I-84 HARTFORD PROJECT

I-84 Hartford Project
&
I-84/I-91 Interchange Study

Briefing to Regional Municipalities

March 8, 2016

Meeting Overview

1. Introductions
2. I-84 Hartford Project Presentation
3. Discussion
4. I-84/I-91 Interchange Study Presentation
5. Discussion

Where is the I-84 Hartford Project?

I-84 Mainline Crosses RR Twice

Currently 80% of highway is elevated (30 acres)

Orange = elevated or structure

I-84 HARTFORD PROJECT

I-84 Project background

- Rail line built in 1830s
- East-west expressway – 1940s/50s
- I-84 built in 1960s
  - Designed to avoid impacting rail
  - Prior to NEPA
- Soon realized effect on Hartford not all positive
- Now, have opportunity to rethink the previous design

"The impact of the I-84 freeway upon the physical environments into which it was introduced has been both dramatic and overwhelming." - 1970 CTDOT & FHWA

Why is it Needed?

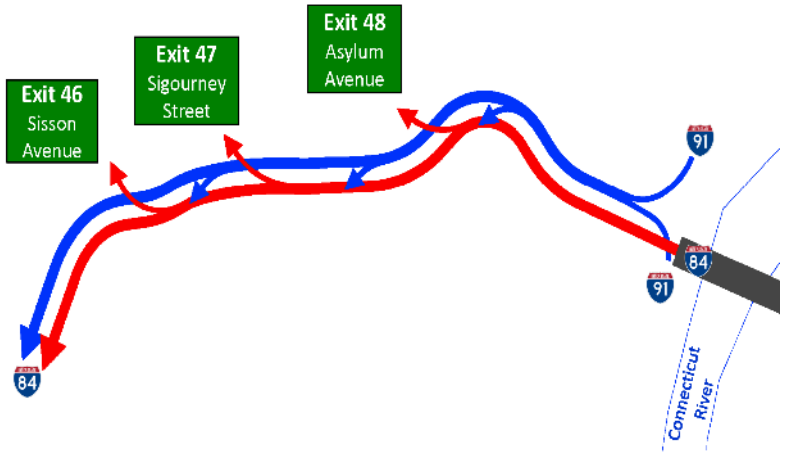
- Bridge structural deficiencies
- Operational and safety deficiencies
- Mobility deficiencies

Bridge Structures (Viaduct)

- Reaching end of lifespan
- Cost of repairs = $60M since 2004
- An additional $80M over next 5 years
- Bridges are safe; deterioration will continue

Operations and Safety

- Eight full / partial interchanges
- Weaves
- Lane drops
- Sharp curves
- High crash rates



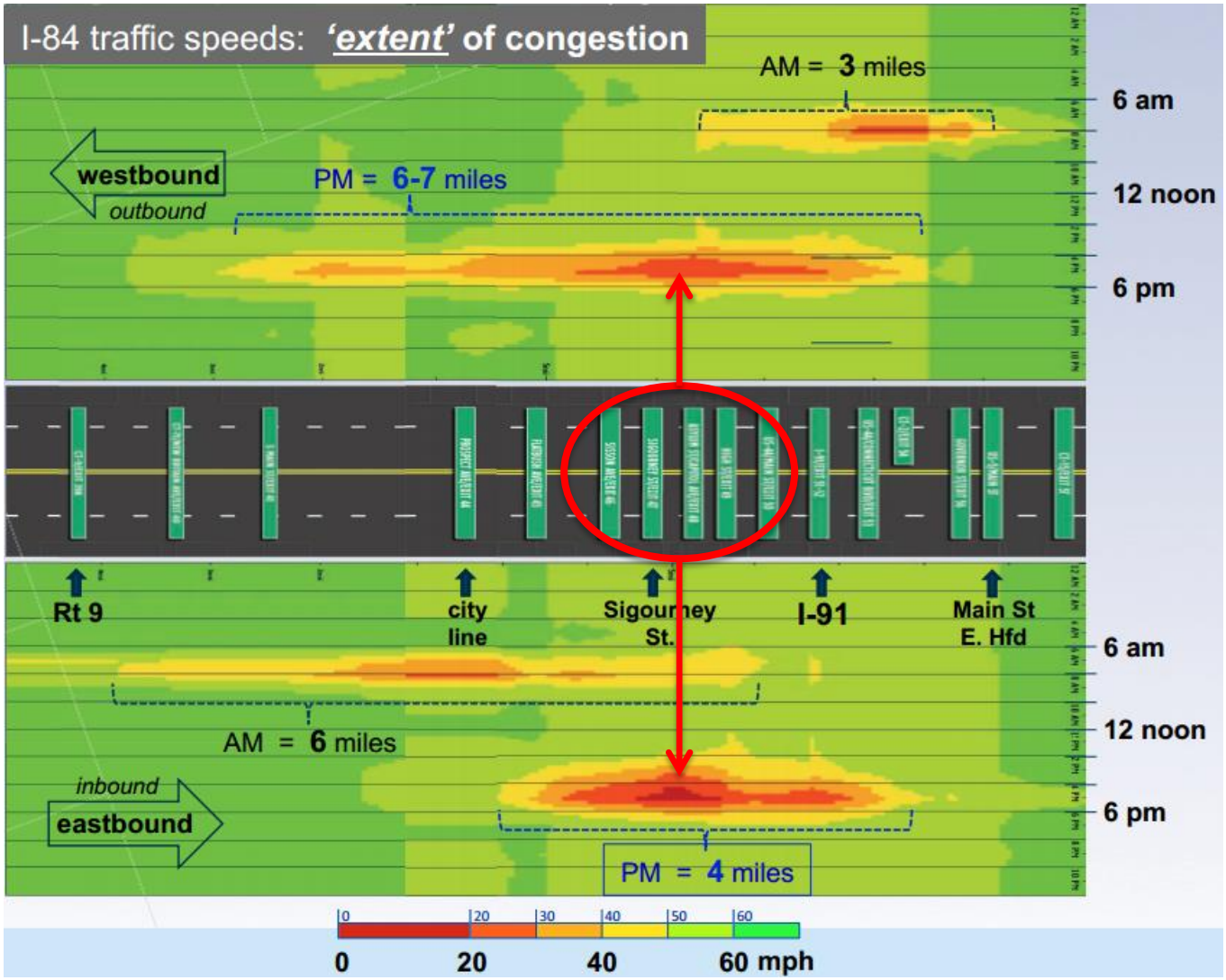
Mobility: Moving People and Goods

- Designed for 55,000 vehicles per day
- Carries 175,000 vehicles per day
- Freight volumes are above national average

