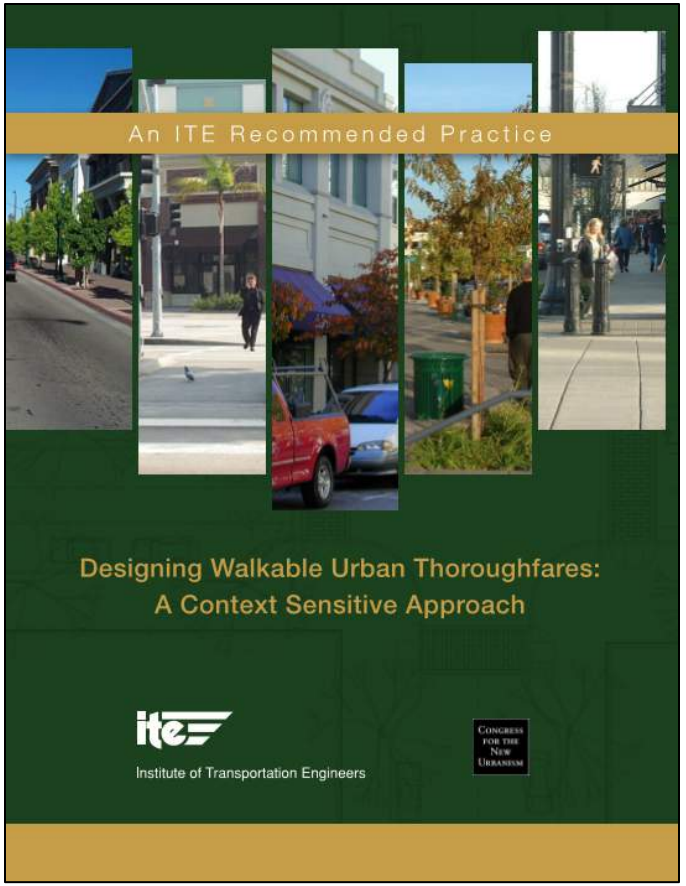
Project Background

- Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (2010)
- Produced by FHWA/EPA/CNU/ITE
- Recommended Practice, focus on new ideas and needs

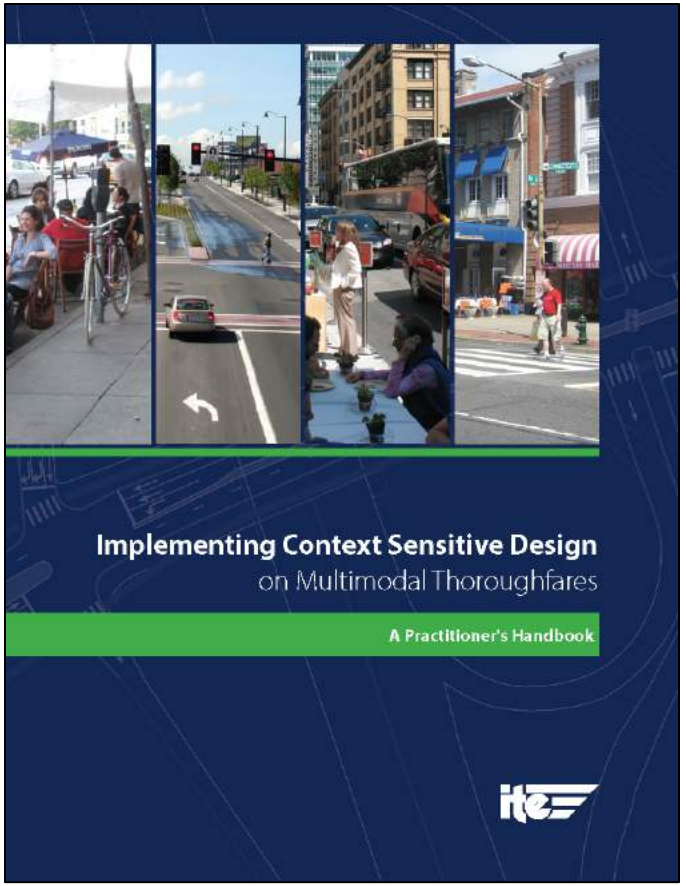


Limitations

- 2010 vs. 2017 → Differences in understanding CSS and Complete Streets
- Some difficulty adapting recommended practices to local contexts
- RP focus on design, less so on policy and process
- Lack of strong guidance for suburban-type areas

This Publication

- Implementing Context Sensitive Design on Multimodal Corridors: A Practitioner's Handbook
- Produced by FHWA/ITE
- Informational Report, focus on adapting to new information and audiences



Project Goals

- User-friendly, graphically-rich application guide
- Expand and enhance the content of the ITE RP and the NACTO Guide through case studies
- Demonstrate successful practical applications
- Solutions with multimodal focus (ped, bike, freight)

Content Development and Review

- Technical Editor: Nelson\Nygaard
- Case Studies: CNU
- FHWA Office of Planning, Environment, Realty
- 30+ Subject Matter Experts

- AASHTO
- AMPO
- ITE Complete Streets Council
- ABPB
- US Access Board
- Smart Growth America
- Independent Truckers (OOIDA)
- Development and Land Use (NADO)
- Freight & Research Communities

Reception and Feedback

- Launch webinar in November 2017
- FHWA dissemination and promotion
- Over 700 copies downloaded since launch
- Positive feedback, innovation with “mature” case studies

Managing Transition

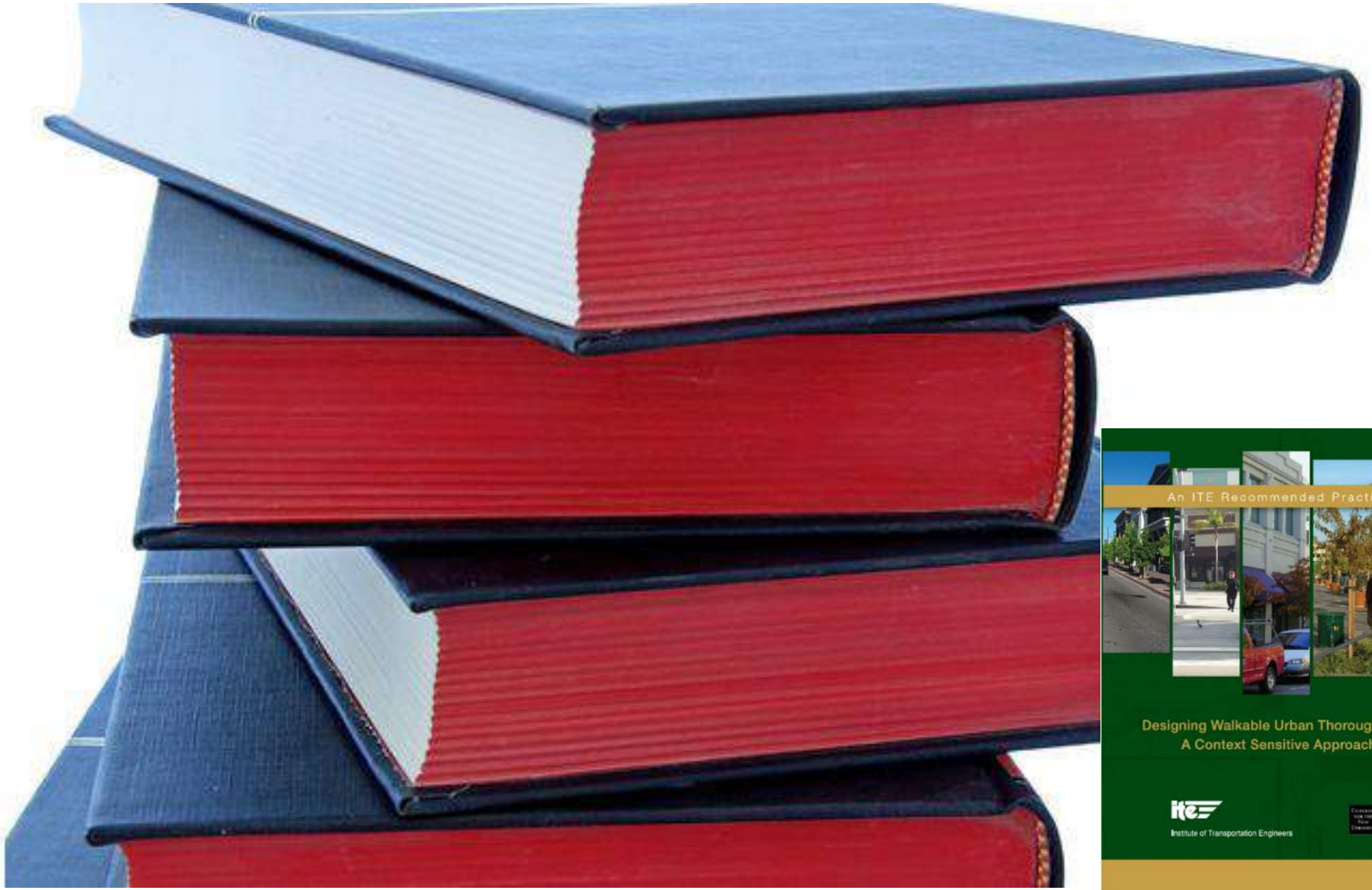
A Practitioner's Guide to Multimodal Thoroughfare Design

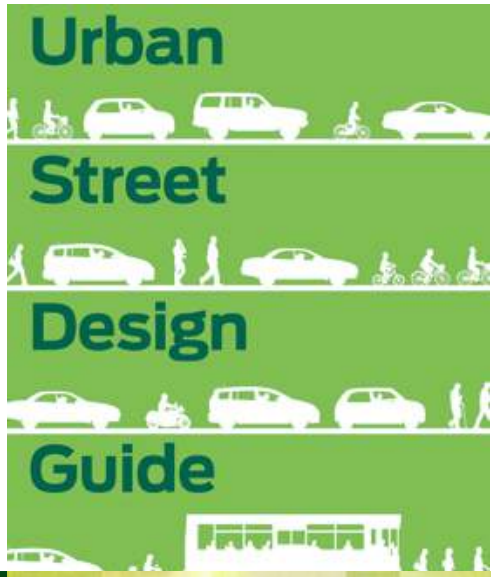
December 11, 2018

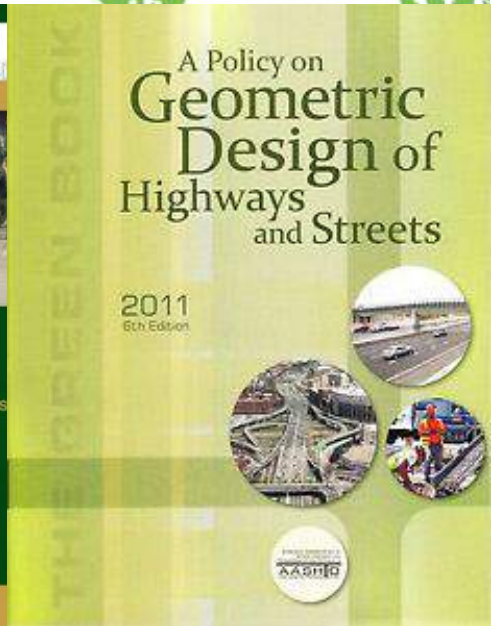
@CompleteStreets

Implementing Context Sensitive Design

Why Another Guide?





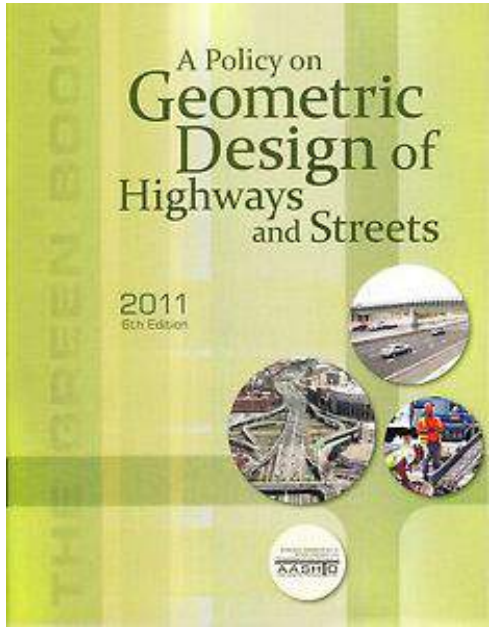


Strong, Clear Urban Guidance

Other Contexts Are Harder To Discern

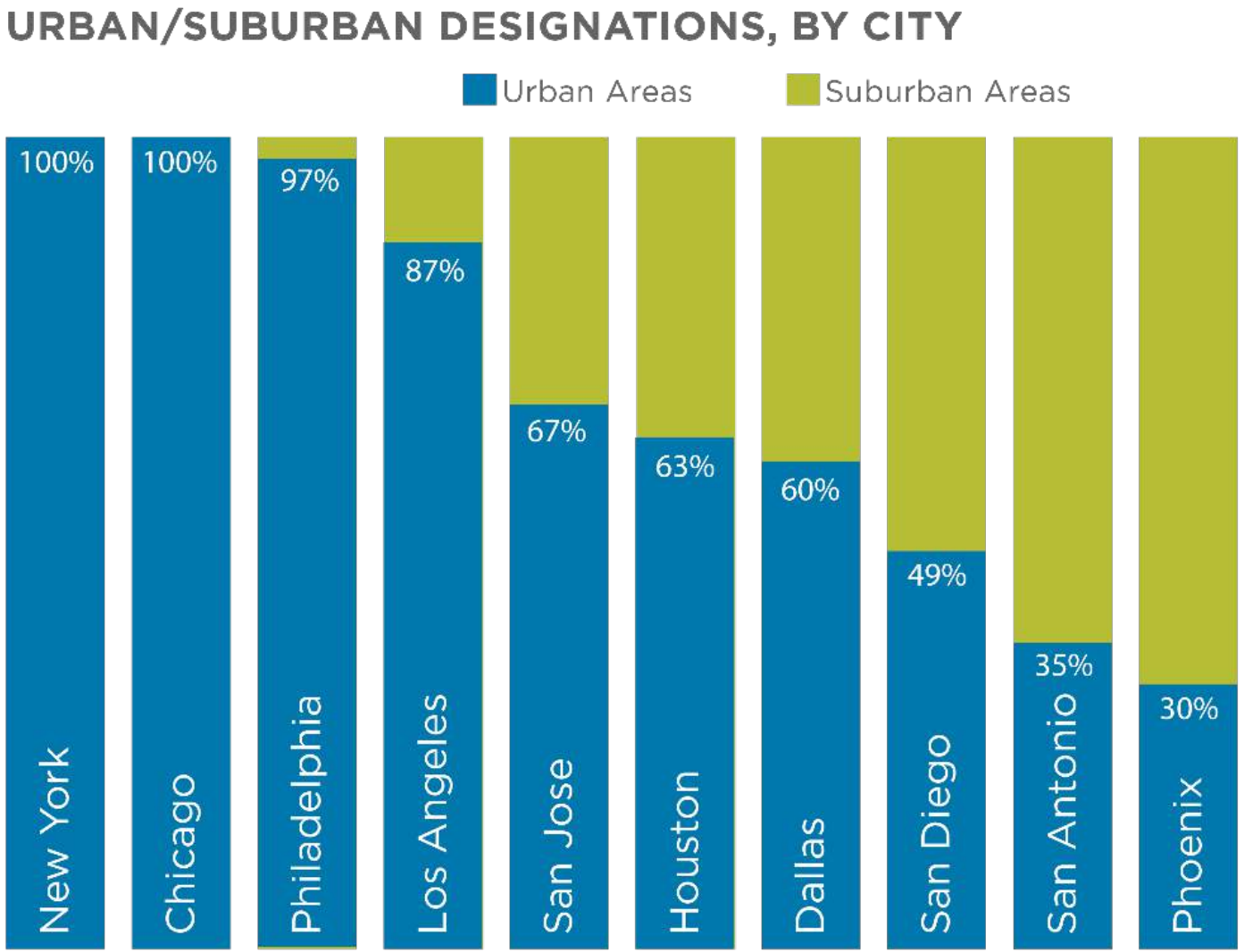
Things The Green Book Says:

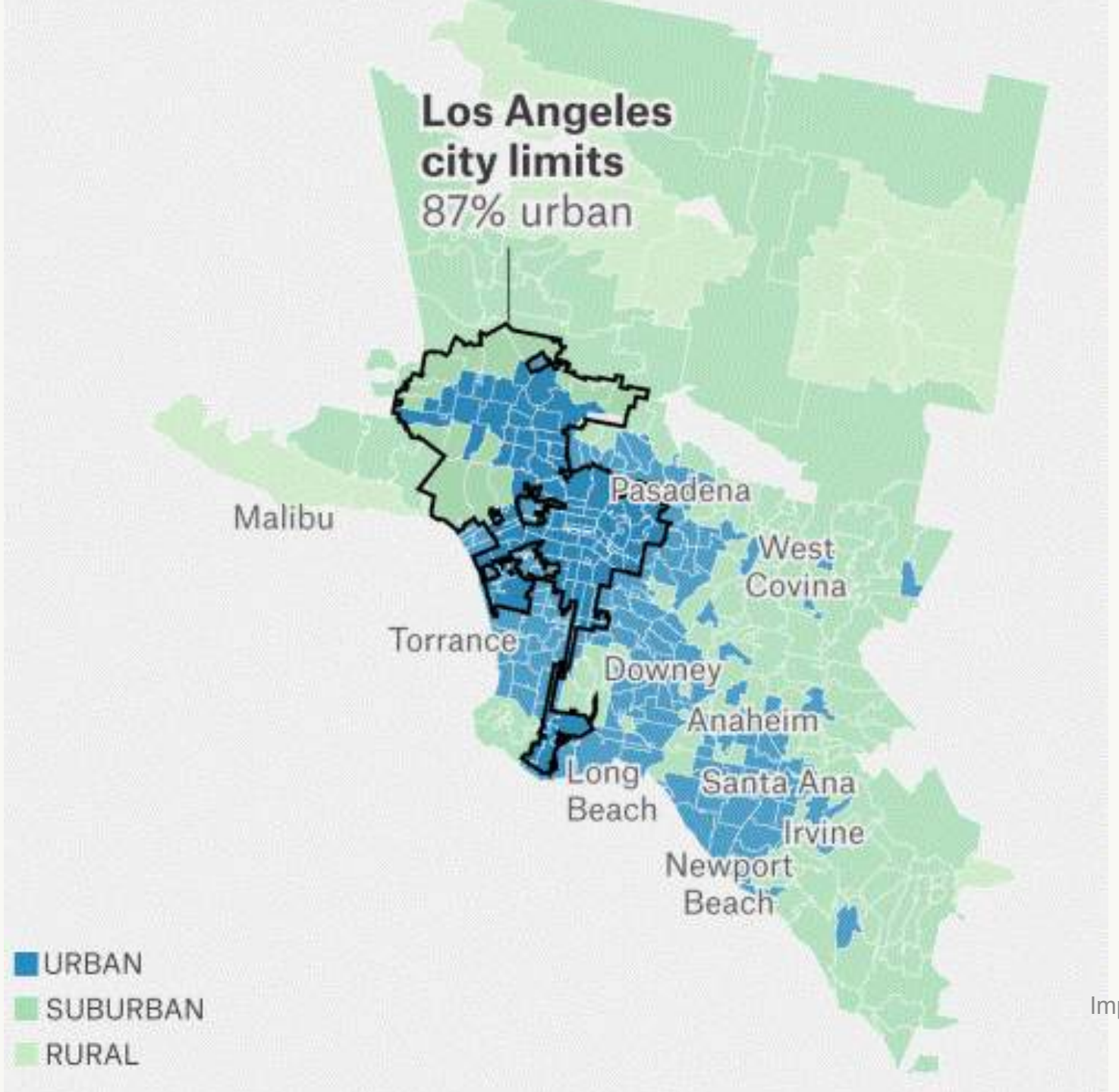
- Provisions should be made, because **pedestrians are the lifeblood** of our urban areas.
- There are **important differences between** the design criteria applicable to **low- and high-speed** designs.
- Use simple designs that **minimize crossing widths** and minimize the use of more complex elements such as channelization and separate turning lanes.
- On lower speed facilities, **use of above-minimum design criteria may encourage travel at speeds higher** than the design speed.



Our Communities Don’t Fit a Mold

53% of Americans describe where they live as suburban




Los Angeles city limits
87% urban
Malibu
Pasadena
West Covina
Torrance
Downey
Anaheim
Long Beach
Santa Ana
Irvine
Newport Beach
URBAN
SUBURBAN
RURAL

Places Are Not Static

Des Moines, Iowa

Design Process

1. Define Problem
2. Document Physical and Policy Context
3. Identify Process and Stakeholders
4. Analyze Collaboratively
5. Manage Communication

Design Process

1. Define Problem
2. Document Physical and Policy Context
3. Identify Process and Stakeholders

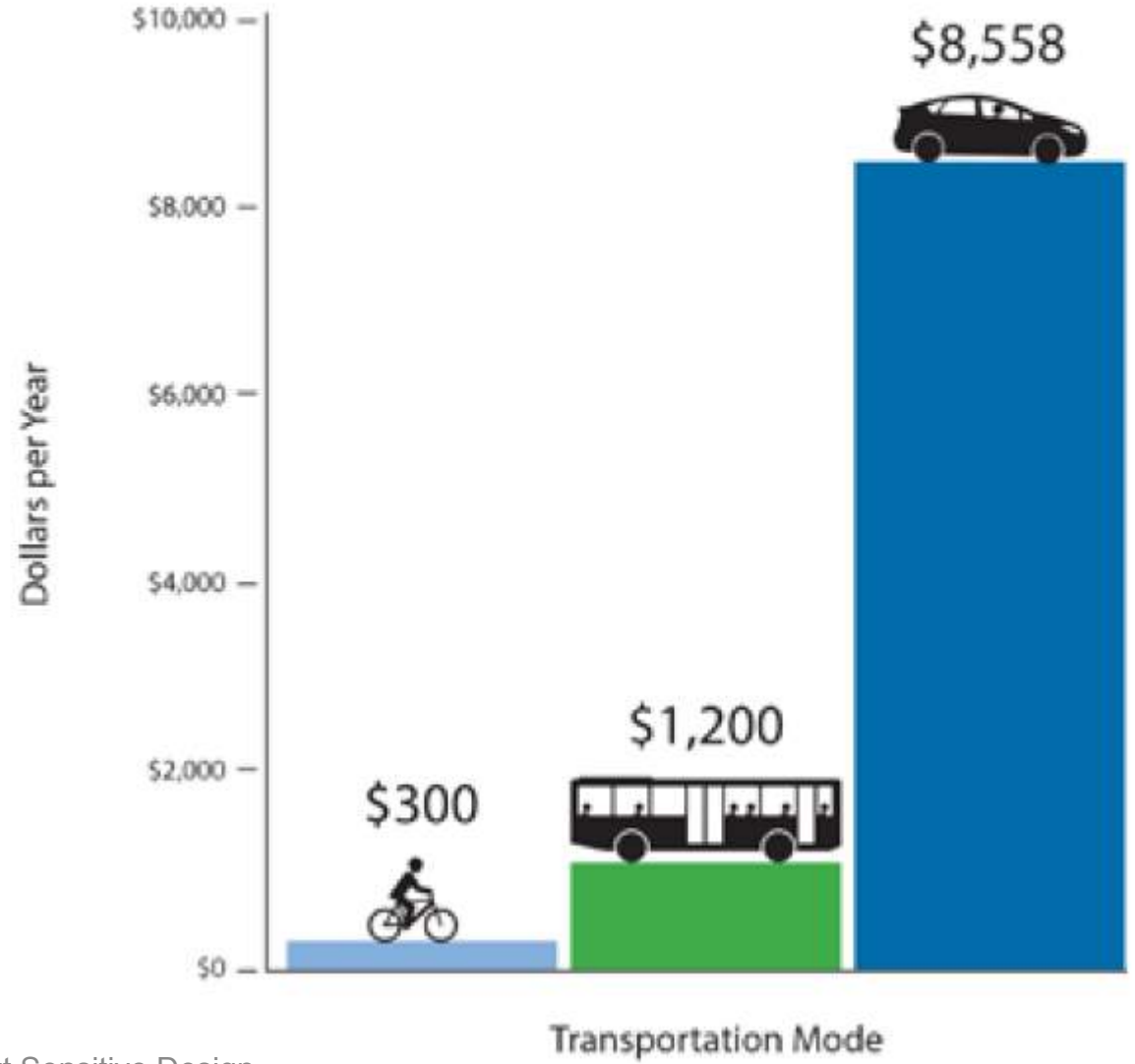
Pre-Design Activities

4. Analyze Collaboratively
5. Manage Communication

Part 1 - Pre-Design: Defining The Problem

Pounds of CO2 Per Person-Mile

Annual Transportation Cost by Mode



California's DOT Admits That More Roads Mean More Traffic

Take it from Caltrans: If you build highways, drivers will come.

