GOVERNORS' INSTITUTE on community design

Accelerating Practical Solutions
A workshop for NHDOT

March 6, 2018

GOVERNORS' INSTITUTE on community design

The Governors' Institute on Community Design® is a program of Smart Growth America that advises governors and state leaders as they seek to guide growth and development in their states.

The Institute brings together leading practitioners and academicians in the fields of government, design, development, and regional economics to help each state's executive team make informed choices as they shape the future of their states.

Trainers

Emiko Atherton
National Complete Streets Coalition

Mike Rutkowski P.E., AICP
Stantec

Agenda

- ✓ Welcome
- ✓ Practical Solutions
- ✓ Why choose Complete Streets?
- ✓ Project Development Process (NH)
- ✓ Review a model PDP
- ✓ Case Study: King Street, Boscawen
- ✓ Brainstorm session – current process

Overview of Practical Solutions

Emiko Atherton

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Purpose of *Accelerating Practical Solutions*

To help agencies tackle **barriers** they face to practical solutions and to protecting the safety of all users of the transportation system

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Practical solutions:

- Seek cost-effective solutions with a high rate of return
- Improve the local *and* regional transportation system
- Seek outcomes beyond just level of service (delay)
- Maintain and improve existing investments first
- Plan and design within the context of the community
- Partner with local governments on land use
- Address the safety of all users equally

What is context?

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Photo: Doug Kerr via flickr

What is context?

GOVERNORS' INSTITUTE on community design

Photo: Berlin, NH. Credit Jasperdo via flickr

What is context?

GOVERNORS' INSTITUTE on community design

Photo: SR149, Hillsborough. Credit: Doug Kerr via flickr

What is context?

GOVERNORS' INSTITUTE on community design

Photo: NH State Route 11. Credit Doug Kerr via flickr

What is context?

GOVERNORS' INSTITUTE on community design

Photo: NH State Route 28. Credit Doug Kerr via flickr

What is context?

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What is cost effective?

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What is Delay/LOS?

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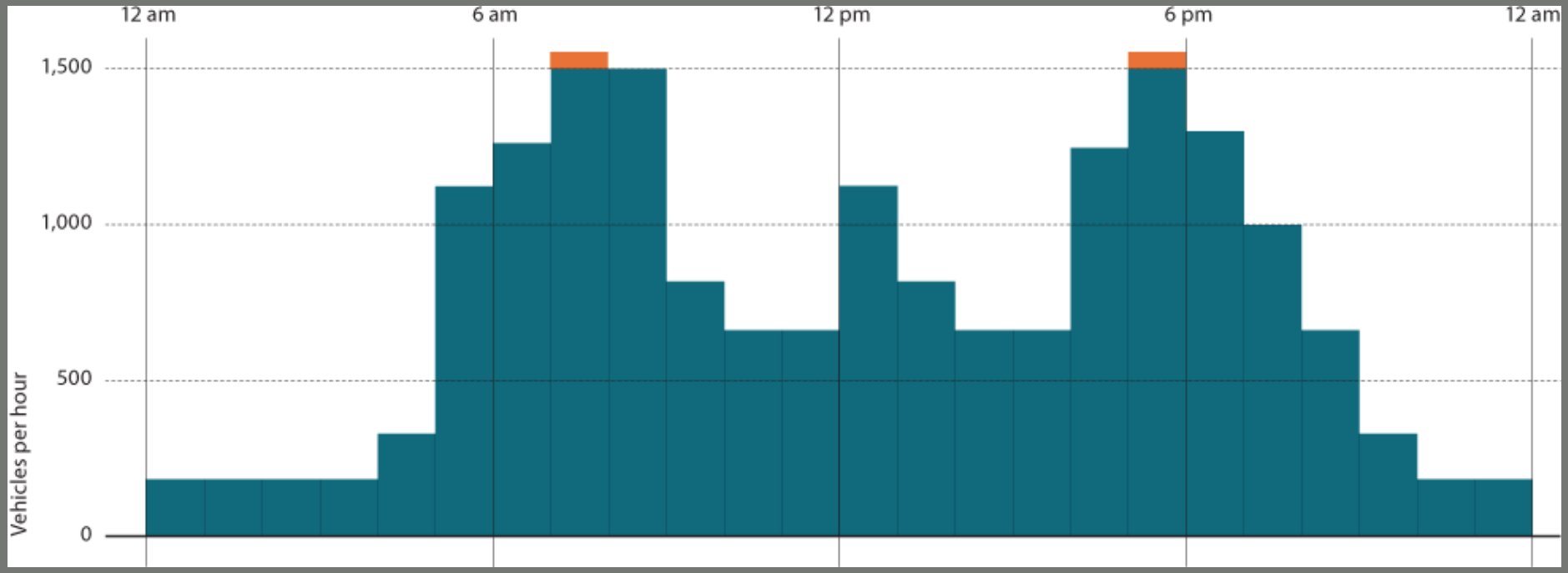
Peak hour vs. overall capacity



What is the role of land use?

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Without Land Use Coordination

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Credit: Billy Hattaway, City of Orlando

With Land Use Coordination

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With Land Use Coordination

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With Actual People!

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FHWA Performance Based Observations

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- Focus on performance improvements that benefit both project and system needs. Agencies make sound decisions based upon performance analysis.
- By scrutinizing each element of a project's scope relative to value, need, and urgency, a PBPD approach seeks a greater return on infrastructure investments.
- PBPD strengthens the emphasis on planning-level corridor or system performance needs and objectives when planning, scoping and developing individual projects.
- PBPD can be implemented within the Federal-aid Highway Program regulatory environment utilizing existing flexibility.

Keys to Successful State Implementation

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- Executives embrace and communicate
- Internal DOT champions
- Agencies revise policies and guidance for a multi-disciplinary and comprehensive approach to delivering projects.
- Agencies encourage and empower engineers to exercise judgments on projects based on PBPD principles.
- FHWA Division Offices support State DOT's in their implementation with early and close coordination.

From FDOT:

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Traditional Design Approach

- Project is initiated.
- Scope of work based on "wants" and compliance with DOT manuals.
- Design is based on latest published design criteria and standards (traditional design).
- Design variations and exceptions are used sparingly.
- Final design is selected, bringing facility up to compliance with standard and project "wants."

Practical Design Approach

- Project is initiated with a purpose.
- Scope of work is based on the project purpose and need.
- Design is based on safety and operational performance (Practical Design).
- Design Variations and Exceptions are used regularly based on project purpose and need
- Final design is selected, addressing project purpose and need.

Why Practical Solutions?

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- Not enough funding
- Not getting results expected
- Fights with local leaders with competing priorities or communities that oppose
- Project delivery and permitting problems

Why consider short term solutions

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What can be known?
How long in advance?

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Philippe Leroyer via flickr

Practical Solutions and Complete Streets

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By defining need carefully upfront, multimodal improvements aren't necessarily an "added" cost.

San Francisco Bicycle Coalition via flickr

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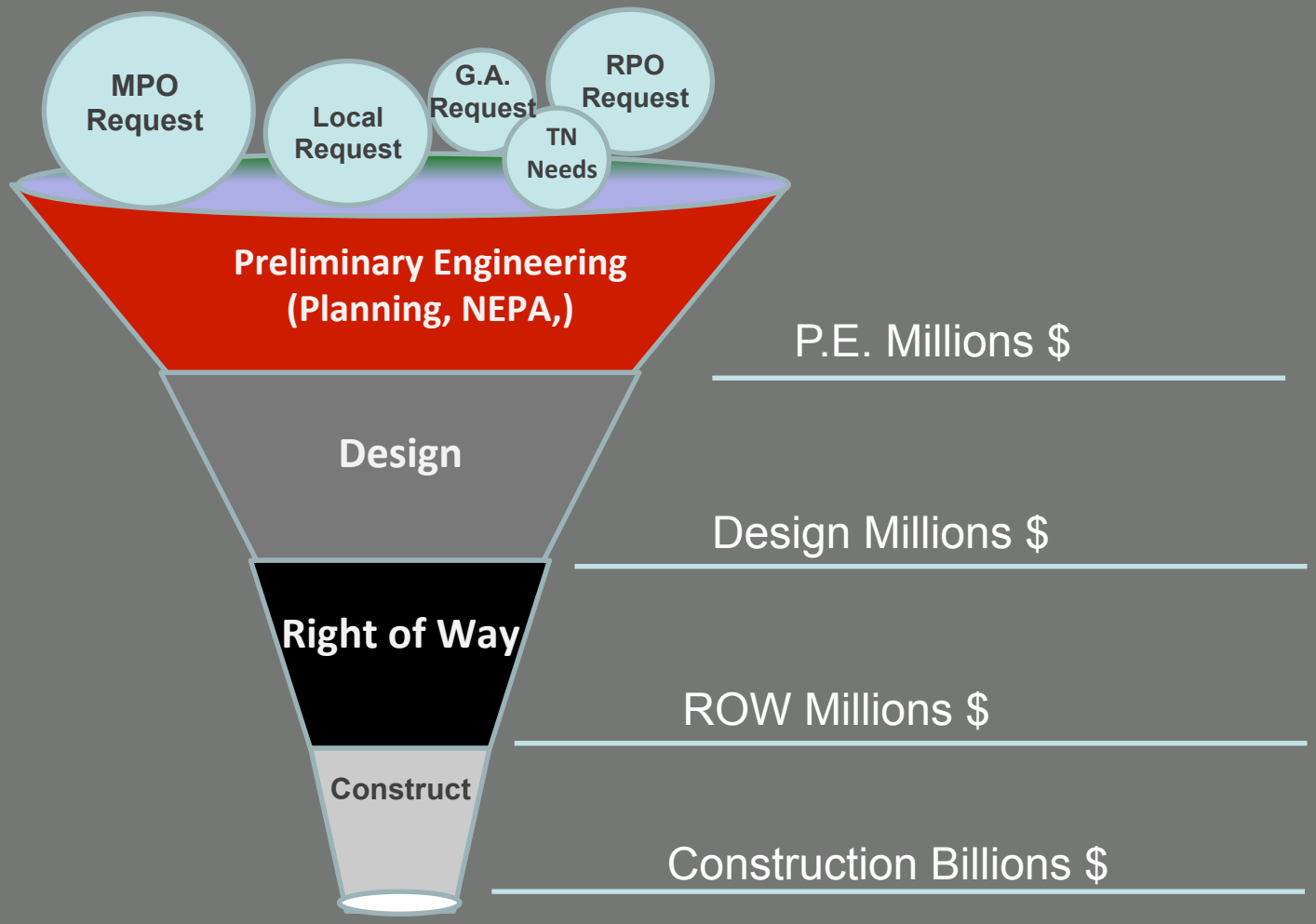
Example: TDOT Expedited Project Delivery

TDOT Expedited Project Delivery



Credit: Toks Omishaken, TDOT

Backlog Projects Total $6.1 Billion

S.R. 19 from EAST of EASTLAND AVE. to HAYWOOD COUNTY LINE

LAUDERDALE COUNTY, TENNESSEE

PIN 102251.01

Original Proposed Project

- 4-Lane Divided Typical Section
  Approx. Project Cost = $19,900,000.00

Recommendations

- **Phase 1** – RSAR Type Safety Improvements
  Approx. Project Cost = $269,500.00
- **Phase 2** – Improve Typical Section (2-12' lanes, 10' shoulders) and sight distance improvements
  Approx. Project Cost = $5,863,500.00

Tennessee Department of Transportation

TDOT

EXPEDITED PROJECT DELIVERY

0 .25 .5 Mile

Lauderdale County SR 19

PIN 102251.01

From East of Eastland Ave. (LM 21.98)
To Haywood County Line (LM 26.14)

Original Project Description:

- In 1996, the Tennessee Department of Transportation (TDOT) undertook a Feasibility Study for improvements to SR 19. This study led TDOT to initiate an Advance Planning Report (APR) in 2003 which studied SR 19 from Eastland Avenue in Ripley, Lauderdale County to U.S. 51 (SR 3) in Brownsville, Haywood County.
- The project was placed on hold until 2008. In 2009, a Transportation Planning Report (TPR) was completed from future I 69 in Ripley to Brownsville Bypass in Lauderdale and Haywood Counties.
- The planning process revealed opposition to major improvements, particularly in the community of Nutbush, Haywood County, located along this segment. However, Lauderdale County generally supported improvements to SR 19, citing the project as conducive to creating jobs and attracting industry.
- In 2011, Mayors from both counties, in addition to the Mayor of Brownsville, gave their support for the project, particularly Option B, which involves widening to a four (4) lane, divided cross section through Lauderdale County and tapering to a two (2) lane cross section through Haywood County.

Existing Typical Section:

- 2-lane Cross Section with 11-ft lanes and 2-ft paved shoulders

Level of Service:

- 2011 = LOS B (2,550 AADT)
- 2031 = LOS B (3,115 AADT)

Crash Data:

- Total Crash Rate of 1.527 (State Avg. 1.66 for rural two (2) lane routes.)
- Severe Crash Rate of 0.145 (State Avg. 0.126 for rural two (2) lane routes.)

Recommendations:

Phase 1:

- Restriping of existing pavement markings throughout
- Replacement of object markers with guard-rail on two (2) box bridges
- Installation of bike route and share the road signs
- Replacement of all MUTCD warning and regulatory signs
- Installation of snowplowable raised pavement markers throughout

Phase 2:

- Widening shoulders to ten (10) feet and travel lanes to twelve (12) feet to improve safety and operations
- Improvements to all associated striping, signage and infrastructure
- Improvements to three (3) vertical curves for sight distance

Project Cost:

- Phase 1 (RSAR) Improvement Costs: $269,500.00
- Phase 2 Costs: $5,863,500.00
- **Total Expedited Project Delivery Cost: $6,133,000.00**

- Original Project Cost: $19,900,000.00
- **Projected Savings: $13,767,000.00**

Savings in TN

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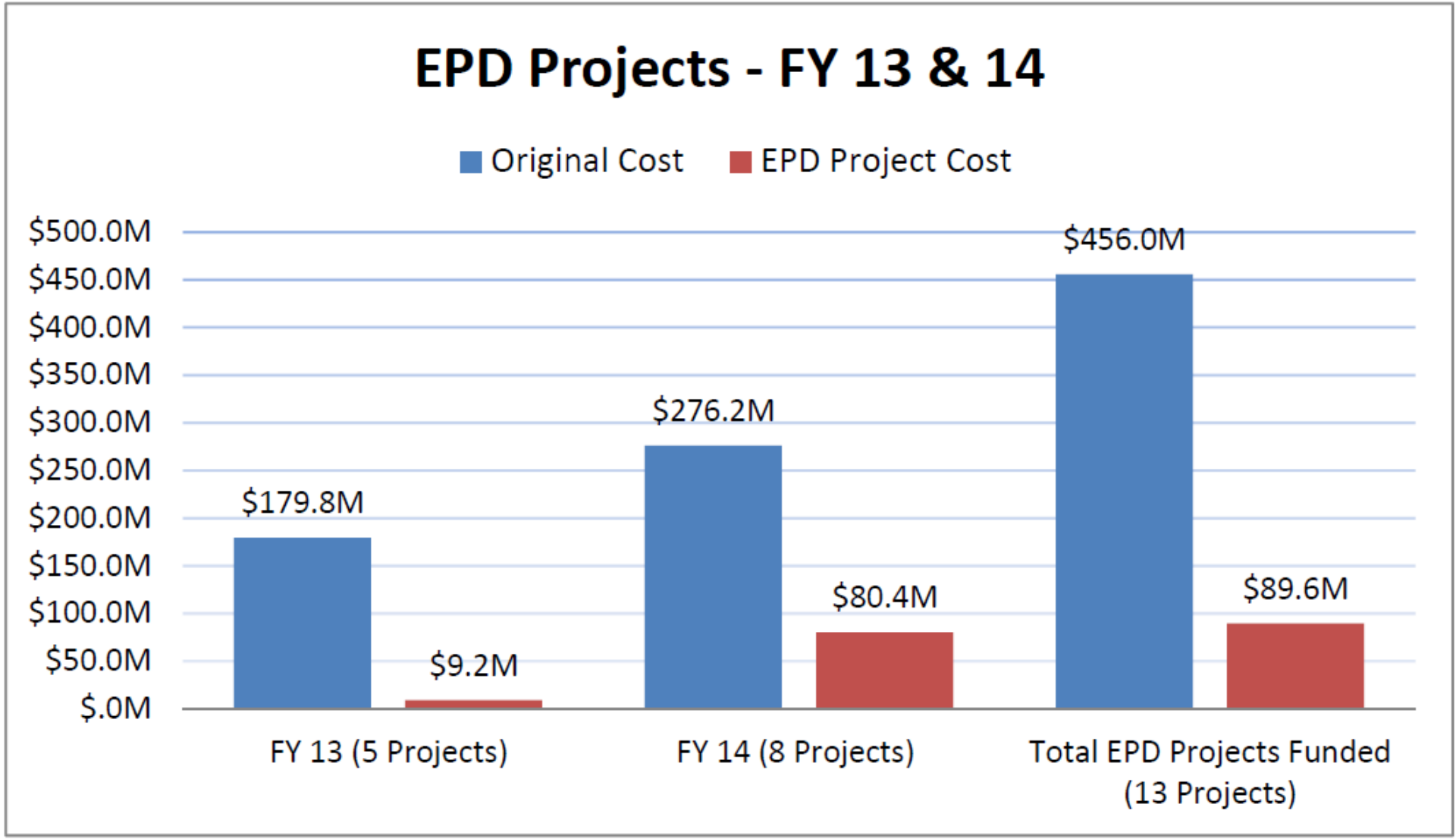

Case Studies on Changing DOT Culture

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- PENNDOT - Smart Transportation
  - contextsensitivesolutions.org/content/case_studies/smart_transportation
- Washington – Practical Solutions
  - www.wsdot.wa.gov/Projects/PracticalDesign/

Other Resource Links

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- Project prioritizations studies
  - https://www.fhwa.dot.gov/planning/processes/land_use/land_use_tools/page03.cfm
- Performance Based Planning
  - http://www.fhwa.dot.gov/planning/performance_based_planning/case_studies/
- Best Practices for DOTs
  - www.smartgrowthamerica.org/the-innovative-dot

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Questions?

Photo credit: AARP

COMPLETE STREETS

Why Choose?

NHDOT

March 6, 2018

Smart Growth America
Improving lives by improving communities

National Complete Streets Coalition

Trainers

Emiko Atherton

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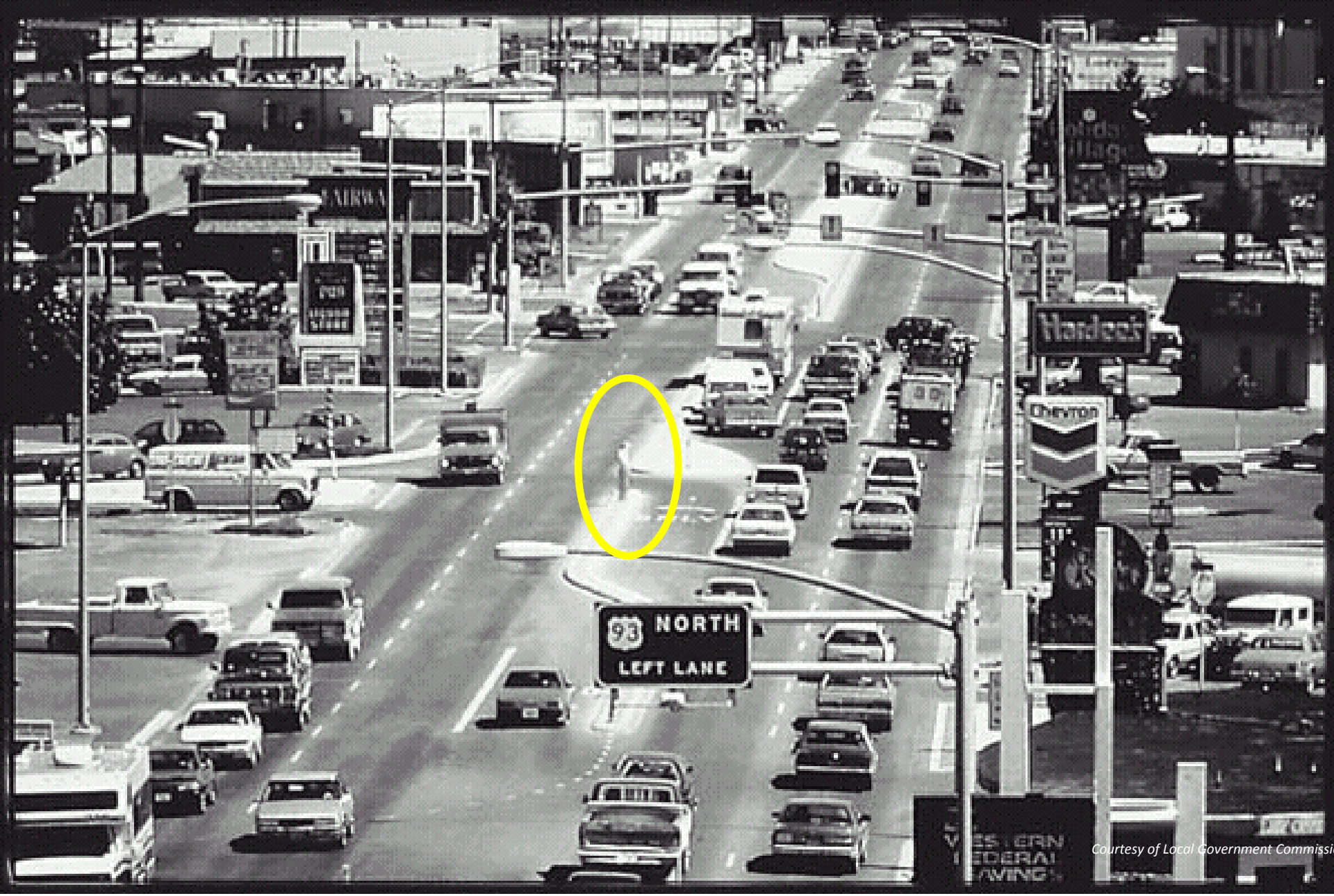
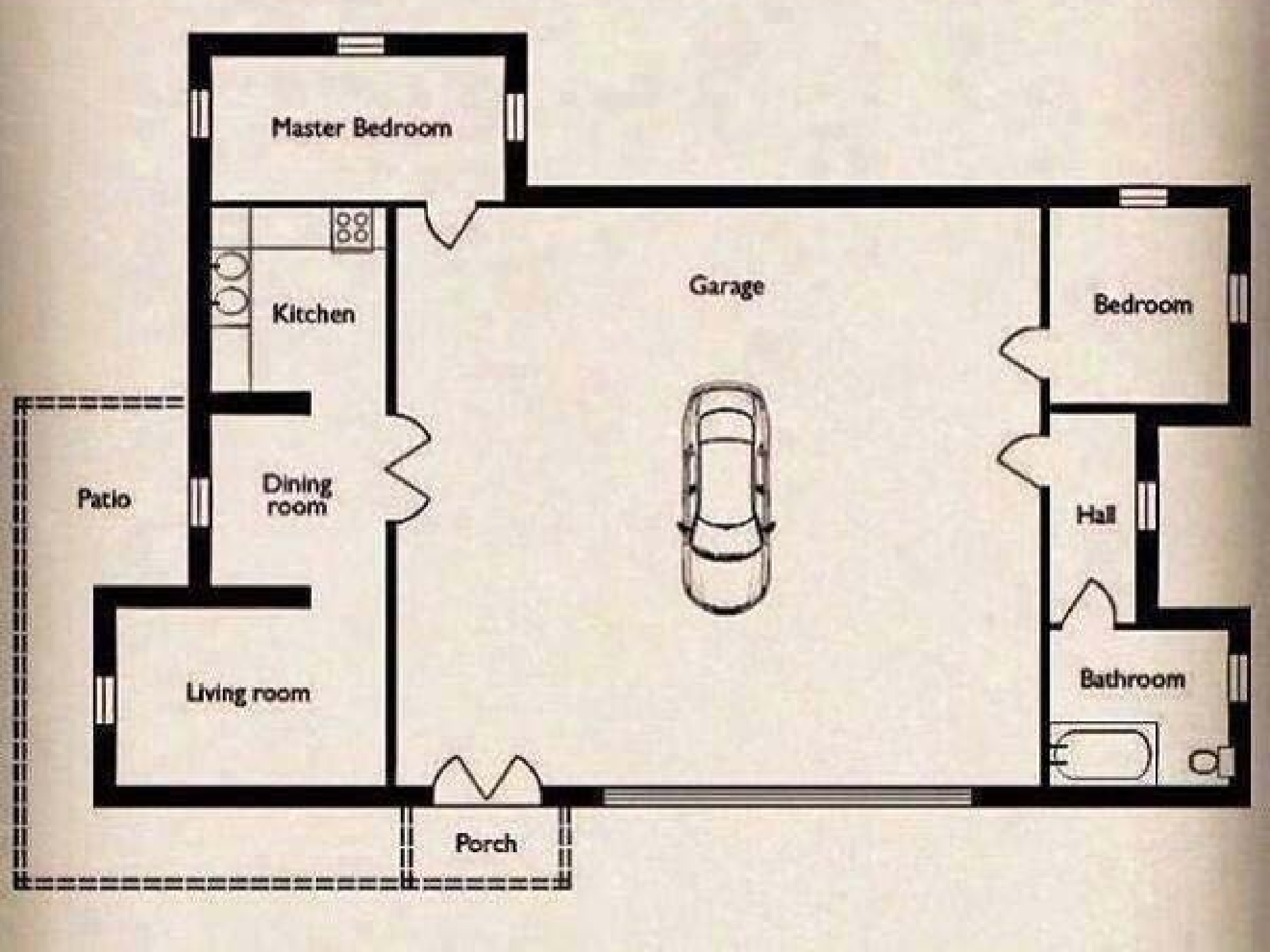
Mike Rutkowski P.E., AICP

Stantec

Courtesy of Local Government Commissi



Courtesy of Local Government Commissi


Master Bedroom
Kitchen
Garage
Bedroom
Patio
Dining room
Hall
Living room
Bathroom
Porch

STOP

What are Complete Streets?

