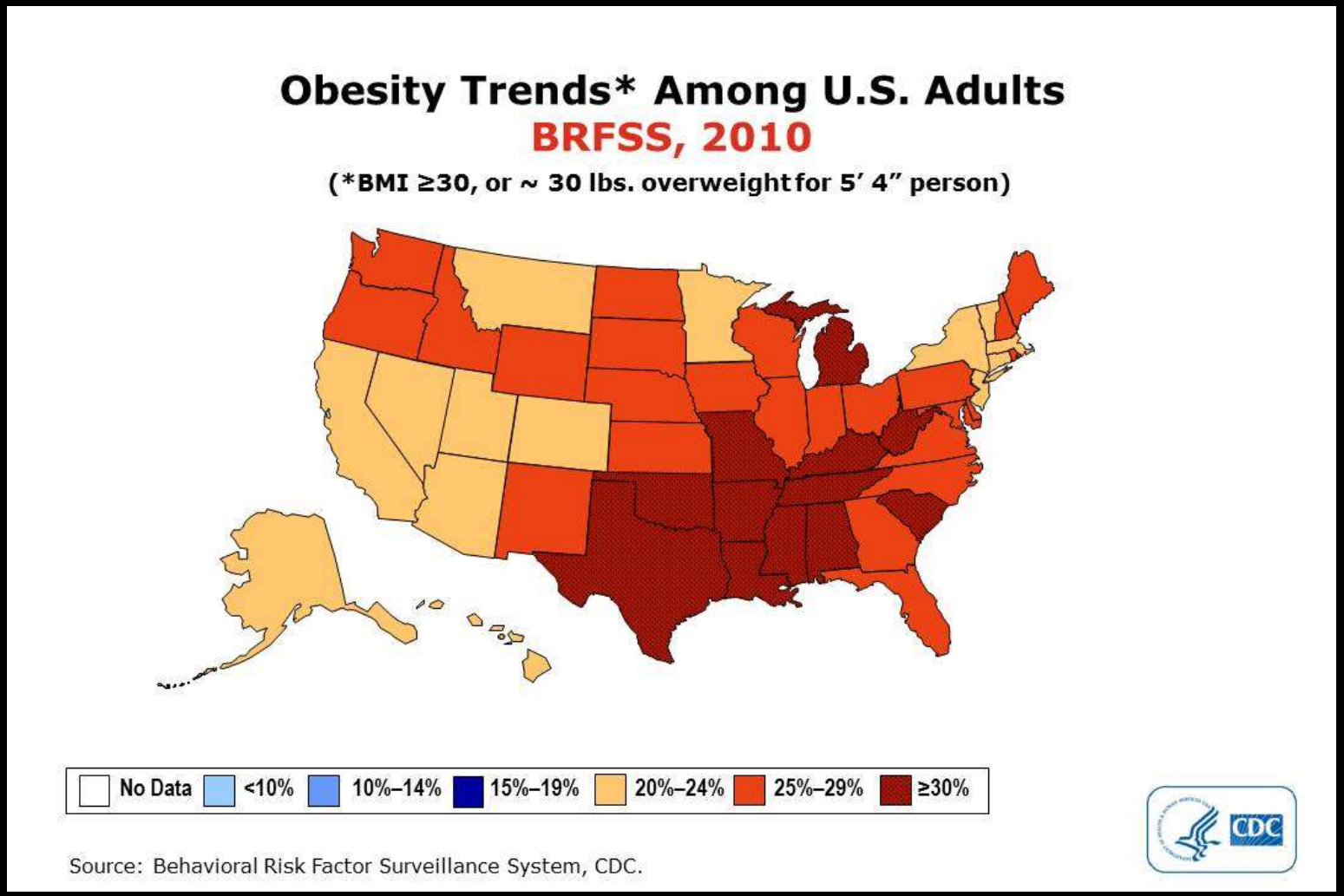
34.9%

of Americans are obese.



Benefits: Health



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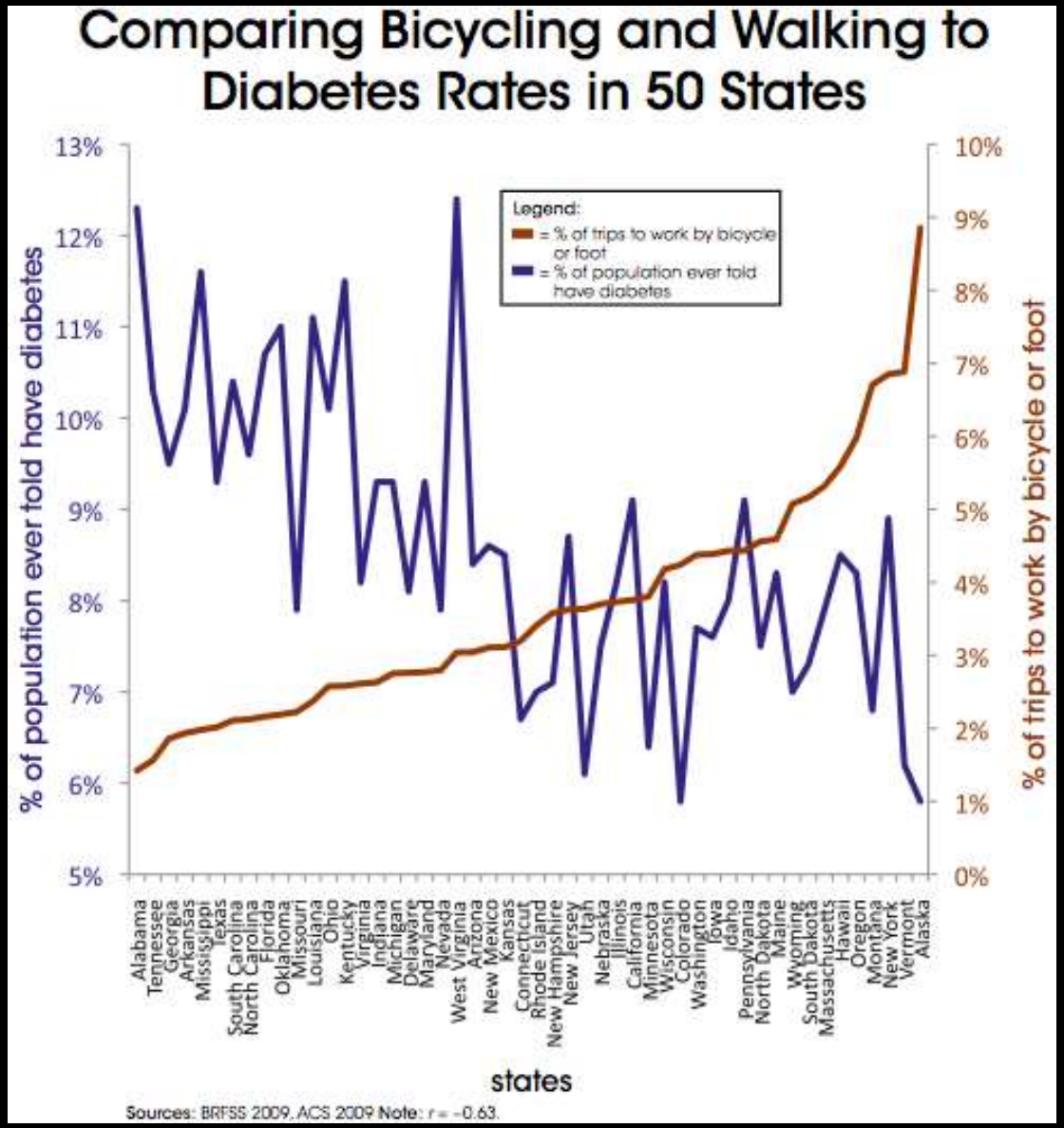
Benefits: Health

States with the lowest levels of biking and walking have, on average, the highest rates of obesity, diabetes, and high blood pressure.