ERIC JAFFE | @e_jaffe | Nov 11, 2015 | 331 Comments

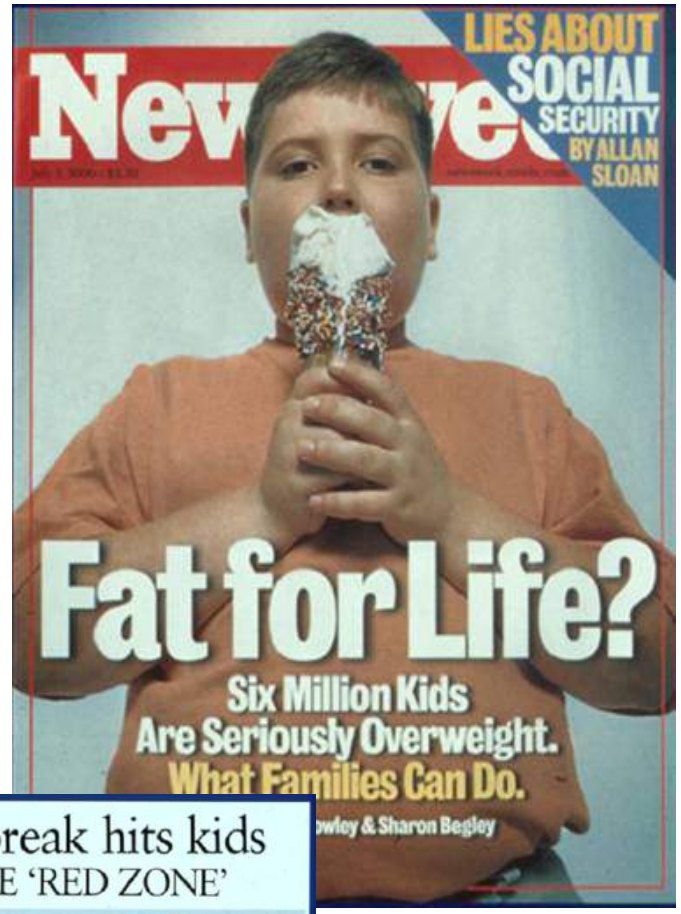
Share on Facebook Tweet

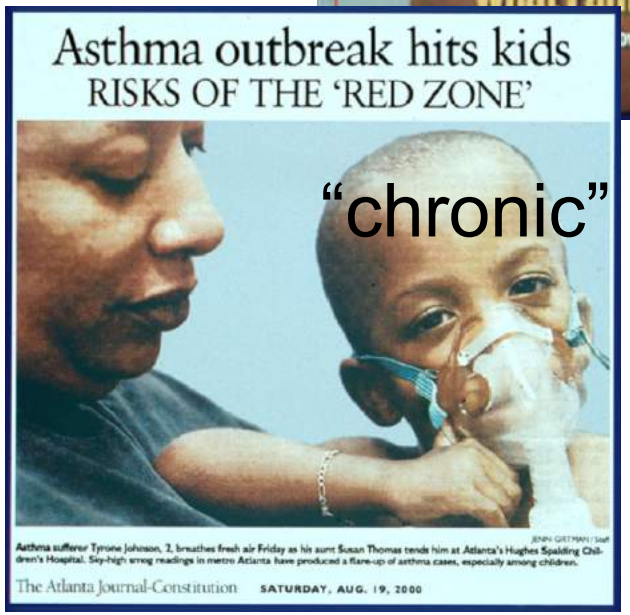
Results Over the Last 50 Years

1. Vehicle Miles of Travel (VMT) Growing Faster Than Population Growth
2. Longer Commute Times
3. Decreased Transit Ridership

Public Health Impacts

- Cardiovascular: Heart Attack
  Stroke
- Respiratory: Asthma
  Emphysema
- Weight Related: Diabetes II
  Heart Disease
- Environmental: Cancer & other diseases

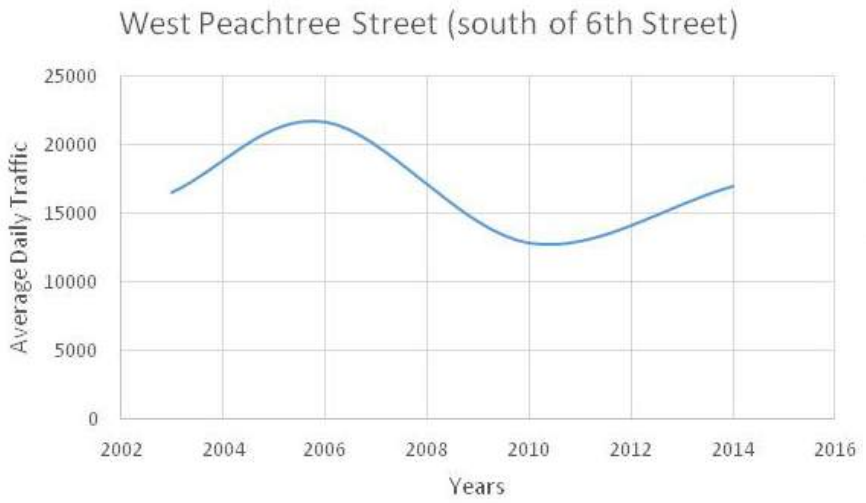


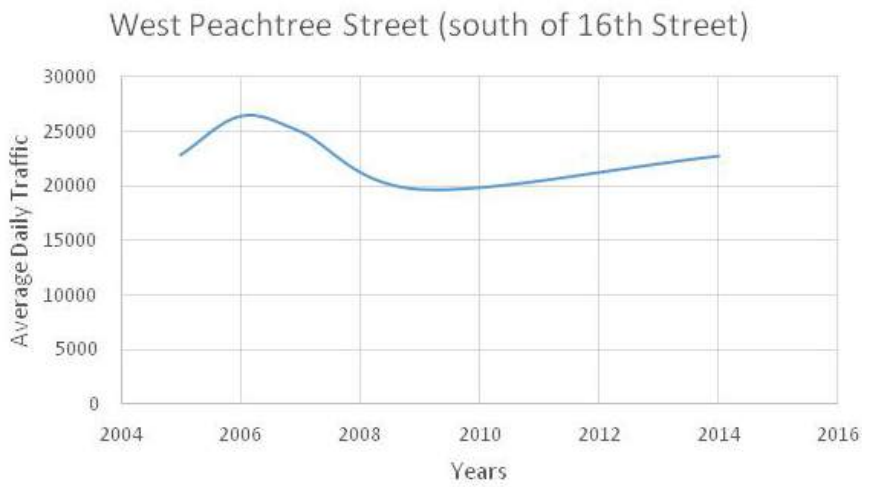


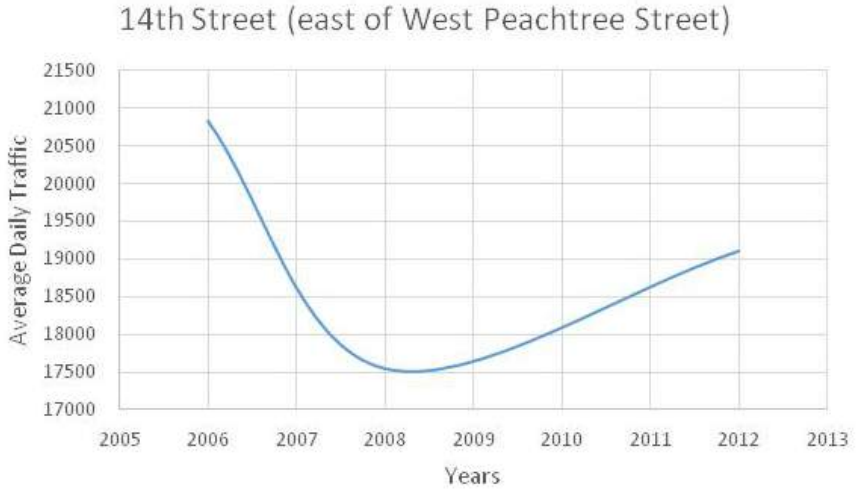
Pre-Design Decisions That Affect Outcomes

1. Traffic Growth Rate – Be Realistic…Don't Preclude Success

Measure, Don’t Just Project Traffic



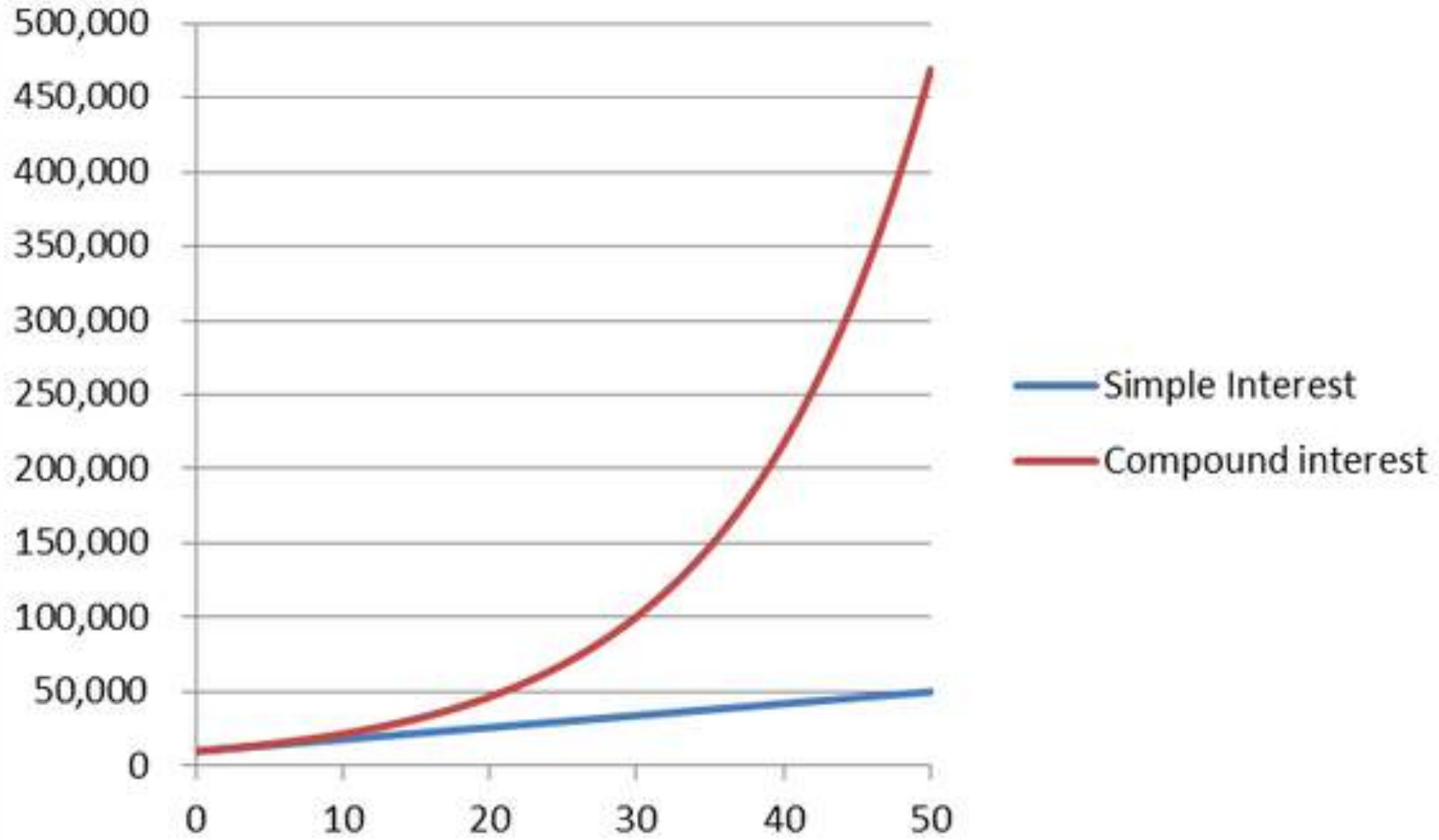




Pre-Design Decisions That Affect Outcomes

1. Traffic Growth Rate – Be Realistic…Don't Preclude Success
2. Planning Horizon – Select Thoughtfully

Pre-Design Decisions That Affect Outcomes



Pre-Design Decisions That Affect Outcomes

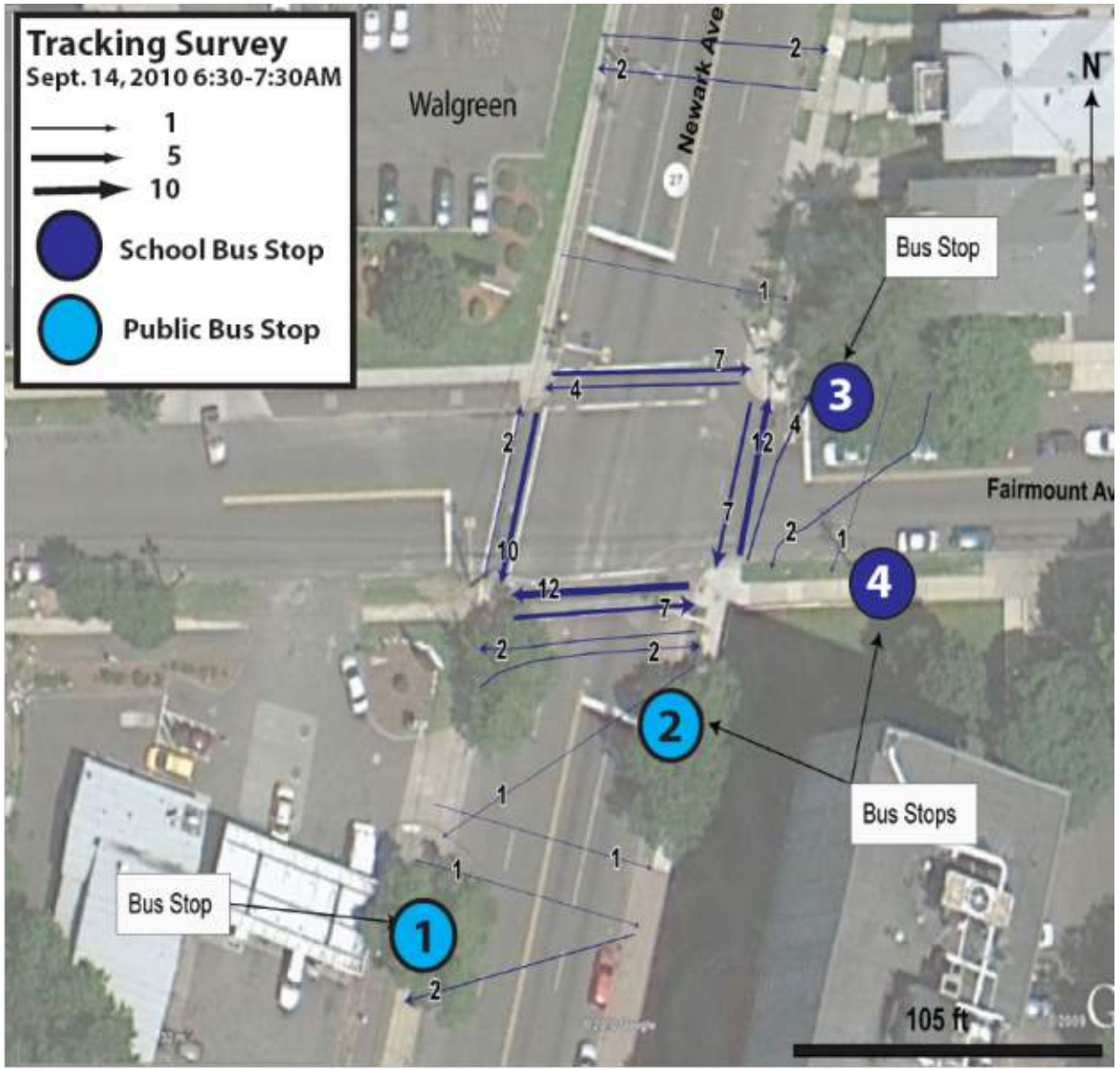
1. Traffic Growth Rate – Be Realistic…Don't Preclude Success
2. Planning Horizon – Select Thoughtfully
3. "Success" Metrics – Know Your Market
    1. Level of Service vs. Travel Time
    2. Auto-Only vs. Multi-Modal
    3. Traditional Analysis vs. Broadly-Focused

Level of Service A

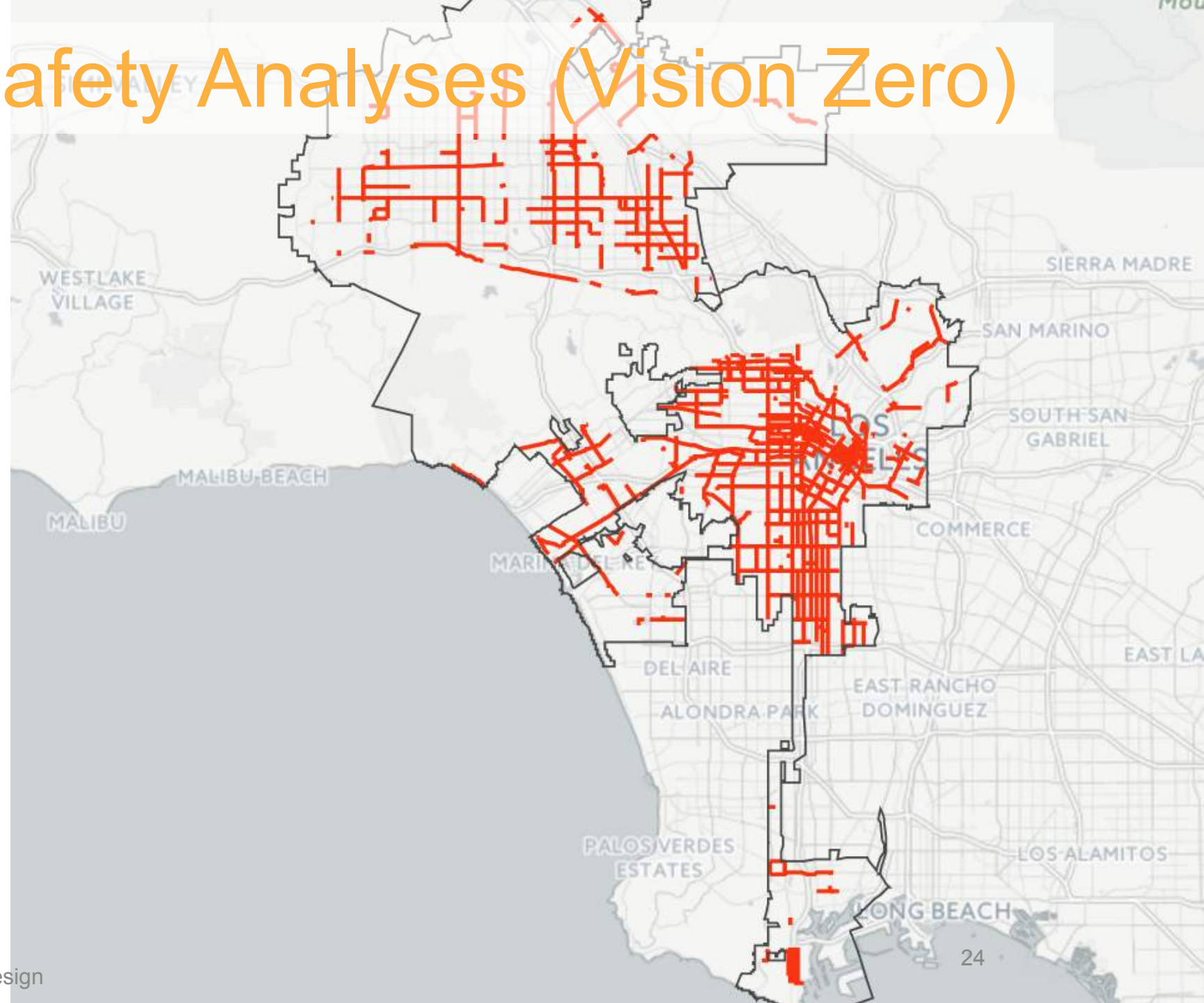
Level of Service F

San Francisco, CA

Strategy 1: Observation Studies



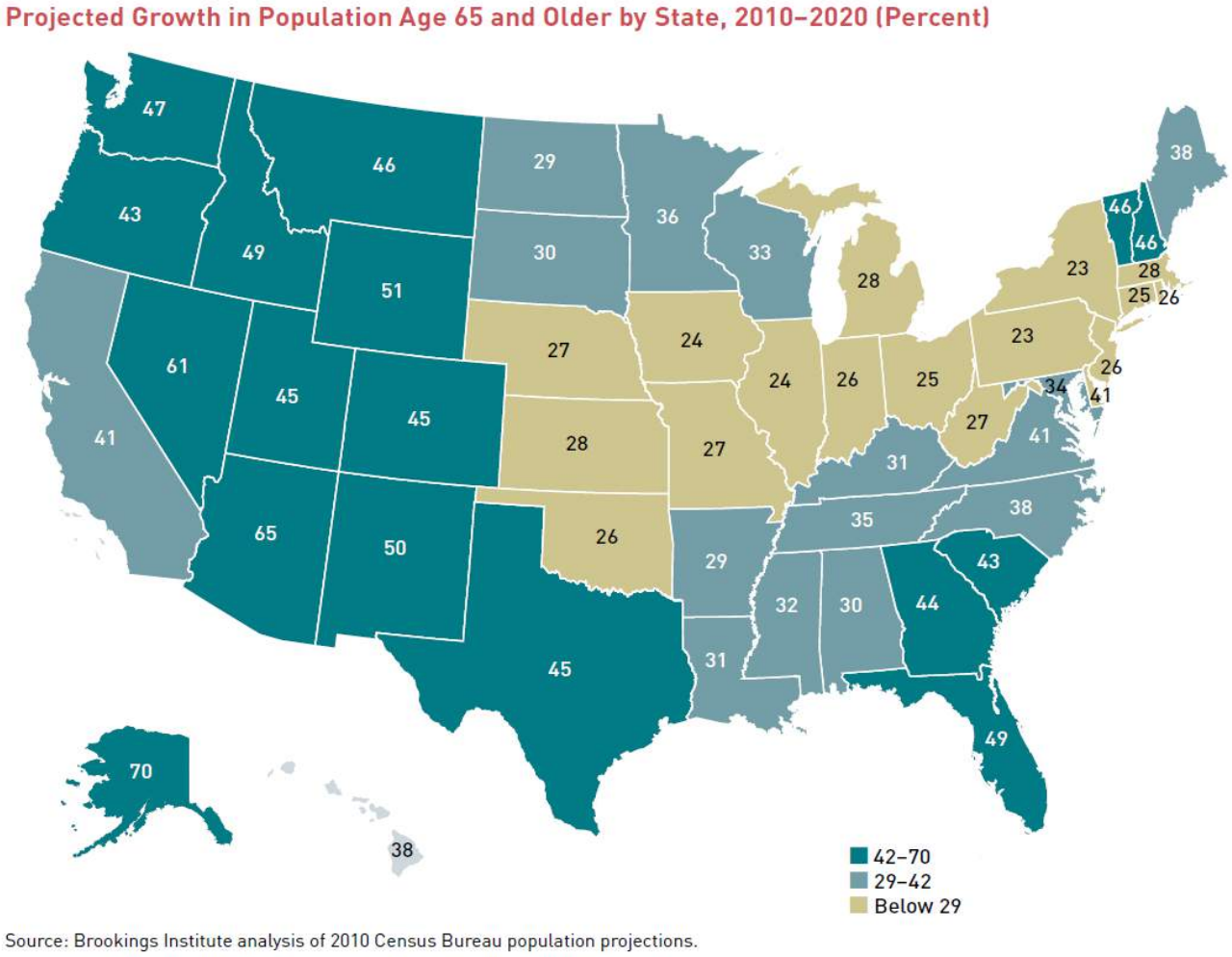
Strategy 2: Safety Analyses (Vision Zero)



Strategy 3: Future-Proofing

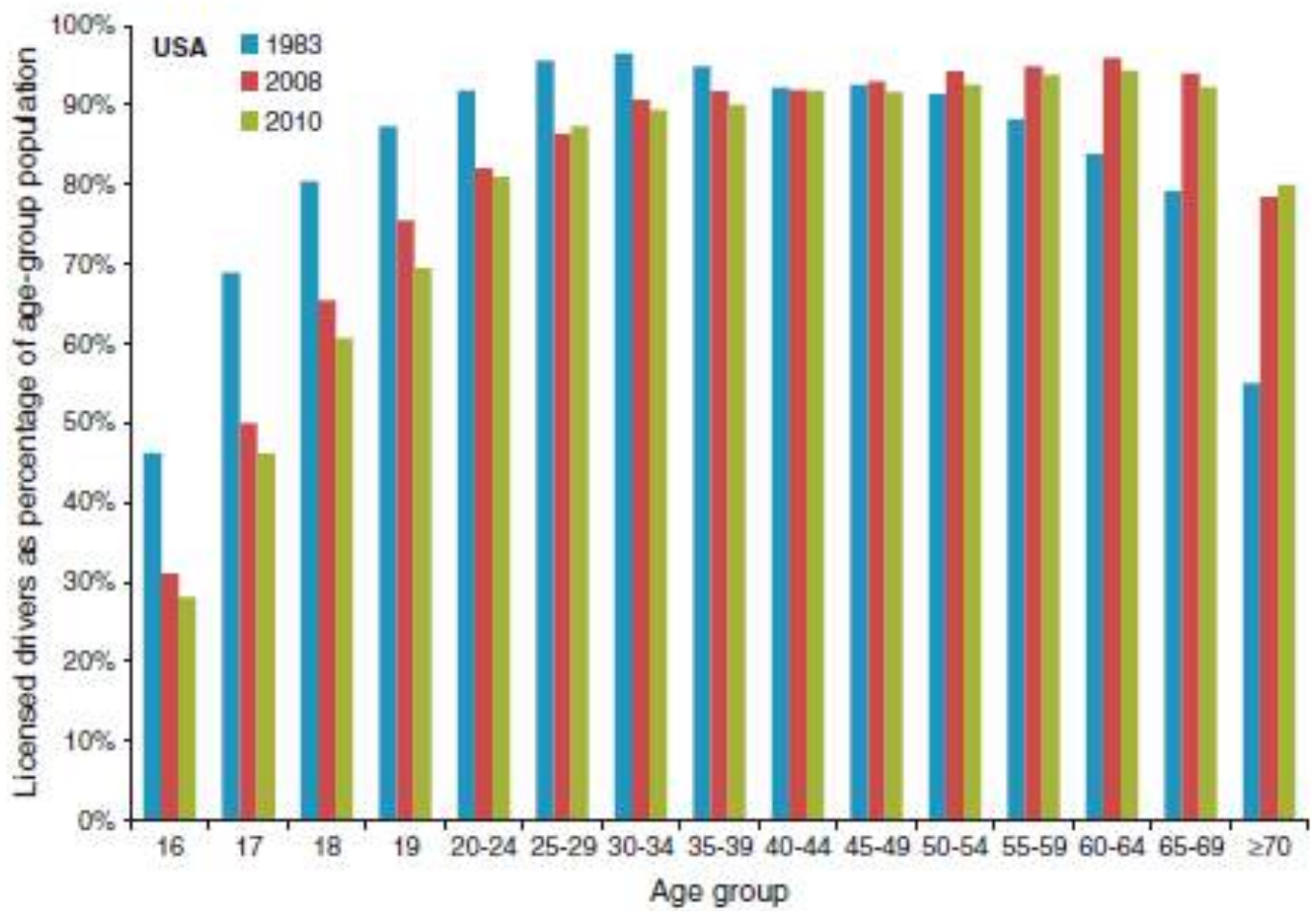
- Plan For Horizon Demographics

Baby Boomers



Source: Brookings Institute analysis of 2010 Census Bureau population projections.

