The National Academies of
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TRANSPORTATION RESEARCH BOARD

Right-sizing transportation investments

Wednesday, March 11, 2020
2:00-3:30 PM ET

The Transportation Research Board has met the standards and requirements of the Registered Continuing Education Providers Program. Credit earned on completion of this program will be reported to RCEP. A certificate of completion will be issued to participants that have registered and attended the entire session. As such, it does not include content that may be deemed or construed to be an approval or endorsement by RCEP.

RCEP

REGISTERED CONTINUING EDUCATION PROGRAM

Learning Objectives

At the end of this webinar, you will be able to:

- Define and identify right-sizing needs and opportunities
- Initiate and structure right-sizing policies
- Utilize existing data, models, tools and knowledge to develop, evaluate and articulate right sizing options and outcomes

TRB WEBINAR
MARCH 11, 2020
NAOMI STEIN, EBP

Right-Sizing Transportation Investments

NCHRP RESEARCH REPORT 917*: RIGHT-SIZING TRANSPORTATION INVESTMENTS: A GUIDEBOOK FOR PLANNING AND PROGRAMMING*

Motivation

On the western edge of the Washington metro area

Loudoun County, Va., **in 2012**

Loudoun County, Va., **in 2018**

The World Has Changed...And Is Changing...

Source: The New York Times. A Decade of Urban Transformation, Seen From Above.

Near Houston, TX

Katy, Texas, **in 2012**

Katy, Texas, **in 2018**

The World Has Changed...And Is Changing...

Source: The New York Times. A Decade of Urban Transformation, Seen From Above.

Urban redevelopment in LA

South Park, Los Angeles, **in 2009**

South Park, Los Angeles, **in 2018**

The World Has Changed...And Is Changing...

Source: The New York Times. A Decade of Urban Transformation, Seen From Above.

The built environment of e-commerce in S.C.

Amazon facility in West Columbia, S.C., **in 2009**

Amazon facility in West Columbia, S.C., **in 2015**

The World Has Changed...And Is Changing...

Source: The New York Times. A Decade of Urban Transformation, Seen From Above.

Where some communities grew, others shrank

Detroit **in 2013**

Detroit **in 2018**

The World Has Changed...And Is Changing...

Source: The New York Times. A Decade of Urban Transformation, Seen From Above.

And our mobility options have changed too

Reston, Va., **in 2009**

Reston, Va., **in 2018**

The World Has Changed...And Is Changing...

Source: The New York Times. A Decade of Urban Transformation, Seen From Above.

What is Right-Sizing? Why Do It?

Opportunities for Right-Sizing

With transportation agencies facing common challenges–

aging infrastructure, unstable funding, and rapidly changing transportation markets and performance expectations–

decision-makers are challenged to develop and sustain an infrastructure portfolio of the appropriate size, function and composition.

Transportation agencies need practical and implementable methods to identify opportunities for “right-sizing” that will unlock economic value and improve the efficiency of infrastructure.

Wherever a transportation system is overbuilt, in the wrong place, or configured in an inefficient way – there is a potential right-sizing opportunity.

What is Right-Sizing?

RIGHT-SIZING

A process by which a transportation agency makes intentional decisions to adjust the size, extent, function and composition of its existing or planned infrastructure and service portfolio in response to changing needs over time.

- Can be implemented agency-wide or applied to specific programs and projects
- Avoid over-/under-build
- Match investment to market served and desired levels and forms of economic development and wellbeing
- Contribute to economically sustainable investments
- Create greater life-cycle value for society

Examples of Right-Sizing

The Tennessee Department of Transportation implements an initiative to strategically relax design standards, saving the department over $170 M on the first ten projects under the new policy.

Rochester, NY transforms an under-utilized sunken section of expressway into an at-grade "complete street" with private development creating over $250 M of value in the local economy in addition to millions more in life cycle cost savings

An initiative in Dallas, TX identifies opportunities to generate nearly $500 M in development by re-aligning routes and re-using highway infrastructure -- boosting property values by about $2.5 B, adding 40,000 jobs, and increasing property tax revenue by $80 M

Sources: Interviews with agency staff. Rogers, Tim. New TxDOT Report Says We Should Tear Down I-345. D Magazine. 10 June 2016. https://www.dmagazine.com/frontburner/2016/06/new-txdot-report-says-we-should-tear-down-i-345/

Considering New Types of Decisions/Strategies

Normal Investment Decisions

- **Maintenance**
  (to an *existing* standard)
- **Repair/Replacement**
  (to an *existing/current* design)
- **Expansion**
  (to an assumed *stable/certain* forecast)

Right-Sizing Decisions

- **Defer/Disinvest Through Non-Action**
  (in effect, relaxing or waiving a condition/performance standard)
- **Modify the Design Standard/Target**
  (intentionally reclassify asset & its role)
- **Replace the Asset**
  (make it smaller/more economical)
- **Decommission an Asset**
  (allow for re-use of land)
- **Relinquishment / Change Jurisdictions**
  (better align objectives & ownership)

Products of NCHRP Project 19-14

Right-Sizing Policy Guidance

Right-Sizing "Toolkit"

The “Right-Size” Will Evolve Over Time

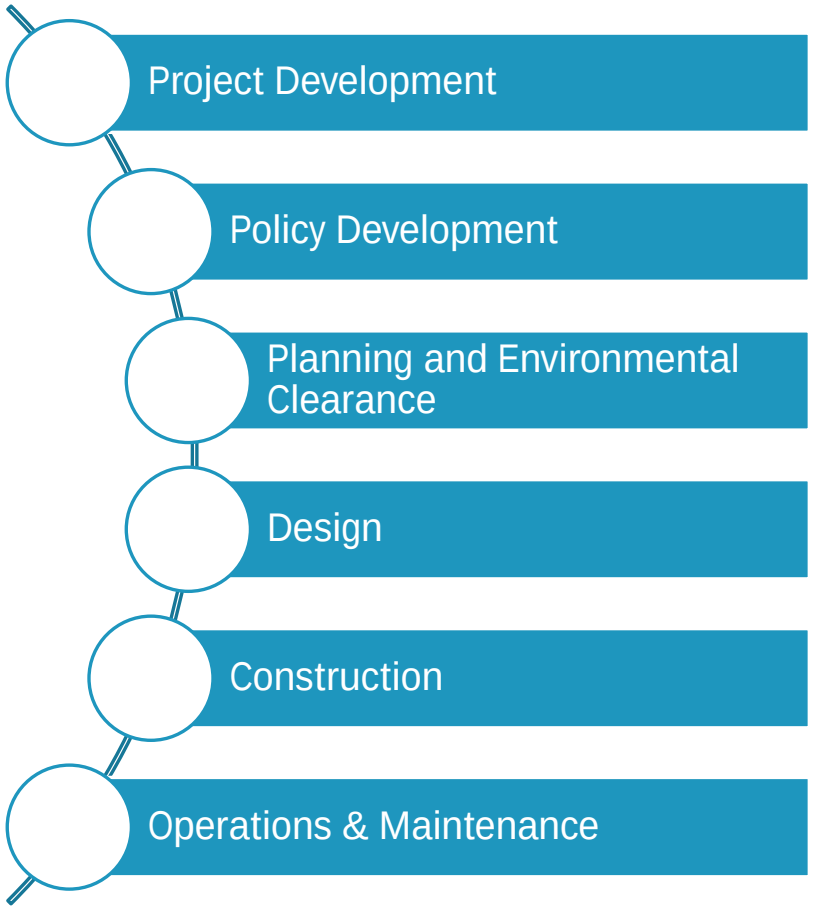
§ There is no absolute “right size”

§ Right-sizing addresses misalignments that arise due to factors that have either **evolved** since the legacy infrastructure was designed or may have been **overlooked** in the past.

§ Right-sizing decisions pertain to **reaching alignment** among:

1. The **owners** responsible for maintaining the infrastructure in the long-term
2. The people or entities **paying** for the infrastructure
3. The people or entities **using** the infrastructure
4. The people or entities **making decisions** about the infrastructure

Ask Key Questions At Every Step



E.g. Project Development:

Major reconstruction/replacement:

- What has changed about the underlying purpose and need for this asset/service since its construction?
- Are there issues related to efficient delivery or return on investment that may point to a different appropriate size/extent/composition/ownership?

Effective Right-Sizing Through Partnerships

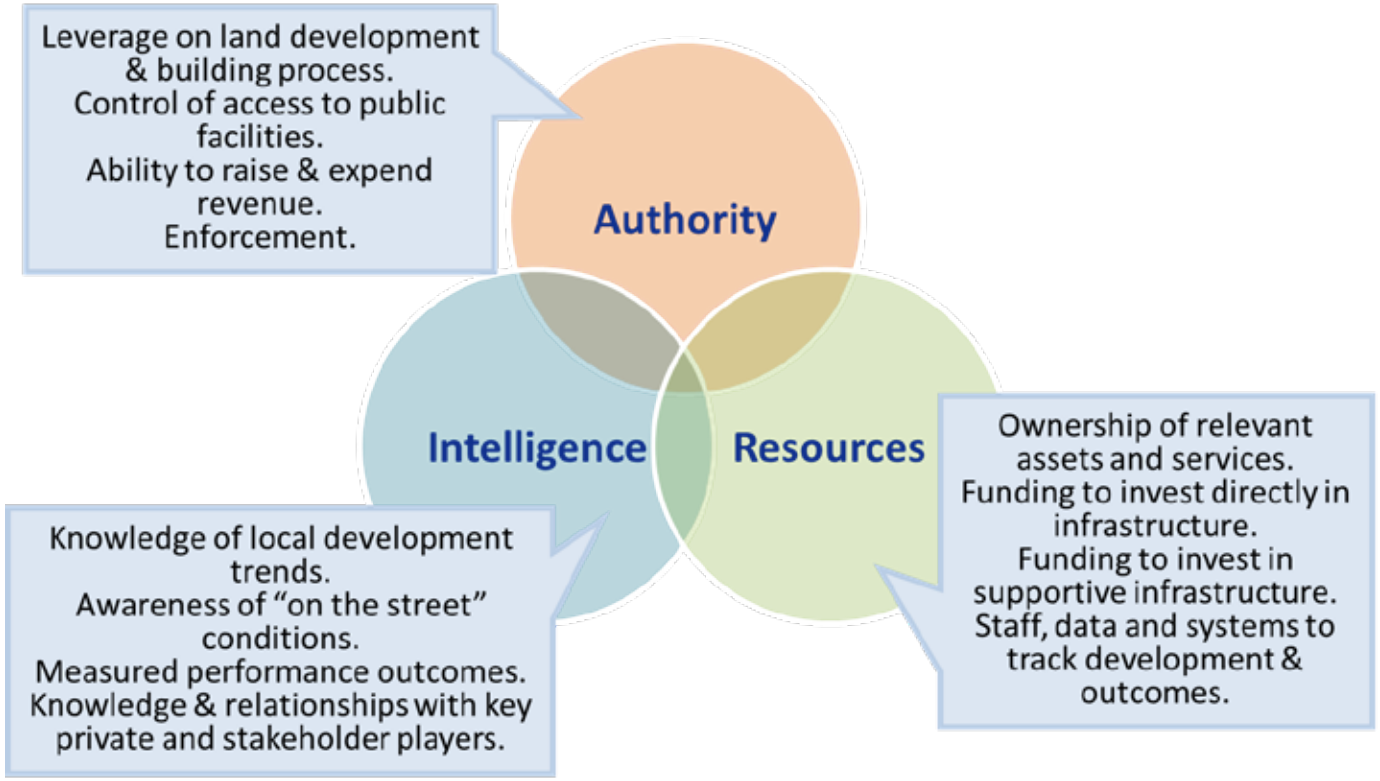
Effective right-sizing relies on a combination of three key elements:

§ **Intelligence**, i.e. an understanding of changing conditions and needs that precipitate the need to right-size and the objectives of right-sizing

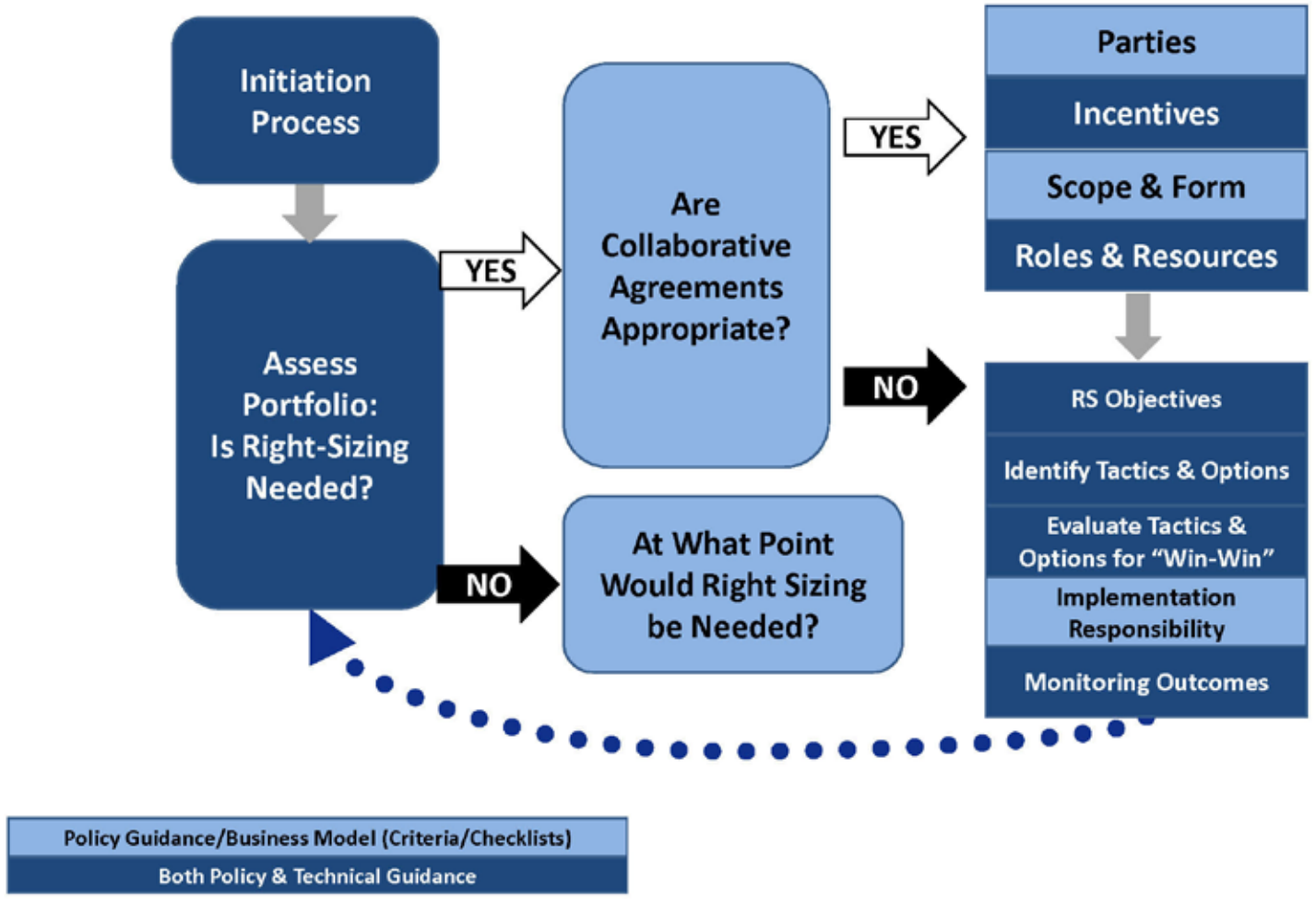
§ **Authority**, i.e. the ability to take the necessary actions in support of right-sizing, and

§ **Resources,** including ownership of relevant assets and services, as well as funding and staff resources to achieve right-sizing objectives.

Right-Sizing Can Mean Building New Connections & Skills



à If these are not present in a single agency, right-sizing requires partnerships, such as between a DOT and city, or a city and a developer.



Roadmap for Right-Sizing

Right-Sizing Initiation

§ Agencies have:
  § Asset management systems to flag a facilities that are ready for preservation treatments
  § Transportation partnerships and performance evaluation methods to identify deficiencies for undersized facilities

à ***But there is no generally accepted trigger for consideration of a right-sizing decision***

à ***Guidebook offers tools and methods for identifying right-sizing opportunities***

Right-Sizing Initiation Process Must:

þ Provide a clear avenue for entities within or outside the agency to raise a potential right sizing opportunity.
þ Not be limited to the creation of new projects or the preservation of existing infrastructure.
þ Have clear criteria for when an asset, facility or system warrants a right-sizing process.
þ Have clear roles, communication protocols, and timetables

Right-Sizing as a Matter of Policy

§Goal: provide a structure within which right-sizing scenarios can be identified and acted upon

§Clearly articulate why your agency is implementing right-sizing

§ Cite specific examples of problems the policy is intended to solve and the expected benefits of solving such problems

§ Differentiate right-sizing from other efforts by specifying goals in at least one of the following categories:

1. *Reduce/Manage Life Cycle Costs*
2. *Achieve Best and Highest Uses of Assets and Revenues*
3. *Aligning Funding and Decision Making with Users and Beneficiaries of the Asset*

Elements of Right-Sizing Strategy - Summary

The guidebook provides additional guidance on...

- **Partnerships:** Forming partnerships in order to gather intelligence, obtain stakeholder buy-in for right-sizing goals and ensure the alignment of authority and resources needed to implement and sustain outcomes
- **Scale and Complexity**: Tailoring right-sizing to urban, suburban, and rural contexts – addressing differences in challenges, opportunities, and tactics
- **Duration:** How to manage and sustain right-sizing over time
- **Uncertainty:** how to incorporate economic & technological uncertainty into traditional BCA or multi-criteria scores
- **Capacity Building:** Right-sizing requires partners to extend beyond the “comfort zone” of their core expertise, experience and immediate jurisdiction.

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How do you make right-sizing an investment decision process?

