NC STATE UNIVERSITY

NCDOT NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Urban Applications of Innovative Intersection Designs

Collection of Best Slides, Pt 2, 3D Renderings

Chris Cunningham, PE (Principal Investigator, NCSU-ITRE)

Celen Pasalar, Ph.D. (Co-PI, NCSU-College of Design)

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ITRE

College of Design

URBAN Innovators

http://www.itre.ncsu.edu

Meet the PI's

Chris Cunningham, PE

ITRE
Institute for Transportation Research and Education

- Director, Highway Systems Group
- NC Professional Civil Engineer
- Co-author of ITE's *Manual of Transportation Engineering Studies*

Mike Brown, PE, AICP

URBAN Innovators

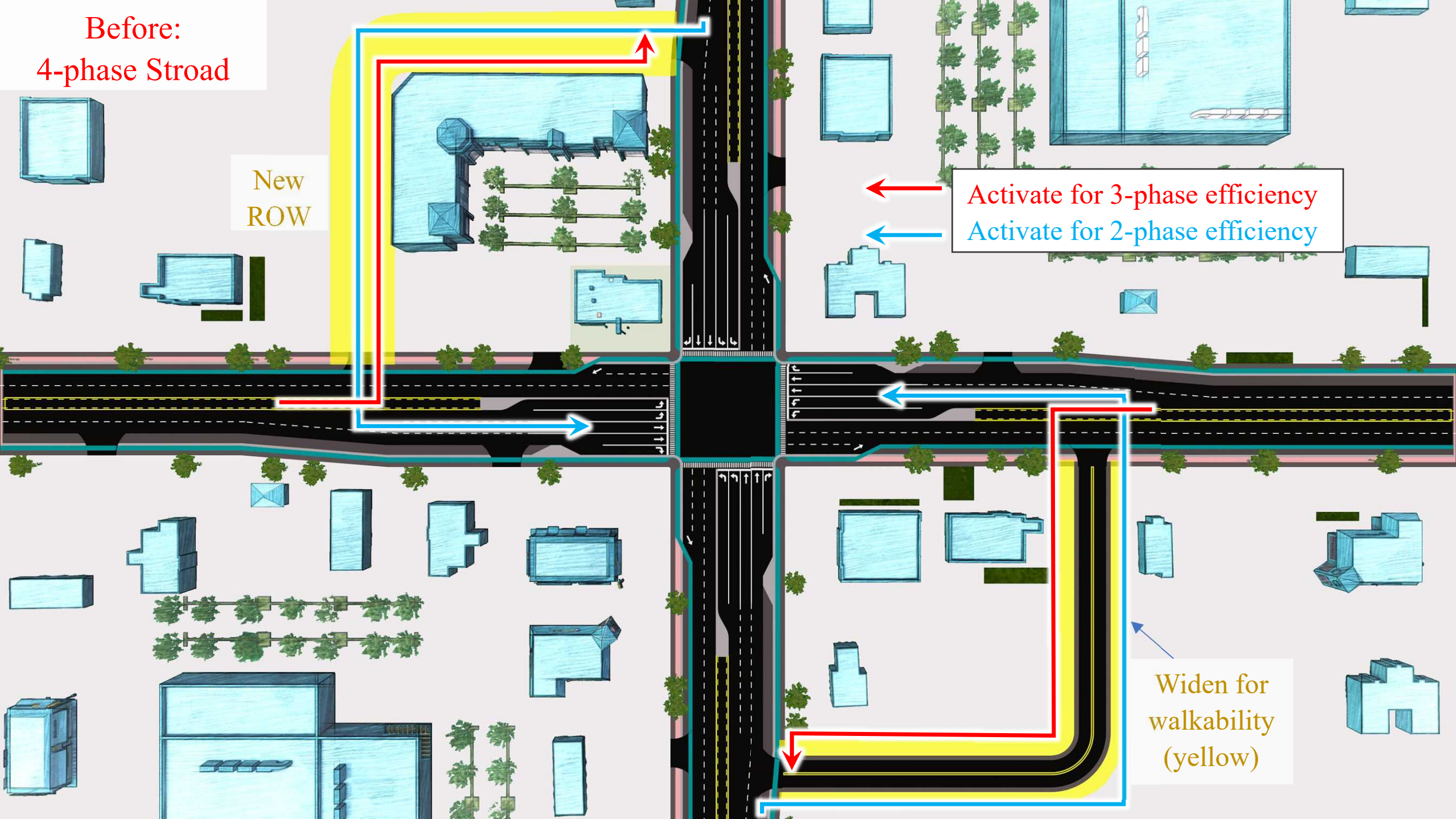
- UT and NC Professional Civil Engineer
- TRB Intersections Committee
- Founder of Urban Innovators
- Creator of below websites

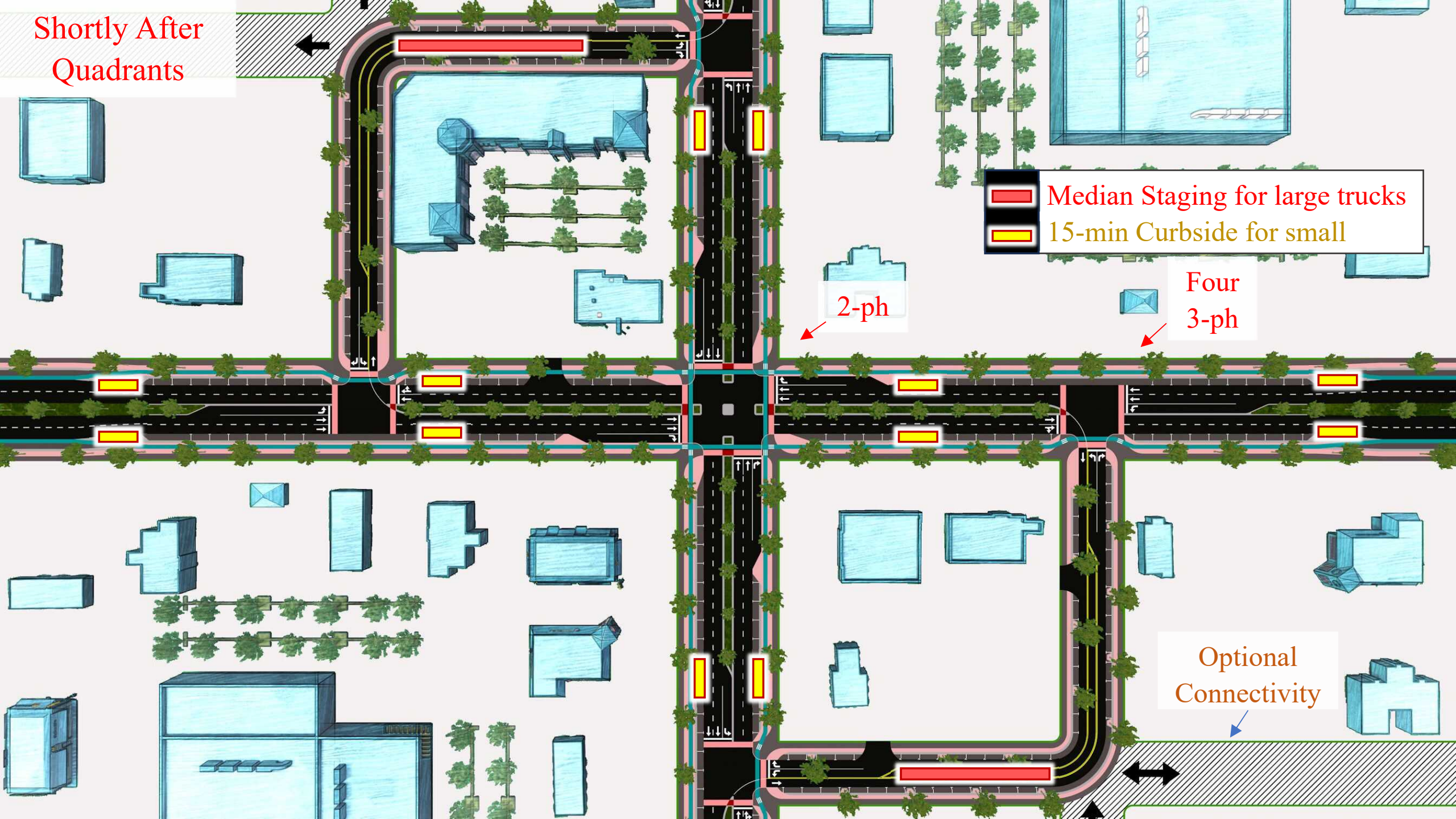
Celen Pasalar, Ph.D.

NC STATE UNIVERSITY College of Design

- Associate Professor of Landscape Architecture and Environmental Planning
- Urban Design, Smart Cities, Community Design

Idealized Top View Diagrams:
1) Before, 2) Shortly After, 3) Buildout


Before:
4-phase Stroad
New
ROW
Activate for 3-phase efficiency
Activate for 2-phase efficiency
Widen for
walkability
(yellow)


Shortly After Quadrants
Median Staging for large trucks
15-min Curbside for small
2-ph
Four 3-ph
Optional Connectivity