Licensed Drivers by Age Group

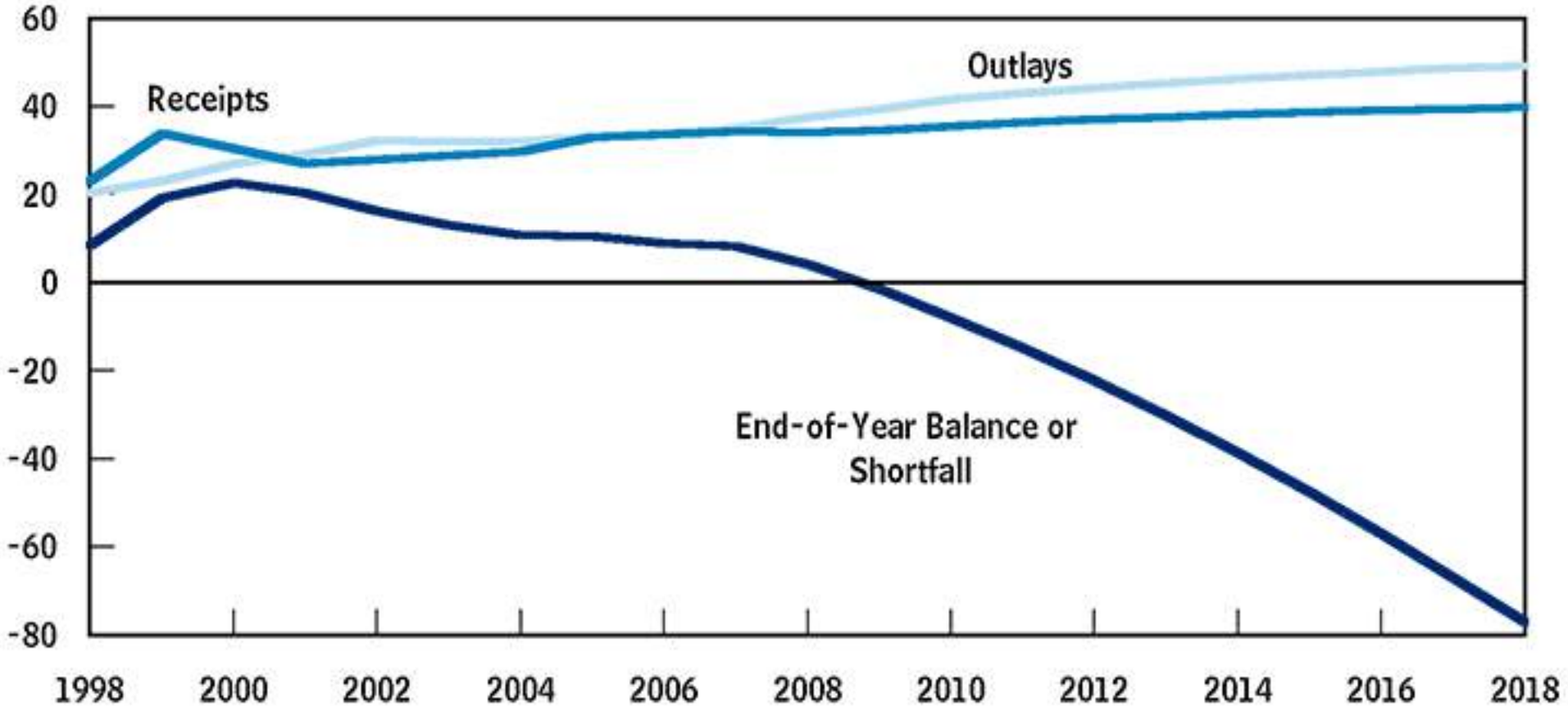


Source: Michael Sivaka & Brandon Schoettlea, "Update: Percentage of Young Persons With a Driver's License Continues to Drop." Traffic Injury Prevention, Volume 13, Issue 4, 2012. Page 341.

Strategy 3: Future-Proofing

- Plan For Horizon Demographics
- Be Realistic About Funding

Funding

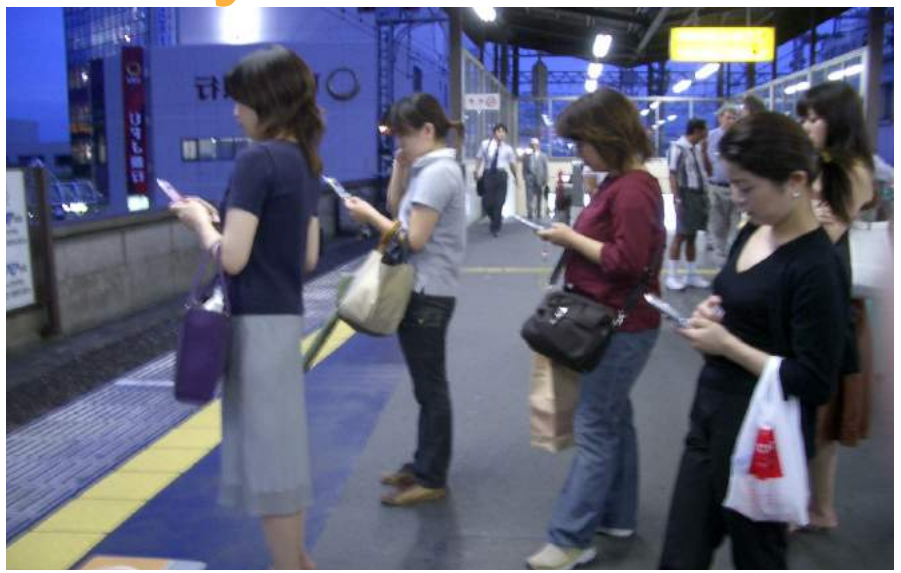

60
40
20
0
-20
-40
-60
-80
Receipts
Outlays
End-of-Year Balance or
Shortfall
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018

Strategy 3: Future-Proofing

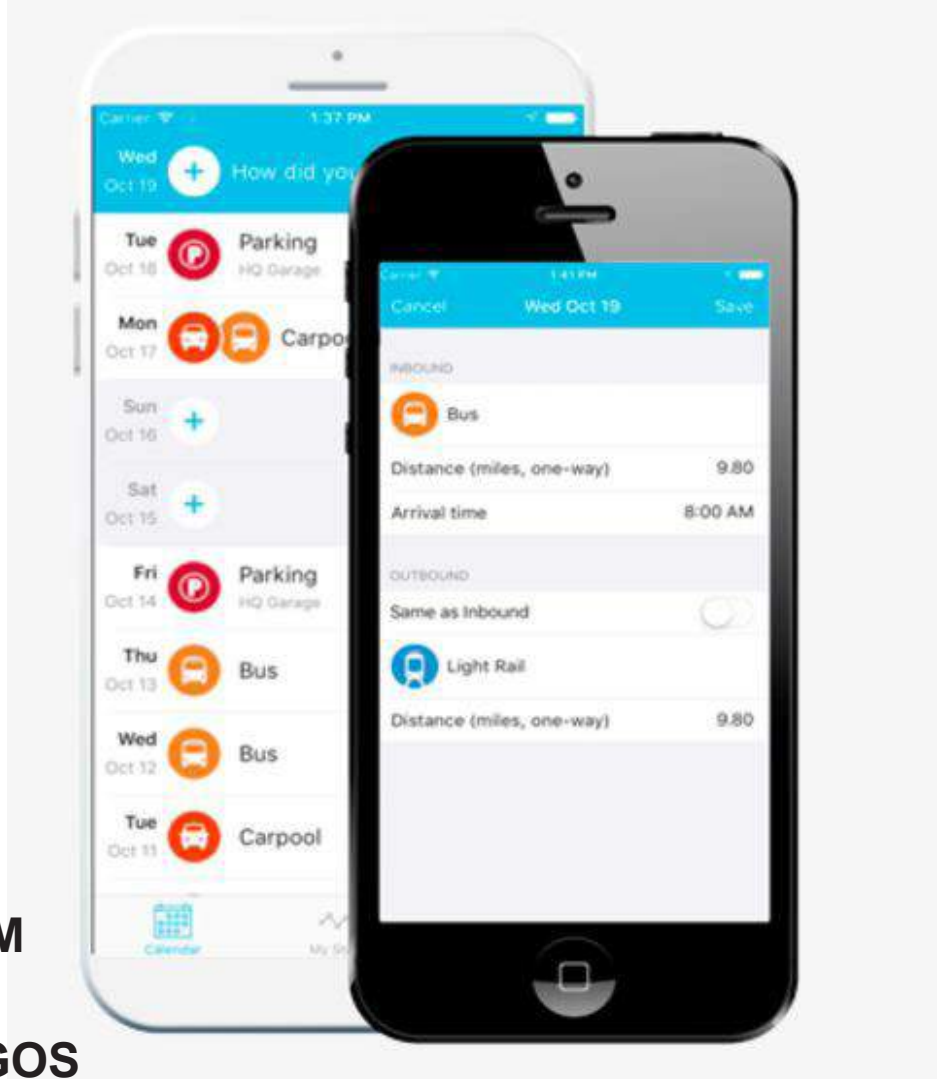
- Plan For Horizon Demographics
- Be Realistic About Funding
- Build In Autonomy Triggers

Driverless Cars

The Shift In Mobility

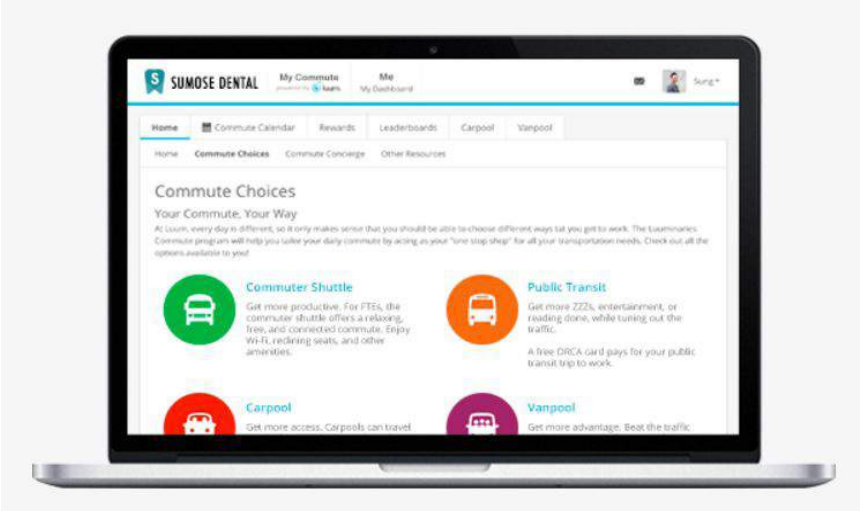


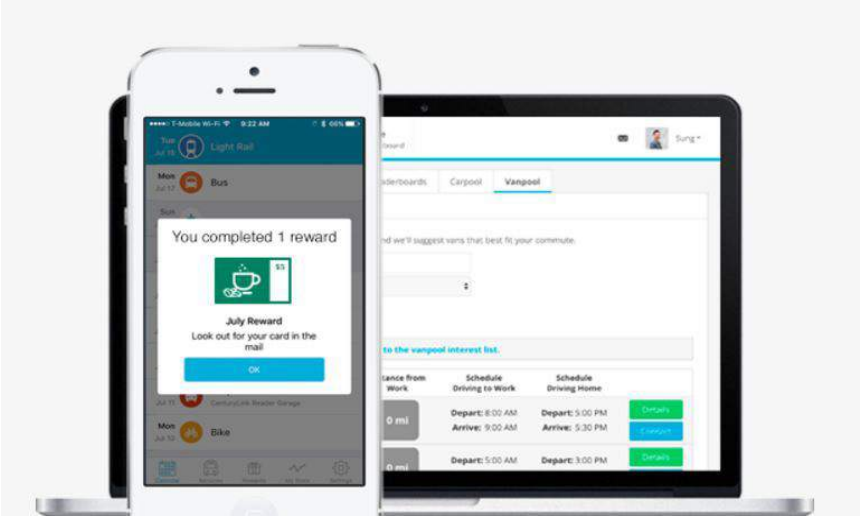
Transportation Management Platforms



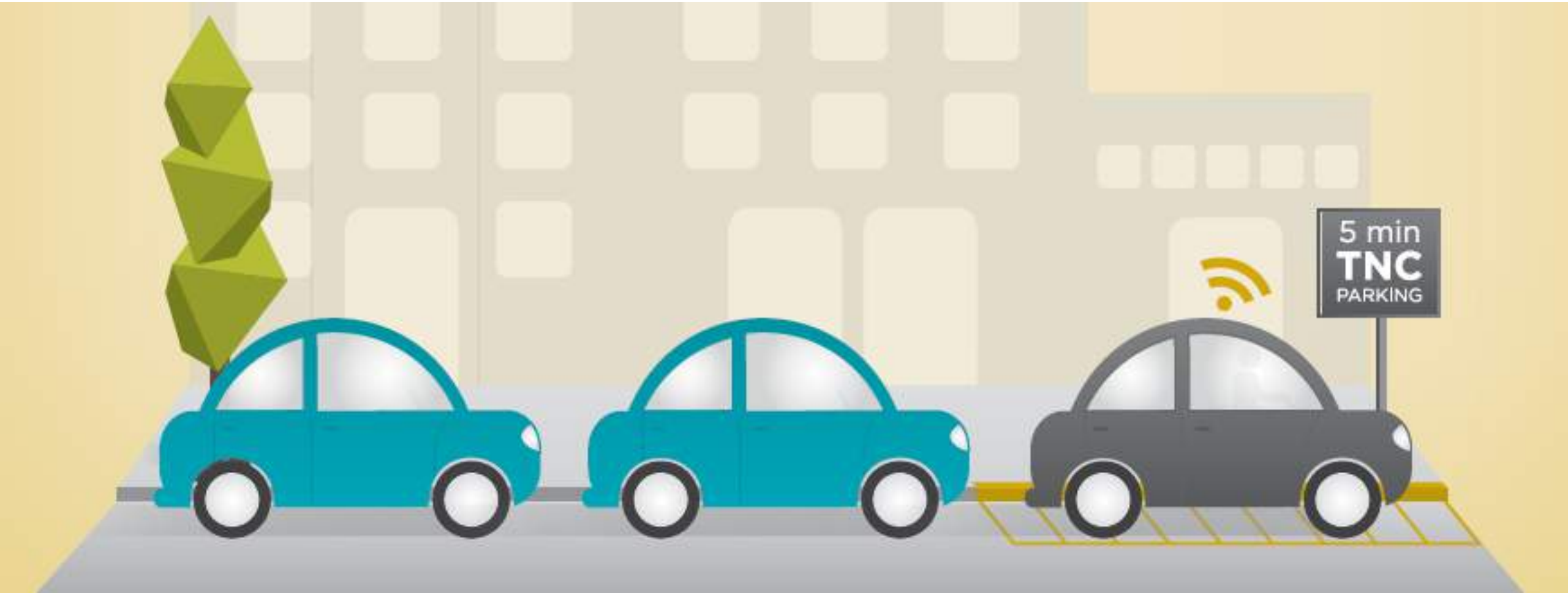
LUUM

RIDE AMIGOS





New Mobility Is About Curb Management



Part 2 - Modes and Networks – The Physical and Policy Context

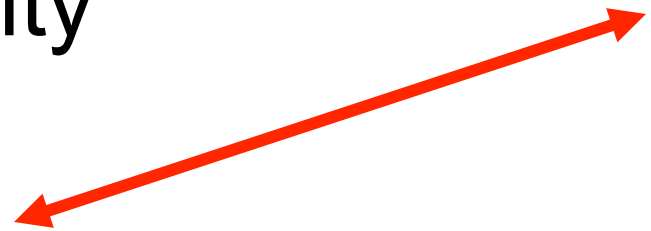
TRADE OFFS

Street Users

	Needs	Wants
Cars	Capacity	Speed
Peds	Safety	Comfort
Transit	Frequency	Reliability
Bikes	Space	Separation

Street Users

	Needs	Wants
Cars	Capacity	Speed
Peds	Safety	Comfort
Transit	Frequency	Reliability
Bikes	Space	Separation