Two-Pronged Initiation Strategy

Recommended two-pronged initiation strategy:

DOT Initiated Right-sizing

External Proponent Initiated Right-sizing

DOT Initiated Right-Sizing

In the STIP Process:

§ Sensitivity testing of changes in project performance under different underlying assumptions such as forecast traffic growth levels

§ Screening candidate projects before they are admitted to the program using the methods provided in the right-sizing toolkit to identify where development trends, travel characteristics or other factors may warrant a different type of project

In the LRTP Process:

§ Considering different economic and traffic forecasts

§ Considering different congestion threshold targets in urban areas

§ Reviewing the network to identify locations with an over-abundance of short-trip volumes, or with exceptionally high preservation costs per trip carried (see toolkit for further guidance)

DOT Initiated Right-Sizing

DOT District Office, Modal Office or Central Office Initiation

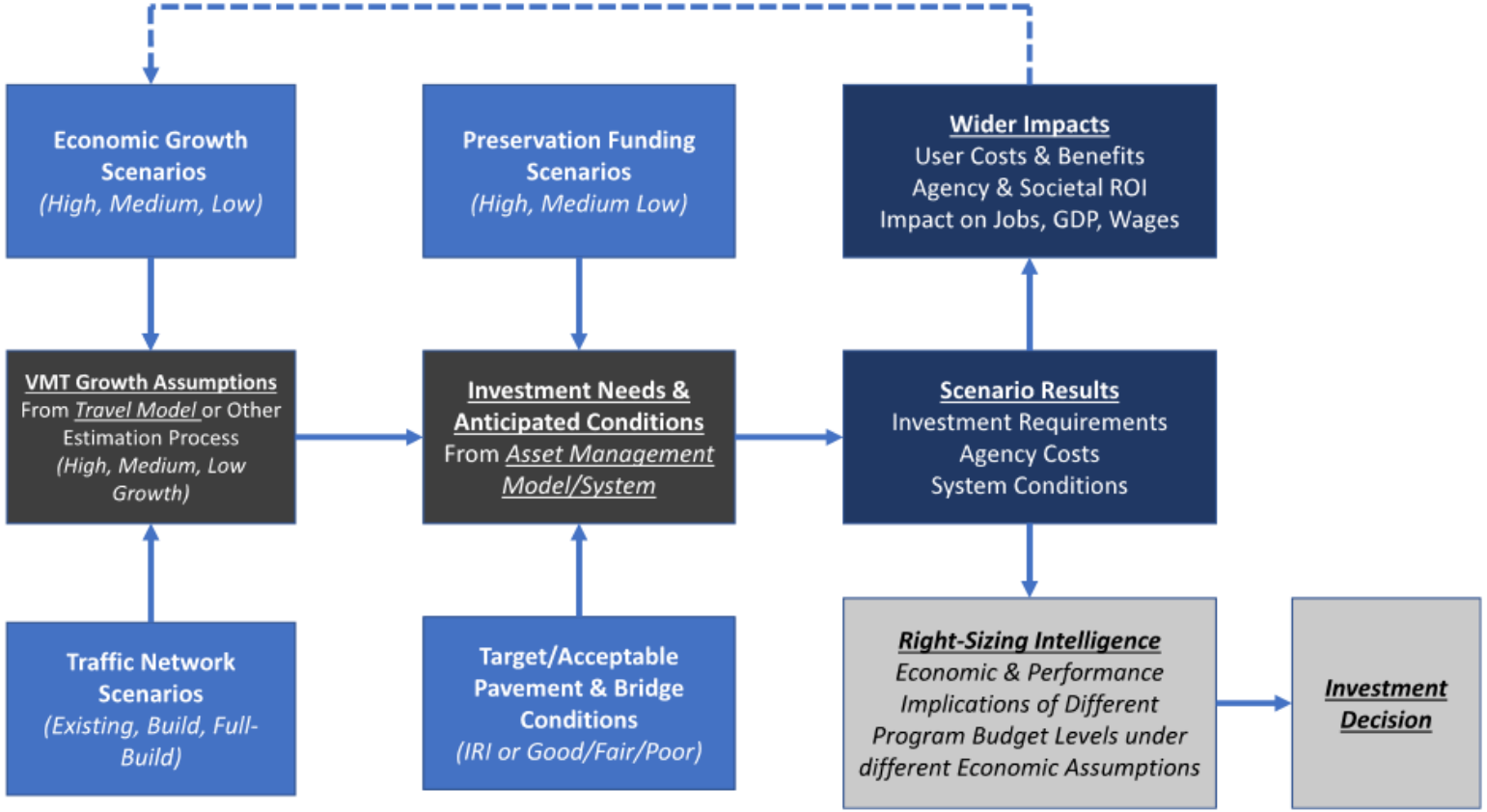
§ Initiate right-sizing based on corridor studies, special modal plans, or when staff notice trends in performance or customer feedback

Example Criteria to Assess and Validating Right-Sizing Initiative:

Criterion	Example	Supporting Information
Repeated Requests for Exemptions to Standards	Requests for driveway access to a principal arterial have more than doubled in the last year.	Documentation of requests and associated building permits/land use changes.
Studies showing facility is underutilized or unutilized	Transit agency completed a plan showing that only 5% of spaces at a park & ride lot are being used	Documentation of utilization level
Significant change in context since last improvement	Major industrial park recently closed or relocated, and land is being converted to mixed-use.	Documentation of precipitating event and associated changes in local planning/zoning.
Event raising legal or financial risk of status-quo	Reports of cyclists and pedestrians routinely using a highway culvert as a pedestrian tunnel.	Case reports of instances of this happening.

DOT Initiated Right-Sizing

§ **In the Asset Management Process**: incorporate sensitivity tests of key policy assumptions that drive forecast investment needs and anticipated conditions



Right-Size Program Investment Levels

Include a Right-Sizing/Economic Sensitivity Assessment in LRTPs or TAMPS

Track Indicators of Economic Change (job or industry growth rates) & VMT Growth to (1) select target investment levels and (2) pivot to appropriate forecasts between planning cycles

Required Preservation Investment Level	Modest Economic Growth	Moderate Economic Growth	Aggressive Economic Growth
Rural Freeway	Cells include $ of anticipated outlay needed to preserve target conditions.		
Rural Principal Arterial			
Rural Minor & Below			
Urban Freeway			
Urban Principal Arterial			
Urban Collector & Below			

Right-Size Investment Priorities

(1) Do not assume that over-build is a low or zero-cost error
(2) How much over-build or under-build "risk appetite" does the agency have?
(3) Which projects represent the most risk, or the most risk per $ of potential benefit?

Scenarios	Modest Economic Growth	Aggressive Economic Growth
Modest Technology Growth	$ Benefits	$ Maximum Benefit for Infrastructure Investment
Aggressive Technology Growth	$ Minimum Benefit for Infrastructure Investment	$ Benefits

Project #	Cost	Max Public Benefit	Min Public Benefit	Max BCA	Min BCA	Max NPV	Min NPV	Net User Cost of Under-Build	Net Agency Sunk Cost of Over-Build	Highest Uncertainty Cost
1	$2.4	$4.4	$2.0	1.83	0.83	$2.00	($0.40)	$2.0	$0.4	UnderBuild ($2.0)
2	$1.6	$1.9	$1.2	1.19	0.75	$0.30	($0.40)	$0.3	$0.4	OverBuild ($.4)
3	$0.7	$1.2	$1.0	1.71	1.43	$0.50	$0.30	$0.5	None	None

Using Models to Identify Right-Sizing Opportunities

Using Analytical Models in Right Sizing

- Right-Sizing can Expand the role of modeling in DOT decision making

ü From simply forecasting needs to providing business intelligence on how needs are understood
ü From a focus only on traffic flow, to a focus on economic function of the transportation network.
ü From a stand-alone modeling system to part of an integrated system of models evaluating both the role of existing facilities and the potential performance of new or enhanced features.

How Right-Sizing Relates to Travel Models

- **Assessing Travel Characteristics:** The focus of right-sizing is on utilizing models and their data to understand **underlying access needs**, as opposed to **simply forecasting** traffic.

- **Identifying "Mismatch":** Modeling applications of right-sizing look to pinpoint areas where the network characteristics **do not align** with trip characteristics or sources of value that may justify the current use of an asset.

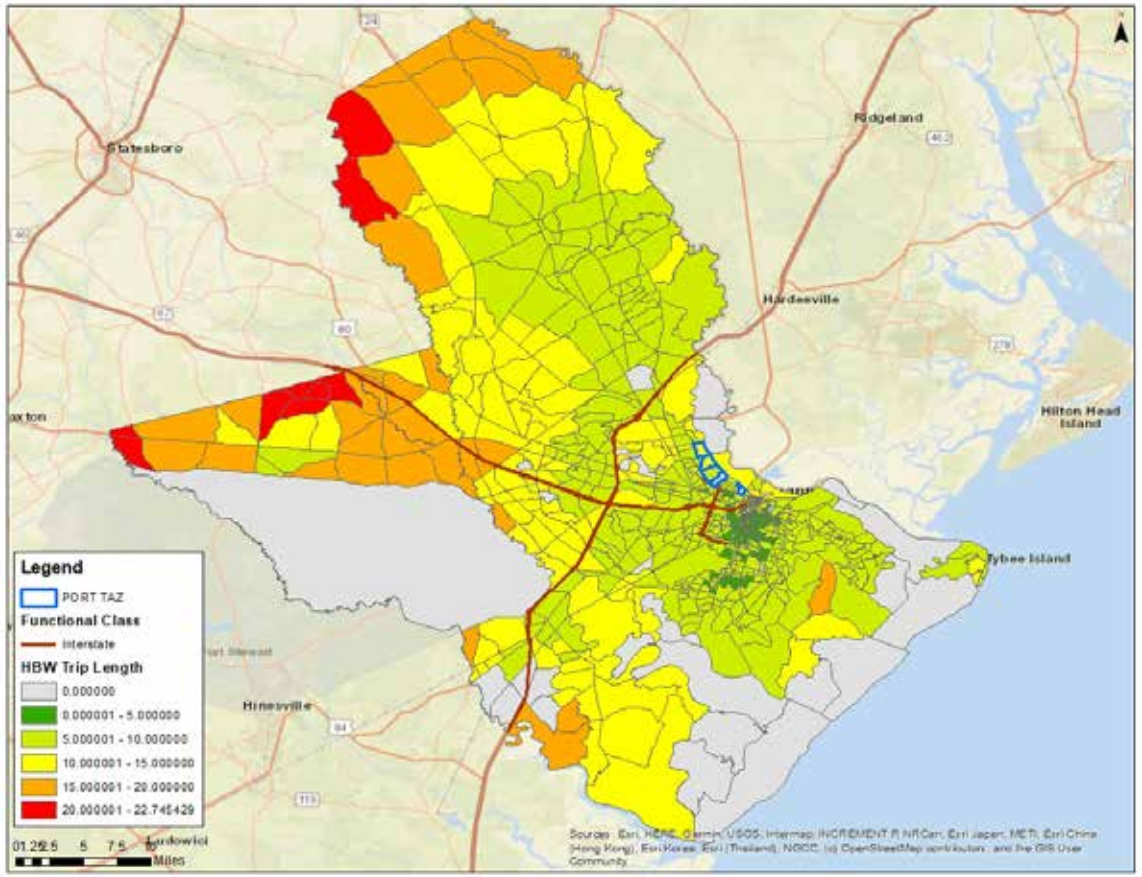
- **Considering Uncertainty:** Right-Sizing applications seek to use models to consider the degree to which transportation needs may change under alternative economic forecasts, or technology assumptions.

Example Application: Savannah, Georgia

What Locations are my Shortest Trips Serving?

Is the Infrastructure Appropriate for Short Trips?

Entire Modeling Area



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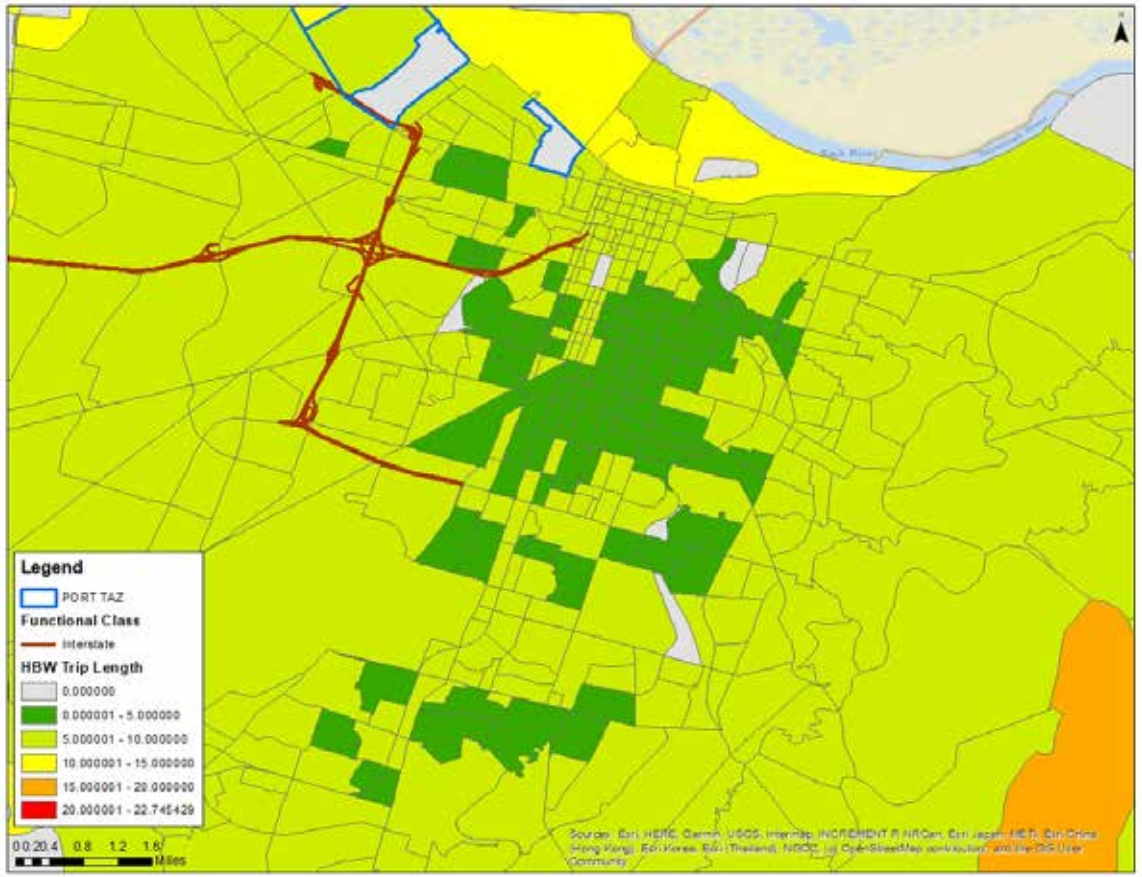
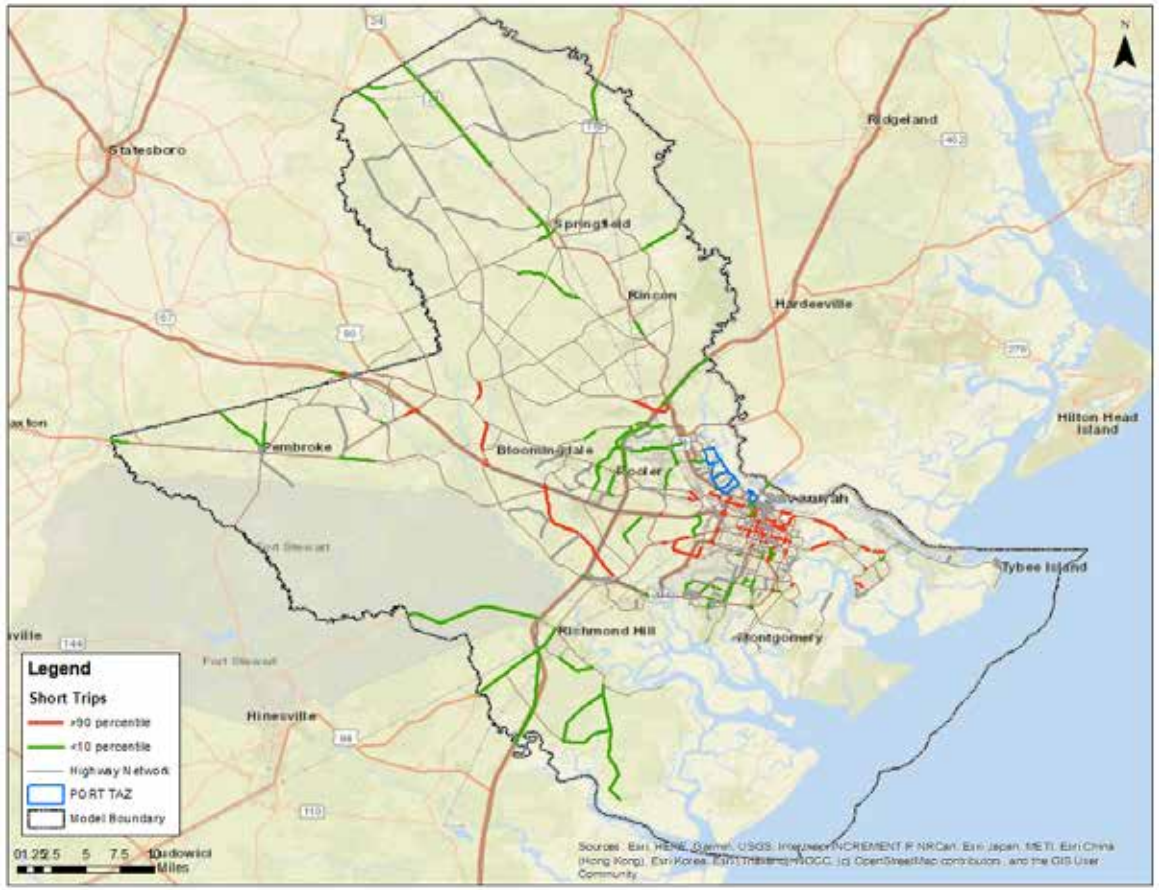


What Facilities Carry my Shortest Trips?

Are these the right facilities?