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People 65 and older account for 13 percent of the U.S. population, yet their pedestrian deaths make up 21 percent of all pedestrian deaths.

NHSTA, National Pedestrian Crash Report

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Benefits: Safety

There were 32,719 traffic fatalities in the U.S. in 2013. Of these fatalities:

23,303 were people in cars

4,735 were people walking

743 were people on bicycles

National Highway Traffic Safety Administration: Fatality Analysis Reporting System 2014

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Benefits: Safety

More than 40% of pedestrian fatalities occur where there is no available crosswalk.

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Benefits: Economy

"Young people do not want to work in office parks anymore… We're seeing this big change in this country. **It's not political…it's generational**… This is where we need to think very differently, because if you don't, you will be left behind."

-Mitchell Silver, former Planning Director, Raleigh, N.C.

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Benefits: Economy

Fayetteville Street, Raleigh

$15 million public investment in streetscape improvement 2006

$50 million in private investment in following 5 years

20 new business establishments

$5 million in sales tax annually

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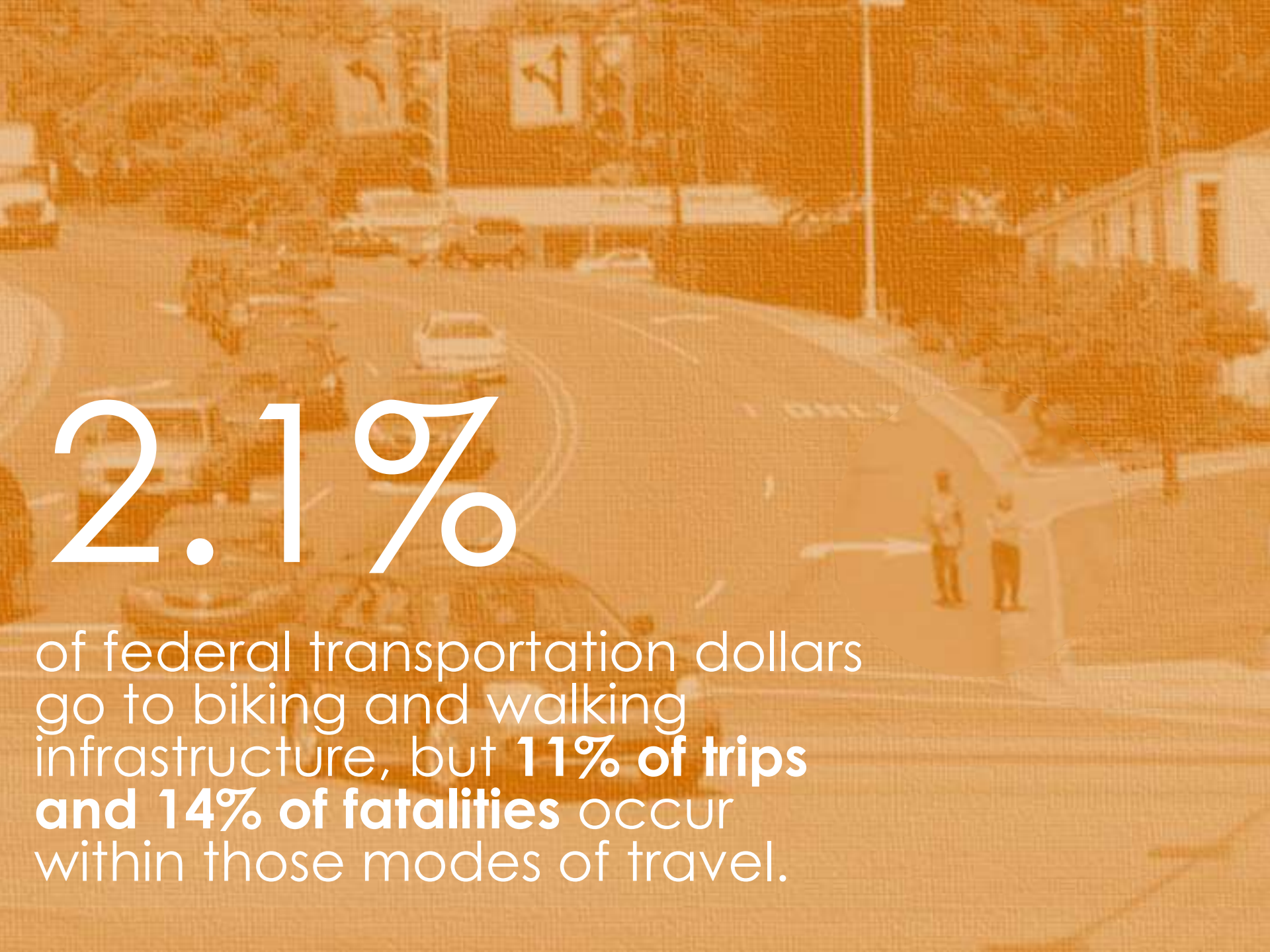

2.1%

of federal transportation dollars go to biking and walking infrastructure, but **11% of trips and 14% of fatalities** occur within those modes of travel.

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How we do it?

Complete Streets:

"It's a process, not a product"

- ✓ **Define Success**
- ✓ Prioritize Modes of Travel
- ✓ Define Design Features/Limitations
- ✓ Make Tradeoffs
- ✓ Design in Detail

"I Would Spend 55 Minutes Defining the Problem and Five Minutes Solving It"

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Look holistically…

Travel Zone

Pedestrian Zone

Building Zone

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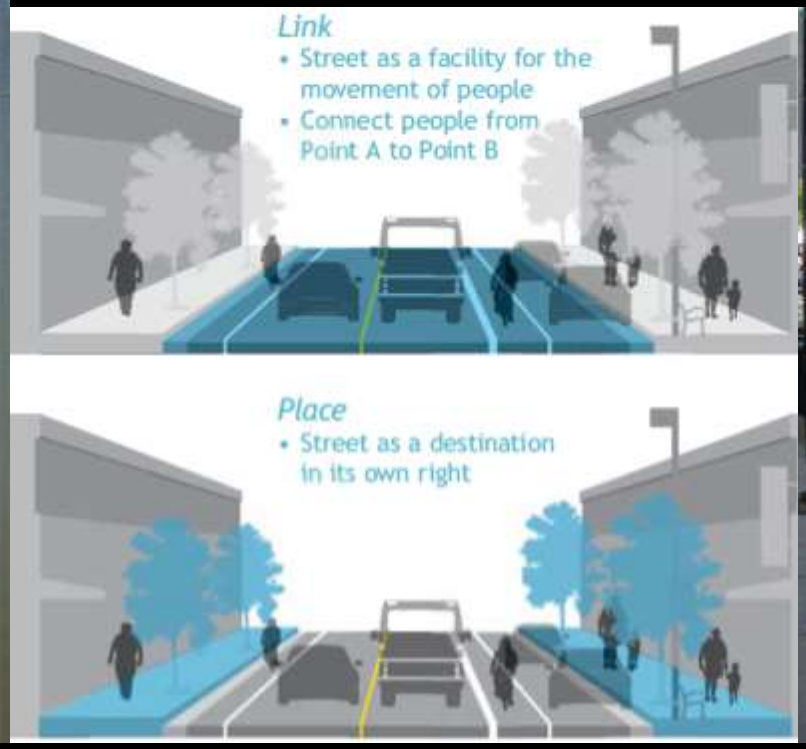
Link and Place