Primary Tradeoff Drivers

1. Mobility Function
2. Modal Emphasis
3. Context

FOUR TYPICAL STREET TYPES

LOCAL

COLLECTOR

MINOR ARTERIAL

PRINCIPAL ARTERIAL

FOUR TYPICAL LAND USE TYPES

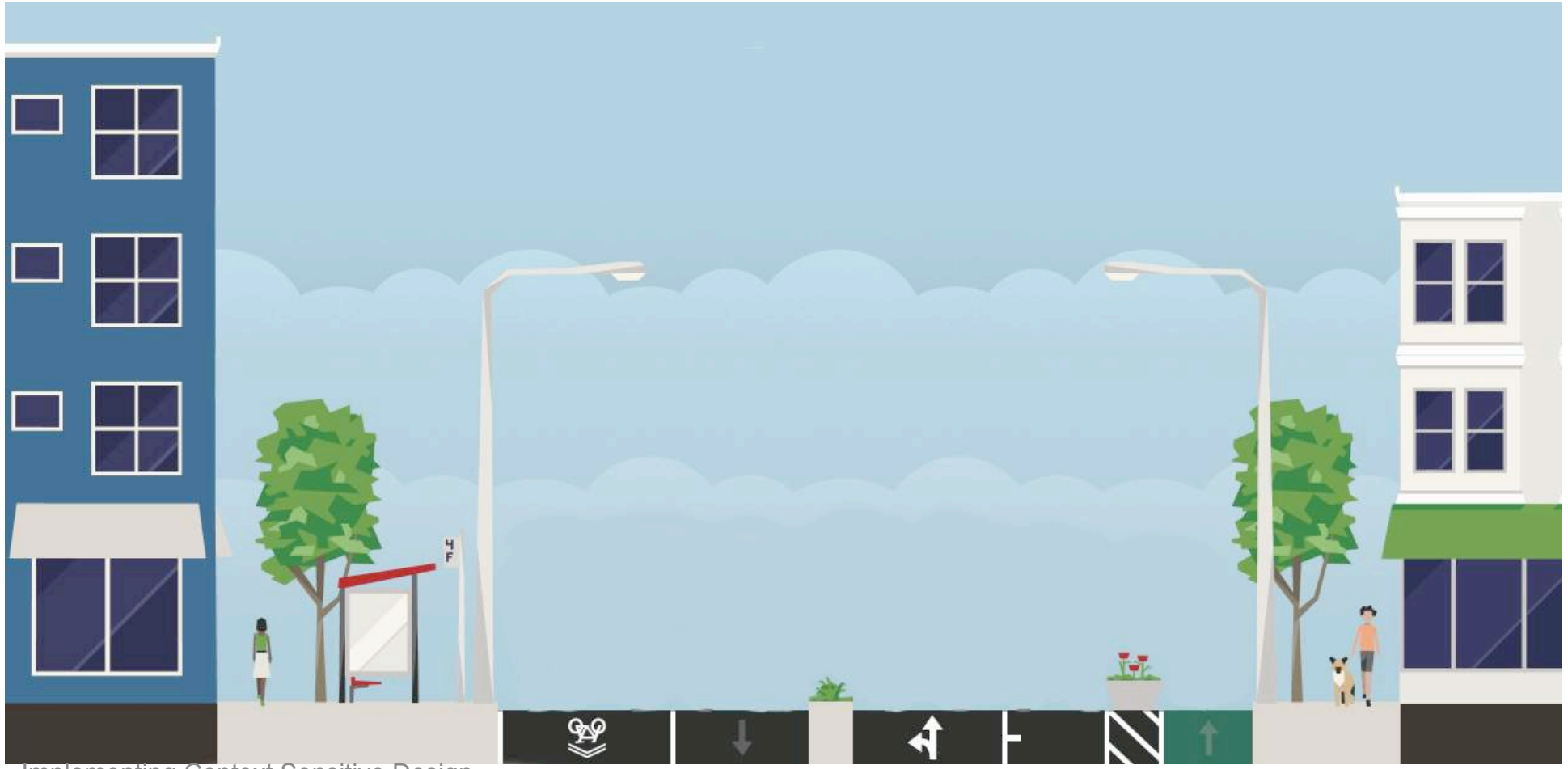
OFFICE PARK/COMMERCIAL

MIXED USE RETAIL

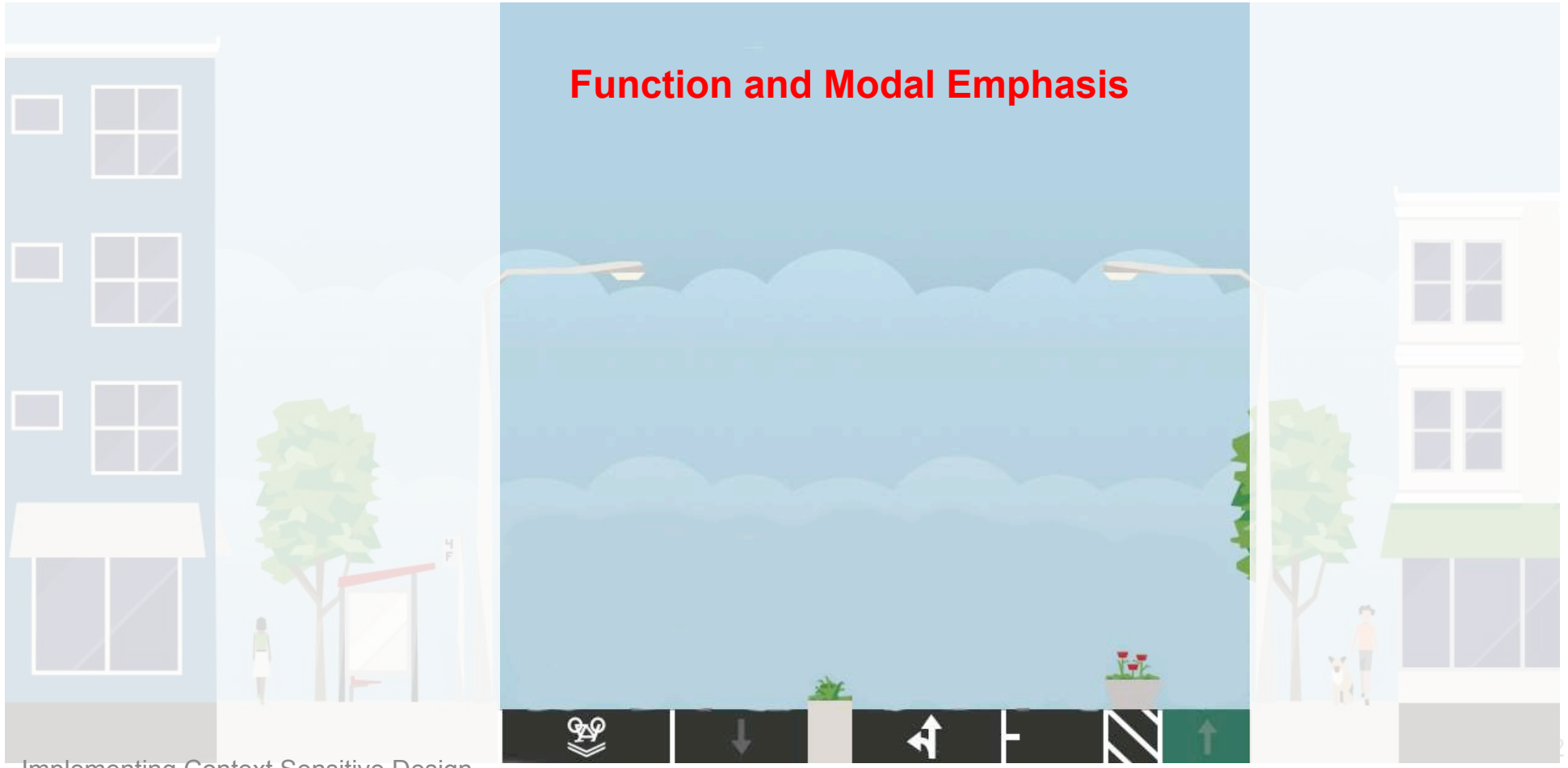
INSTITUTIONAL

RESIDENTIAL

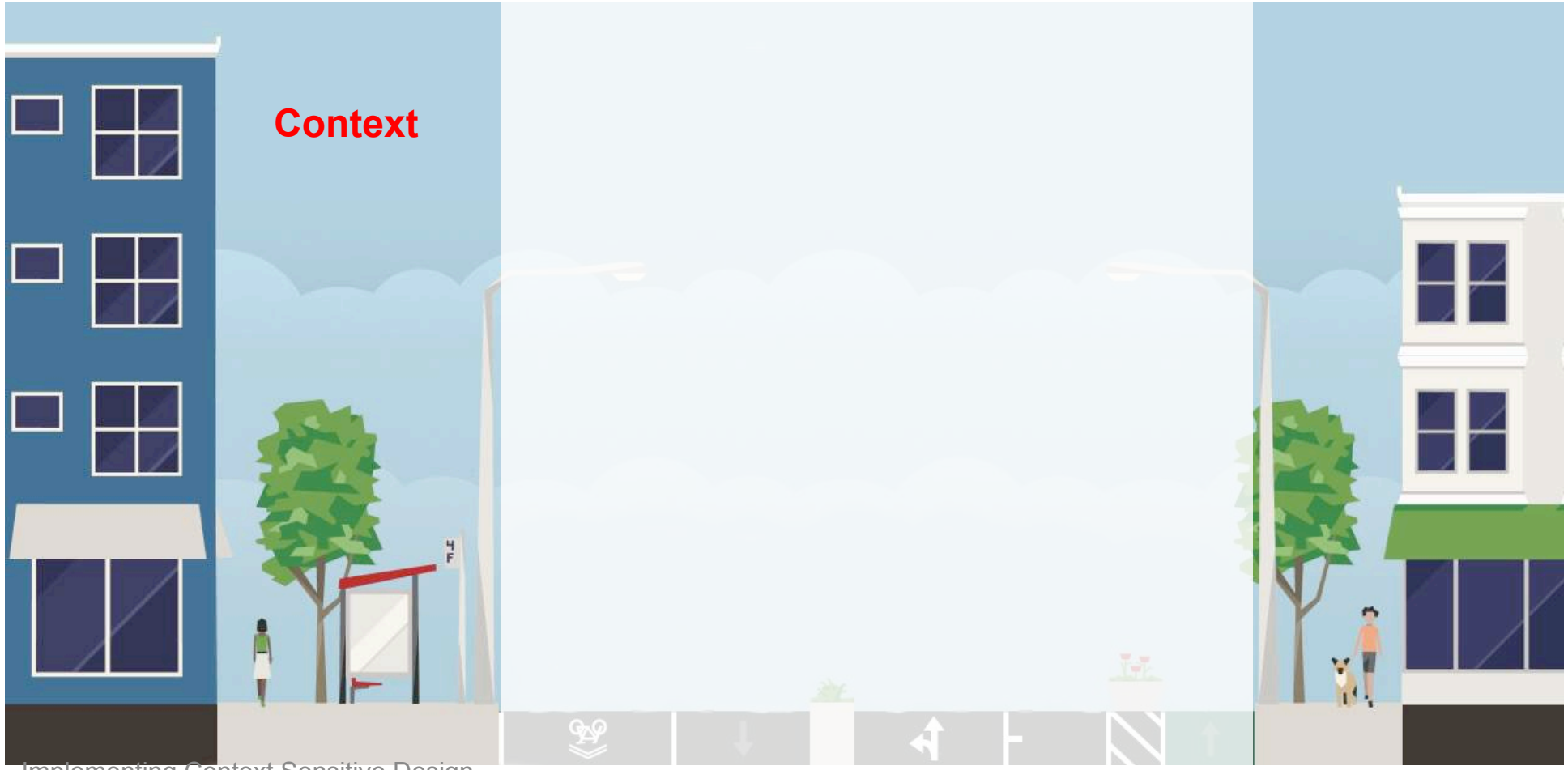
Tradeoff Tools: Zones



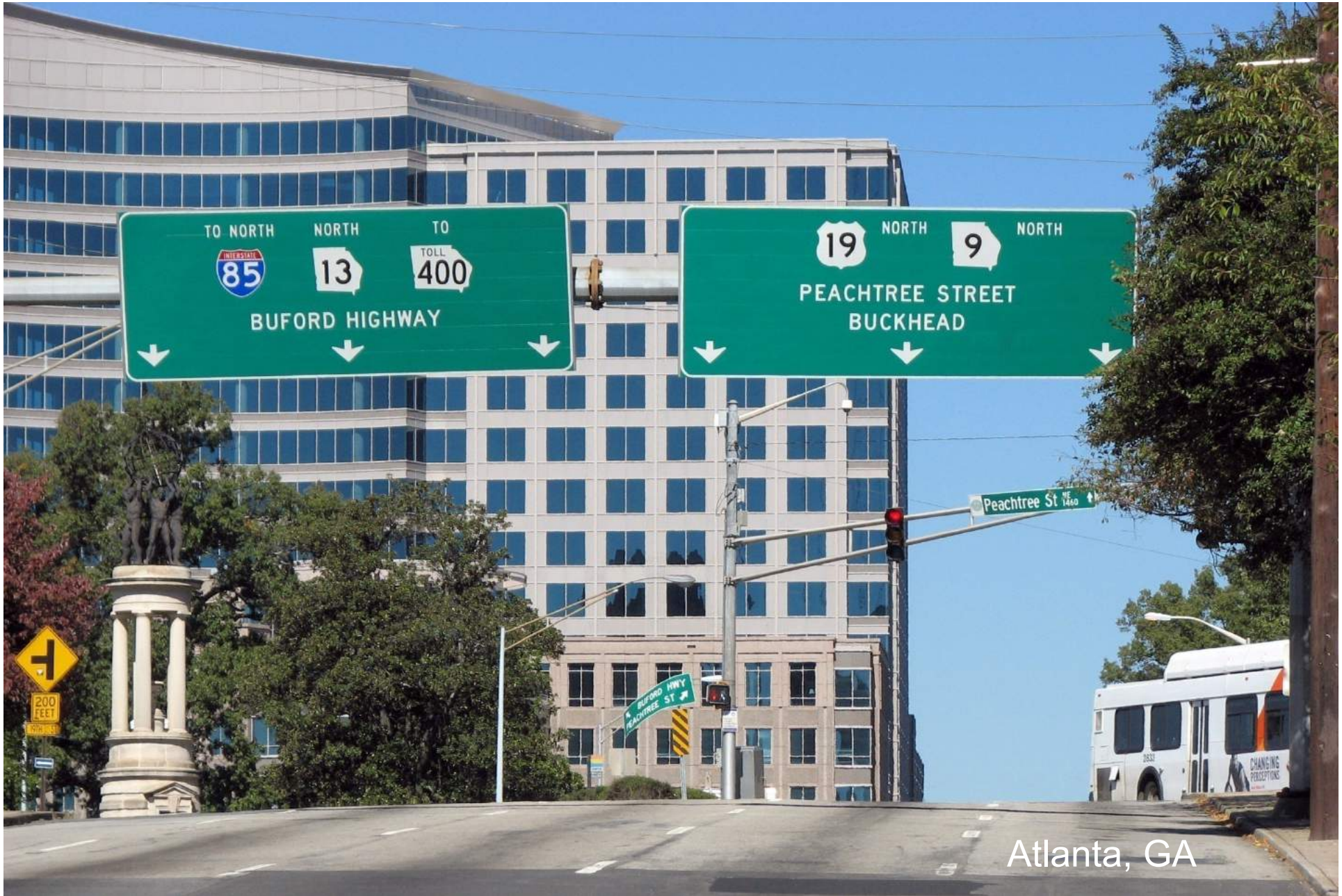
Tradeoff Tools: Function-Driven Zones



Tradeoff Tools: Context-Driven Zones



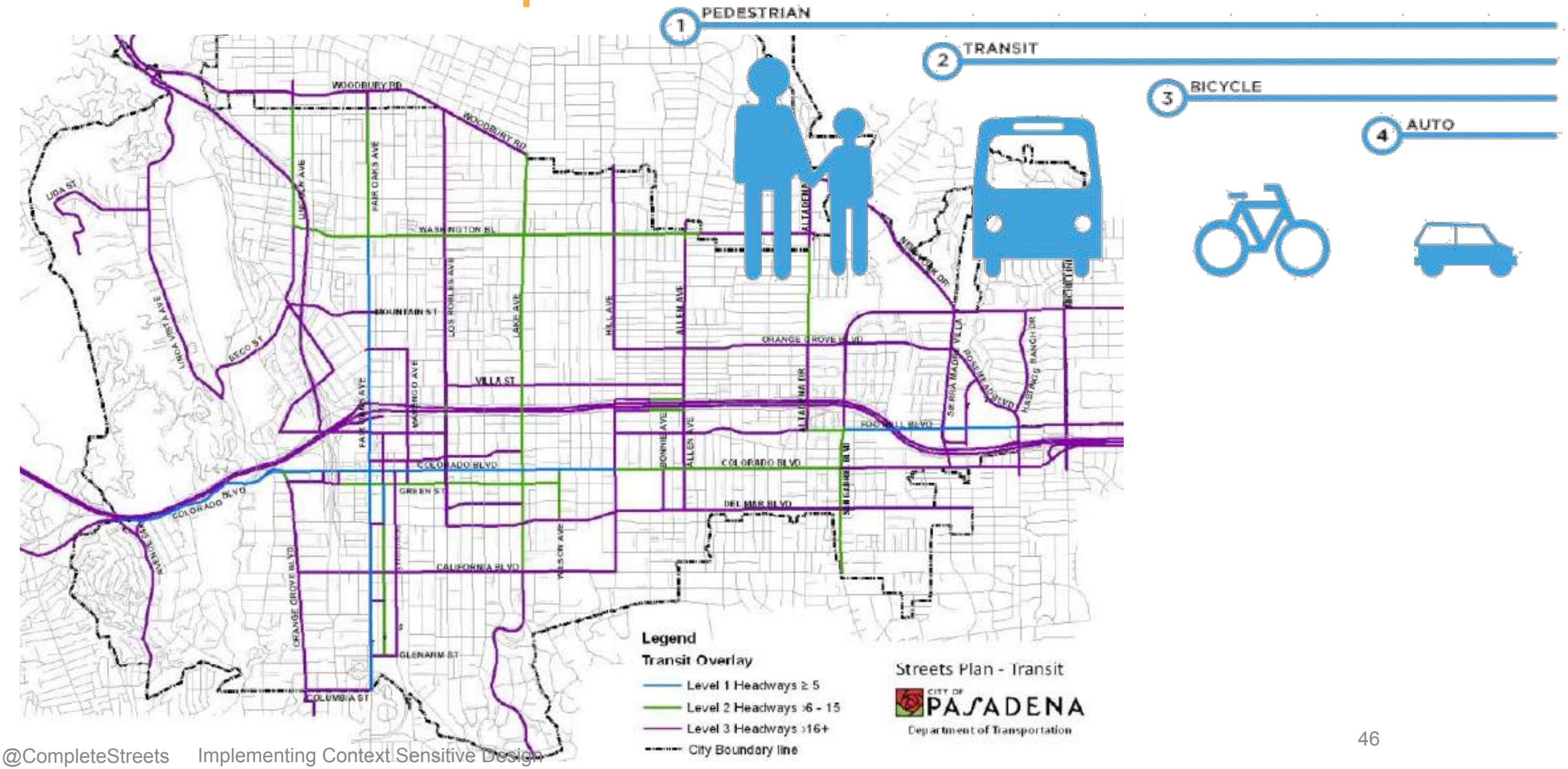
1. Mobility Function



1. Mobility Function

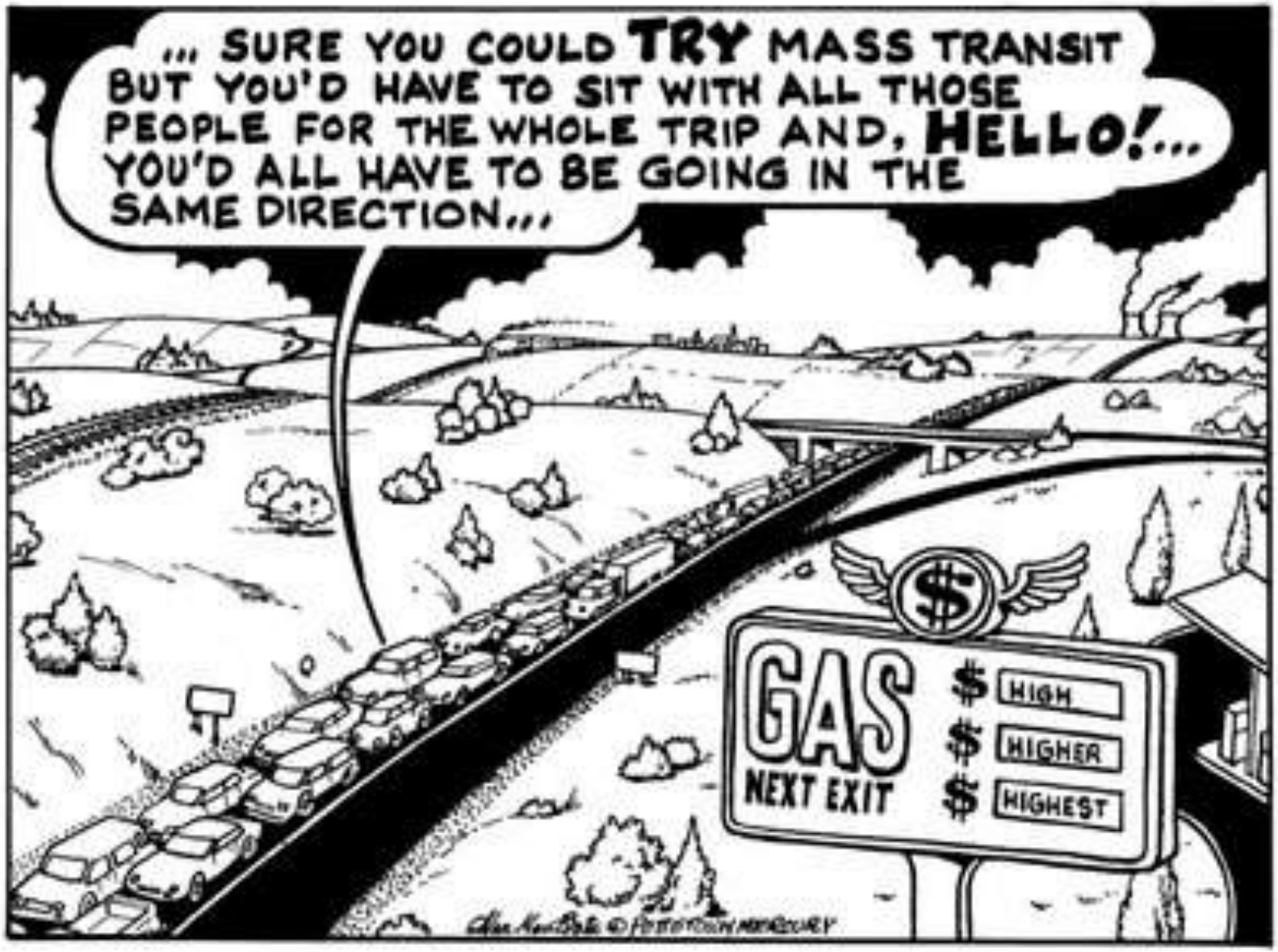
Atlanta, GA

2. Modal Emphasis



Successful Transit Must Be

1. Convenient

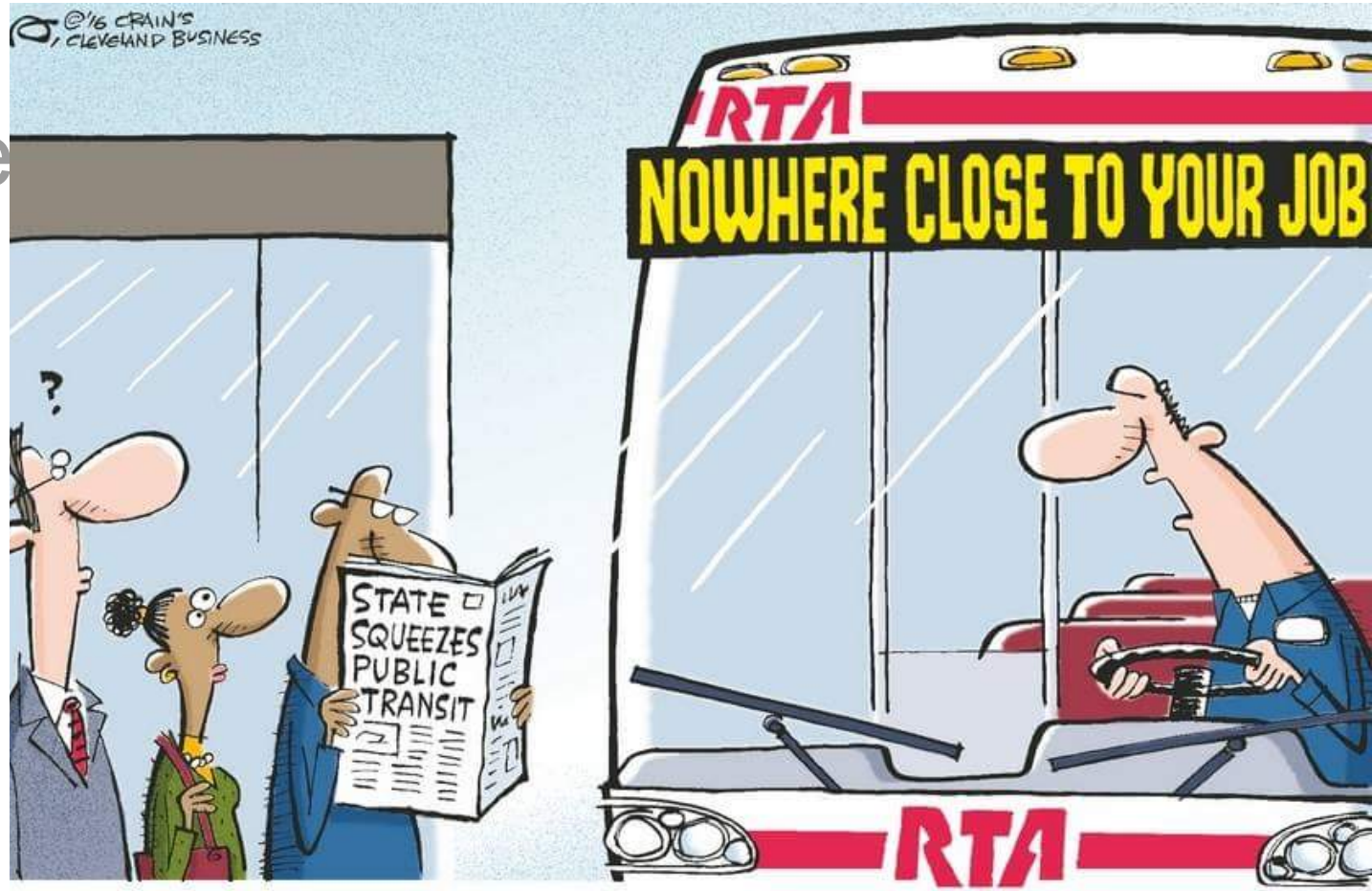


Successful Transit Must Be

1. Convenient
2. Safe & Comfortable

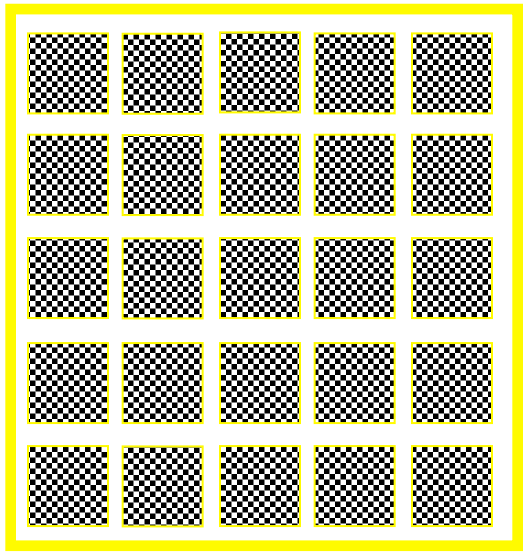
Successful Transit Must Be

1. Convenient
2. Safe & Comfortable
3. Reliable

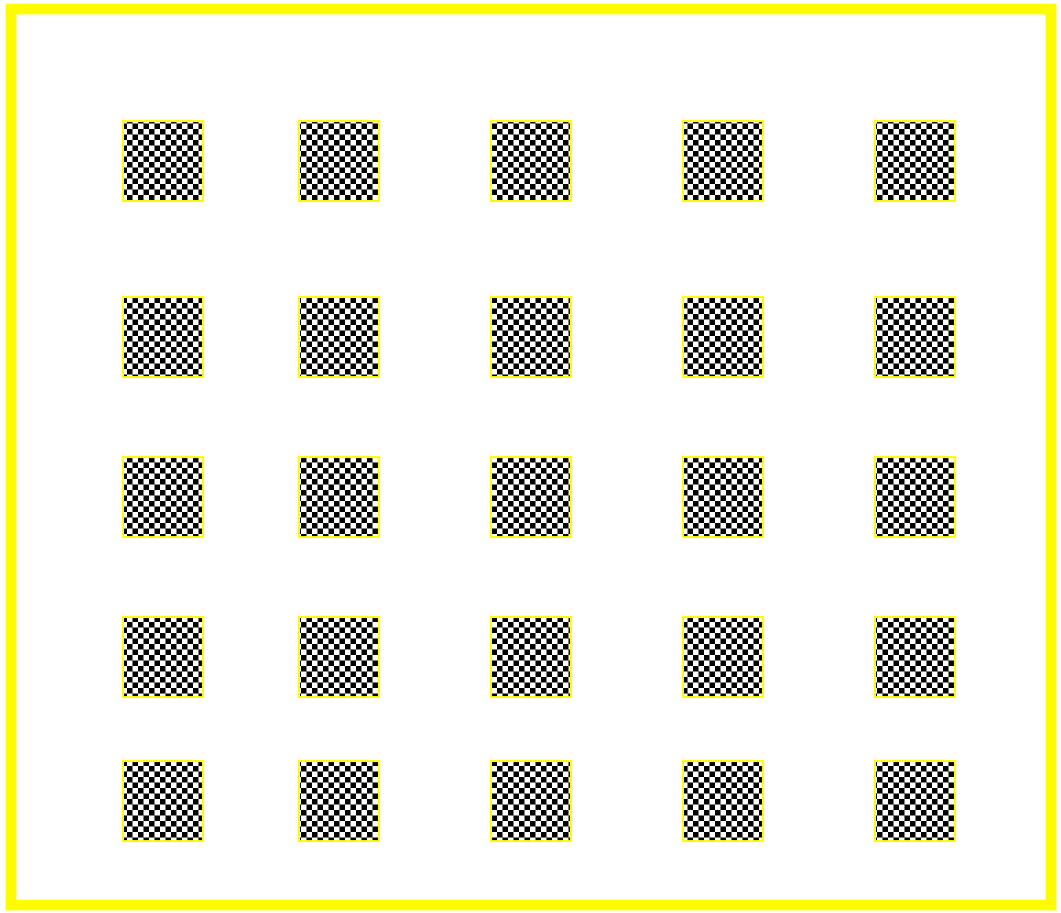


"YEAH, WE'VE HAD TO CUT SOME ROUTES..."

Context (Urban Form) Matters

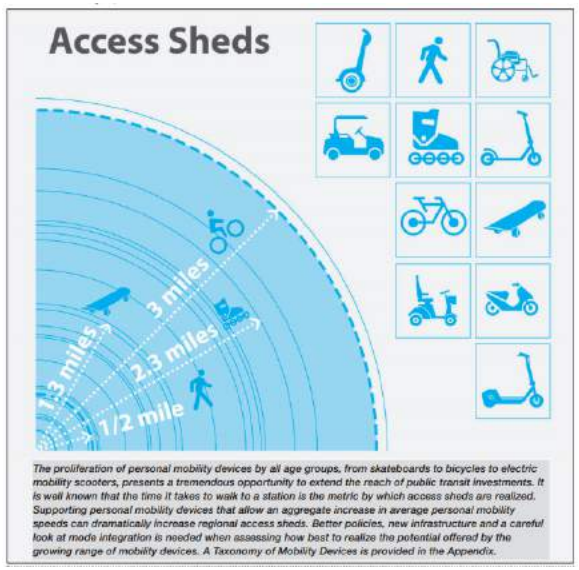


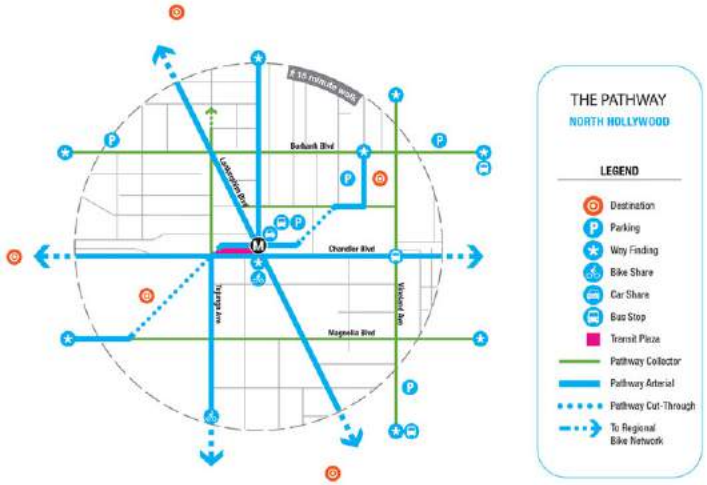
Walk Bike Transit



Automobile

“First/Last Mile” Options Are Often Poor



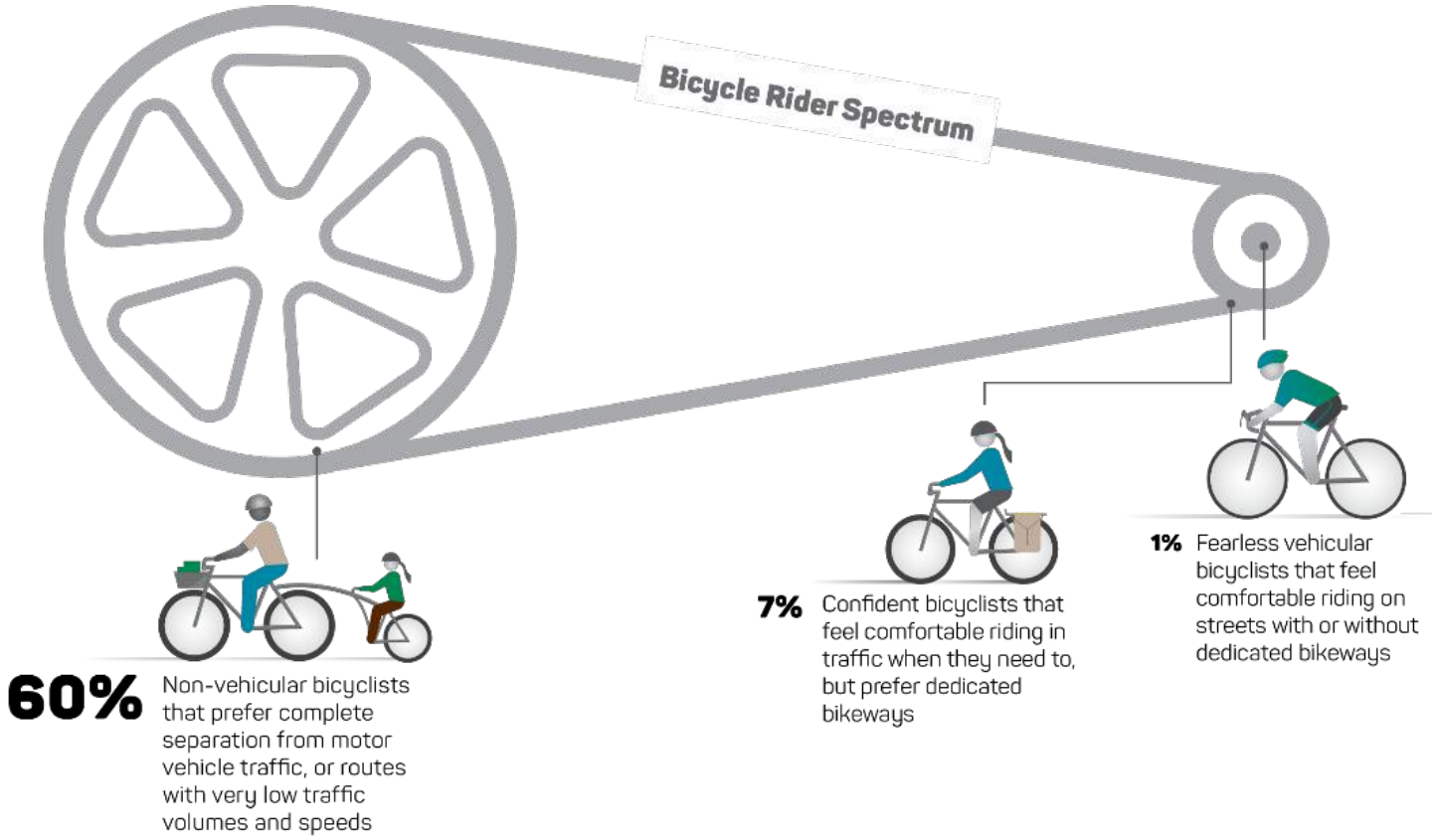


Will People Ride Bikes?