Entire Modeling Area



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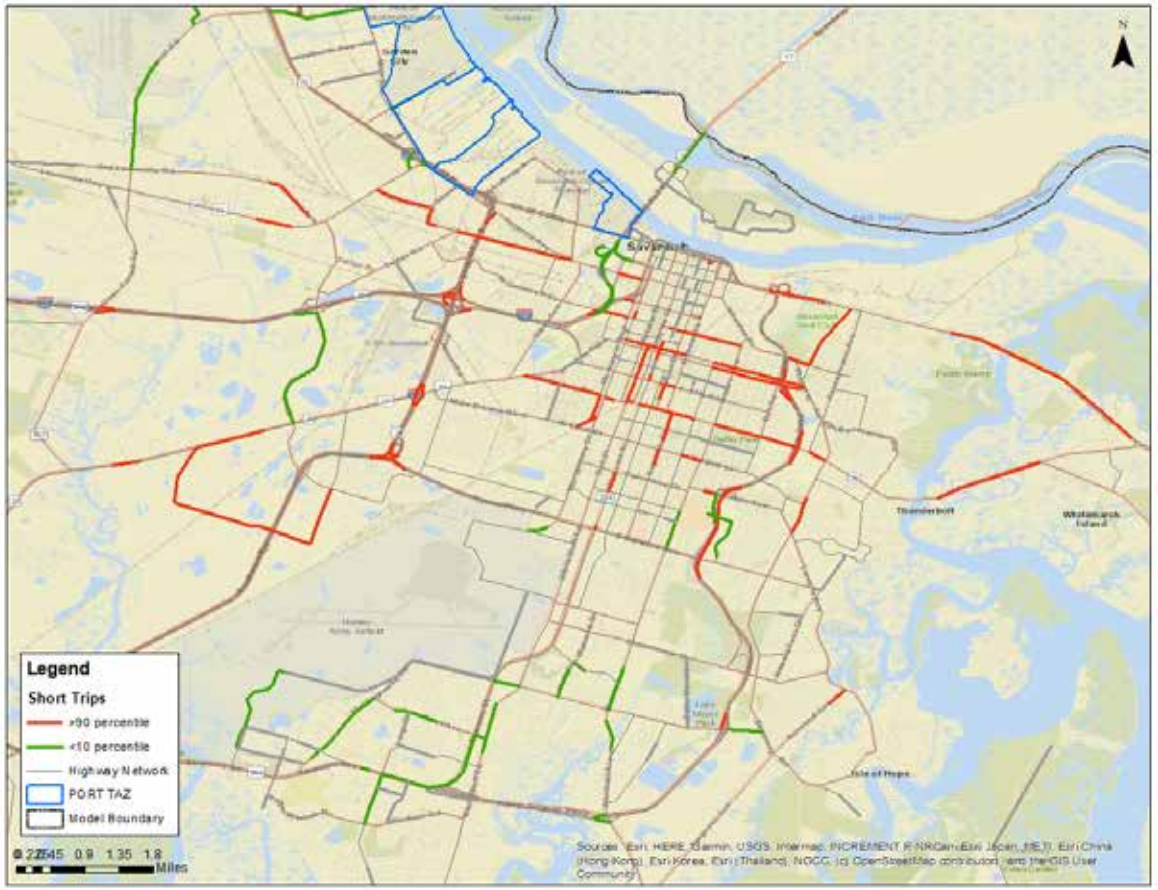
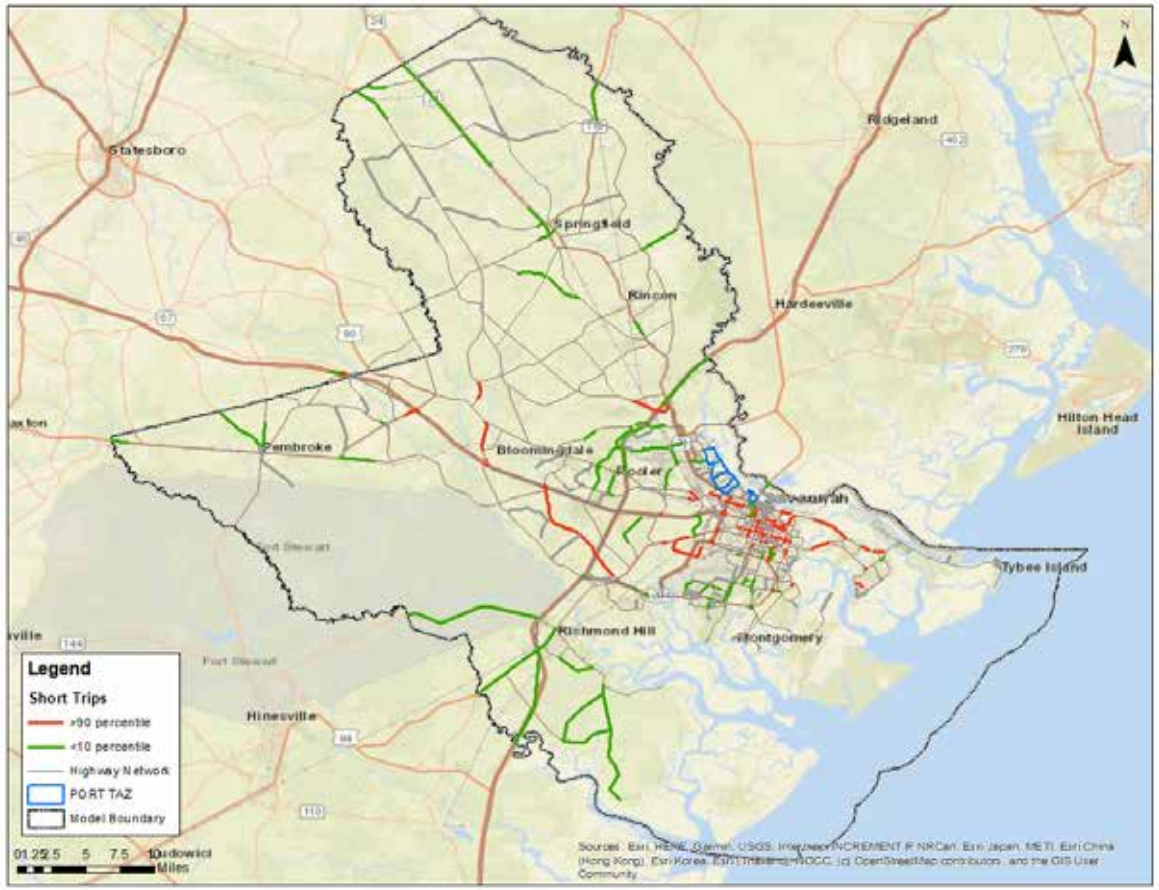


What Facilities Carry my Shortest Trips?

Are these the right facilities for these trips?

Entire Modeling Area



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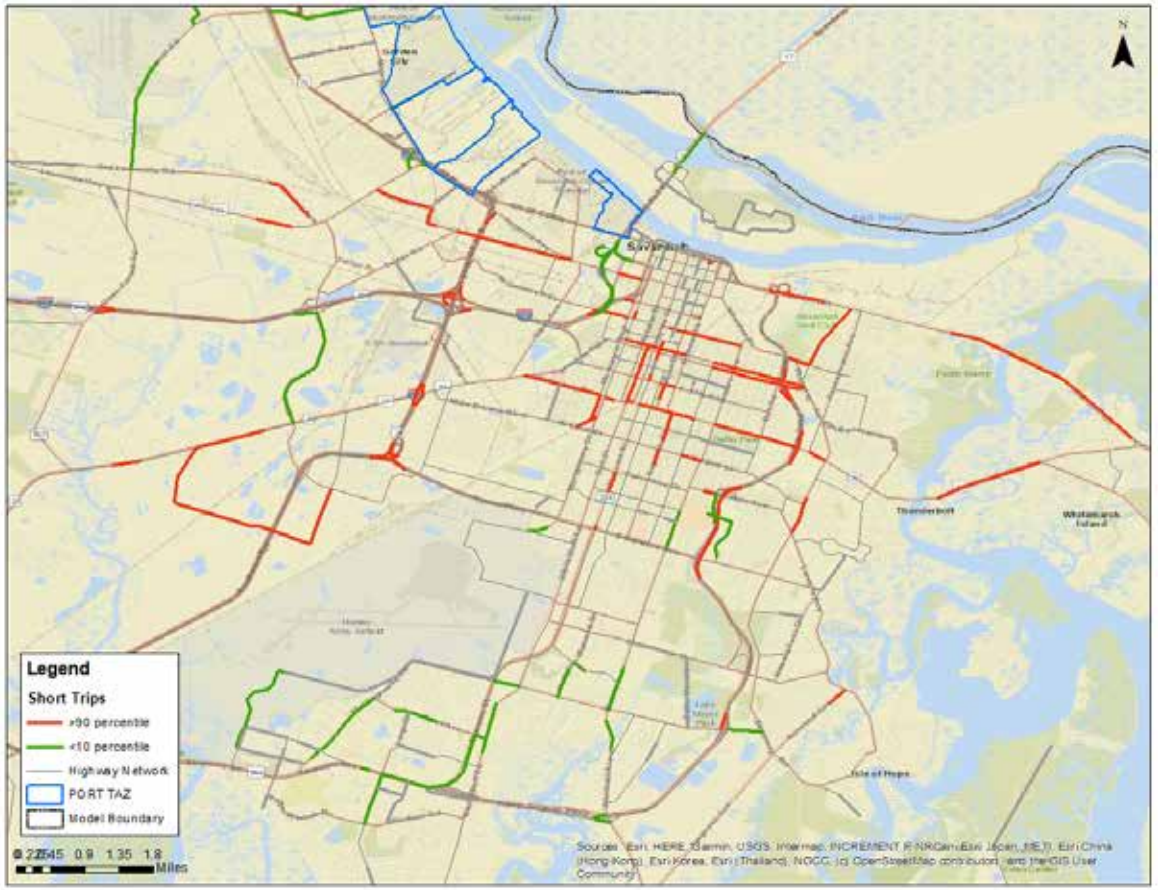
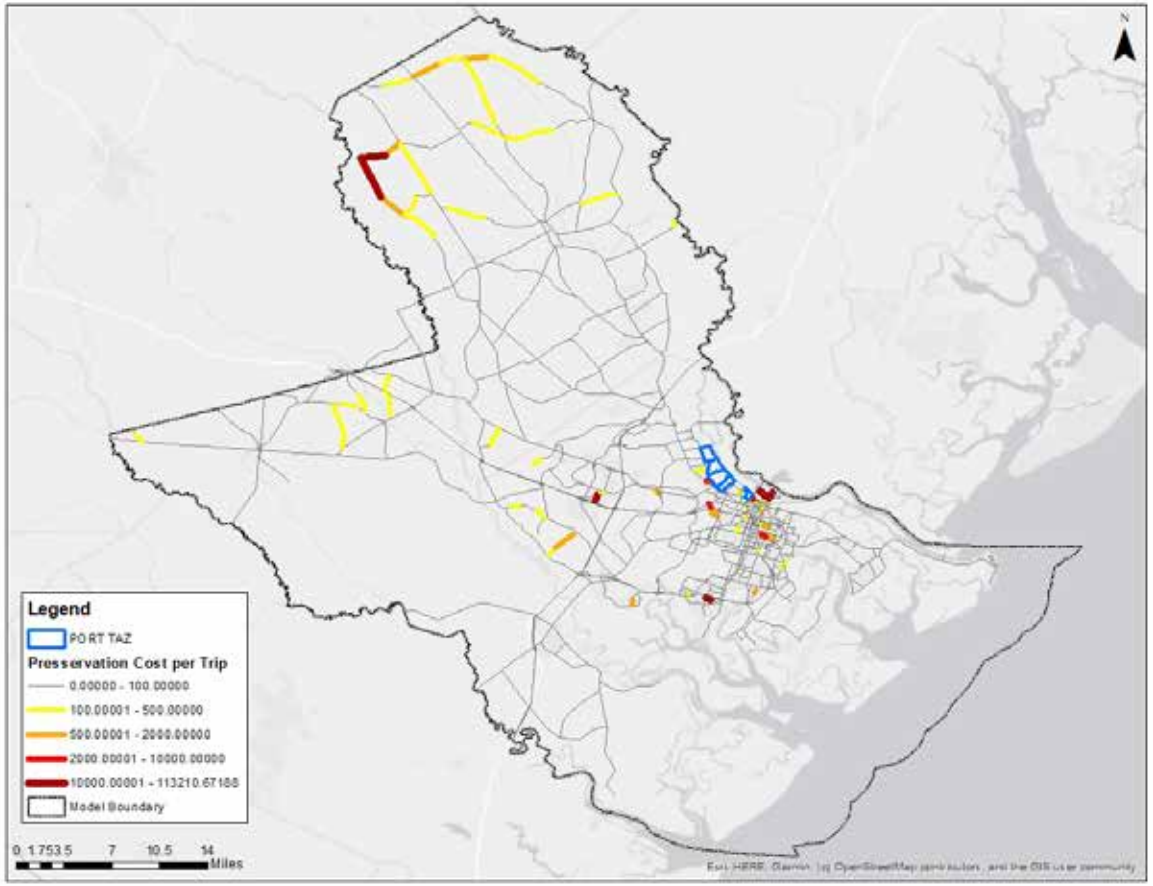
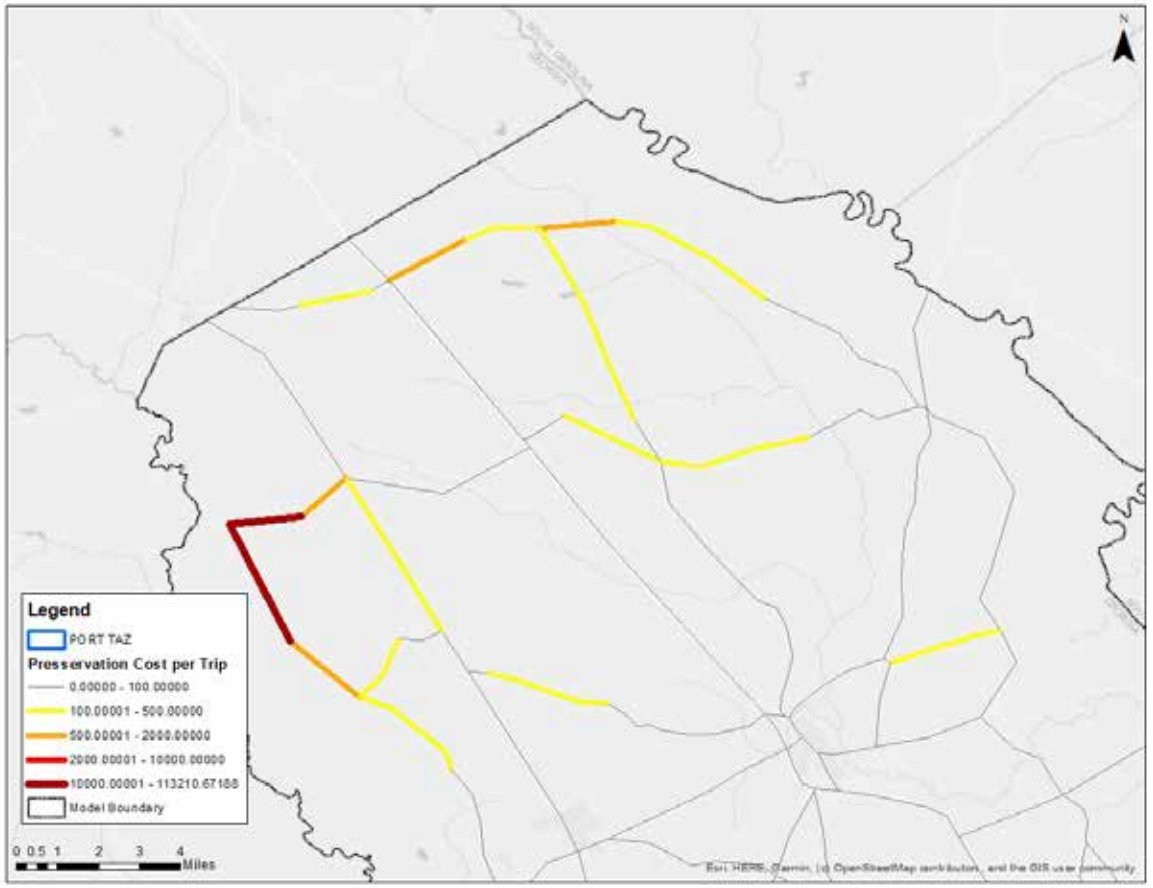


Which Facilities Cost the Most to Preserve?

Entire Modeling Area



Area 1

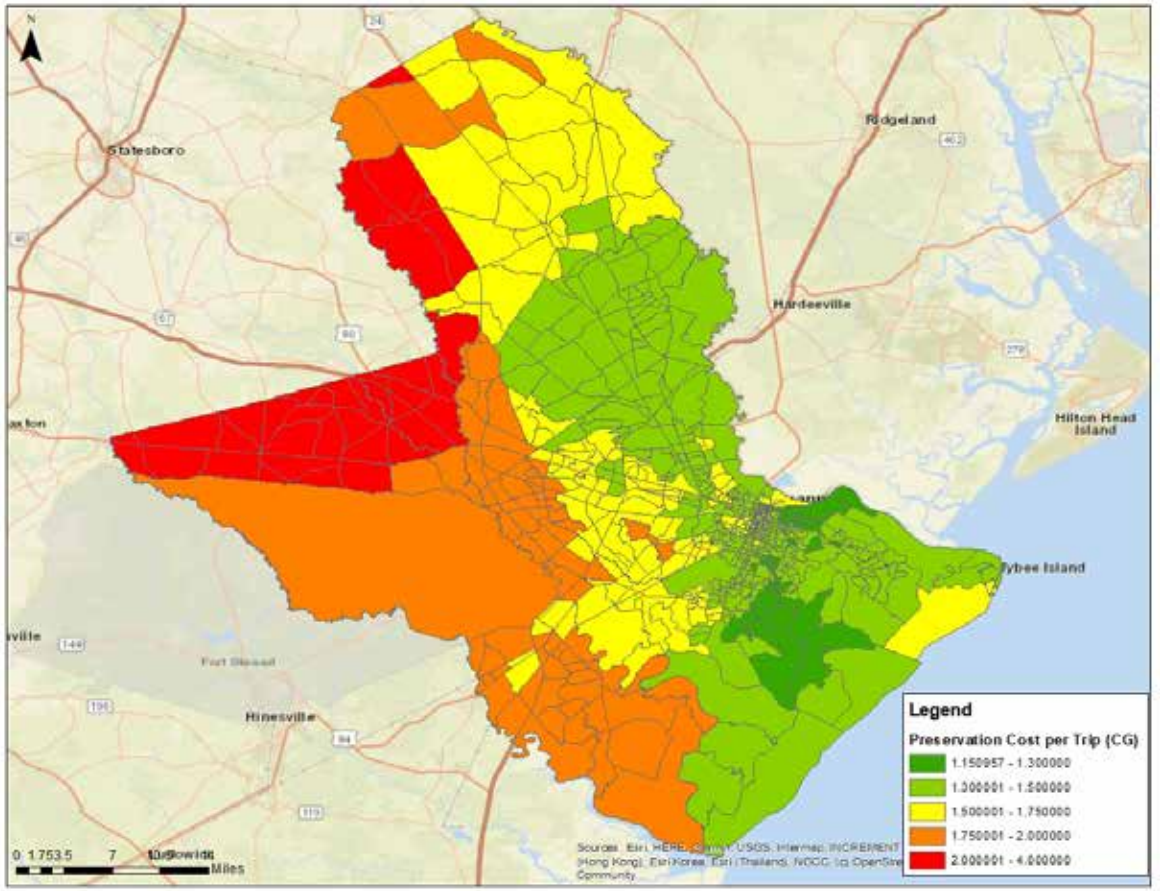


What Locations are the most-costly to serve from a highway/bridge preservation standpoint?