Safe. Comfortable. Convenient.

What are Complete Streets?

Benefit All Users.

Children

- More than 1/3 of kids and teens are overweight or obese.
- Unhealthy weight gain brings higher risk for pre-diabetes, high cholesterol, high blood pressure, sleep apnea, and joint problems.

Older Adults

- More and more people want to age in place.
- By 2025, nearly 1 in 5 Americans will be 65 or older.
- About ½ of all non-drivers over the age of 65 would like to get out more often.

People Living with Disabilities

- Almost 1 in 5 people live with some type of disability.
- Complete Streets = attention to detail for travelers with disabilities, and a reduction in isolation
- High PDI for 65+

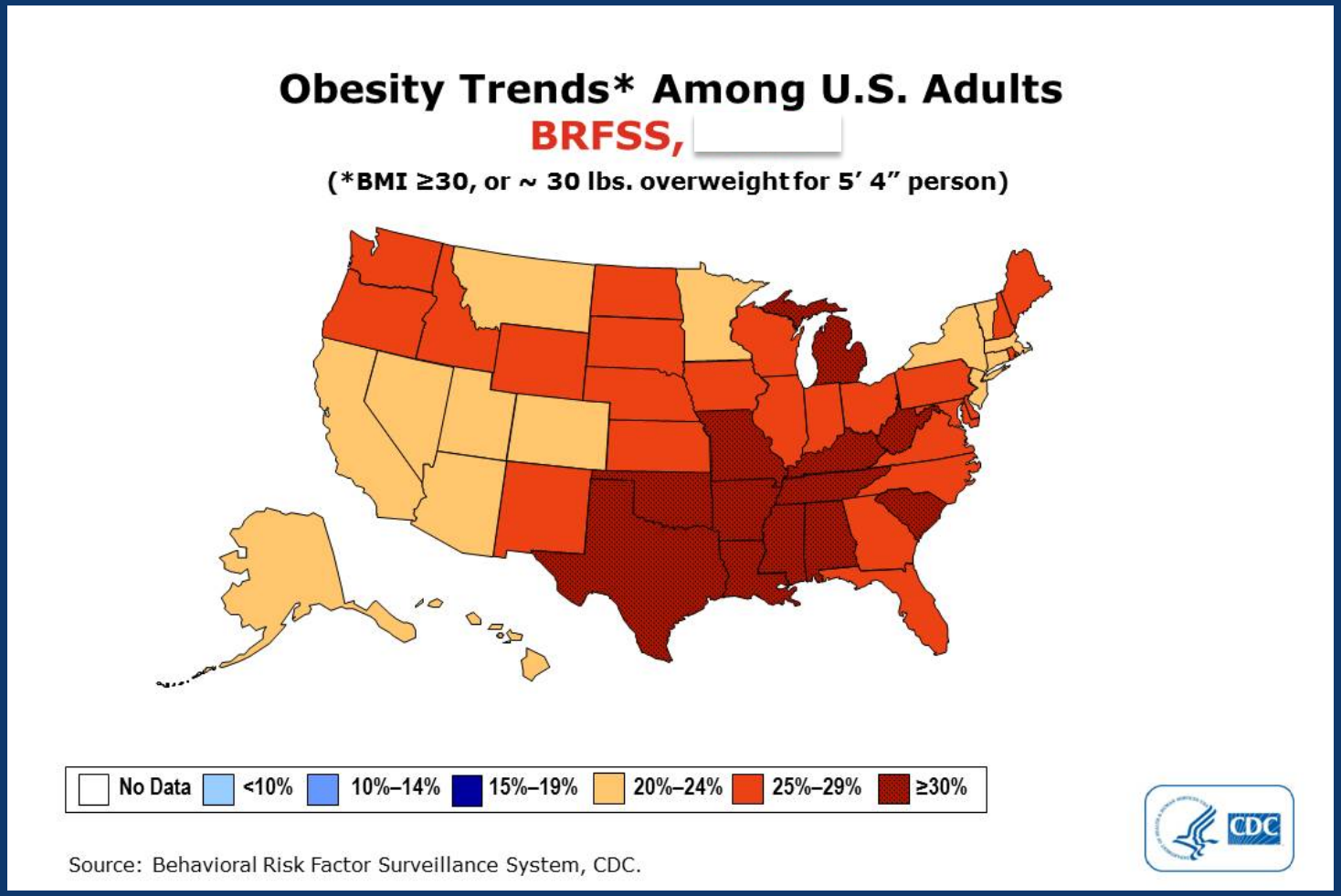
Underserved Communities

- Transportation is second largest expense for families: ~18% of budget
- Low income households spend up to 55% of their budget

34.9%

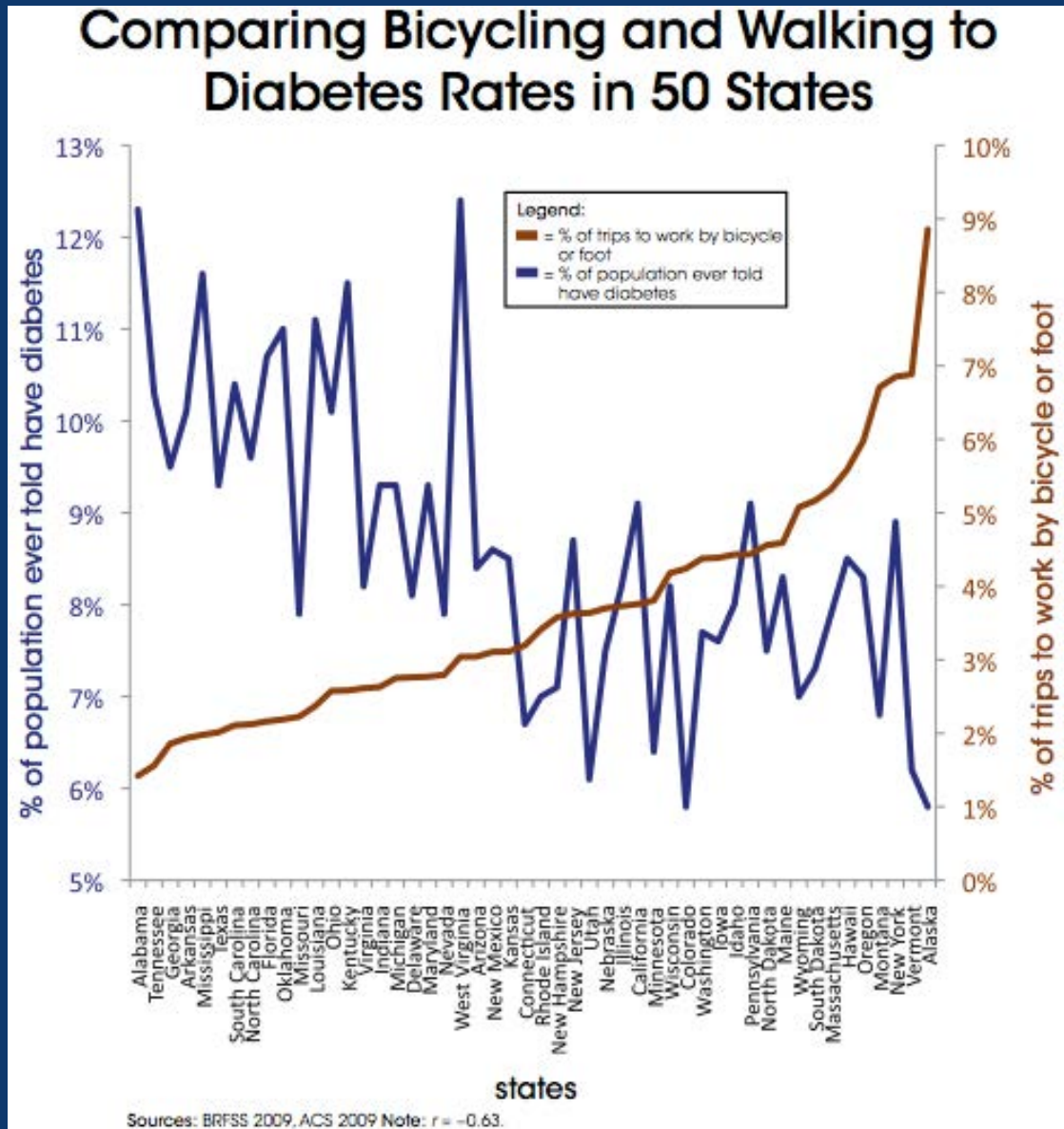
Americans are obese.

Benefits: Health



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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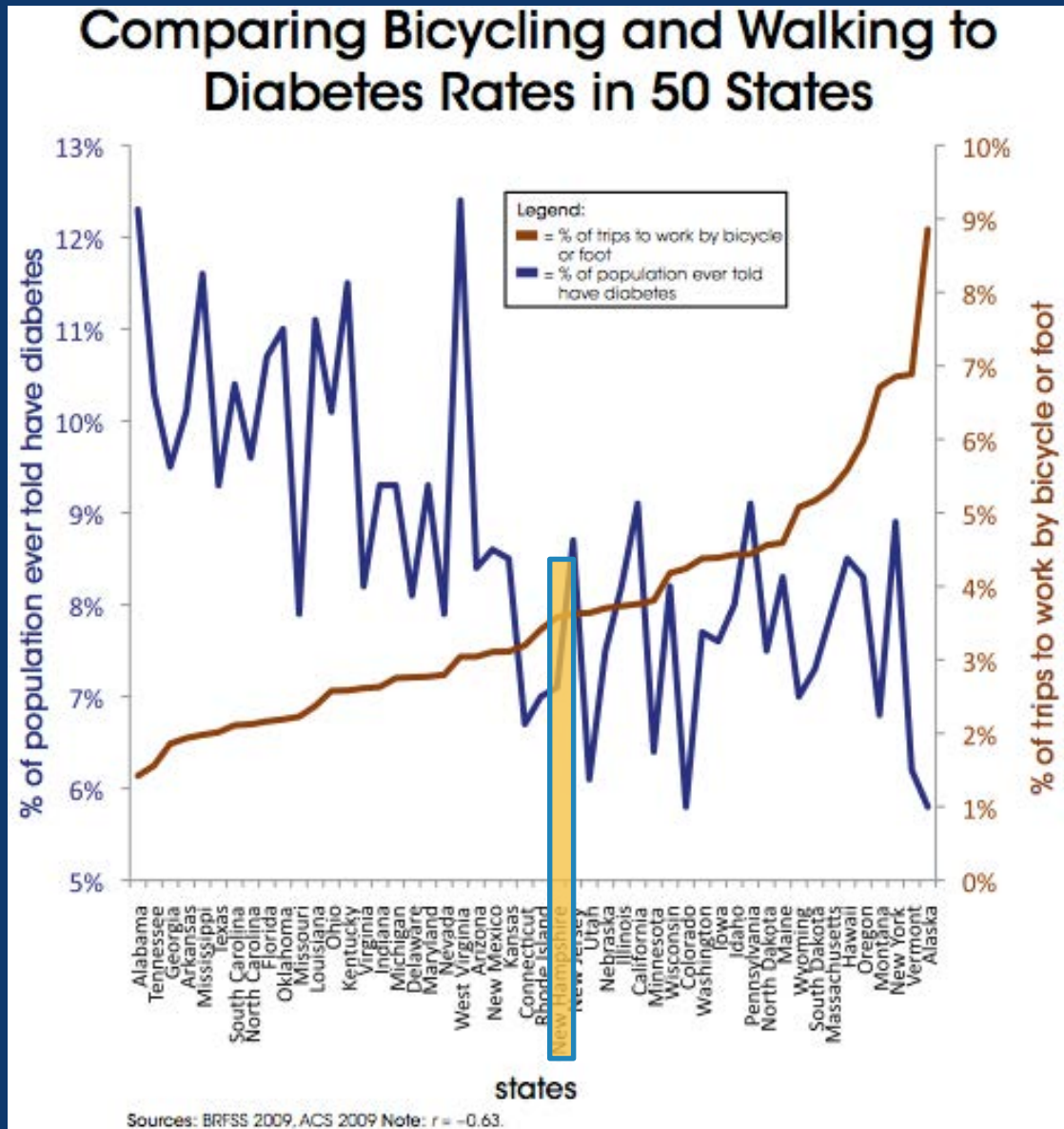

Safety Benefits

- Sidewalks reduce pedestrian crashes 88% (FHWA)
- Shoulders reduce pedestrian crashes 71% (FDOT)
- Medians reduce crashes 40% (NCHRP)
- Road diets reduce crashes 18 – 49% (ITE)
- Countdown signals reduce crashes 25% (FHWA)

Benefits: Safety

There were 32,719 traffic fatalities in the U.S. in 2015. Of these fatalities:

23,303 were people in cars

National Highway Traffic Safety Administration: Fatality Analysis Reporting System 2014

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4,735 were people walking

National Highway Traffic Safety Administration: Fatality Analysis Reporting System 2014

Benefits: Safety

There were 32,719 traffic fatalities in the U.S. in 2015. Of these fatalities:

23,303 were people in cars

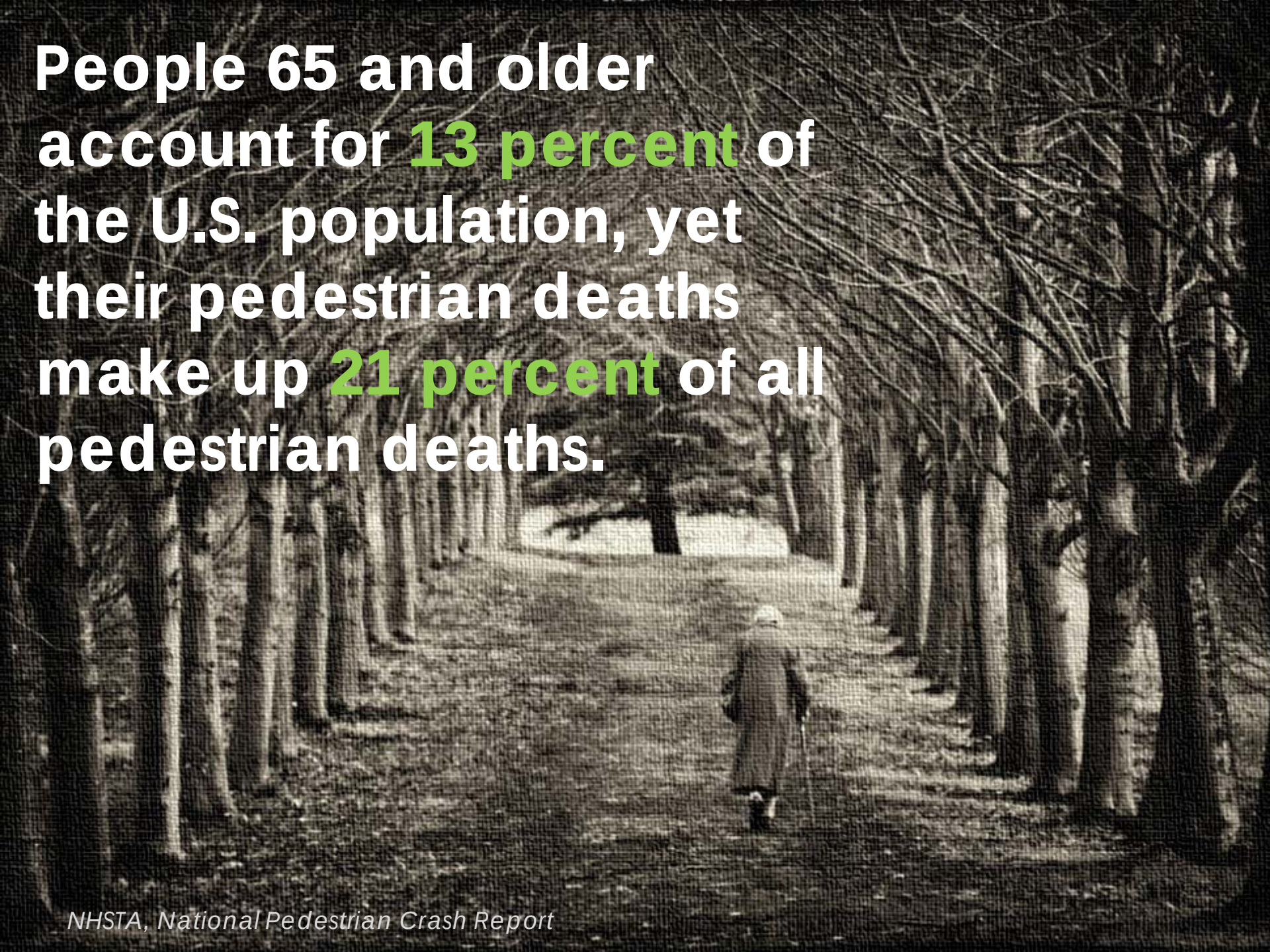
4,735 were people walking

743 were people on bicycles

National Highway Traffic Safety Administration: Fatality Analysis Reporting System 2014

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.



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

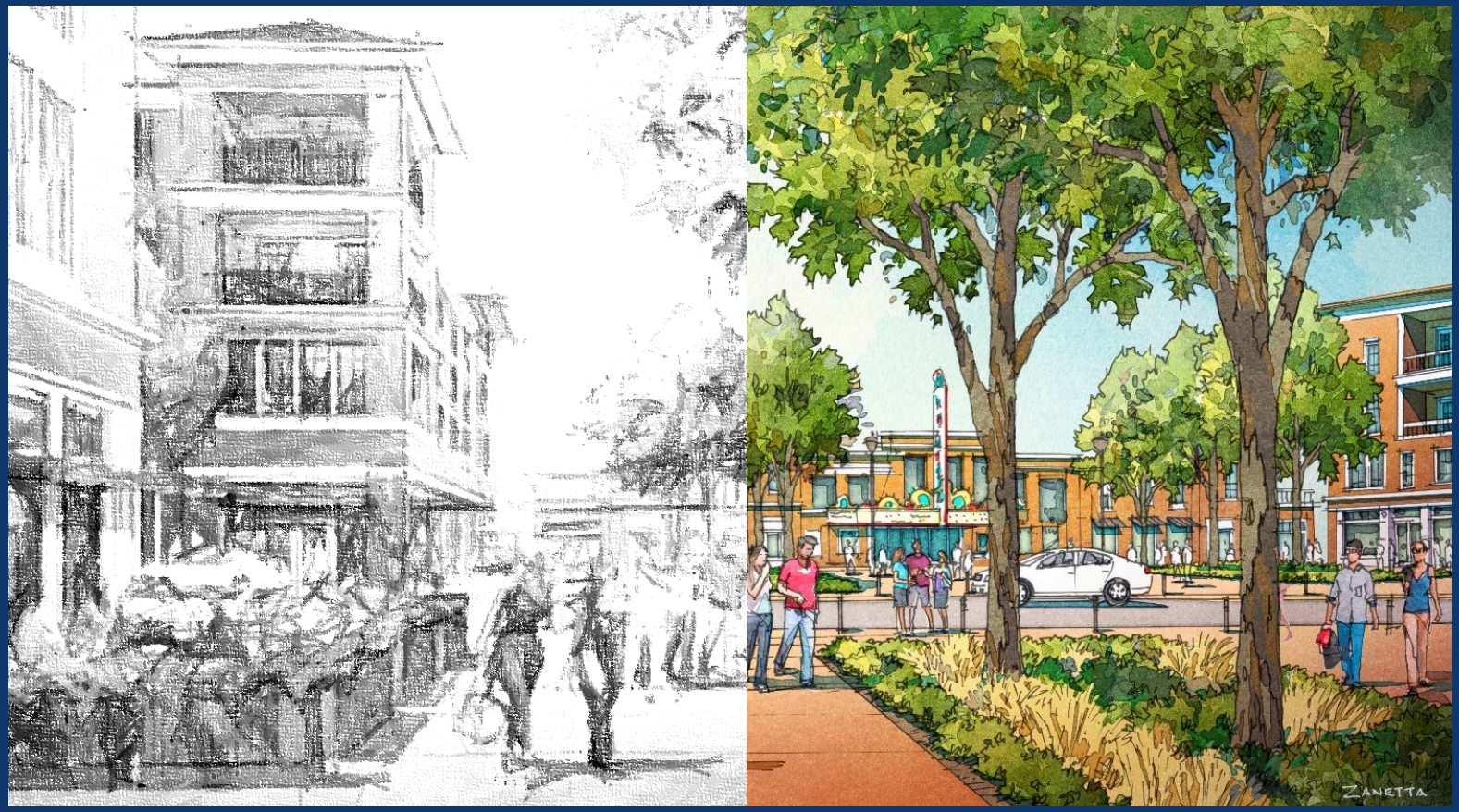
Benefits: Safety

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

Smart Growth America and National Complete Streets Coalition

CREATING VALUE

ASSESSING THE RETURN ON INVESTMENT IN COMPLETE STREETS



Zanetta Illustration

RETURN ON INVESTMENT

It was Bad

FOR A LOT OF PLACES IT STILL IS

01 PRIVATE INVESTMENT
Non-residential investment still down by 20% compared to pre-2009 levels

02 SMALL BUSINESSES TOOK A BEATING
2006: 19,700 business filing for bankruptcy
2008: 43,500

03 $900 BILLION
Spent in 2009 alone by U.S. government to support crippled housing market

04 PAIN SPREADING
Education, relationships, and health all suffered

PERFORMANCE & R.O.I. & SAFETY

GOING BEYOND LEVEL-OF-SERVICE TO CREATE PLACE

PERFORMANCE

Understanding how performance varies by community, and how to get it on the (level) playing field.

SECURITY

Completing a street does little good if it isn't safe to walk or ride on it. How good design can help. This one is on many people's minds today.

RETURN ON INVESTMENT

Maslow was right. It's about needs first, wants second. Creating better places means better opportunity in many cases.

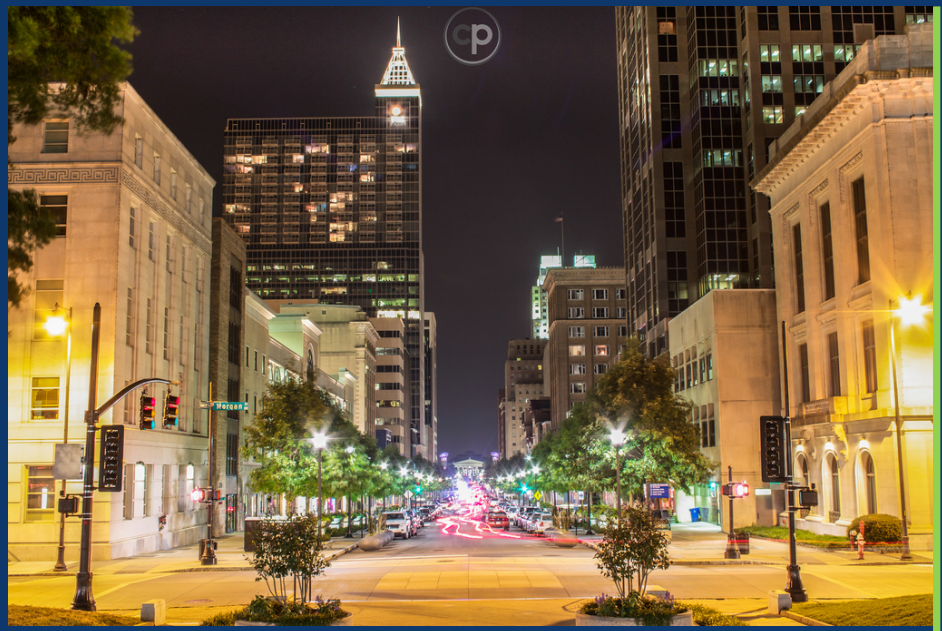
Benefits: Economy

"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 more generational**… This is where we need to think very differently, because if you don't, you will be left behind."