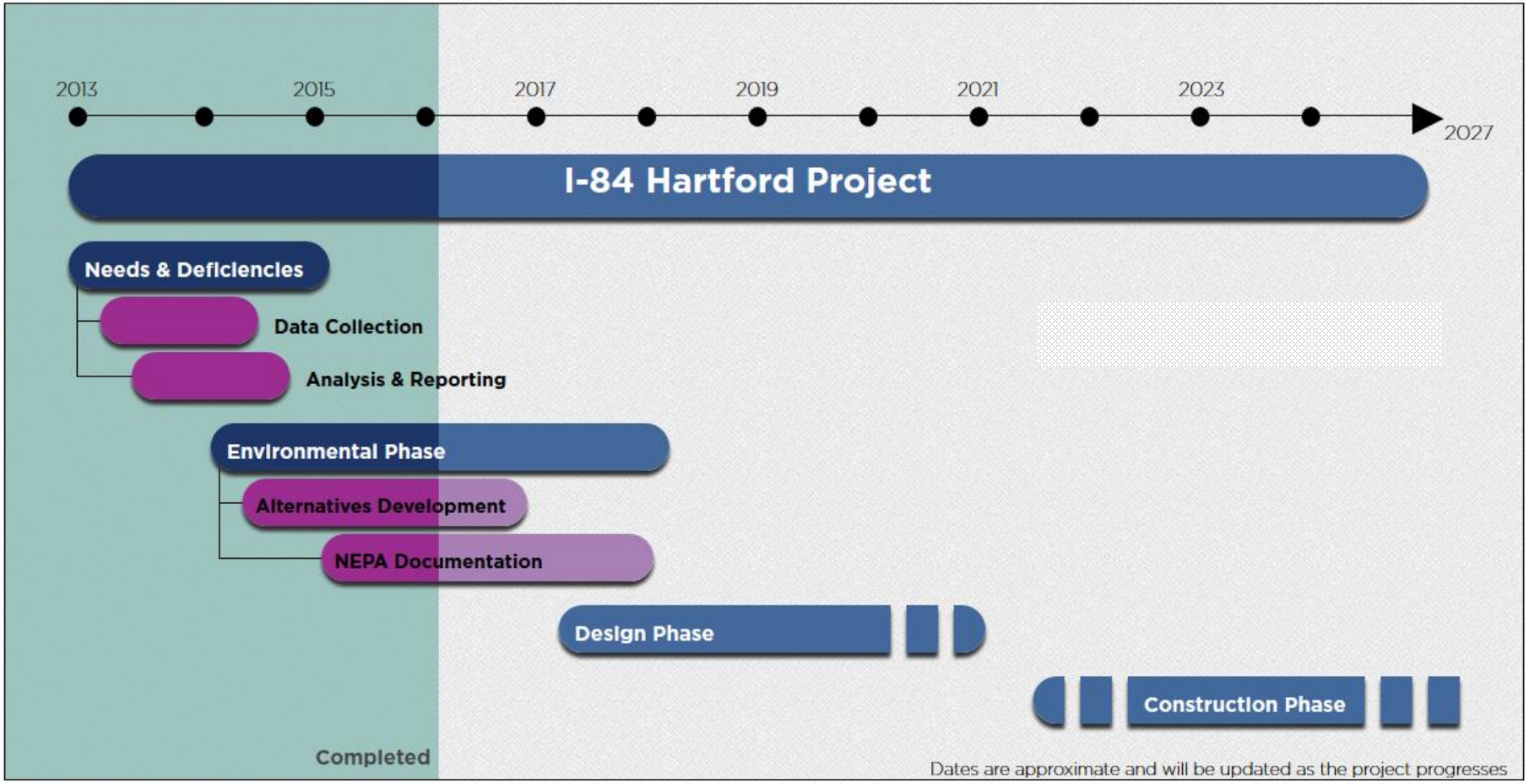
Mobility: Moving People and Goods

- Improved pedestrian and bicyclist connections
- Transit, parking are also considerations