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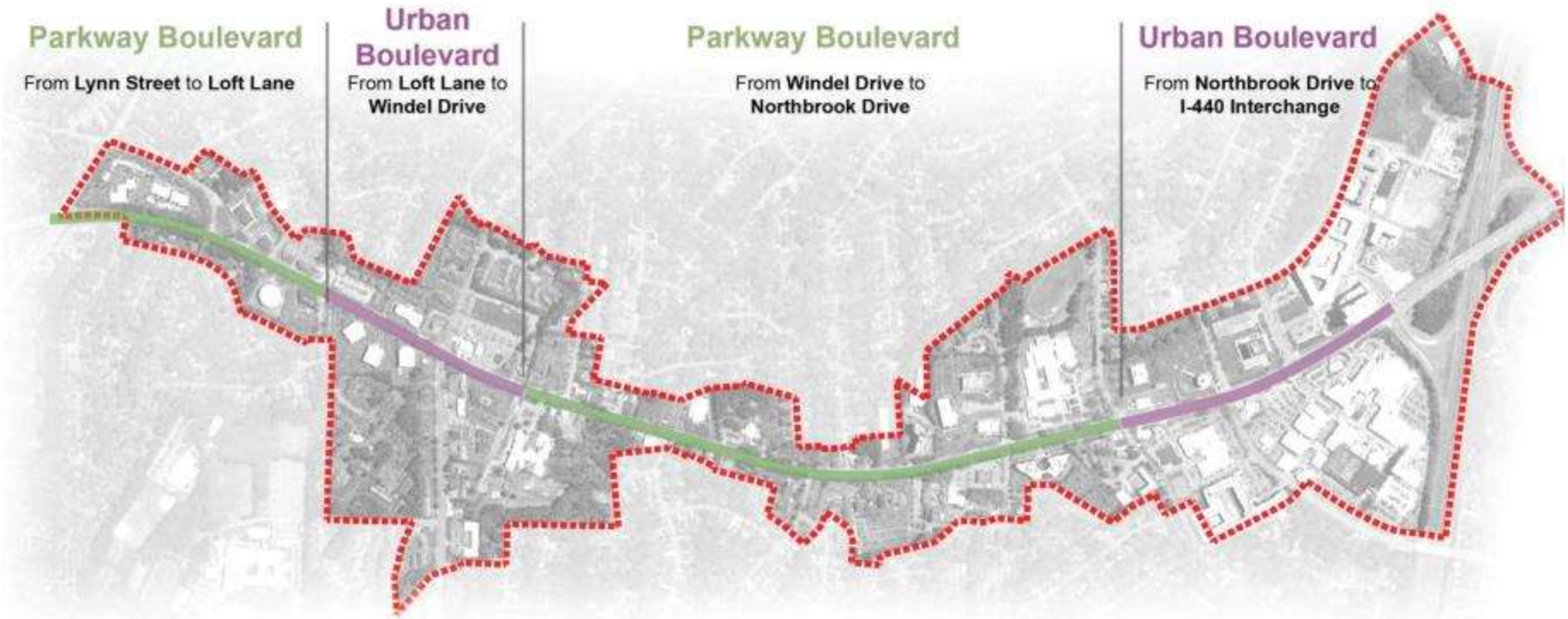
Design Elements

Area Context



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Area Context

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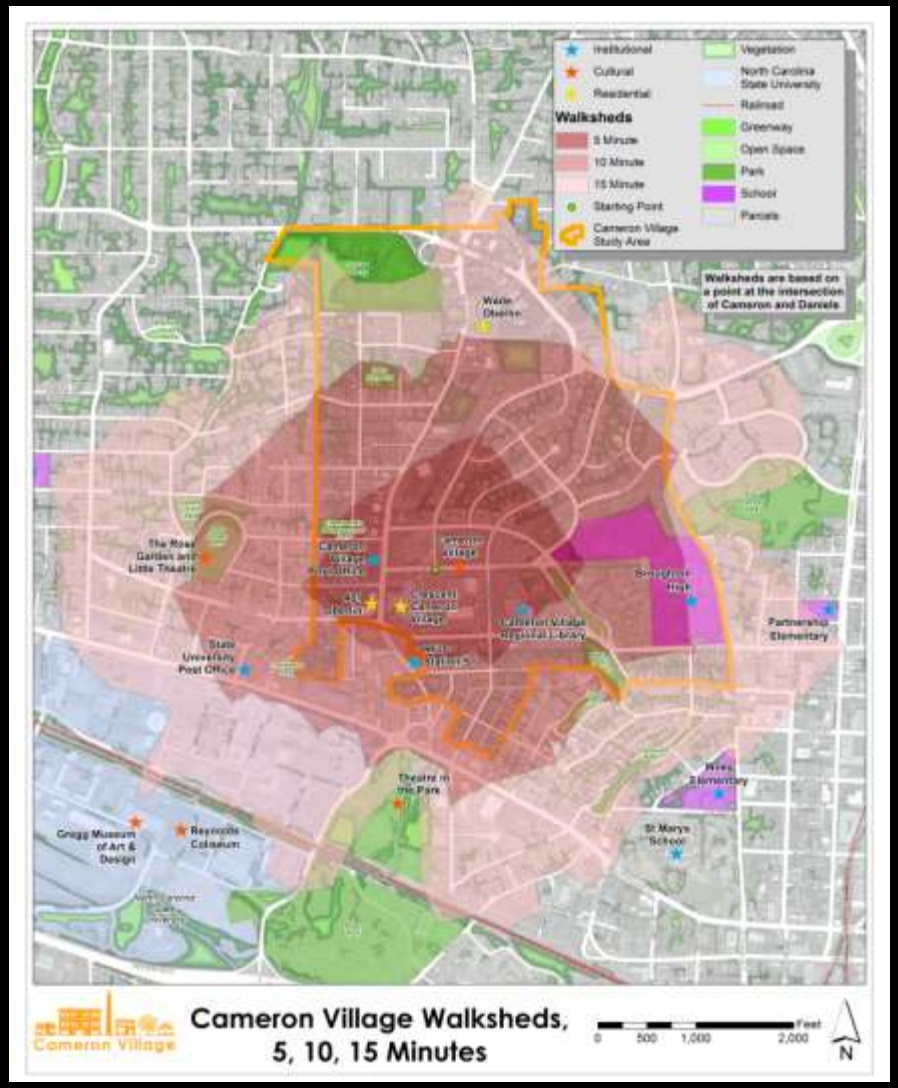
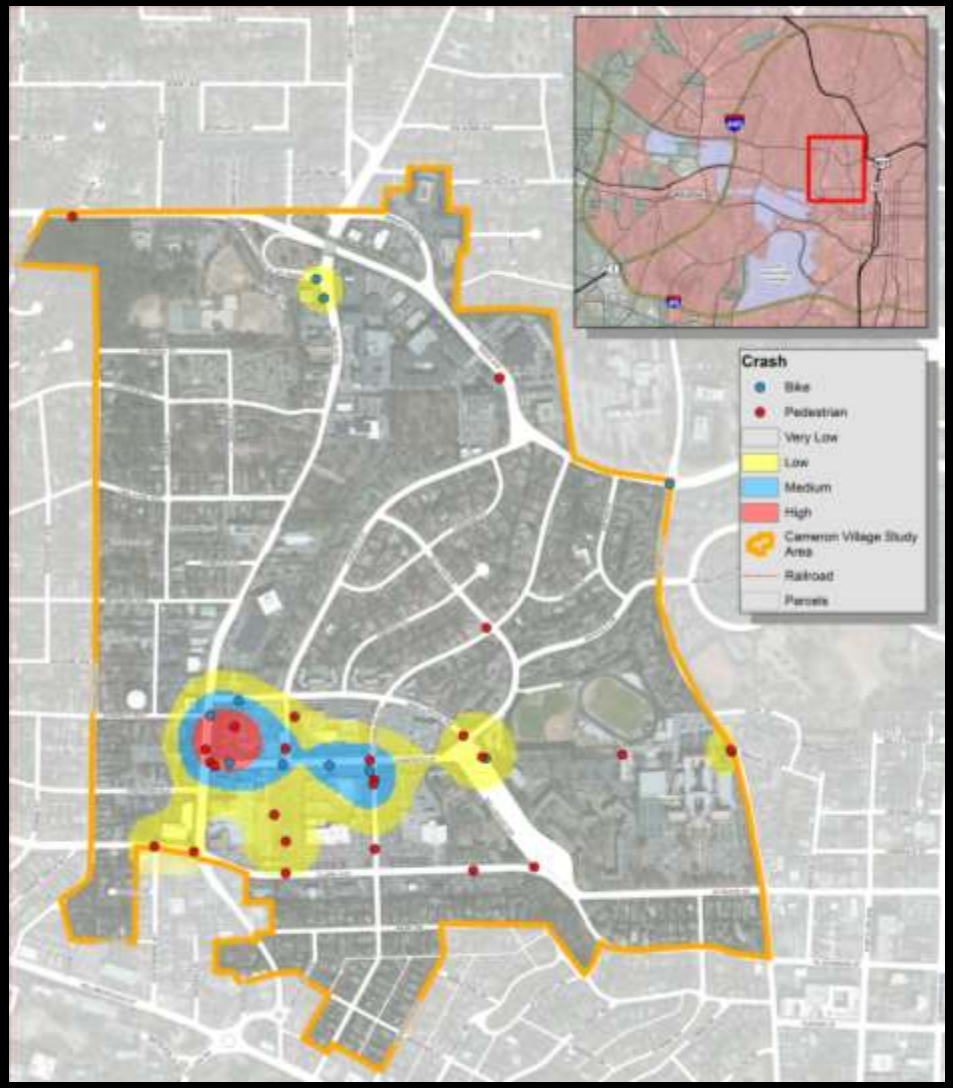
Walksheds & Bike/Ped Crashes