Cyclists Are Not Monolithic

Bike Travelers

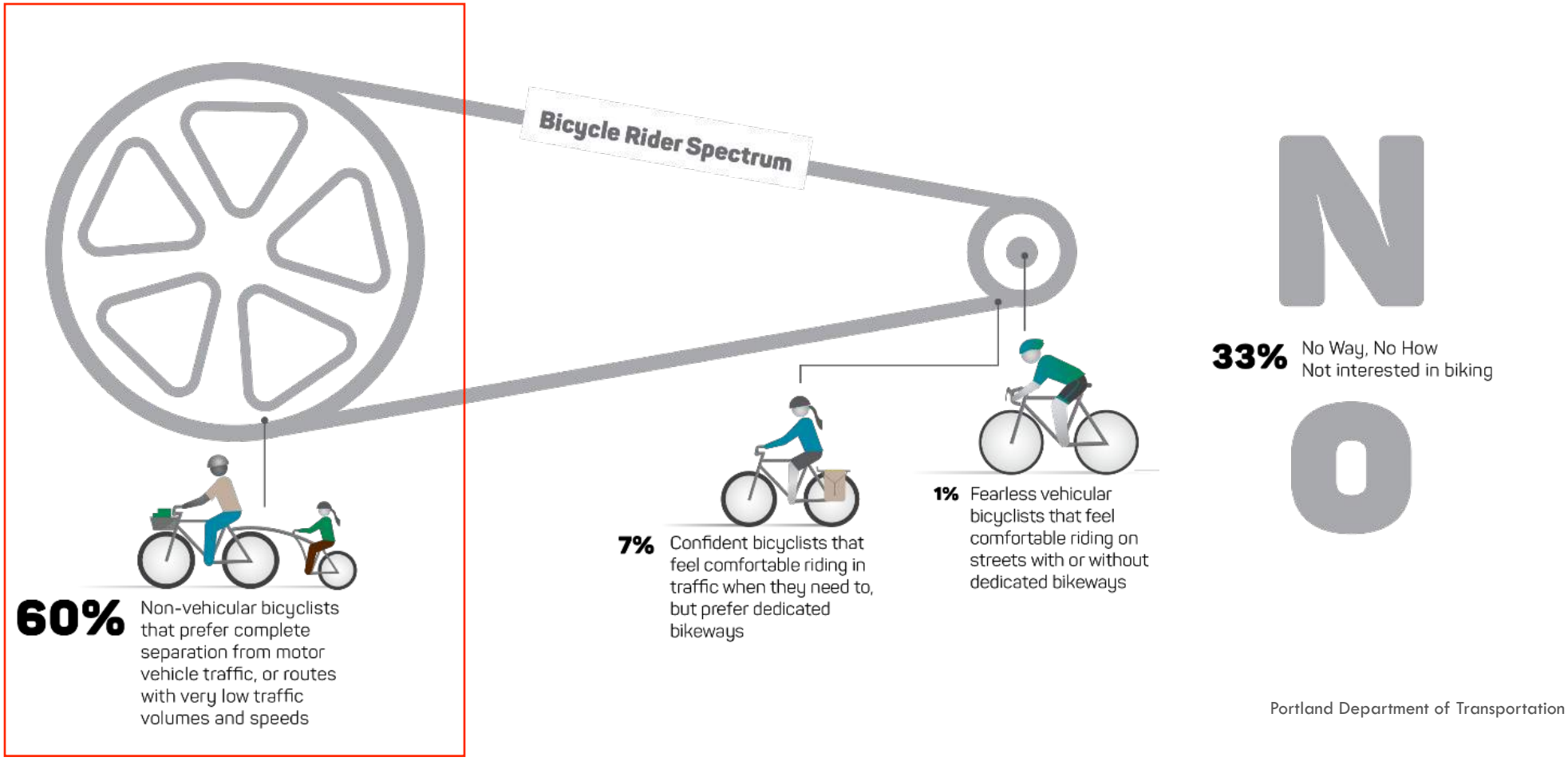
- Who is the market?



Portland Department of Transportation

Bike Travelers

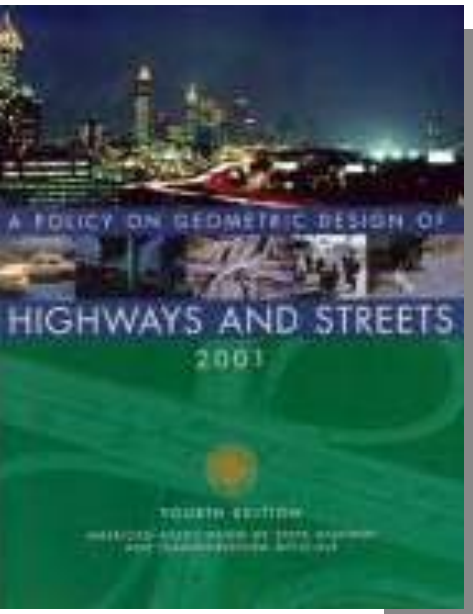
- Who is the market?




RAWFORD
GOLD JEWELRY

3. Identifying Context

Speed



- for two-lane highways, speed decreases linearly with increasing flow rate over the entire range of flow rates between zero and capacity.

Design Speed

Design speed is a selected speed used to determine the various geometric design features of the roadway. The assumed design speed should be a logical one with respect to the topography, anticipated operating speed, the adjacent land use, and the functional classification of highway. Except for local streets where speed controls are frequently included intentionally, every effort should be made to use as high a design speed as practical to attain a desired degree of safety, mobility, and efficiency within the constraints of environmental quality, economics, aesthetics, and social or political impacts. Once the design speed is selected, all of the pertinent highway features should be related to it to obtain a balanced design. Above-minimum design values should

67

TODAY

IN 5 YEARS

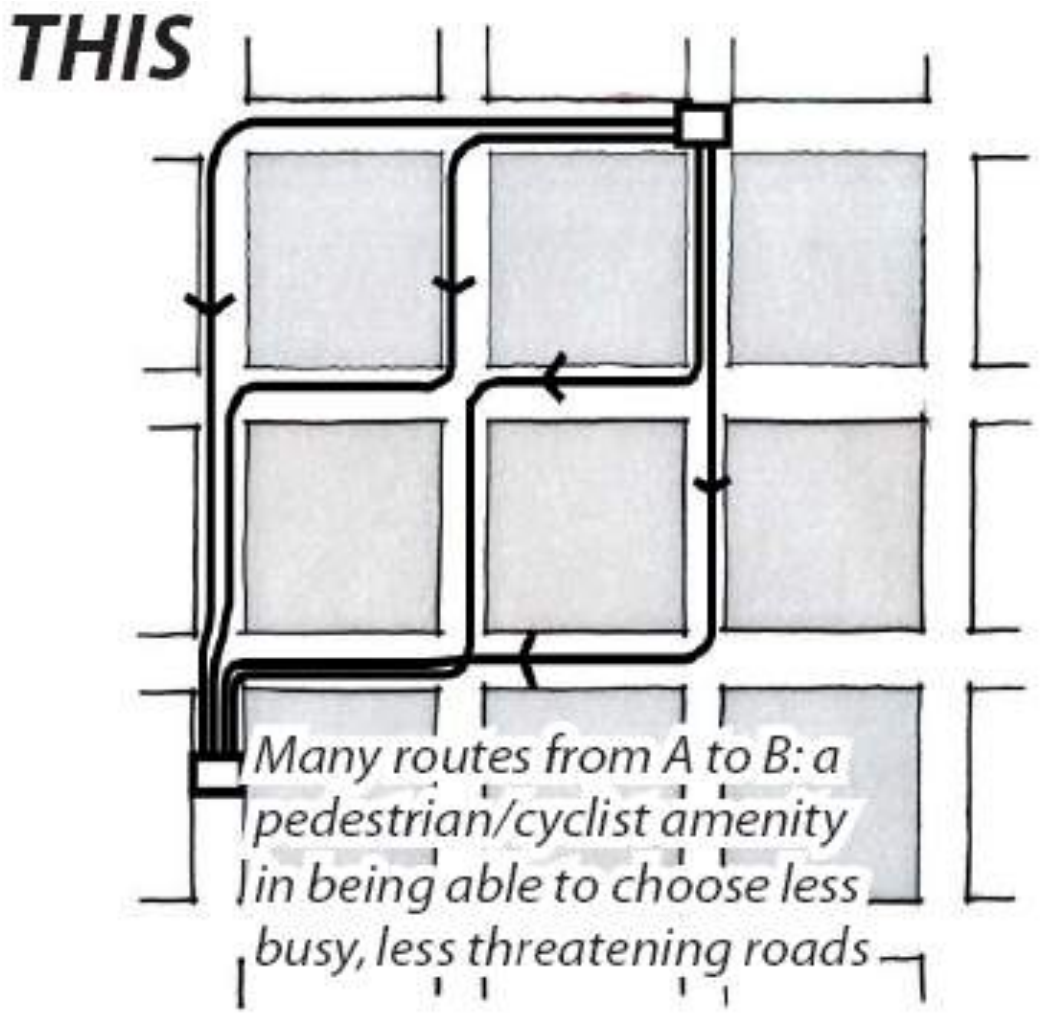
IN 20 YEARS

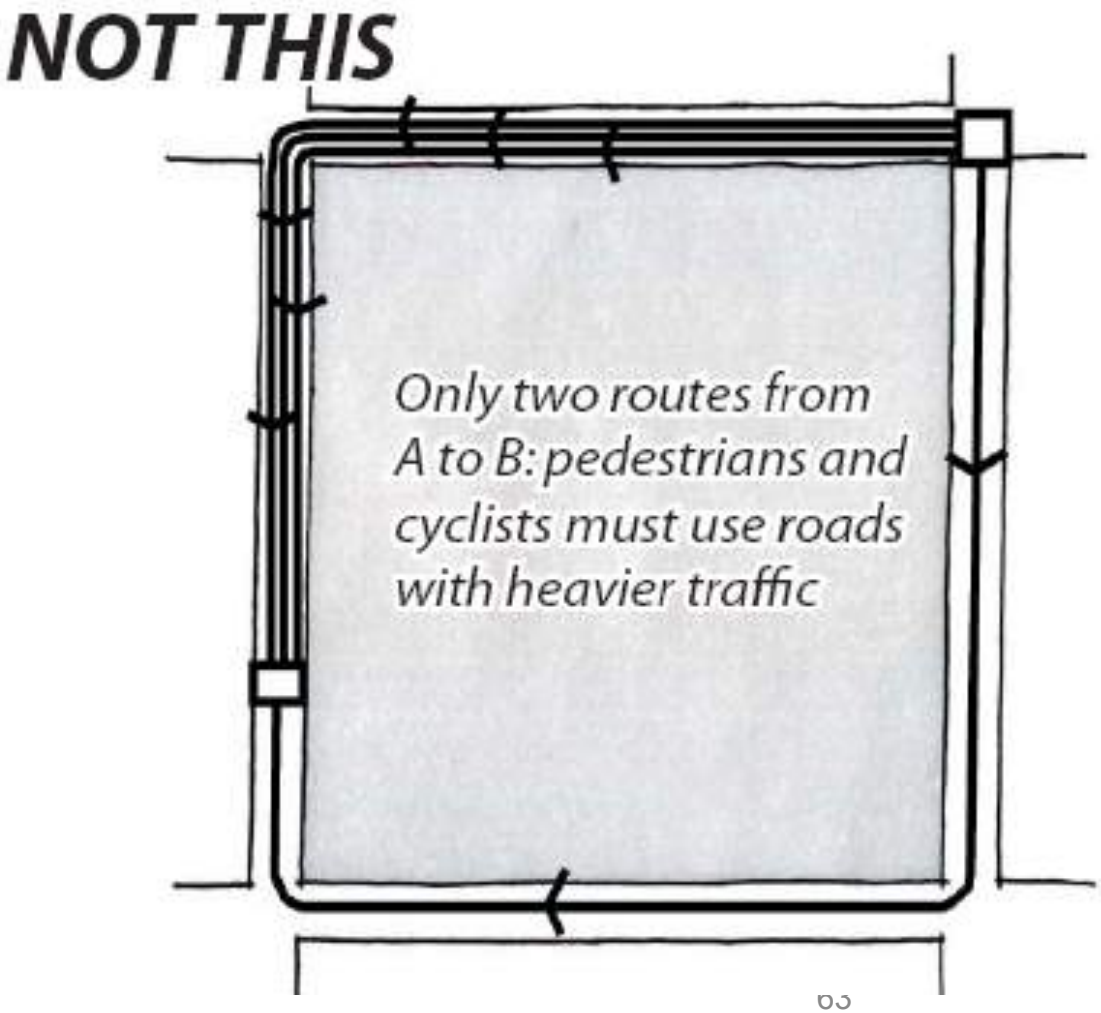
Context May Not Be Temporally Constant

Context May Not Be Temporally Constant


The best drinks ice
could hope for.

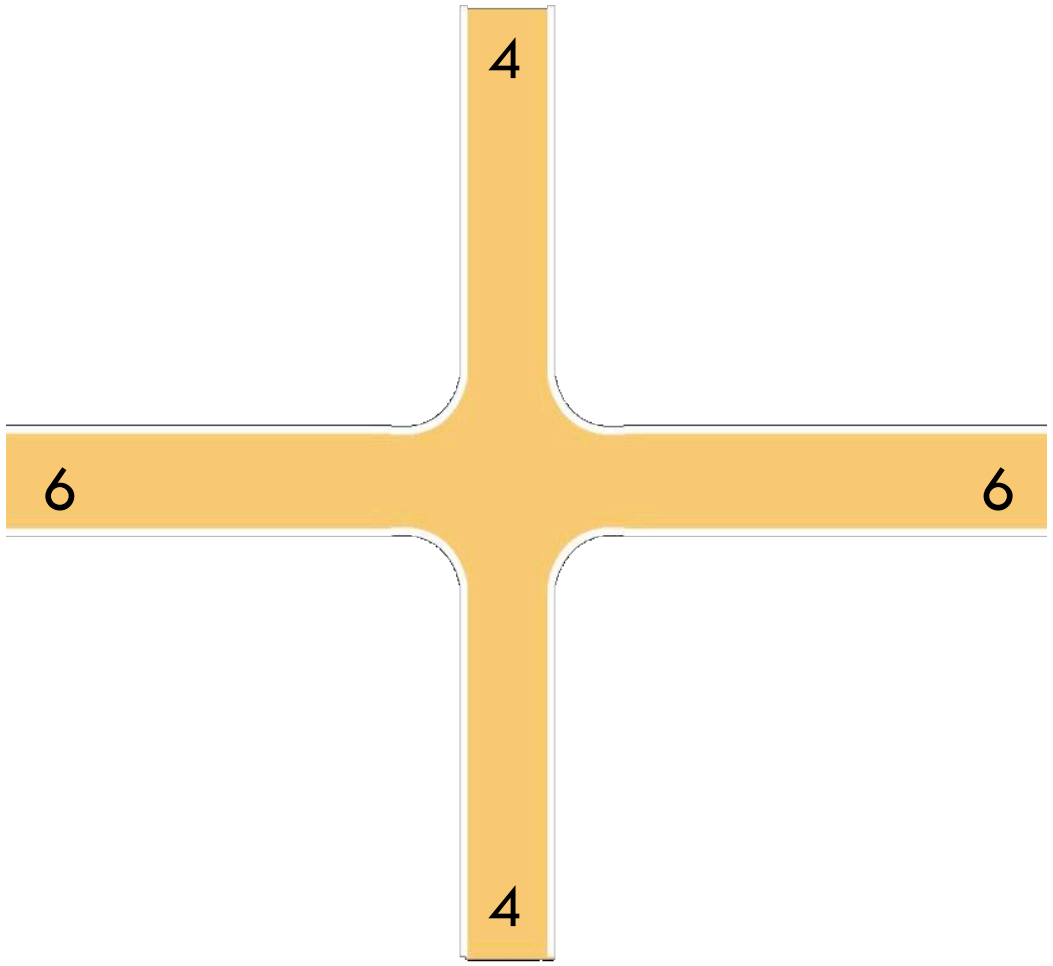
Network Strategy 1: Break Down The Blocks