Traffic Congestion



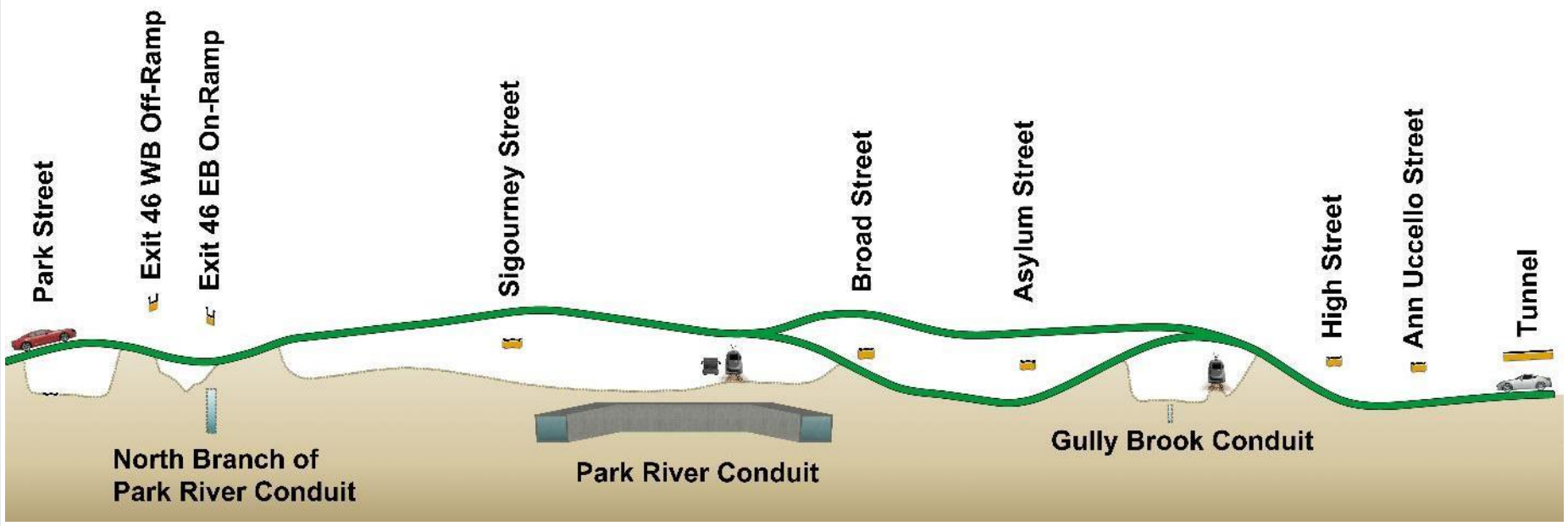
Project Schedule



Alternatives & Screening Process

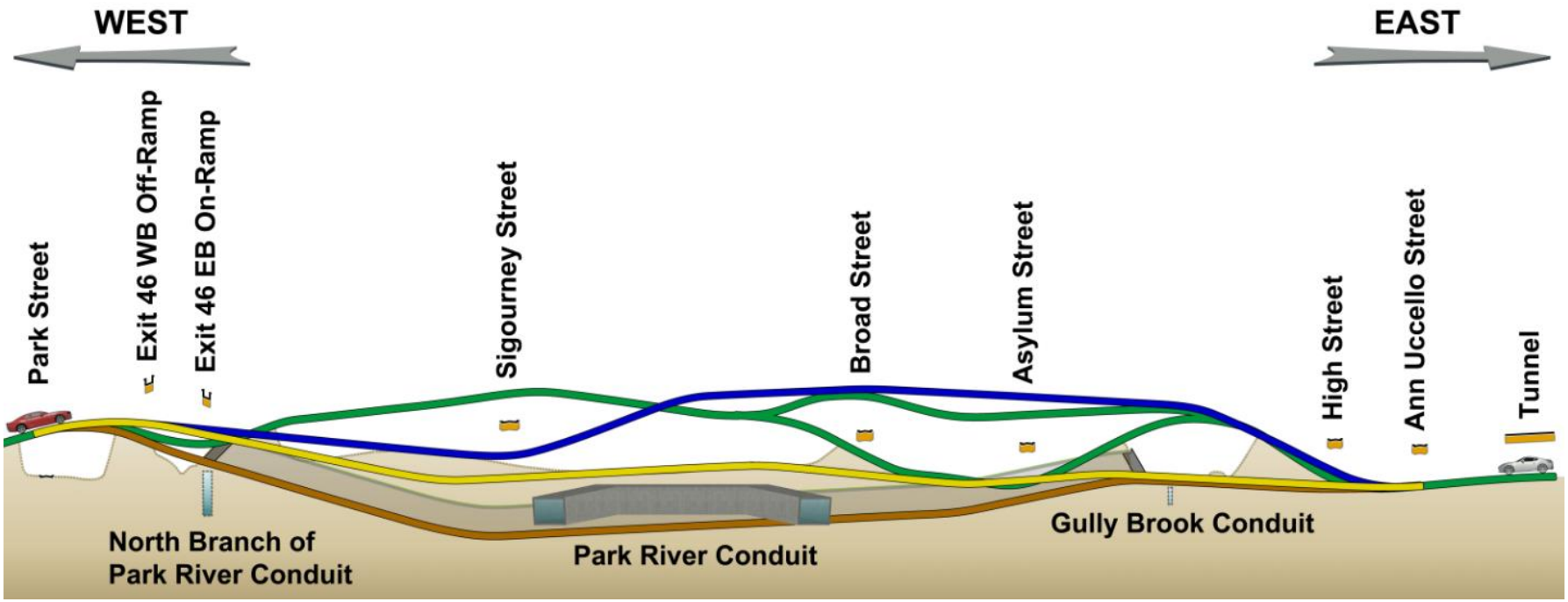
Mainline Alternatives

- Alternative 1: No Build
- Alternative 2: (Elevated Highway)
- Alternative 3: (Lowered Highway)
- Alternative 4: (Tunneled Highway)