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Lighting

Suspicious I Am…

Traffic-Traffic-Traffic!

Six Forks Road & Lynn Road	AM							
	No Build				Build			
Direction	NB Left	SB Left	EB Left	WB Left	NB Left	SB Left	EB Left	WB Left
Volume	93	216	124	113	93	216	124	113
Lanemage								
95th Percentile Queue (ft)	117	352	255	179	58	149	158	166
Average Queue (ft)	57	180	111	99	20	82	87	71
Left Turn Lane LOS	F	F	E	E	F	F	E	E
Approach LOS (Through Movements)	E	E	E	E	D	D	E	F
Approach Delay (Turn Movements)	100.8	103.6	68.8	77.4	98.3	87.7	57.2	67.9

Six Forks Road & Lynn Road	PM							
	No Build				Build			
Direction	NB Left	SB Left	EB Left	WB Left	NB Left	SB Left	EB Left	WB Left
Volume	271	339	204	117	271	339	204	117
Lanemage								
95th Percentile Queue (ft)	424	808	980	222	202	298	272	129
Average Queue (ft)	217	530	259	115	85	196	159	57
Left Turn Lane LOS	F	F	F	E	F	F	F	D
Approach LOS (Through Movements)	F	F	F	F	F	F	E	F
Approach Delay (Turn Movements)	104.3	143.2	227.4	56.2	83.2	116.5	103.6	44.3

Six Forks Road & Millbrook Road	AM							
	No Build				Build			
Direction	NB Left	SB Left	EB Left	WB Left	NB Left	SB Left	EB Left	WB Left
Volume	149	110	127	153	149	110	127	153
Lanemage								
95th Percentile Queue (ft)	502	253	298	486	267	210	252	556
Average Queue (ft)	166	67	157	290	106	52	133	232
Left Turn Lane LOS	F	E	F	F	F	E	F	F
Approach LOS (Through Movements)	D	F	F	F	D	E	F	F
Approach Delay (Turn Movements)	100.2	62.8	129.2	173.4	141.7	66.3	133.8	150

Six Forks Road & Millbrook Road	PM							
	No Build				Build			
Direction	NB Left	SB Left	EB Left	WB Left	NB Left	SB Left	EB Left	WB Left
Volume	135	248	185	246	135	248	185	246
Lanemage								
95th Percentile Queue (ft)	271	483	346	560	294	555	541	560
Average Queue (ft)	129	265	228	340	92	181	228	408
Left Turn Lane LOS	F	F	F	F	F	F	F	F
Approach LOS (Through Movements)	F	F	F	F	F	E	F	F
Approach Delay (Turn Movements)	107	273.3	117.3	152.3	95.5	163.2	166.8	132.5

Six Forks Road & Lassiter Mill Road	AM							
	No Build				Build			
Direction	NB Left	SB Left	EB Left	WB Left	NB Left	SB Left	EB Left	WB Left
Volume	164	77	323	19	164	77	323	19
Lanemage								
95th Percentile Queue (ft)	180	222	588	50	162	572	1000	55
Average Queue (ft)	85	89	284	18	82	96	968	24
Left Turn Lane LOS	F	F	F	F	F	F	F	F
Approach LOS (Through Movements)	C	F	F	E	B	F	F	E
Approach Delay (Turn Movements)	112.5	122.2	100.3	83.5	101.4	82.7	108.3	85.3

Six Forks Road & Lassiter Mill Road	PM							
	No Build				Build			
Direction	NB Left	SB Left	EB Left	WB Left	NB Left	SB Left	EB Left	WB Left
Volume	352	42	766	49	352	42	766	49
Lanemage								
95th Percentile Queue (ft)	250	149	898	128	188	241	895	139
Average Queue (ft)	146	40	825	71	125	50	828	50
Left Turn Lane LOS	F	F	F	F	F	F	F	F
Approach LOS (Through Movements)	F	F	F	F	E	F	F	F
Approach Delay (Turn Movements)	161.1	90.7	355.7	115.6	136.7	99.3	194	113.2

Future Year 2035 Left-Turn Performance

Lynn ⤴ Millbrook ⤴ Lassiter Mill ⤴

Preliminary Six Forks Corridor Average and 95th Percentile Left-Turn Lane Queuing