-Mitchell Silver, Chief Planner, Raleigh, N.C.

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

Smart Growth America
Improving lives by improving communities

National Complete Streets Coalition

KINK
KINK fm102. (Now, 20% kinkier.)
BARTH TRAILER SALES
7035 BUZ
CASH GOLD
Marlboro
SERVICE

Smart Growth America
Improving lives by improving communities

National Complete Streets Coalition

TAR

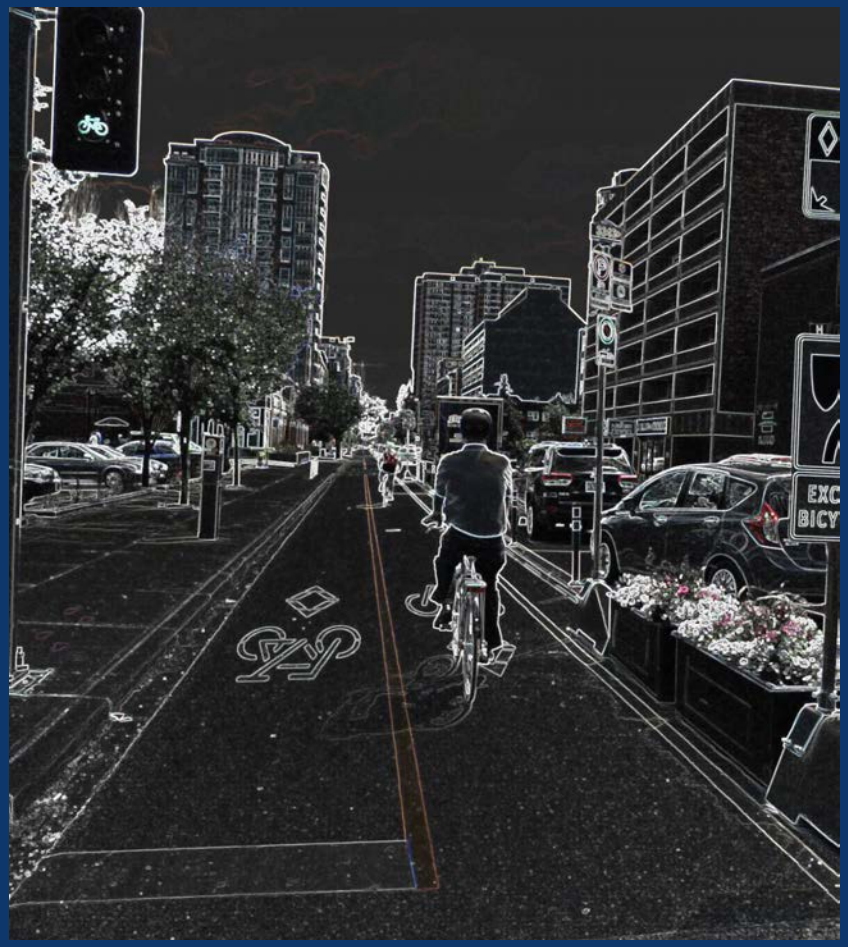
TAR

Types of Complete Streets

Shared rural road with bike lanes

Calgary Cycle Track

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



N
Memorial Dr NW
Bow River
10 St NW
9A St NW
7 St NW
7 St SW
2 St SW
1 St SW
Centre St SW
Centre St S
Macleod Trail SE
4 St NE
Edmonton Trail NE
Memorial Dr NE
Bow River
Riverfront Ave SE
4 Ave SE
5 Ave SE
6 Ave SE
4 St SE
3 Ave SW
4 Ave SW
5 Ave SW
7 Ave SW
9 Ave SW
10 Ave SW
11 Ave SW
10 Ave SE
15 Ave SW
17 Ave SW
11 St SW
9 St SW
8 St SW
14 St SW
3 St SW
4 St SW
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

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Memorial Dr NW
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14 St SW
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Riverfront Ave SE
4 Ave SE
5 Ave SE
6 Ave SE
10 Ave SE
4 St SE
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Potential supporting bikeway
Regional pathway
C-train

6.5

kilometers of bike infrastructure designed and constructed to create a network in the downtown core

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

FINAL THOUGHTS

- It's a process, not a product
- Context Defined
- Prioritize modes
- There are always tradeoffs
- Intersection Design Exceptions
- Available Design Guidelines
- Measure your success!

NHDOT Project Development Process

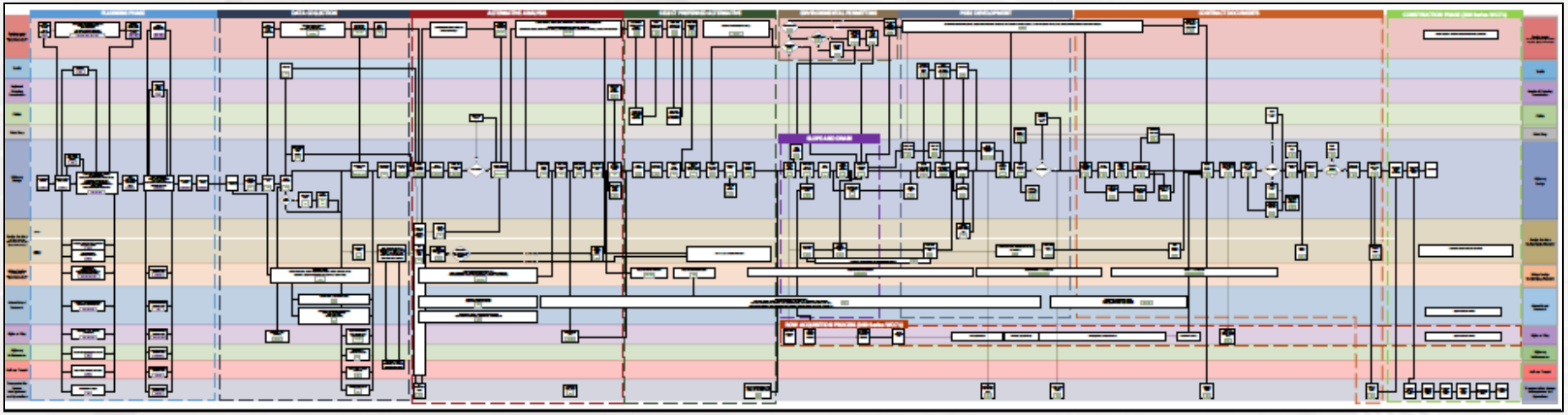
US 302/NH 10, Littleton, NH

Bill Oldenburg,
Asst. Director of Project Development

March 6, 2018

New Hampshire DOT Department of Transportation

The Process….



One Size Fits All….

New Hampshire DOT Department of Transportation

One Size Fits All…….

- Big Projects
  - Salem-Manchester
  - Bow-Concord
  - Newington-Dover
- Mid-Sized Projects
  - Loudon-Canterbury
  - Milford-Nashua
- Small Projects
  - Intersections
  - Culverts
- Programmatics
  - Bridge Rehab/Replace
  - Highway Paving
  - CMAQ/LPA
  - Safety
- Maintenance
  - Resurfacing
  - Bridge Maintenance

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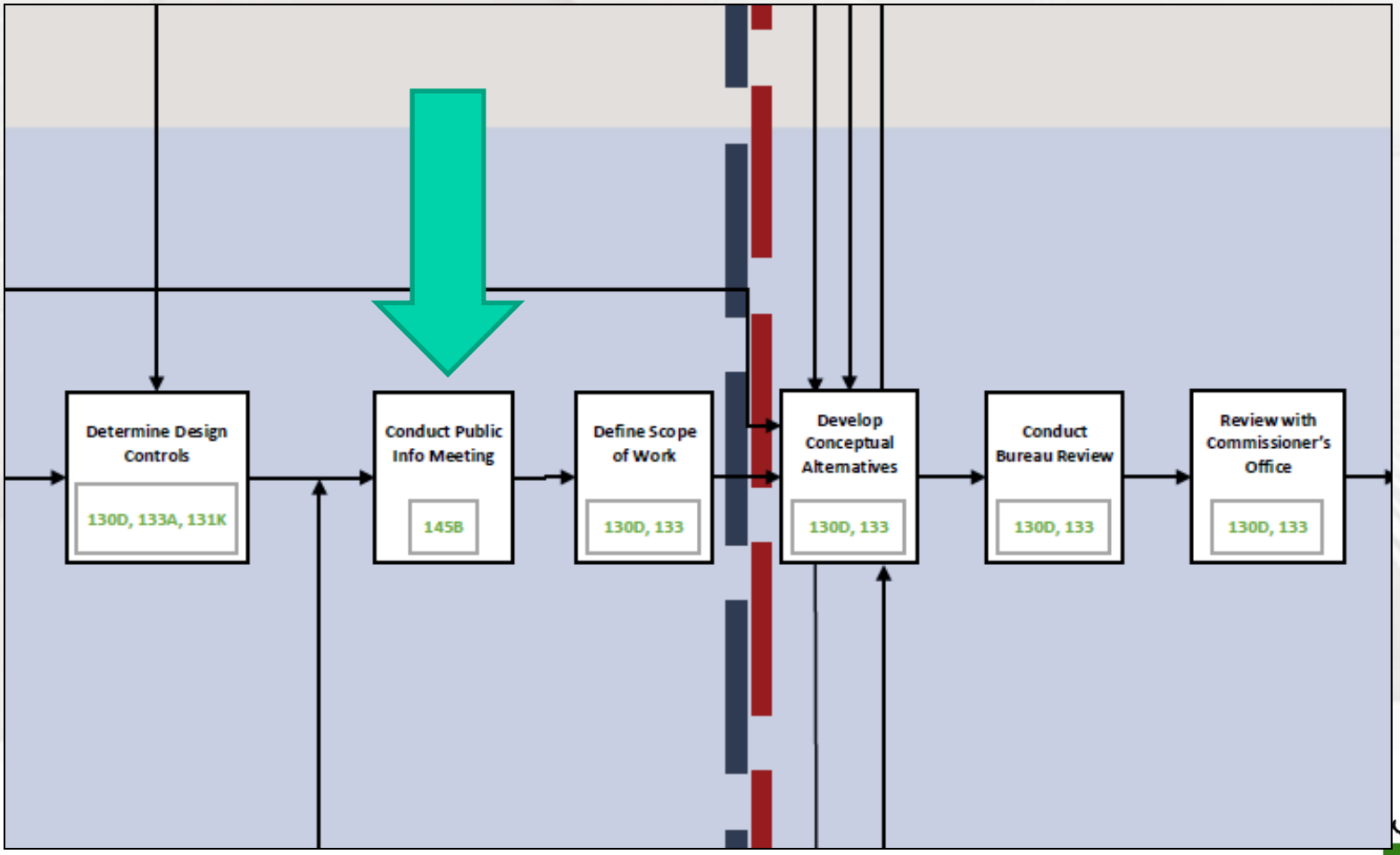
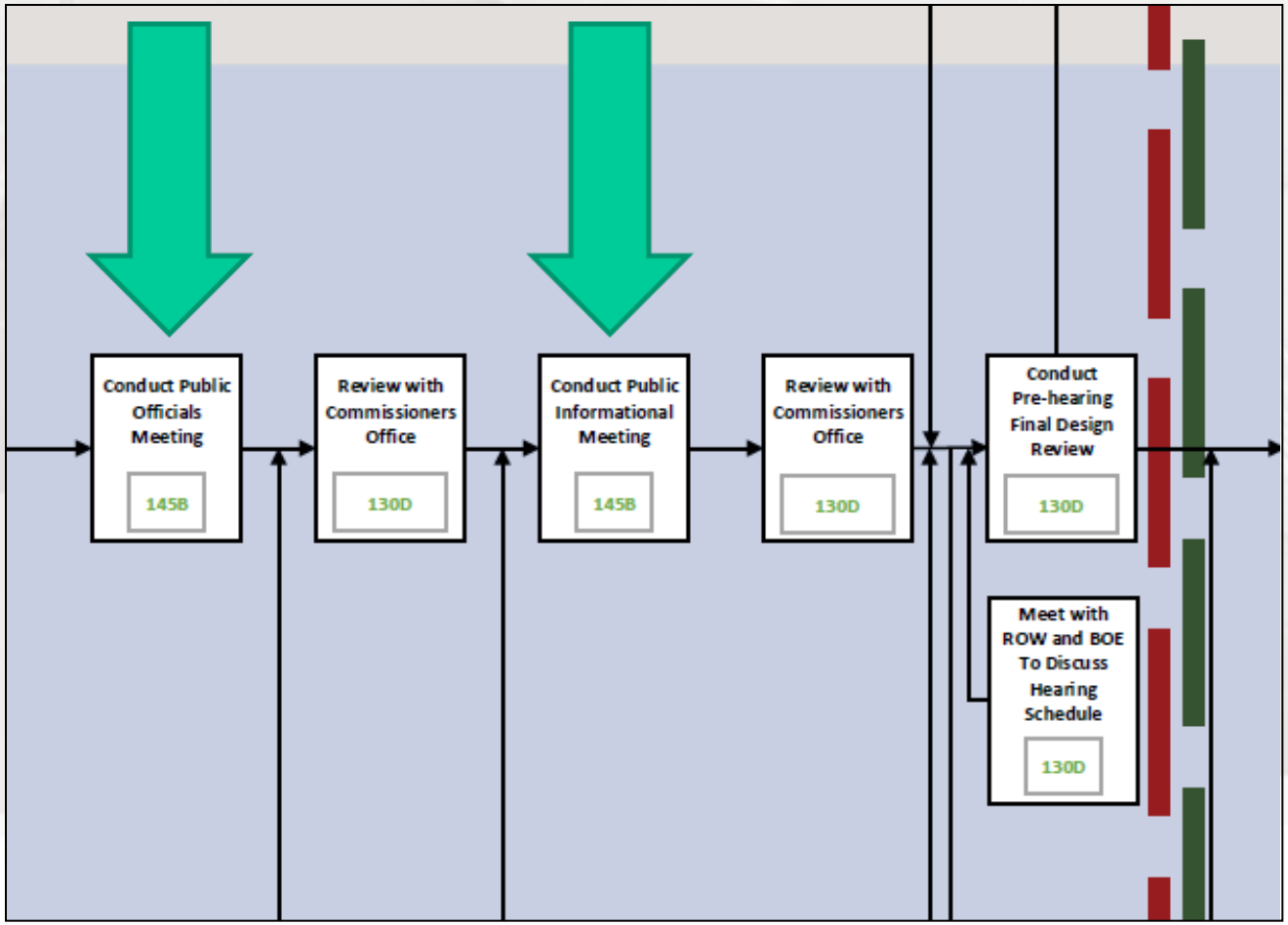
Stakeholder Input – Data Collection



New Hampshire DOT Department of Transportation

Stakeholder Input – Alternatives Analysis



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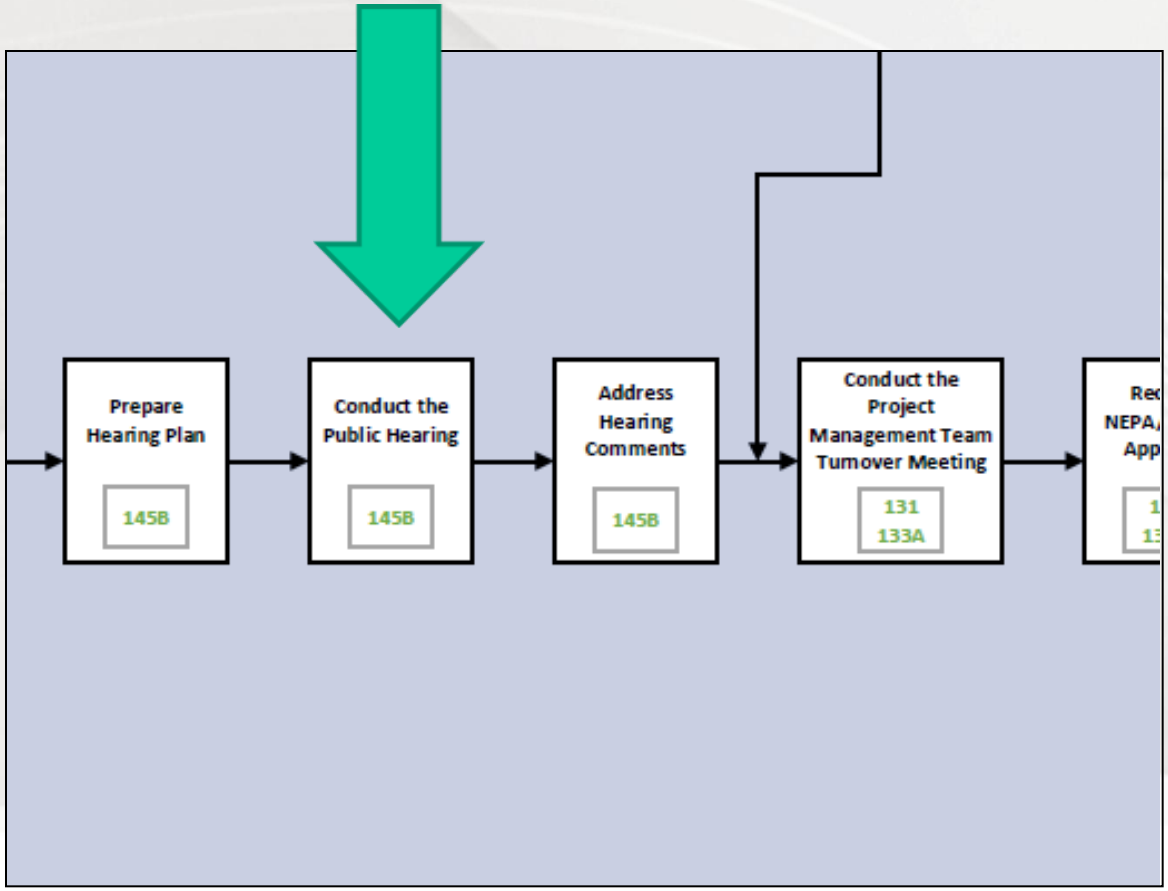
Stakeholder Input – Select Preferred Alternative



New Hampshire DOT Department of Transportation

Public Participation

- Context sensitive solution CSS
- How a project fits into the setting
- Flexibility in design standards
- Considers needs of all users

New Hampshire DOT Department of Transportation

The CSS Project Delivery Process

Excellence in Transportation Design

FEEDBACK

1 Problem Identification

CSS

- Identify transportation problem or need
- Identify stakeholders
- Outreach & preliminary partnership-building
- Project enters 10-Yr Plan

PRODUCTS

- Stakeholder lists
- Preliminary identification of transportation issues
- *Budget decision to proceed*

AND/OR

- Possible non-Transportation Solutions: e.g. No-Build decision; Land Use or Zoning solutions, etc

2 Problem Solution

CSS

PLANNING

- Bring in resource agencies; identify context
- Establish a multi-discipline team
- Discuss and develop consensus on a decision-making process, including plans for public involvement
- Develop consensus around a **problem and need statement** that includes transportation, community and environmental components
- Develop consensus on a project vision that includes transportation, community and environmental components
- Agree on project limits

PRODUCTS

- Process Contract
- Problem Statement
- Vision Statement

SCOPING

- Study the context
- Confirm problem statement
- Develop criteria to evaluate alternatives, based on problem and vision
- Establish a wide range of preliminary alternatives; narrow to a range of reasonable alternatives
- Document environmental effects of the reasonable range of alternatives
- Apply evaluation criteria to alternatives
- Secure consensus on the best alternative
- Create concept design
- Experiment
- Secure consensus on the conceptual design
- Secure official approval
- Preliminary engineering of selected alternative

PRODUCTS

- Evaluation criteria
- Reasonable range
- Preferred alternative
- Approved conceptual design
- *Budget decision to proceed*

3 Solution Implementation

CSS

DESIGN

- Final design of the selected solution of phase or project
- Purchase ROW
- Negotiate community maintenance agreements
- Include in construction documents all agreements and commitments made during Planning, Scoping, and Design
- Prepare bid package
- Spin off related community development projects

PRODUCTS

- Final design
- Bid package

CONSTRUCTION

- Advertise & bid project
- Award contract
- Maintenance of Traffic Plan & schedule to minimize disruption to residents & businesses
- Perform construction
- Coordinate, communicate on change orders and design details
- Open project

PRODUCTS

- A completed project that addresses the problem and achieves the vision

4 Operation-Evaluation

CSS

- Make traffic adjustments
- Maintain community partnerships
- Monitor negotiated maintenance agreements
- Routine Maintenance and Operations activities
- Evaluate the project in terms of the extent to which it solves the problem and achieves the vision
- Capture lessons learned to improve the process
- Provide feedback
- Provide input to new problems & needs identification

PRODUCTS

- Adjusted facility
- Captured lessons

New Hampsh DOT

Maintenance

- Maintenance responsibility often an issue
  - Sidewalks
  - Lighting
  - Pavement Markings (Crosswalks/Bike Symbols)
  - Landscaping
- Maintenance agreements
- Financial constraints, extremely tight budgets
  - DOT & Municipal

New Hampshire DOT Department of Transportation

Partnerships

- Invested/ownership
- Collaboration
- Citizen/Stakeholder Advisory Group(s)

New Hampshire DOT Department of Transportation

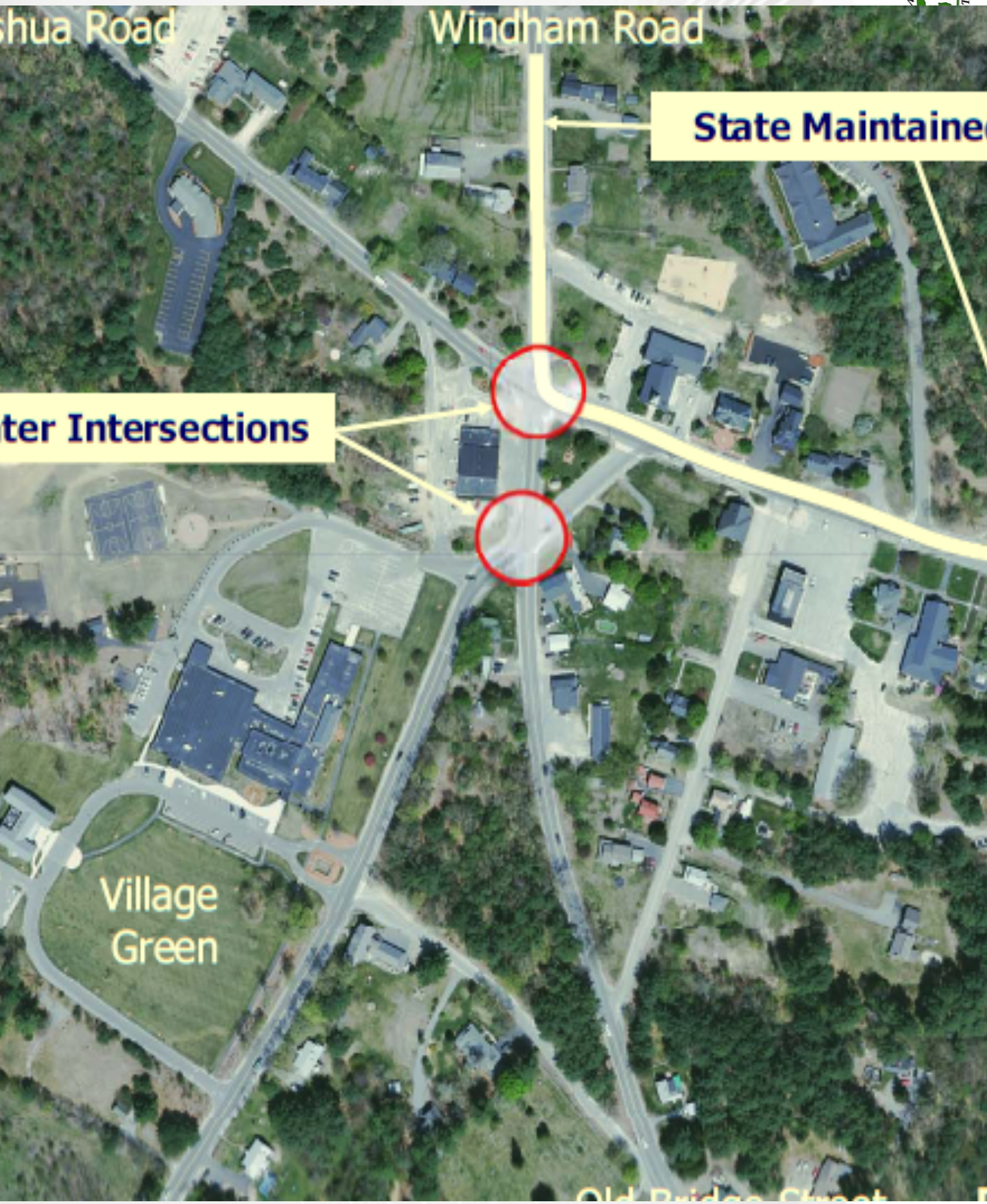
Project Example: Pelham Main Street

- Involved CSS process
- Local funds
- Fire Department (relocated)
- Community Connectedness
- Landscaping
- Increased green space
- Additional parking