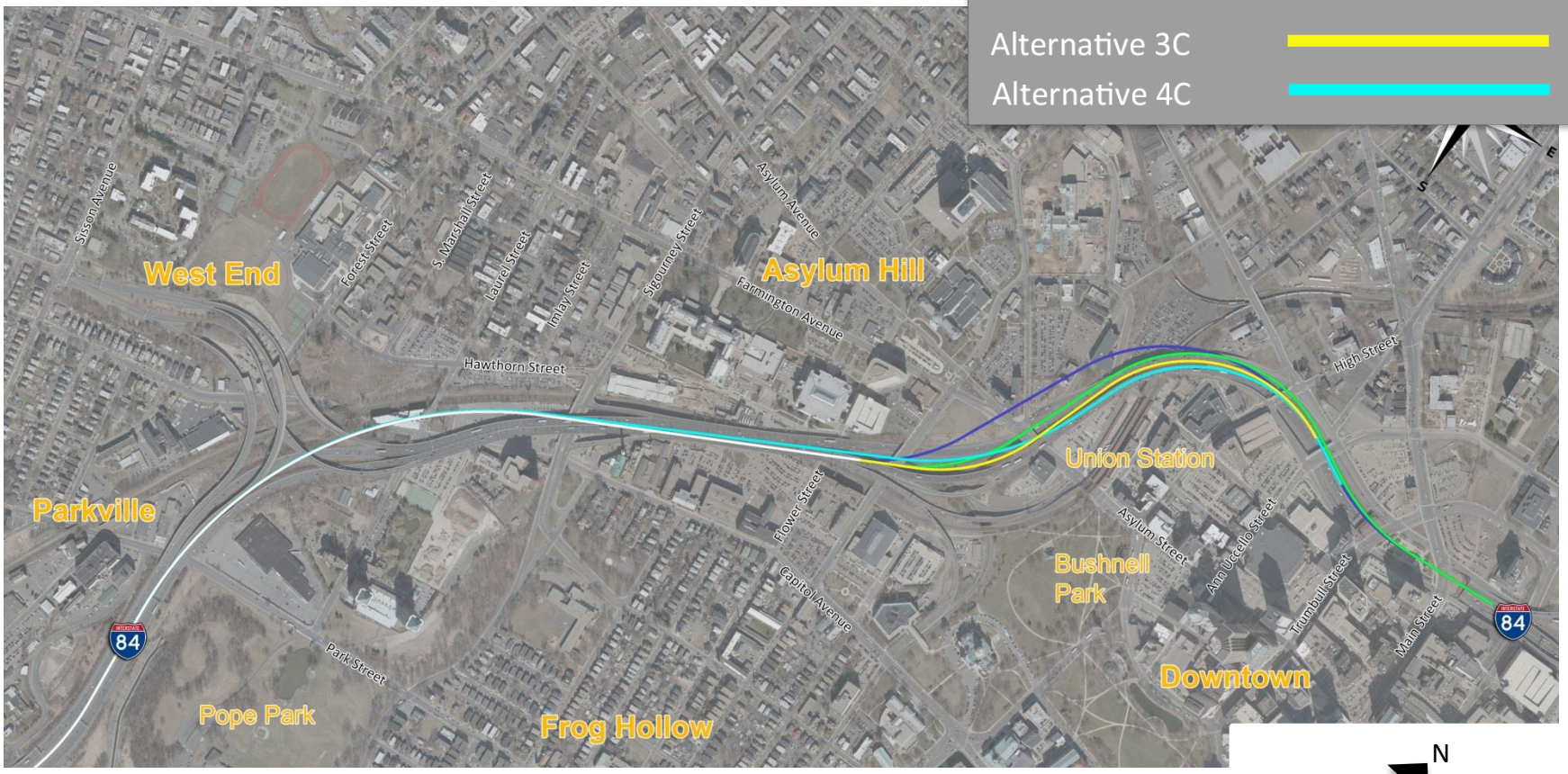


Mainline Alternatives

- Alternative 1(No-Build) Green
- Alternative 2 (Elevated) Blue
- Alternative 3 (Lowered) Yellow
- Alternative 4 (Tunnel) Brown