2035 Average Queuing Length

2035 95th Percentile Queuing Length

AM / PM Future Year 2035 Overall Intersection Level of Service

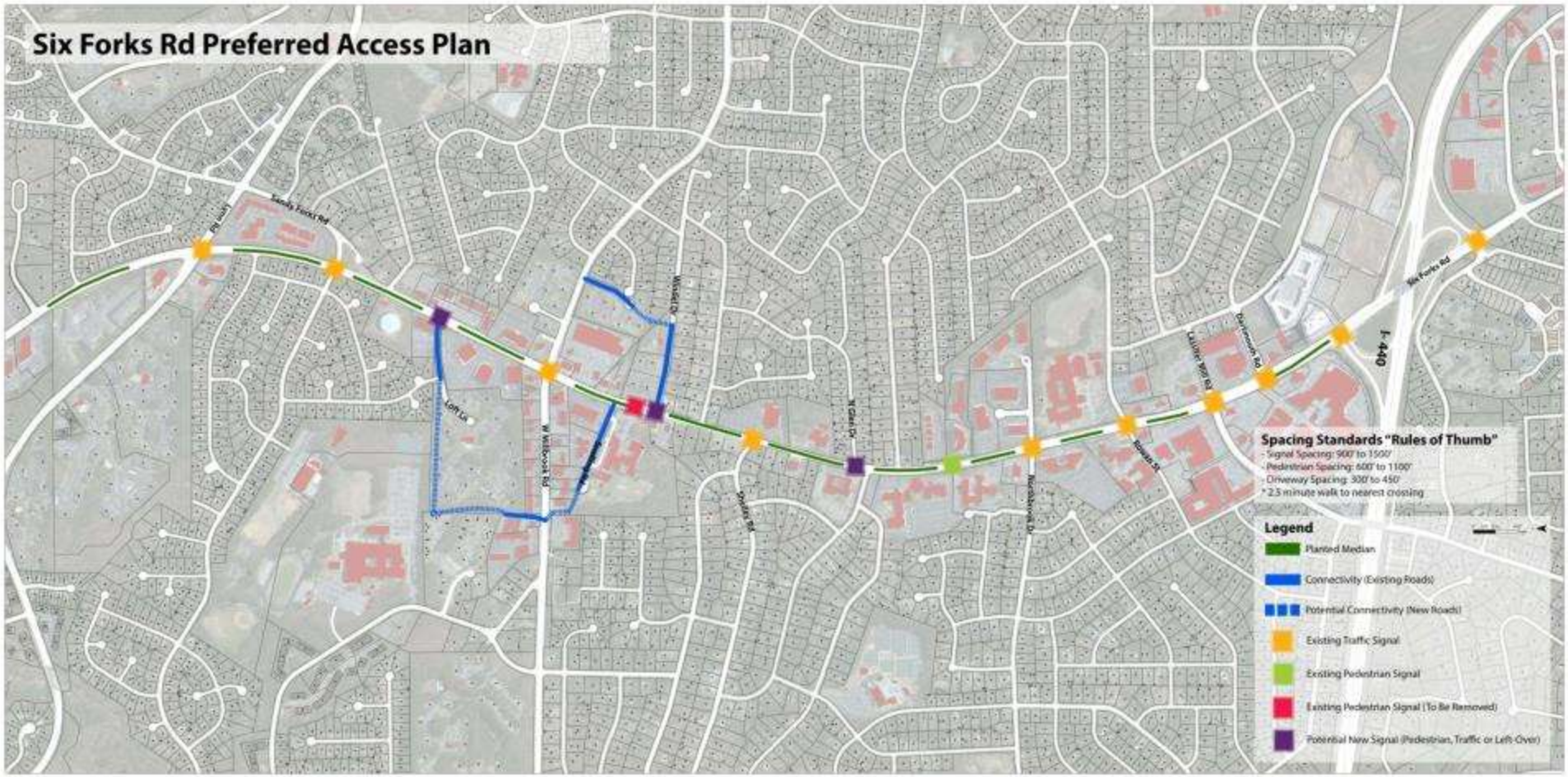
Raleigh Roads

Building Footprints

Updated on: 11/20/2014

0 450 900 1,800 Feet

How does it all work together?



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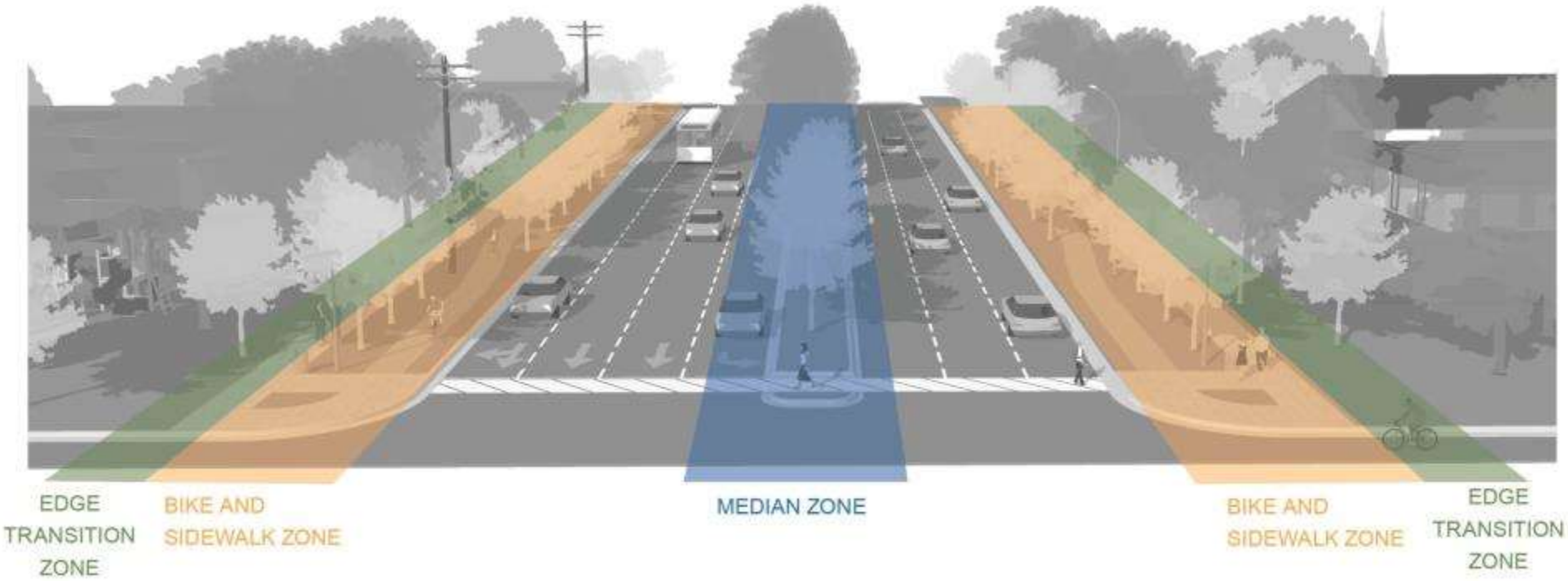
Corridor Transition



DesignWorkshop/Raleigh Urban Design Center

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Corridor Cross-Section

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Bicycle/Pedestrian

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Intersection Treatments

Major Intersections

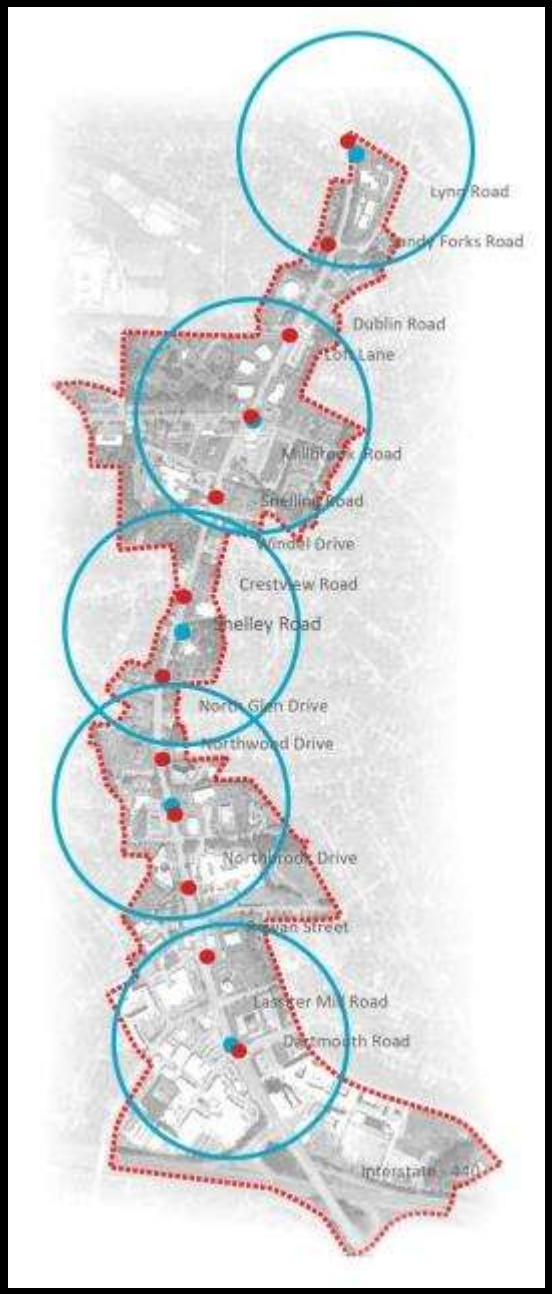
Minor Cross Streets

Consultants Got Principles.