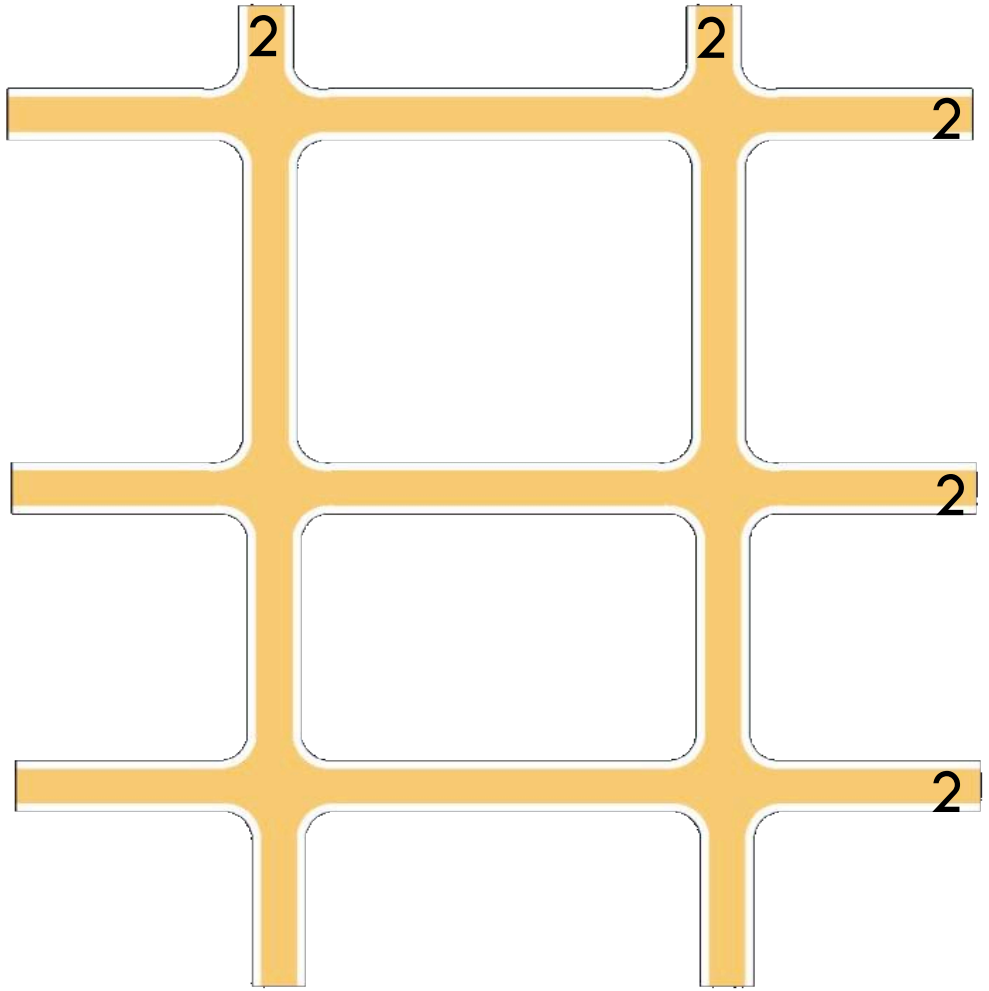




Network Strategy 1: Break Down The Blocks

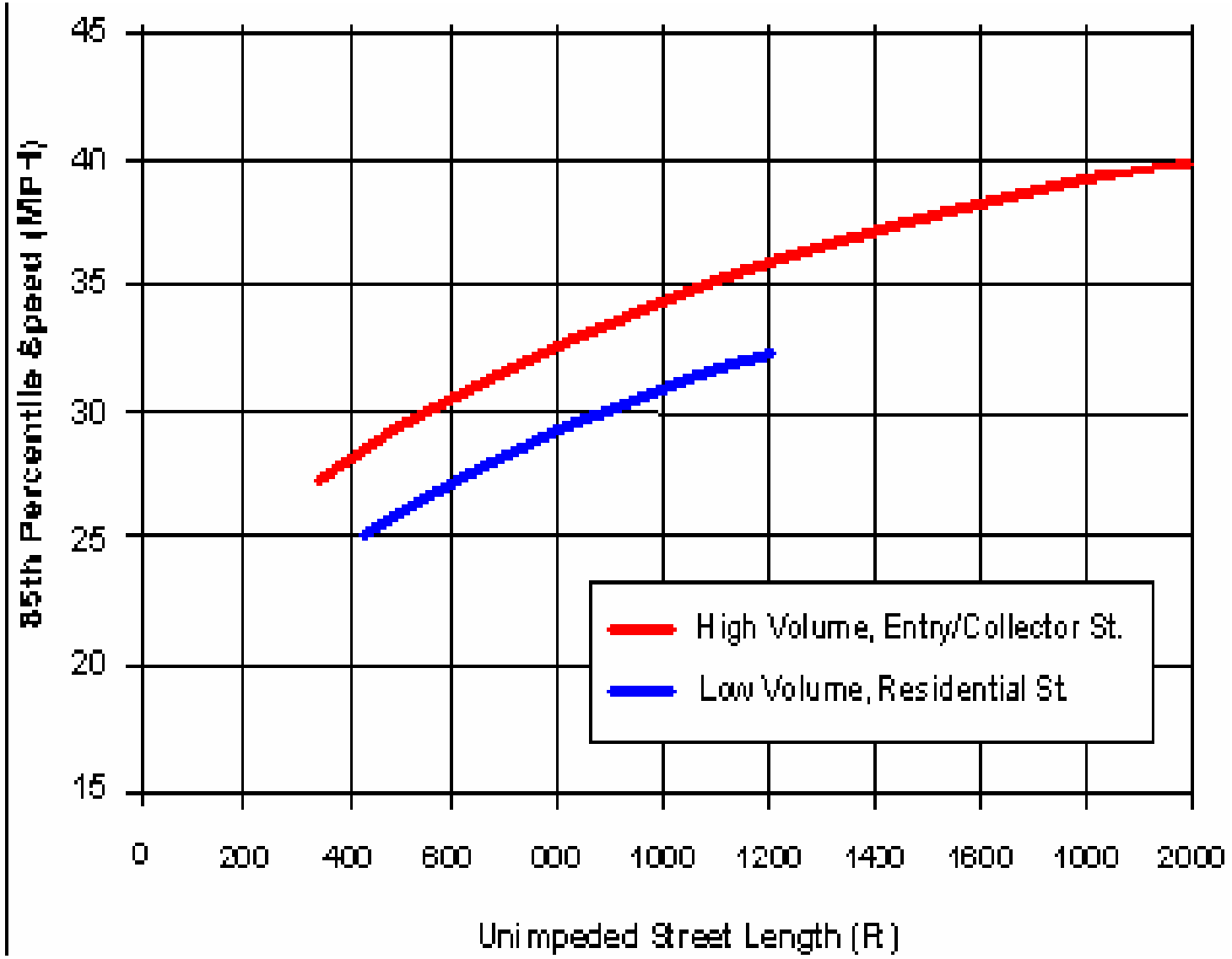
Same Total Lanes



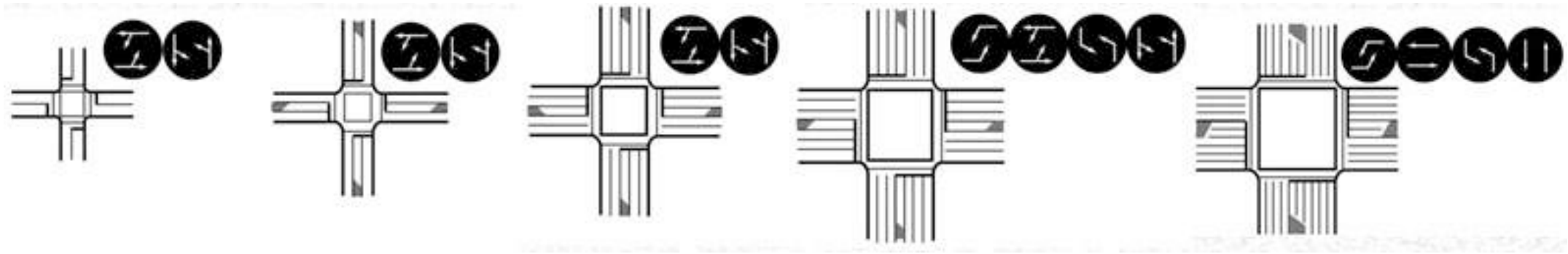


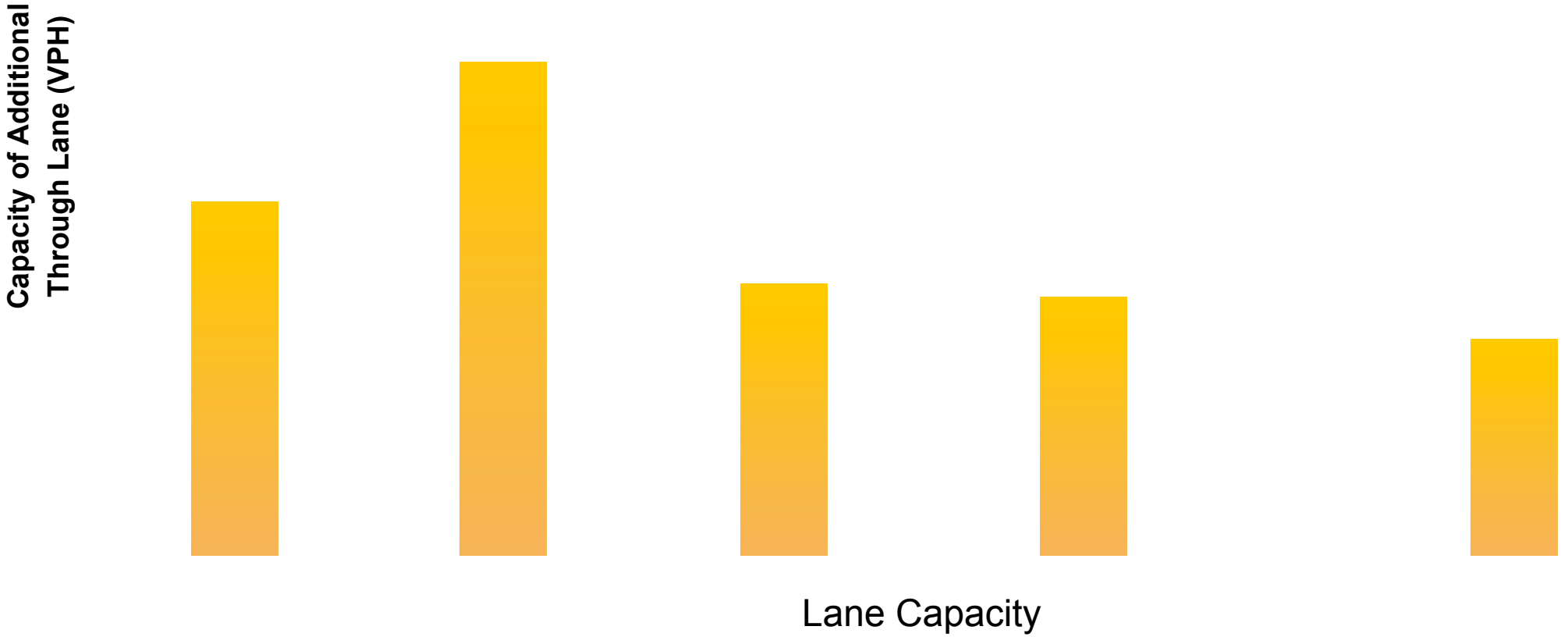
More Capacity

Relationship Between Unimpeded Block Length and Speed

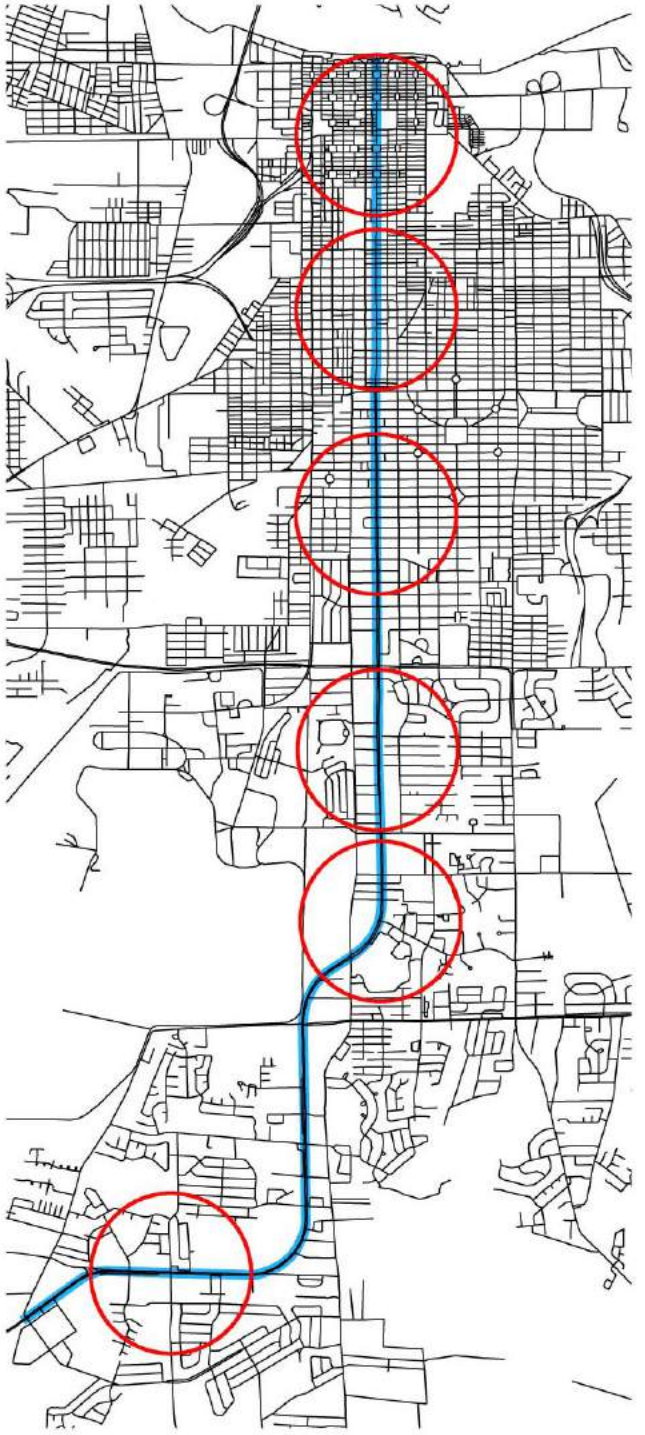


Network Strategy 2: Look For Efficiency





Strategy 3: Use The Network

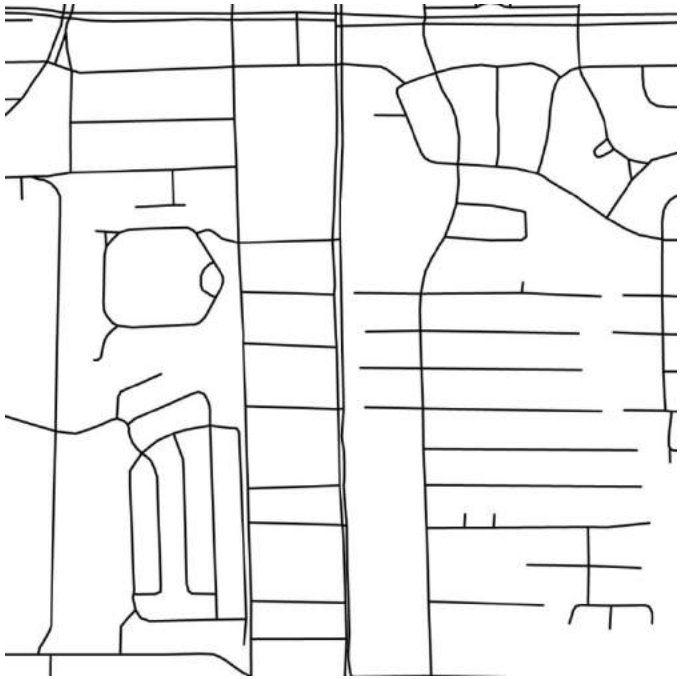


Abercorn Street - Historic District

10.4 Miles
of Streets

40,000 Sq.Ft
per Acre
Density

Abercorn Street: Suburban Pattern



4.3 Miles of Streets

15,500 Sq.Ft per Acre Built Density

Abercorn Street: Retail Mall District

3.3 Miles of Streets

13,500 Sq. Ft. per Acre built Density

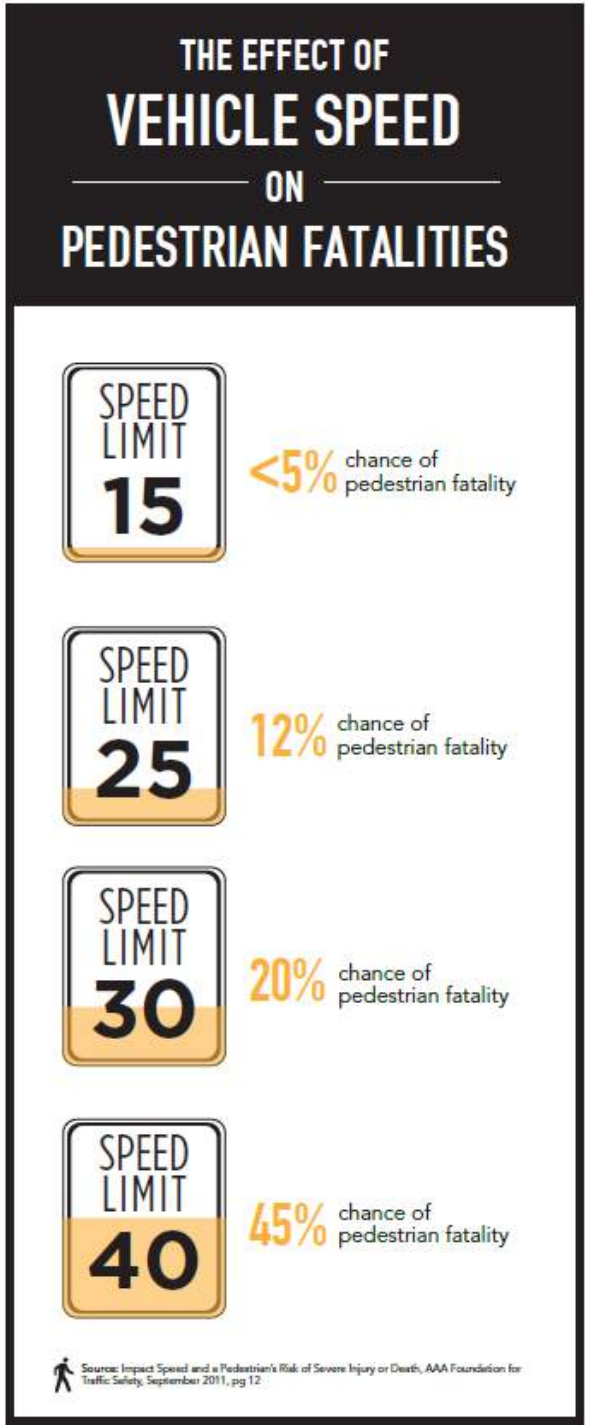
Part 3 - Safety and Walkability: Process and Tools

Stakeholders and Outreach

@CompleteStreets

Implementing
Context Sensitive
Design

Speed Matters – (See Next Section)



How much safer are livable streets?

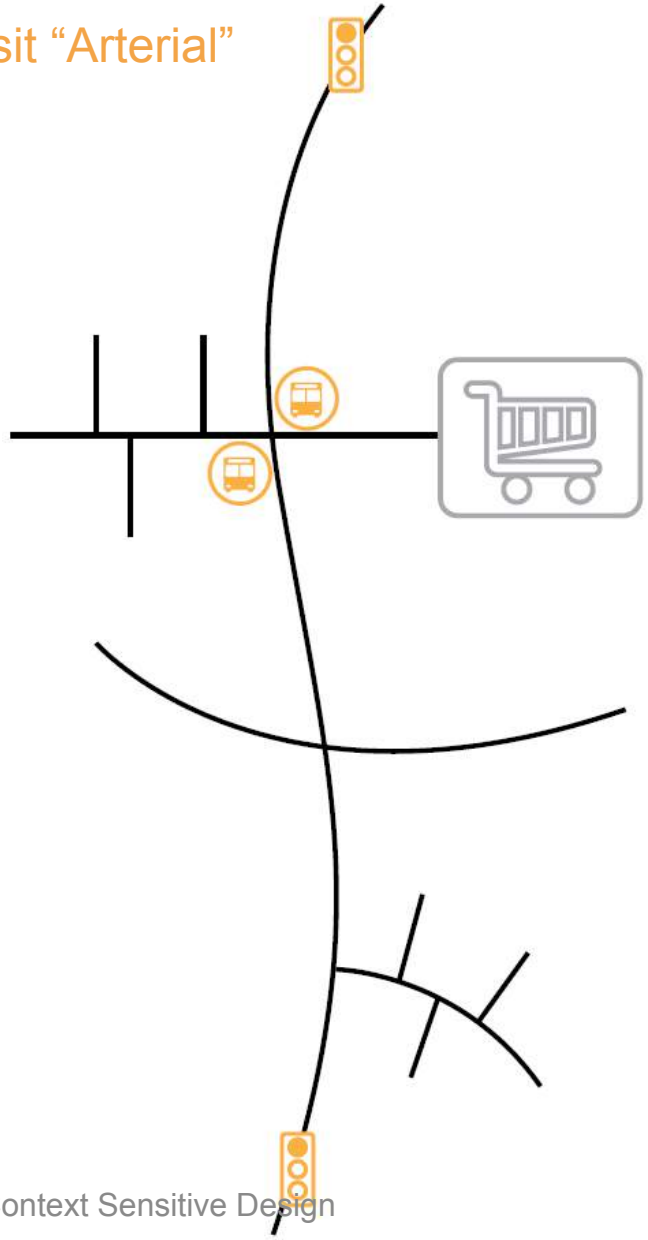
Source: Eric Dumbaugh, Texas A&M

- Per vehicle mile traveled:
  - 40% fewer midblock crashes than roadway averages.
  - 67% fewer roadside crashes than roadway averages.

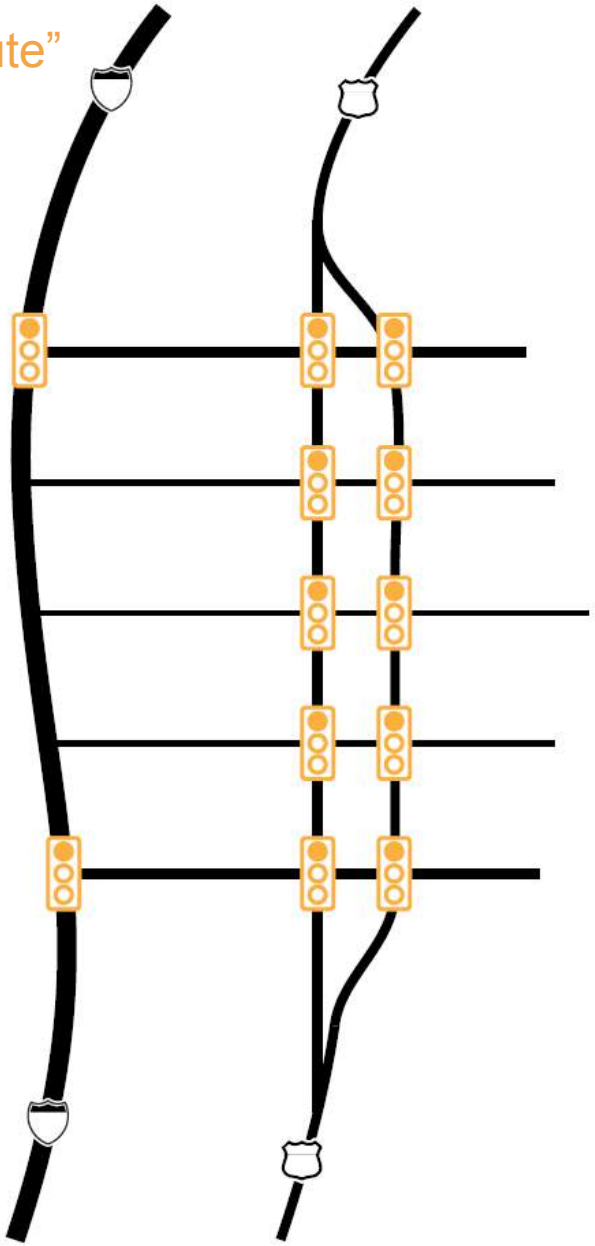
- *Examined lengths of arterials in 3 small metro regions:*
- *Substantial design variation:*
  - *Pedestrian-oriented "livable" streetscape in downtown core.*
  - *Conventional suburban.*
  - *Suburban/rural transition.*

Common Situations

The Transit “Arterial”

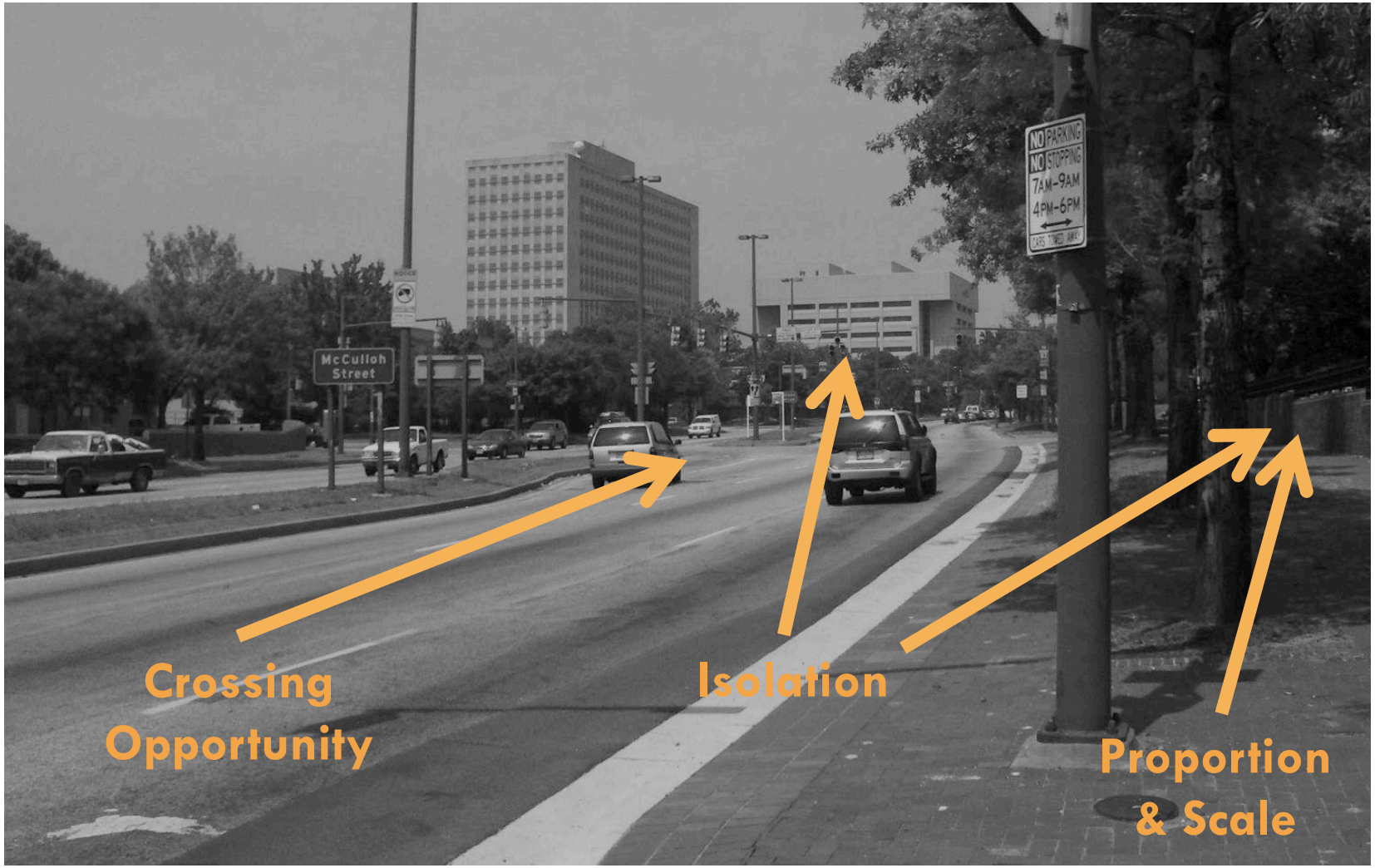


The “Escape Route”



Scale Myth: Some Streets Only Feel Big

Scale Myth: Some Streets Only Feel Big




Ohio

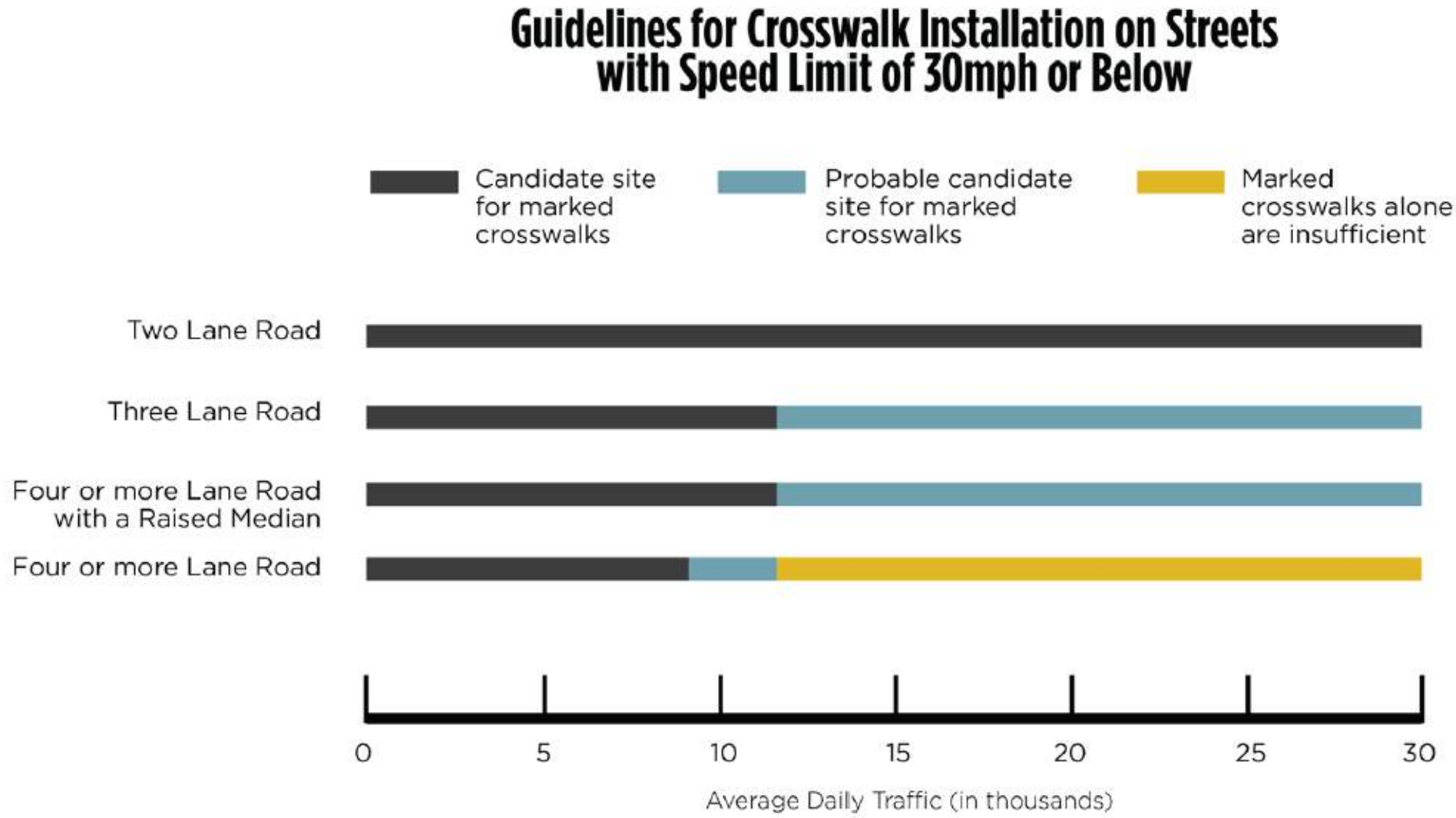

Vertical Enclosure


Ohio
Scale


Crossing
Opportunity

Activity (Driven By Density)

Crossing Toolkit 1: Safety Standards



Pedestrian Crossings

Crossing Toolkit 2: Policies and Priorities

Set Spacing Standard

Should be well under 1000' in any walkable context

Prioritize Locations

Speed Limits Above 30mph

Generator Component

Transit Stops (Boarding Thresholds?)

Jobs Centers (Density Definition?)

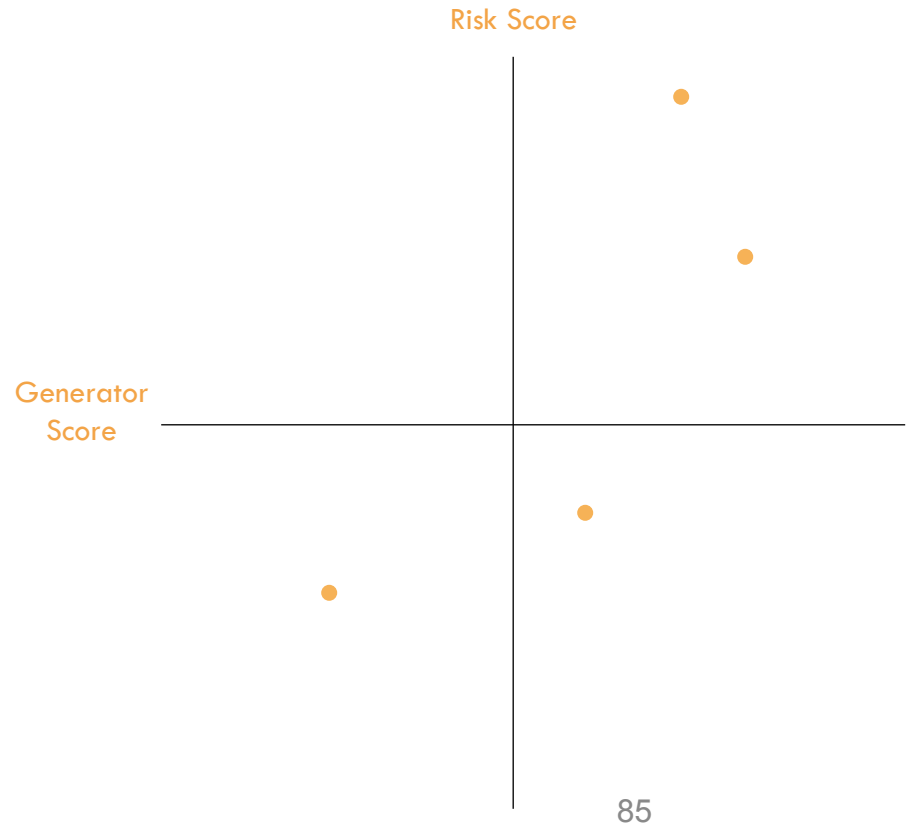
Schools

Risk Component

Spacing (Tied to Typology?)