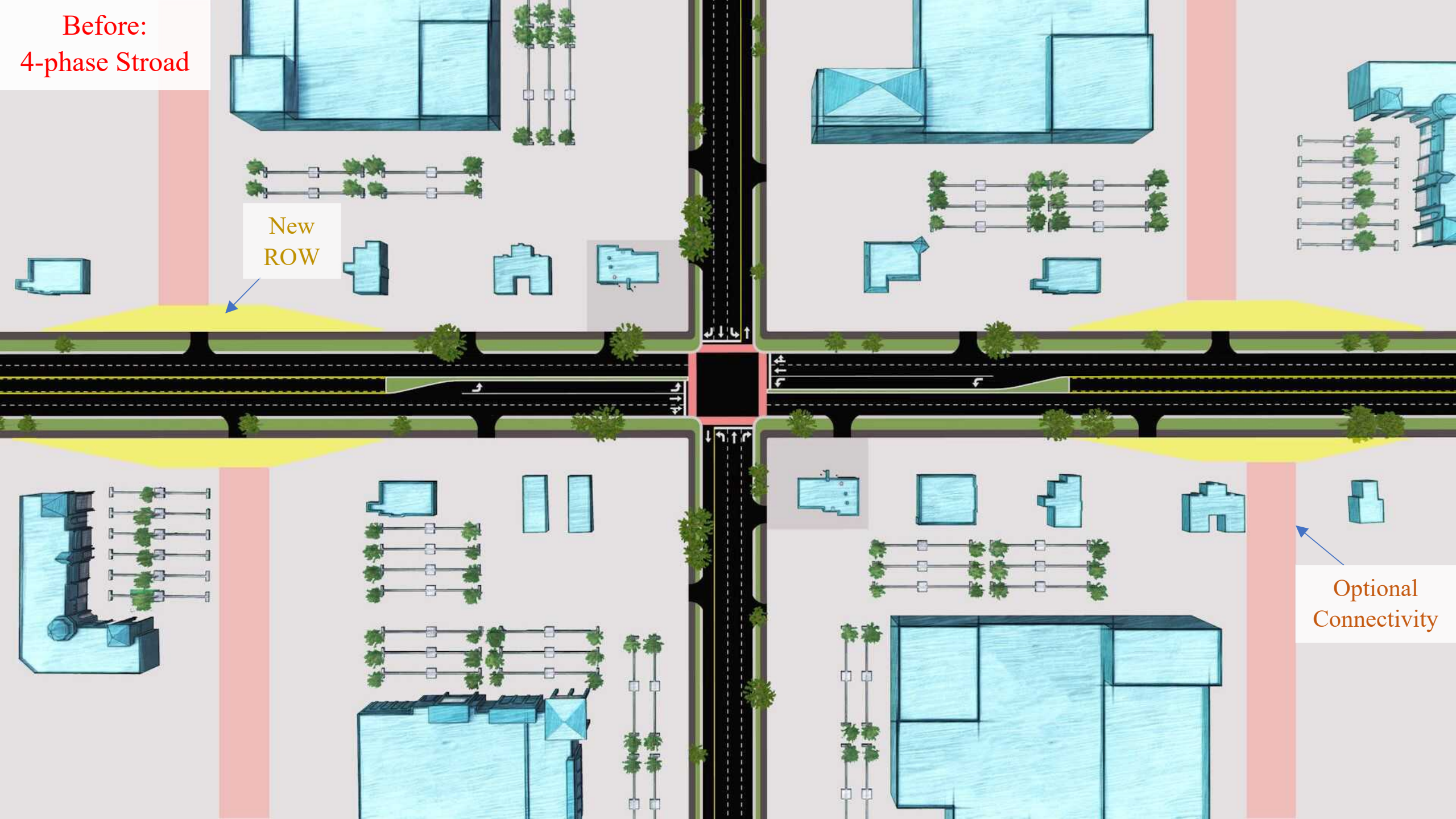
Walkable
Buildout

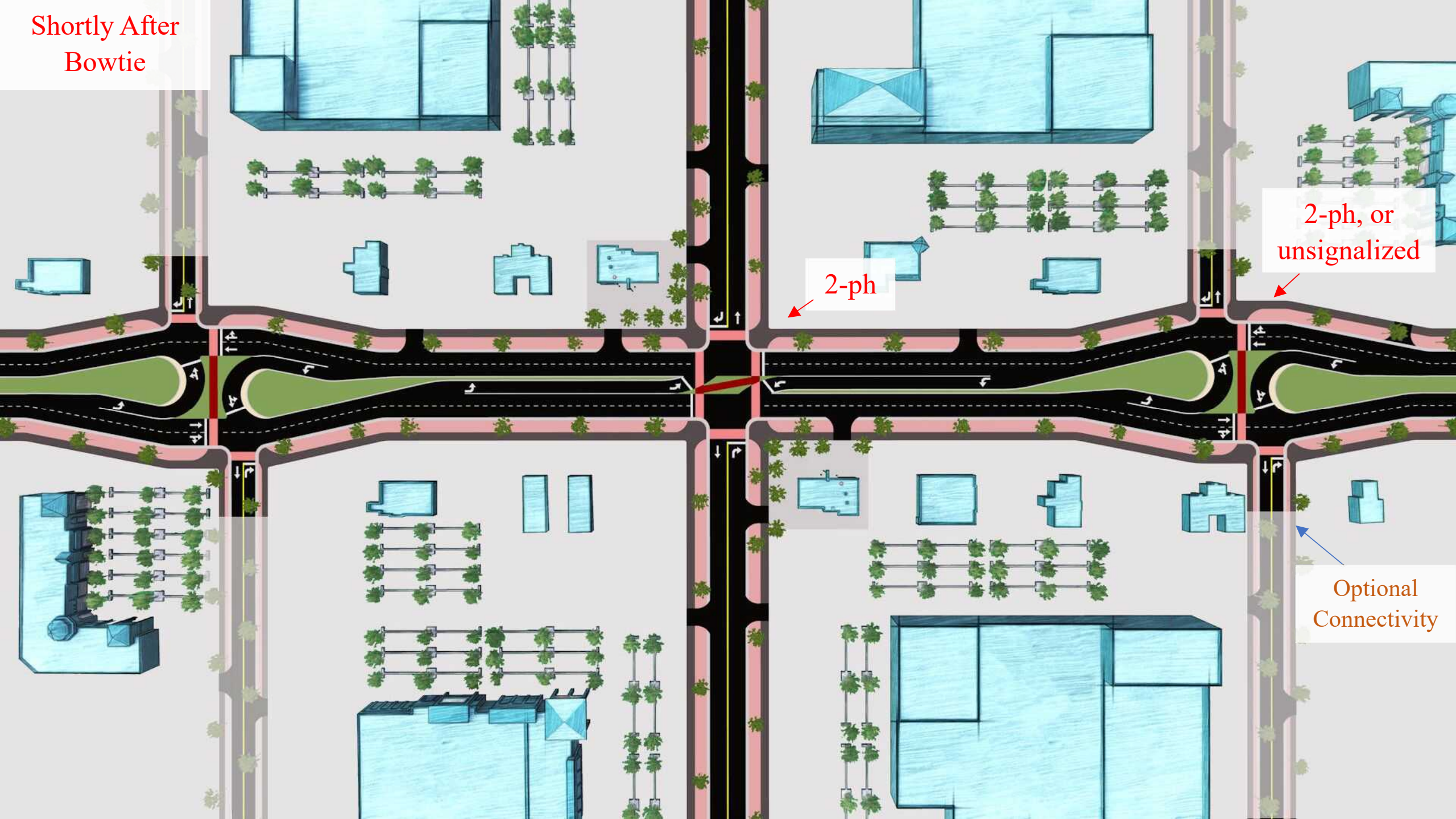
Walkable Kitty-Corner Quadrant

Quadrant Intersections

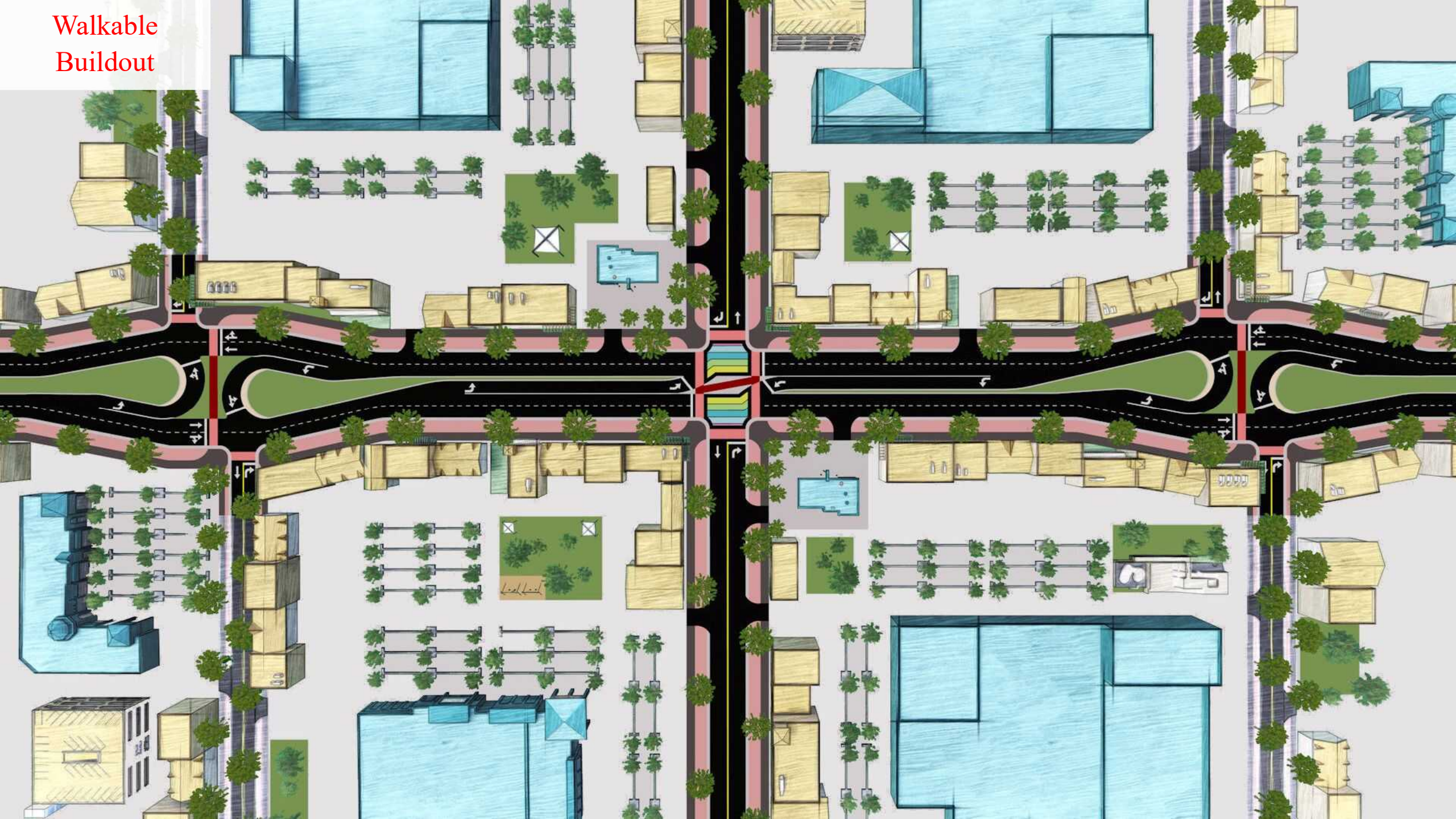
Shortly After
Quadrants

Walkable
Buildout

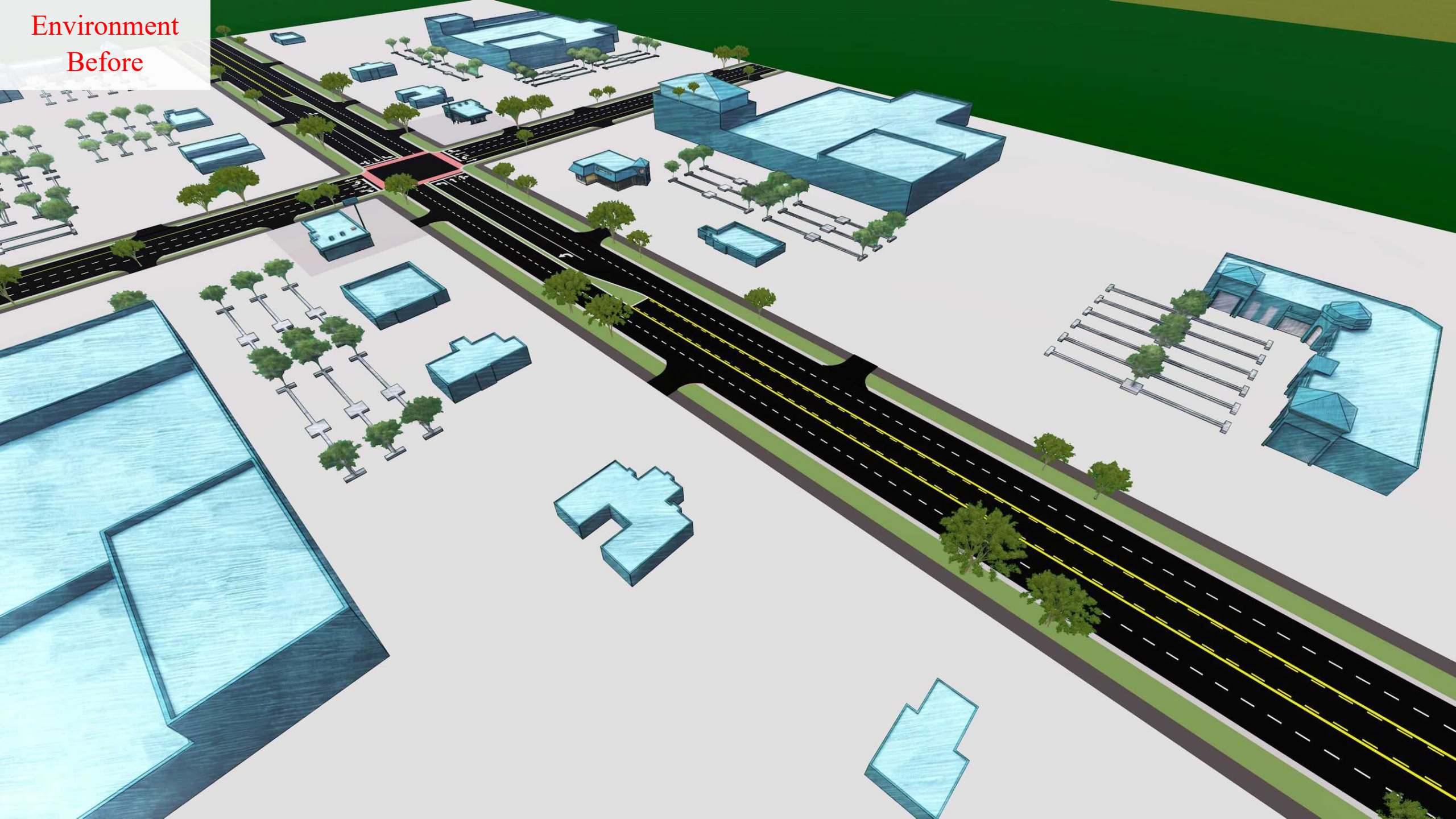

Before:
4-phase Stroad
New
ROW
Optional
Connectivity


Shortly After Bowtie
2-ph
2-ph, or unsignalized
Optional Connectivity

Walkable
Buildout

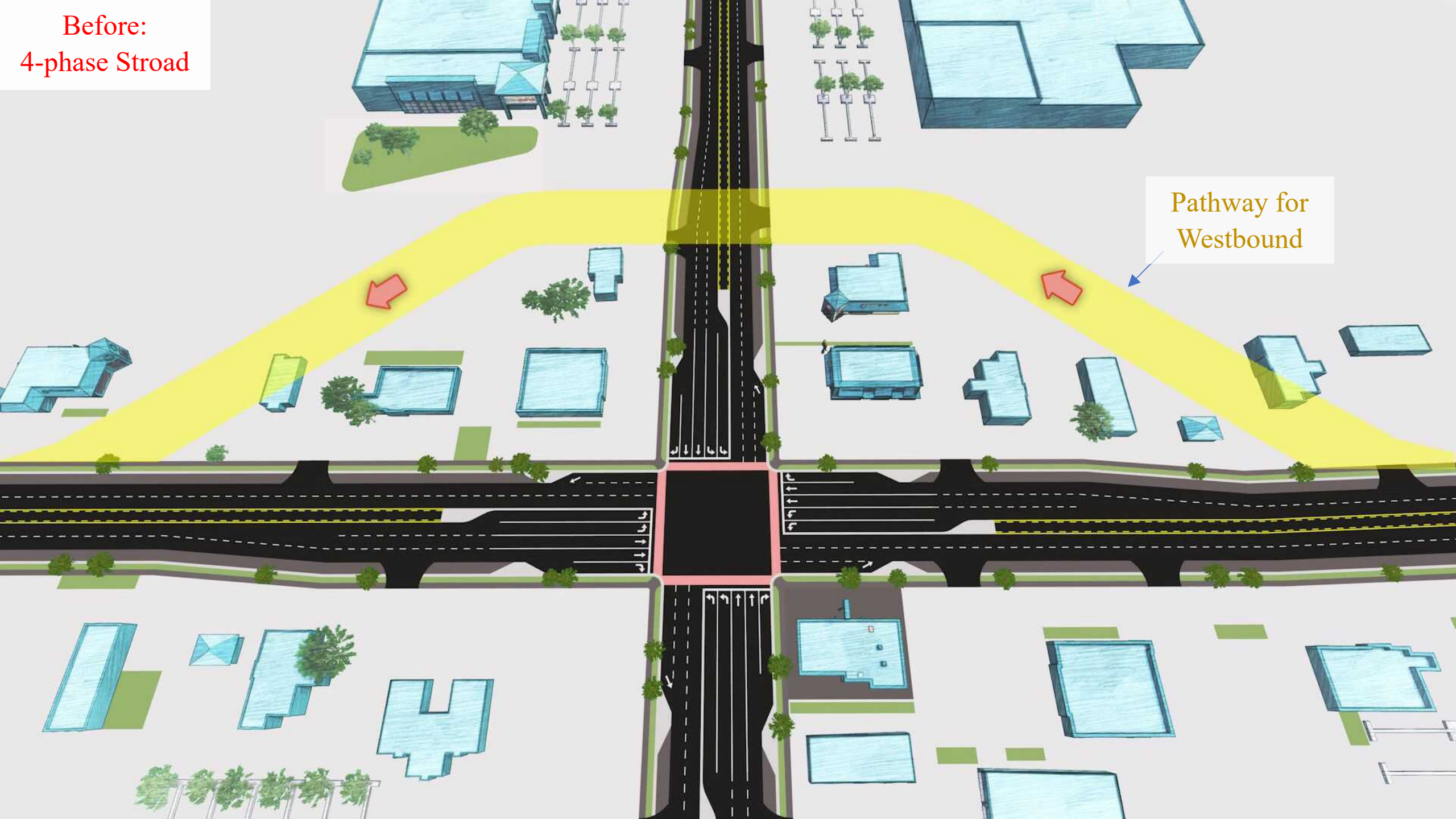


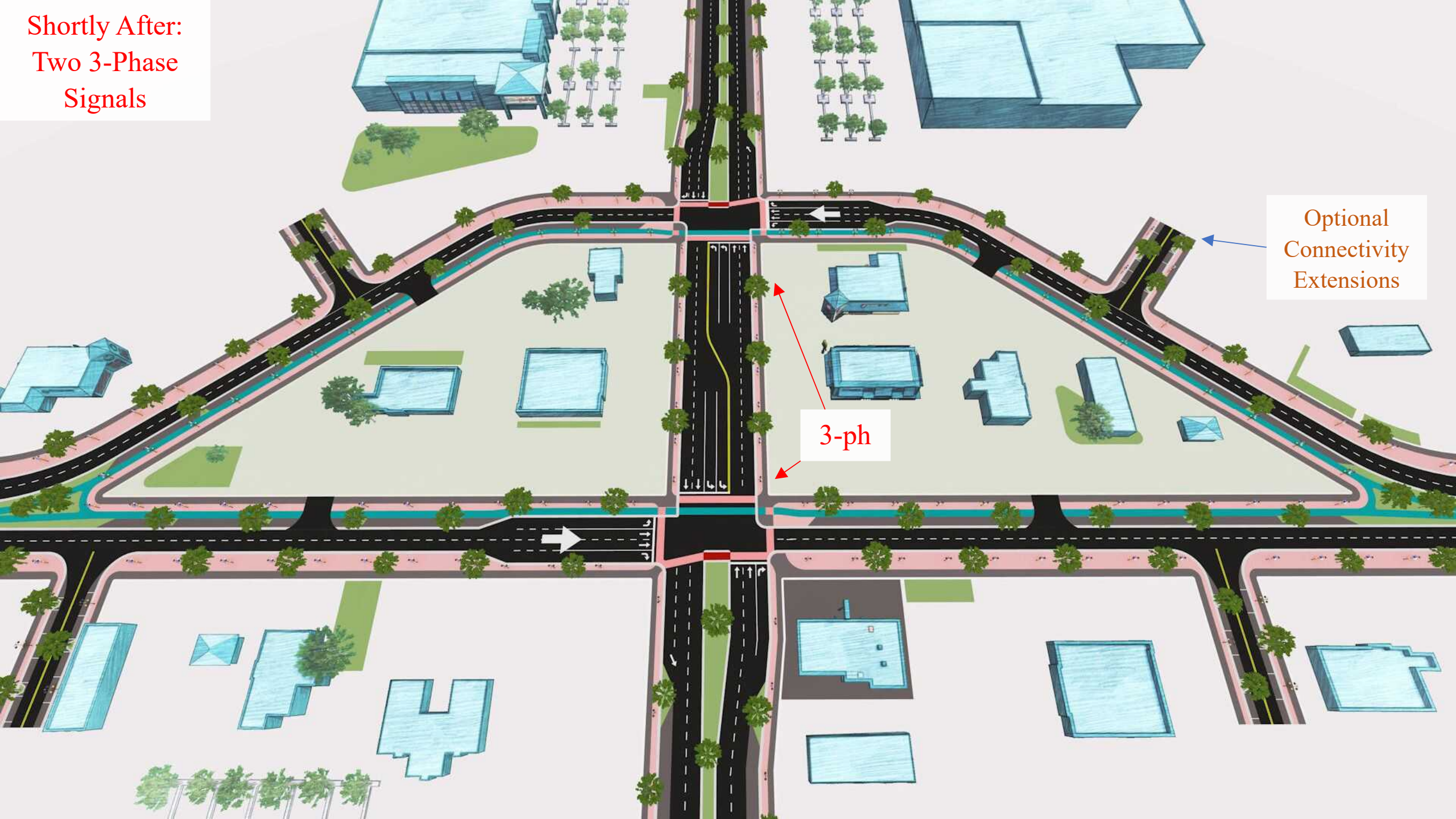
Environment
Before




Shortly After
Project

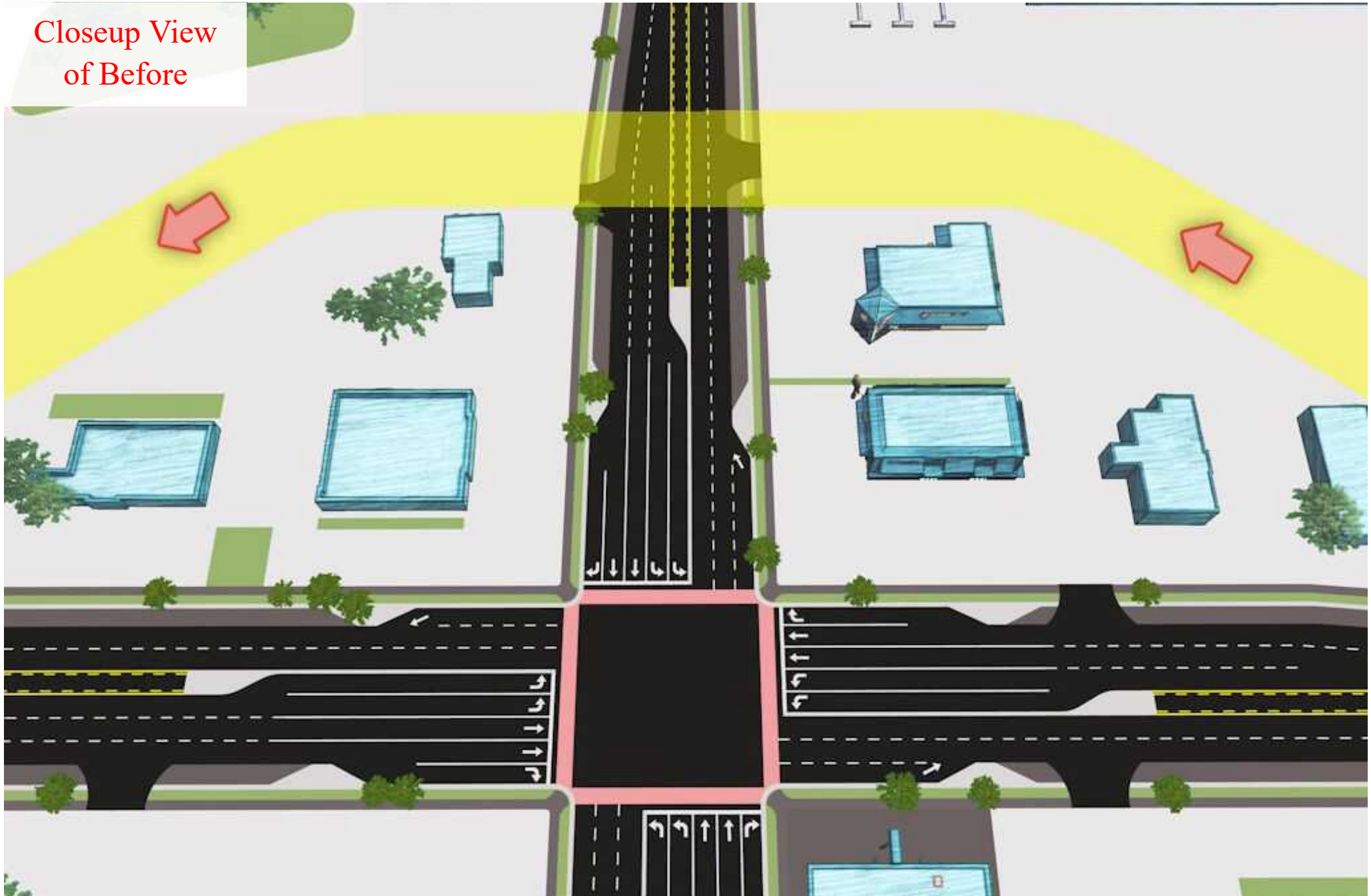
Walkable
Buildout


Before:
4-phase Stroad
Pathway for
Westbound


Shortly After:
Two 3-Phase
Signals
Optional
Connectivity
Extensions
3-ph

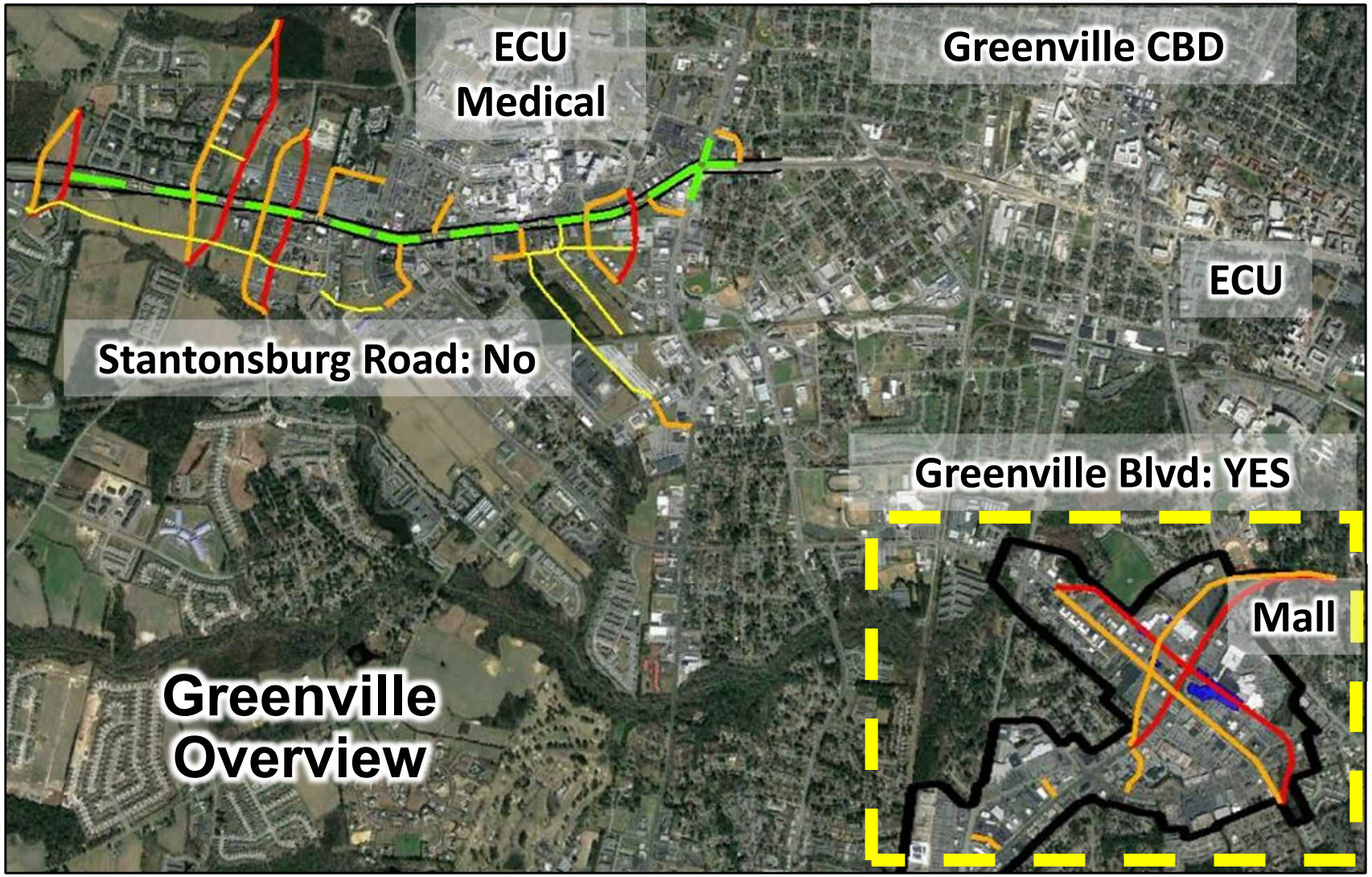
Walkable
Buildout

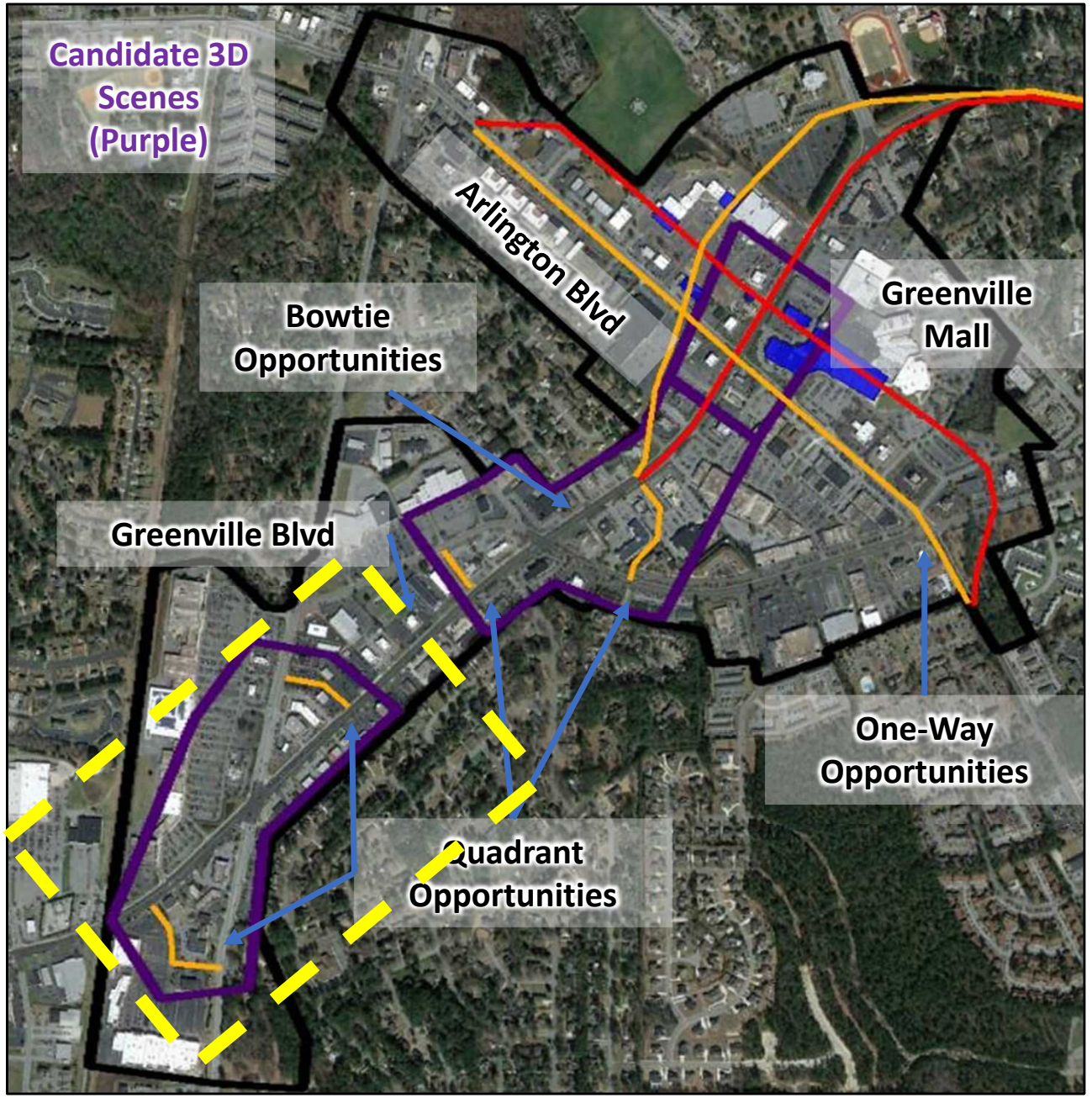
Closeup View of Before



Closeup View of Buildout

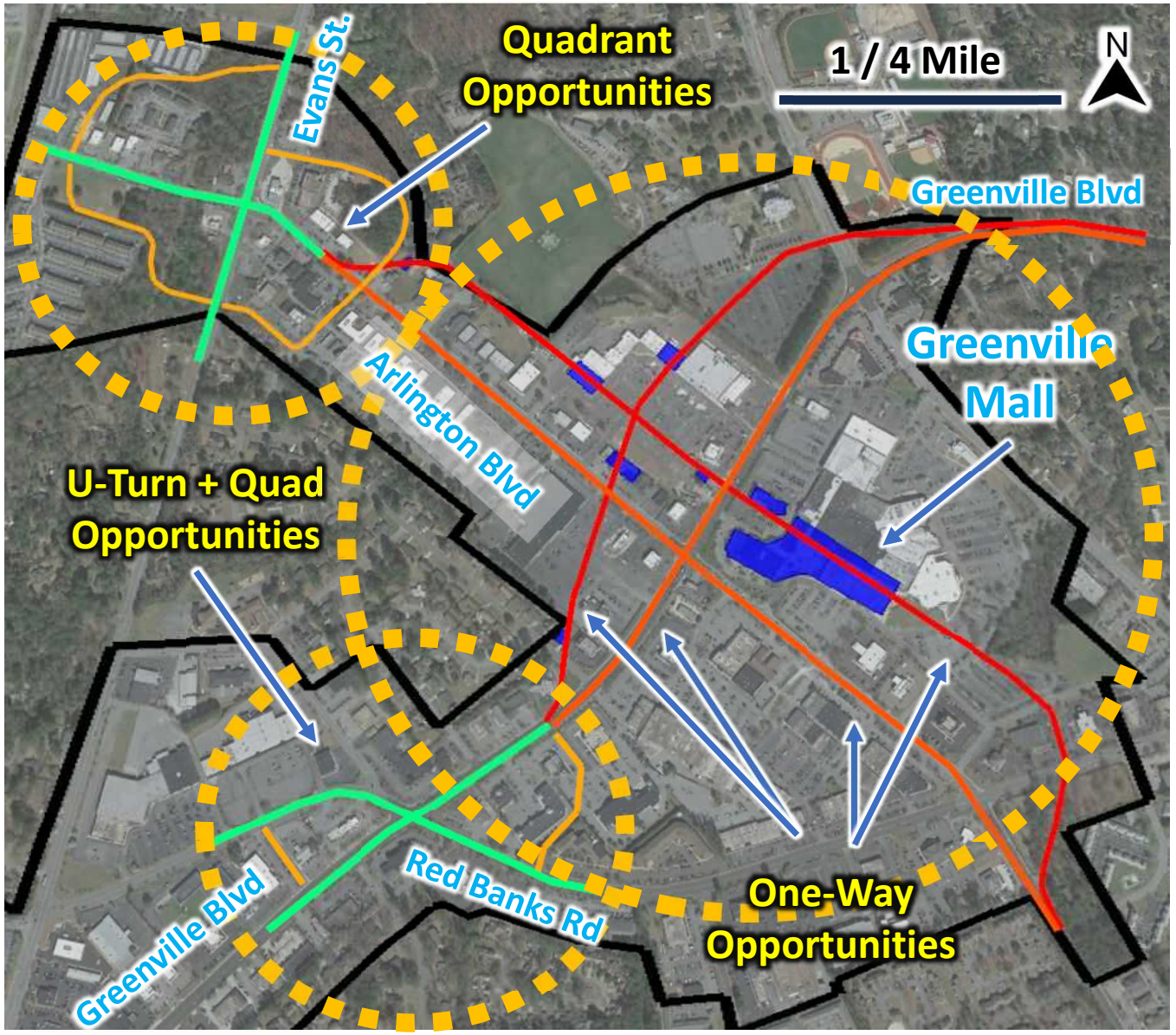
Greenville Overview


ECU
Medical
Greenville CBD
ECU
Stantonsburg Road: No
Greenville Blvd: YES
Mall
Greenville
Overview


Candidate 3D Scenes (Purple)
Arlington Blvd
Bowtie Opportunities
Greenville Mall
Greenville Blvd
One-Way Opportunities
Quadrant Opportunities

Greenville Mall Area

- Blue are impacted buildings. The one-way that hits part of the big blue mall would only be enacted after the owners want an “extreme makeover.”

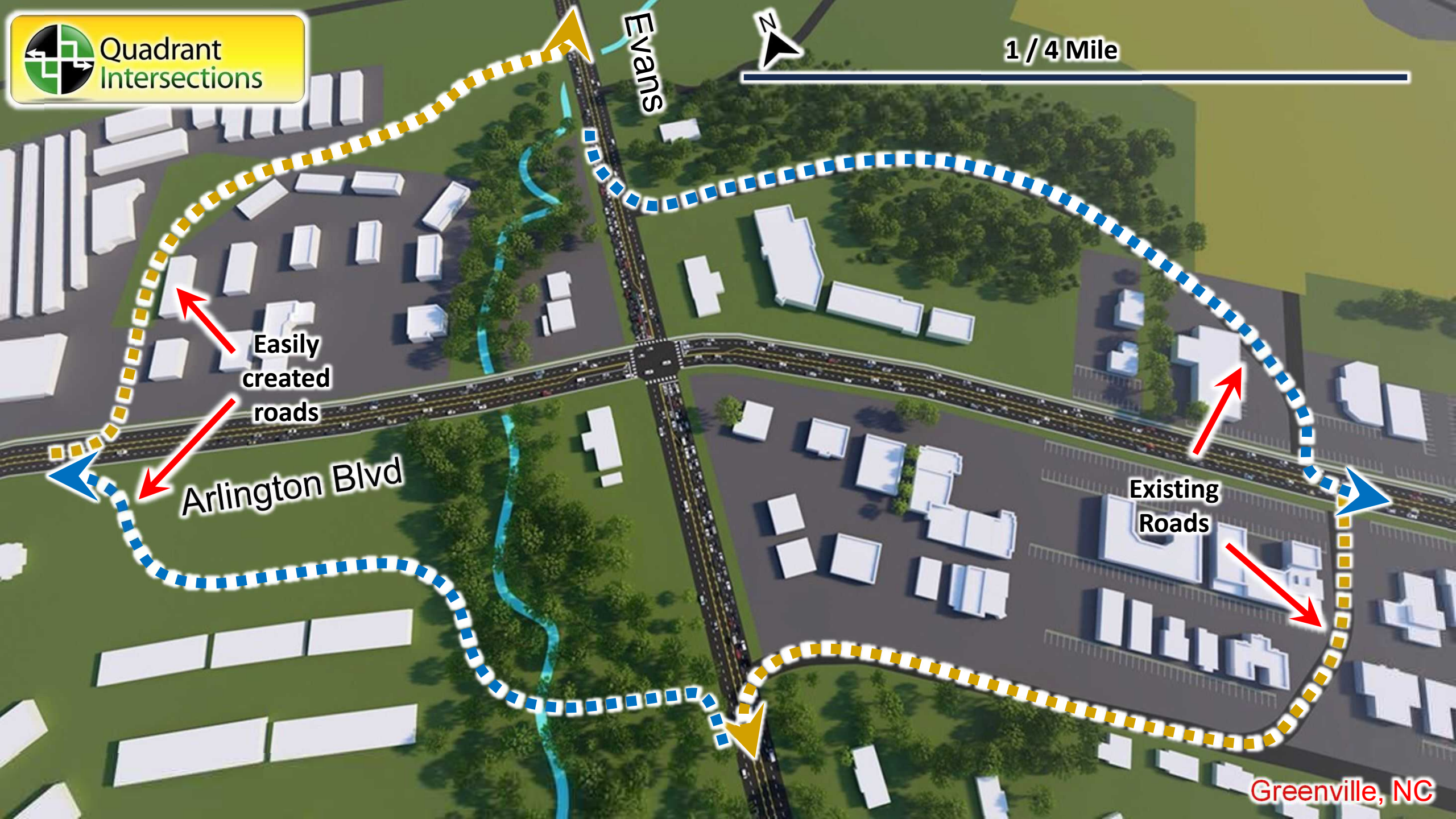


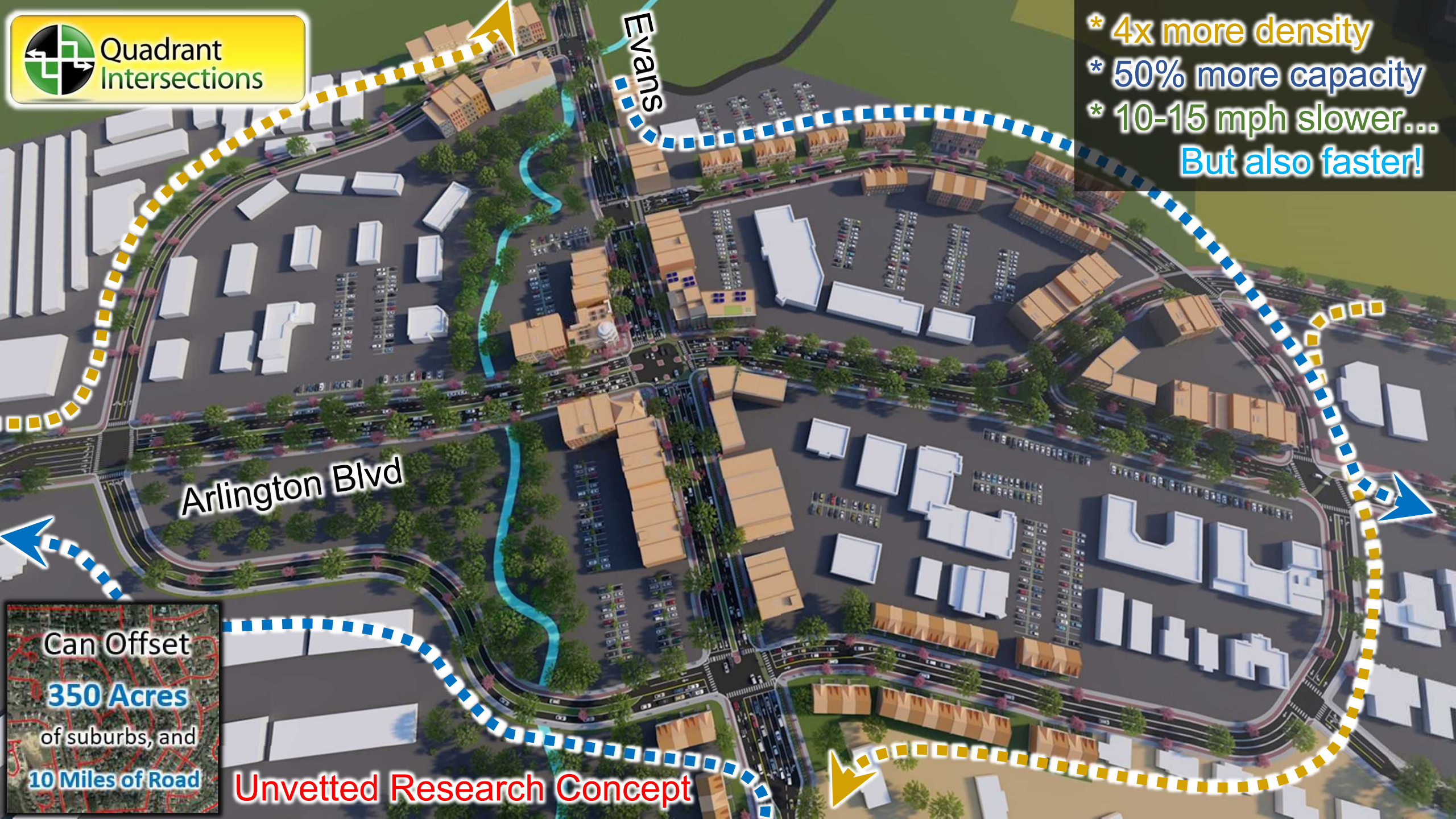
Quadrant concepts in Greenville

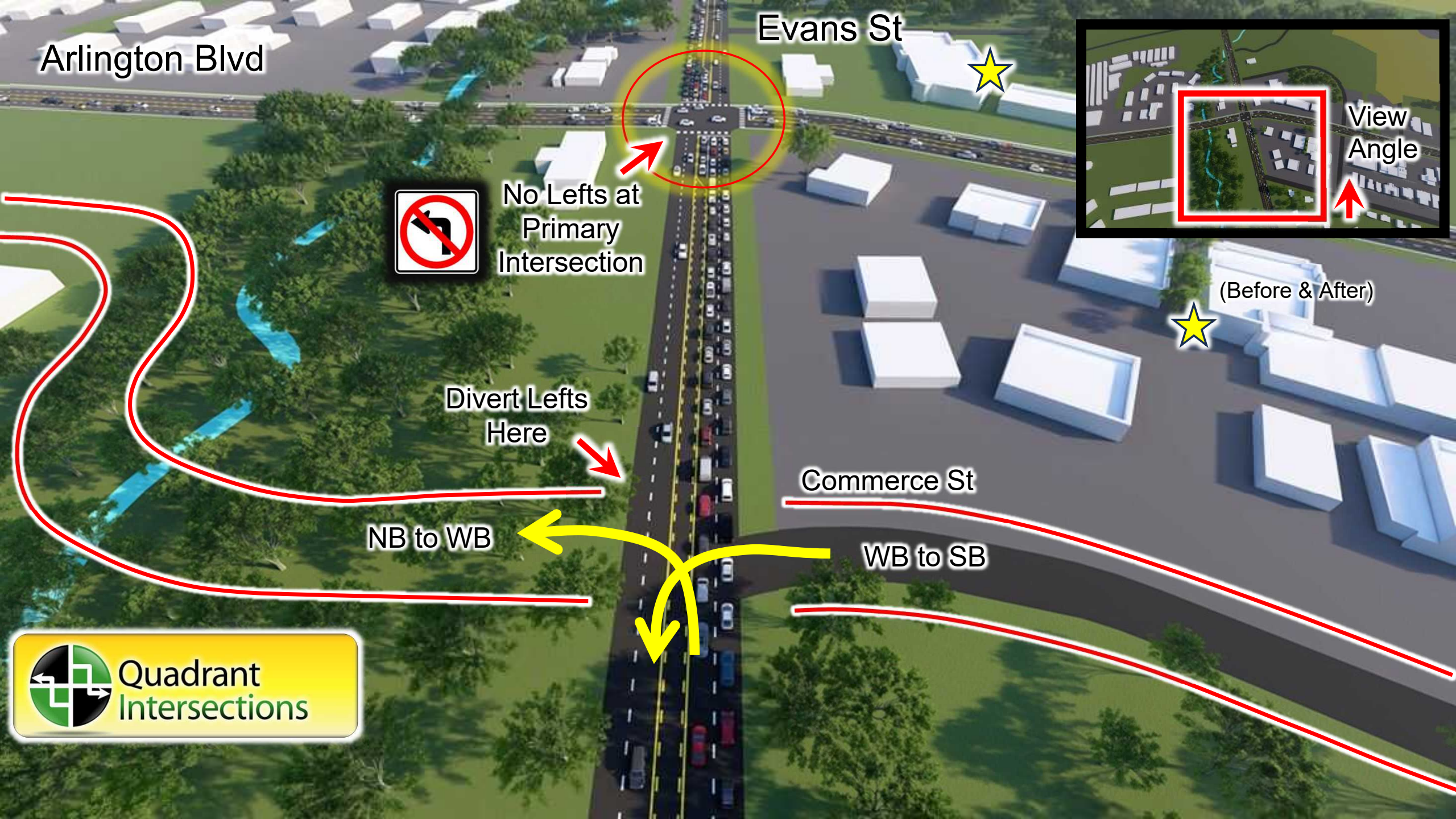
But also imagine them for Raleigh, Charlotte, or “Anywhere, USA”

During the presentation, please write down your questions, observations, and slide numbers that you may want to be displayed again during discussions.