And not just the kind found at the top of an organization chart

High Priority Transit Corridor

- ✓ ¼-mile to a safe pedestrian crossing
- ✓ ½-mile to a high-quality transit stop



Furnishings, Public Art, Streetscape

LID & Stormwater BMPs

Example: Honore Avenue, Sarasota, FL (2012)

- Two-Lane vs. Four-Lane
- Limited ROW
- Needed better connections to school and parks
- What to do with the water?
- Save the Trees!

Context-sensitive design saves mature trees and enhances aesthetics.

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The Idea Behind Stormwater

Measuring Success

- 3X the area for bikes, pedestrians and streetscape
- Consistent lanes, with only a 26% increase in asphalt roadway paving
- 10 new high quality bus shelters
- 52 high visibility crosswalks
- Over 4 miles of grade separated bike lanes
- Over 4 miles of new wider sidewalks
- Almost 8 million gallons of water quality treatment
- Locations for over 700 canopy and flowering trees
- Over 3 acres of planted medians
- Plans for 10 neighborhood gateways
- **Measurable increase in LOS for cars, bikes, pedestrian and transit**

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Nothing like a great example!

Route 9A – West Side Manhattan
Calgary Cycle Track
Edmonton CS Design Guidelines

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Complete Retrofit

- Elevated freeway
- Transformed into an active Complete Street Boulevard

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The Original West Side Highway

Post Highway Collapse

At-grade interim solution

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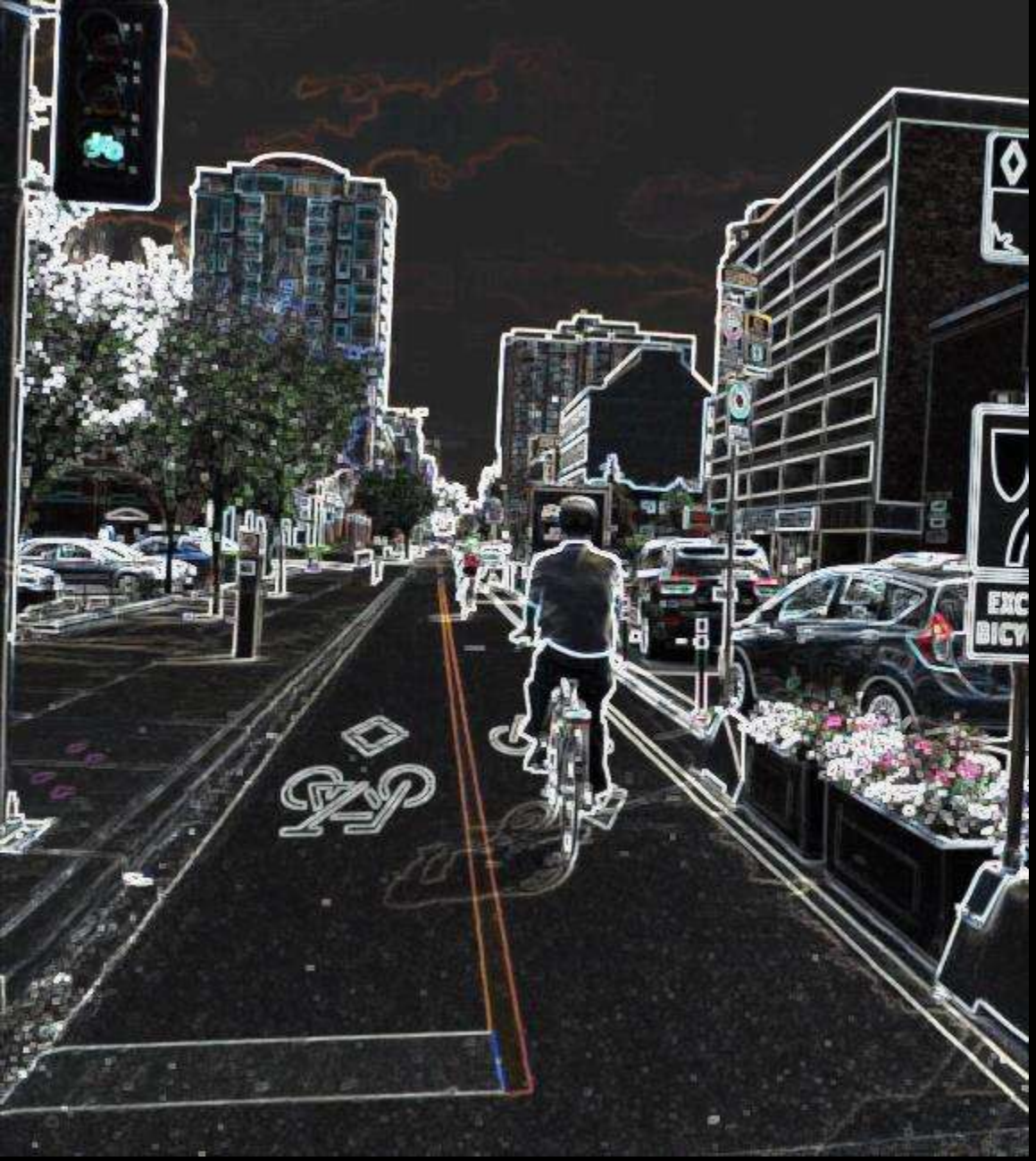
West Side Highway Southern Terminus



Calgary Cycle Track

- 1.5 year pilot project
- $ 5.5M capital cost
- 2 years from award of planning study to opening of the network

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N
Memorial Dr NW
Bow River
10 St NW
9A St NW
7 St NW
3 Ave SW
4 Ave SW
5 Ave SW
7 Ave SW
9 Ave SW
10 Ave SW
11 Ave SW
15 Ave SW
17 Ave SW
14 St SW
8 St SW
7 St SW
4 St SW
3 St SW
2 St SW
1 St SW
Centre St S
Macleod Trail SE
Riverfront Ave SE
4 Ave SE
5 Ave SE
6 Ave SE
10 Ave SE
4 St SE
Memorial Dr NE
4 St NE
Edmonton Trail NE
Elbow River
1
2
3
3
4
LEGEND
1 New cycle track on 5 Street SW
2 New cycle track on 12 Avenue
3 New cycle track on 8/9 Avenue
4 Shared space on Stephen Avenue
Existing cycle track
Existing supporting bikeway
Potential supporting bikeway
Regional pathway
C-train