Are there more economical ways to serve these areas?

Are there economic activities in the highest-cost areas that justify the high public outlay per-trip?

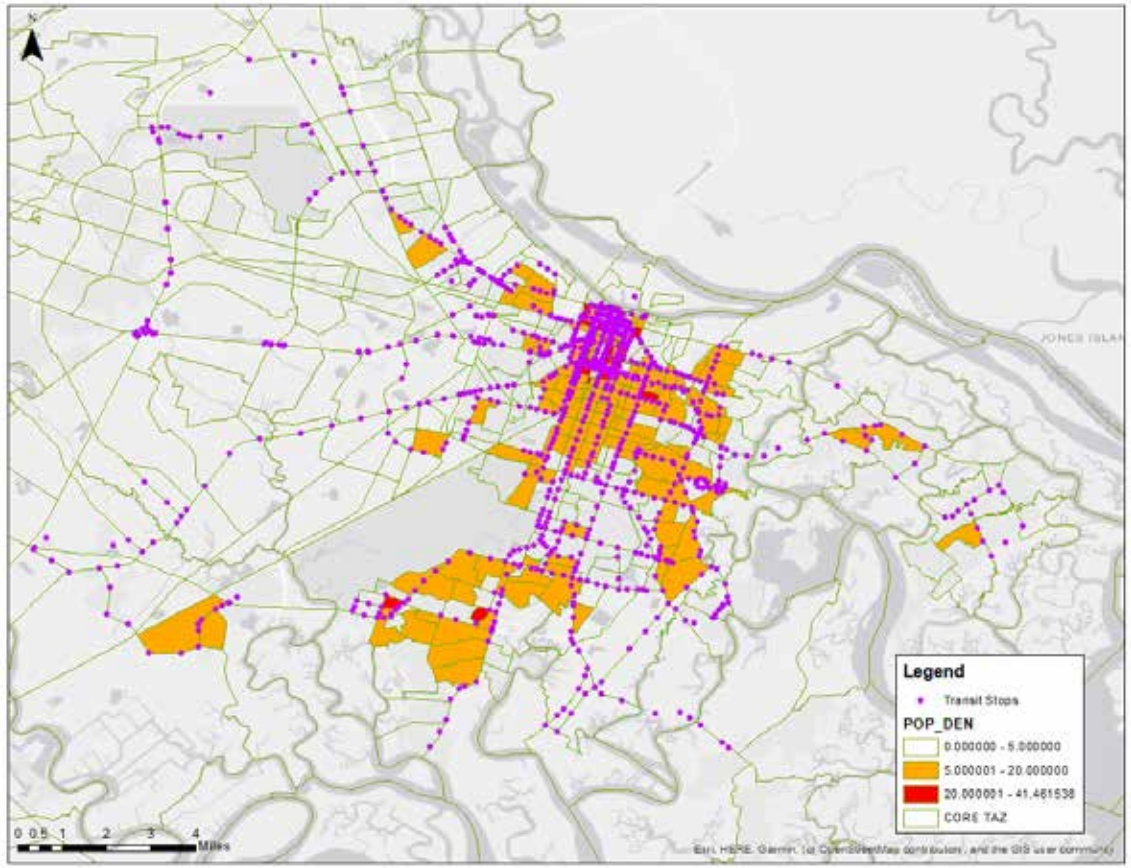
This type of analysis can also be used to further explore the cost per trip in relation to GDP created, population, land area served and other indicators.



Is there transit to serve my short trips?

Is there bike-ped infrastructure?

Entire Modeling Area



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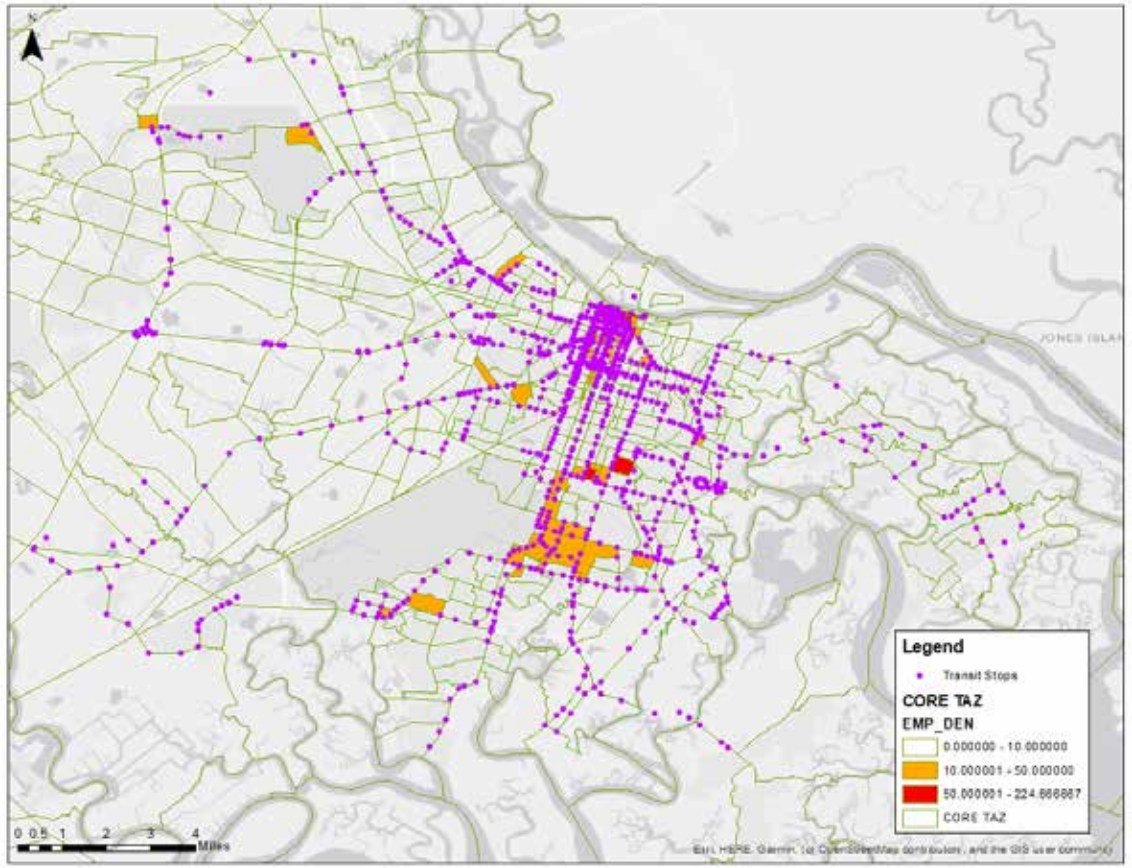
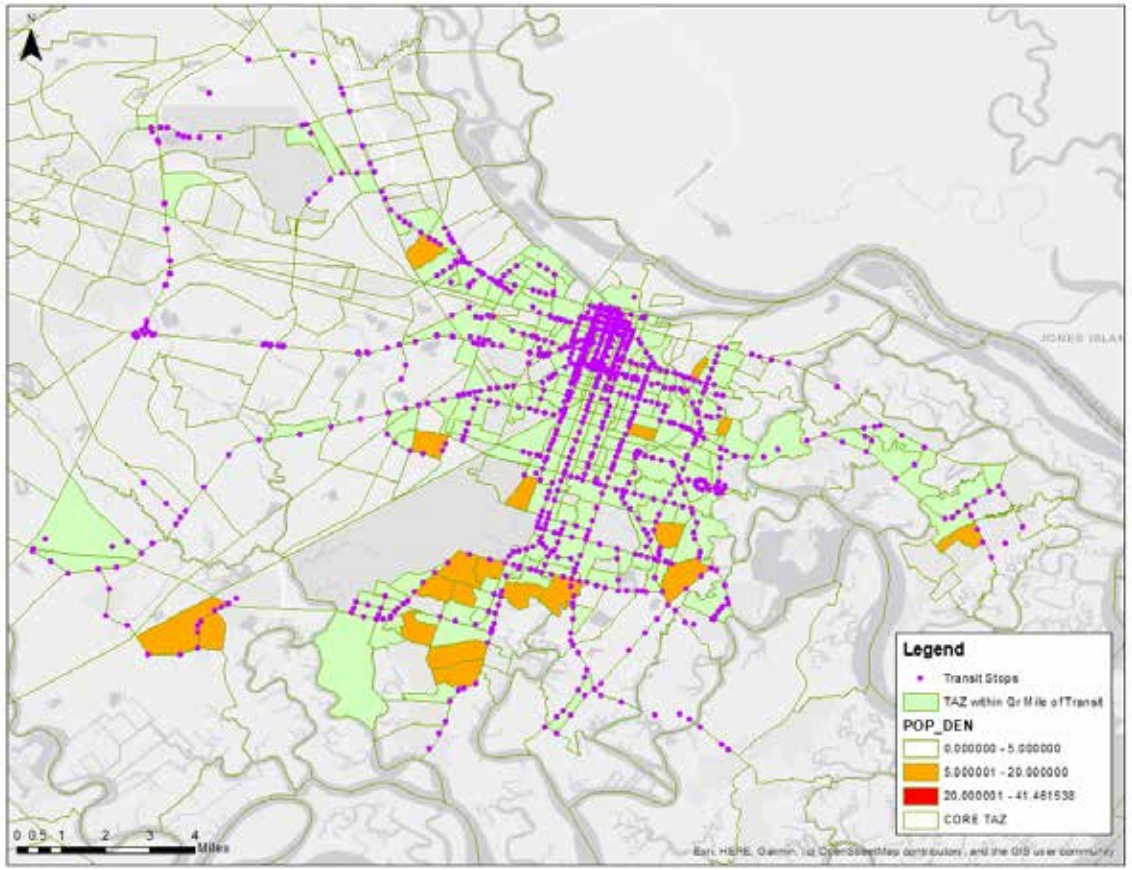


Is there transit to serve my short trips?

Is there bike-ped infrastructure?

Areas Shown in ORANGE may be mis-aligned regarding transit access

Entire Modeling Area



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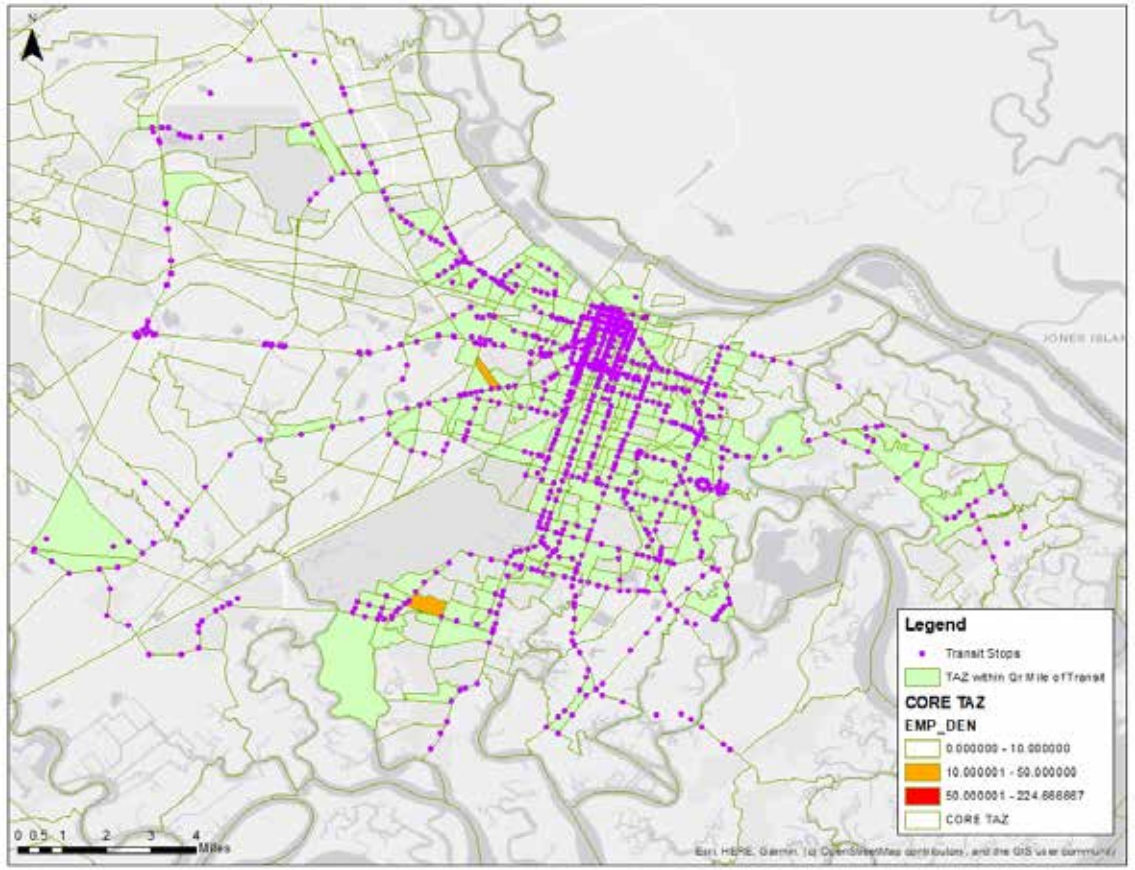

Proponent Initiated Right-Sizing

§ Because cities, developers, counties and other entities outside of a state DOT often have the best understanding of development trends, opportunities and other changes, agencies can benefit greatly from policies for outside proponents to initiate right-sizing.

Example Review Guidelines for Right-Sizing Proposals

Criterion Type	Key Evaluation Factors
Nature of Opportunity	Does the program or facility proposed for right-sizing affect the cost, condition or performance of the agency's assets enough to warrant action?
Misalignment of Utilization & Demand	How does the utilization of this facility compare with other comparable facilities? Are the claims of "better and higher" uses supported by concrete proposals of better ways to use the land or resources or with examples of where such uses have been achieved elsewhere?
Potential Cost Savings	Are the sources and magnitude of cost savings given in the application quantified (or quantifiable)? Have there been studies (or is other objective information cited in the application) verifying how these costs accrue?
Partners & Beneficiaries	Do the intended beneficiaries agree with the proponent's assessment of the opportunity and if so is there indication of their willingness to participate in a right-sizing effort?

Click to return to section beginning

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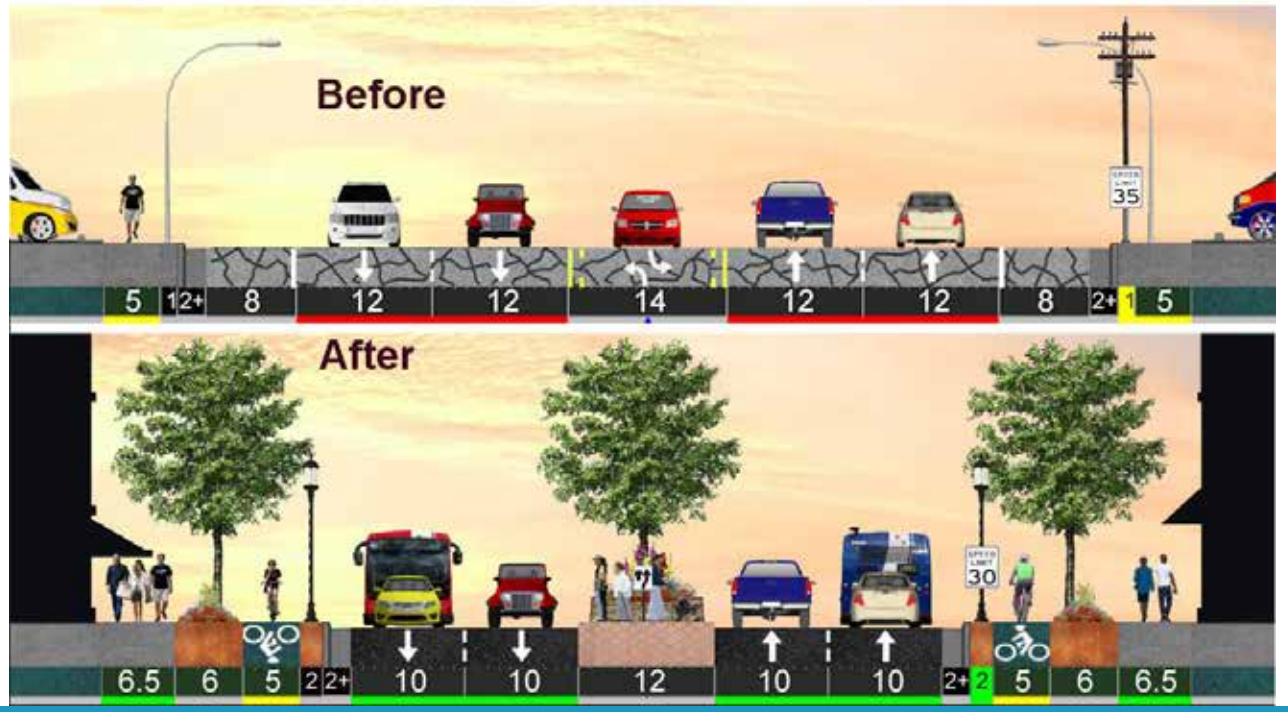
How do you Implement Right-Sizing When Developing Projects?