★ Buildings with stars are present in Before and After images, so you can track the changes more easily.


Quadrant Intersections
Evans
N
1 / 4 Mile
Easily created roads
Arlington Blvd
Existing Roads
Greenville, NC


Quadrant Intersections
Evans
Arlington Blvd
* 4x more density
* 50% more capacity
* 10-15 mph slower...
But also faster!
Can Offset
350 Acres
of suburbs, and
10 Miles of Road
Unvetted Research Concept


Arlington Blvd
Evans St
No Lefts at Primary Intersection
View Angle
(Before & After)
Divert Lefts Here
Commerce St
NB to WB
WB to SB
Quadrant Intersections


Arlington Blvd
Evans St
View Angle
(Before & After)
Commerce St
Quadrant Intersections
Unvetted Research Concept


Quadrant Intersections
Evans St
Clifton St
(Before & After)
Arlington Blvd
Primary Intersection


Quadrant Intersections
Evans St
Clifton St
(Before & After)
Arlington Blvd
Can Offset
350 Acres
of suburbs, and
10 Miles of Road
* 4x more density
* 50% more capacity
* 10-15 mph slower…
But also faster!
Unvetted Research Concept

Backway Access, Pedestrian Refuge, Connectivity, Higher Tax Base

I thought I could!
I thought I could!

Before

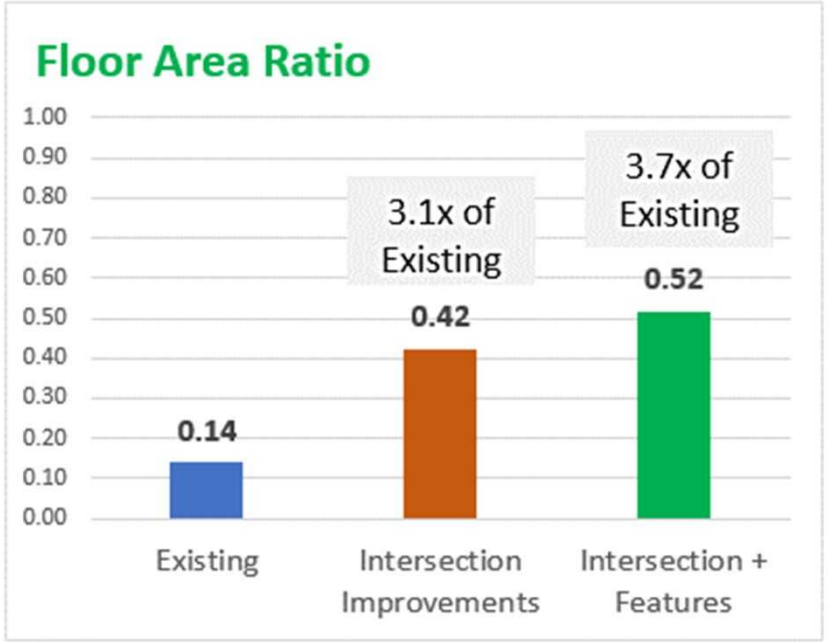
After

Quadrant Intersections

Quadrant Intersections

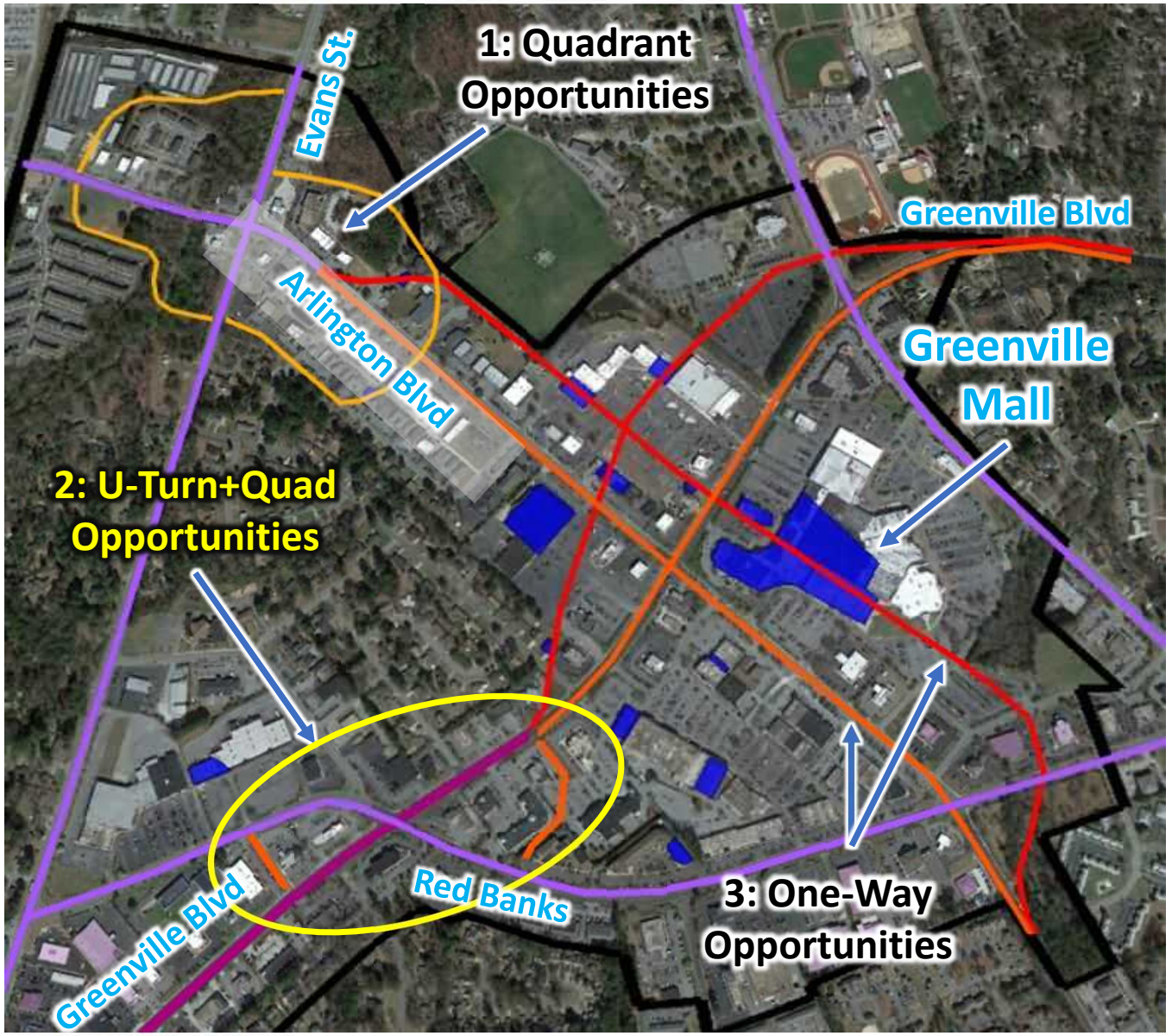
Proposed AI Design	Measure	Existing	Alternative Design	
		A: Capacity at 60-sec	B: New Des, Same Vol	C: New Des, Add Vol
Quadrant Roadway	Speed Limit	45	35	35
	Travel Time (sec)	110	90 *(-17%)*	110
	Vehicles per hour	3600	3600	5700 *(+58%)*

- Quadrant increases vehicle capacity from 3,600 to 5,700 per hour – 58% more
- Before / After travel time is 110 seconds, despite lowering speed limit from 45 to 35.
- System can support 3 to 4 times the existing density (FAR) at same travel time



U-Turn Intersections

Greenville U-Turns



Corridor View:
Before,
After with Parking,
After No Parking.

Planted Median Access Control made possible by U-Turns Nearby.


(Before & After)
View Angle
Today


(Before & After)
View Angle
Eventually,
Parallel Parking


(Before & After)
View Angle
Eventually,
No Parking

Top View:
Today,
Eventually, with Parking,
Eventually, No Parking.

Planted Median Access Control and Mid-block pedestrian crosswalk with refuge area made possible by U-Turns Nearby.


(Before & After)
eye
eye
Today


(Before & After)
Eventually,
Parallel Parking


(Before & After)
Eventually,
No Parking

Big Picture Overview:
Today vs Eventually,
U-Turns with Quadrant Shortcuts

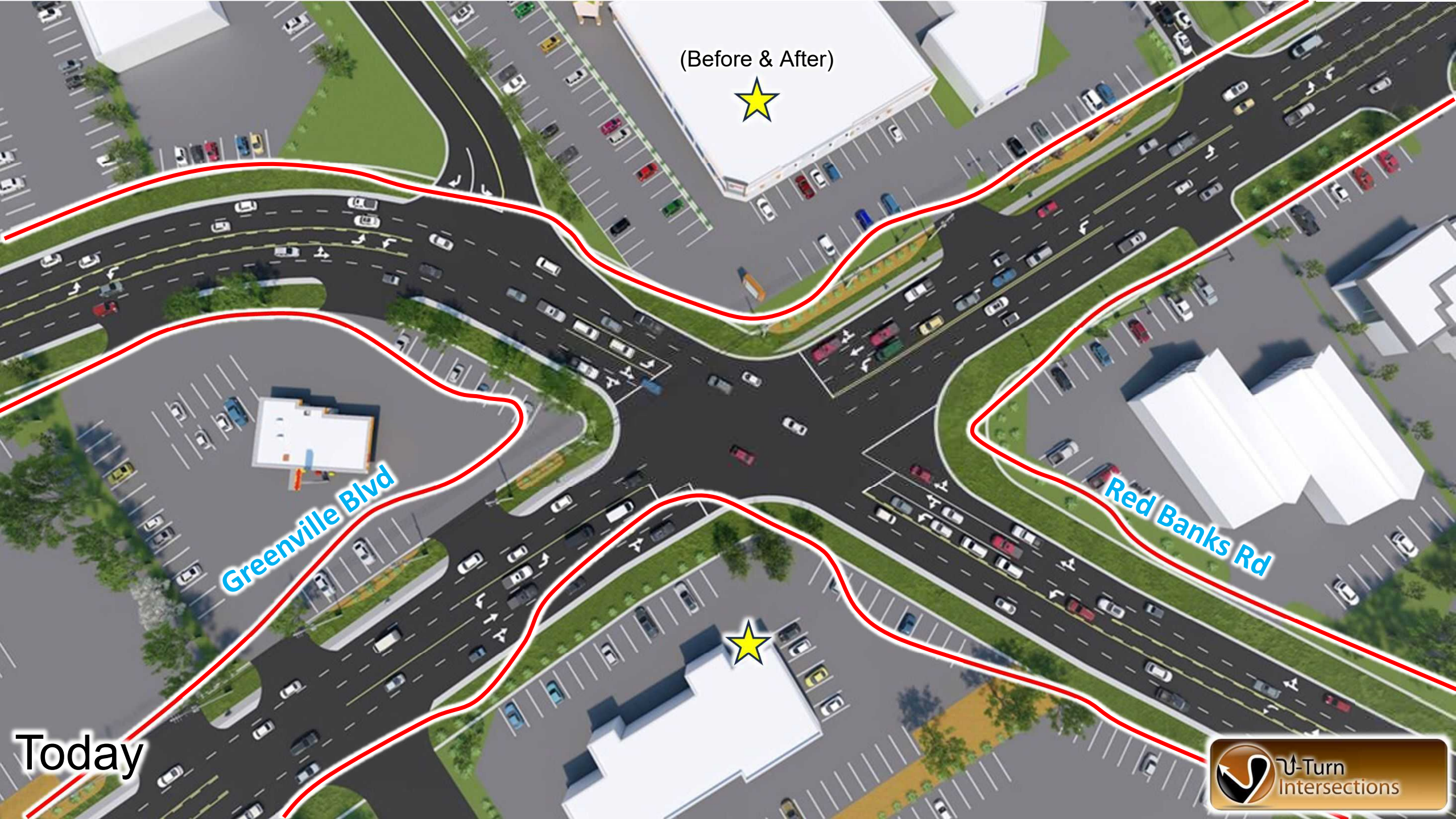
Greenville Blvd and Red Banks Road

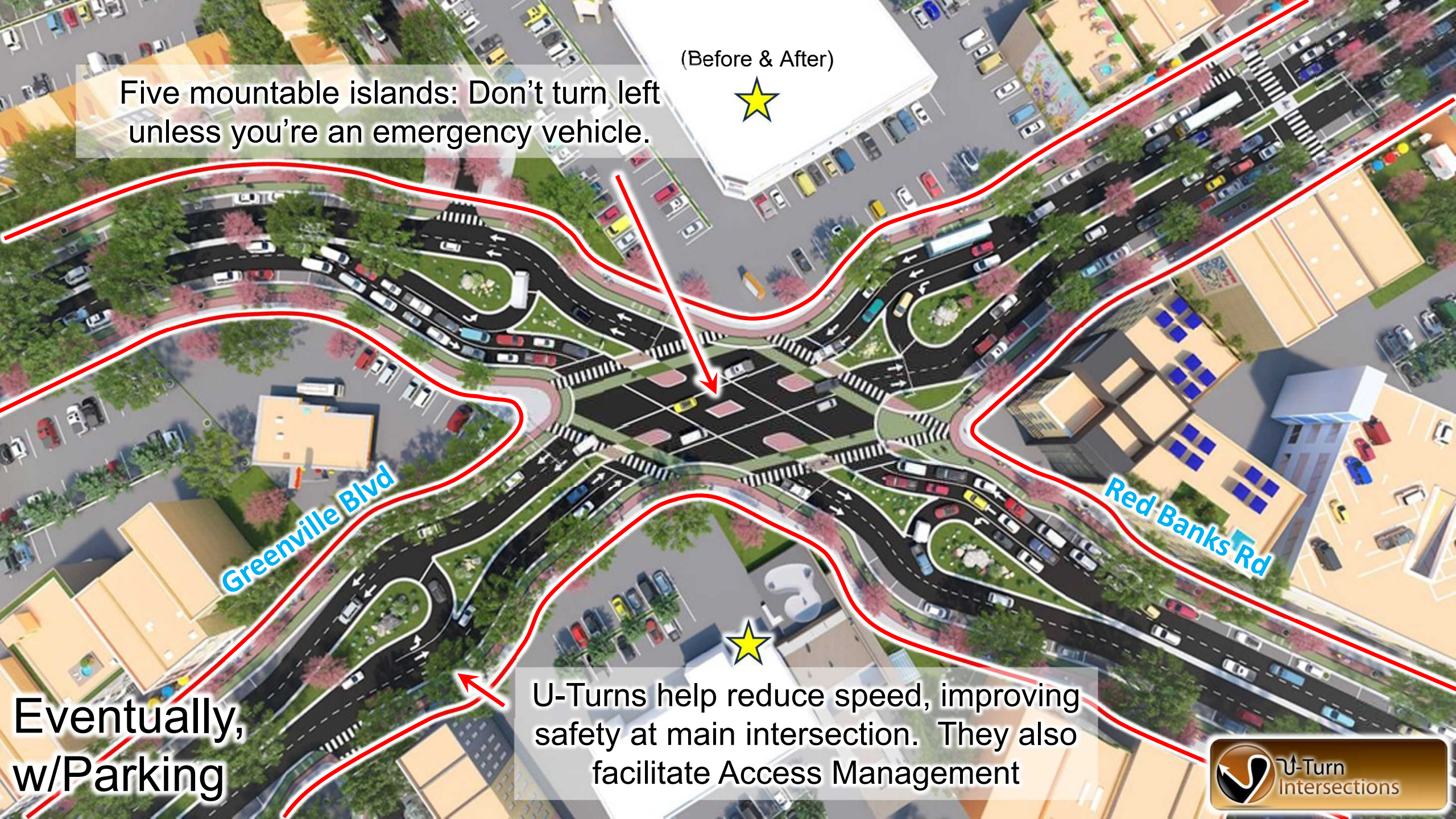

N
660 feet, or 1 / 8 Mile
Buildings Present in both Before and After
(Before & After)
Quadrant Path
U-Turn Paths
Red Banks Rd
Quadrant
Greenville Blvd
U-Turn Intersections
Quadrant Intersections

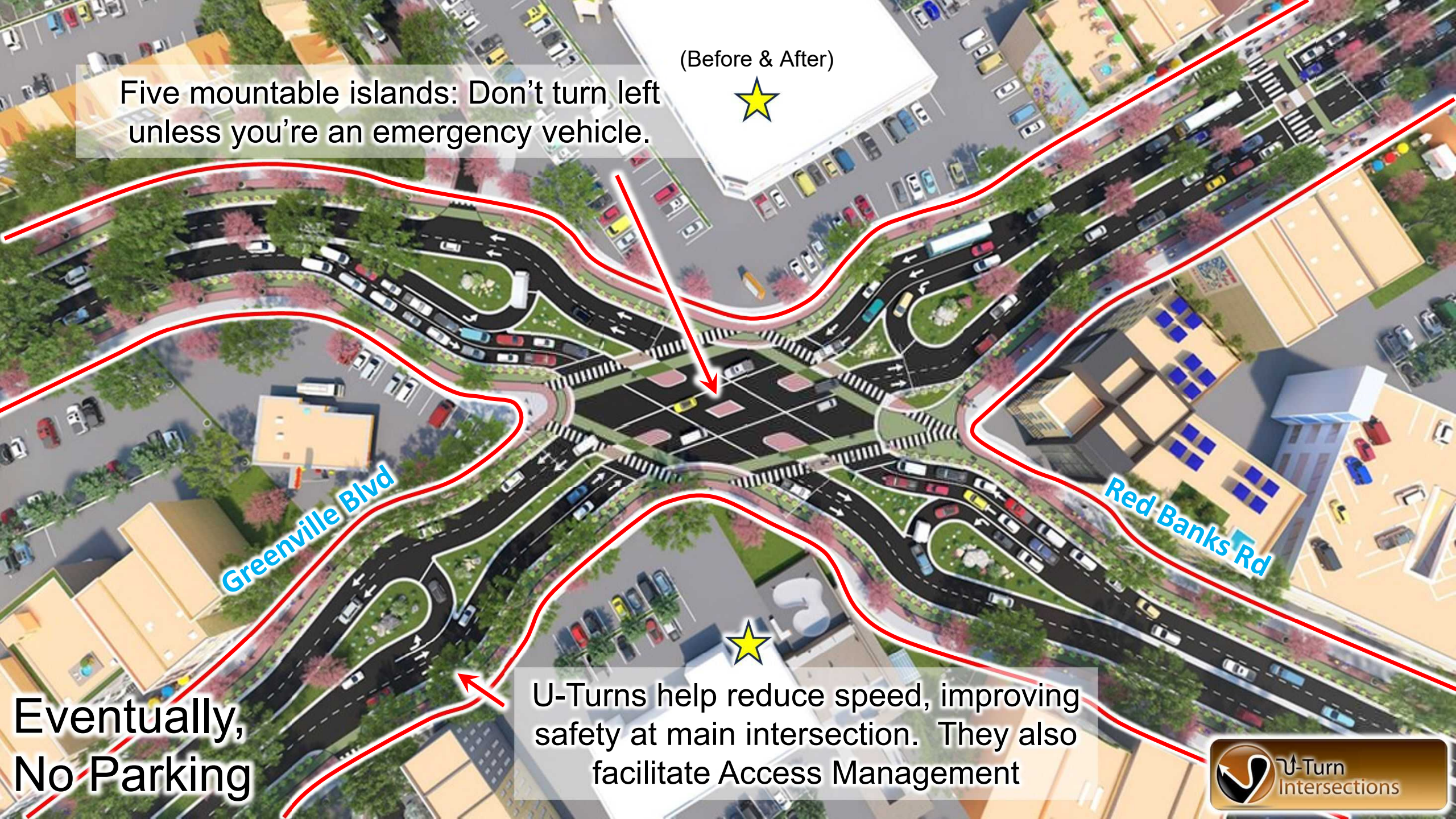

Can Offset
680 Acres
of suburbs, and
19 Miles of Road
* 3x more density
* 60% more capacity
* 10-15 mph slower…
but also faster!
(Before & After)
Quadrant Path
U-Turn Paths
Red Banks Rd
Quadrant
Greenville Blvd
Unvetted Research Concept
U-Turn Intersections
Quadrant Intersections

Same, but zoomed in a little to focus on U-turns at the main intersection.

Red Before/After outlines are removable.


(Before & After)
Greenville Blvd
Red Banks Rd
Today
U-Turn Intersections


(Before & After)
Five mountable islands: Don't turn left unless you're an emergency vehicle.
Greenville Blvd
Red Banks Rd
Eventually, w/Parking
U-Turns help reduce speed, improving safety at main intersection. They also facilitate Access Management
U-Turn Intersections


(Before & After)
Five mountable islands: Don't turn left unless you're an emergency vehicle.
Greenville Blvd
Red Banks Rd
Eventually, No Parking
U-Turns help reduce speed, improving safety at main intersection. They also facilitate Access Management
U-Turn Intersections

Birdseye View, Main Intersection.

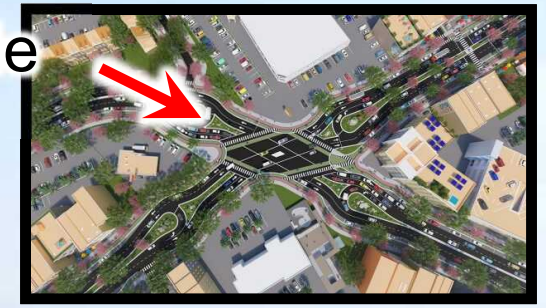
Emphasizes how U-Turns combined with trees and other multimodal investments create conditions that catalyze higher density mixed use development (helping you overcome “Mount Stroad”)

Today

U-Turn Intersections

I think I can!
I think I can!

View Angle

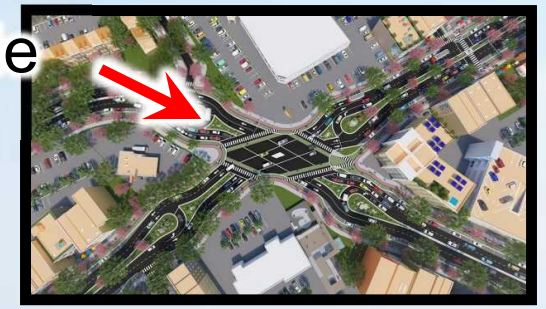


Eventually, w/Parking

U-Turn Intersections

I thought I could!
I thought I could!

View Angle

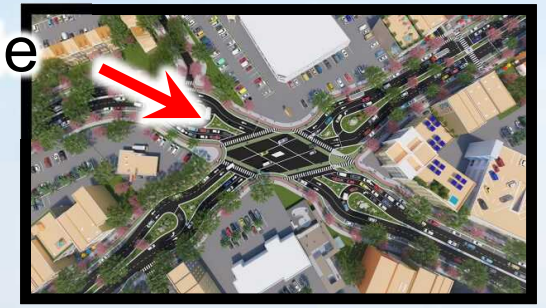


Eventually, No Parking

U-Turn Intersections

I thought I could!
I thought I could!

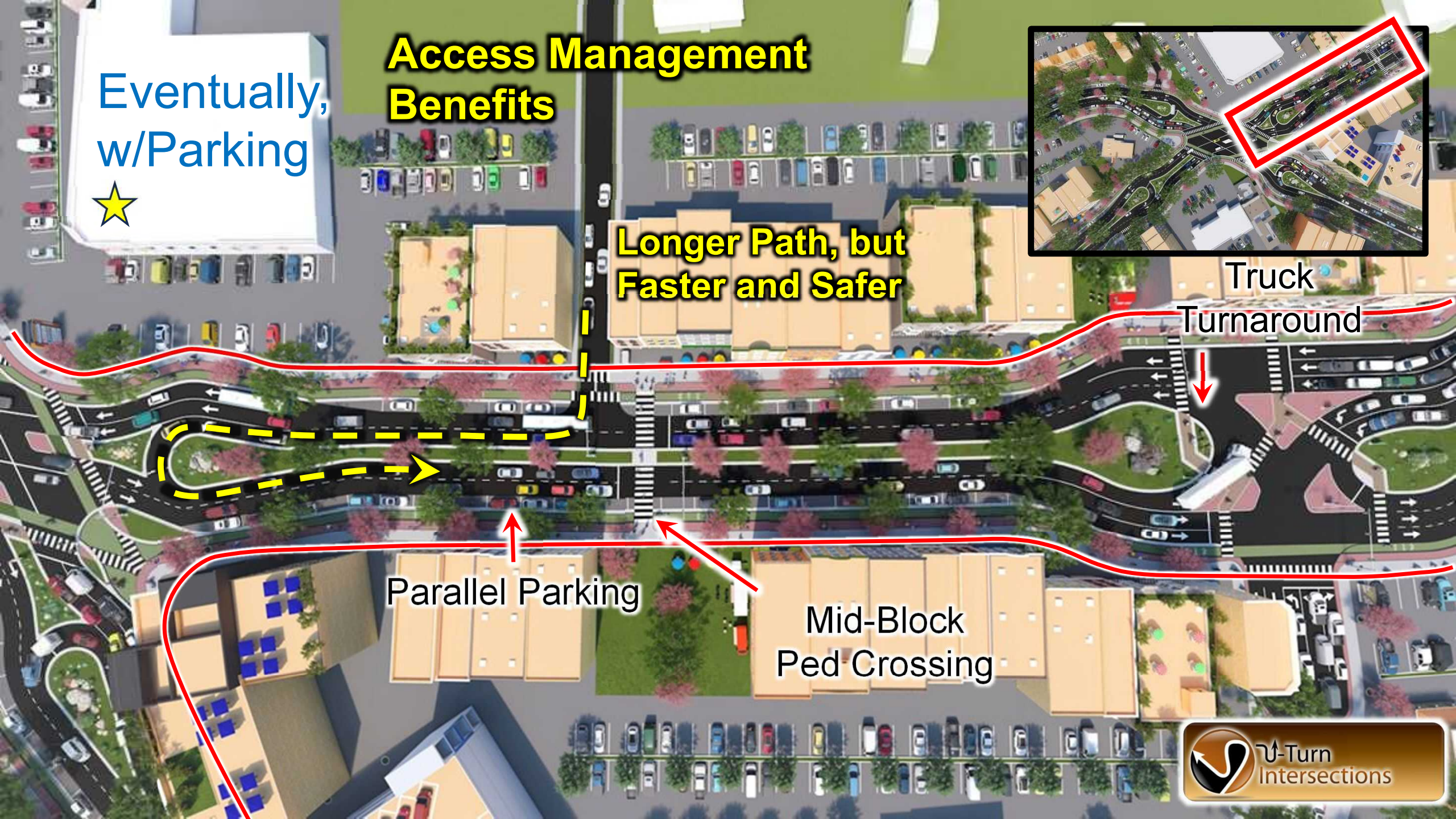
View Angle

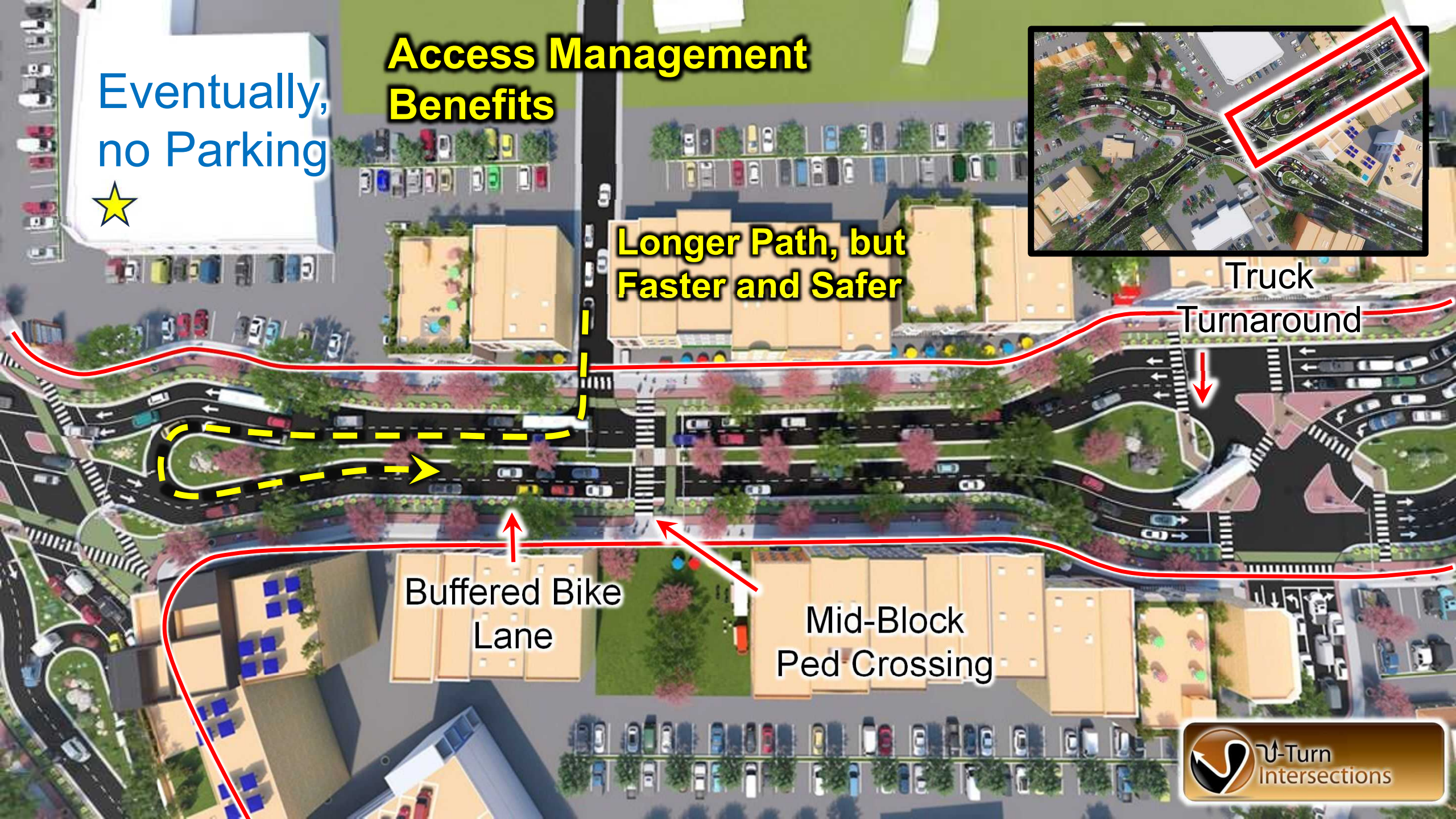


Safety and Access Management

These show how adding U-turns makes it easier to “sell” a raised median project to businesses, because their customers can still get in and out easily via the U-turns.