Speed

Width



Crossing Toolkit 3: Warrants

From MUTCD:

- They *(traffic signals)* are used to **interrupt heavy traffic** at intervals to permit other traffic, vehicular or pedestrian, to cross.

Pedestrian Warrant

- The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that **pedestrians experience excessive delay** in crossing the major street.
- The criterion for the pedestrian volume crossing the major street may be **reduced as much as 50 percent** if the 15th-percentile crossing speed of pedestrians is less than 3.5 feet per second.
- School Warrant and Progression Warrant

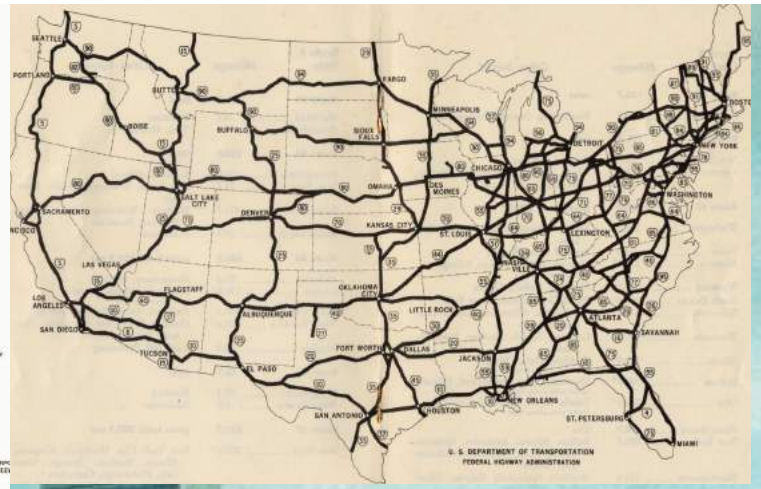
Pedestrian Hybrid Beacon

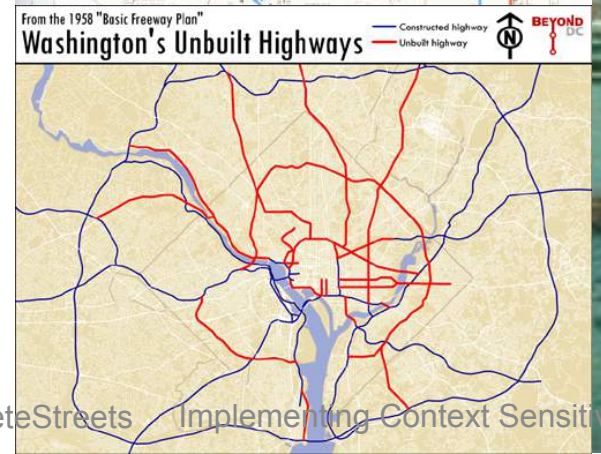
- A pedestrian hybrid beacon may be considered for installation to facilitate pedestrian crossings at a **location that does not meet traffic signal warrants**.

Crossing Toolkit 4: Legibility

Speed Management: Process and Tools

Myth: Freeways Are Efficient



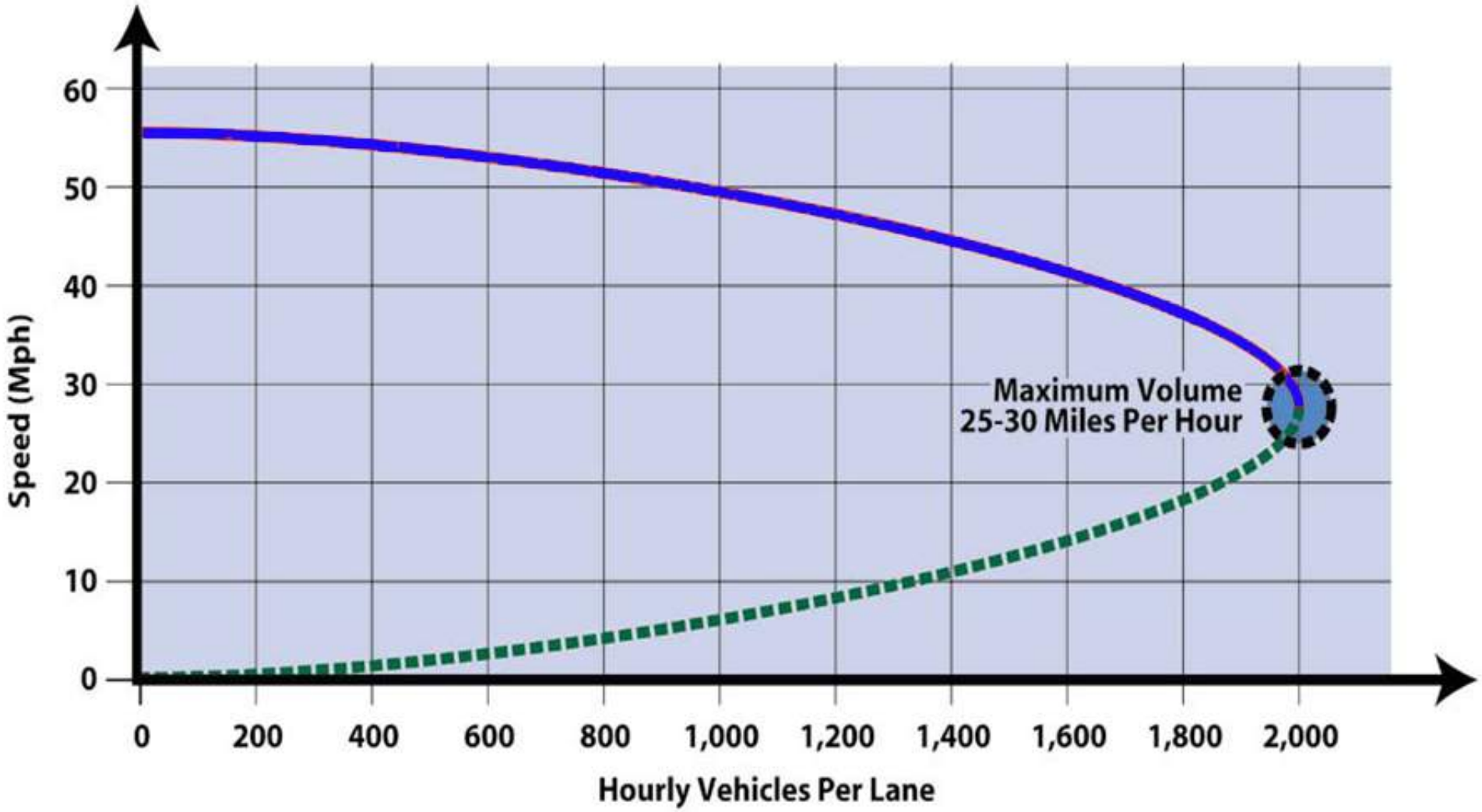


Reality: Good At Certain Things

"Metro areas that invested heavily in road capacity expansion fared no better in easing congestion than metro areas that did not. Trends in congestion show that areas that exhibited greater growth in lane capacity spent roughly **$22 billion more** on road construction than those that didn't, yet ended up with slightly **higher congestion costs** per person, wasted fuel, and travel delay."

–Surface Transportation Policy Project

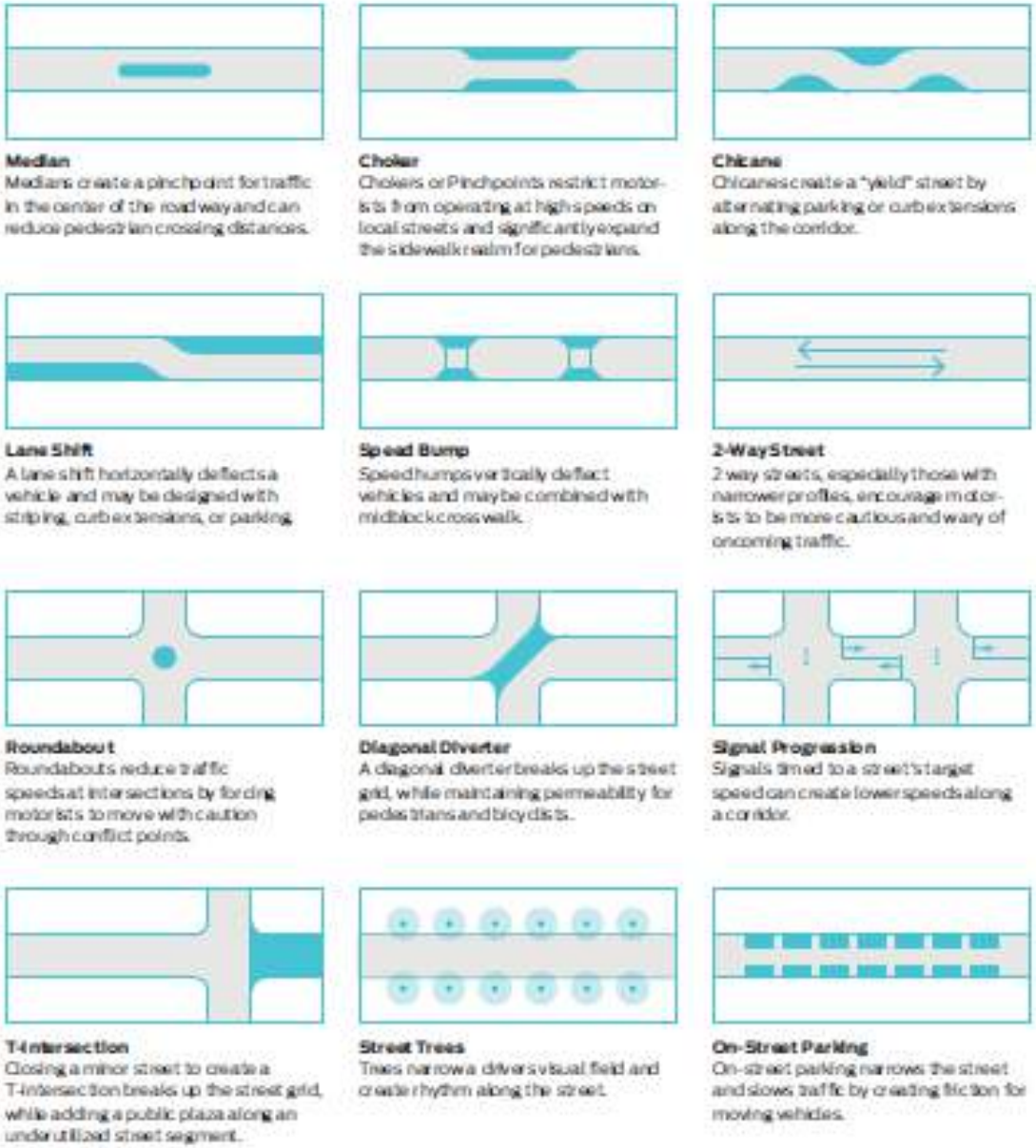
Speed Myth: Speed vs. Capacity



NACTO

Speed Reduction Mechanisms

Cities can achieve a reduction in traffic speeds using a variety of traffic calming techniques. While certain speed controls alter the configuration of a roadway, others change its operation, impacting motorists through regulation, signalization, and right of way. Consider the following tools to encourage motorists to drive at target speeds.



Median
Medians create a pinch point for traffic in the center of the roadway and can reduce pedestrian crossing distances.

Choker
Chokers or Pinchpoints restrict motorists from operating at high speeds on local streets and significantly expand the sidewalk realm for pedestrians.

Chicane
Chicanes create a "yield" street by alternating parking or curb extensions along the corridor.

Lane Shift
A lane shift horizontally deflects a vehicle and may be designed with striping, curb extensions, or parking.

Speed Bump
Speed humps vertically deflect vehicles and may be combined with midblock crosswalk.

2-Way Street
2 way streets, especially those with narrower profiles, encourage motorists to be more cautious and wary of oncoming traffic.

Roundabout
Roundabouts reduce traffic speeds at intersections by forcing motorists to move with caution through conflict points.

Diagonal Diverter
A diagonal diverter breaks up the street grid, while maintaining permeability for pedestrians and bicyclists.

Signal Progression
Signals timed to a street's target speed can create lower speeds along a corridor.

T-Intersection
Closing a minor street to create a T-intersection breaks up the street grid, while adding a public plaza along an underutilized street segment.

Street Trees
Trees narrow a driver's visual field and create rhythm along the street.

On-Street Parking
On-street parking narrows the street and slows traffic by creating friction for moving vehicles.

Space Myth: The Cars in MY City Are Huge!

Prius

5.8’

Pickup

6.6’

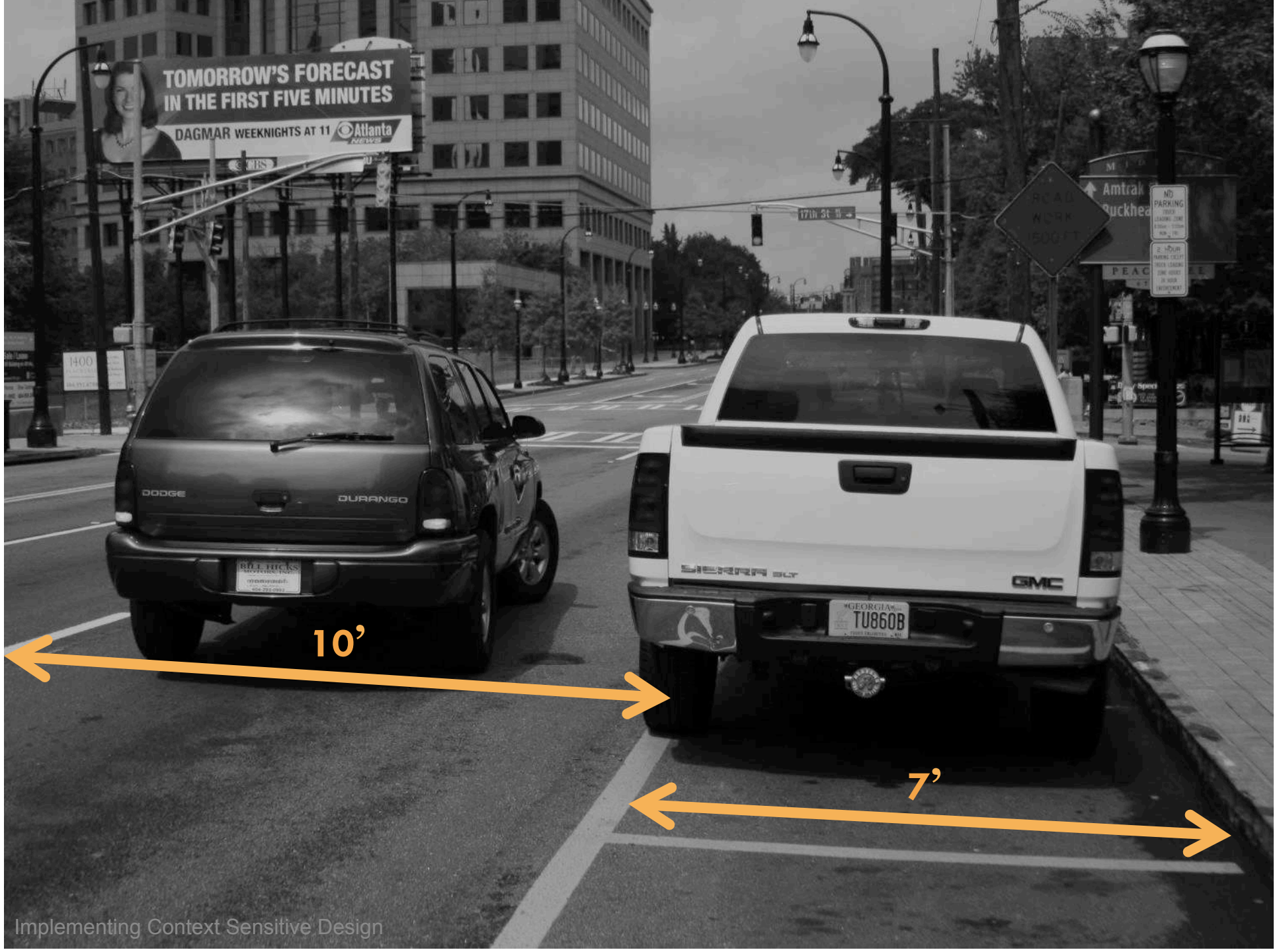
Bus

8-9’

Ladder Truck

7-8’

Stabilizers 12-16’


TOMORROW'S FORECAST
IN THE FIRST FIVE MINUTES
DAGMAR WEEKNIGHTS AT 11
Atlanta
CBS
DODGE
DURANGO
SIERRA SLT
GMC
GEORGIA
TU860B
10'
7'

What Makes Drivers Slow Down?

Design Speed vs. Operating Speed

- Selection of design speed controls:
  - Horizontal curvature
  - Vertical curvature

Speed Selection

Design Engineers: Design Speed (60 mph) - *5*

Speed Selection

Design Engineers: Design Speed (60 mph) - 5

Design Speed (100 mph) - 5


SPEED LIMIT
ENFORCED BY
AIRCRAFT

Risk vs. Reward

- Risk:
  - Design of street/street type
  - Weather
  - Presence of pedestrians/cyclists
  - Vertical elements (trees, buildings, etc.)

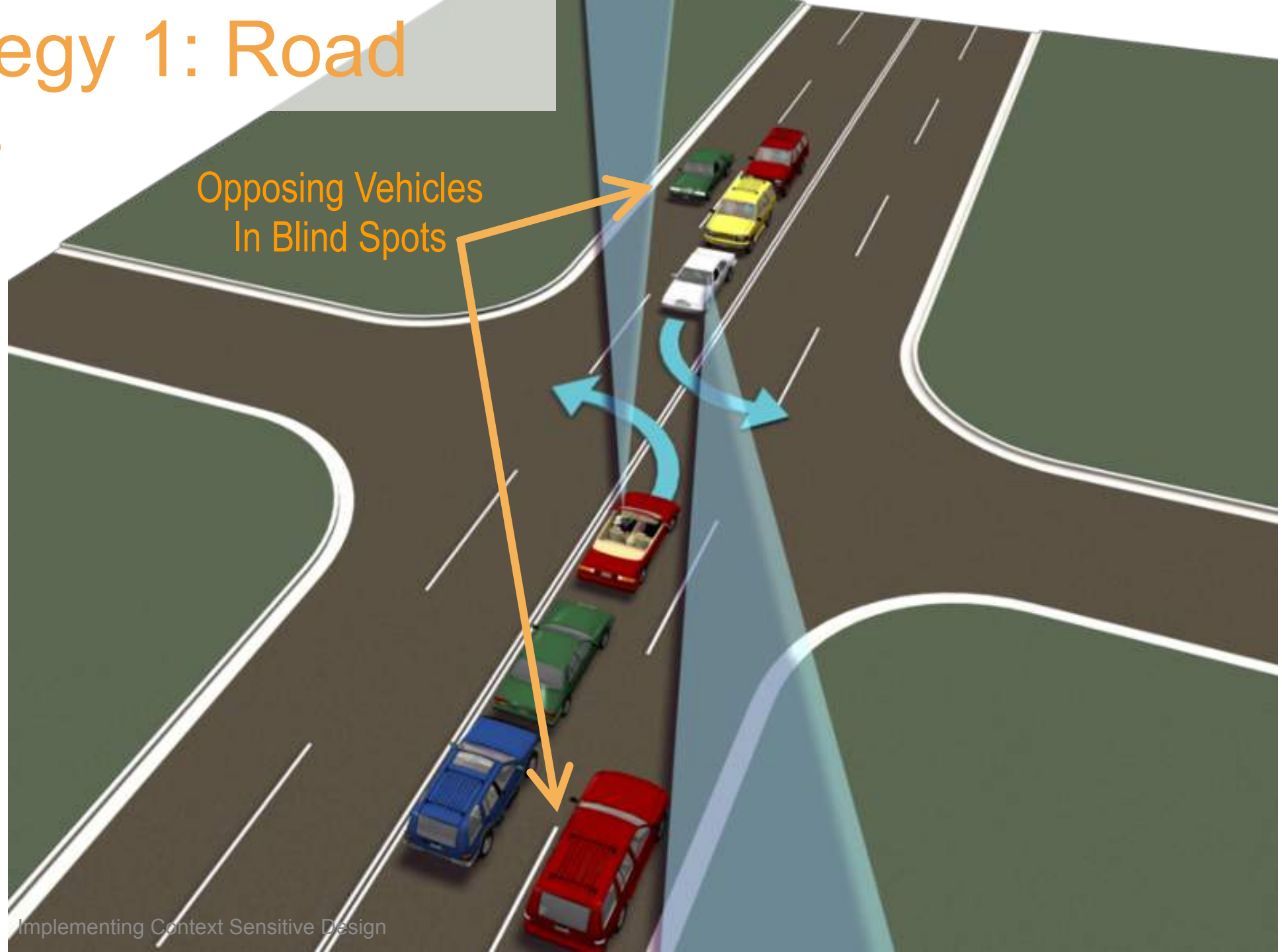
Risk vs. Reward

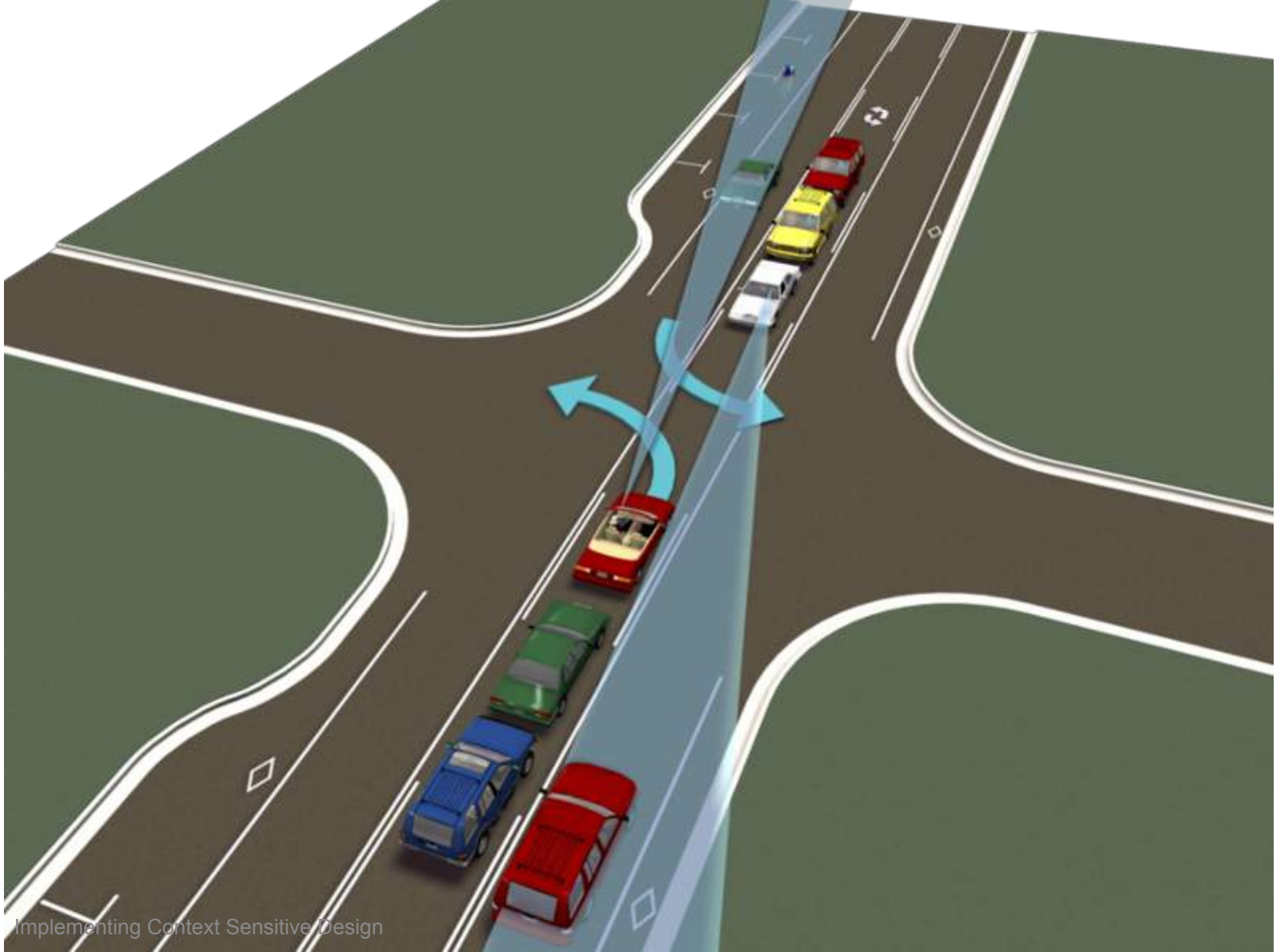
- Risk:
  - Design of street/street type
  - Weather
  - Presence of pedestrians/cyclists
  - Vertical elements (trees, buildings, etc.)
- Reward:
  - Decreased travel time

Design Speed vs. Operating Speed

- Selection of design speed controls:
  - Horizontal curvature
  - Vertical curvature
- Design elements that affect operating speed:
  - Multilane Cartways
  - Lane width
  - Edge activity
  - Vertical elements

Strategy 1: Road Diets





Edgewater Drive (Orlando, FL)