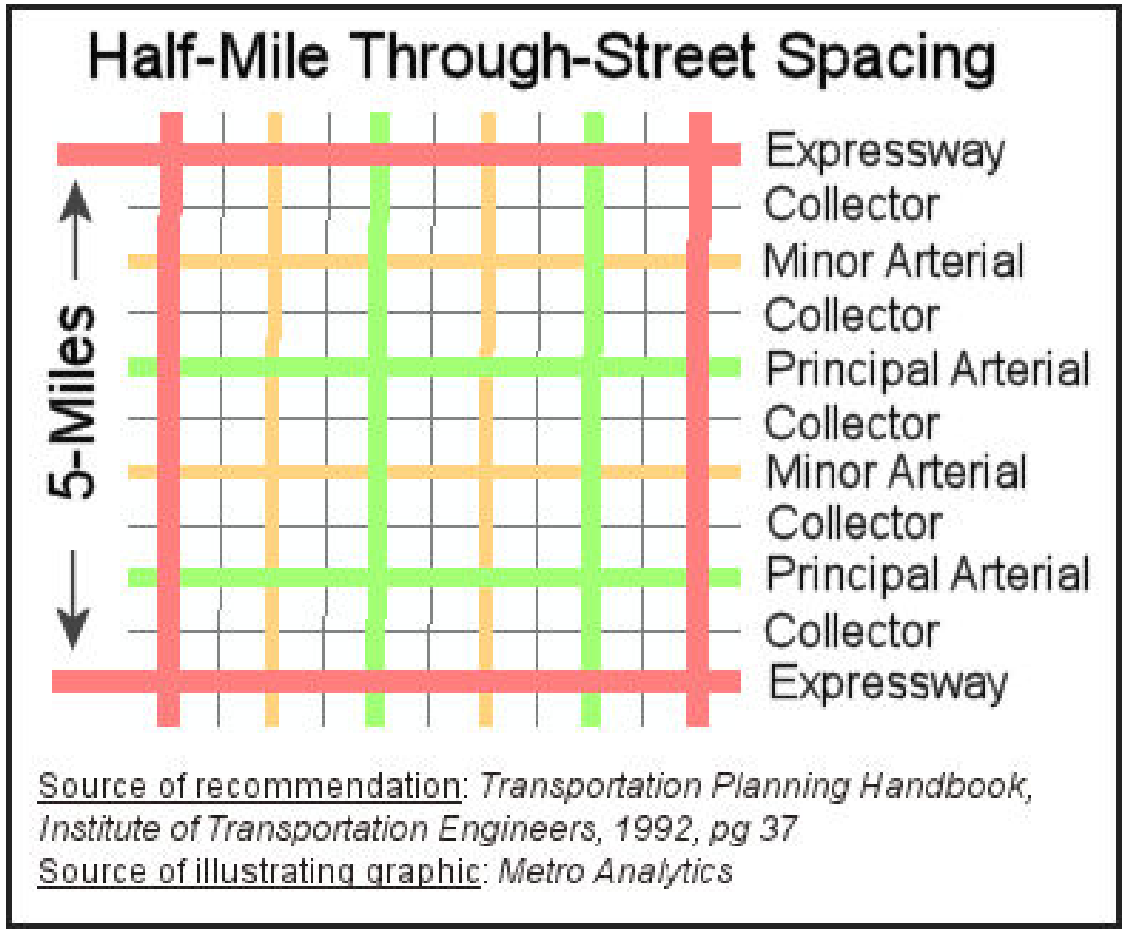
Right-Sizing Guidebook for Planning and Programming (NCHRP Report 917)

- Right-Sizing via Design



How do you right size a region?

- First, discover that there is something “wrong-sized”
- Are emerging Greenfields well planned?
- Are there extensive Greyfields that can compete against Greenfields?

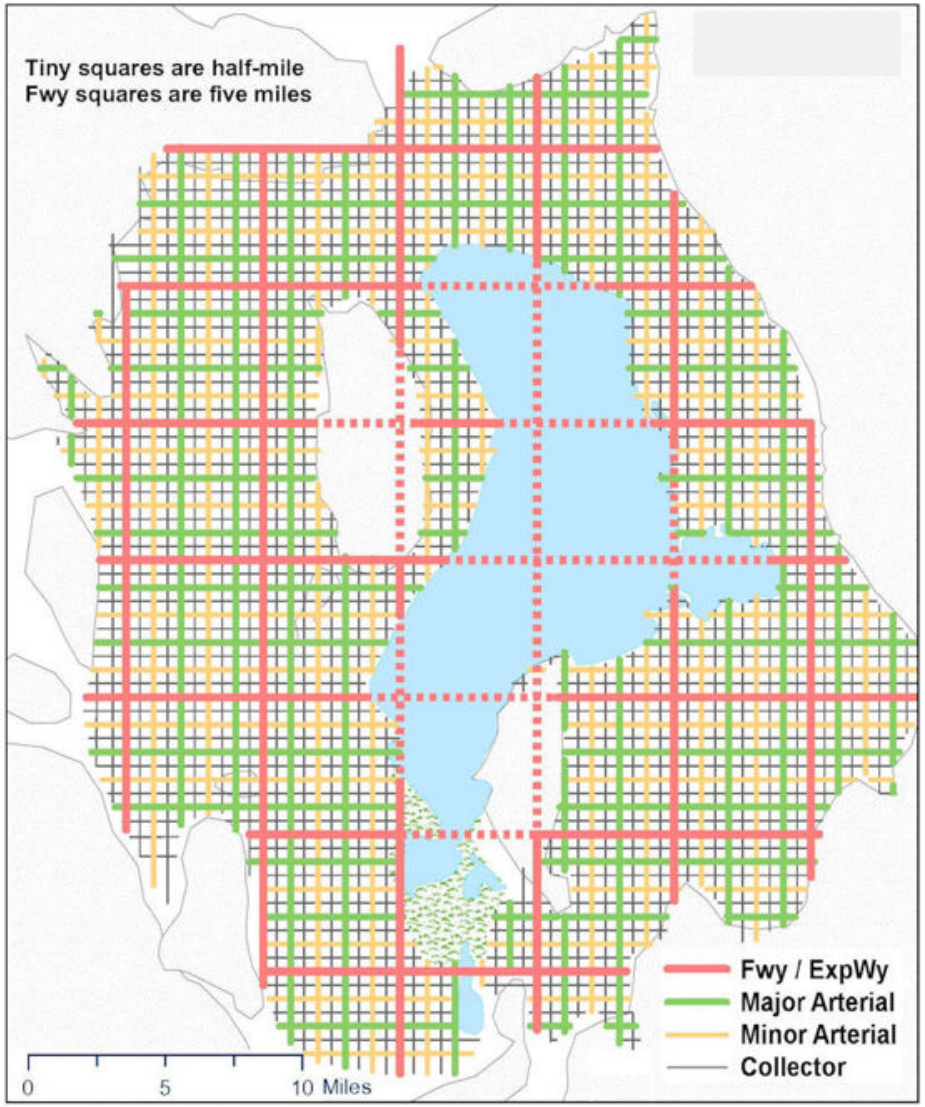


Source of recommendation: *Transportation Planning Handbook, Institute of Transportation Engineers, 1992, pg 37*
Source of illustrating graphic: *Metro Analytics*

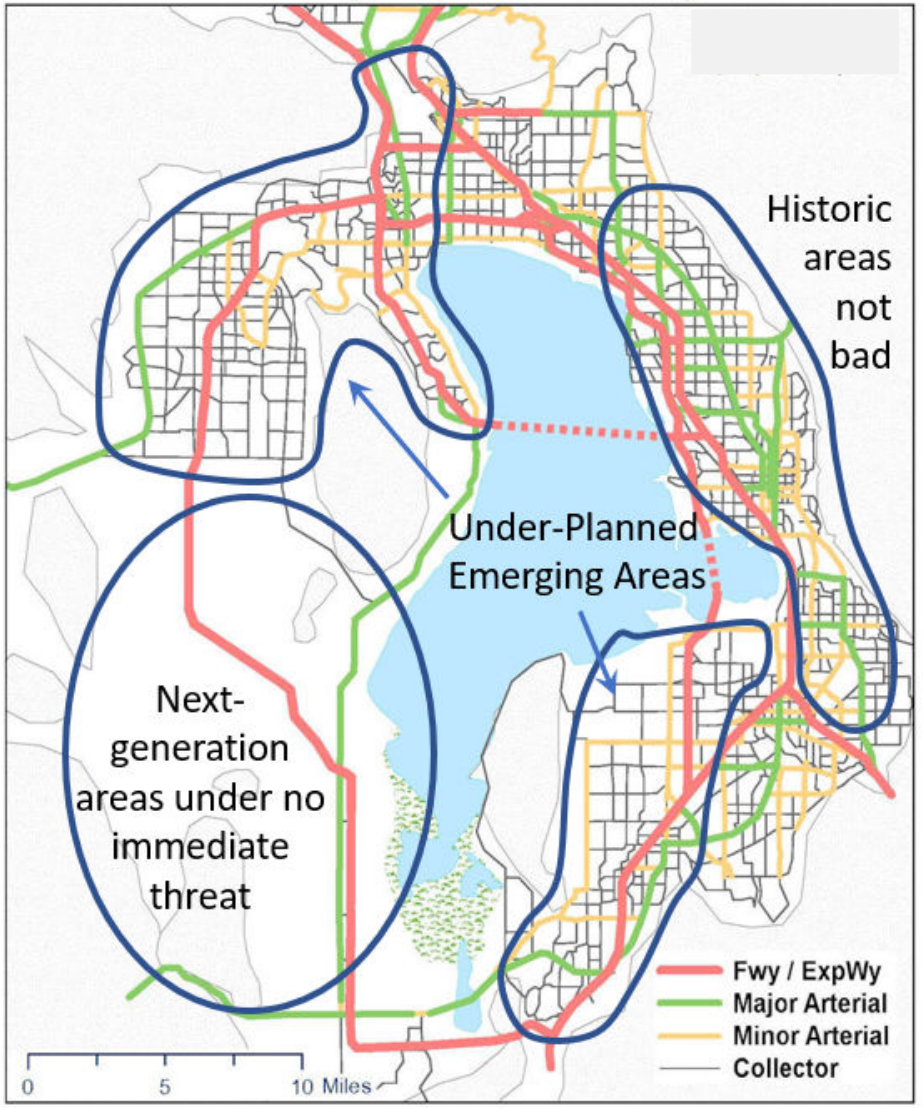
Learning Objectives

- Macro-level right-sizing network design
- 7-D frameworks for land use and traffic
- Arterial street design strategies consistent with 7-D’s