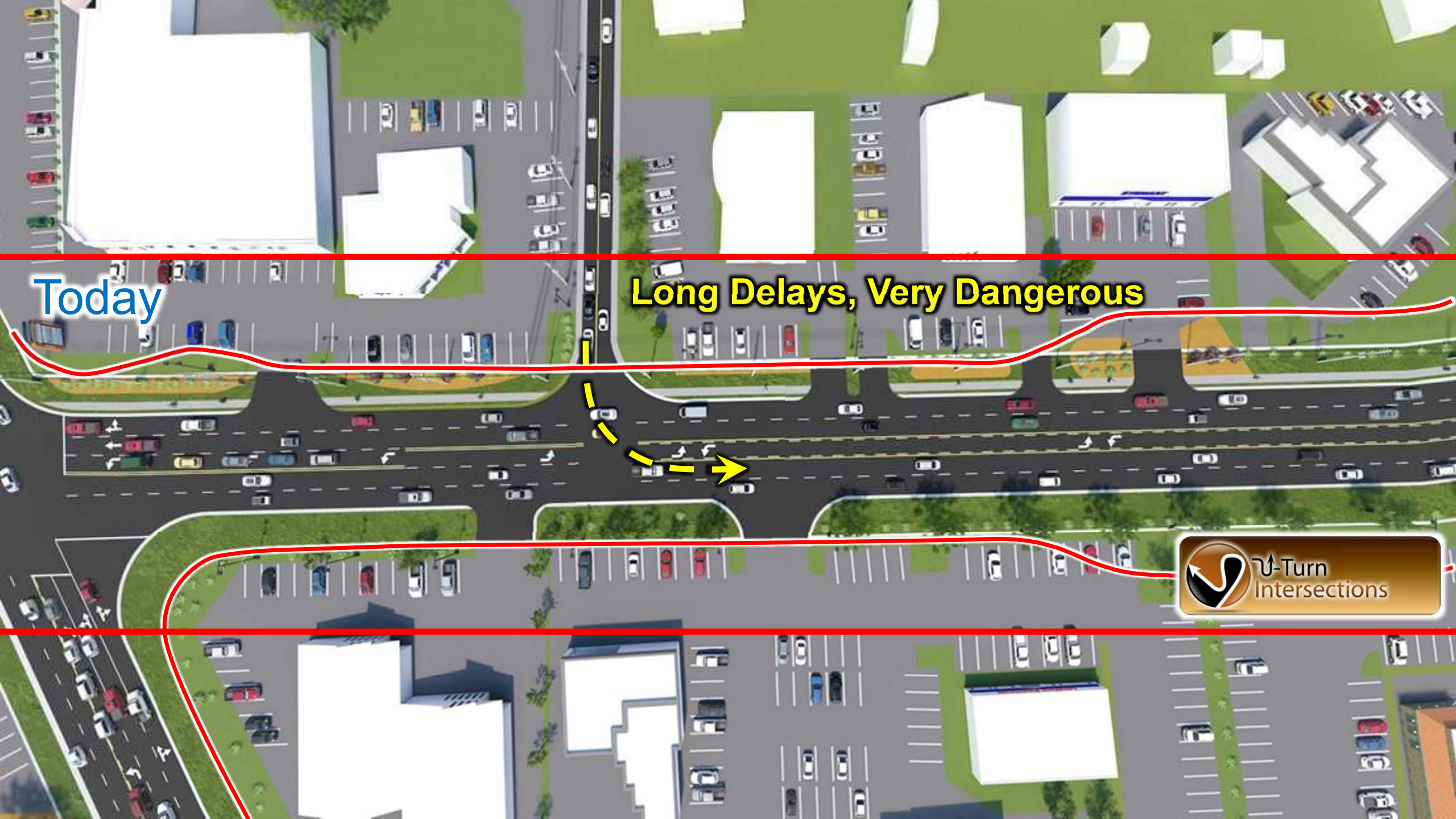

Today
Access Management Challenges
Long Delays, Very Dangerous
U-Turn Intersections


Access Management Benefits
Eventually, w/Parking
Longer Path, but Faster and Safer
Truck Turnaround
Parallel Parking
Mid-Block Ped Crossing
U-Turn Intersections


Access Management Benefits
Eventually, no Parking
Longer Path, but Faster and Safer
Truck Turnaround
Buffered Bike Lane
Mid-Block Ped Crossing
U-Turn Intersections

Safety and Access Management

Same, but made “shorter” to fit into report.


Today
Long Delays, Very Dangerous
U-Turn
Intersections


Eventually
Longer Path, but Faster and Safer
Truck
Turnaround
Buffered Bike Lane
Mid-Block Ped Crossing
U-Turn
Intersections

Birdseye View, Corridor View

Emphasizes dramatic change that becomes possible due to U-Turns and Quadrants

Red ROW lines help your eye see “something constant” amidst so much change (removable if need be).


View angle
Existing conditions not capable of catalyzing mixed-use development
U-Turn Intersections

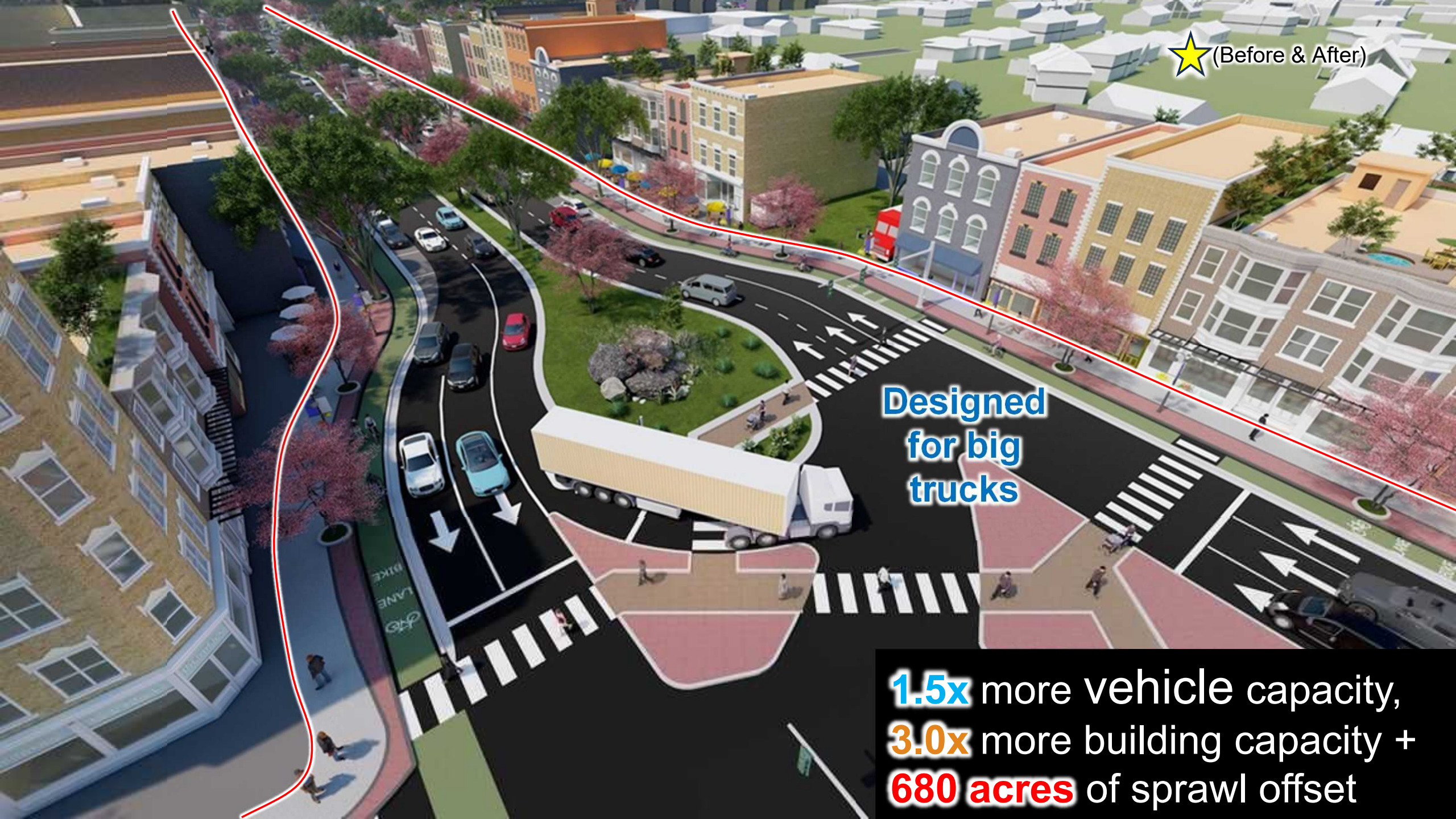

View angle
Outdoor Dining
Mid-Block Pedestrian Crossing
BIKE LANE
Bikes protected by parking & trees
U-Turn Intersections

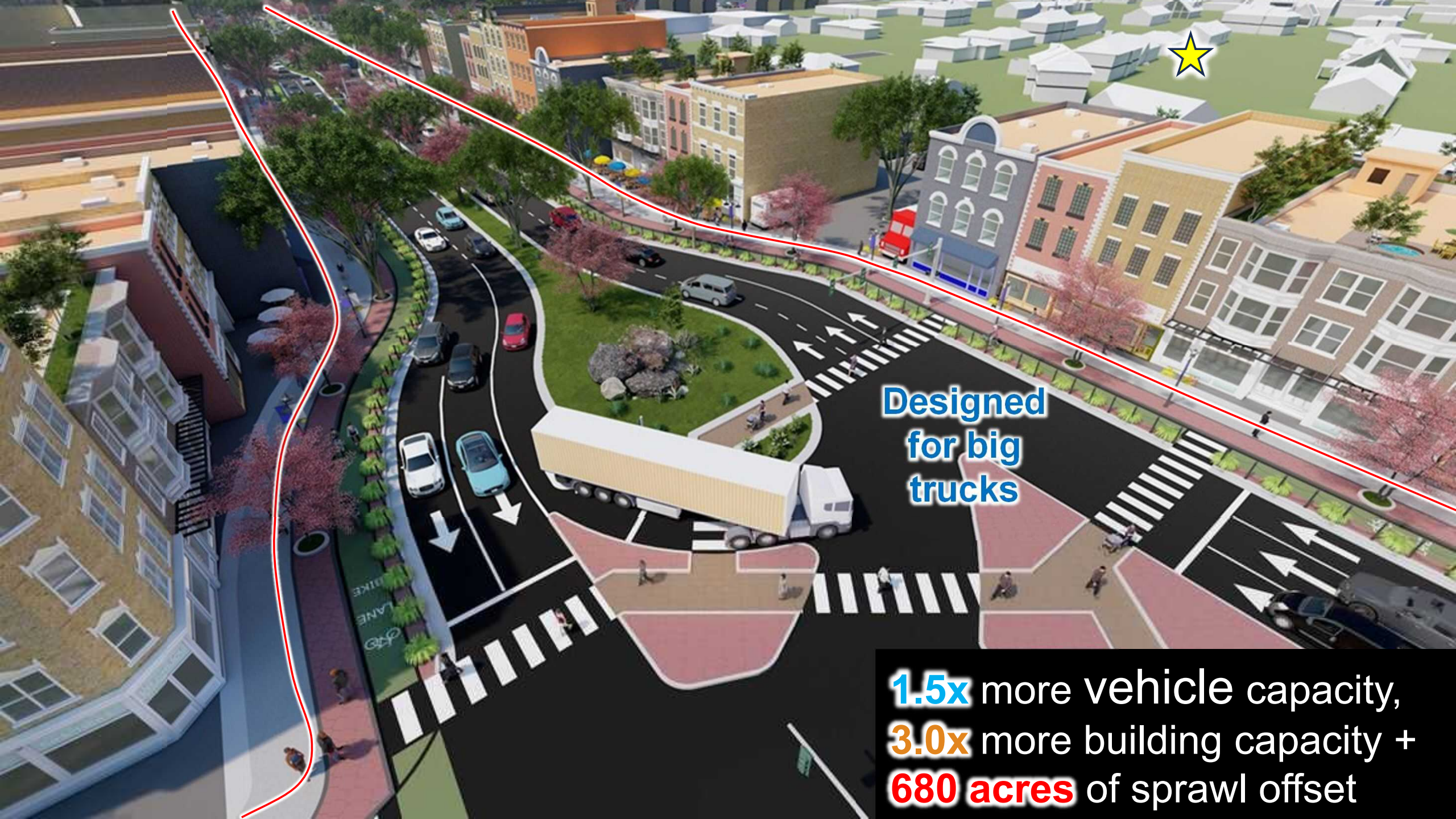

View angle
Mid-Block
Pedestrian
Crossing
Outdoor
Dining
LANE
BIKE
Bikes protected with buffer
U-Turn
Intersections

Birdseye View, Truck-Capable U-Turn.

Emphasizes how it is possible to accommodate big trucks and still achieve a walkable environment.


(Before & After)
EYEMART
Today
U-Turn
Intersections

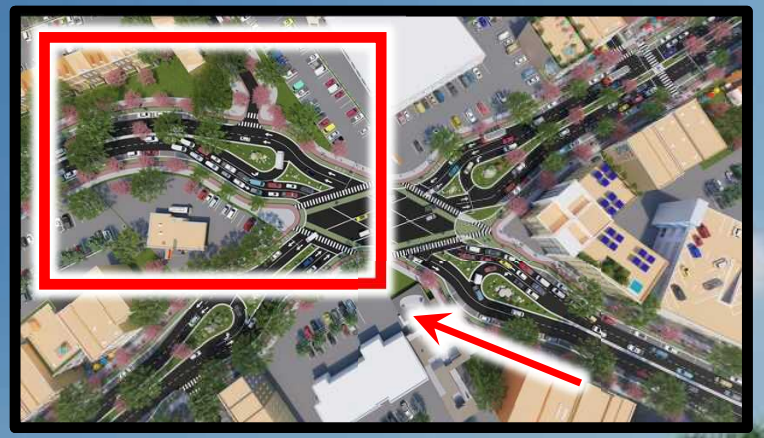

(Before & After)
Designed for big trucks
1.5x more vehicle capacity,
3.0x more building capacity +
680 acres of sprawl offset


Designed
for big
trucks
1.5x more vehicle capacity,
3.0x more building capacity +
680 acres of sprawl offset

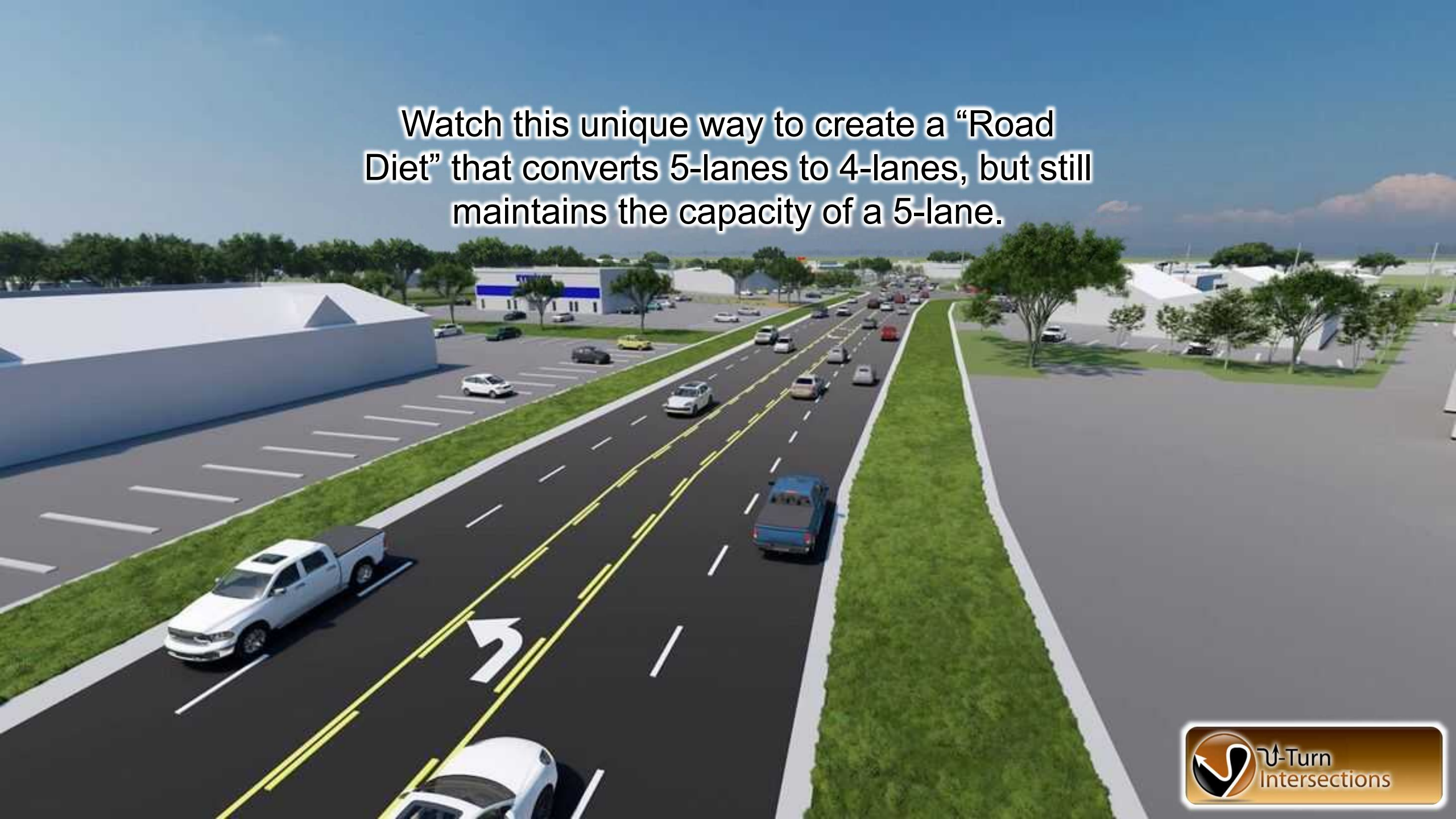
U-Turn Intersections


U-Turn
Intersections

Busy streets don't
always need to have
"ground floor commercial."
They can be
"ground floor livable"

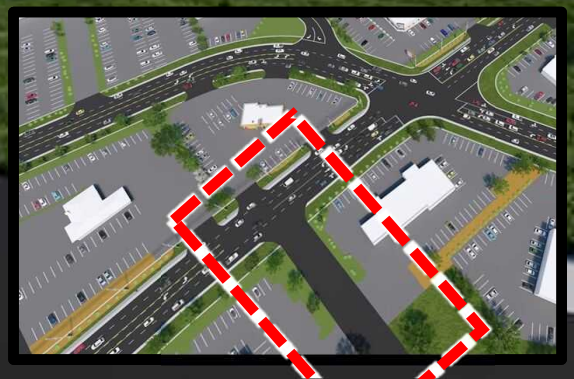


U-Turn Intersections


Watch this unique way to create a “Road Diet” that converts 5-lanes to 4-lanes, but still maintains the capacity of a 5-lane.
U-Turn Intersections


U-turns help convert wide medians to narrow
without loss of safety or functionality
Before Path:
Requires Median
After Path
Does Not
U-Turn
Intersections

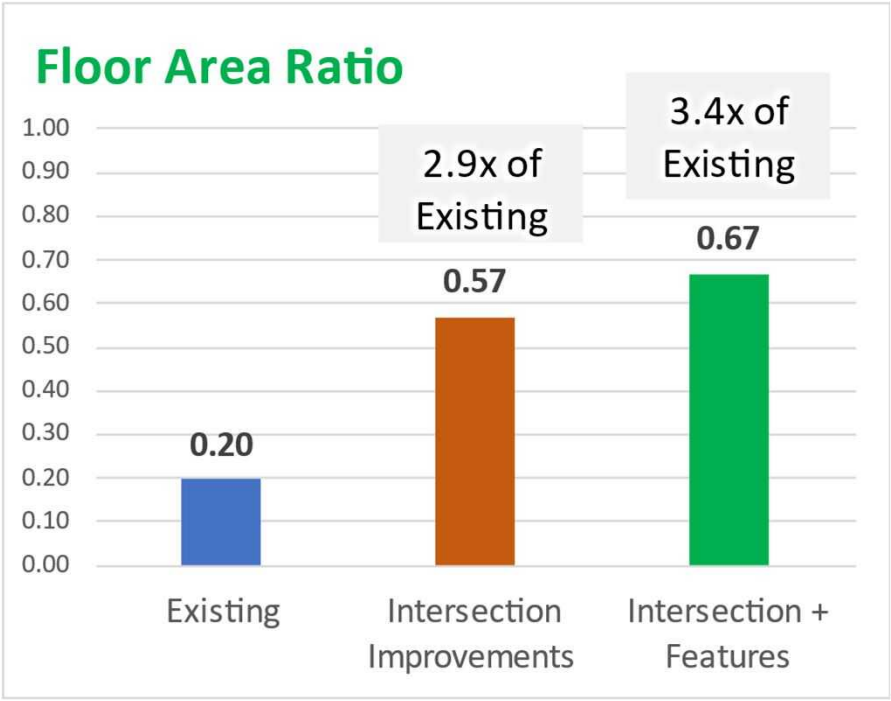
Placemaking Alternative Interchanges make underutilized land prime for redevelopment.
Watch what happens to this random parking lot…



Break up under-utilized parking lots with real streets to attract residential uses

Proposed AI Design	Measure	Existing	Alternative Design	
		A: Capacity at 60-sec	B: New Des, Same Vol	C: New Des, Add Vol
RCI / U-Turn	Speed Limit	45	35	35
	Travel Time (sec)	100	90 *(-12%)*	100
	Vehicles per hour	3800	3800	6000 *(+58%)*

- U-Turn increases vehicle capacity from 3,800 to 6,000 per hour – 58% more
- Before / After travel time is 100 seconds, despite lowering speed limit from 45 to 35.
- System can support 3 to 3.5 times the existing density (FAR) at same travel time



Hidden Slides: Designed for NSF proposal


McIntosh High School, Peachtree, GA
Only about 10% of parking dedicated to
“carts,” but half of all vehicles are carts!

One-Way concepts in Greenville

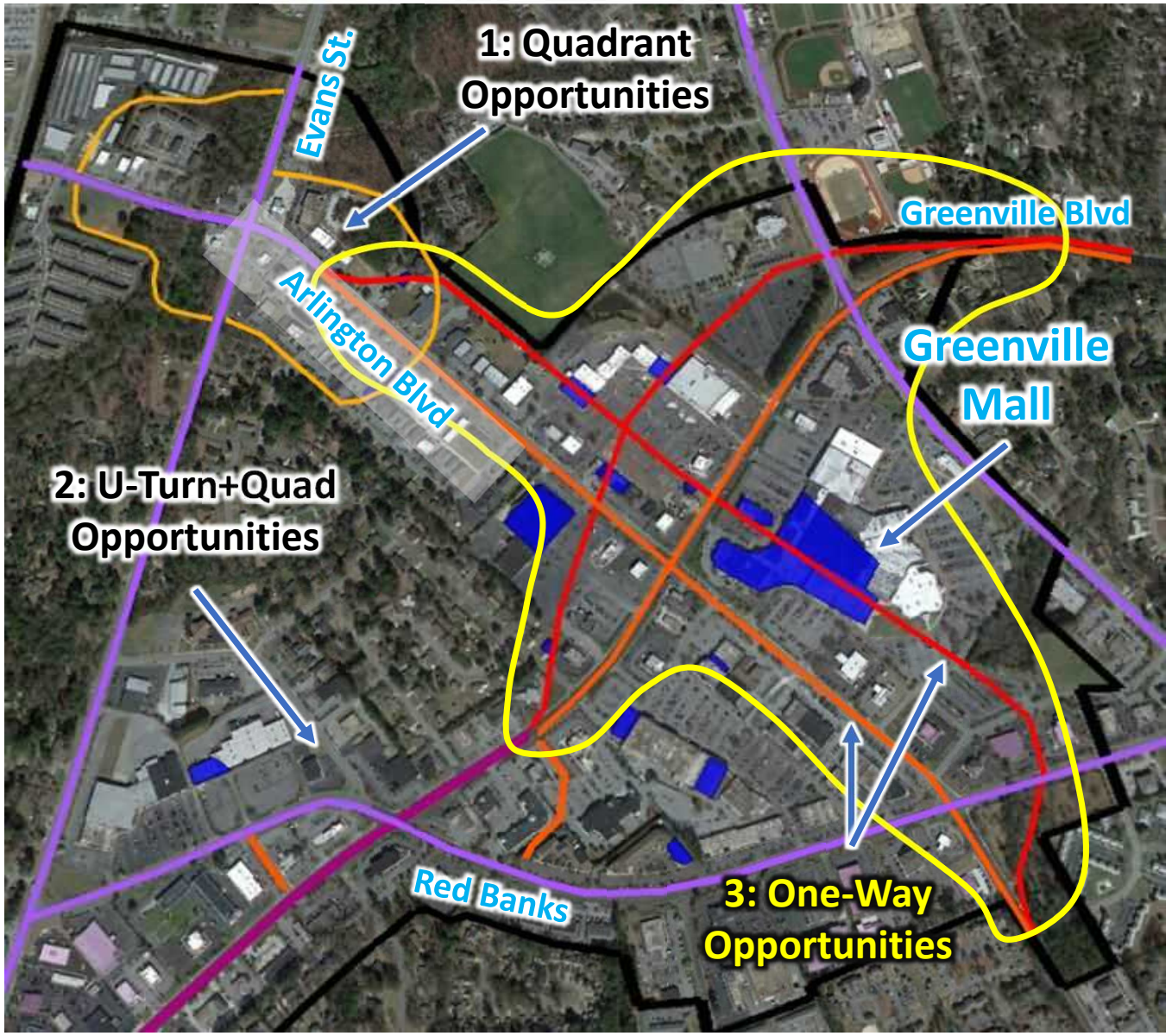
But also imagine them for Raleigh, Charlotte, or "Anywhere, USA"