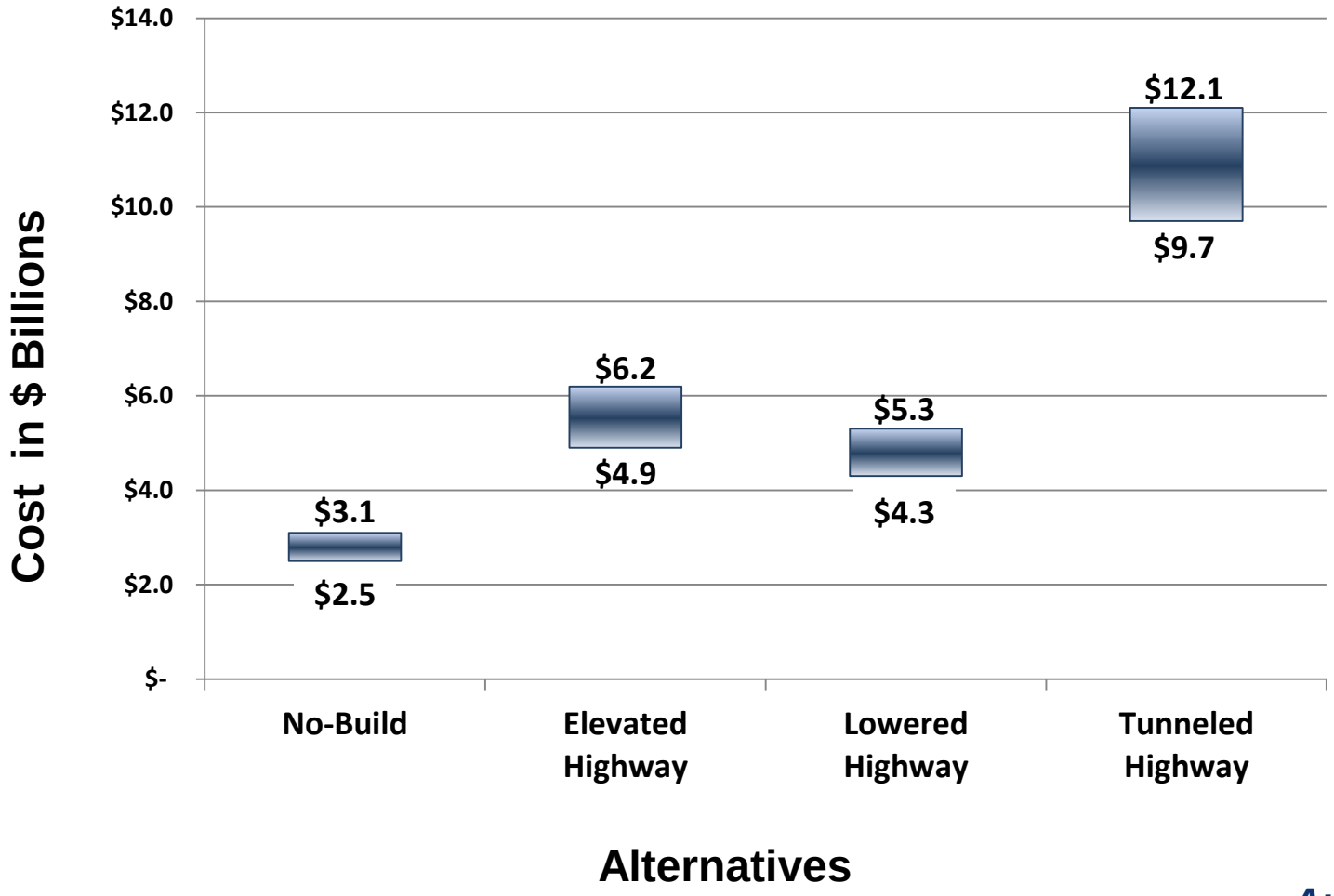


Mainline Alternatives



Various Ramp Options

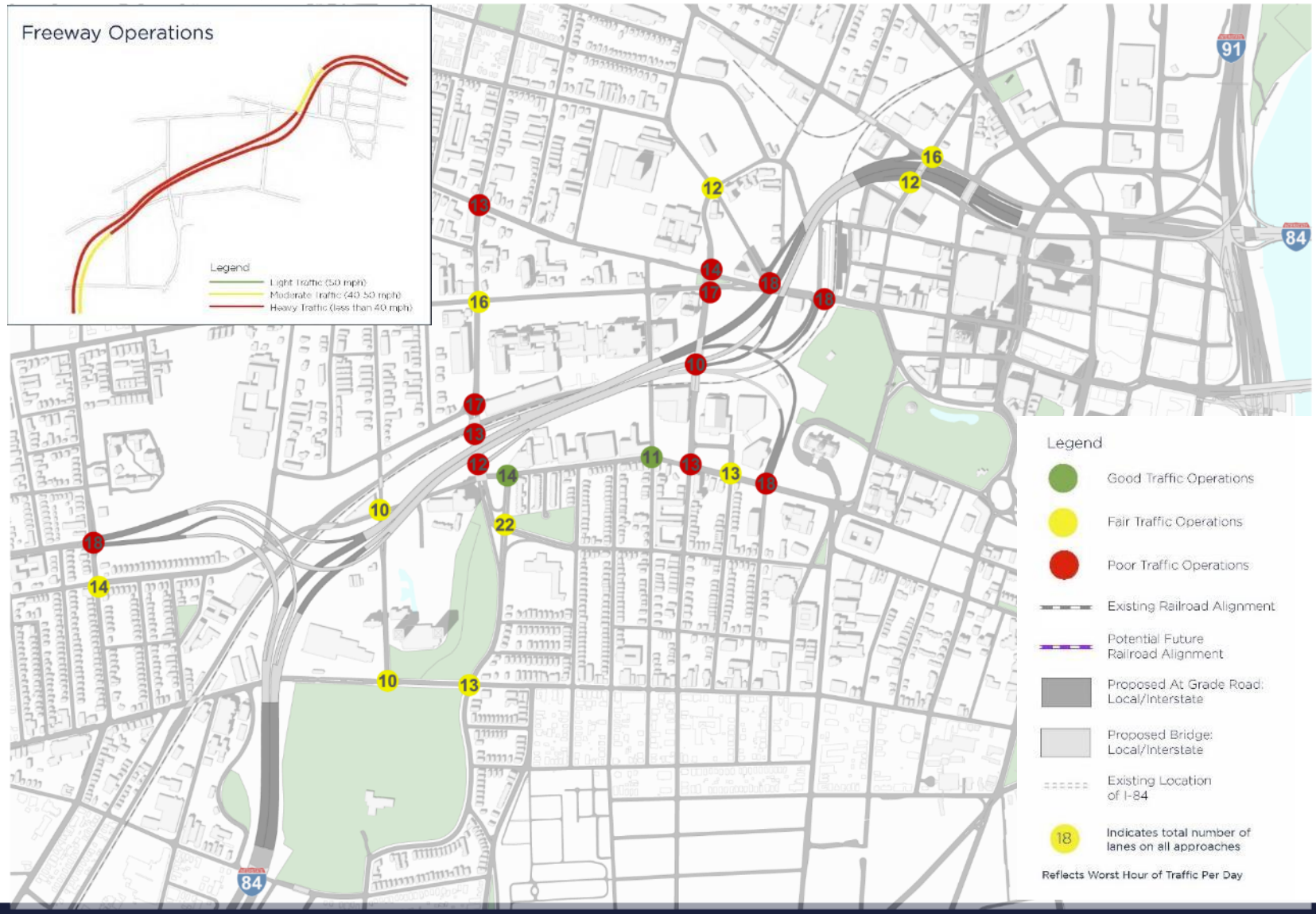
Alternatives Cost Estimates



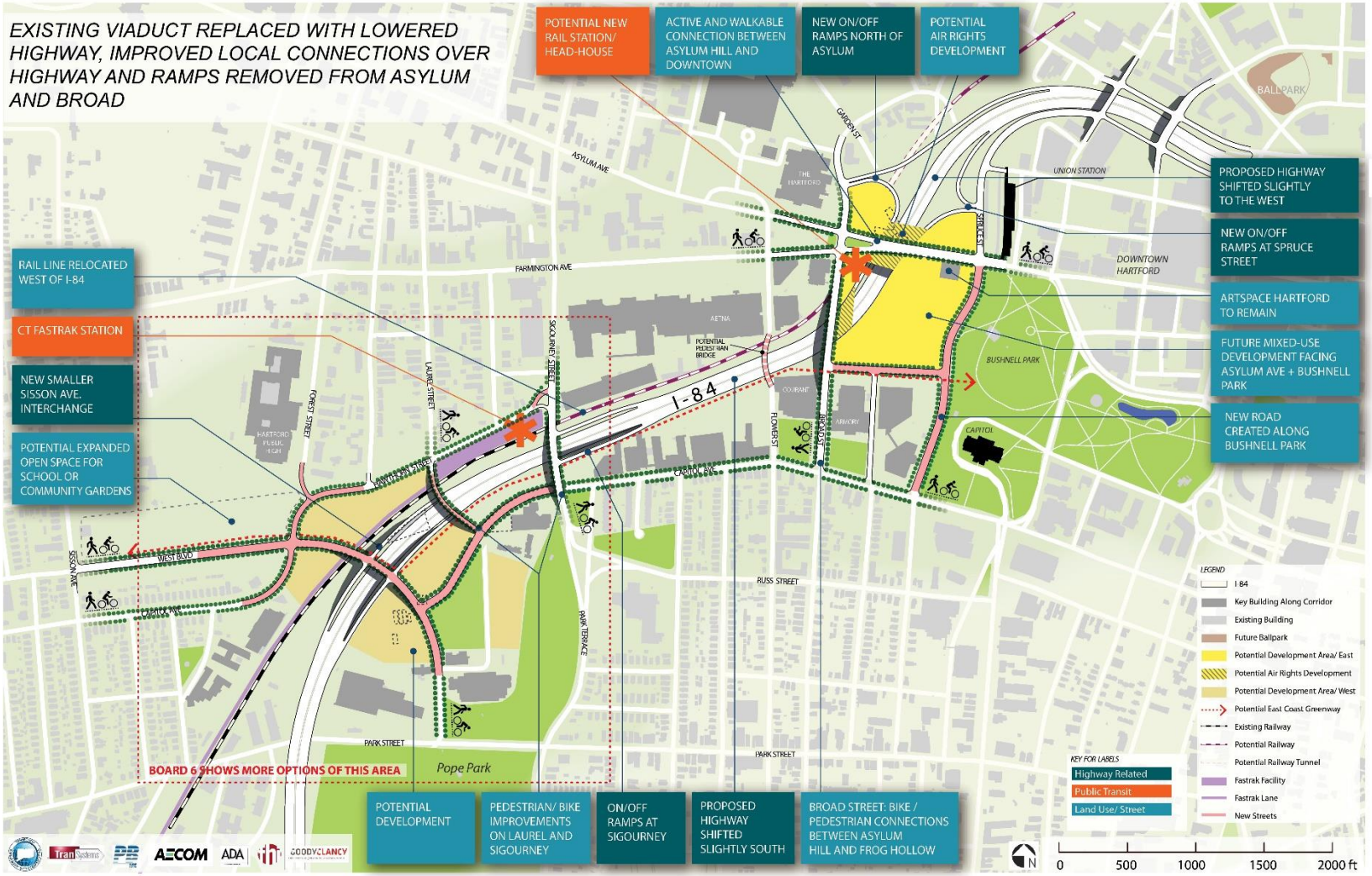
August 2015

Existing Conditions

Existing Conditions (No-Build)