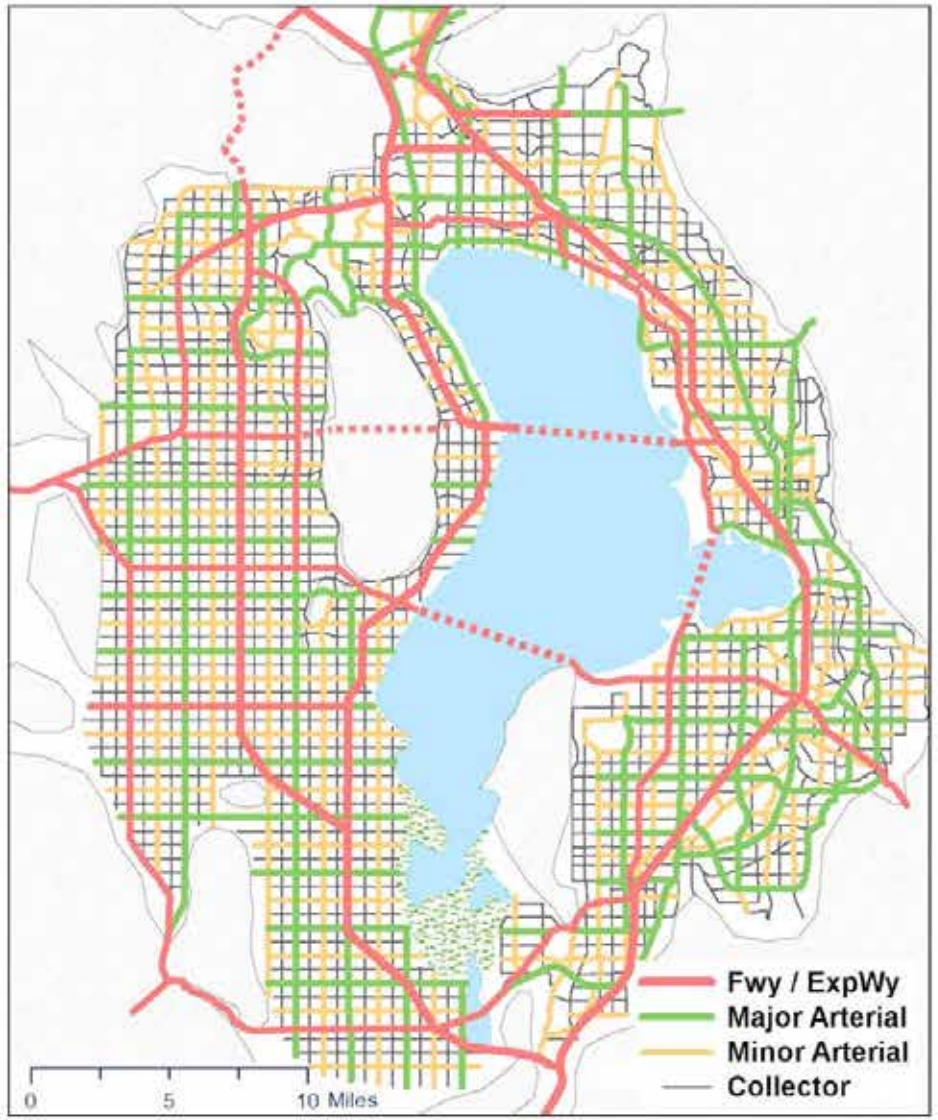
ITE Ideal Grid, Overlaying Utah County



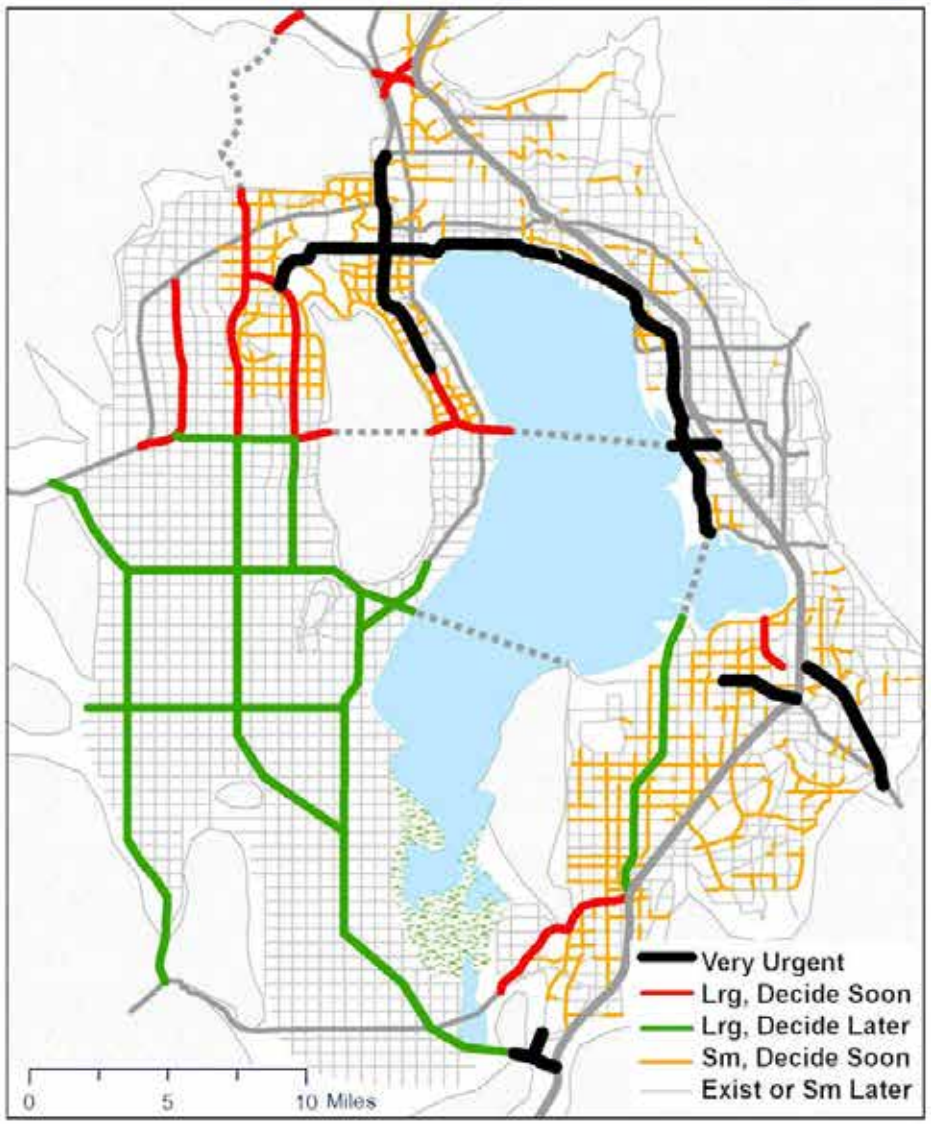
Utah County 2040 Roadway Plan



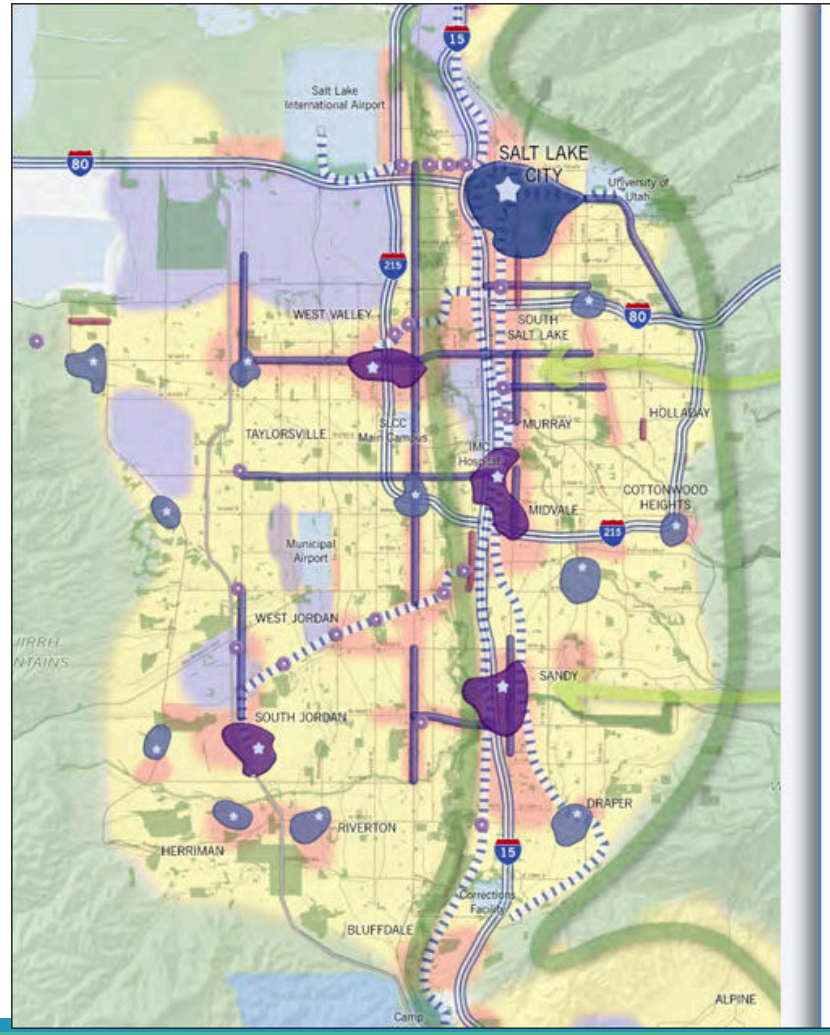
Ideal Build-Out, Modified to Reality



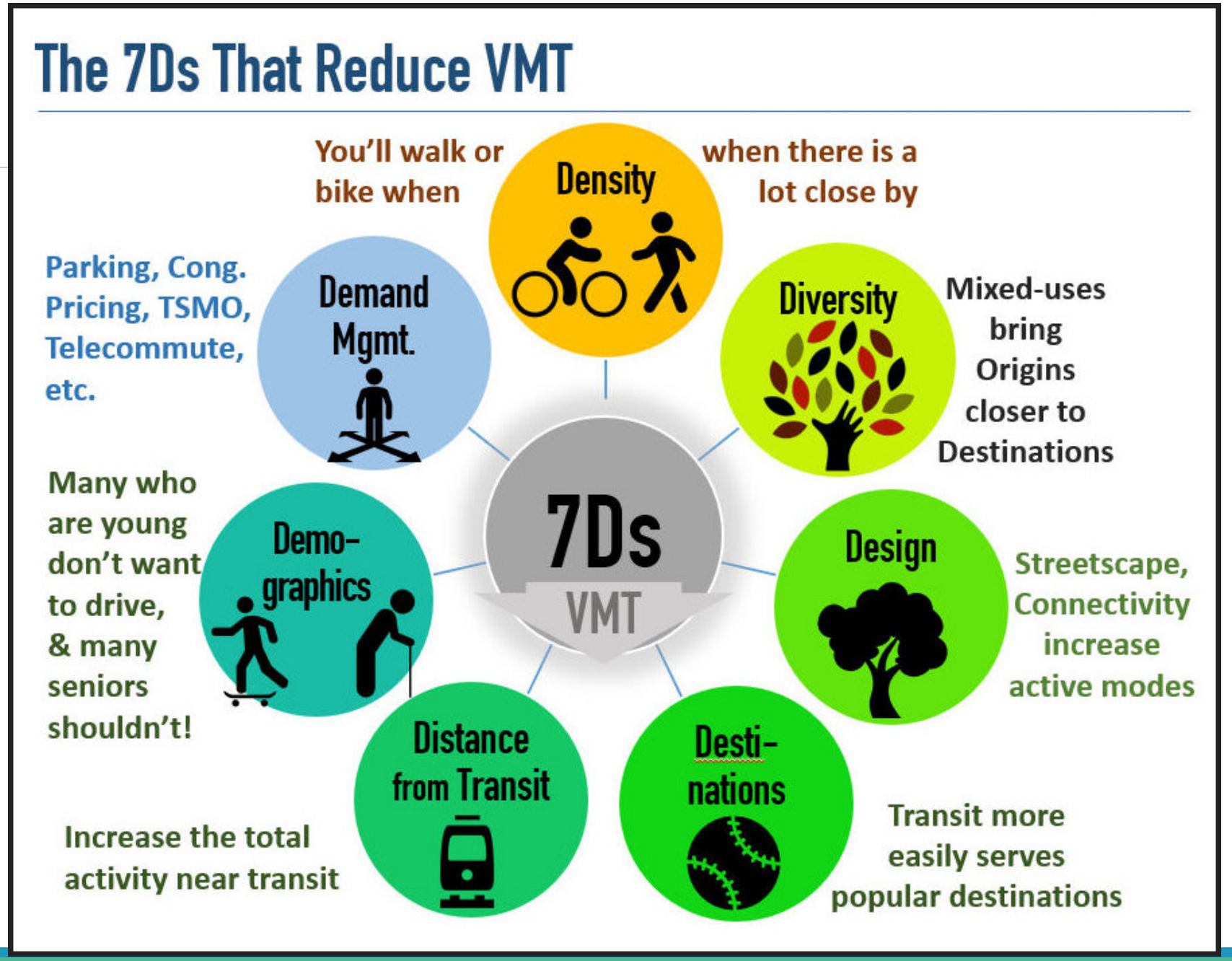
Preservation Needs, by Level of Urgency



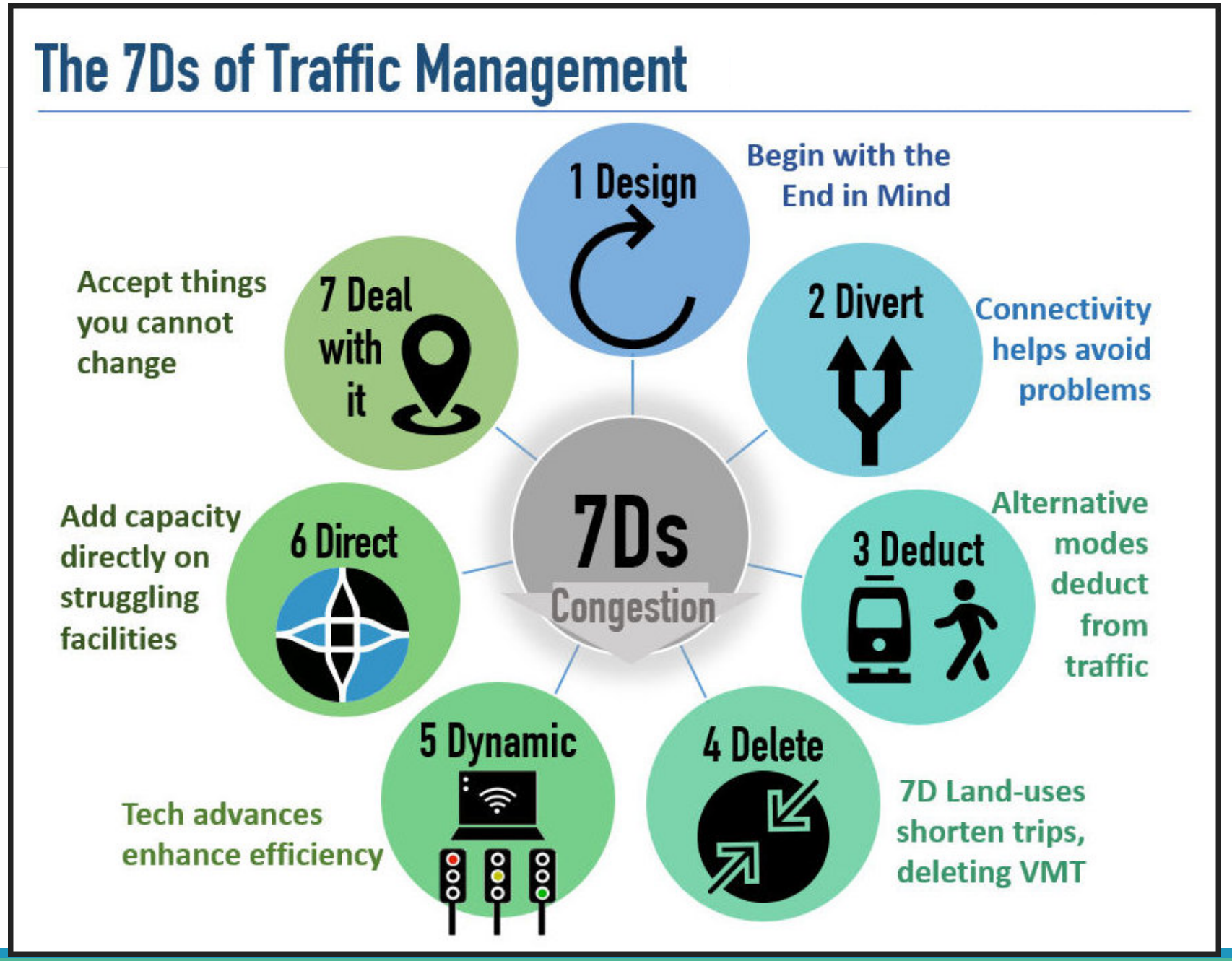
Helping Greyfields Compete Against Greenfields



7-D Framework for catalyzing walkable activity centers



7-*More* D's for Right-Sizing to Congestion

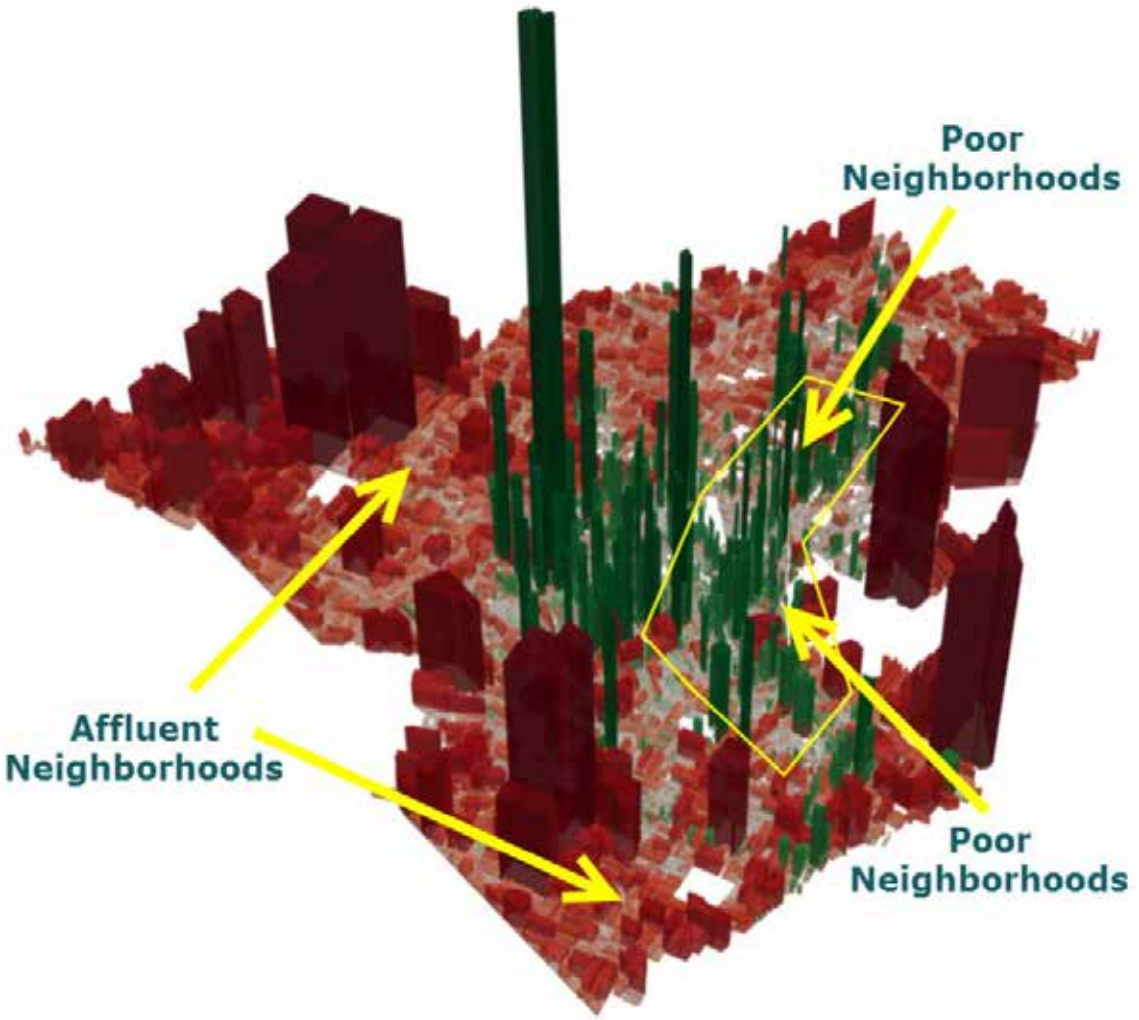


	ASHEVILLE WALMART	DOWNTOWN MIXED-USE
Land Consumed (acres):	34.0	00.2
Total Property Taxes per Acre:	$6,500	$634,000
Retail Taxes* per Acre to City:	$47,500	$ 83,600
Residents per Acre:	0.0	90.0
Jobs per Acre:	5.9	73.7

Walmart taxes: $221,000

Downtown Taxes: $126,000

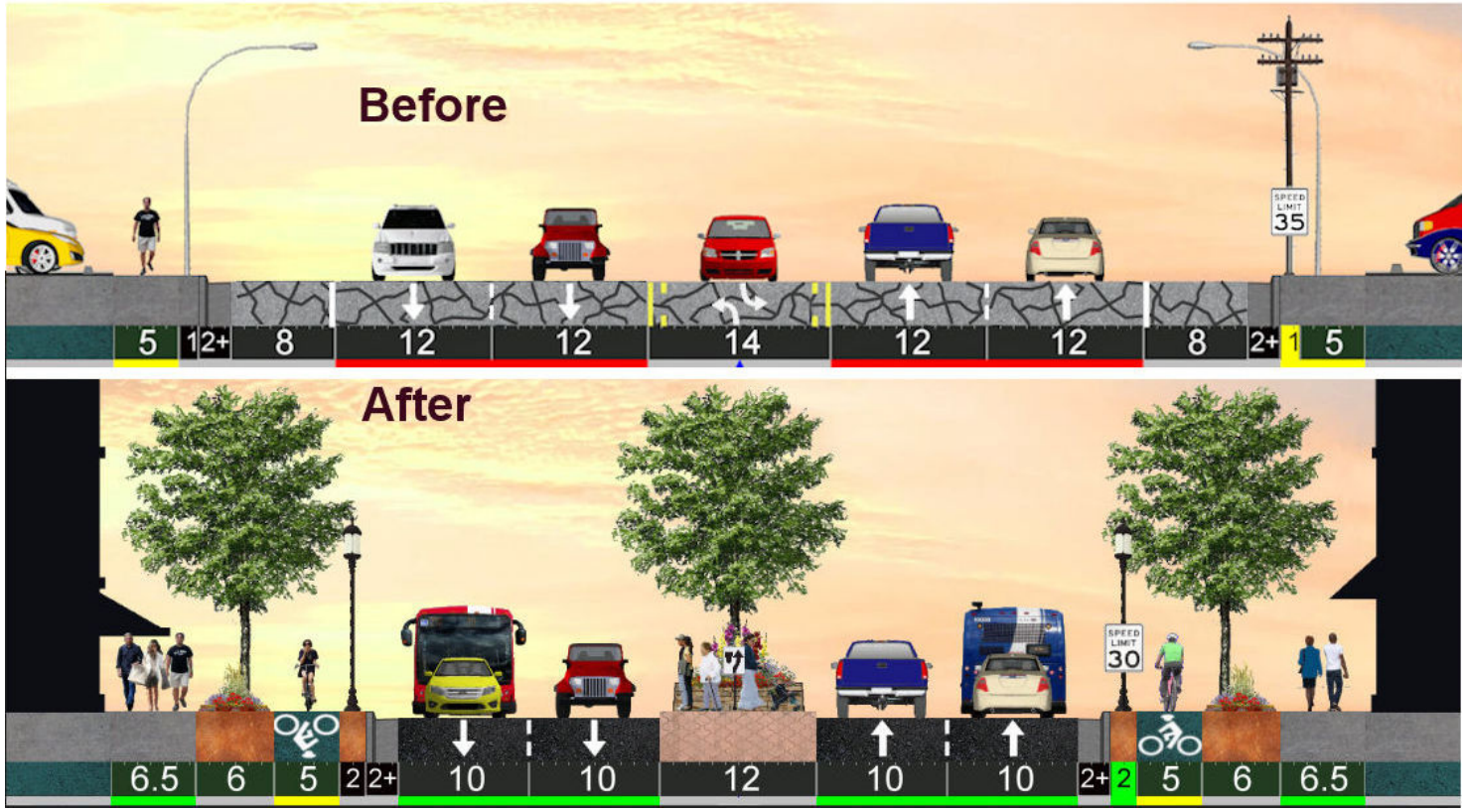
Source: Urban3 and Strong Towns



Source: Urban3

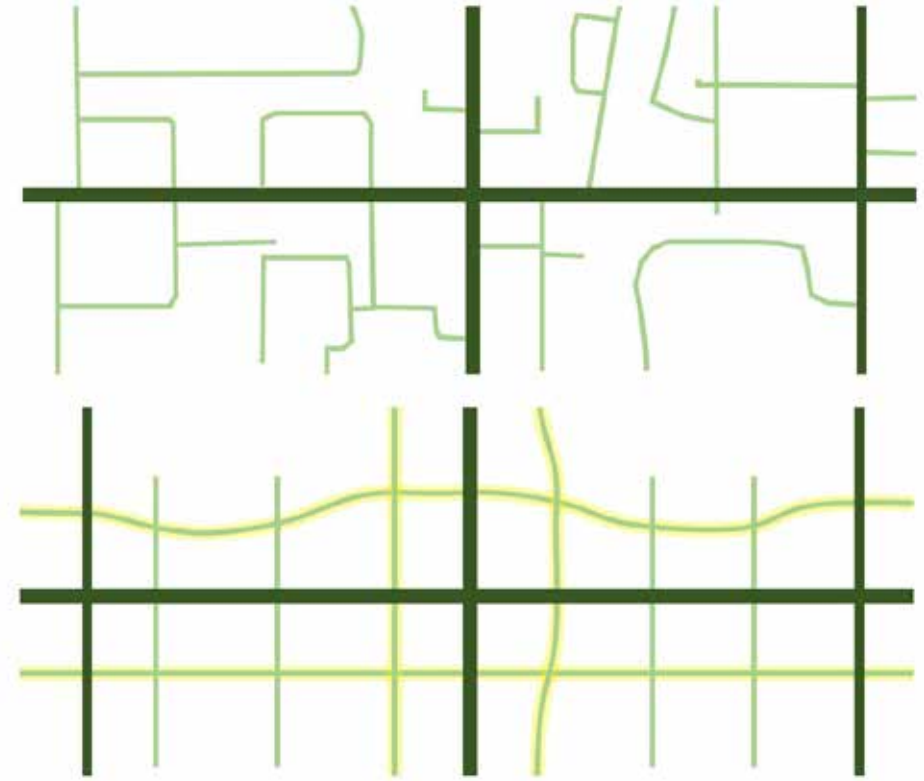
Right-Sizing Projects

300 WEST
BUILD a Safe | Smart | Complete | Street



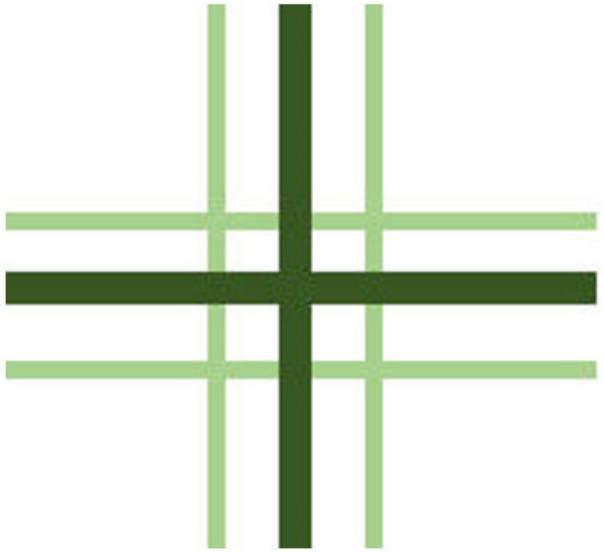
Create Arterial “Backage Roads”

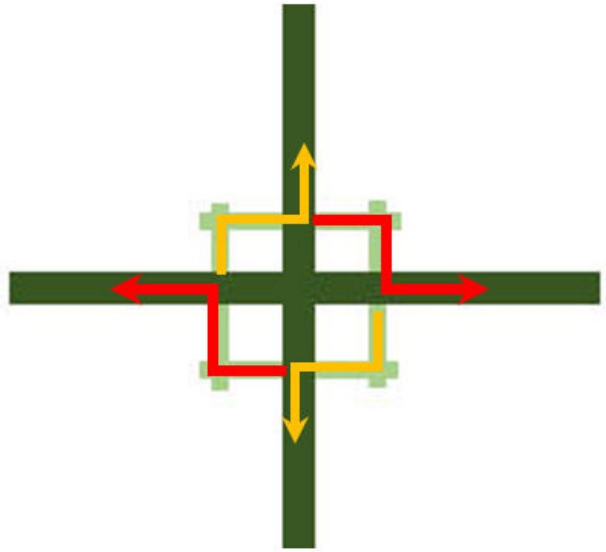
Figure 19: Getting it Right the first time. Disjointed Access along arterial, vs "backage road" short trip network support.