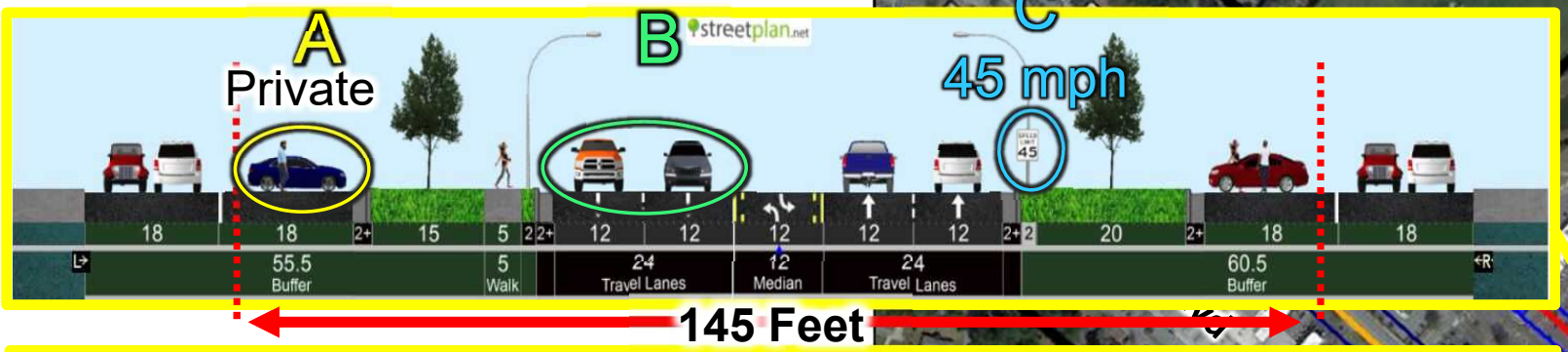
5-minute target

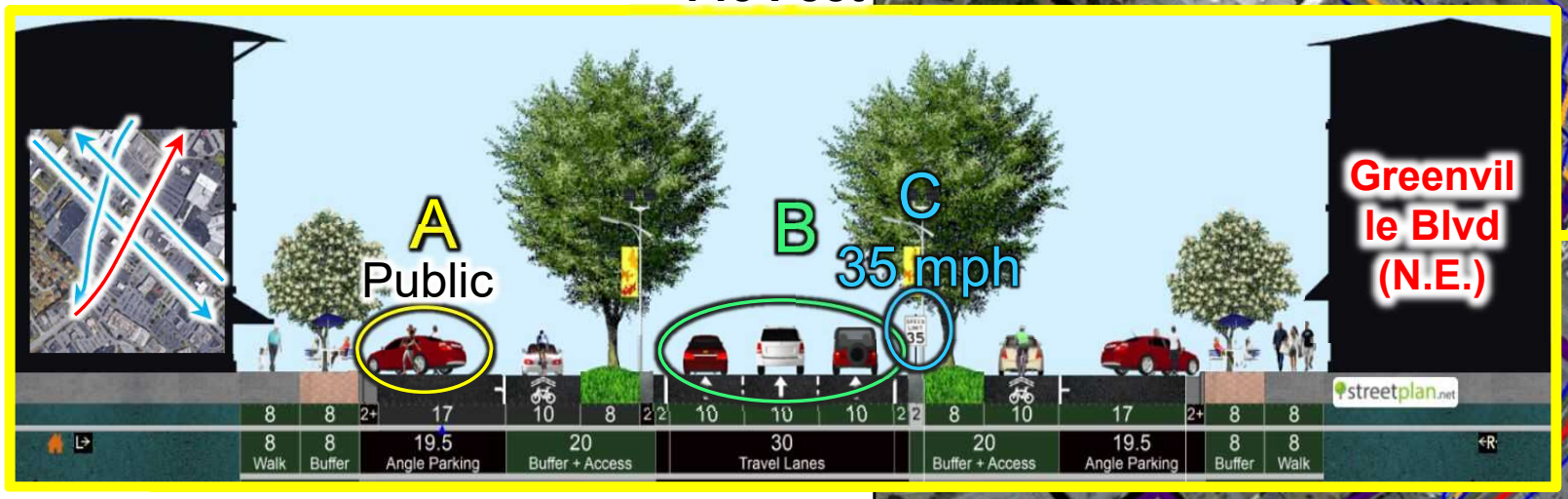
Greenville One-Ways, Mall Area

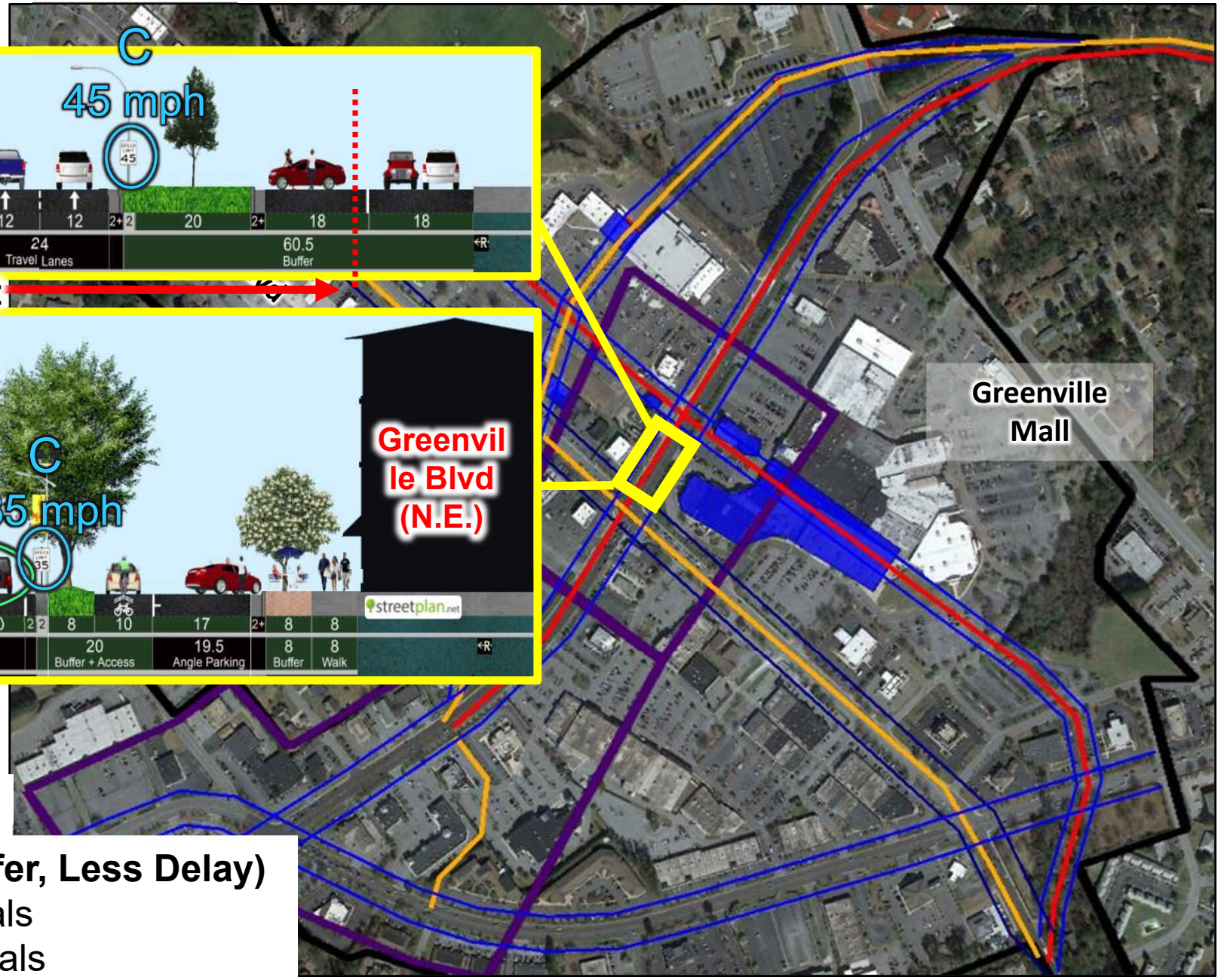
One-Way Split Intersections

- Any alignment that impacts major buildings, such as the mall (big blue), would be enacted only when the owners want an “extreme makeover”.







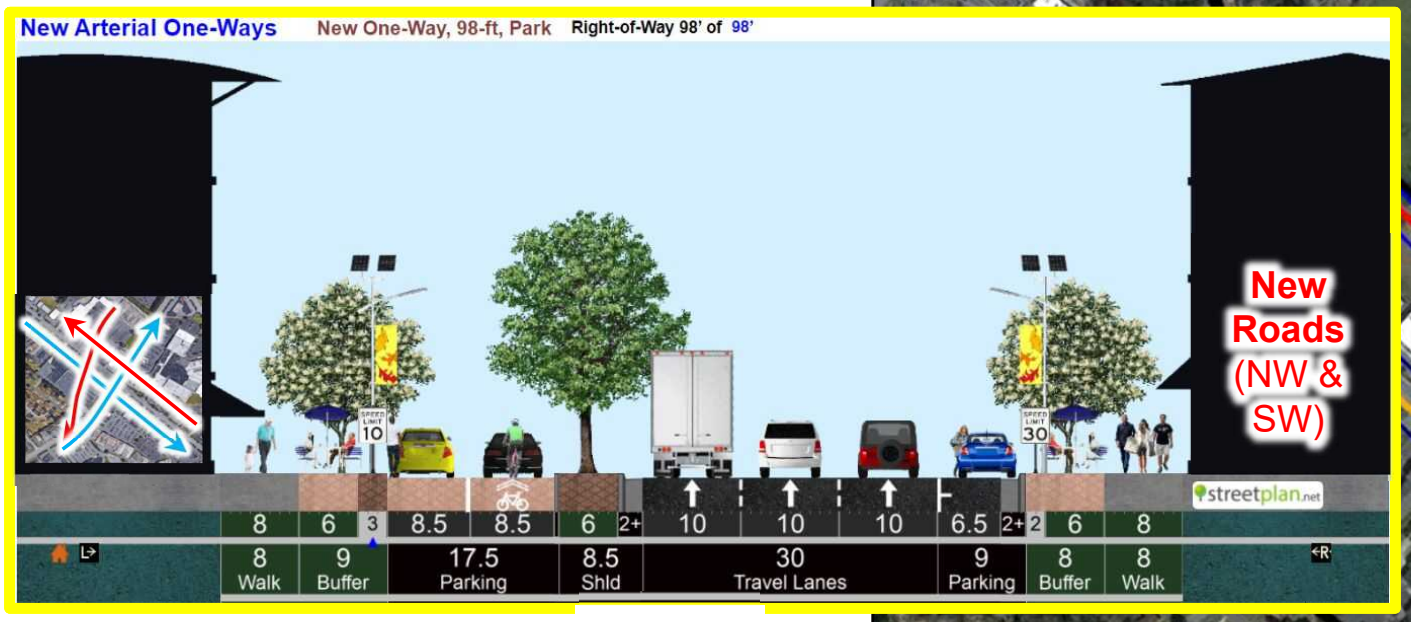


A Similar parking before and after

B More Capacity

C **Drive Slower, *Travel Faster!* (Safer, Less Delay)**

- Before: 2-lanes, 4-phase signals
- After: 3-lanes, 2&3 phase signals


New Arterial One-Ways
New One-Way, 98-ft, Park
Right-of-Way 98' of 98'
streetplan.net
8 6 3 8.5 8.5 6 2+ 10 10 10 6.5 2+ 2 6 8
8 Walk
9 Buffer
17.5 Parking
8.5 Shld
30 Travel Lanes
9 Parking
8 Buffer
8 Walk

98 Feet


New Roads (NW & SW)
Greenville Mall

Hidden Slides: Designed for NSF proposal


FAR 190 Acr
0.92
0.17
5x
Now
Max
Veh / Hr
8k
7k
6k
5k
4k
3k
2k
1k
0k
3,600
7,100
+97%
Now
New
Today
One-Way Split Intersections
(Before & After)
Mall
New WB
New SB
Greenville
Concept Only
Needs vetting with mall owners and general public first
Arlington
Can Offset
1200 Acres
of suburbs, and
34 Miles of Road
Greenville, NC


* 5x more density
* 97% more capacity
* 10-15 mph slower...
but also faster!
With 5x Development
One-Way Split Intersections
(Before & After)
Small Mall
New WB
New SB
Greenville NB
Arlington EB
Can Offset
1200 Acres
of suburbs, and
34 Miles of Road
Unvetted Research Concept


FAR 190 Acr
0.92
0.17
5x
Now
Max
Veh / Hr
8k
7k
6k
5k
4k
3k
2k
1k
0k
7,100
3,600
+97%
Now
New
With 5x Development
One-Way Split Intersections
(Before & After)
Small Mall
New WB
New SB
Greenville NB
Arlington EB
Can Offset
1200 Acres
of suburbs, and
34 Miles of Road
Unvetted Research Concept

- For flier, fewer words


FAR 190 Acr
0.92
0.17
5x
Now
Max
Veh / Hr
8k
7k
6k
5k
4k
3k
2k
1k
0k
3,600
7,100
+97%
Now
New
Arlington Blvd
Can Offset
1150 Acres
of suburbs, and
32 Miles of Road
Publix
Greenville Blvd
Mall


FAR 190 Acr
0.92
0.17
5x
Now
Max
Veh / Hr
8k
7k
6k
5k
4k
3k
2k
1k
0k
3,600
7,100
+97%
Now
New
Arlington Blvd
Can Offset
1150 Acres
of suburbs, and
32 Miles of Road
Publix
Greenville Blvd
Former
Mall

Greenville Mall Area, One-way Couplet Concept

Current: 3800 veh per hour

One-Ways with 3800 vph

One-Ways at 6400 vph

Red cars: Significant Delay
Green / yellow: Little Delay

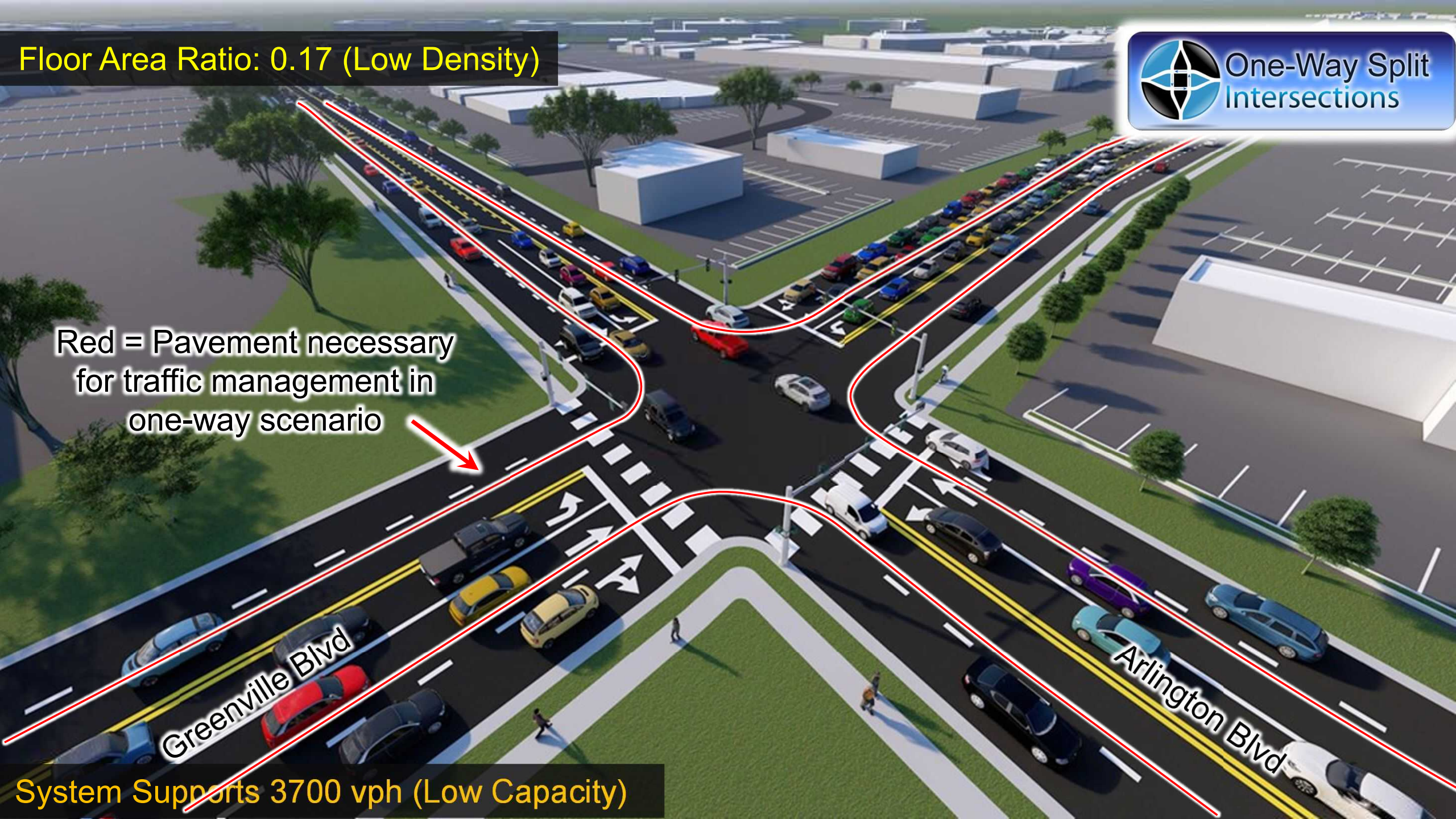
Average Time 100 sec

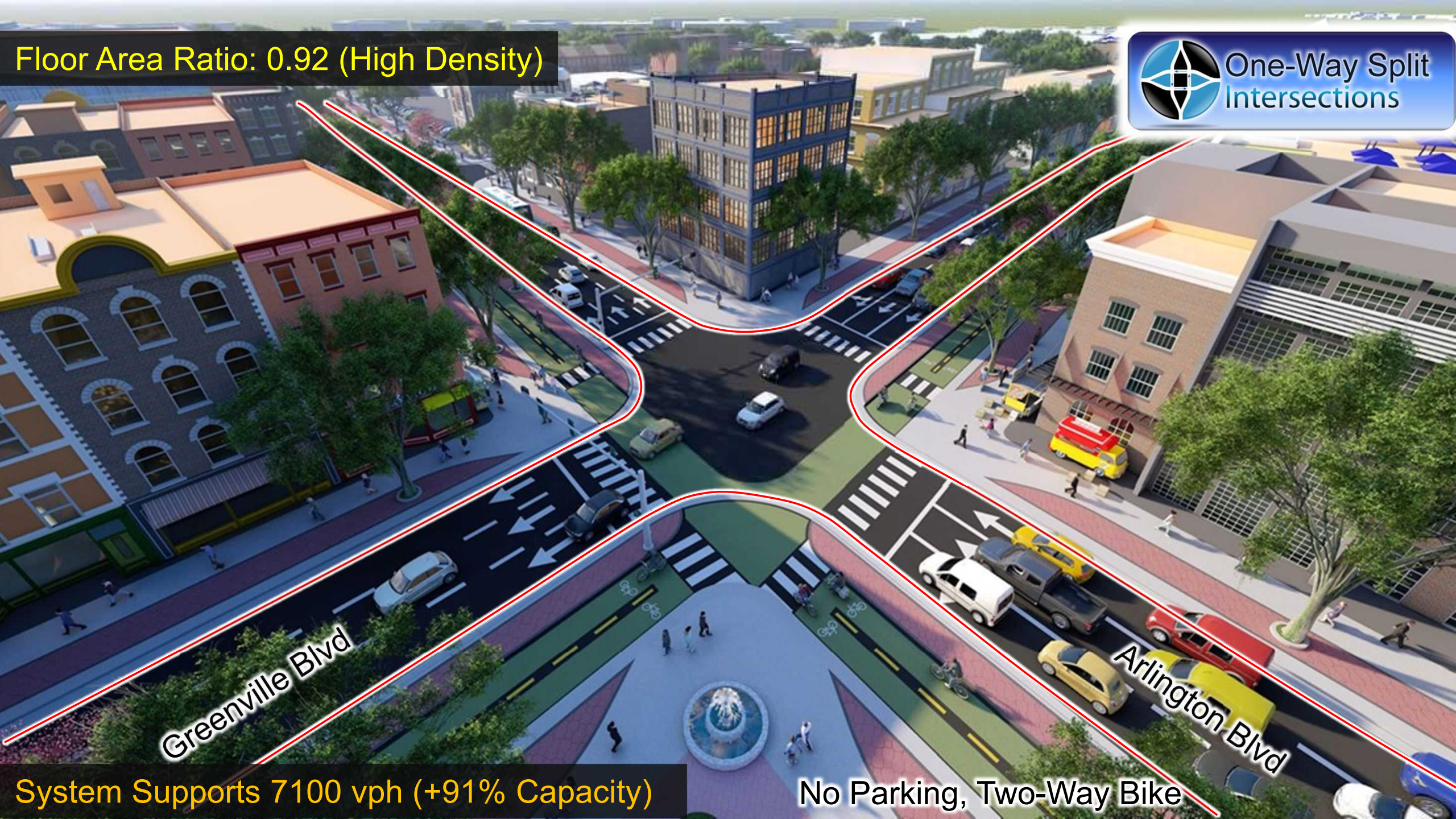
Unvetted Research Concept

Average Time 60 sec

Average Time 100 sec

(70% more capacity)


Floor Area Ratio: 0.17 (Low Density)
One-Way Split Intersections
Red = Pavement necessary for traffic management in one-way scenario
Greenville Blvd
Arlington Blvd
System Supports 3700 vph (Low Capacity)


Floor Area Ratio: 0.92 (High Density)
One-Way Split Intersections
Greenville Blvd
Arlington Blvd
System Supports 7100 vph (+91% Capacity)
No Parking, Two-Way Bike


Floor Area Ratio: 0.92 (High Density)
One-Way Split Intersections
Greenville Blvd
Arlington Blvd
BIKE LANE
BIKE LANE
System Supports 7100 vph (+91% Capacity)
With Parking, One or Two-Way Bike


FAR 111 Acr
0.14
Now
FAR 190 Acr
0.92
0.17
Now
Evans
Greenville
Charles
Mall
Arlington
Red Banks
One-Way Split Intersections
Quadrant Intersections
Existing
Greenville, NC


Can Offset
350 Acres
of suburbs, and
10 Miles of Road
FAR 111 Acr
0.52
0.14
4x
Now
Max
Can Offset
1200 Acres
of suburbs, and
34 Miles of Road
FAR 190 Acr
0.92
0.17
5x
Now
Max
One-Way Split
Intersections
Greenville
Charles
Evans
Mall
Arlington
Red Banks
Quadrant
Intersections
Potential
Unvetted Research Concepts

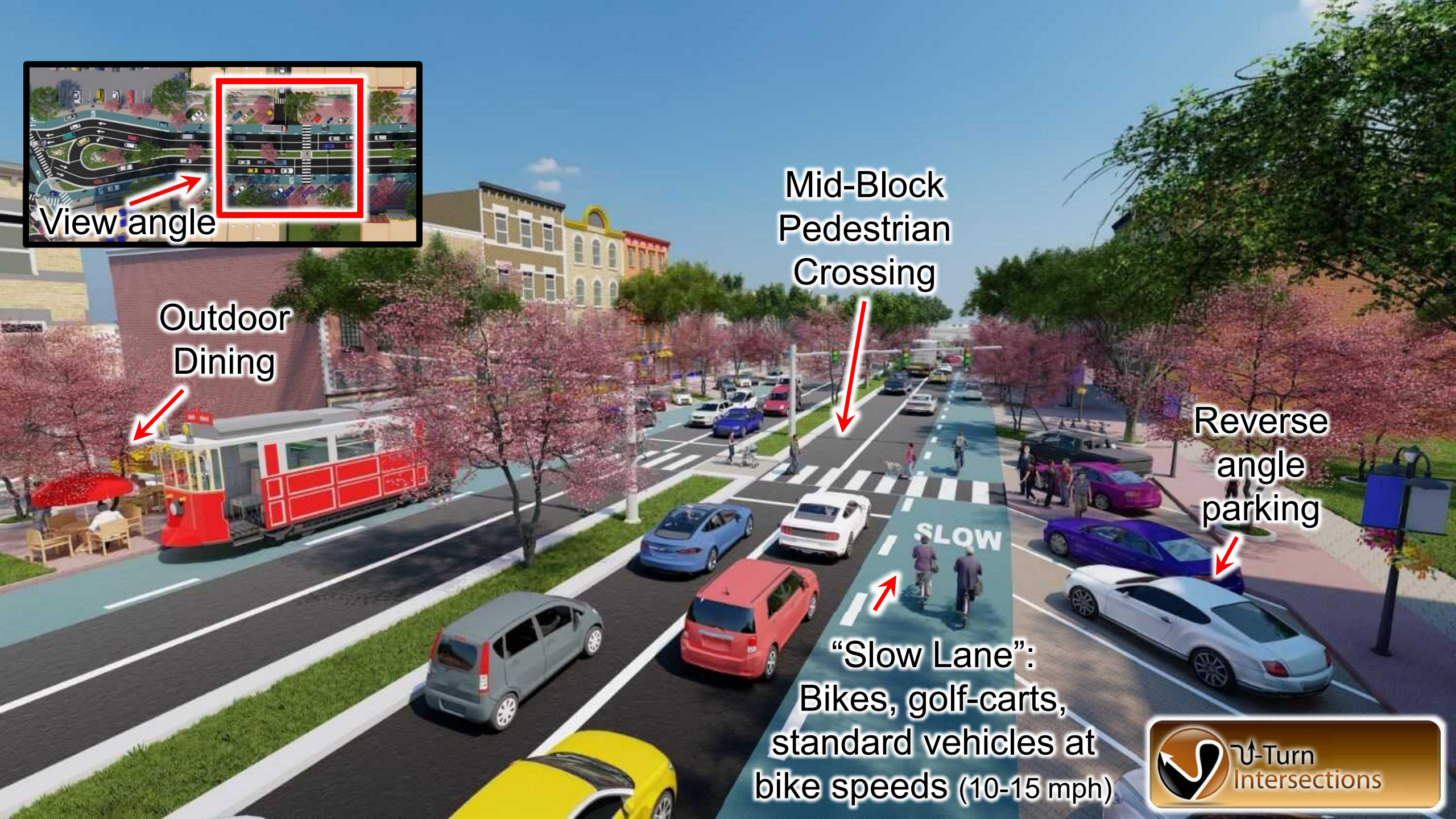
Proposed AI Design	Measure	Existing	Alternative Design	
		A: Capacity at 60-sec	B: New Des, Same Vol	C: New Des, Add Vol
One-way Couplet	Speed Limit	45	35	35
	Travel Time (sec)	100	60 *(-41%)*	100
	Vehicles per hour	3700	3700	7100 *(+91%)*

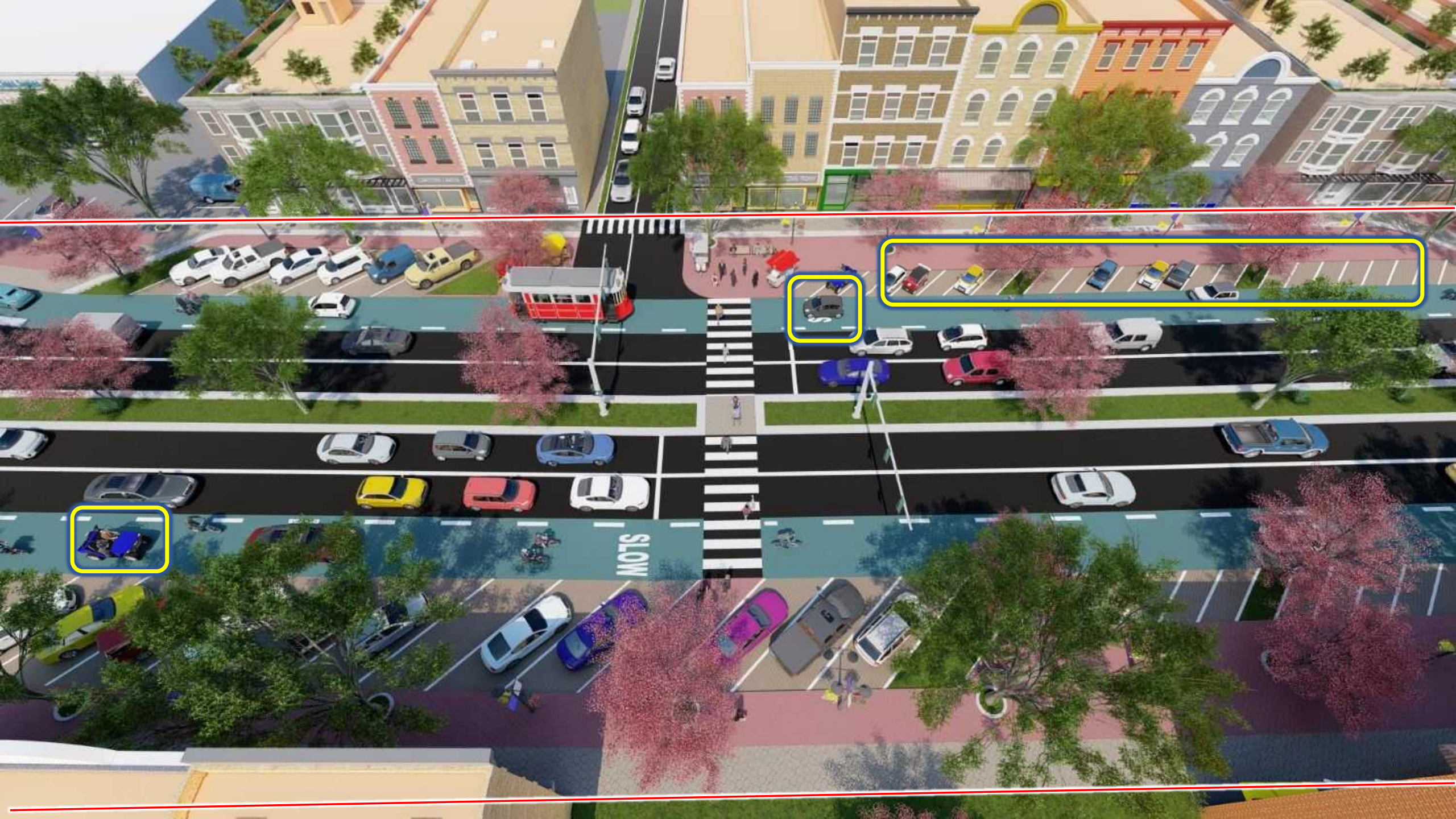
One-Way Split Intersections

- Crossing one-ways increase vehicle capacity from 3,700 to 7,100 per hour – 91% more
- Before / After travel time is 100 seconds, despite lowering speed limit from 45 to 35.
- System can support 4 to 5 times the existing density (FAR) at same travel time