Lowered Highway



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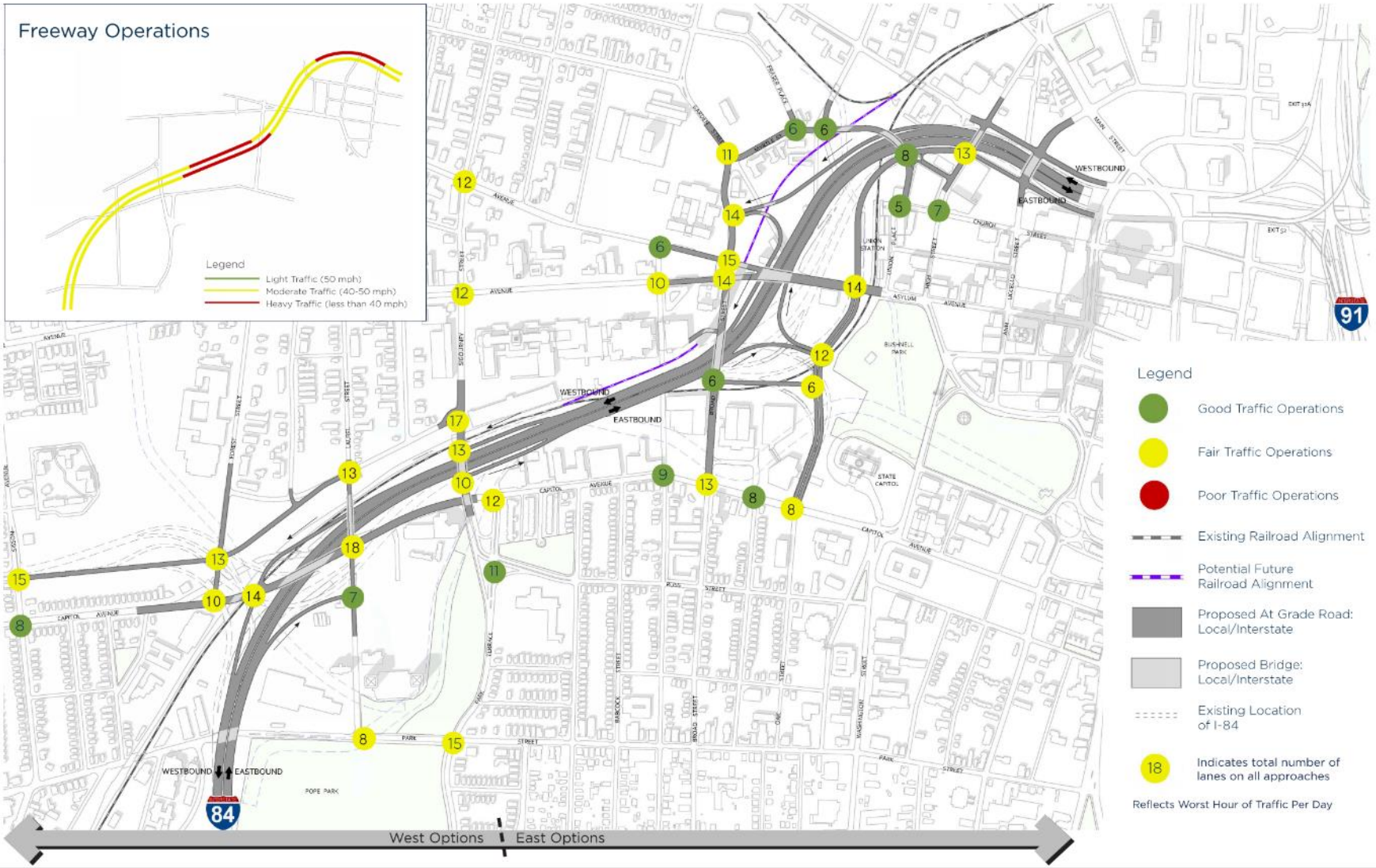
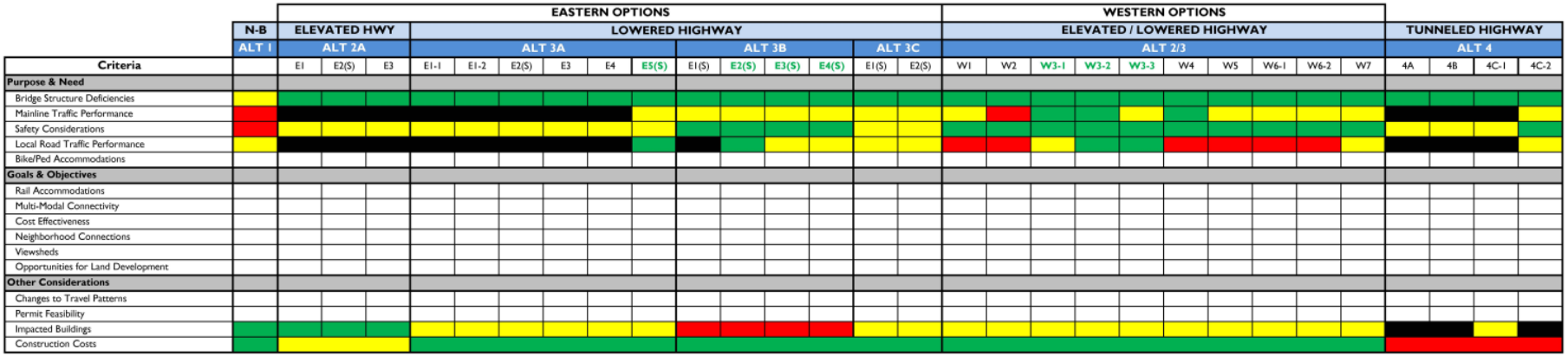
PRELIMINARY TRAFFIC ANALYSIS