New Hampshire DOT Department of Transportation

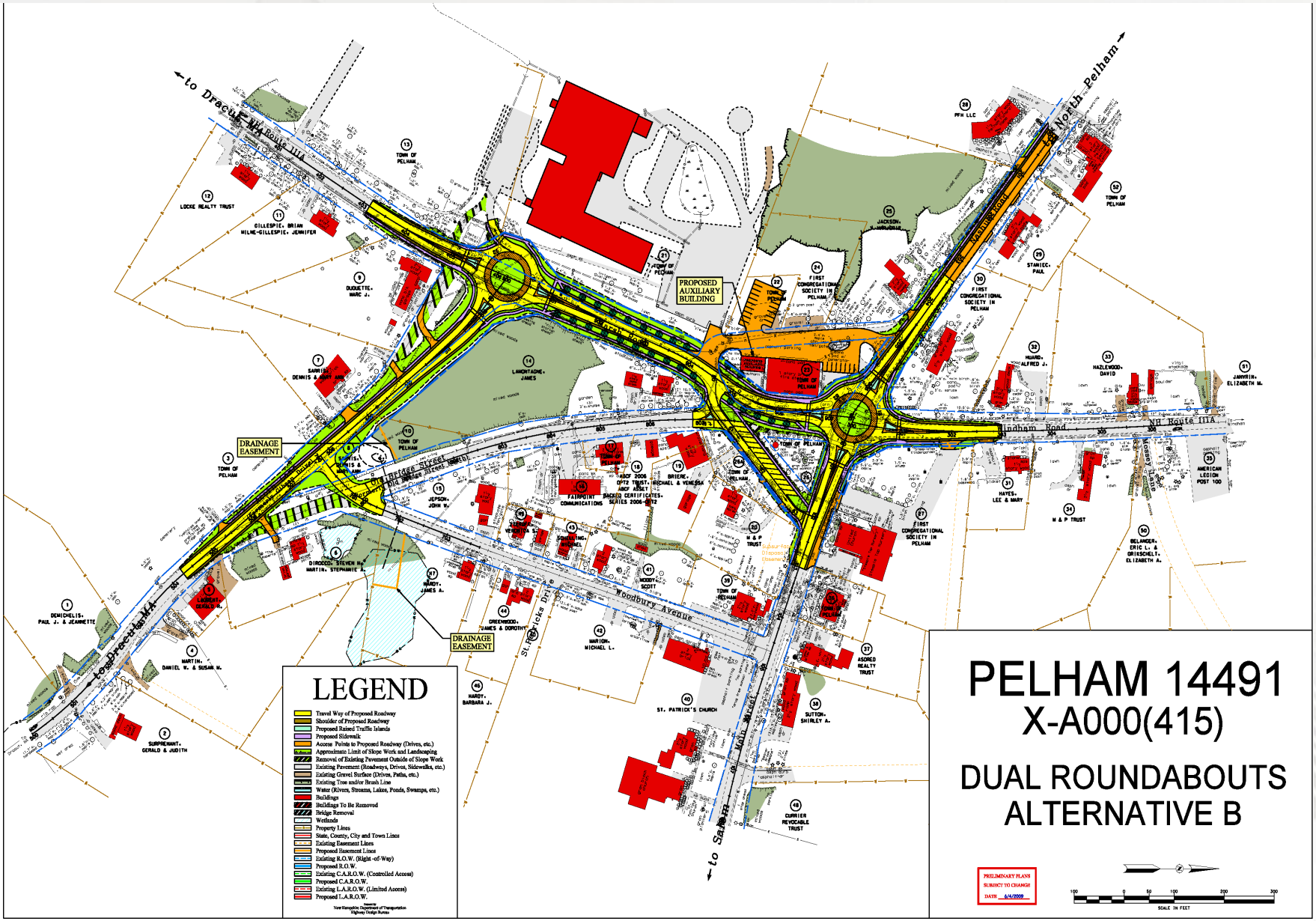
CSS Steps

Department of Transportation


shua Road
Windham Road
State Maintaine
ter Intersections
Village
Green

Reasonable Alternatives

- Roundabout Alternatives
  - Dual Roundabout Alternative A
  - Dual Roundabout Alternative B
  - Single 5-Leg Roundabout Alternative
- Signal Alternatives
  - Dual Signal Alternative A
  - Dual Signal Alternative B



New Hampshire DOT
Department of Transportation

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Pembroke US 3

(Proposed lane layout tick mark for three lane section)

New Hampshire DOT Department of Transportation

Hopkinton NH 9

New Hampshire DOT Department of Transportation

New London – NH 11 Crockett's Corner

New Hampshire DOT
Department of Transportation

Lebanon – NH 12A

http://mutcd.fhwa.dot.gov/htm/2009/part9/fig9c_04_longdesc.htm

(City-maintained Lebanon, NH 12 A sample, above)

New Hampshire DOT Department of Transportation

Wentworth NH 25

New Hampshire DOT
Department of Transportation

Wentworth Village Common

New Hampshire DOT
Department of Transportation

Wentworth Village Common

New Hampshire DOT
Department of Transportation

US 3 - Nashua and Merrimack

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Questions ???

New Hampshire DOT
Department of Transportation

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A model inclusive project development process

Emiko Atherton, Smart Growth America

Yakima, WA Hwy 82

FDOT Revisited

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Traditional Design Approach

- Project is initiated.
- Scope of work based on "wants" and compliance with DOT manuals.
- Design is based on latest published design criteria and standards (traditional design).
- Design variations and exceptions are used sparingly.
- Final design is selected, bringing facility up to compliance with standard and project "wants."

Practical Design Approach

- Project is initiated with a purpose.
- Scope of work is based on the project purpose and need.
- Design is based on safety and operational performance (Practical Design).
- Design Variations and Exceptions are used regularly based on project purpose and need
- Final design is selected, addressing project purpose and need.

Defining context and need

EXISTING AND FUTURE CONDITIONS

1. Define land use context

2. Define transportation context

GOALS AND OBJECTIVES

3. Identify deficiencies/ needs

4. Select future project objectives

DECISION-MAKING

5. Define street type, initial cross-section, amenities

6. Evaluate trade-offs and select cross-section, amenities, etc

What makes an effective need statement? (WSDOT)

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1. **What is the problem/What is wrong?**
   - More crashes than similar intersections.
2. **Where is it happening?**
   - The intersection of SR 2 and Elm Way
3. **When is it happening?**
   - During the PM Peak (5:00pm to 7:00pm)
4. **What is the magnitude of the problem**
   - In the last 5 years, there have been 5 more injury crashes per year than similar intersections.
5. **Why is it important to solve it now?**
   - Five more injury crashes per year than similar intersections is no longer acceptable to the community.

An effective need statement has these attributes (WSDOT):

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- Factual
- Focused and precise
- Specific
- Relevant
- *Does not include a solution*

Identifying contributing factors (WSDOT)

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Example: A corridor segment has operating speeds below 70% of posted speed during the PM peak hour. In evaluating location data, it was found that the inefficacy of the right-turn operation at the east leg of the intersection is the contributing factor for these lower operating speeds. Vehicles turning right cut off traffic and cannot accelerate quick enough to not impede traffic causing slowing and sometimes causing rear-end crashes.

Quiz

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- What is a purpose and need statement?
- What else do you need to know?

MnDOT project scoping checklist

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Key Context Informing Questions and Destination Assessment (consider existing and planned)
Programmed projects within or adjacent to the project?
Is the project along a main street area or urban corridor?
Is there a school within a 1 mile radius of the project, or in a developing/edge location?
Is there a college or community center within a 1 mile radius of the project?
Are there parks/recreational areas or trails within a 1 mile radius of the project?
Are there medical facilities (e.g. hospitals, clinics, etc.) within 1 mile of the project?
Is there an elder care facility within 1 mile of the project corridor?
Is the project occurring on a portion of a state bikeway?
Is the project within an airport influence area?
Are there rail lines or at-grade rail crossings within 1 mile of the project corridor?
Is there fixed transit on the project corridor or transit stop that intersects the project corridor?
Is this project only a rural highway section, which does not go through any small towns?
Is the project occurring near significant freight or truck traffic generators, or near a significant freight route?
Is the project occuring on a portion of a Scenic Byway
Is the project occurring on a Oversize Overweight (OSOW) Route?

Considerations based on context

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The following section describes key considerations based on the context identified above	
A	**Review the community's comprehensive plan and/or transportation plan. Review current and future land use patterns along the corridor. If no plans exist, the RDC or MPO staff can help identify the critical needs and objectives of the community. If there are conflicting needs on the cooridor, review MnDOT's Conflict Scoping Process:** http://www.dot.state.mn.us/pm/pdf/csp.pdf
B	**Review programmed projects adjacent to the project. Here are the projects currently identified in MnDOT's Work Plan:** http://mndot.maps.arcgis.com/home/webmap/viewer.html?webmap=e094104e19674dbf87d444c4463a0136
C	**Review project with Aeronautics Office (link above) and consult MnDOT's Airport Influence Maps:** http://www.dot.state.mn.us/aero/airportinfluencemaps.html
D	**Review the Safe Routes to School Plan. A full list of communities with SRTS plans can be found here:** http://www.dot.state.mn.us/saferoutes/map.html
E	**Identify the intersecting roadways and shared use paths with pedestrian traffic. Are there physical characteristics of the roadway intersection that limit the safety and access for pedestrians crossing the roadway? How can the proposed project address these limitations?** (e.g. sidewalks; mid-block crosswalks; striped crosswalks; geometric modifications to reduce crossing distances; lead pedestrian intervals; high visibility crosswalks, and pedestrian refuge islands)
F	**There is a mix of users of the system. Consider traffic calming measures. Ways to address the potential conflicts include:** • Using narrower travel lanes • Using physical measures to narrow the roadway (e.g. bump-outs) • Using on-street parking to create side friction • Using smaller curb radii • Eliminating channelized right-turn lanes • Lower posted speed
G	**When serving the elderly community, particular attention should be paid to curb ramps, acceptable slope and cross-slope (including driveway ramps over sidewalks, over crossings and trails), seating, and adequate signal crossing time.**
H	**Review the planned shoulder, does it meet the needs of the users of the system (e.g. pedestrians, people on bikes, farm vehicles, etc.)**

Example from MnDOT checklist

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Question: Are there medical facilities (e.g. hospitals, clinics, etc.) within 1 mile of the project?

If yes:

- Review comprehensive plan and/or transportation plan. Review current and future land use patterns along the corridor.
- Review project with Aeronautics Office and consult MnDOT's Airport Influence Maps
- There is a mix of users of the system. Consider traffic calming measures.
- Transit considerations:
  - Sidewalks and pedestrian crossings should connect the stop with the surrounding area
  - Far-side of signalized intersections are the preferred locations for transit stops on main streets, avenues and boulevards

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When do these types of questions get raised? By whom?

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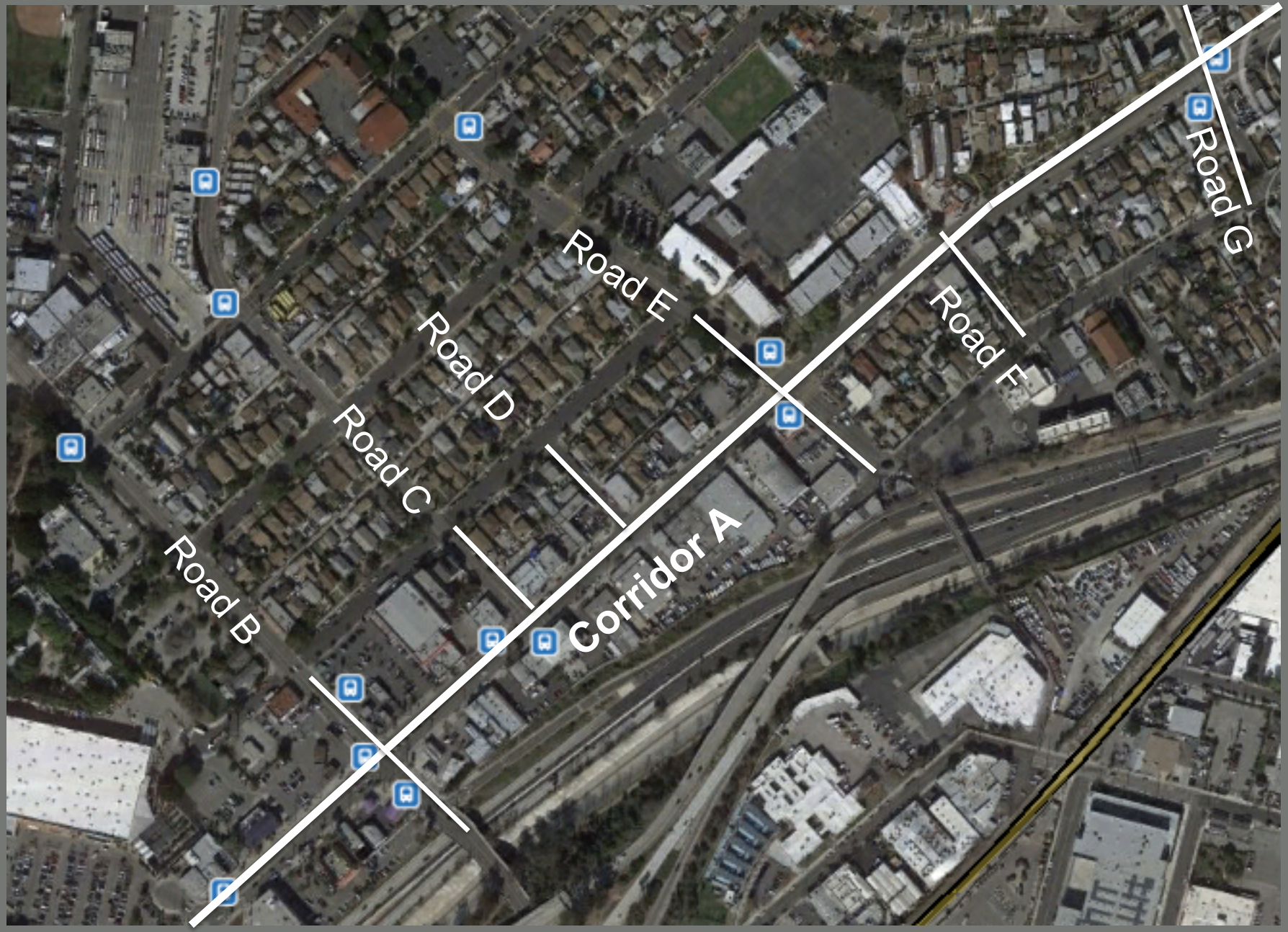
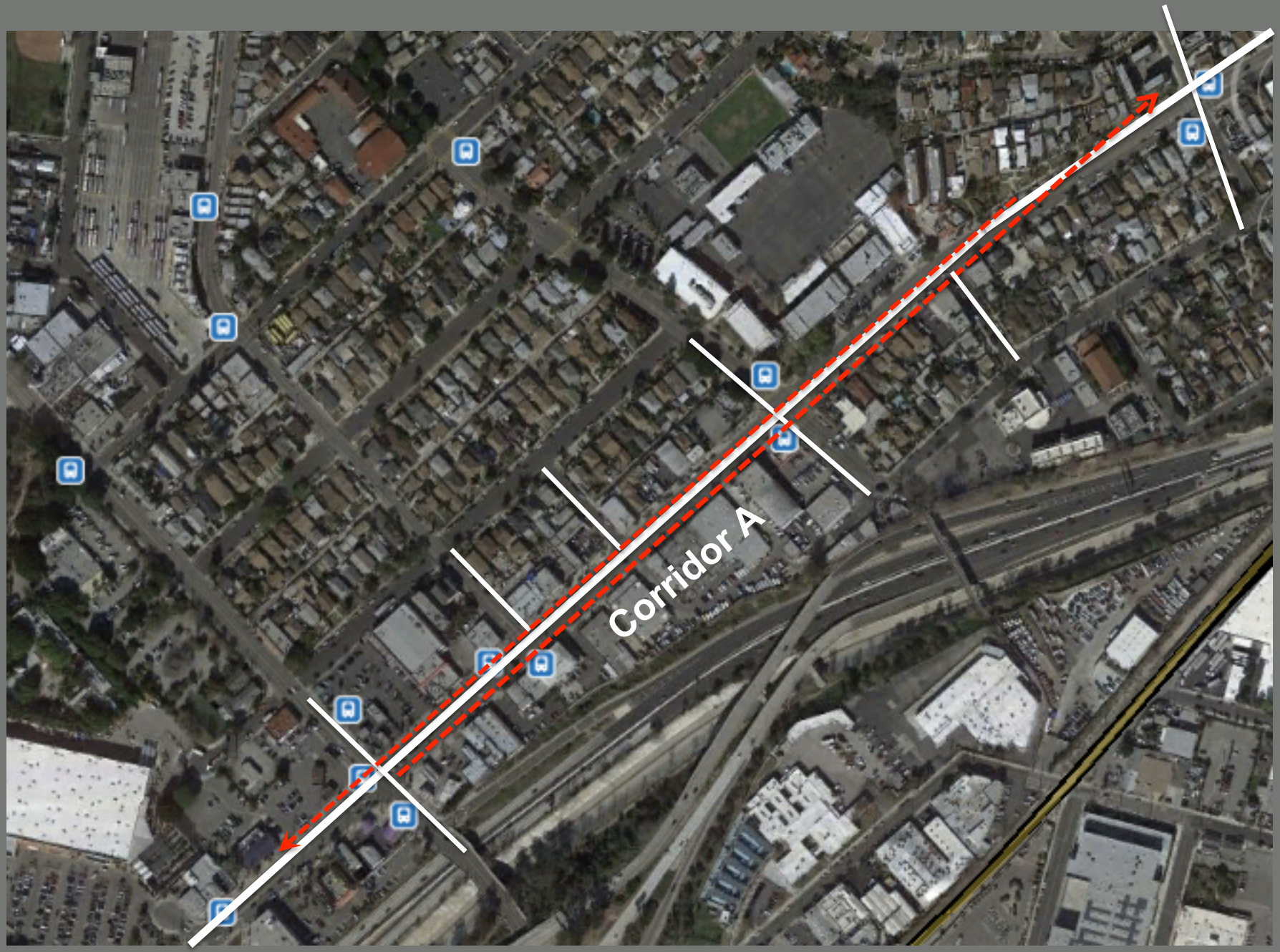
Case Study


Road B
Road C
Road D
Road E
Corridor A
Road F
Road G


Corridor A

Which concept best exemplifies the need(s) for this project?

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A. Resurface Corridor A.
B. This project has 2 core needs:
   1. Resurface Corridor A.
   2. Add an additional lane to Corridor A in the Southwest direction.
C. This project has 2 core needs:
   1. Extend the service life of Corridor A.
   2. Reduce delay on Corridor A.
D. Need more info to determine the project needs.

Which concept best exemplifies the need(s) for this project?

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D. Need more info to determine the project needs.

Delay on Corridor A. We are still missing some key info:

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- The underlying **causes** of the delay
- Why the delay on this corridor is a problem **from the perspective of the people and businesses the transportation network is serving.**
- The **magnitude** of that problem.

Steps to better understand the need?

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A. Meet with municipality to understand underlying needs behind their desire for an additional lane.
B. Take a closer look at the timing, duration, and consistency of the delay.
C. Review the existing and planned future land uses
D. Evaluate current and expected future travel patterns
E. Meet with local stakeholders to better understand how people in the community are using Corridor A.
F. Assess local demographics, mode share, and other available data.

When is the delay occurring?

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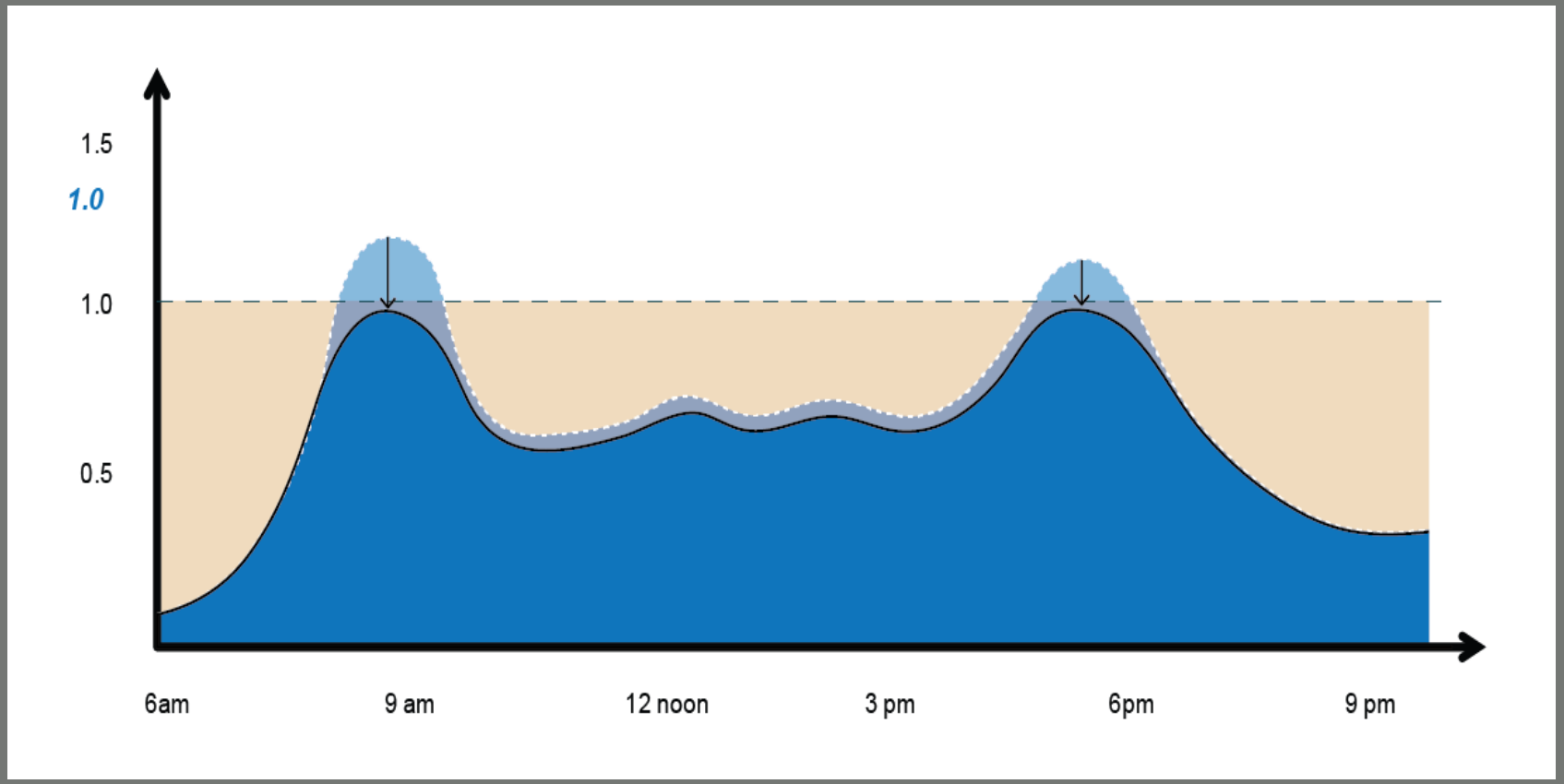

Image: Karina Ricks, Nelson\Nygaard

Stakeholder engagement

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Municipality concern: People traveling through this sub-area on their way to work in the morning are sitting in traffic for too long. The municipality is receiving lots of complaints.

Community concerns: Corridor A is very unsafe to cross as a pedestrian. Members of this community are concerned about letting their children walk in the neighborhood.