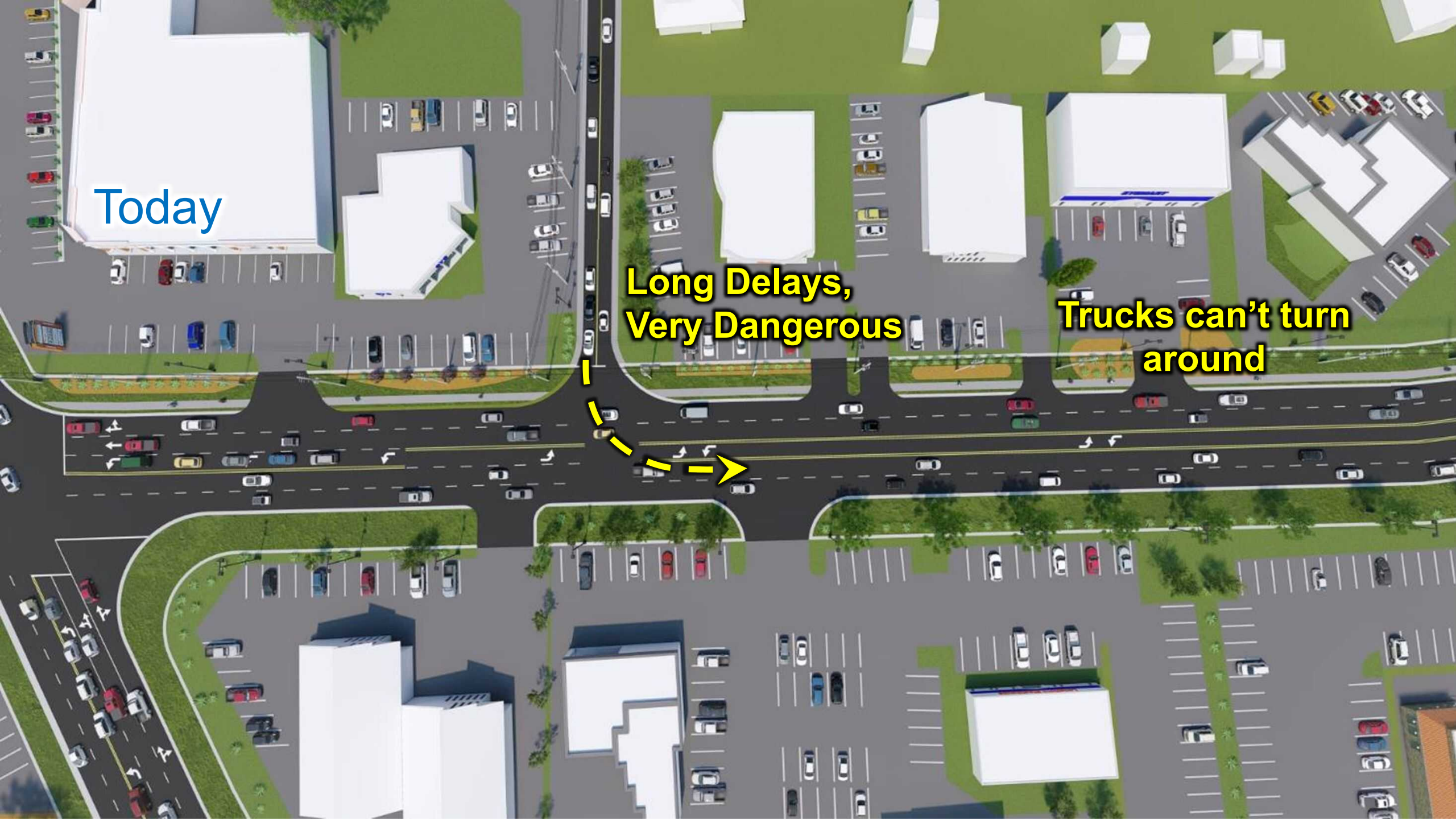
Greenville – Old Graphics with Slow Lane Concepts


SLOW

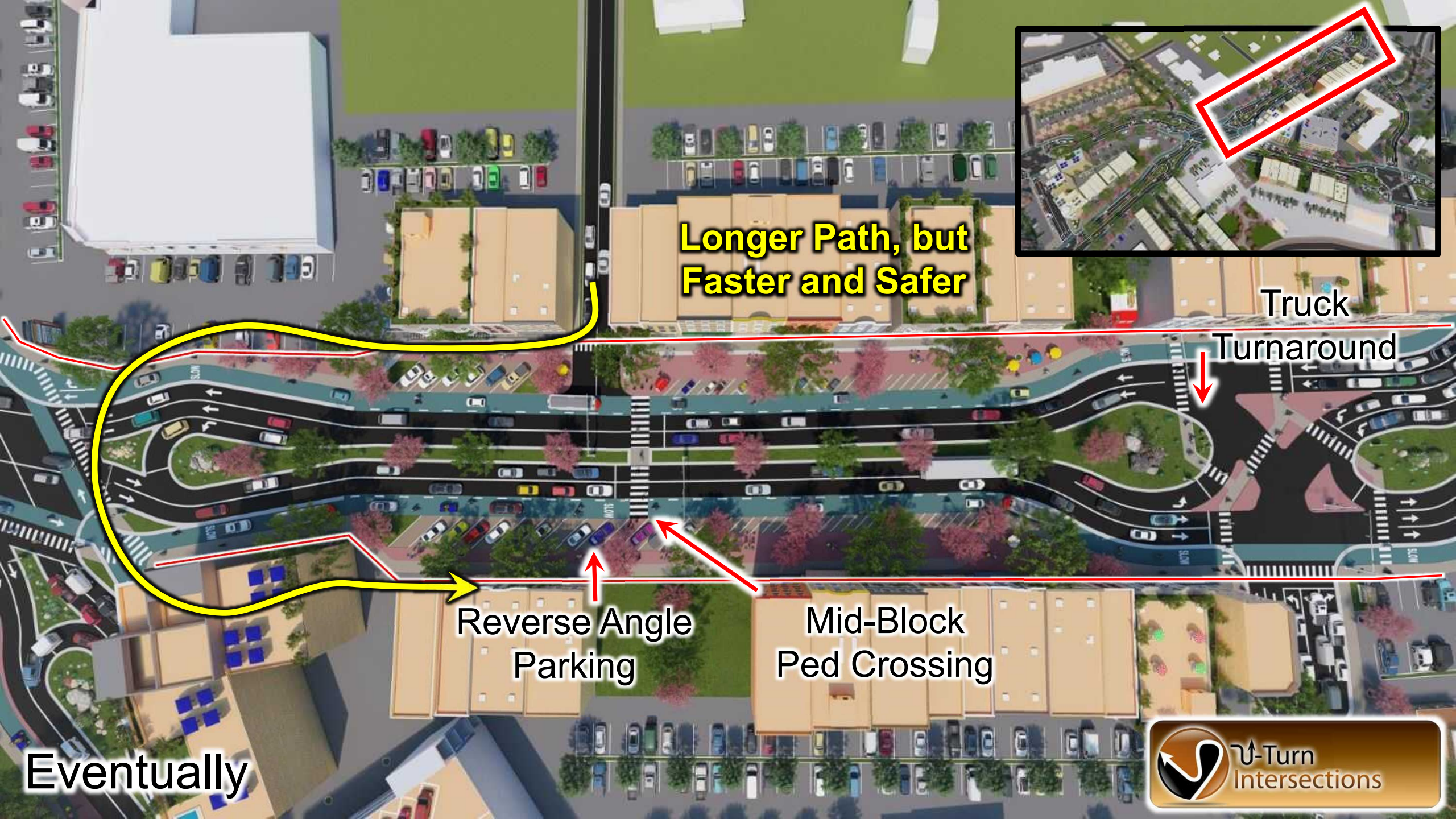

View angle
Outdoor Dining
Mid-Block Pedestrian Crossing
Reverse angle parking
SLOW
“Slow Lane”: Bikes, golf-carts, standard vehicles at bike speeds (10-15 mph)
U-Turn Intersections

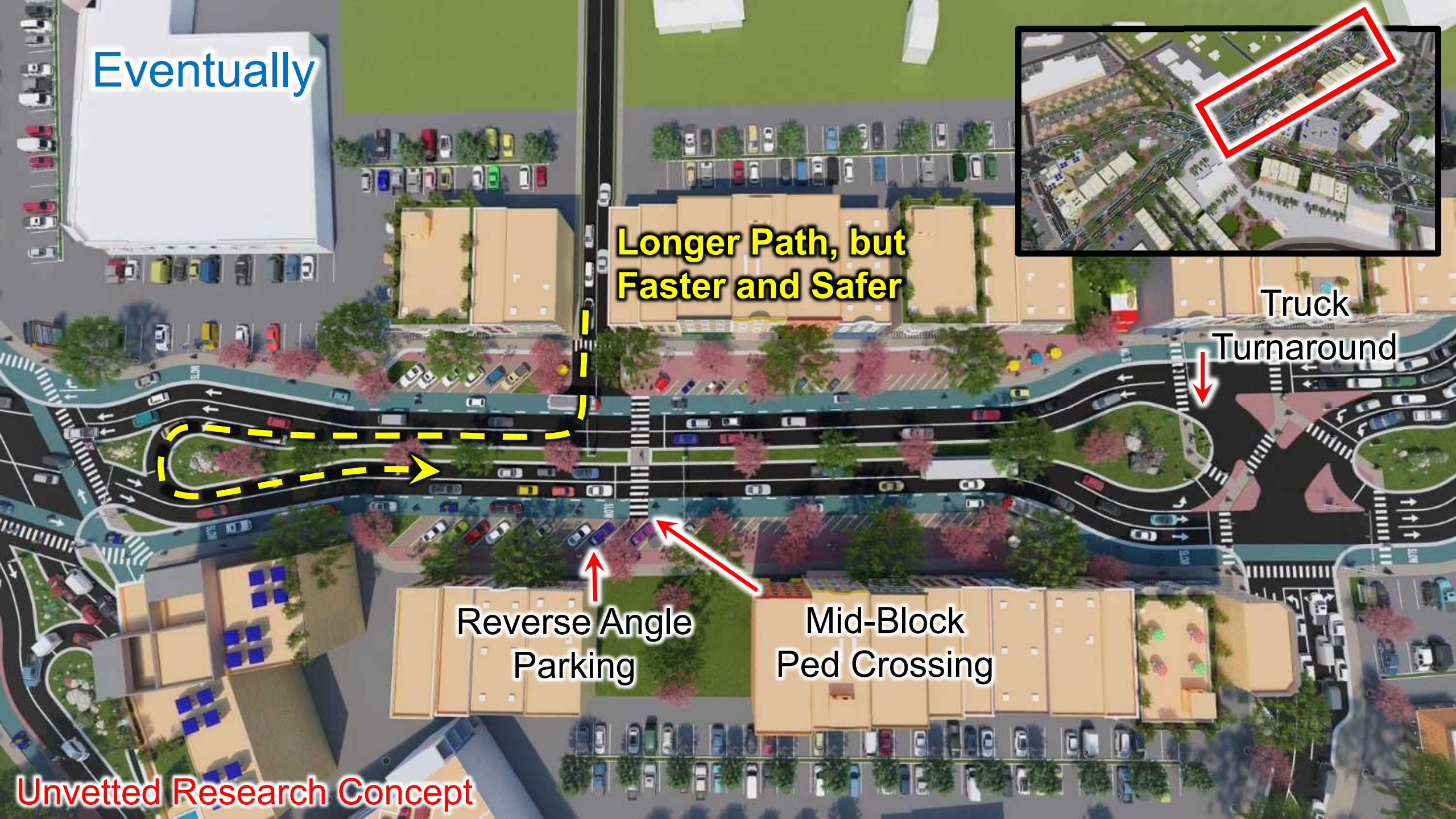

SLOW


Quadrant Intersections
Evans St
Unvetted Research Concept
Clifton St
FAR 111 Acr
0.52
0.14
4x
Now
Max
Arlington Blvd
Veh/Hr
8k
7k
6k
5k
4k
3k
2k
1k
0k
5,700
3,700
1.5x
Now
New
Can Offset
350 Acres
of suburbs, and
10 Miles of Road

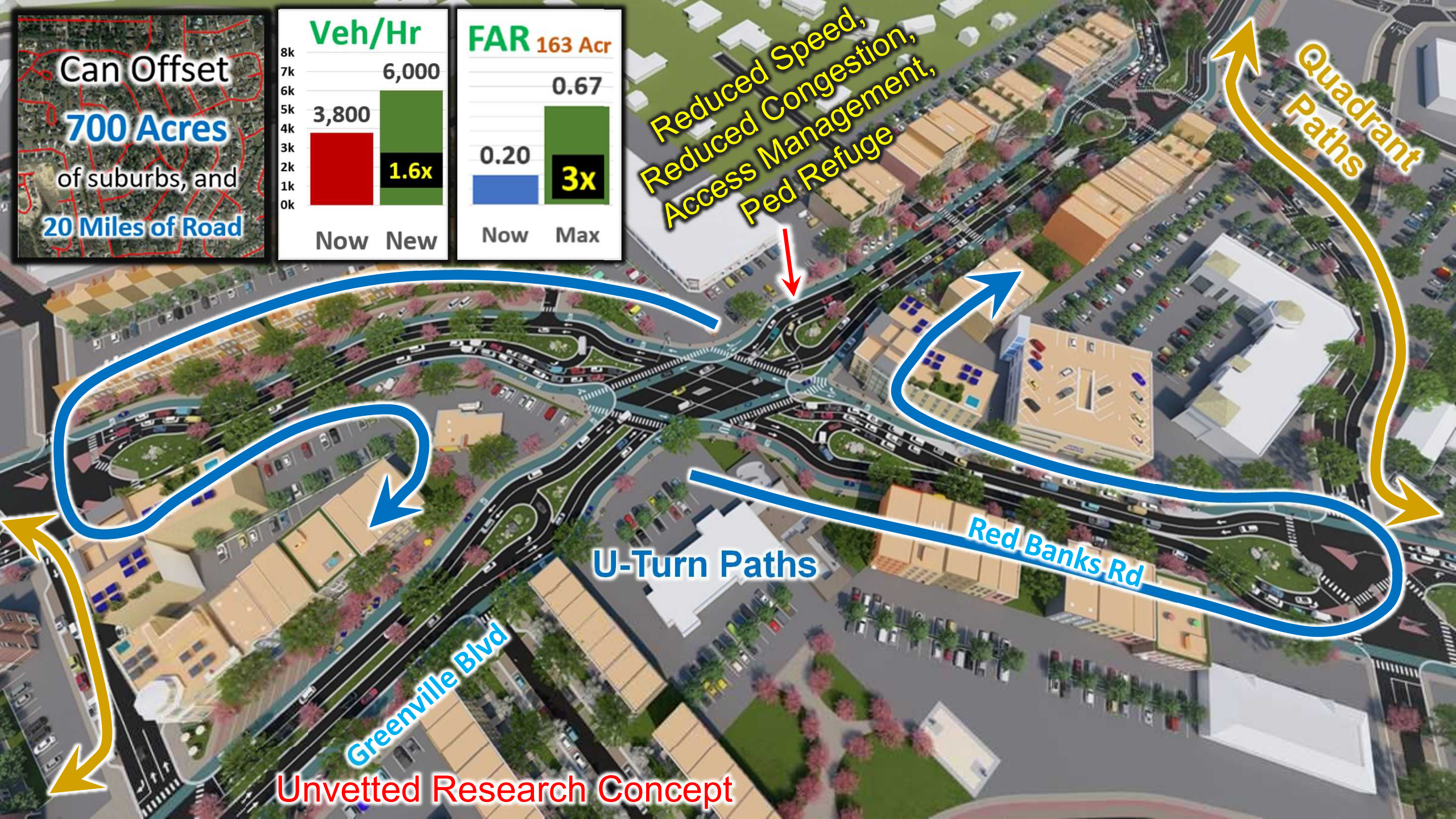

Today
Long Delays,
Very Dangerous
Trucks can’t turn
around

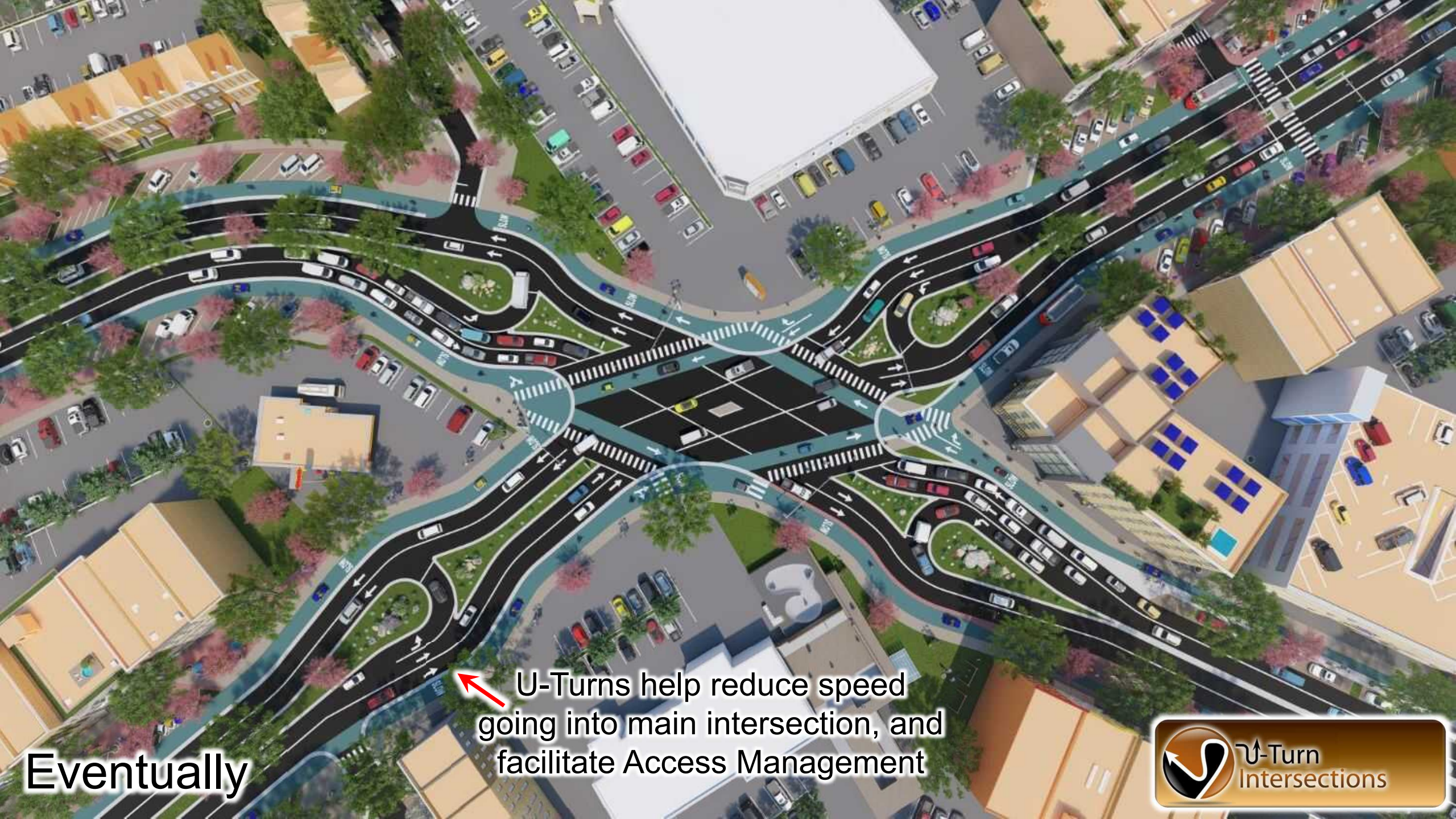

Eventually
Longer Path, but
Faster and Safer
Back door deliveries
Truck
Turnaround
Reverse Angle Parking
Mid-Block Ped Crossing


Longer Path, but
Faster and Safer
Truck
Turnaround
Reverse Angle
Parking
Mid-Block
Ped Crossing
Eventually
U-Turn
Intersections


Eventually
Longer Path, but
Faster and Safer
Truck
Turnaround
Reverse Angle
Parking
Mid-Block
Ped Crossing
Unvetted Research Concept


Can Offset
680 Acres
of suburbs, and
19 Miles of Road
Veh / Hr
8k
7k
6k
5k
4k
3k
2k
1k
0k
3,800
6,000
+58%
Now
New
FAR 163 Acr
0.20
0.67
3x
Now
Max
Quadrant Path
U-Turn Paths
Red Banks Rd
Quadrant
Greenville Blvd
U-Turn Intersections
Quadrant Intersections


Can Offset
700 Acres
of suburbs, and
20 Miles of Road
Veh/Hr
8k
7k
6k
5k
4k
3k
2k
1k
0k
3,800
6,000
1.6x
Now
New
FAR 163 Acr
0.20
0.67
3x
Now
Max
Reduced Speed,
Reduced Congestion,
Access Management,
Ped Refuge
Quadrant
Paths
U-Turn Paths
Red Banks Rd
Greenville Blvd
Unvetted Research Concept


U-Turns help reduce speed going into main intersection, and facilitate Access Management
Eventually
U-Turn Intersections


U-Turn Intersections
Eventually
View Angle
"Bike Speed"
SLOW


SLOW
Designed for big trucks
1.5x more vehicle capacity,
3.0x more building capacity,
680 acres of sprawl offset


Designed
for big
trucks
1.5x more vehicle capacity,
3.0x more building capacity,
680 acres of sprawl offset


Designed
for big
trucks
1.5x more vehicle capacity,
3.0x more building capacity +
680 acres of sprawl offset
Unvetted Research Concept

U-Turn Intersections

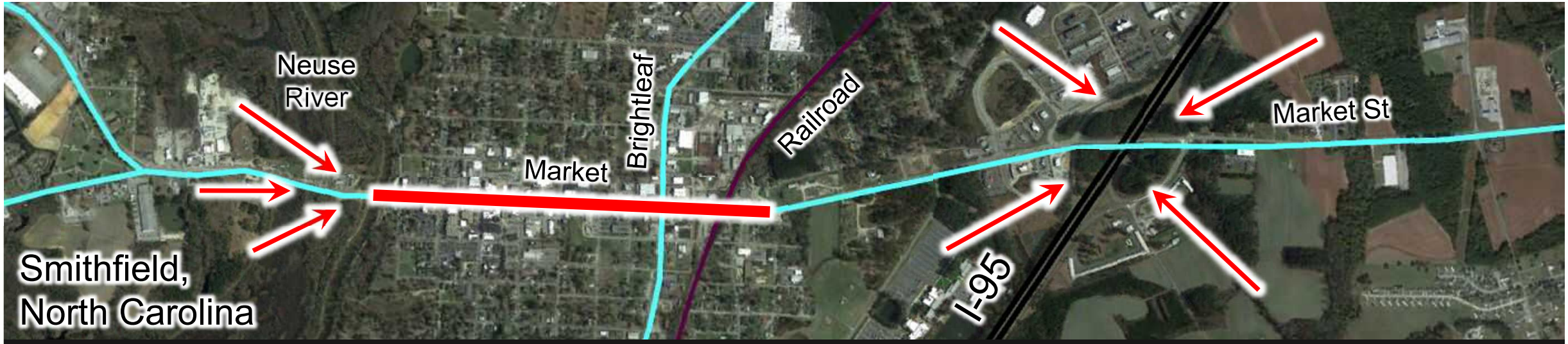

U-Turn
Intersections

One-Way concepts in Smithfield: Historic “Main Street”

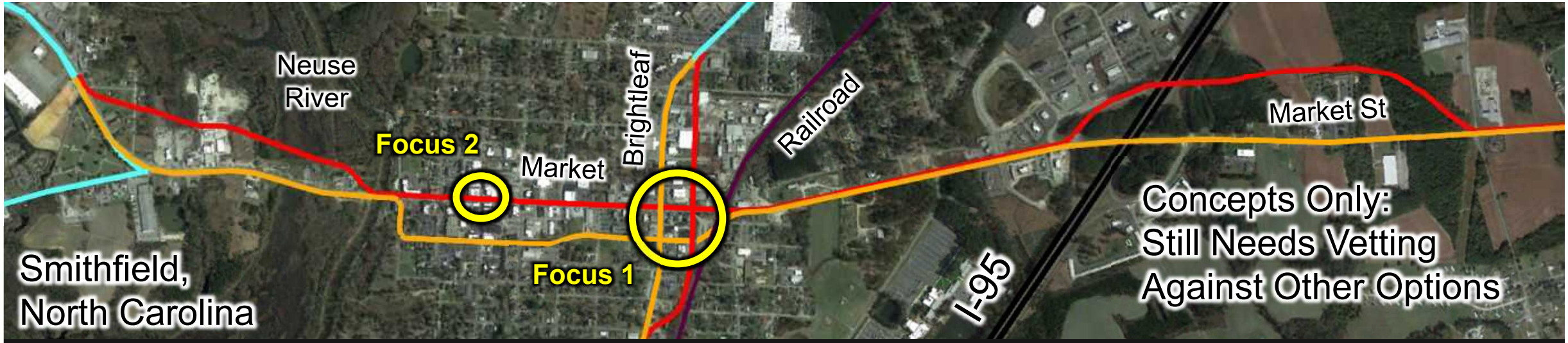
But also imagine them for any small town, or even large cities with “small town” segments.

5-minute target

NC STATE UNIVERSITY NCDOT URBAN Innovators



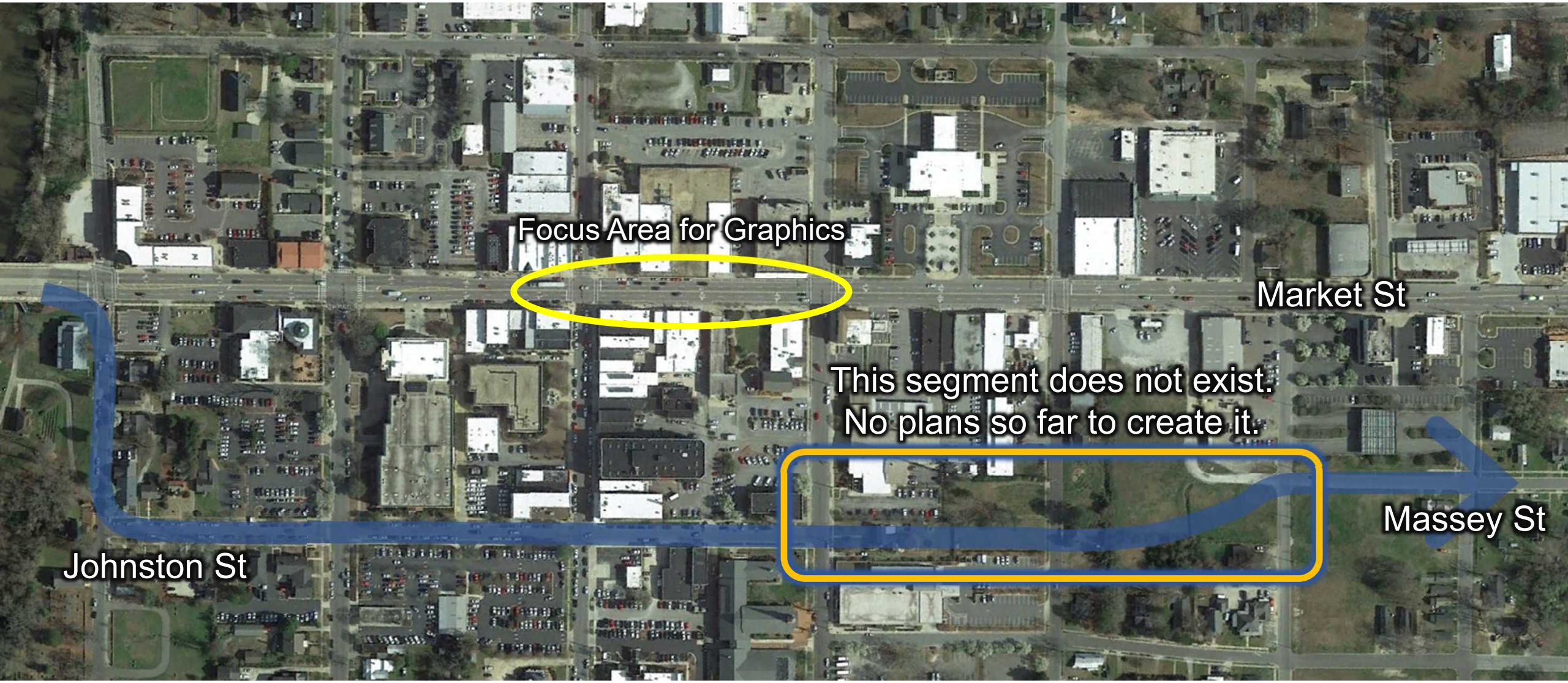
Rare bridge + freeway access means Market Street will remain an overwhelmed Stroad



Dividing into one-ways reduces congestion, improves walkability, + net-positive for economic development.