80

Presentations in one year to plan the network with stakeholders

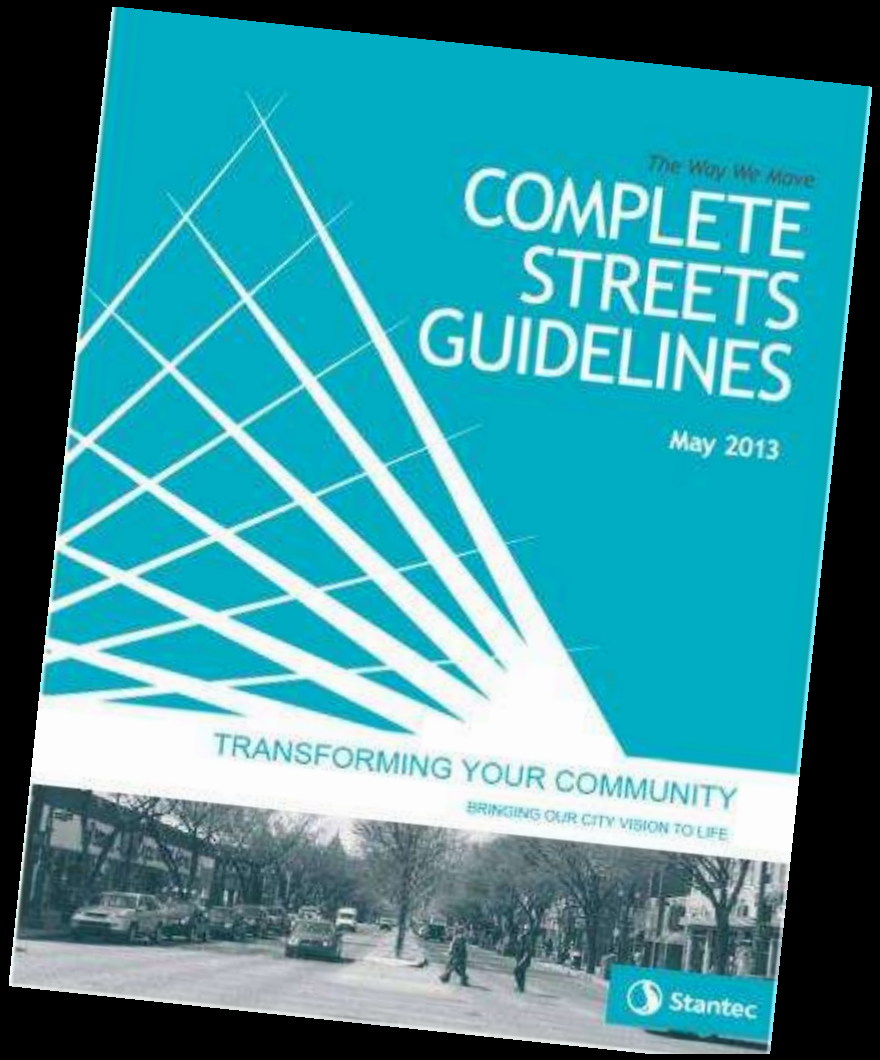
Three different bicycle treatments to create a network using four downtown streets

Two-way cycle track on a Two-way street

One-way cycle tracks on a Two-way street

Integration of slow moving bicycles on a pedestrian street

Edmonton Complete Streets Guidelines



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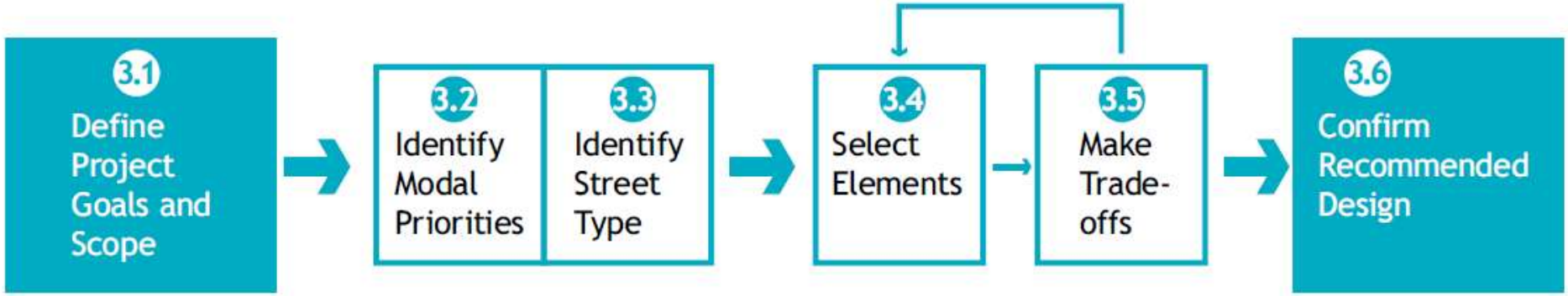
Complete Street Process

Alignment with Complete Streets Principles

Broad Parameters

Specifics

Final Check Back



Process Flowchart

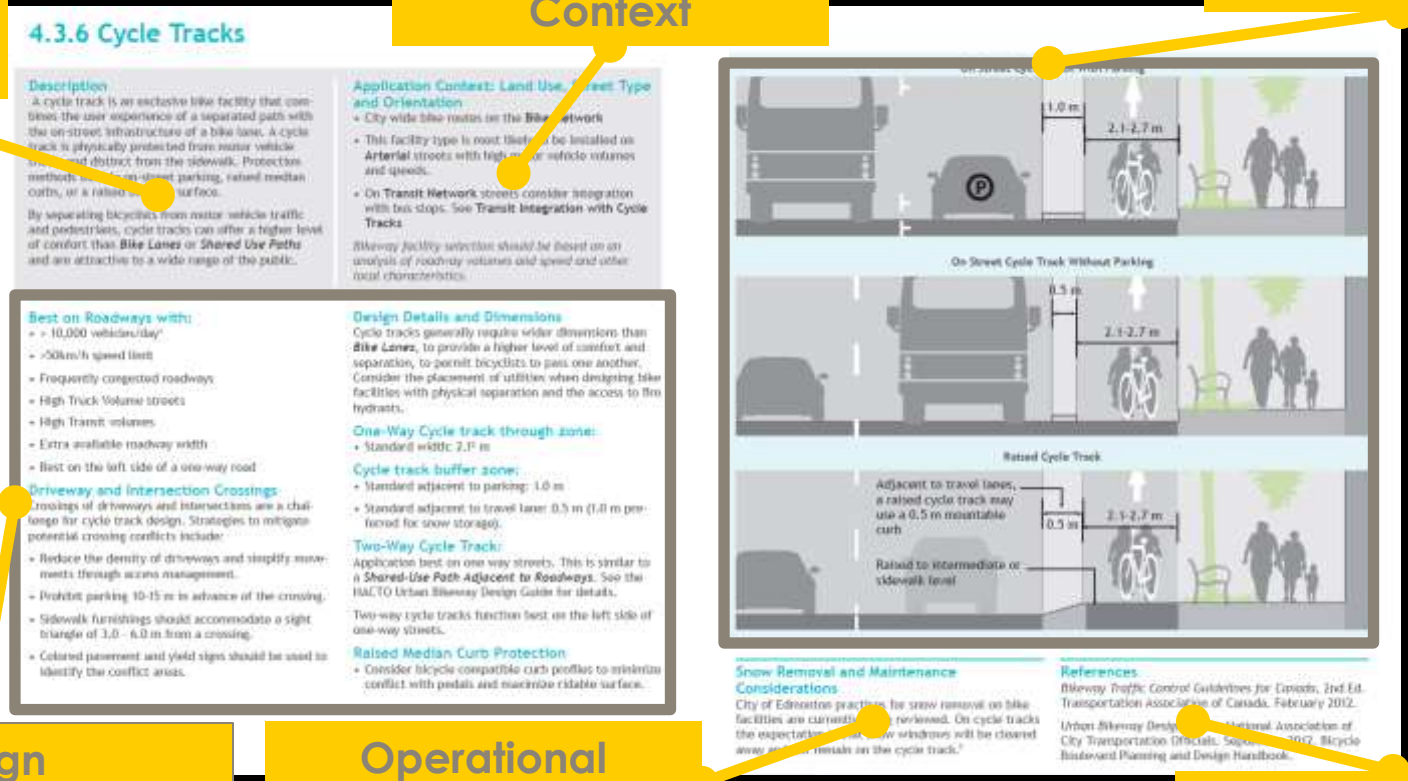
Edmonton Complete Streets Guidelines

Evidence-based design tailored to local conditions

Element Description

Application Context

Cross-sections



4.3.6 Cycle Tracks

Description

A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a bike lane. A cycle track is physically protected from motor vehicle traffic and distinct from the sidewalk. Protection methods include on-street parking, raised median curbs, or a raised bike surface.