Network context

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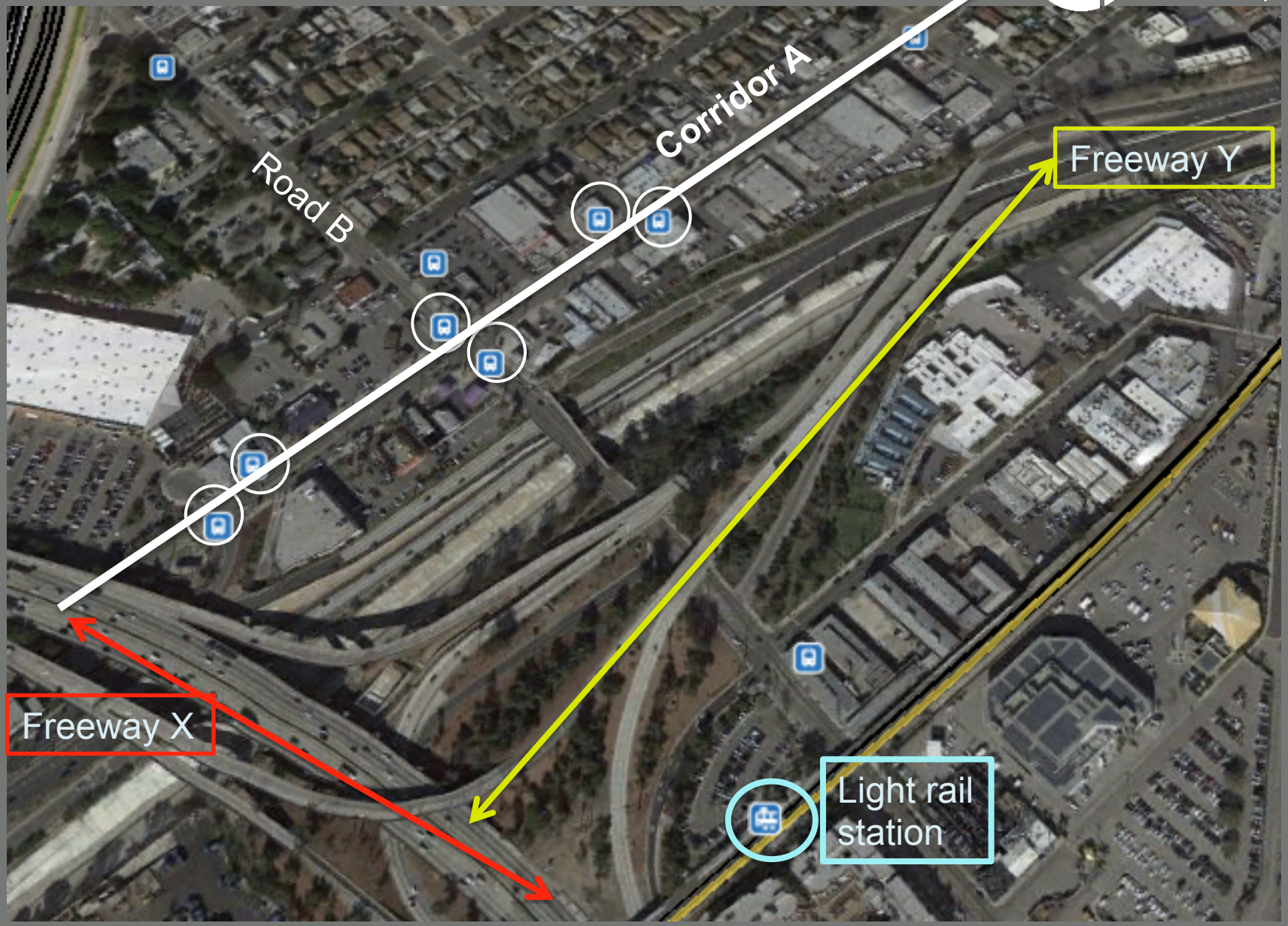
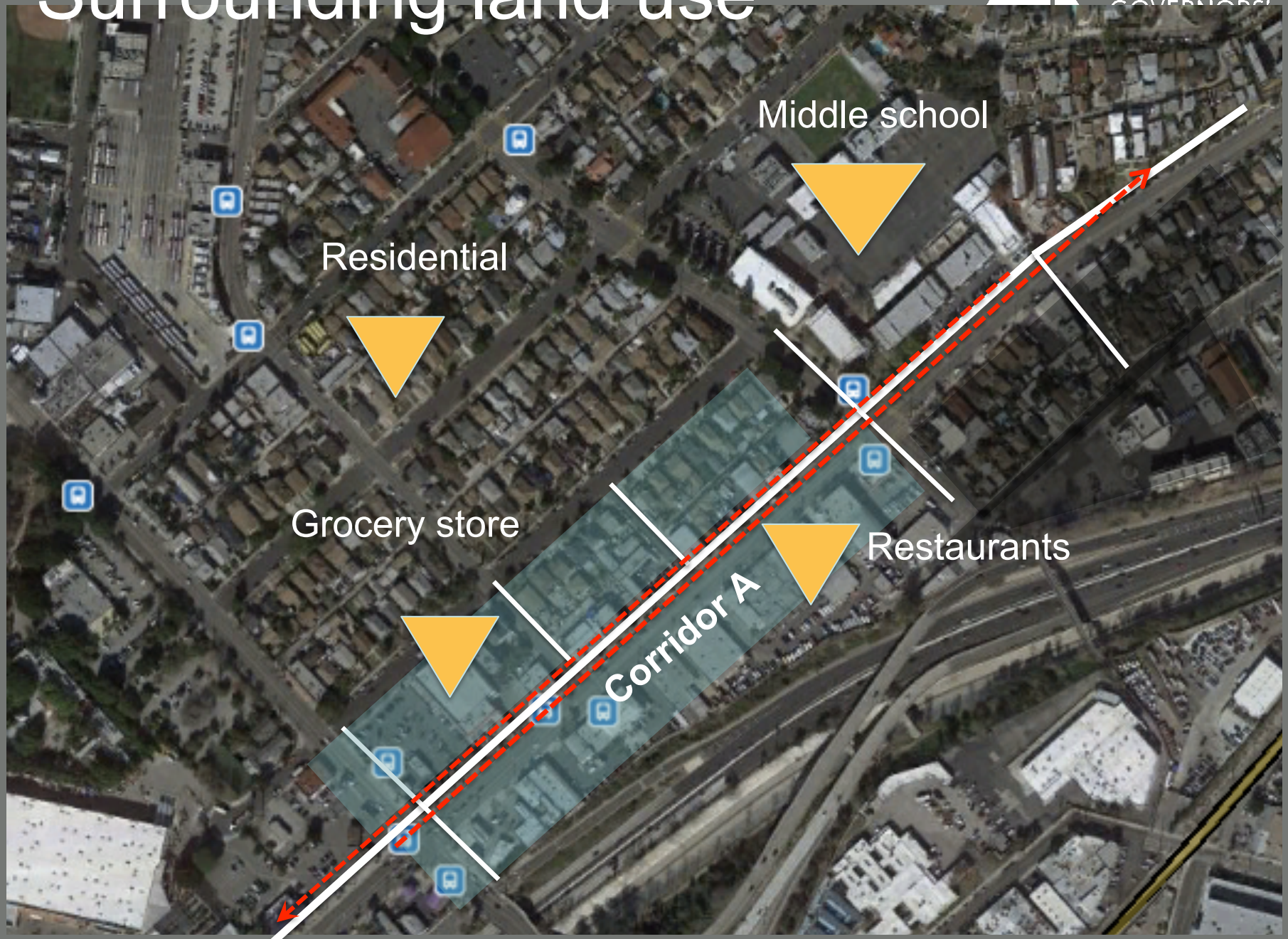


Surrounding land use



Surrounding land use: site visit

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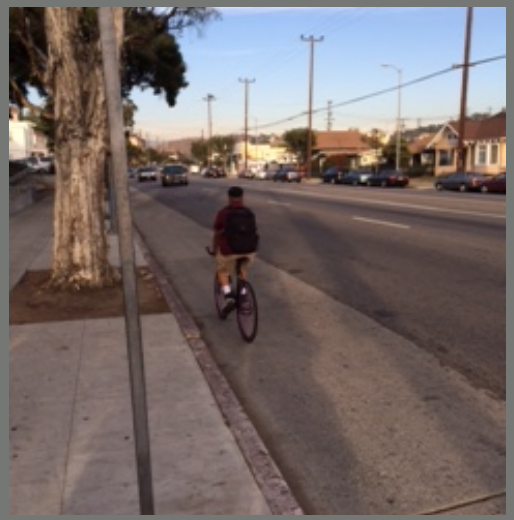

Income Demographics

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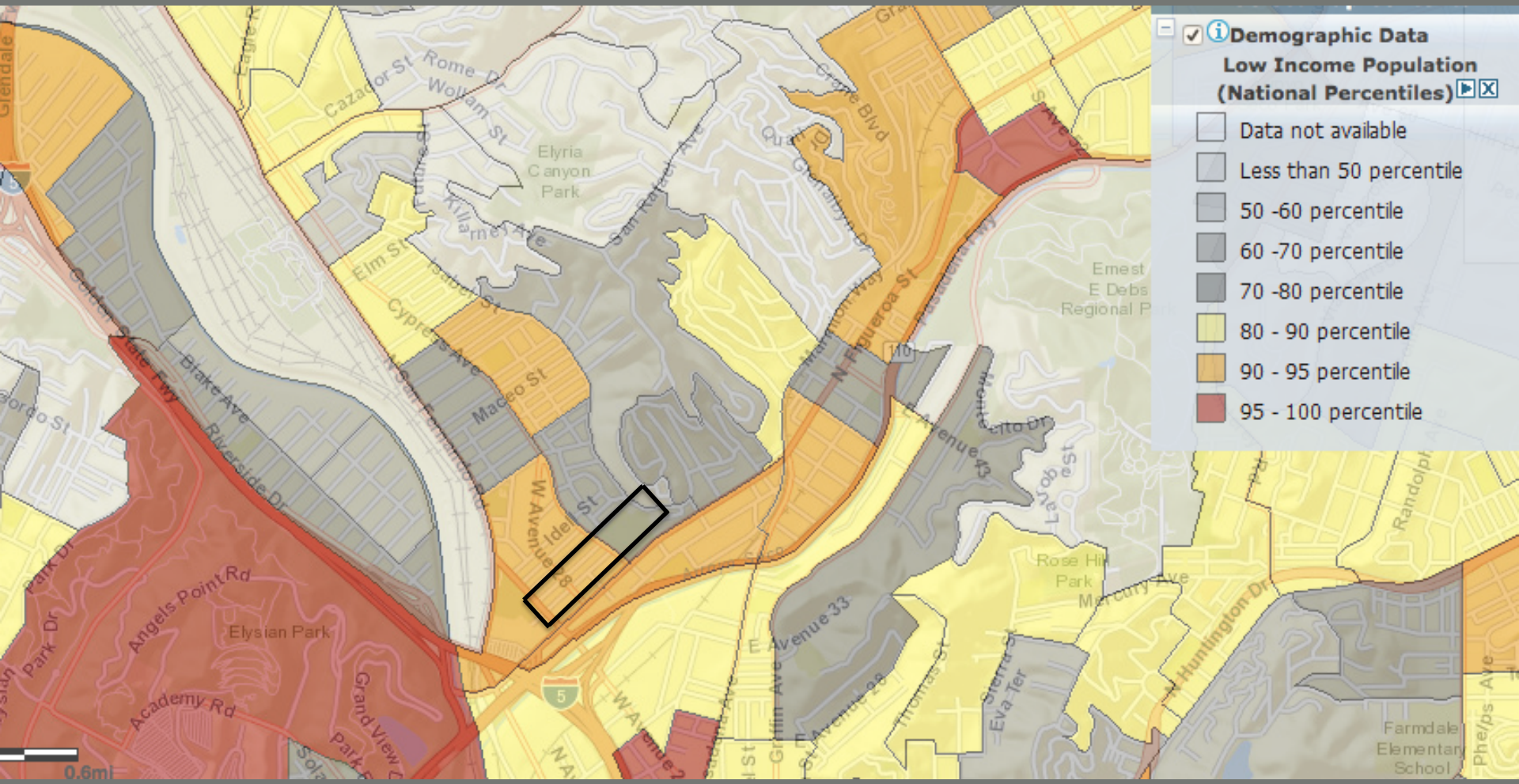

Source: EJScreen

Travel Patterns

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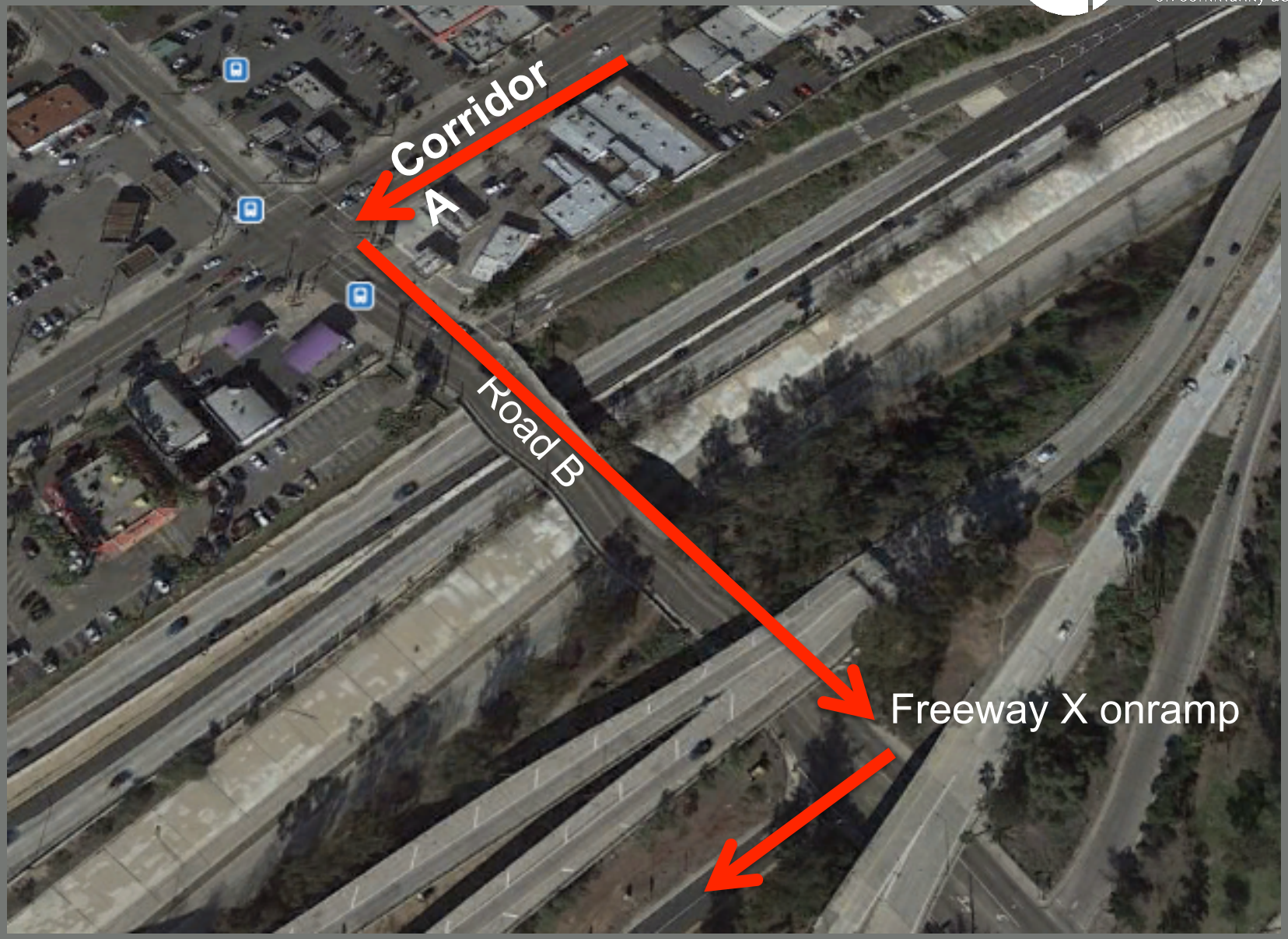

Origins and destinations

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Likely choke points

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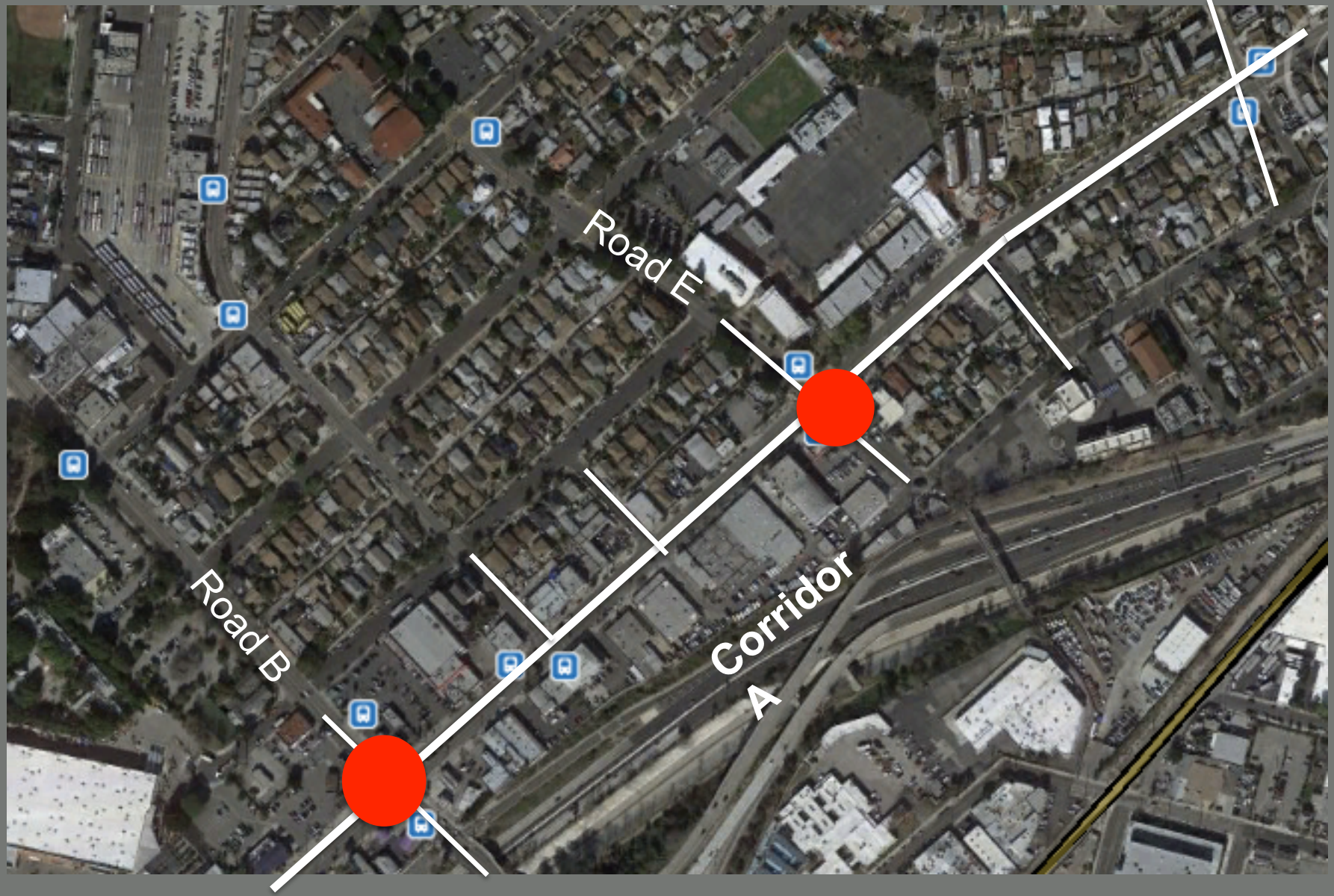

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Identifying a range of potential solutions to meet the project need

Potential solutions to address the identified need?

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A. Add another lane to Corridor A in the Southwest direction.
B. Add additional turn lanes at the intersections with Road B and Road E.
C. Improve signal timing along the corridor.
D. Increase the commute transit mode share by providing more frequent bus service during the peak and better access to the light rail station
E. Provide more and safer pedestrian crossings of Road A so that more children can walk to school from the surrounding neighborhoods.
F. Stagger student arrival times at the middle school to disperse demand
G. All of the above.

Answer

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A. Add another lane to Corridor A in the Southwest direction.
B. Add additional turn lanes at the intersections with Road B and Road E.
C. Improve signal timing along the corridor.
D. Increase the commute transit mode share by providing more frequent bus service during the peak and better access to the light rail station
E. Provide more and safer pedestrian crossings of Road A so that more children can walk to school from the surrounding neighborhoods.
F. Stagger student arrival times at the middle school to disperse demand
G. **All of the above.**

Which potential solutions are likely to be the least costly?

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A. Add another lane to Corridor A in the Southwest direction.
B. Add additional turn lanes at the intersections with Road B and Road E.
C. Improve signal timing along the corridor.
D. Increase the commute transit mode share by providing more frequent bus service during the peak and better access to the light rail station.
E. Provide more and safer pedestrian crossings of Road A so that more children can walk to school from the surrounding neighborhoods.
F. Stagger student arrival times at the middle school to disperse demand
G. All of the above.

Trade-offs

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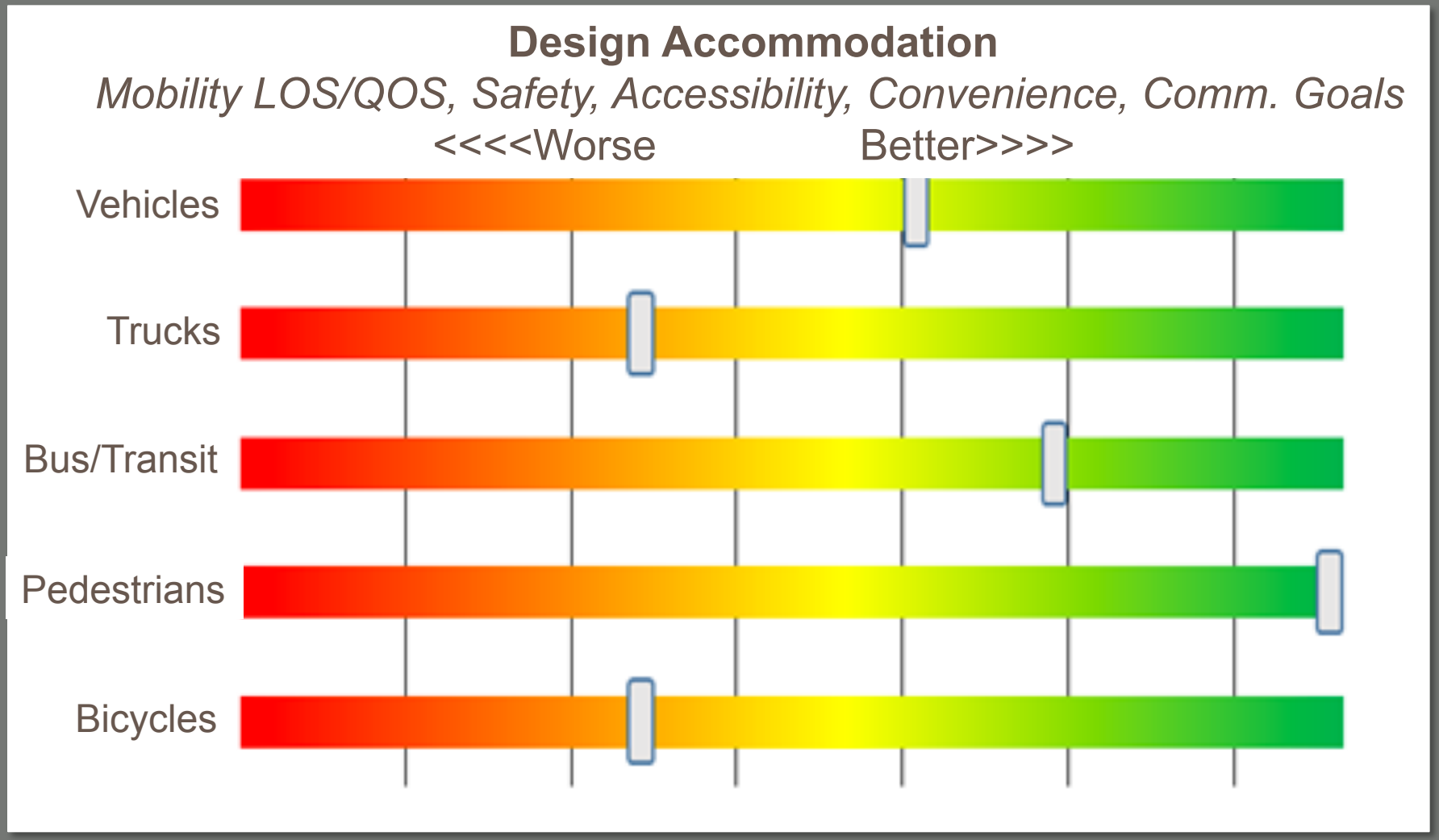

Example: Creating a retail-oriented main street

Objective:

"Convert an existing four-lane minor collector street into a commercial-oriented street that supports an adjacent mix of retail, restaurants and entertainment uses on the ground floor."