Market Street as it is today

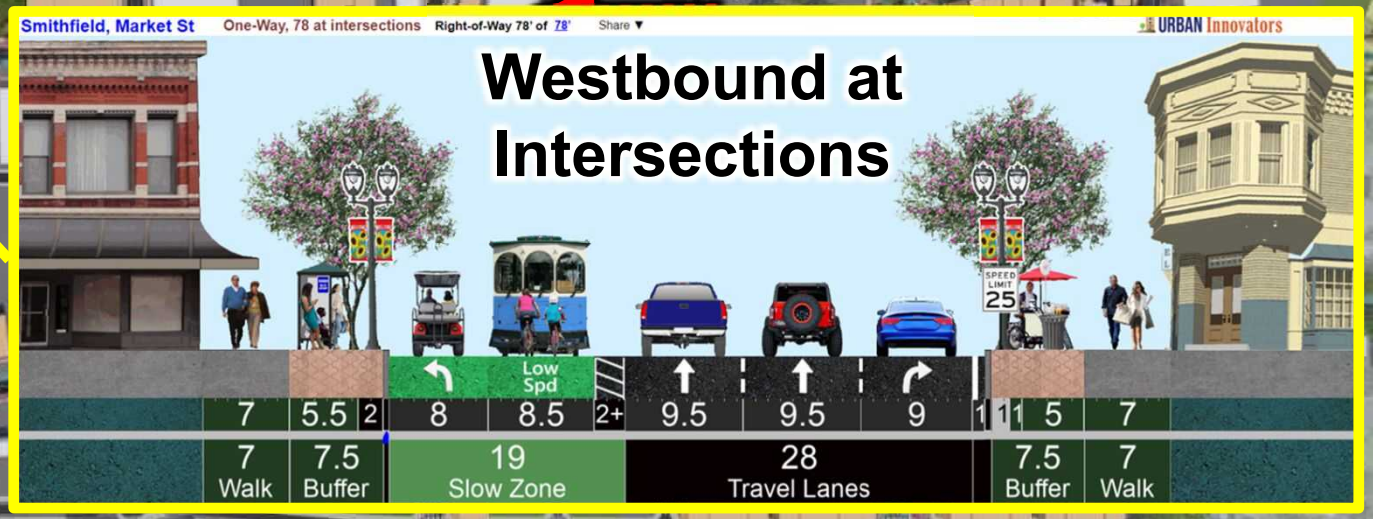
Downtown area today



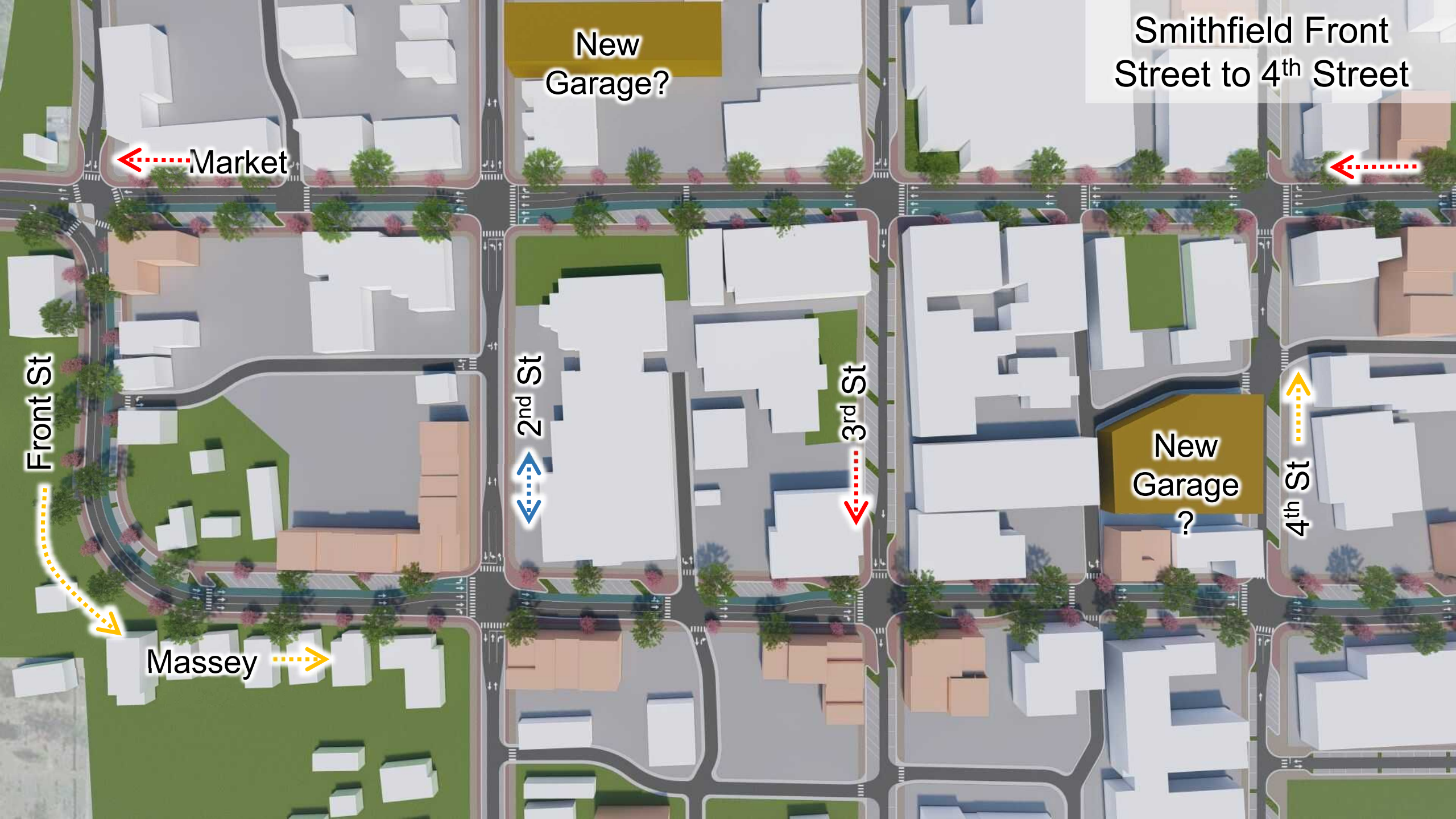
Focus 2 Area

Market St

Johnston / Massey



Smithfield, NC: Unvetted Research Concept


Smithfield Front
Street to 4th Street
New
Garage?
Market
Front St
2nd St
3rd St
New
Garage
?
4th St
Massey

Next Slides were modeled on Smithfield's Market Street, but they have been redesigned for generic use (no references to Smithfield)

“Main Street” environment, with sad two-way Stroad running through it.
Typical speeds: ***35-45 mph (5-10 above limit)***

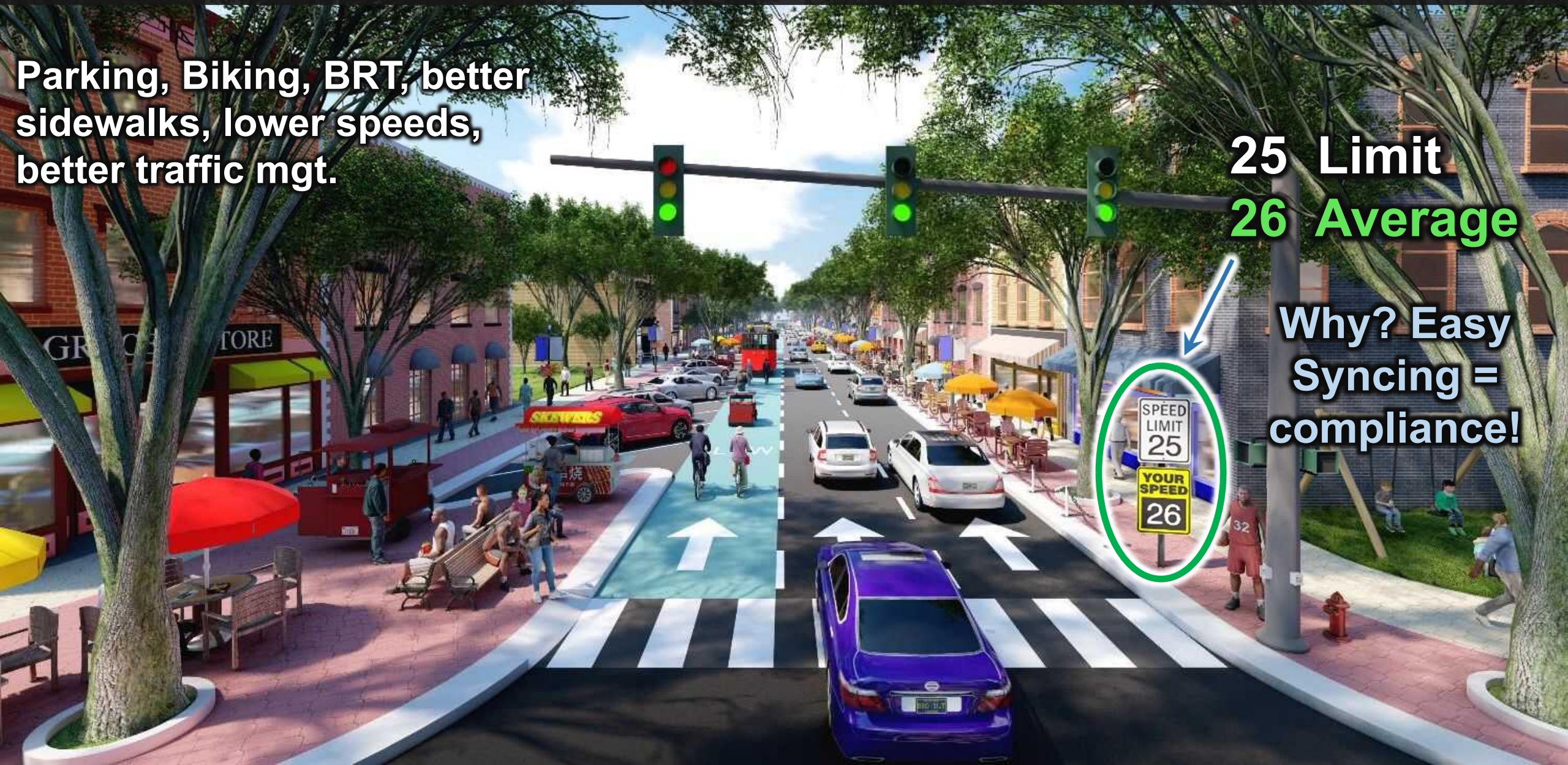
High traffic pressures DOTs to widen in historic areas, often to 5-lanes.
Even with street trees, it is still just a “Nicer Stroad”.

One-Ways handle high traffic, but also create space for alt. modes, parking, transit, premium streetscape. ***Synchronized signals: Drivers obey limit!***


GROCERY STORE
LANE
BRT
LANE
BIKE
SPEED LIMIT 25
YOUR SPEED 26

- Next slide designed with Slow Lane

One-Ways handle high traffic, but also create space for alt. modes, parking, transit, premium streetscape. ***Synchronized signals:*** ***Drivers obey limit!***



- Top Views

Four-Lanes with Parking (Typical of Many Small-Town “Main Streets”)


Five Lanes, No Parking: When traffic gets bad enough, DOTs often remove on-street parking

Reconfigured with One-Ways Less Congested; Space for Placemaking Features

Similar, but with Angle Parking and “Slow Lane” for Bikes, NEVs, Transit, Parking Access

Target: 3-min

Smithfield Near UNC-Johnston Hospital

Combination of Quadrant, U-Turn, and One-Way


Quadrant Intersections
U-Turn Intersections
One-Way Split Intersections
UNC Johnston Hospital
Unvetted Research Concept
Low-volume 3-phase with U-Turns for access control, traffic calming, resiliency.
Low-volume 3-phase
2-ph w/ped refuge
Brightleaf Blvd
9th Street
"Medical Residential" activated by design


Quadrant Intersections
U-Turn Intersections
One-Way Split Intersections
UNC Johnston Hospital
Unvetted Research Concept
Low-volume 3-phase with U-Turns for access control, traffic calming, resiliency.
Low-volume 3-phase
2-ph w/ped refuge
Brightleaf Blvd
9th Street
"Medical Residential" activated by design


Quadrant Intersections
U-Turn Intersections
Resiliency: Additional path options for lefts


Quadrant
Intersections
U-Turn
Intersections

Crossing One-Way concepts in Smithfield: “Town Square”

But also imagine them for Raleigh, Charlotte, or “Anywhere, USA”

5-minute target

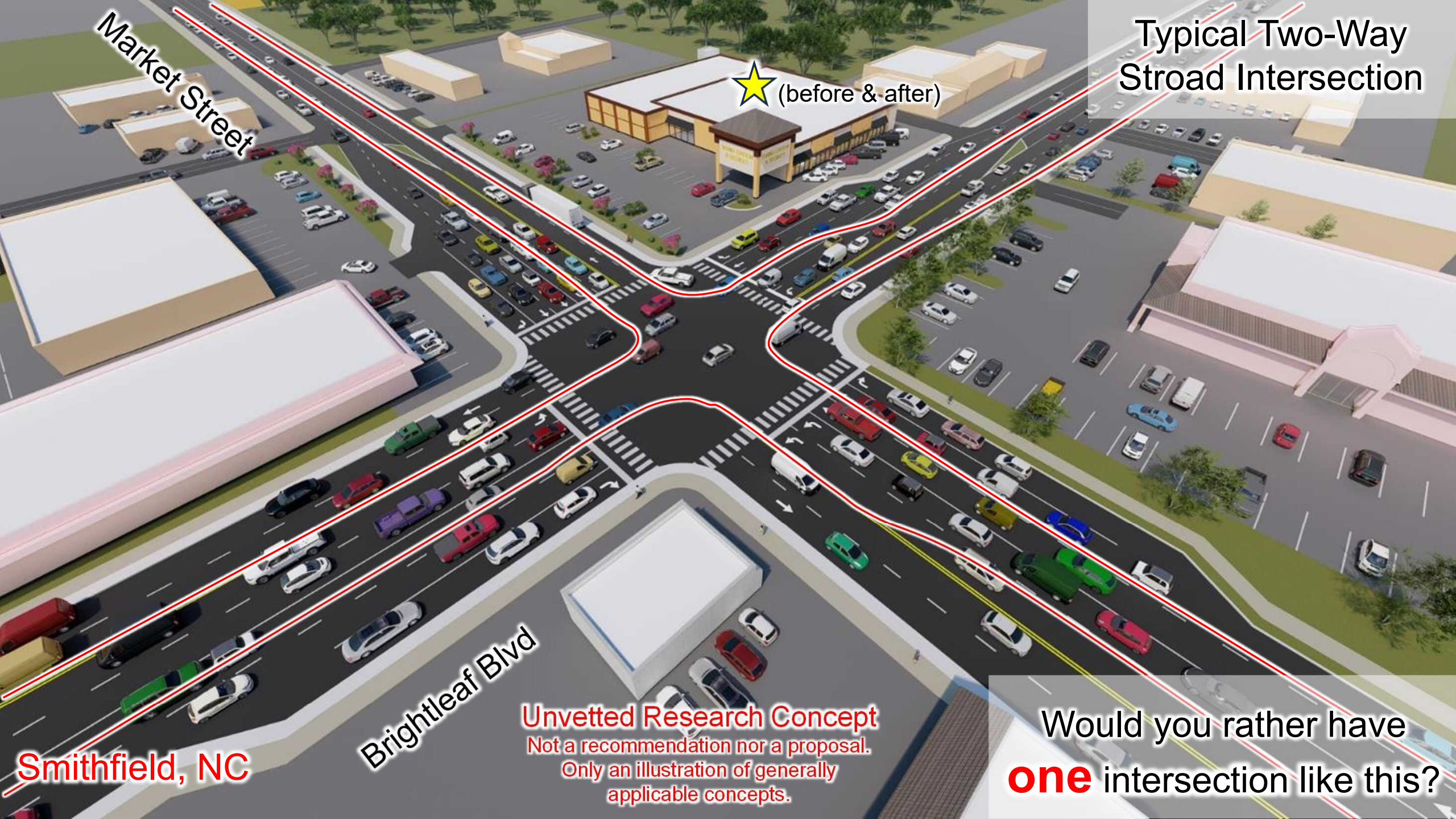
NC STATE UNIVERSITY

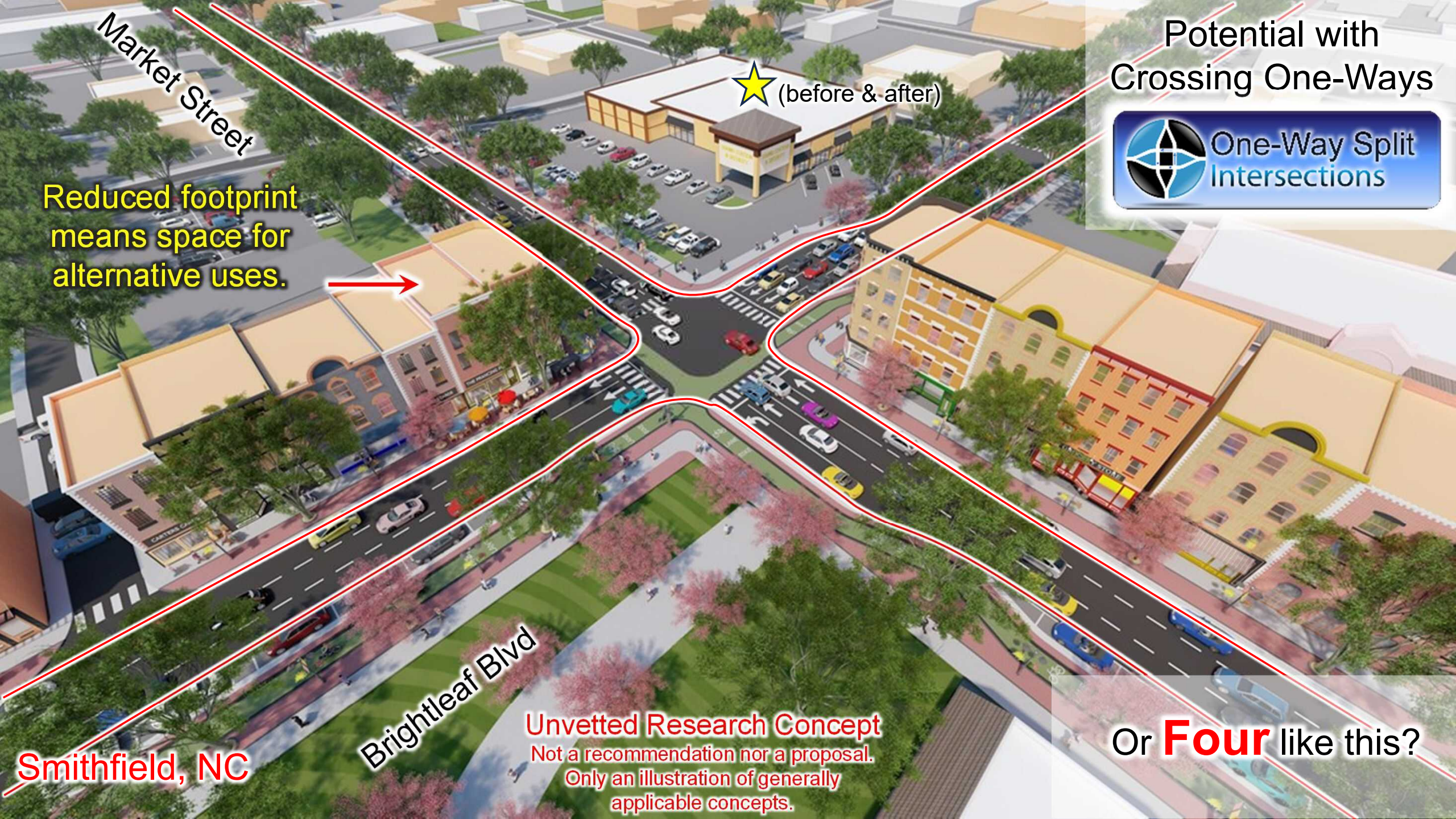
Focus Area #2

"One-Way Split Intersection"

* Unvetted Research Concept


Market
Brightleaf
Massey
9th
Smithfield, NC
Unvetted Research Concept

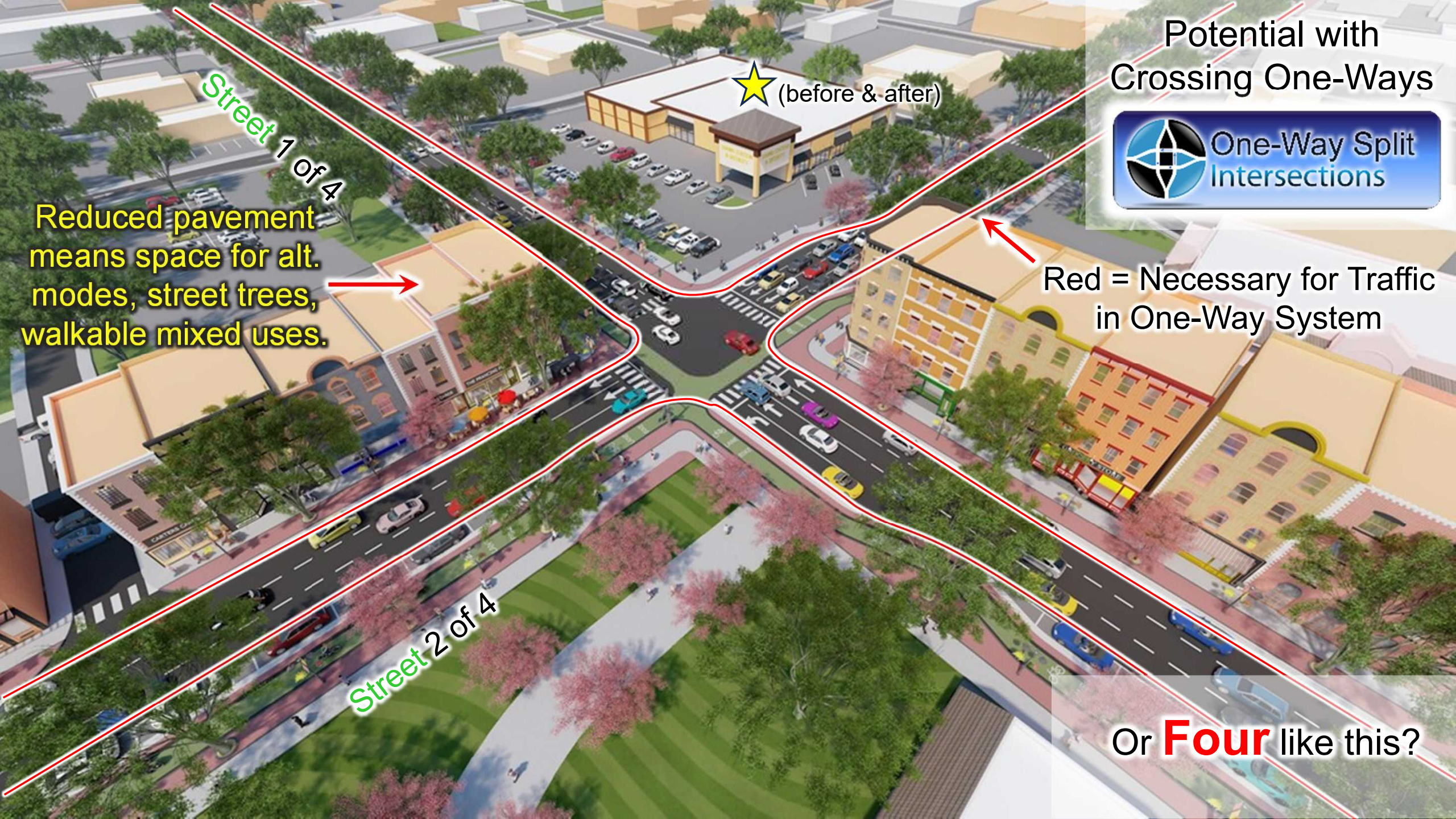

Market Street
(before & after)
Typical Two-Way
Stroad Intersection
Brightleaf Blvd
Unvetted Research Concept
Not a recommendation nor a proposal.
Only an illustration of generally
applicable concepts.
Smithfield, NC
Would you rather have
one intersection like this?

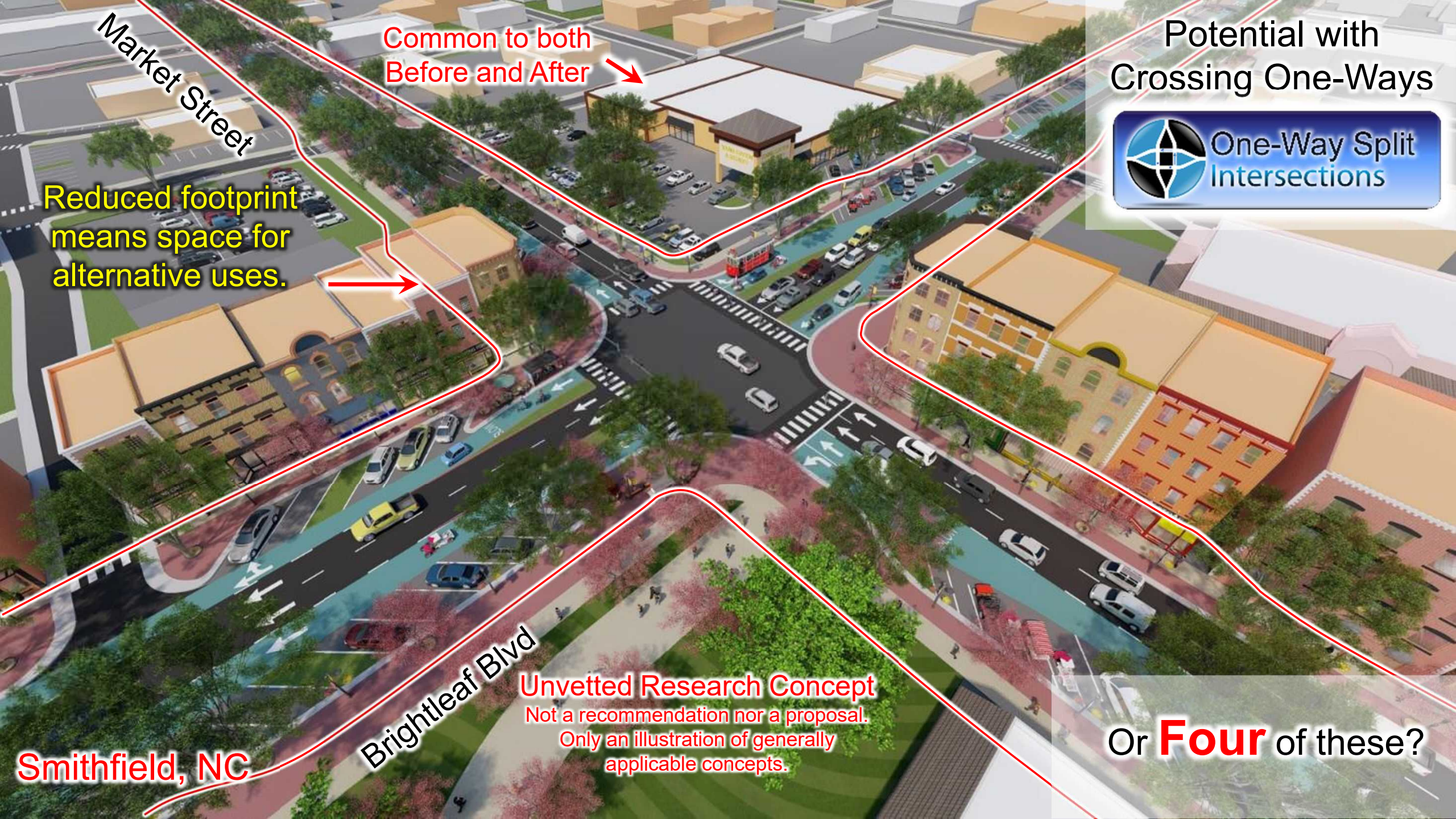

Market Street
(before & after)
Potential with
Crossing One-Ways
One-Way Split
Intersections
Reduced footprint
means space for
alternative uses.
Brightleaf Blvd
Unvetted Research Concept
Not a recommendation nor a proposal.
Only an illustration of generally
applicable concepts.
Smithfield, NC
Or Four like this?

- Same as before, but text removes all references to Smithfield so it can be easily applied for generic situations.
- Smithfield graphics retained in case NCDOT or anyone wants to reference that or otherwise look into the idea for application there.


SB
WB
EB
NB
The Magic of One-Way
Split Intersections!


Typical Two-Way
Stroad Intersection
One-Way Split
Intersections
(before & after)
Stroad 1 of 2
Red = Necessary for Traffic
in One-Way System
Stroad 2 of 2
Would you rather have
one intersection like this?