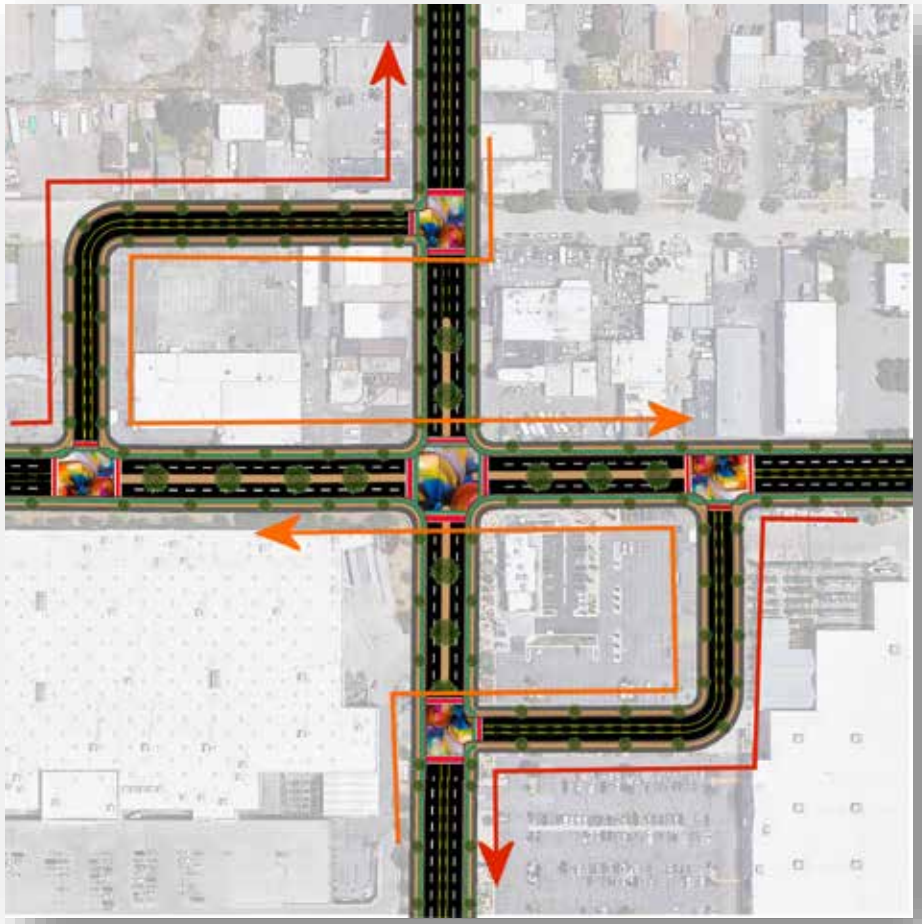
Source: Metro Analytics, NCHRP 19-14 Right-Sizing Technical Appendix

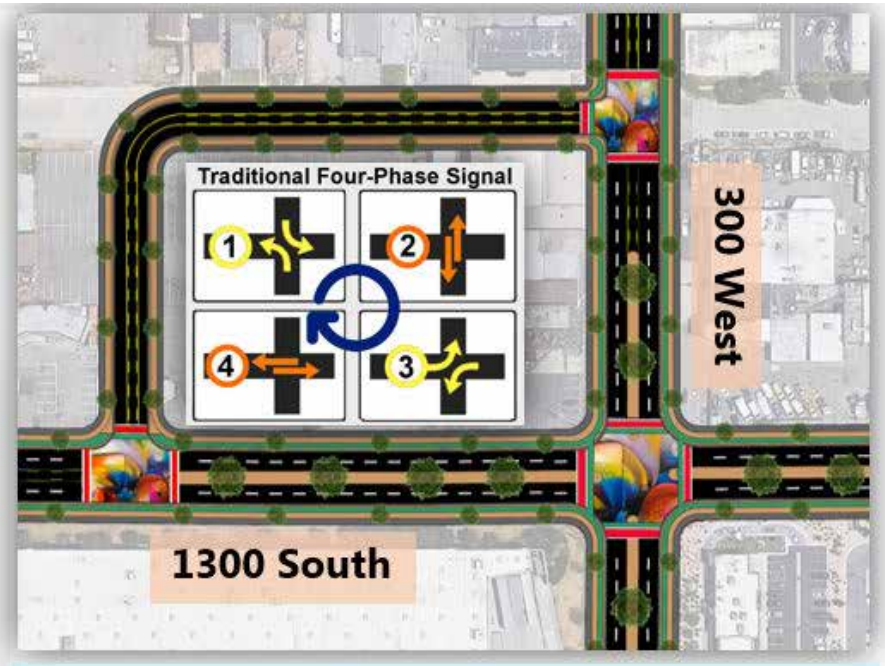
Guidebook recommends all new arterials include “backage roads” to help support local circulation and reduce pressure on arterials. It also notes how a backage network makes the Quadrant design for left-turn efficiency easy to achieve.

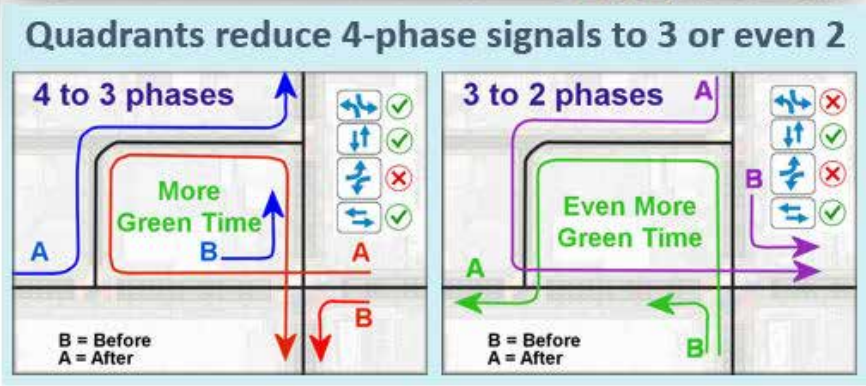




- Quadrants reduce congestion, improve safety
- Create a platform for mixed-use development

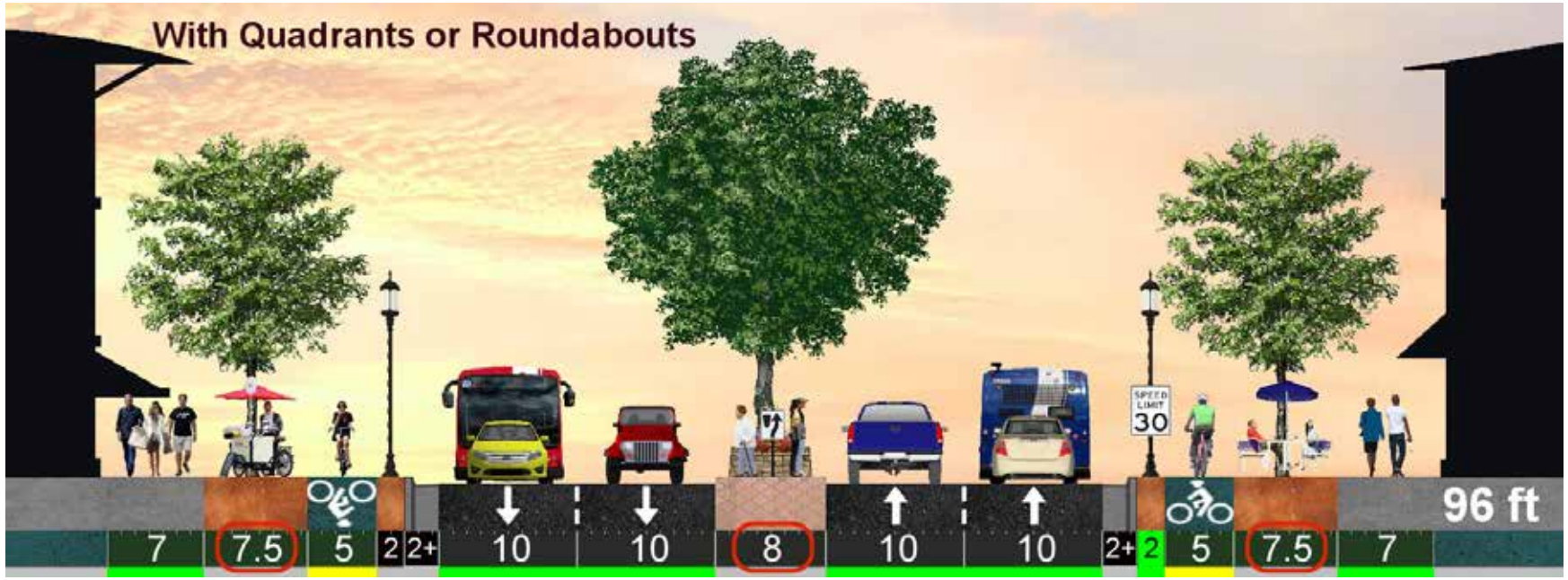


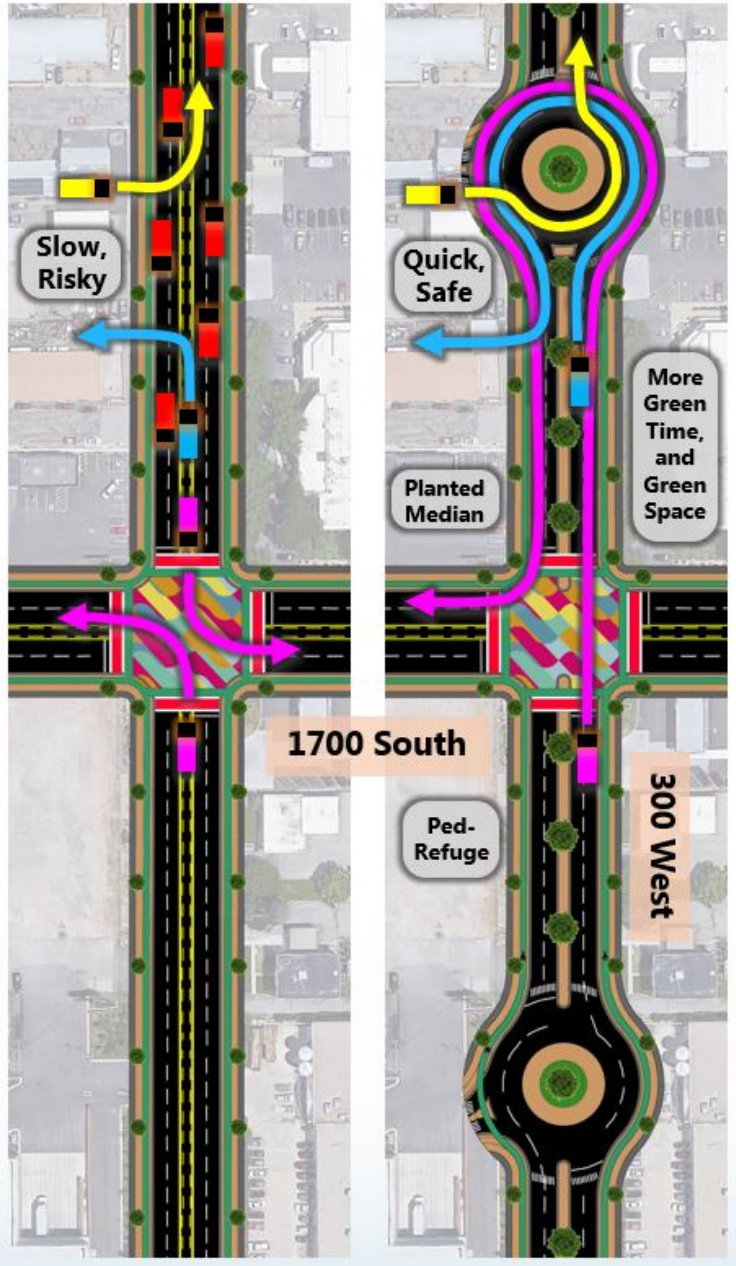




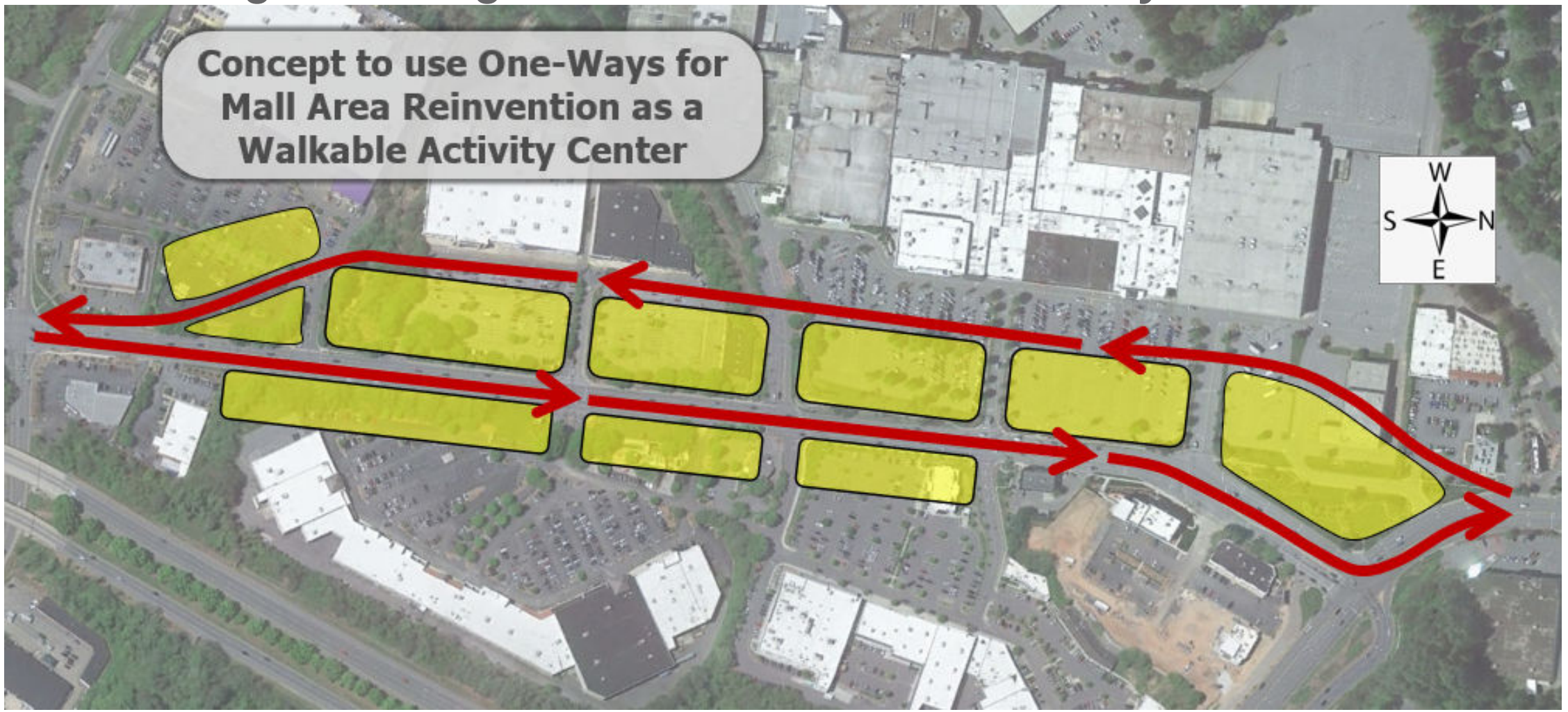
Right-Sizing with “Bowties”

- Bowties also reduce congestion, improve safety
- Create a platform for mixed-use development