Source: The Institute of Transportation Engineers. Designing Walkable Urban Thoroughfares: A context sensitive approach *(2010).*

Example: Creating a retail-oriented main street

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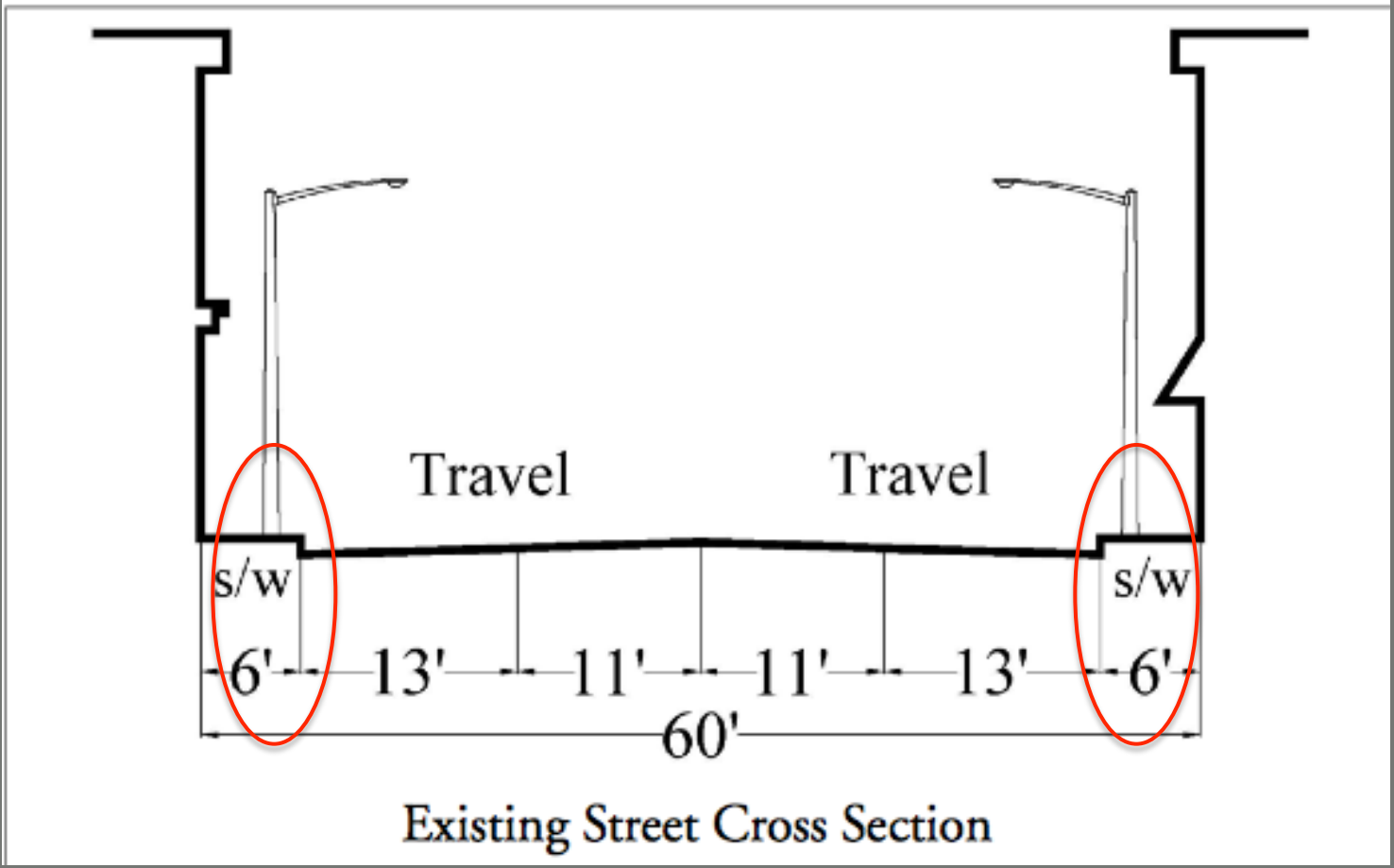

Alternative #1

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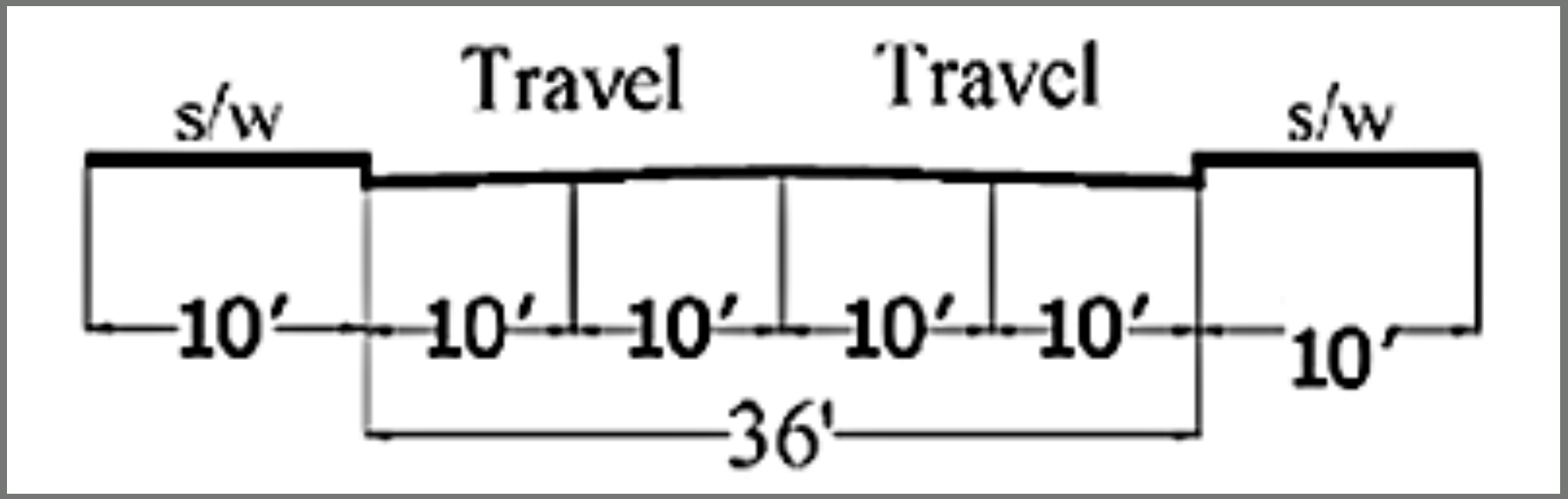
Emphasize **vehicular capacity** by retaining existing four-lane section with 10-foot-wide travel lanes to allow 10-foot-wide sidewalks.



Alternative #2

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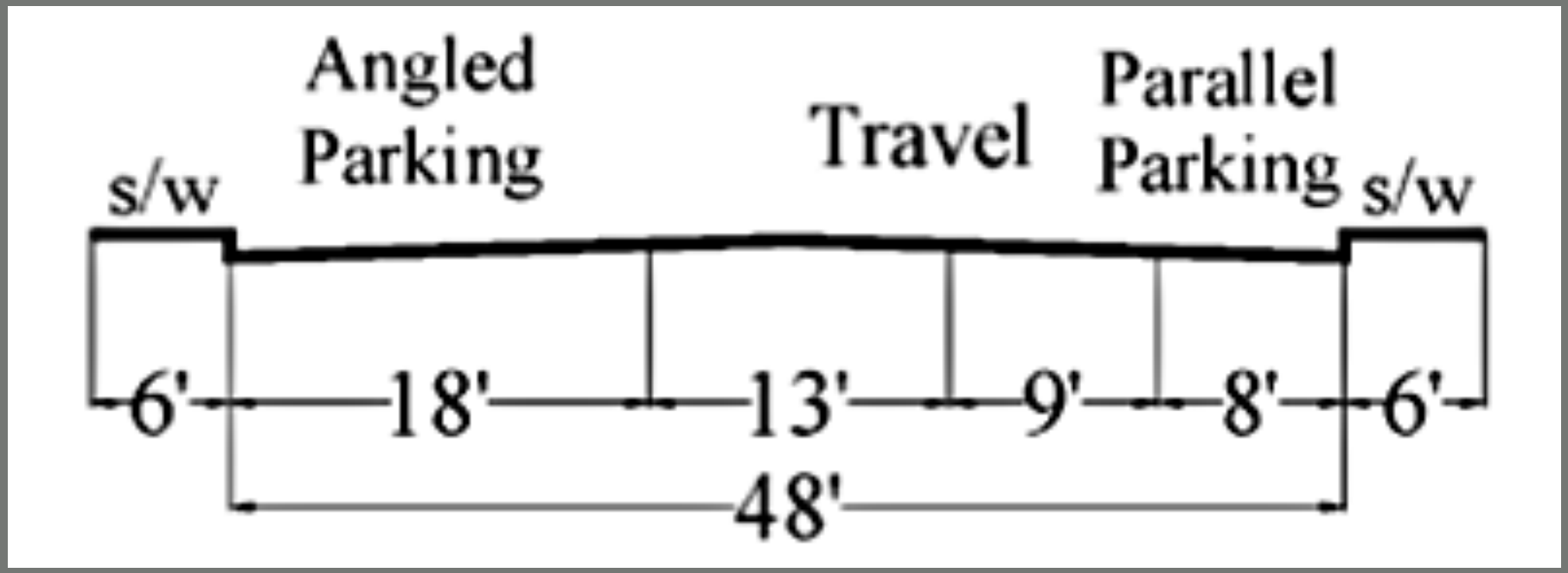
Emphasize **parking** by providing angled parking on one side, parallel parking on the other side and narrowing the two remaining travel lanes.



Alternative #3

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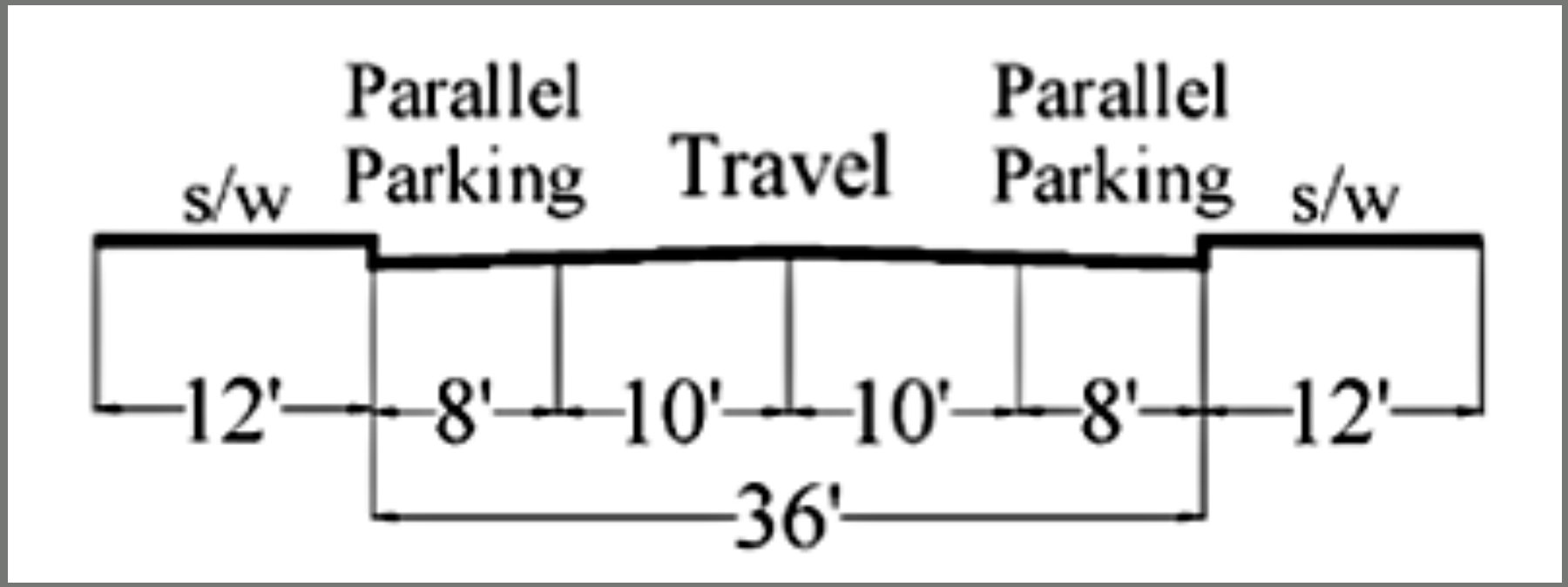
Emphasize **parking and wider sidewalks** by providing parallel parking on both sides, two travel lanes and 12-foot-wide sidewalks.



Alternative #4

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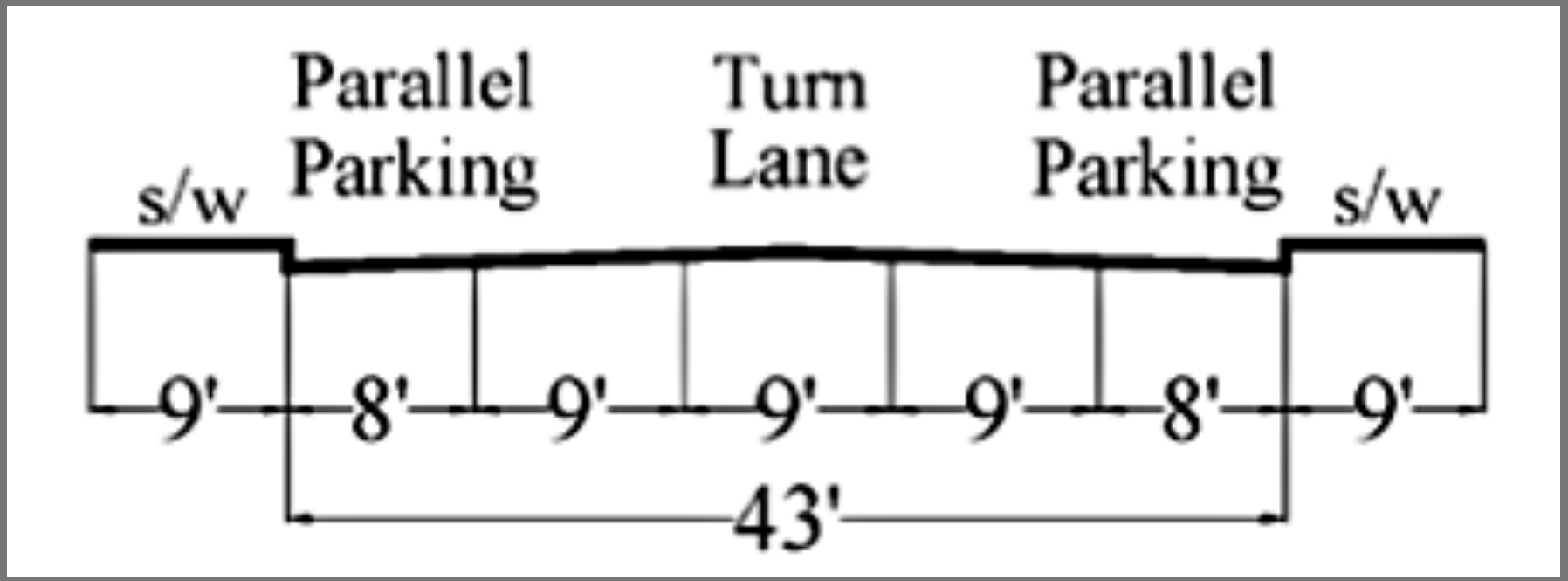
Emphasize **parking and vehicular capacity** with parallel parking on both sides, 9-foot-wide side- walks, two travel lanes and a center turn lane.



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Alternative	Parking	Sidewalk width	Vehicular capacity	Large vehicles	Ped X-ing width	Left turn lanes	Bike accommodation	Ped amenities	Speed reduced
Existing	- -	- -	+ +	- -	- -	- -	- -	- -	- -
1	- -	+ +	+ +	- -	- -	-	- -	+ +	+
2	+ +	- -	-	+	+ +	+ +	- -	- -	-
3	+	+ +	-	+ +	+ +	-	- -	+ +	+
4	+	-	+	- -	+	+ +	- -	-	+ +

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Who makes decisions about tradeoffs?
When?

State leading: MassDOT

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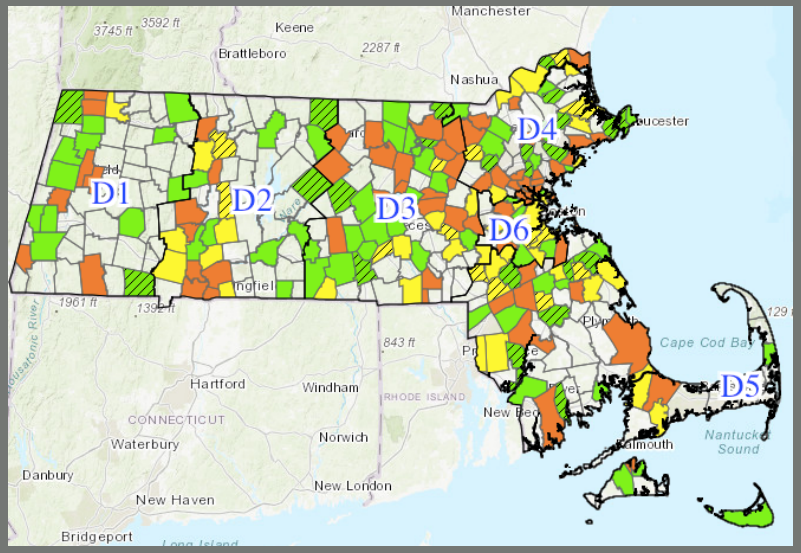
Complete Streets assistance for locals:

- Tier 1: Policy development support
- Tier 2: Technical assistance
- Tier 3: Construction funding



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Questions?

Photo credit: AARP

COMPLETE STREETS

Design & Implementation

NHDOT CS Training

Smart Growth America
Improving lives by improving communities

National Complete Streets Coalition

Complete Streets

Complete Streets – the Process

Mike Rutkowski, P.E., AICP

Complete Streets

Design Elements

Smart Growth America
Improving lives by improving communities

National Complete Streets Coalition

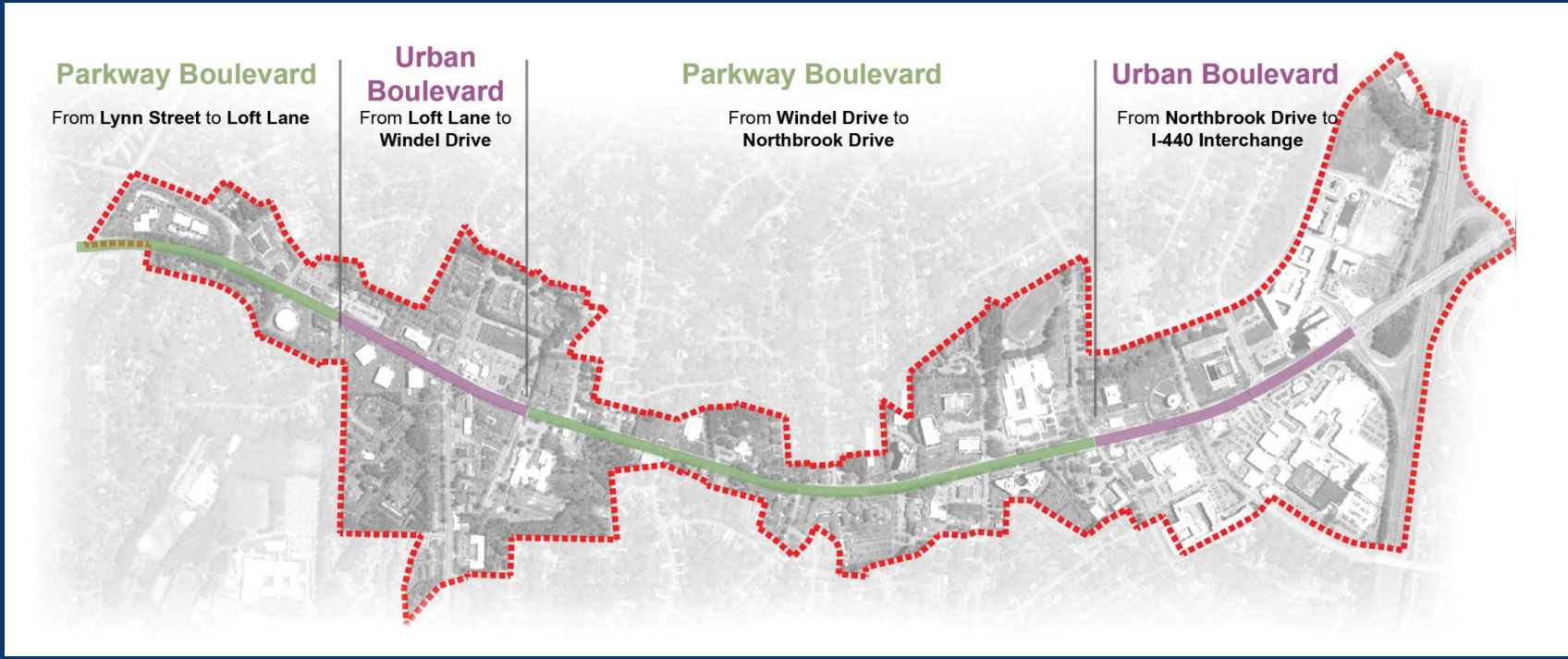
Complete Streets

Complete Streets:

"It's a process, not a product" - mmr

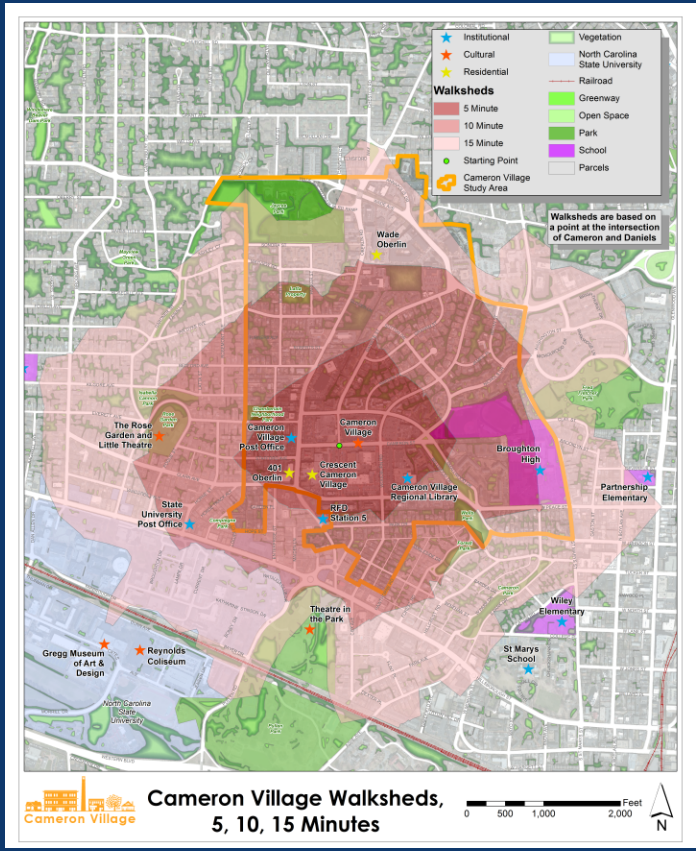
- ✓ Define Success
- ✓ Prioritize Modes
- ✓ Define Design Features/Limitations
- ✓ Make Tradeoffs
- ✓ Design in detail
- ✓ Measure Success

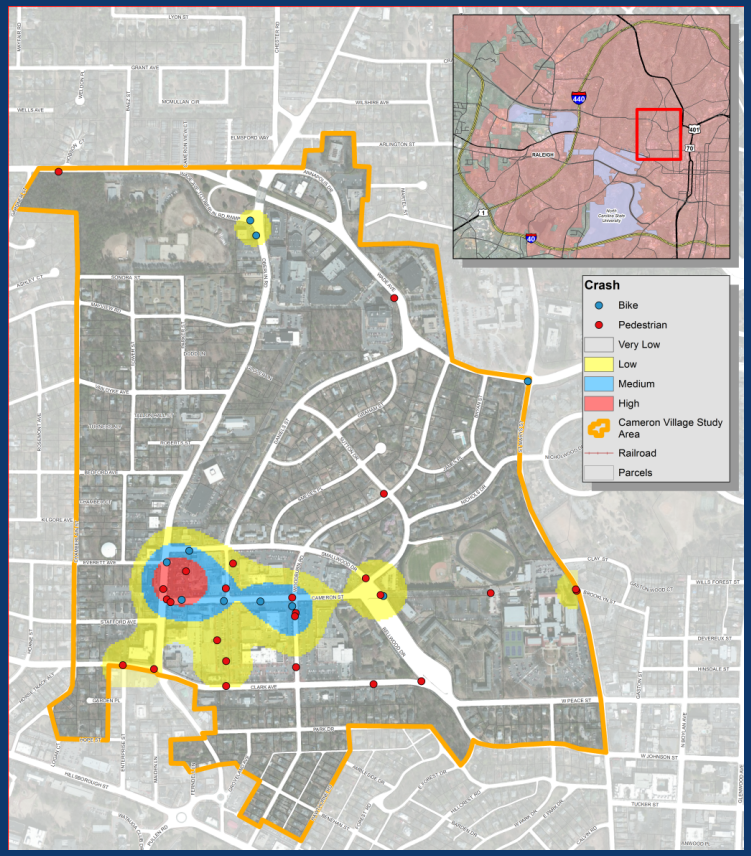
Area Context



Area Context

Walksheds and Bike/Ped Crashes





Lighting

Not just lighting

There's more to lighting than you think.