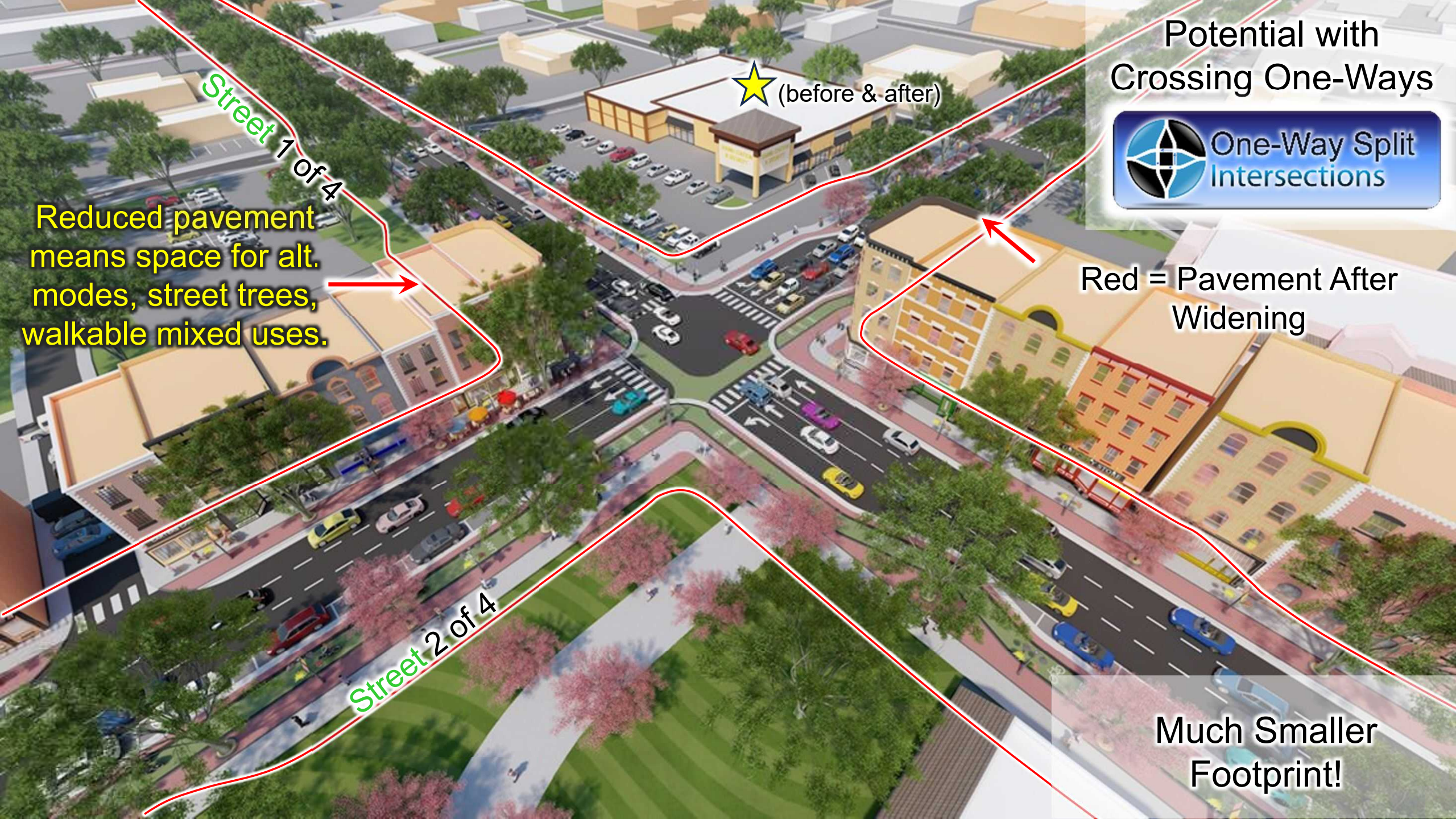

Potential with
Crossing One-Ways
One-Way Split
Intersections
(before & after)
Street 1 of 4
Reduced pavement
means space for alt.
modes, street trees,
walkable mixed uses.
Red = Necessary for Traffic
in One-Way System
Street 2 of 4
Or Four like this?


Market Street
Common to both
Before and After
Potential with
Crossing One-Ways
One-Way Split
Intersections
Reduced footprint
means space for
alternative uses.
Brightleaf Blvd
Unvetted Research Concept
Not a recommendation nor a proposal.
Only an illustration of generally
applicable concepts.
Smithfield, NC
Or Four of these?

Next slides show how DOTs are often forced into widenings that make the Stroad situation even worse!


Two-Way Stroad Intersection
Single Lefts, No Right Pockets
(before & after)
Stroad 1 of 2
Red = Pavement After Widening
Stroad 2 of 2
DOTs often make Stroads even bigger! Try One-Ways!


Two-Way Stroad Intersection
Double Lefts, Right Pockets
(before & after)
Red = Pavement After Widening
Stroad 1 of 2
Stroad 2 of 2
DOTs often make Stroads even bigger! Try One-Ways!

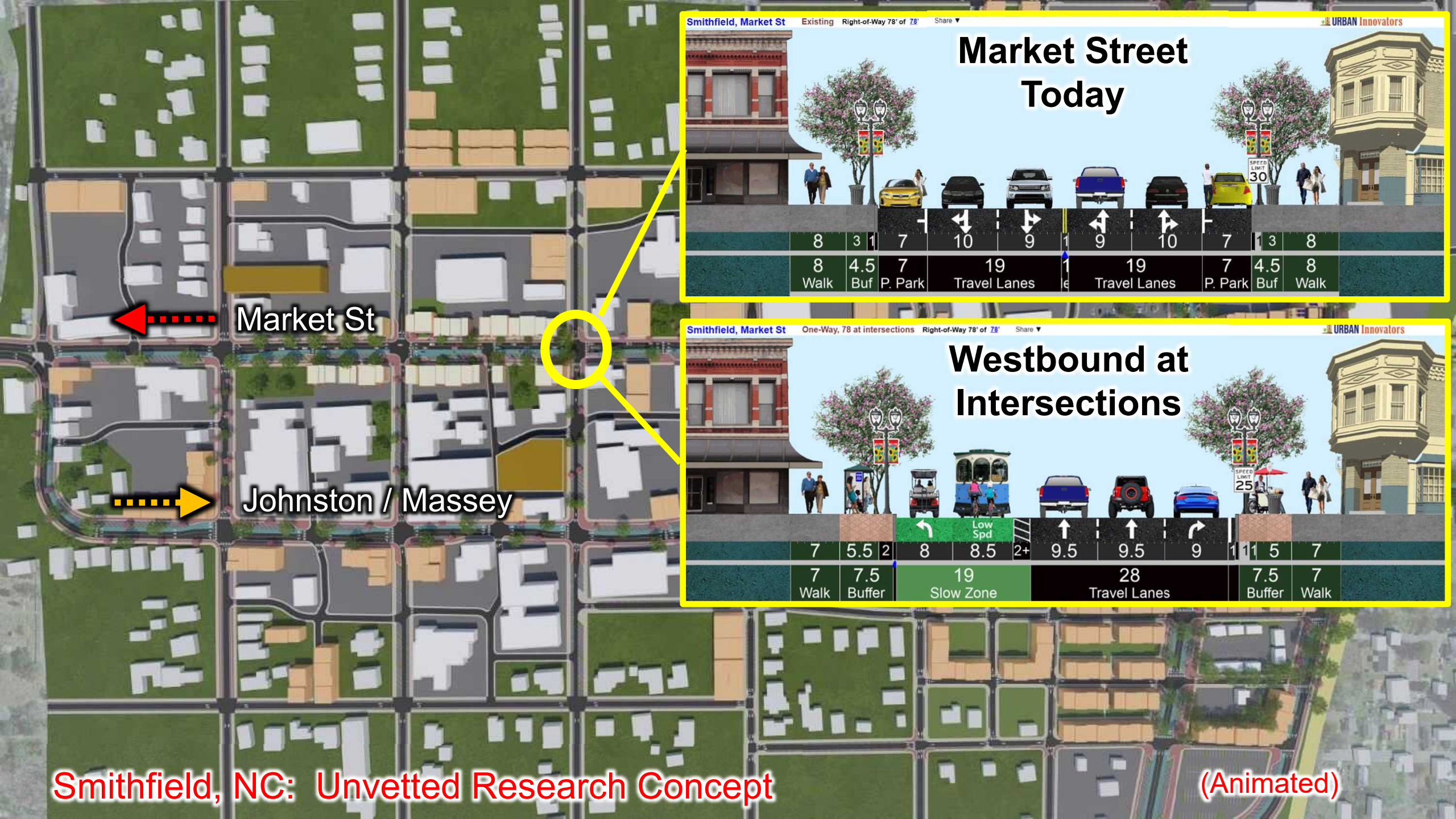

Potential with Crossing One-Ways
One-Way Split Intersections
(before & after)
Street 1 of 4
Reduced pavement means space for alt. modes, street trees, walkable mixed uses.
Red = Pavement After Widening
Street 2 of 4
Much Smaller Footprint!

- Next slides designed with Slow Lane


BIKE
S PONY


Pharmacy


Market St
Johnston / Massey
Smithfield, Market St
Existing
Right-of-Way 78' of 78'
Share
URBAN Innovators
Market Street
Today
8 Walk
4.5 Buf
7 P. Park
19 Travel Lanes
19 Travel Lanes
7 P. Park
4.5 Buf
8 Walk
Smithfield, Market St
One-Way, 78 Between Intersections
Right-of-Way 78' of 78'
As One-Way
Westbound
7 Walk
7.5 Buffer
28.5 Slow + Parking
19 Travel Lanes
7.5 Buffer
7 Walk
Smithfield, NC: Unvetted Research Concept
(Animated)


Market St
Johnston / Massey
Smithfield, Market St
Existing
Right-of-Way 78' of 78'
Share
URBAN Innovators
Market Street Today
8 3 1 7 10 9 1 9 10 7 1 3 8
8 Walk
4.5 Buf
7 P. Park
19 Travel Lanes
19 Travel Lanes
7 P. Park
4.5 Buf
8 Walk
Smithfield, Market St
One-Way, 78 at intersections
Right-of-Way 78' of 78'
Share
URBAN Innovators
Westbound at Intersections
Low Spd
7 5.5 2 8 8.5 2+ 9.5 9.5 9 1 1 5 7
7 Walk
7.5 Buffer
19 Slow Zone
28 Travel Lanes
7.5 Buffer
7 Walk
Smithfield, NC: Unvetted Research Concept
(Animated)

Without footprint outlines

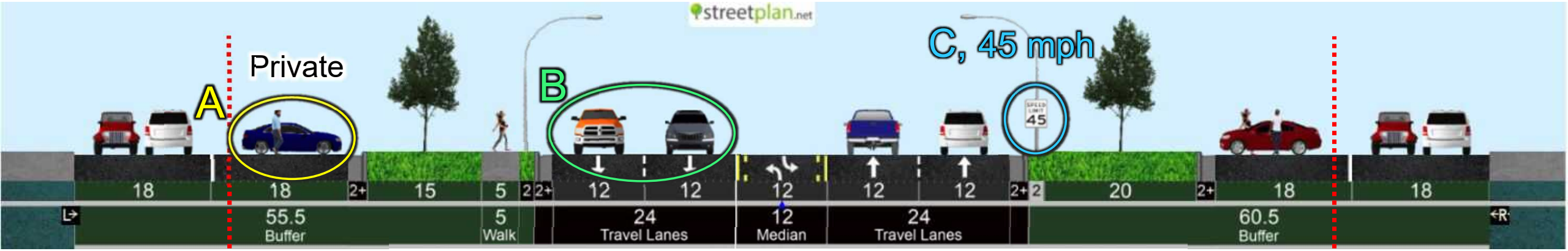

Market Street
Today:
Smithfield, NC
Single Left,
Shared Right
Brightleaf Blvd
Unvetted Research Concepts
Not a recommendation nor a proposal.
Only an illustration of generally
applicable concepts.
Smithfield, NC


Market Street
Brightleaf Blvd
Common Default
“Upgrade” to
Double Lefts,
Dedicated Rights
Unvetted Research Concepts
Not a recommendation nor a proposal.
Only an illustration of generally
applicable concepts.
Smithfield, NC
Would you rather default
to one of these?


Market Street
Common to
Before and After
Potential with
Crossing One-Ways
One-Way Split
Intersections
Brightleaf Blvd
Unvetted Research Concepts
Not a recommendation nor a proposal.
Only an illustration of generally
applicable concepts.
Smithfield, NC
Or aim for
Four of these?

Keeper Cross Section Diagrams

Two-Way w/Private Parking to 145-ft One-Way w/public parking



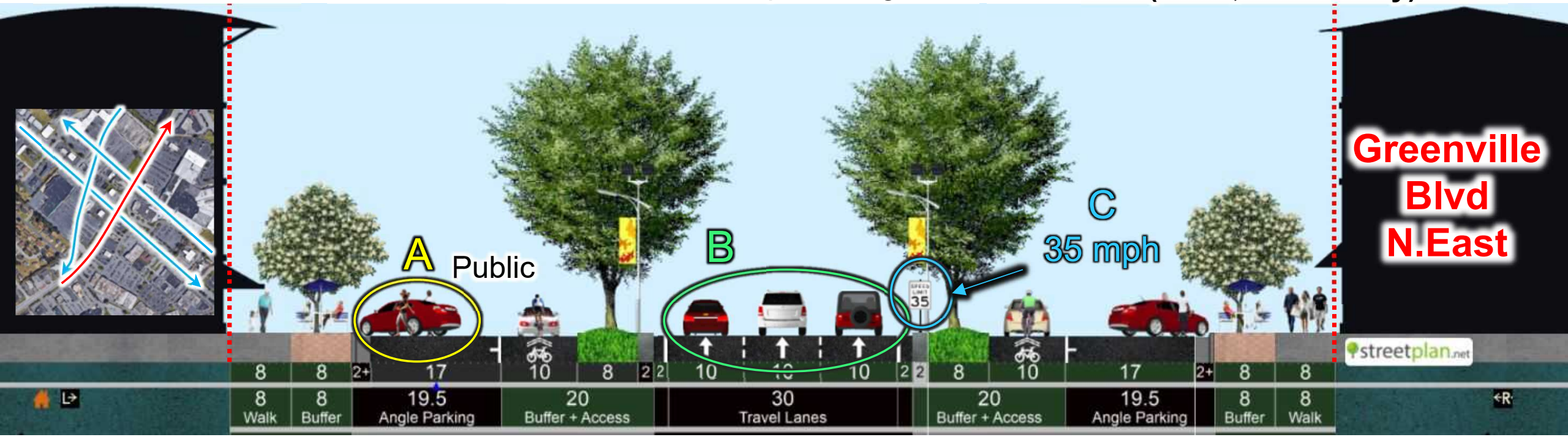
145 Feet: How to make this much space walkable?

A Similar parking before and after

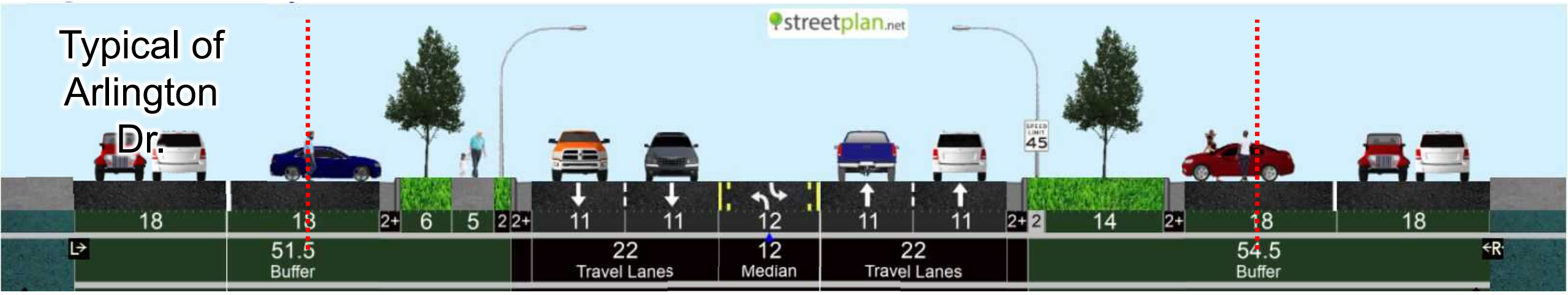
B More Capacity

Before: 2-lanes, 4-phase signals
After: 3-lanes, 2&3-phase signals

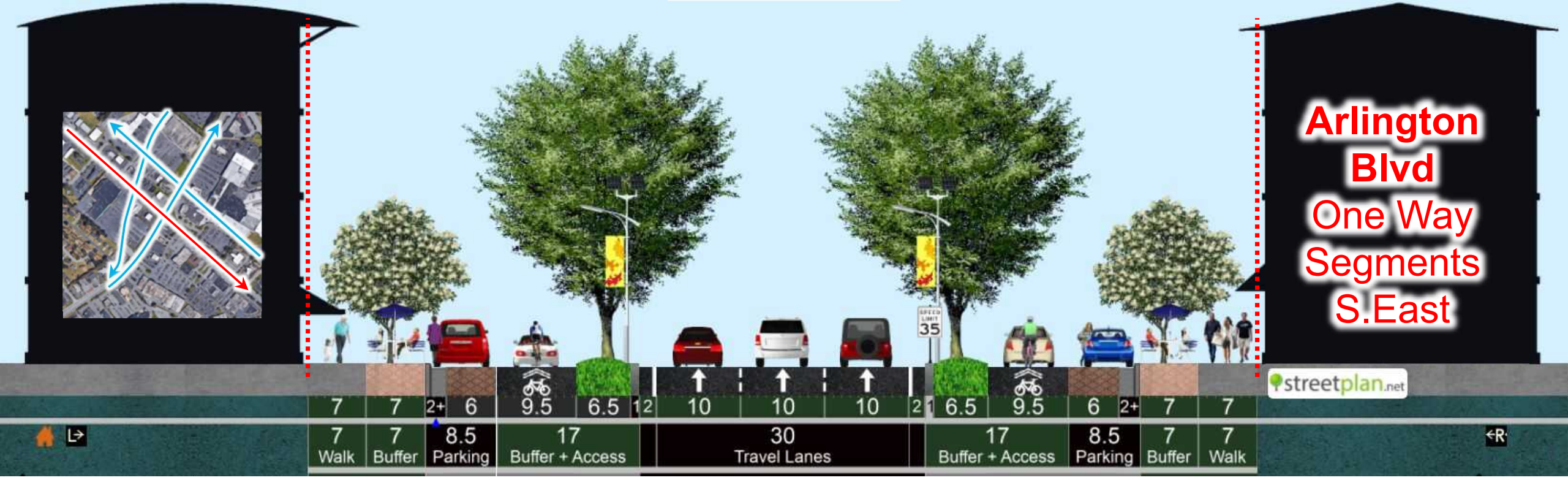
C **Drive Slower, *Travel Faster!* (Safer, Less Delay)**



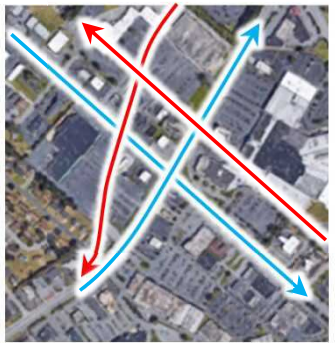
Two-Way w/Private Parking to 113-ft One-Way w/parallel parking

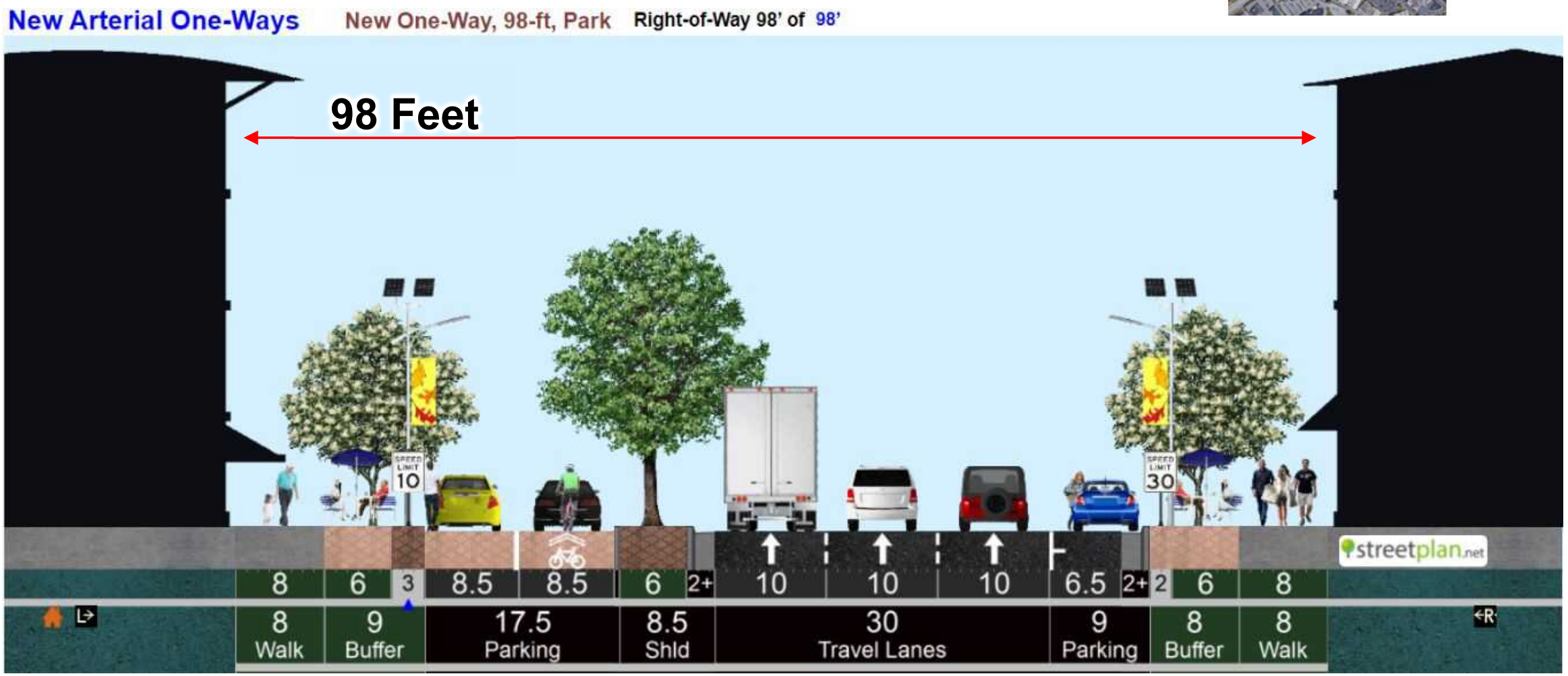


113 Feet



Concept for Two New 98-ft One-Ways (NW and SW) via parking lots, mall





Misc. Keepers

Hide if too long

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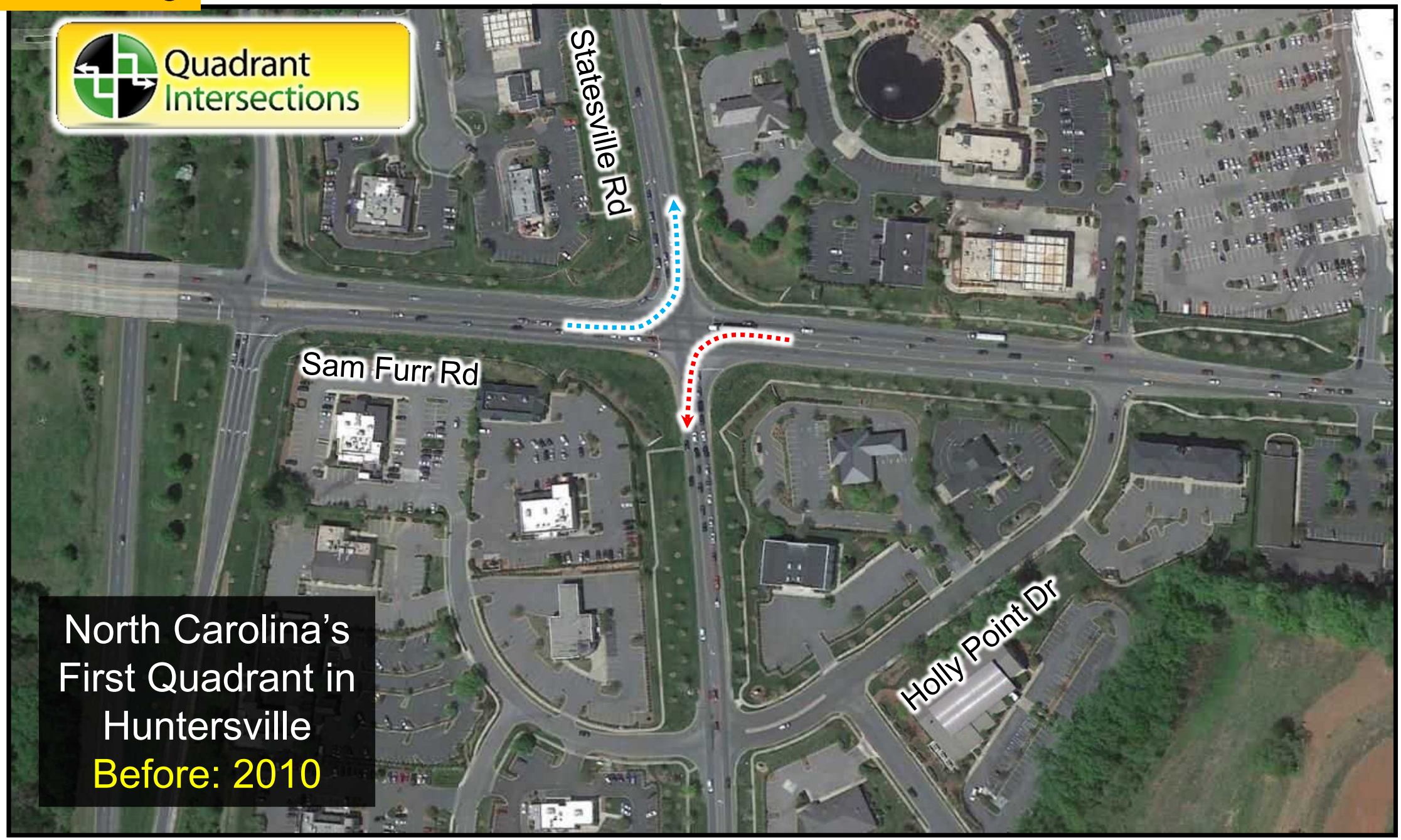
NCDOT

URBAN Innovators



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URBAN Innovators

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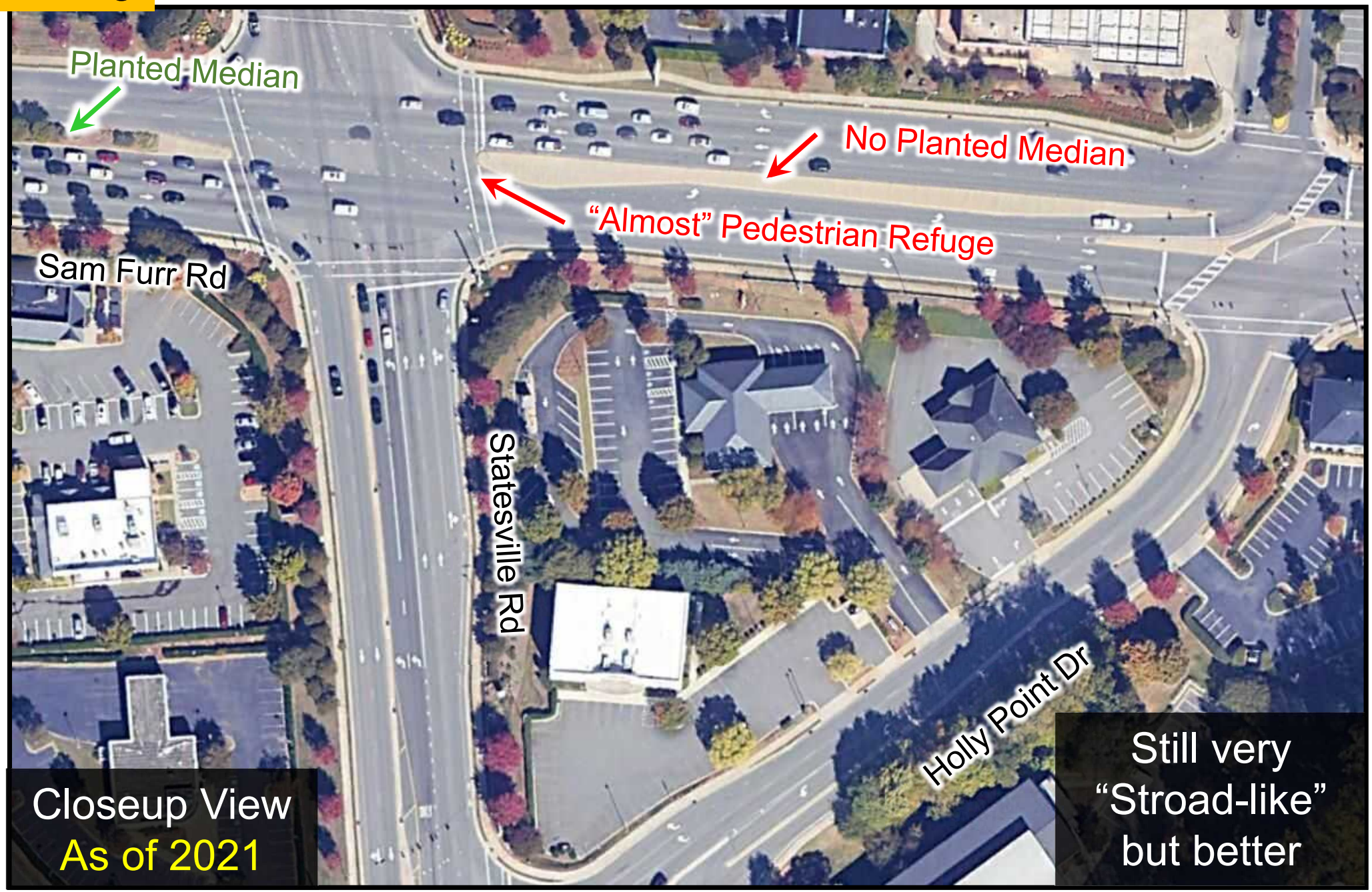
URBAN Innovators



MPO Superpowers: Funding Prioritization

Encourage Stroad transforming design with policies in the Regional Transportation Plan (RTP) such as:

- Walkable small-area plans receive **infrastructure funding priority** in the Transportation Improvement Program (TIP) for federal and NCDOT funds.
- More “points” if the plan includes bone-structure Placemaking Alternative Intersection improvements that are likely to reduce overall infrastructure costs
  - By attracting infill development, which reduces sprawl.