ALTERNATIVE 3B: W3-2/E2 (S) Lowered

Intersection Operation



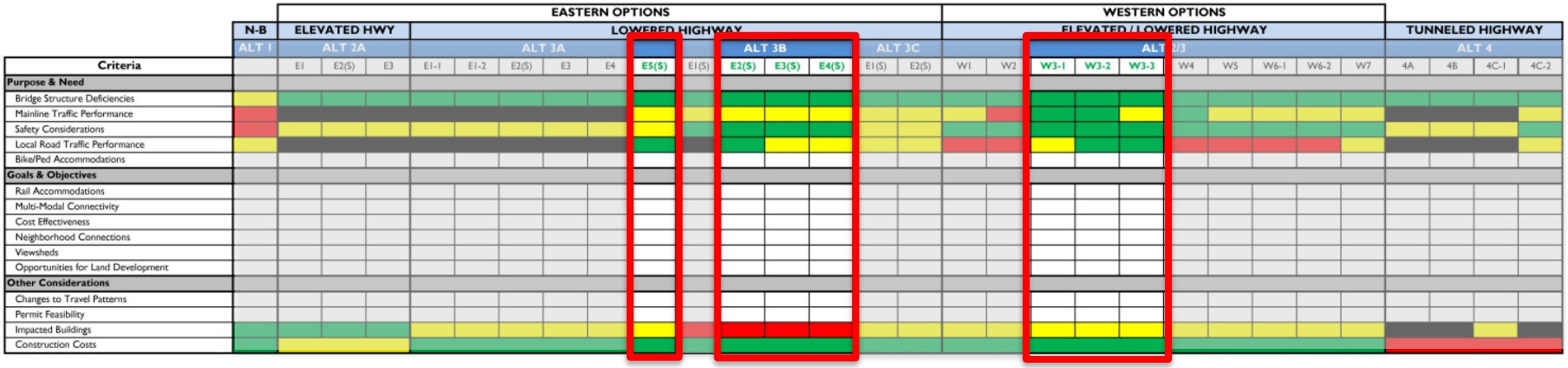
Initial analysis shows…



		EASTERN OPTIONS														WESTERN OPTIONS										TUNNELED HIGHWAY			
	N-B	ELEVATED HWY			LOWERED HIGHWAY											ELEVATED / LOWERED HIGHWAY													
	ALT 1	ALT 2A			ALT 3A						ALT 3B				ALT 3C		ALT 2/3										ALT 4			
Criteria		E1	E2(S)	E3	E1-1	E1-2	E2(S)	E3	E4	E5(S)	E1(S)	E2(S)	E3(S)	E4(S)	E1(S)	E2(S)	W1	W2	W3-1	W3-2	W3-3	W4	W5	W6-1	W6-2	W7	4A	4B	4C-1	4C-2
Purpose & Need																														
Bridge Structure Deficiencies																														
Mainline Traffic Performance																														
Safety Considerations																														
Local Road Traffic Performance																														
Bike/Ped Accommodations																														
Goals & Objectives																														
Rail Accommodations																														
Multi-Modal Connectivity																														
Cost Effectiveness																														
Neighborhood Connections																														
Viewsheds																														
Opportunities for Land Development																														
Other Considerations																														
Changes to Travel Patterns																														
Permit Feasibility																														
Impacted Buildings																														
Construction Costs																														

- Elevated highway options perform poorly
  - Poor traffic operations
- Tunneled highway options perform poorly
  - Poor traffic operations or significant property impacts
  - High Cost

Initial Analysis Shows…



- Some lowered highway options perform very well
  - Relocated railroad creates interchange opportunities
  - New roadways create redundancy in network
- Additional building impacts

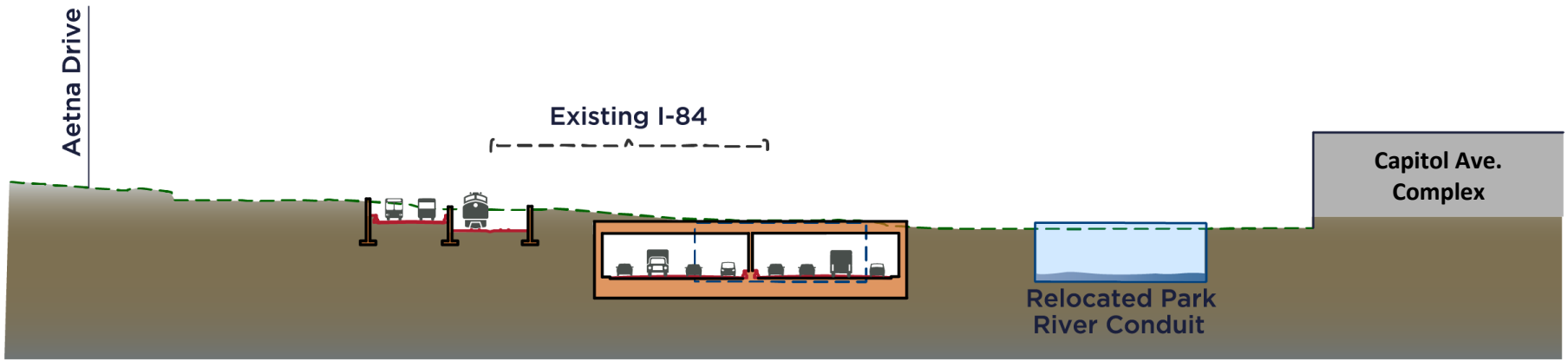
Lowered Highway

	LOWERED HIGHWAY						
Criteria	**E5(S)**	**E2(S)**	**E3(S)**	**E4(S)**	**W3-1**	**W3-2**	**W3-3**
Purpose & Need							
Bridge Structure Deficiencies							
Mainline Traffic Performance							
Safety Considerations							
Local Road Traffic Performance							
Bike/Ped Accommodations							
Goals & Objectives							
Rail Accommodations							
Multi-Modal Connectivity							
Cost Effectiveness							
Neighborhood Connections							
Viewsheds							
Opportunities for Land Development							
Other Considerations							
Changes to Travel Patterns							
Permit Feasibility							
Impacted Buildings							
Construction Costs							

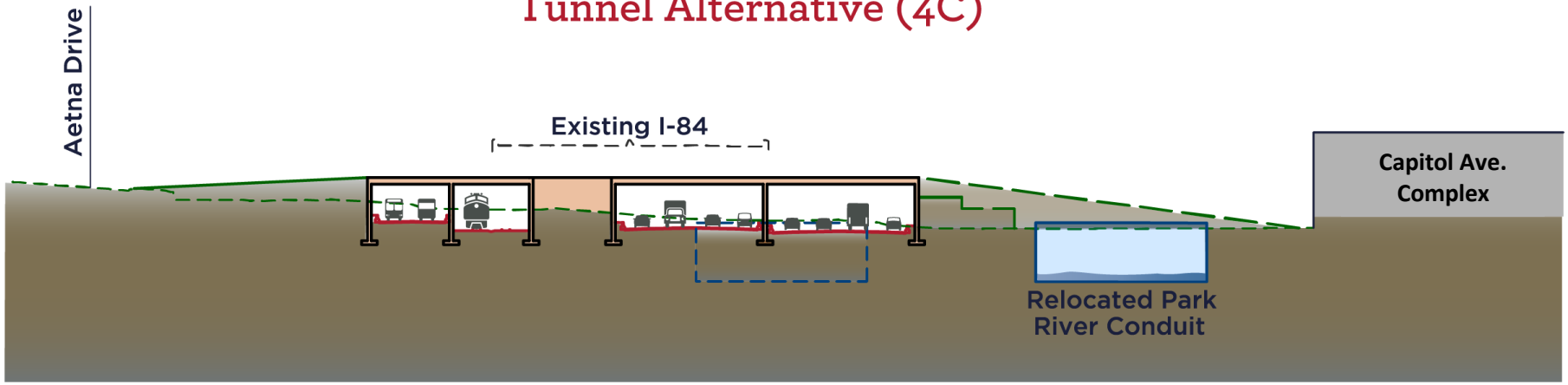
Ability to Meet Purpose and Need	
Meets P&N	
Moderately Meets P&N	
Does Not meet P&N	
Critical Flaw	
More Analysis Needed	