Pattern, illumination source, and placement make a big difference in the result.

Not Just lighting

But there's more to lighting than you think.

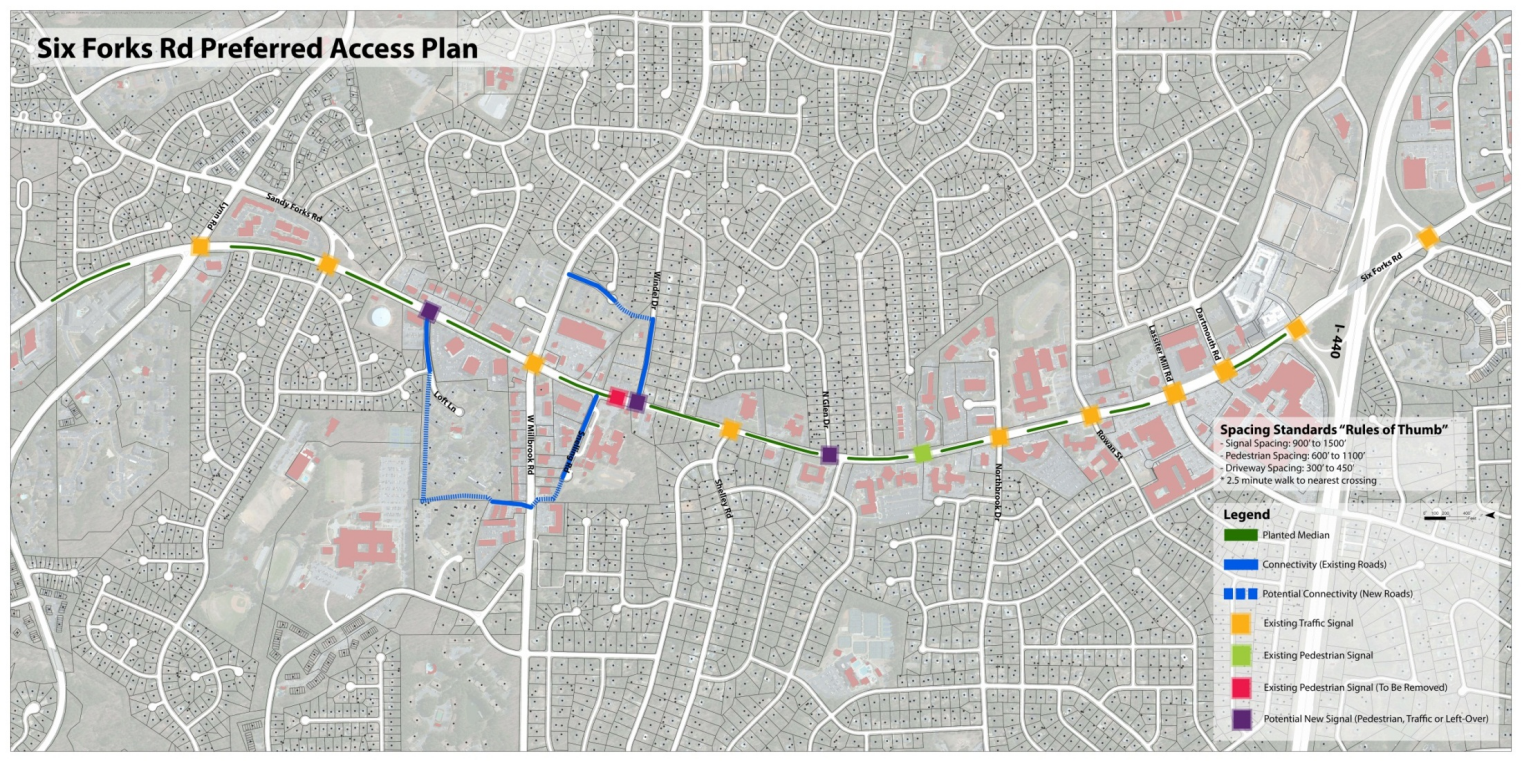
Pattern, illumination source, and placement make a big difference in the result.

Not just lighting

There's more to lighting than you think.

Pattern, illumination source, and placement make a big difference in the result.

How does it all work together?



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
Laneage								
95th Percentile Queue (ft)	**117**	**352**	**235**	**173**	**58**	**149**	**158**	**146**
Average Queue (ft)	**57**	**169**	**111**	**93**	**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	E
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
Laneage								
95th Percentile Queue (ft)	**424**	**808**	**580**	**222**	**202**	**298**	**272**	**123**
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	E	E	E	F
Approach Delay (Turn Movements)	166.3	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
Laneage								
95th Percentile Queue (ft)	**302**	**253**	**298**	**486**	**267**	**210**	**252**	**336**
Average Queue (ft)	**166**	**67**	**157**	**290**	**106**	**52**	**153**	**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
Laneage								
95th Percentile Queue (ft)	**271**	**483**	**346**	**560**	**294**	**333**	**341**	**560**
Average Queue (ft)	**129**	**285**	**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	166.9	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
Laneage								
95th Percentile Queue (ft)	**180**	**222**	**586**	**50**	**162**	**572**	**1000**	**53**
Average Queue (ft)	**85**	**89**	**284**	**18**	**92**	**96**	**568**	**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
Laneage								
95th Percentile Queue (ft)	**250**	**149**	**838**	**124**	**188**	**241**	**835**	**103**
Average Queue (ft)	**146**	**40**	**825**	**71**	**125**	**38**	**826**	**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	164	113.2

Future Year 2035 Left-Turn Performance

Lynn ⤴ Millbrook ⤴ Lassiter Mill ⤴

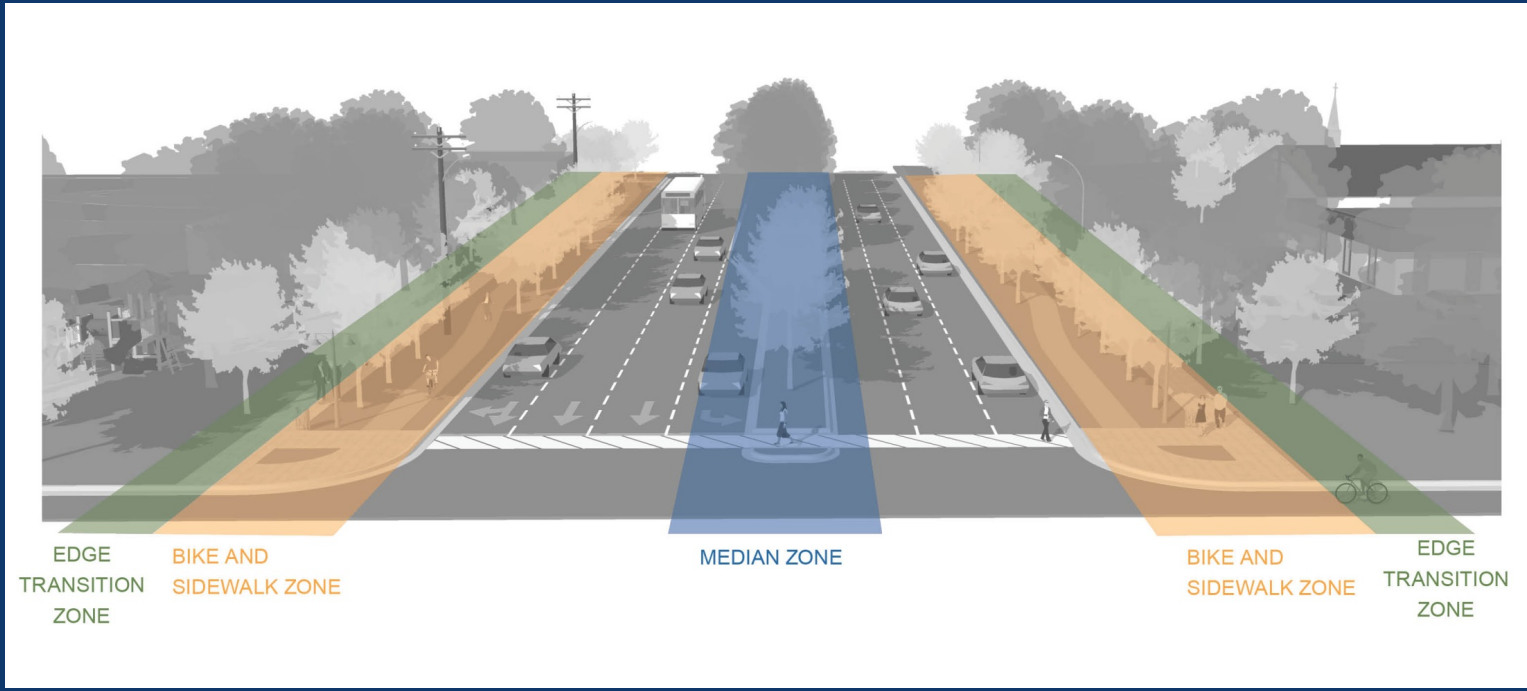
Preliminary Six Forks Corridor Average and 95th Percentile Left-Turn Lane Queuing

2035 Average Queuing Length
2035 95th Percentile Queuing Length
AM PM Future Year 2035 Overall Intersection Level of Service
Raleigh Roads
Building Footprints

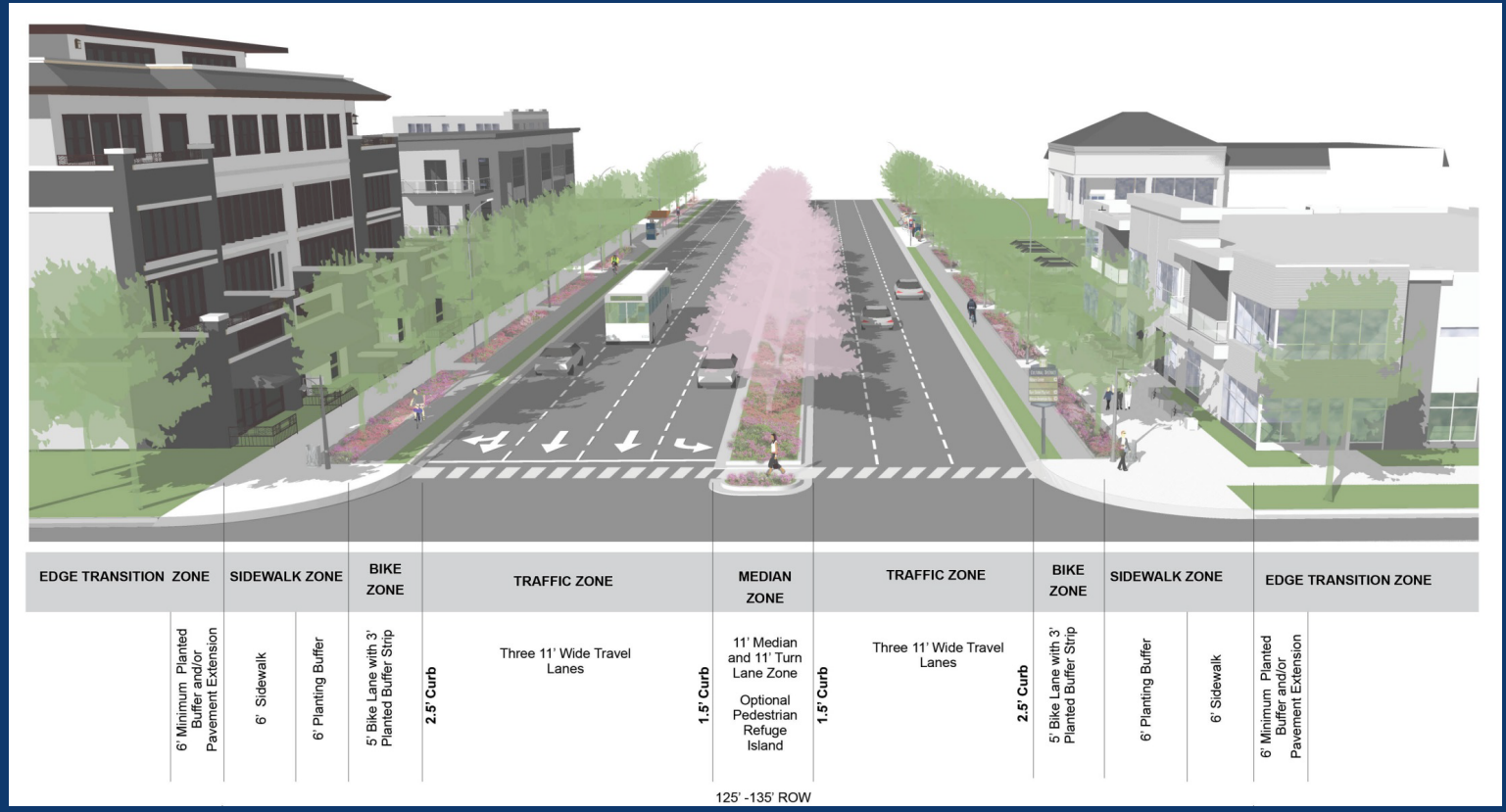
Updated on: 11/20/2014

0 450 900 1,800 Feet

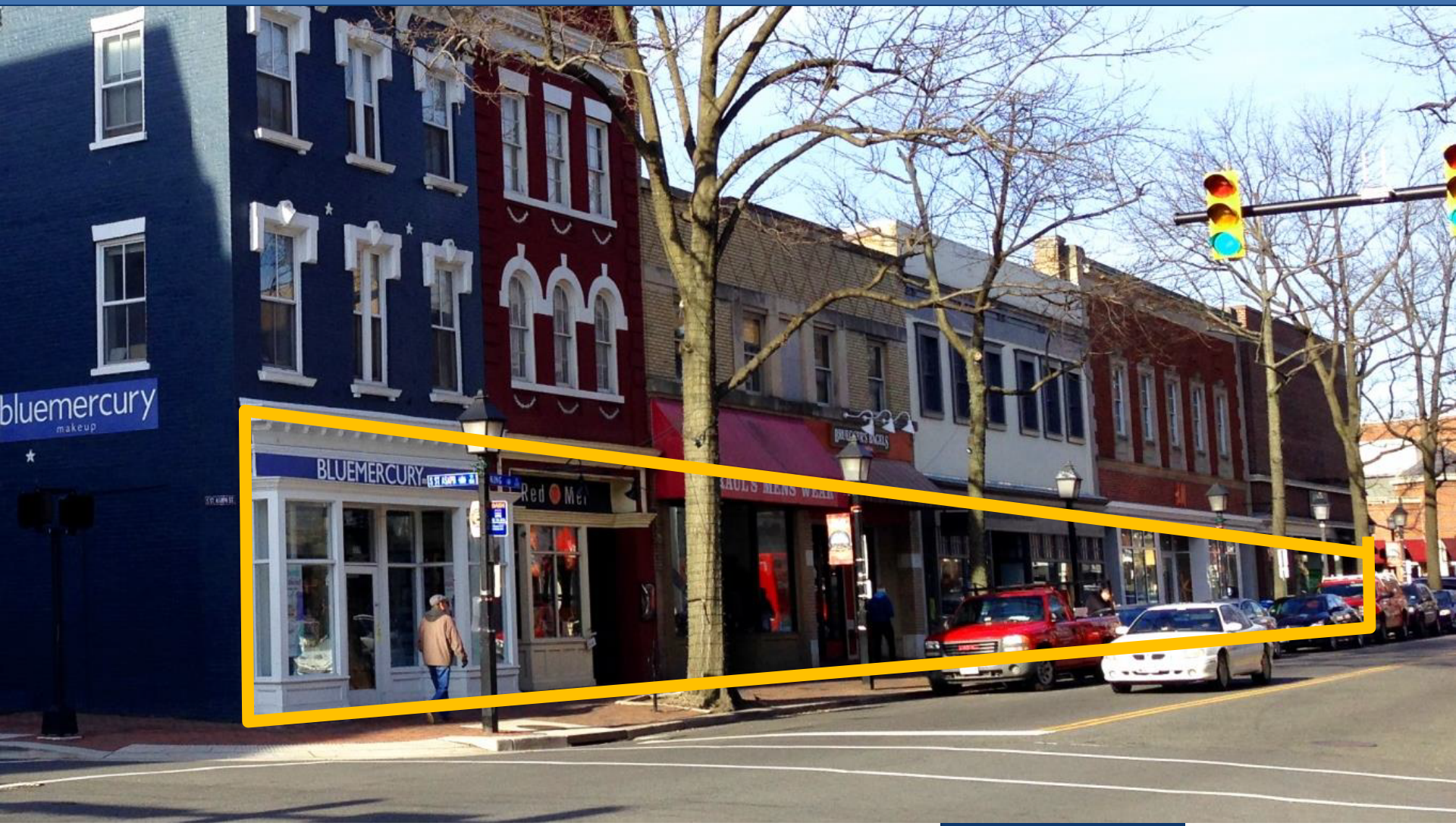
Corridor Transition



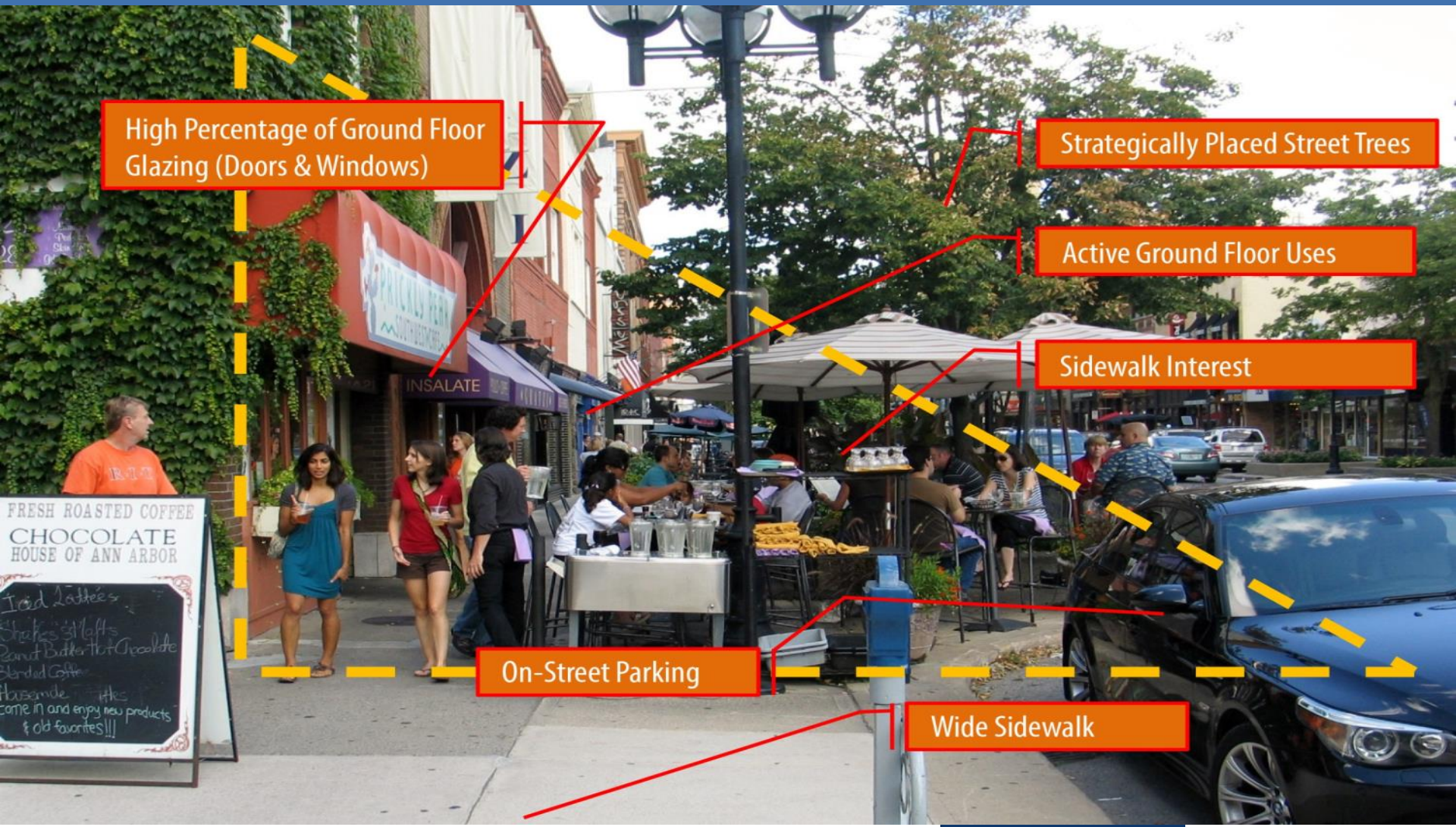
Corridor Cross-Section



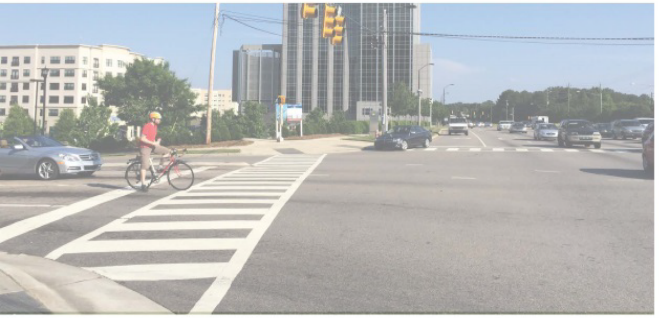
Urban Context



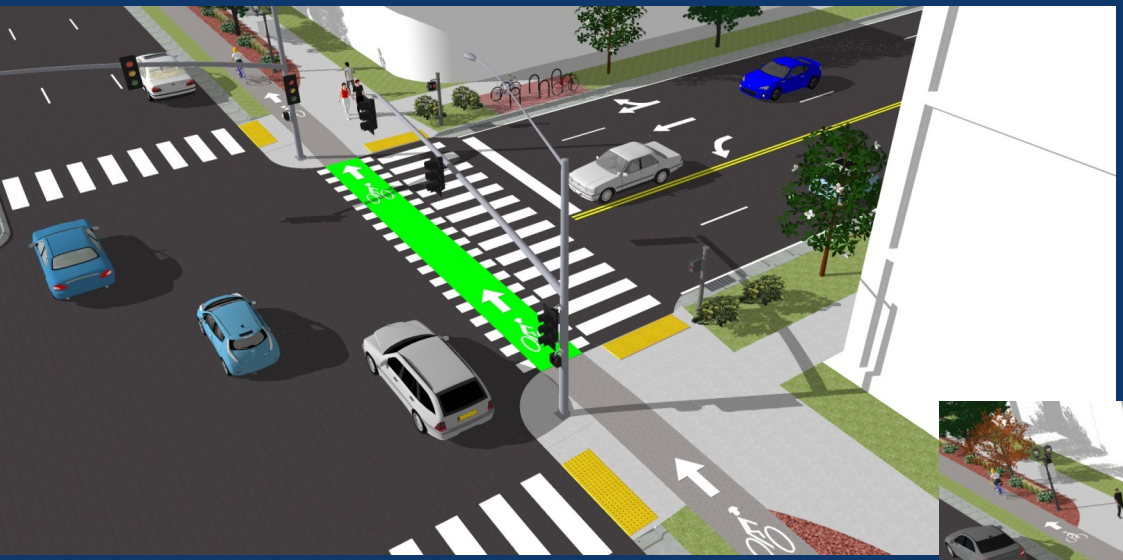
Urban Context



Bicycle/Pedestrian

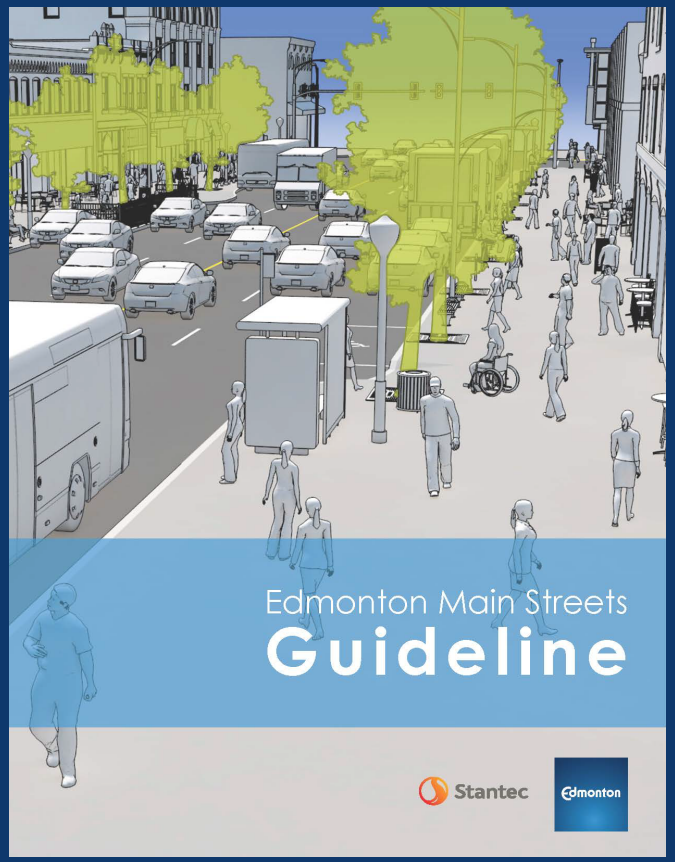


Intersection Treatments



Major intersections

Minor Cross Streets



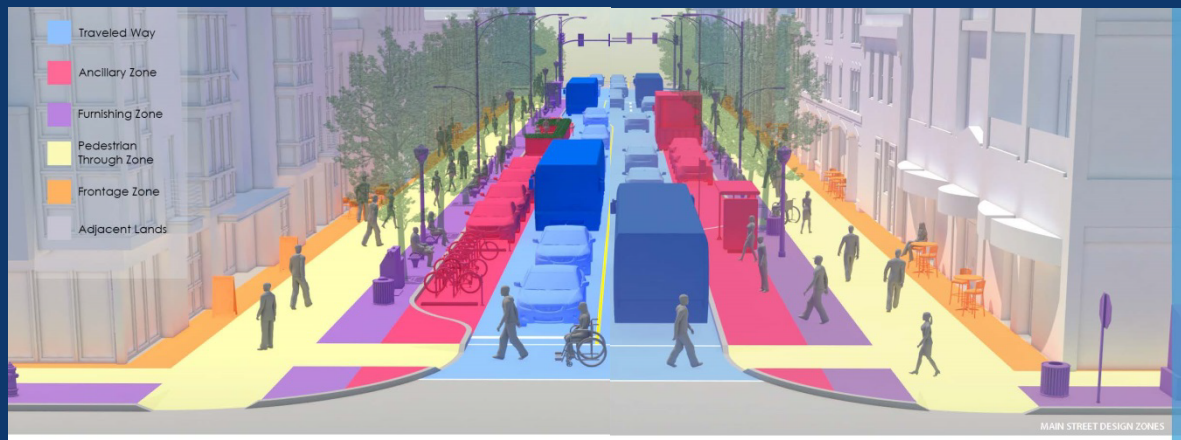
Edmonton Main Streets Guideline

Addition to the 2013 Complete Streets Guidelines (by Stantec)

Outlines:

- Design Parameters for Main Streets
- Design Process
- Guidelines for Requirements for Main Street Design Elements

Definition of Design Zones



- Main Streets *have narrow lane widths* that encourage lower vehicle speeds and create pedestrian oriented places while supporting transit service.
- Main Streets design *does not increase the amount of public right of way allocated to the Travelled Way.*
- Main Streets are differentiated through the *provision of an Ancillary Zone* which is flexible space used to support the activity of the adjacent lands and helps create great people places.
- Main Streets are *designed, constructed, maintained, and renewed to an enhanced standard* to support the Main Streets Principles in all seasons.