By separating bicyclists from motor vehicle traffic and pedestrians, cycle tracks can offer a higher level of comfort than **Bike Lanes** or ***Shared Use Paths*** and are attractive to a wide range of the public.

Application Context: Land Use, Street Type and Orientation

- City wide bike routes on the **Bike Network**
- This facility type is most likely to be installed on **Arterial** streets with high motor vehicle volumes and speeds.
- On **Transit Network** streets consider integration with bus stops. See **Transit Integration with Cycle Tracks**

Bikeway facility selection should be based on an analysis of roadway volumes and speed and other local characteristics.

Best on Roadways with:

- > 10,000 vehicles/day*
- >50km/h speed limit
- Frequently congested roadways
- High Truck Volume streets
- High Transit volumes
- Extra available roadway width
- Best on the left side of a one-way road

Driveway and Intersection Crossings

Crossings of driveways and intersections are a challenge for cycle track design. Strategies to mitigate potential crossing conflicts include:

- Reduce the density of driveways and simplify movements through access management.
- Prohibit parking 10-15 m in advance of the crossing.
- Sidewalk furnishings should accommodate a sight triangle of 3.0 – 6.0 m from a crossing.
- Colored pavement and yield signs should be used to identify the conflict areas.

Design Details and Dimensions

Cycle tracks generally require wider dimensions than **Bike Lanes**, to provide a higher level of comfort and separation, to permit bicyclists to pass one another. Consider the placement of utilities when designing bike facilities with physical separation and the access to fire hydrants.

One-Way Cycle track through zone:

- Standard width: 2.1 m

Cycle track buffer zone:

- Standard adjacent to parking: 1.0 m
- Standard adjacent to travel lane: 0.5 m (1.0 m preferred for snow storage).

Two-Way Cycle Track:

Application best on one way streets. This is similar to a ***Shared-Use Path Adjacent to Roadways***. See the IMCTO Urban Bikeway Design Guide for details.

Two-way cycle tracks function best on the left side of one-way streets.

Raised Median Curb Protection

- Consider bicycle compatible curb profiles to minimize conflict with pedals and maximize ridable surface.

Snow Removal and Maintenance Considerations

City of Edmonton practices for snow removal on bike facilities are currently being reviewed. On cycle tracks the expectation is that snow windrows will be cleared away and remain on the cycle track.[1]

References

Bikeway Traffic Control Guidelines for Canada, 2nd Ed. Transportation Association of Canada. February 2012.

Urban Bikeway Design Guide. National Association of City Transportation Officials. Sept. 2012. Bicycle Boulevard Planning and Design Handbook.

Design Considerations/Details

Operational Considerations

References

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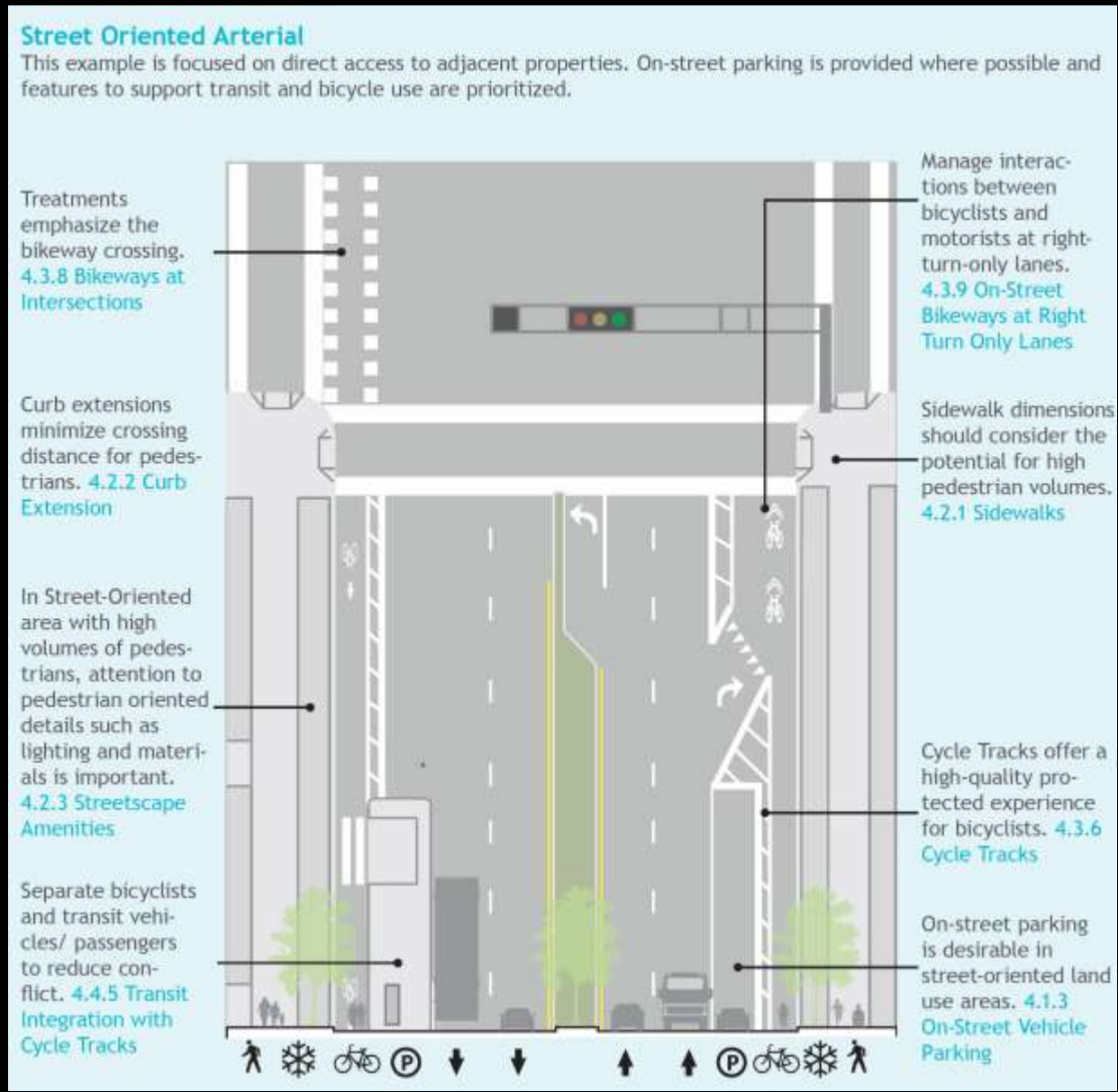
Edmonton Complete Streets Guidelines

Pulling it all together: Making it easy to use



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Final Thoughts…

- Measure your success!
- It's a process, not a product
- Context defined
- Prioritize modes
- There's always tradeoffs
- Design exceptions
- Measure your success!

Platinum Partner
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Just Waiting for a Call…

(Thank You!)

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