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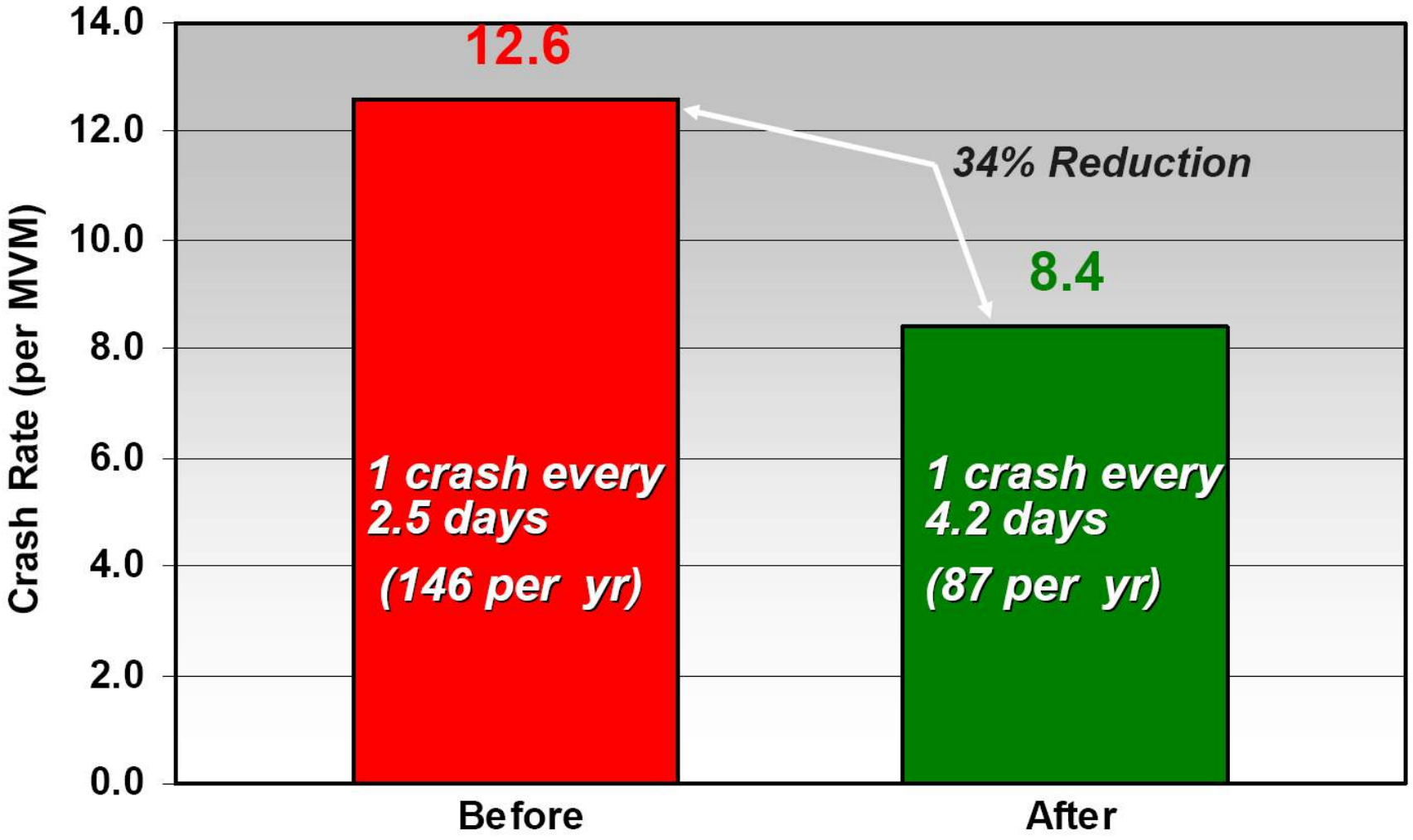
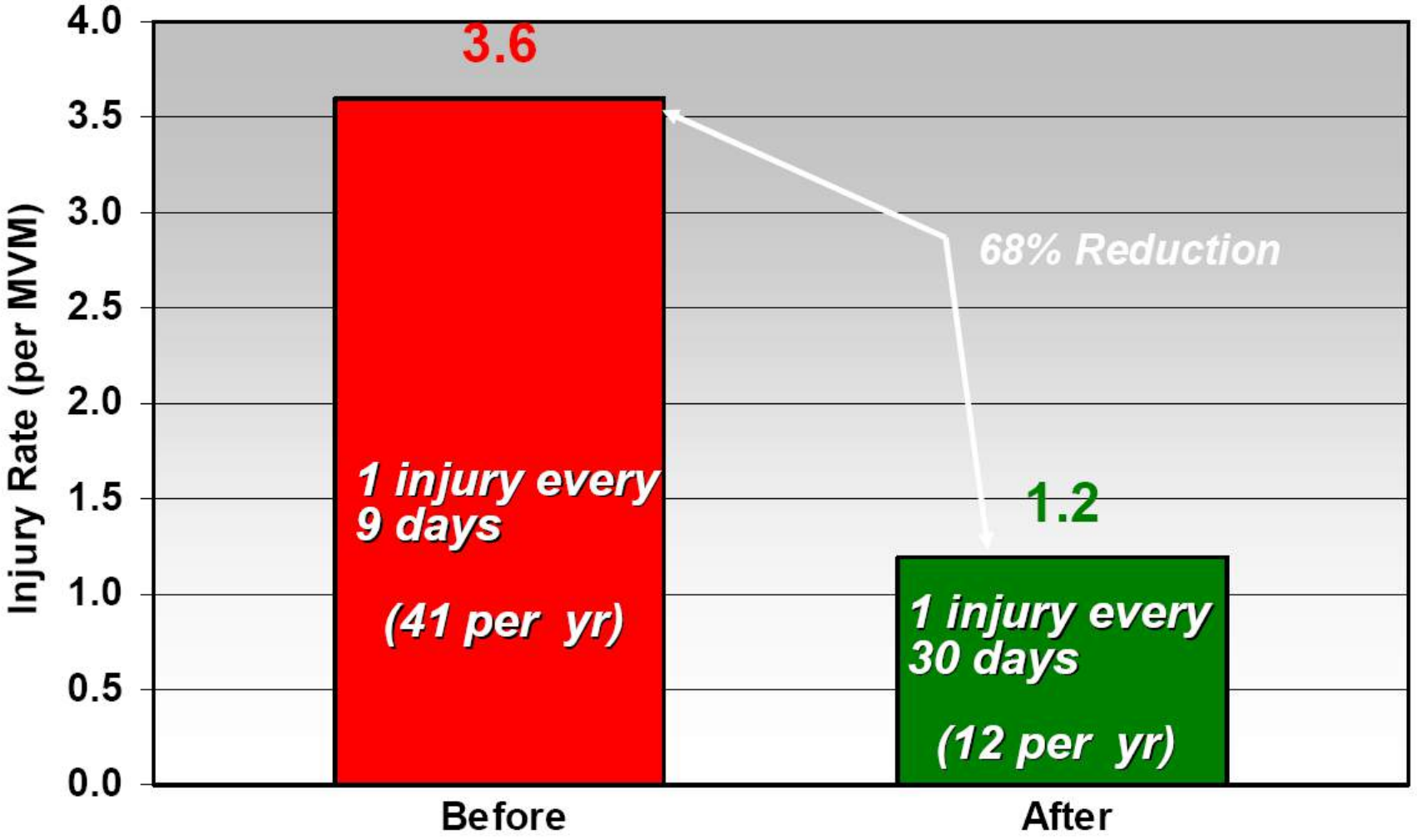
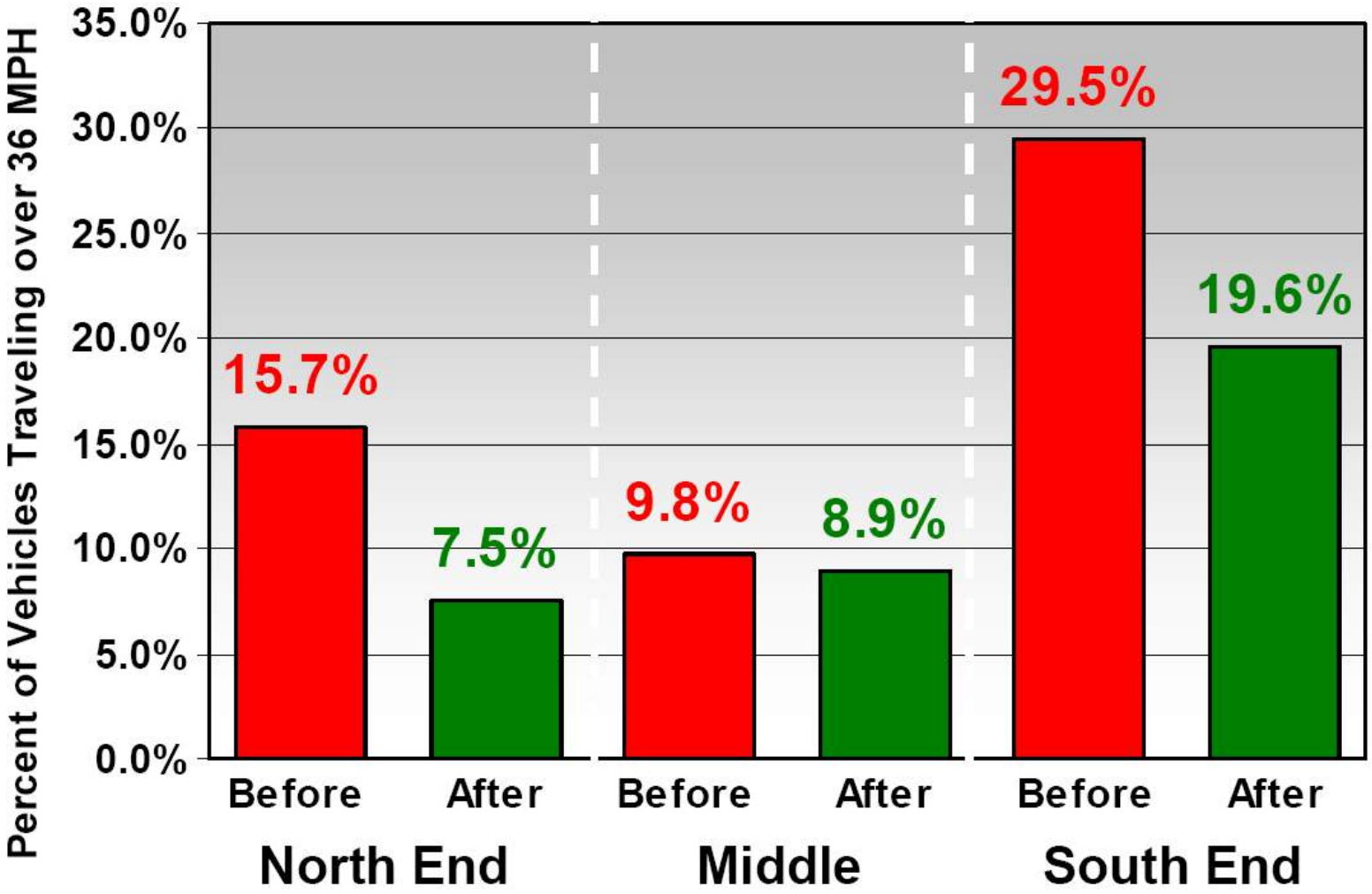


Edgewater Drive (Orlando, FL)

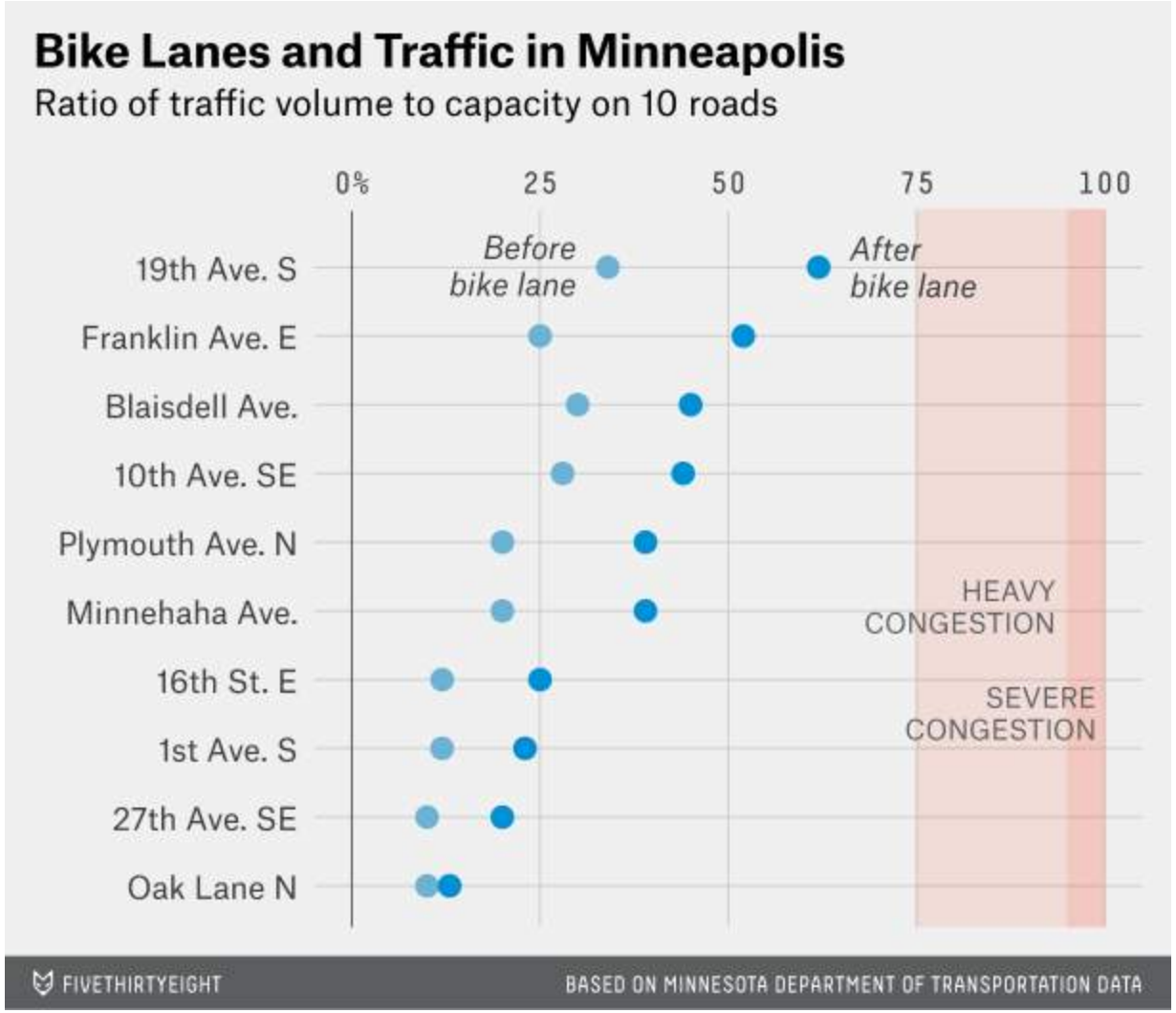


Edgewater Drive (Orlando, FL)



Areas of Successful Road Diet Implementation - Collision			
Location	**Street**	**Change**	**Collision Reduction**
Seattle, WA	8th Avenue, NW, in Ballard Area	4 Lanes to 3	18 to 7 61%
Seattle, WA	24th Avenue, NW, From NW 85th St. to NW 65th Street	4 Lanes to 3	14 to 10 28%
Seattle, WA	Dexter Avenue, N, East side of Queen	4 Lanes to 3	19 to 16 59%
Seattle, WA	Greenwood Avenue	4 Lanes to 3	24 to 10 58%
Seattle, WA	North 45th Street	4 Lanes to 3	45 to 23 49%
Seattle, WA	Martin Luther King Jr. Way, North of I-90	4 Lanes to 3	15 to 6 60%

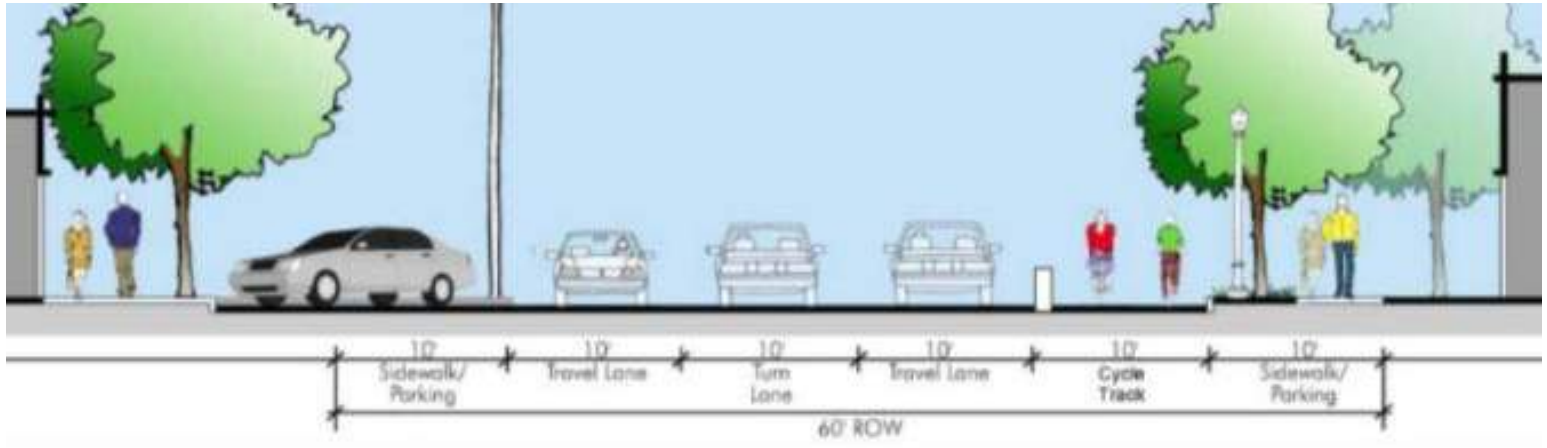
Minneapolis Lane Removals



Strategy 2: Lane Width Adjustment

Before

Testing



Plan

Knox St, Dallas (Demonstration Project)

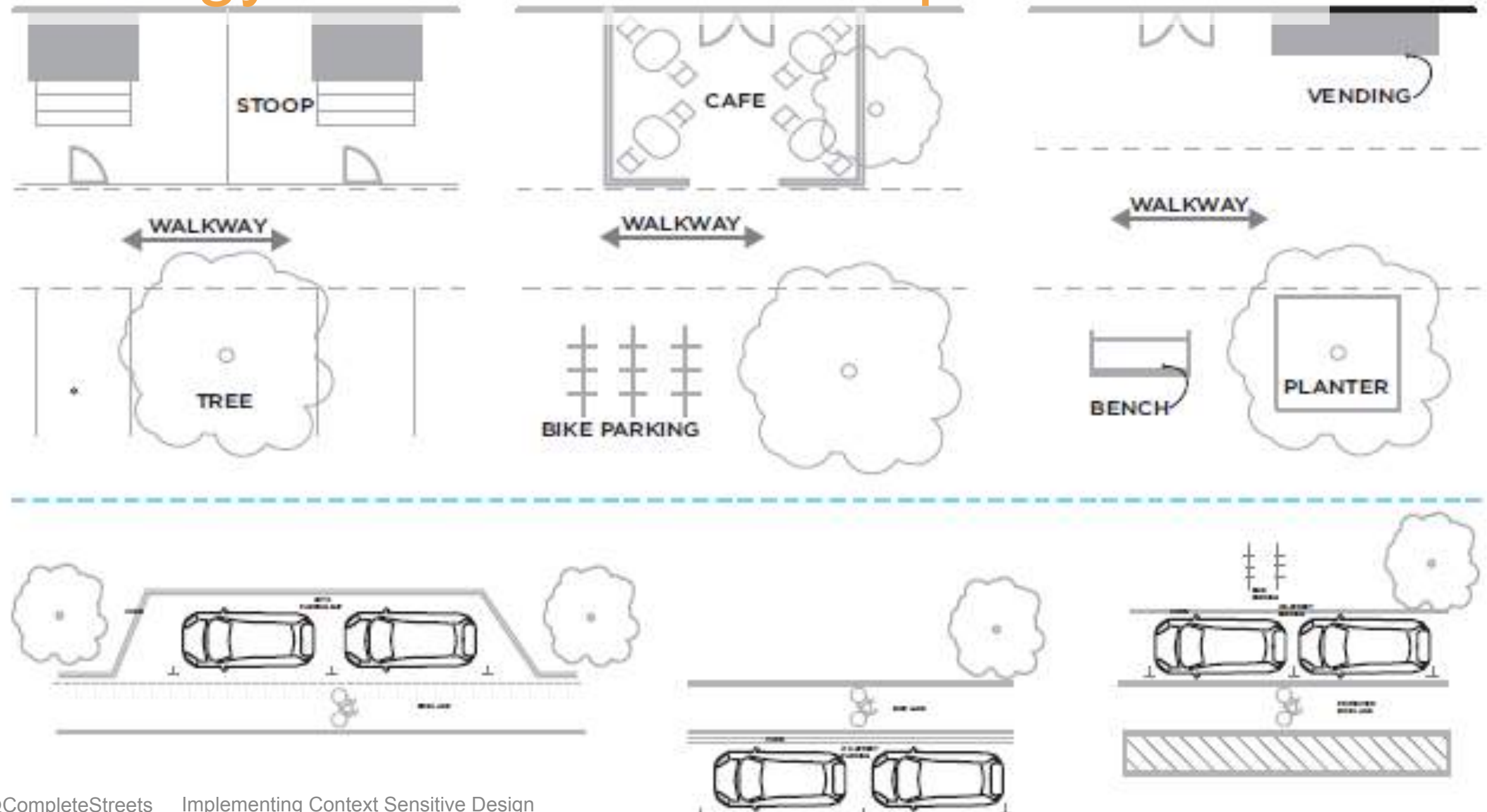
Lane Widths and Speed

Knox St, Dallas (Demonstration Project)

Strategies 1 and 2

The bike lanes may only be incidental, but you still get them.

Strategy 3: Amenitize The Space Saved

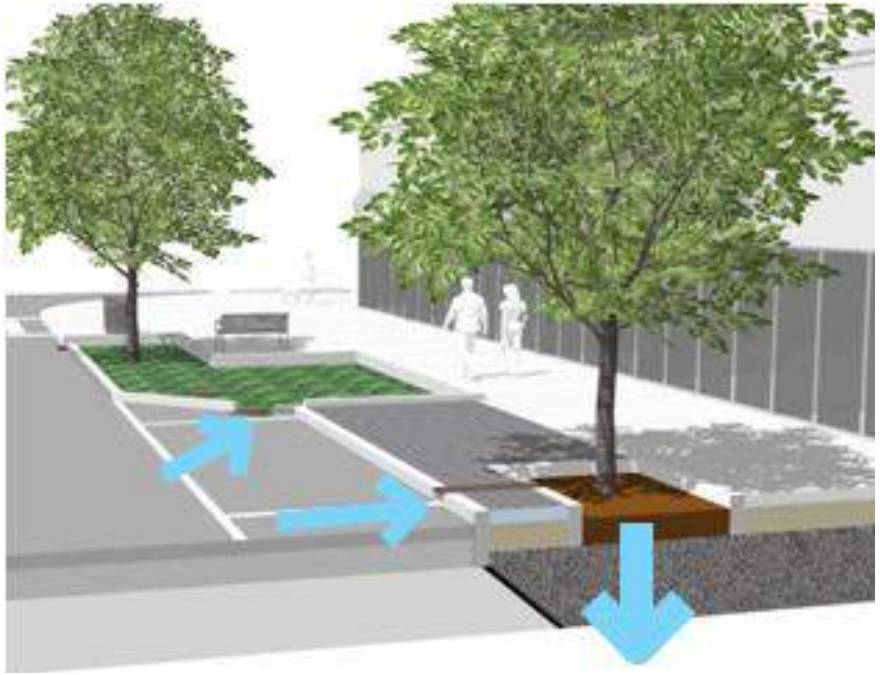


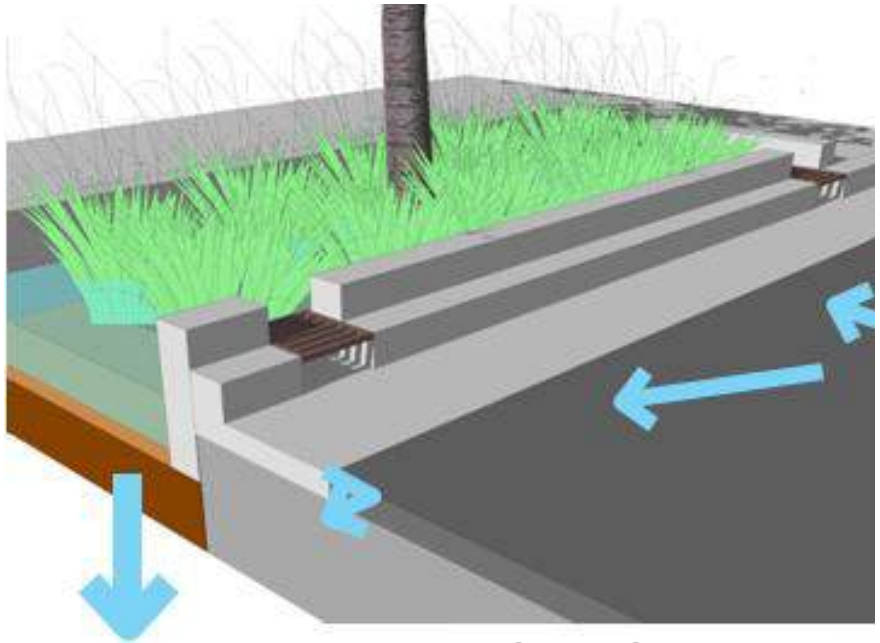
Bicycle Parking or Infrastructure

Dedicated Transit Lanes/Stops

Public Space

More Vehicle Lanes





Pittsburgh Street Design Guidelines

THANK YOU

Paul Moore
Nelson\Nygaard
213.785.5500