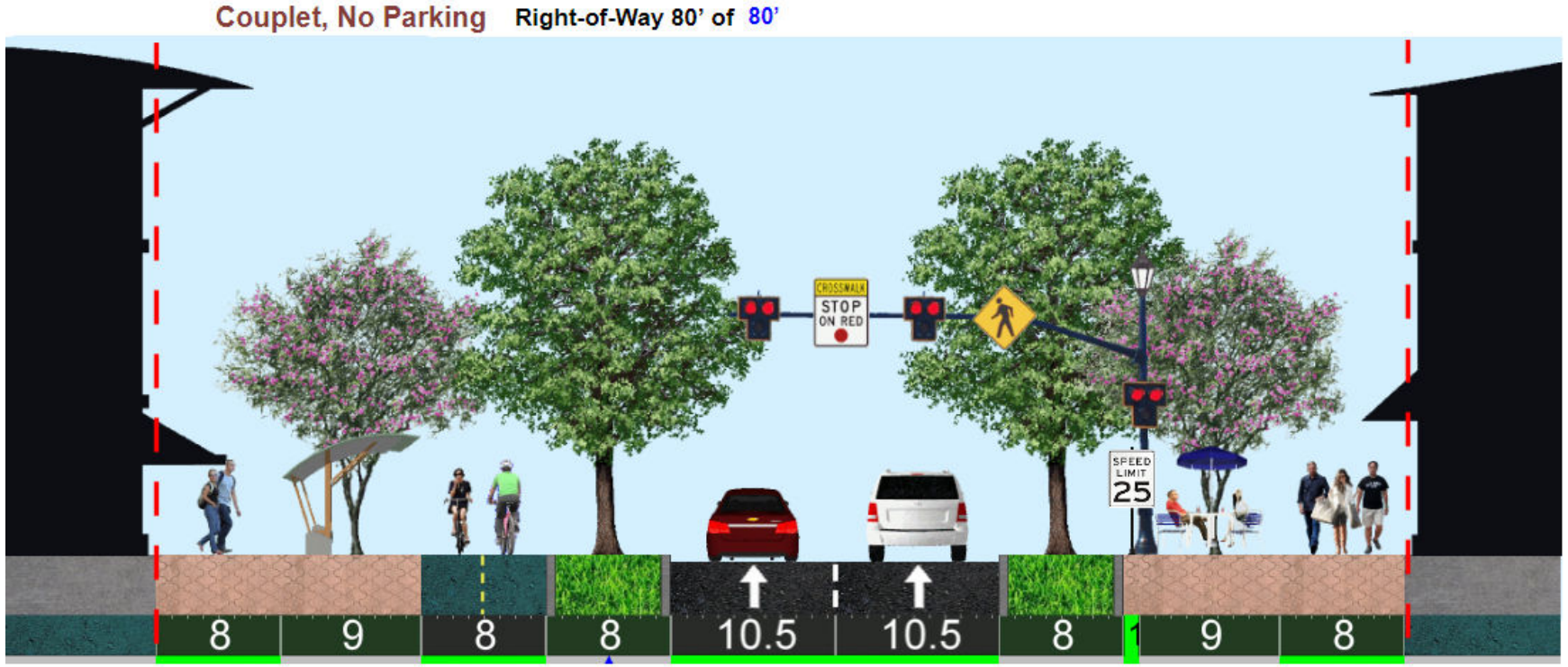


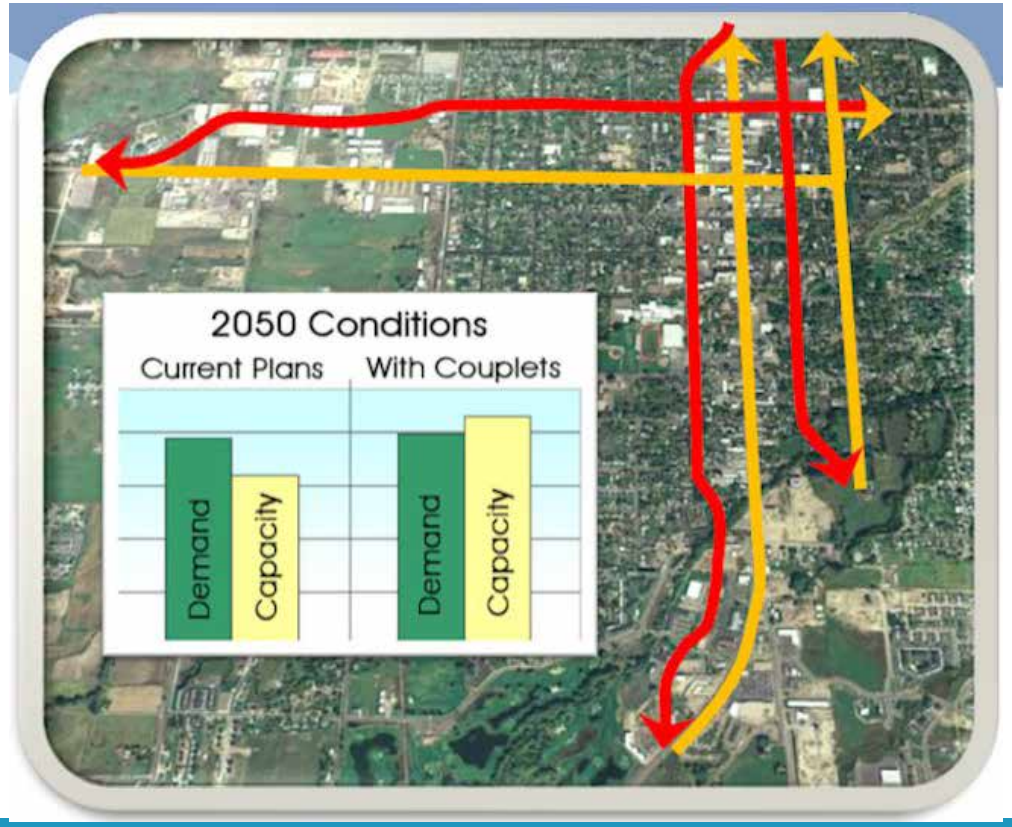
Right-Sizing with Walkable One-Way Arterials

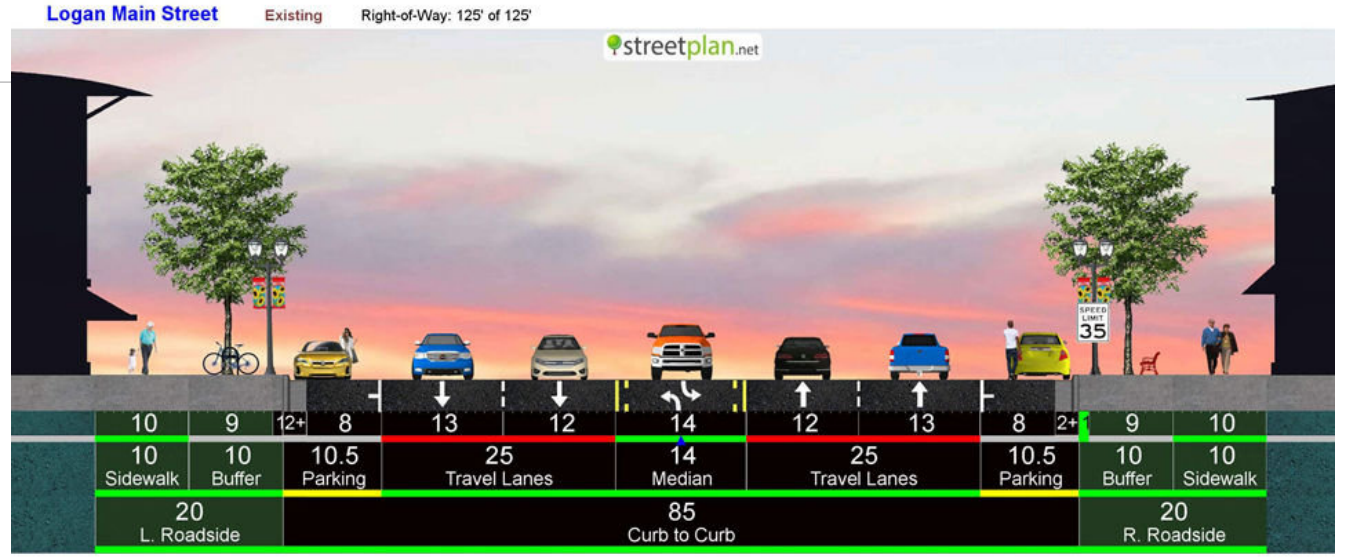


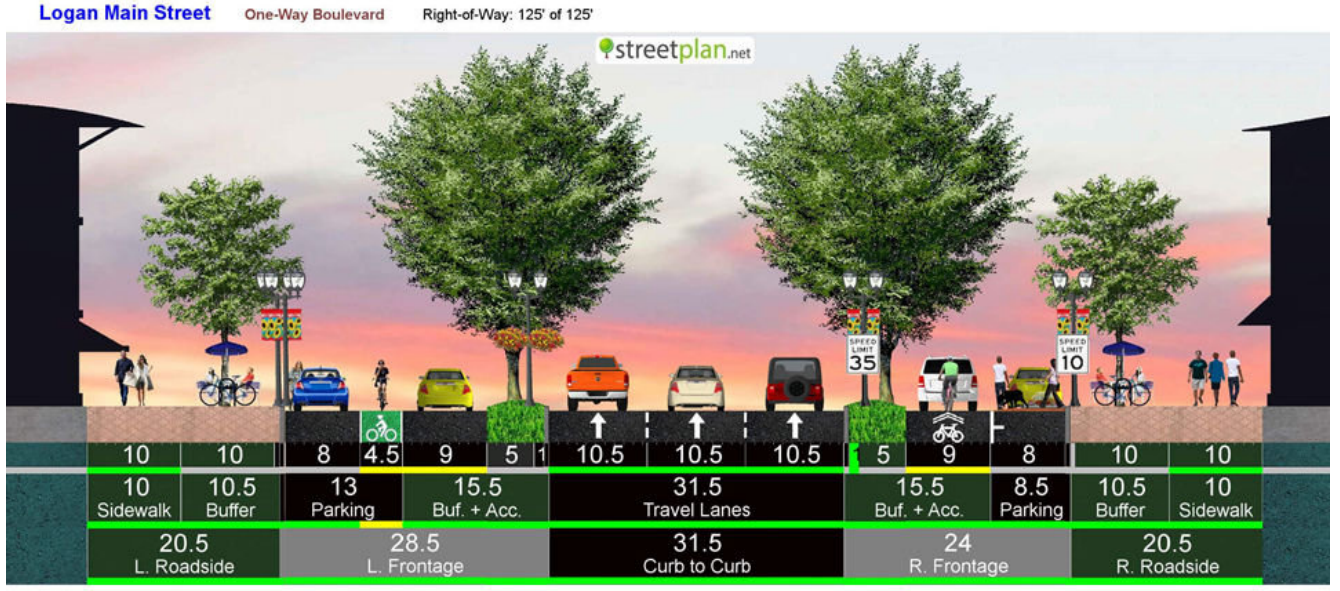
Guess which has more traffic capacity?

Guess which will get a driver home faster?

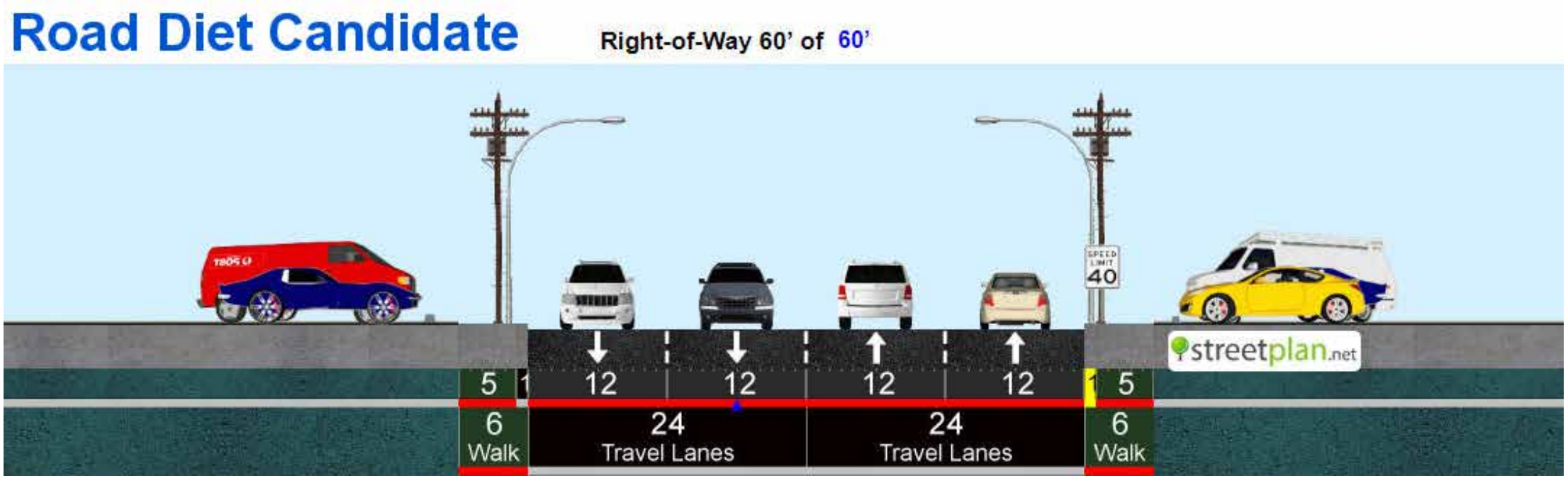



2050 Conditions
Current Plans
With Couplets
Demand
Capacity
Demand
Capacity


Logan Main Street
Existing
Right-of-Way: 125' of 125'
streetplan.net
10 9 12+ 8 13 12 14 12 13 8 2+ 9 10
10 Sidewalk
10 Buffer
10.5 Parking
25 Travel Lanes
14 Median
25 Travel Lanes
10.5 Parking
10 Buffer
10 Sidewalk
20 L. Roadside
85 Curb to Curb
20 R. Roadside


Logan Main Street
One-Way Boulevard
Right-of-Way: 125' of 125'
streetplan.net
10 10 8 4.5 9 5 1 10.5 10.5 10.5 5 9 8 10 10
10 Sidewalk
10.5 Buffer
13 Parking
15.5 Buf. + Acc.
31.5 Travel Lanes
15.5 Buf. + Acc.
8.5 Parking
10.5 Buffer
10 Sidewalk
20.5 L. Roadside
28.5 L. Frontage
31.5 Curb to Curb
24 R. Frontage
20.5 R. Roadside

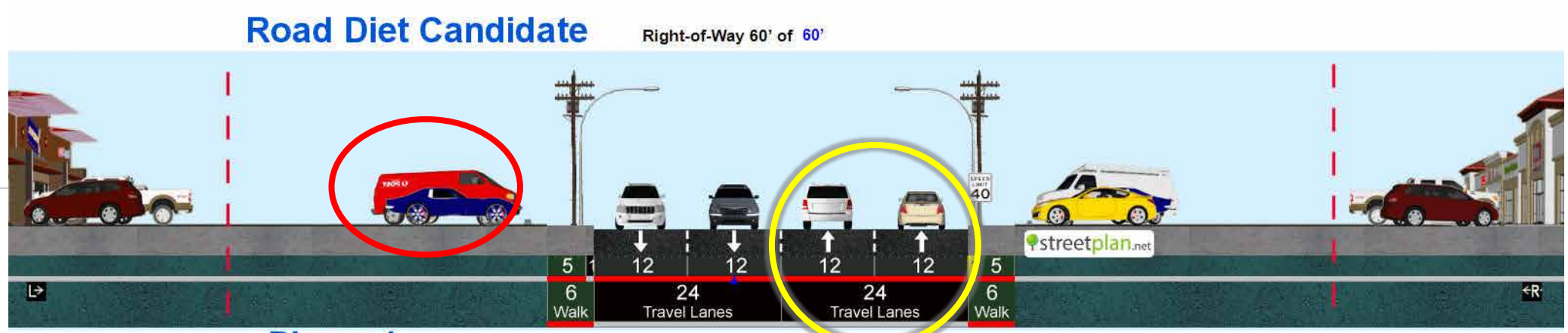
What’s the Right-Size for this 60-ft corridor? 142 feet?

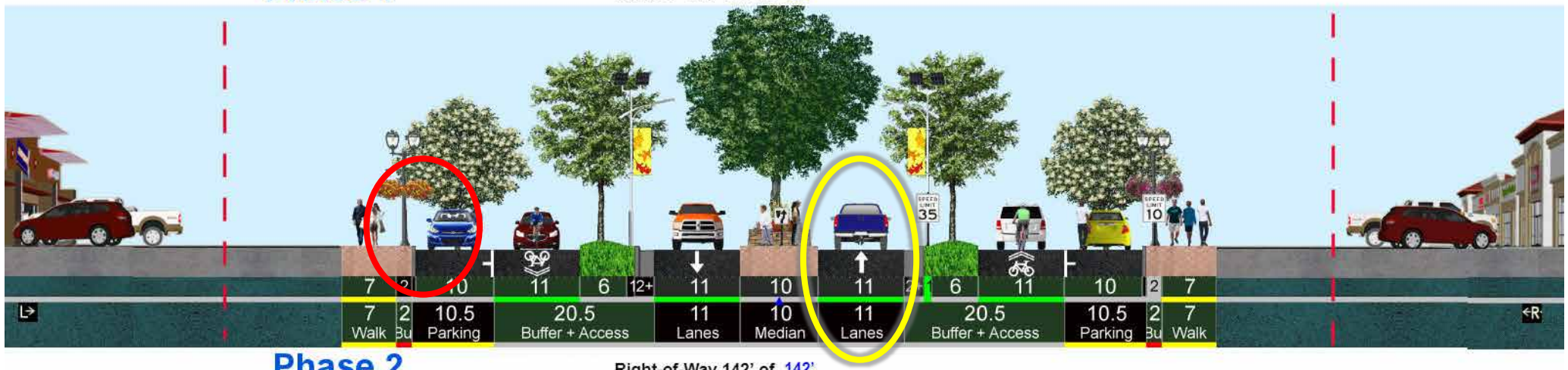


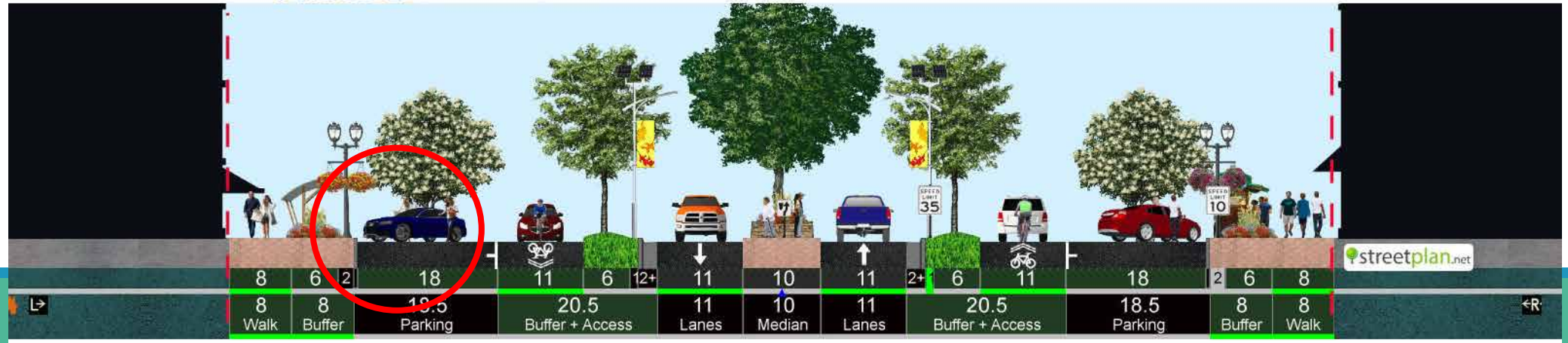
Public parking is more mixed-use friendly than private parking.

Inverting it from private to public can kick-start 7-D land uses that many communities want.

Alternative Intersections make it easier to reduce number of lanes.







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- Naomi Stein, Nstein@edrgroup.com
- Chandler Duncan, cduncan@metroanalytics.com
- Michael Brown, mbrown@metroanalytics.com

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