2.2 MAIN STREET DESIGN ZONES

The Main Street right of way is divided into six design zones that provide different functionality for people accessing, spending time, and travelling through Main Streets. The following defines each Main Street Design Zone.

2.1.1 Adjacent Lands

This space provides active land uses such as ground floor retail and food and beverage establishments that attract people to Edmonton's Main Streets and generate pedestrian activity.

2.1.2 Frontage Zone

Adjacent to the building, this space is used as a support and/or extension of the active land uses along Edmonton's Main Streets. Uses can include ground floor retail displays, café seating, temporary signage, lineup areas, and other activities to support active use of the street by people and businesses.

2.1.3 Pedestrian Through Zone

This space provides an area for pedestrian mobility for people of all ages and abilities to access the various pedestrian oriented destinations along and around Edmonton's Main Streets.

2.1.4 Furnishing Zone

This space provides an area for signs, light and signal poles, street trees, transit stops, and benches in addition to underground utilities to support Edmonton's Main Streets as destinations and people places.

2.1.5 Ancillary Zone

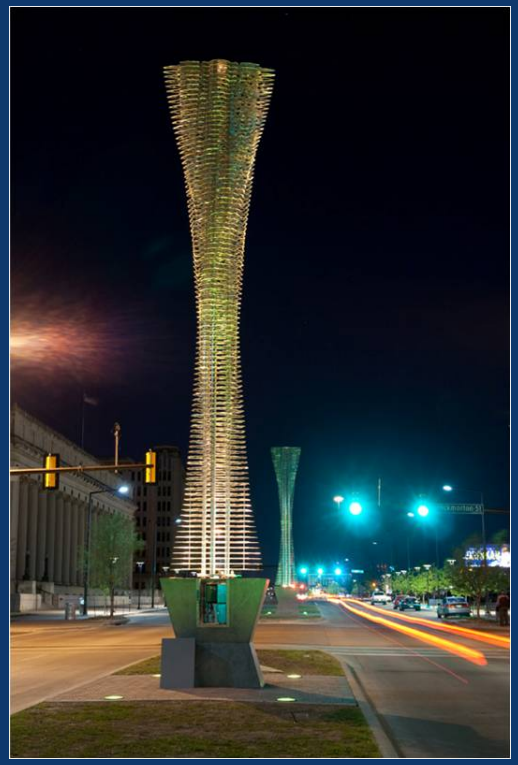
Located between the travelled way and the furnishing zone, this space provides the opportunity for various permanent and temporary pedestrian oriented uses depending on the context and characteristics of the Main Street. The use of this flexible space can vary between blocks and along an individual block. Uses can include parklets, patios, motor vehicle or bicycle parking, loading zones, accessible parking, curb extensions, transit stops, and taxi stands.

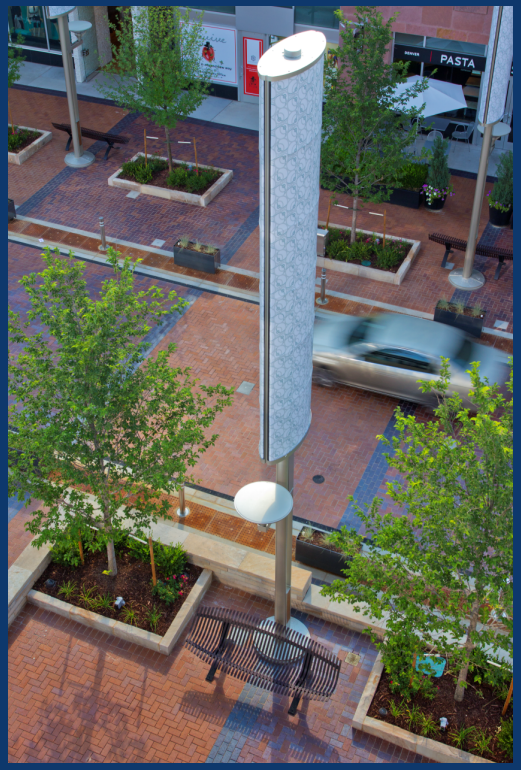
2.1.6 Travelled Way

This space provides an area for travelling through a Main Street area or to access Main Street destinations for people travelling by automobile and transit, and for the delivery of goods. In non-peak hours, some of this space may be used as an area for parking and loading and can also be closed at times to motor vehicles to host events and festivals.

High Priority Transit Corridor

Furnishings, Public Art, Streetscape



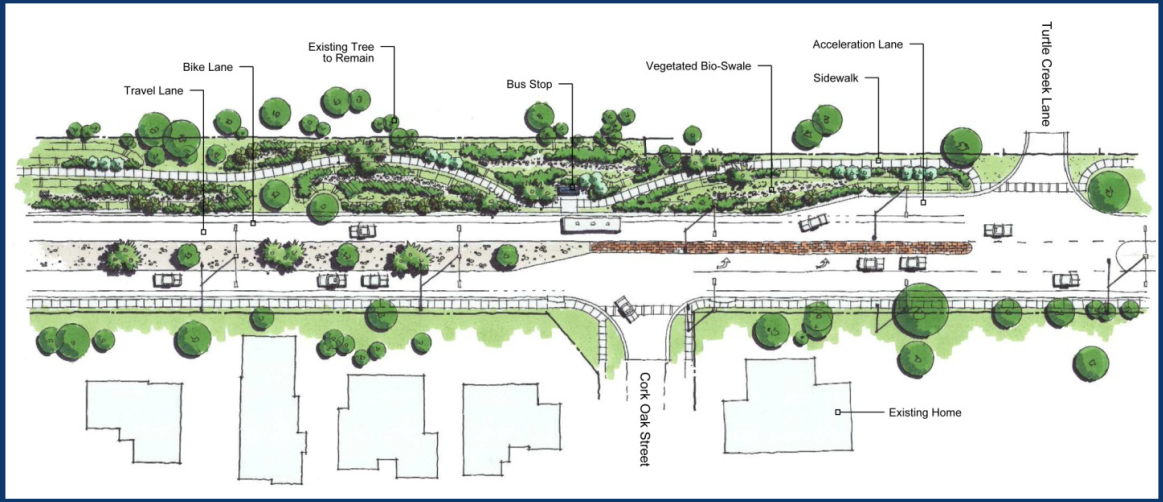


LID & Stormwater BMPs

Example: Honore Avenue, Sarasota, FL (2013)

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

The Idea Behind Stormwater



Tradeoff Benefits

- **Context-sensitive design and low impact development (LID) strategies reduced floodplain impacts by 23.2 acre-feet**
- **Saved 1000 mature trees**
- **Buffered ped/bike facilities with connections to school/parks**

Reduced Floodplain Compensation Area

Design in Detail

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 gateway
- Measurable increase in LOS for cars, bikes, pedestrian and transit

GOVERNORS' INSTITUTE on community design

Case Study Exercise

King Street, Boscawen

Complete Streets

COMPLETE STREETS

Case Study

two guys named Mike

Mike Tardif
Central NH Regional Planning Commission

Mike Rutkowski P.E., AICP
Stantec

Smart Growth America
Improving lives by improving communities

National Complete Streets Coalition

King Street:
Background

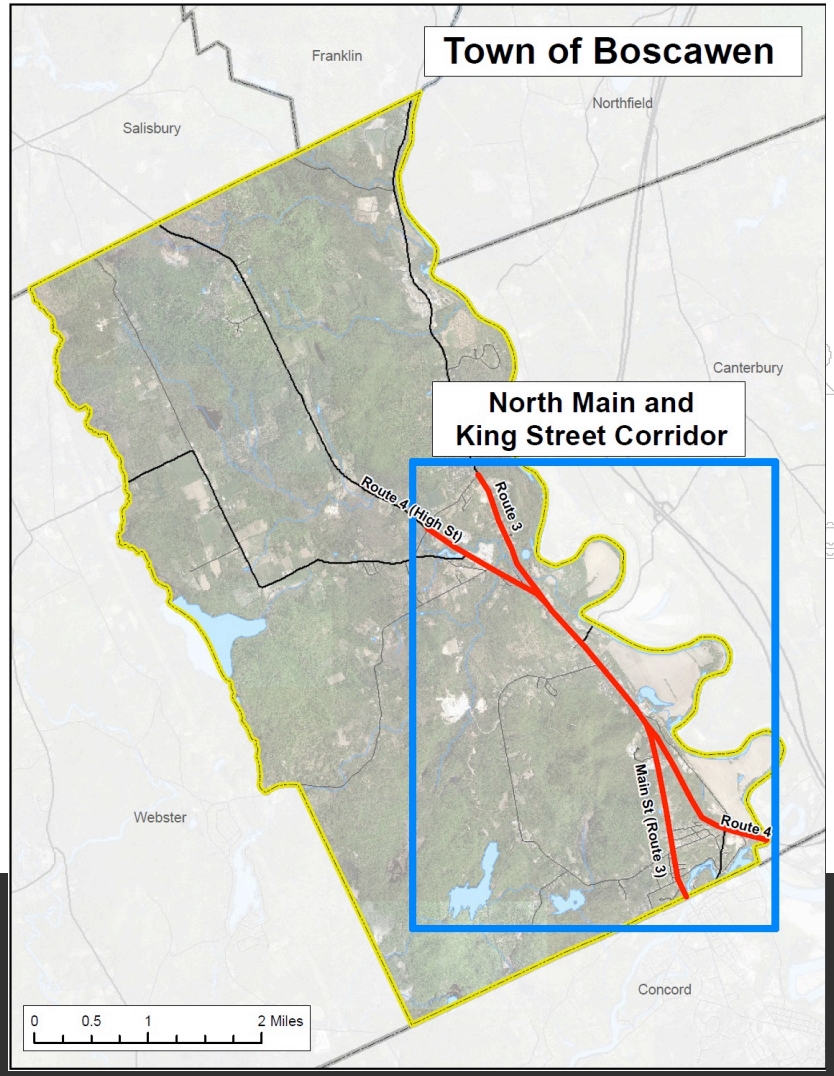
- History/ Public Outreach
- Problem Statement
- Recent King Street Coordination Study
- Rail Trail
- Project Commitments

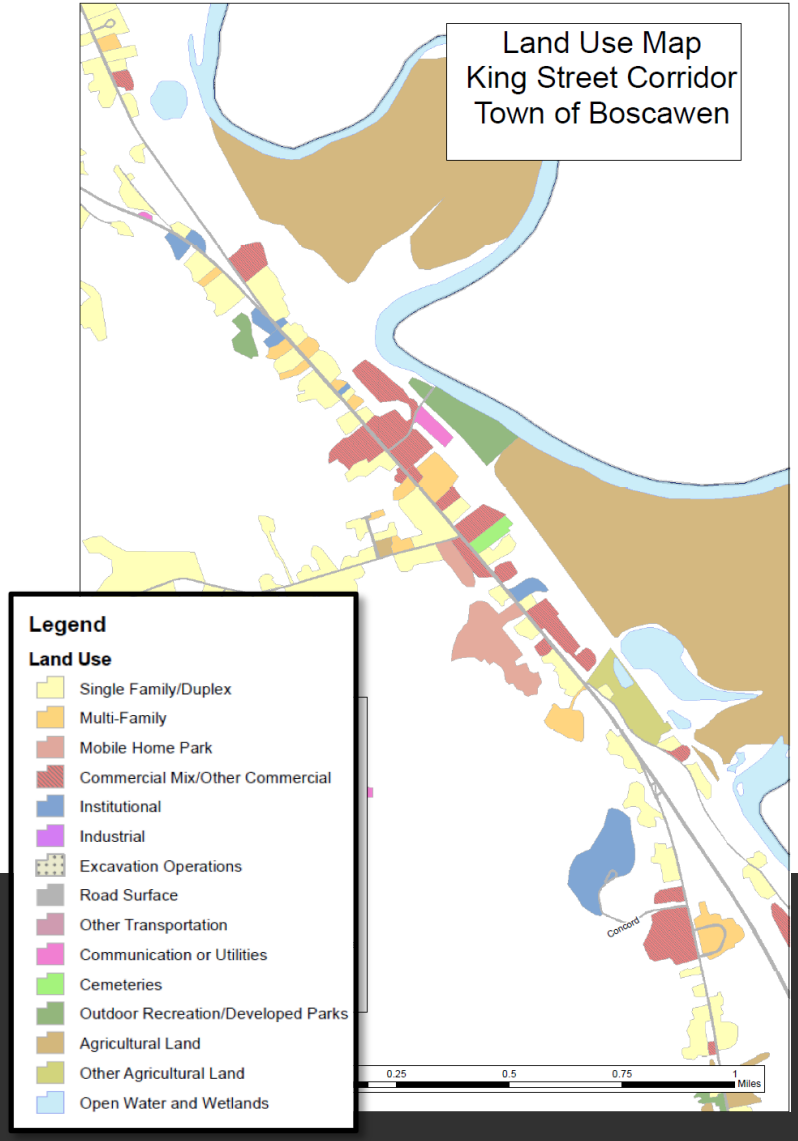
Complete Streets

King Street
(today)

King Street (today)

Complete Streets



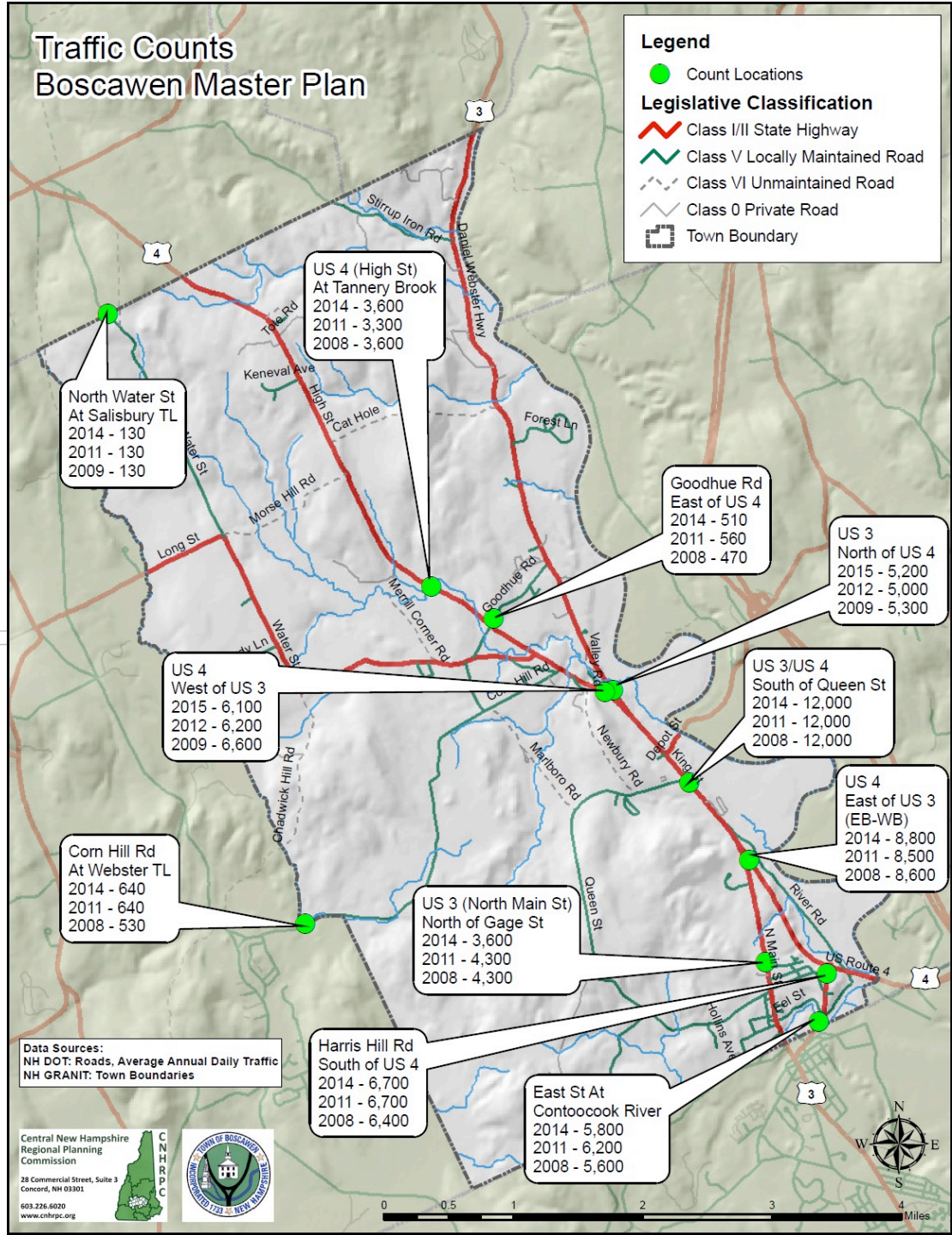


King Street

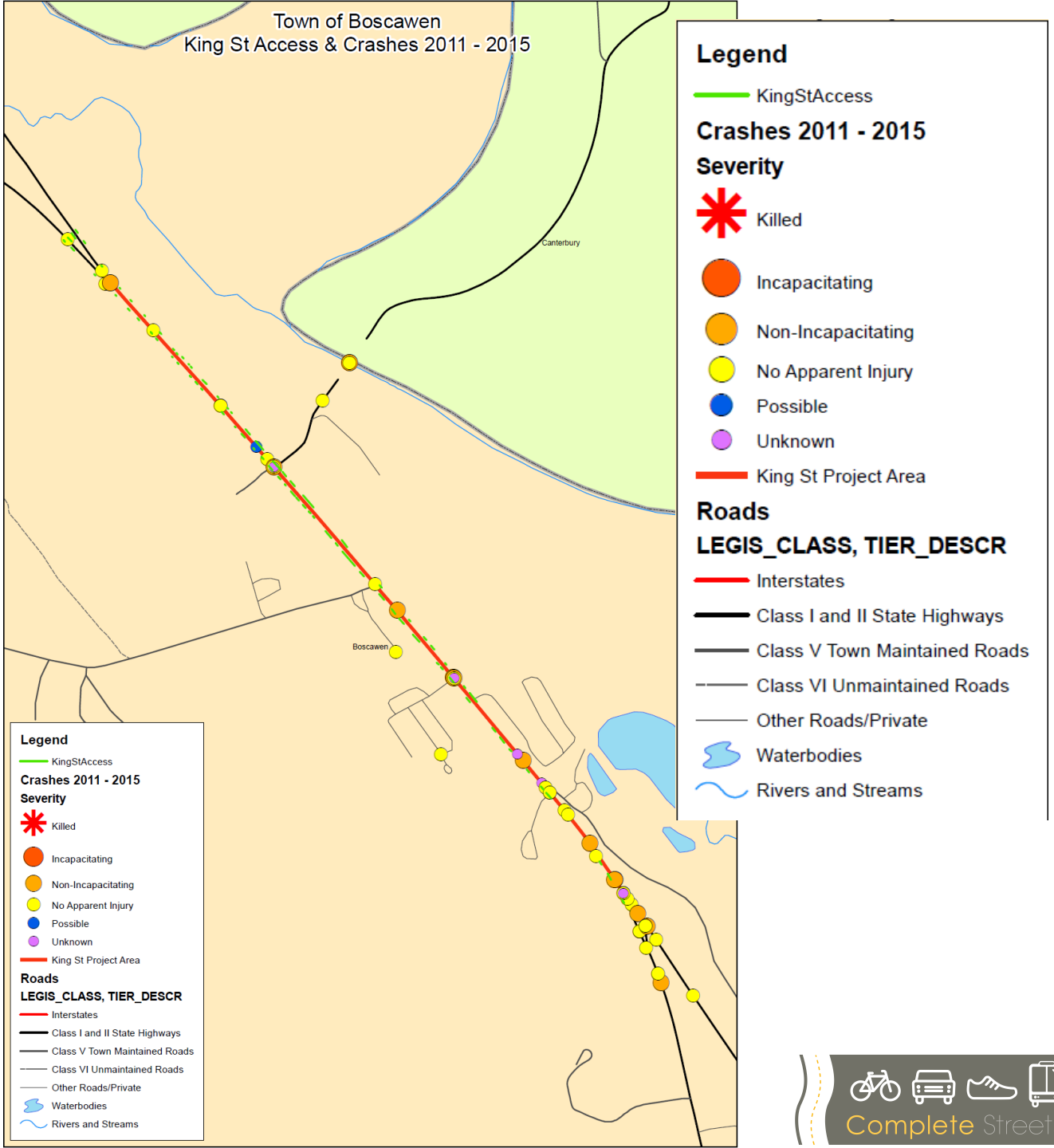
Complete Streets

King Street (traffic)

- King Street ADT (2014)
- 6,100 (north)
- 12,000 (@ Queen St)
- 8,800 (south)



King Street (safety)



Complete Streets

King Street
(potential projects)

Complete Streets

Your Turn
Case study goals

- ✓ Use example corridor to work through process of identifying project needs and brainstorming improvements to meet the needs.
- ✓ Discuss implications for NHDOT project development process, coordination, and decision-making culture.

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Approach

GOVERNORS' INSTITUTE on community design

- Identify current context
- Define needs and objectives for the corridor. Consider:
  - People walking, biking, taking transit, and driving
  - Safety, access, comfort, and convenience of the corridor environment.
- Brainstorm improvements to meet the needs
- Note where tradeoffs are being made between different objectives or modes of travel
- Discuss implications for the project development process

- What are the problem areas?
- Identify Priorities & Tradeoffs
- How do address Safety, Connectivity & Modal Choices?

King Street

(mapping exercise)

Complete Streets