Other Considerations	
Good	
Fair	
Poor	
Critical Flaw	
More Analysis Needed	

New Alternative: Capped Highway



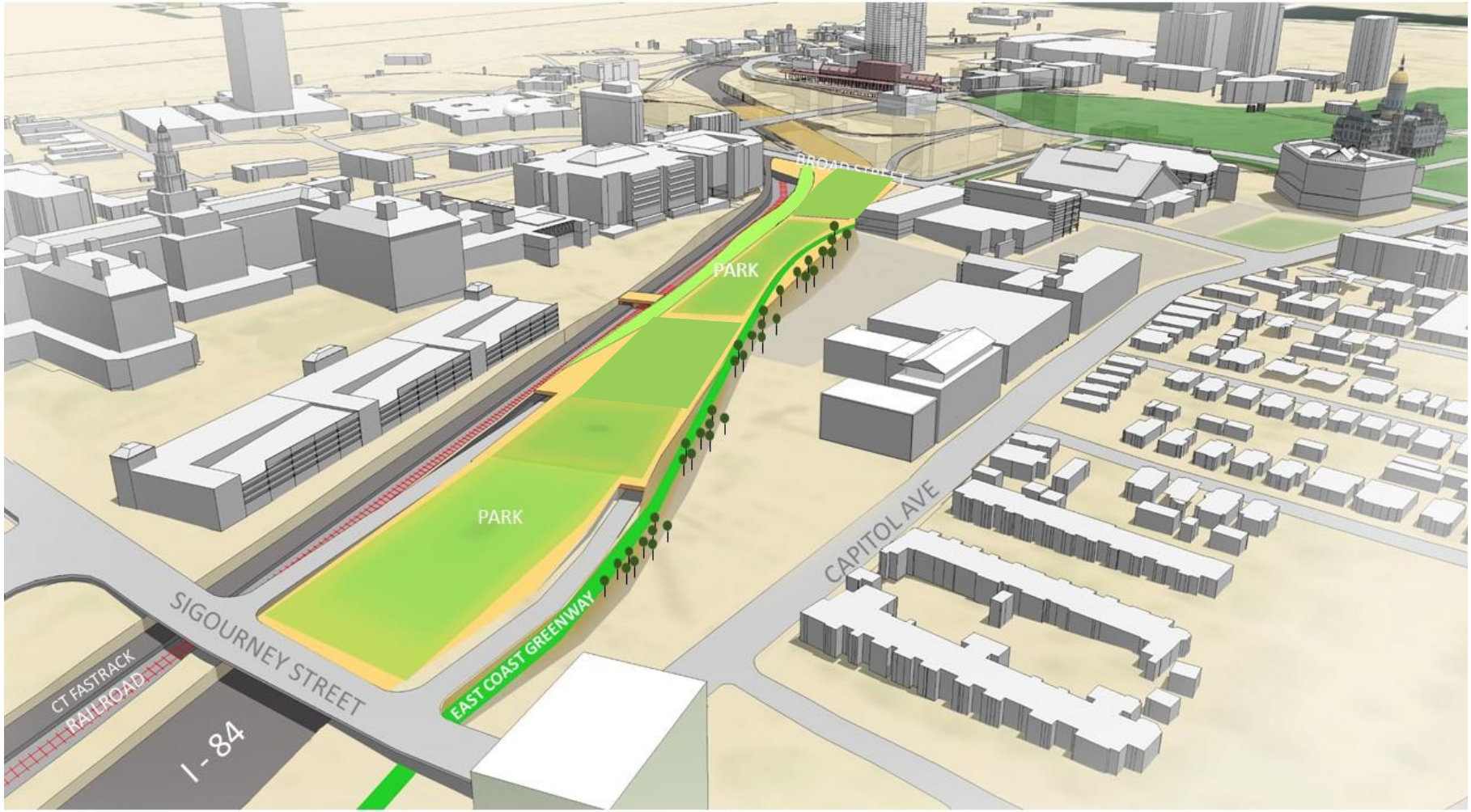
Tunnel Alternative (4C)



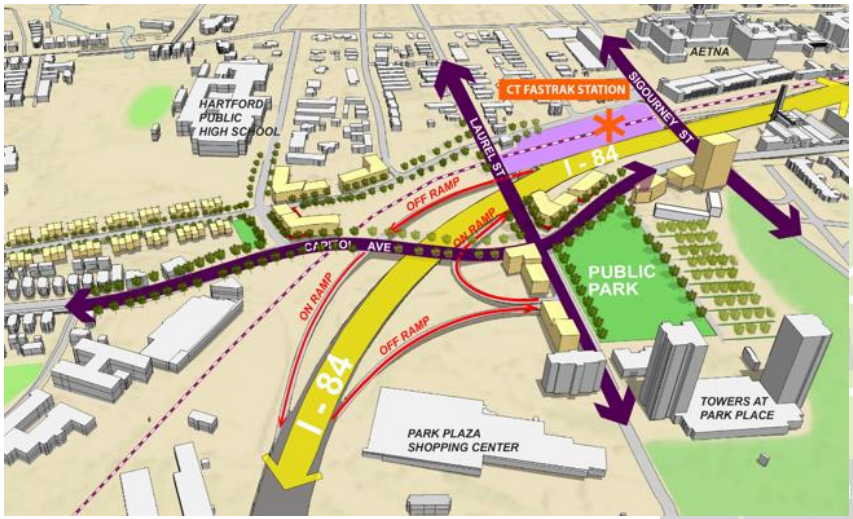
Lowered Highway with Cap

New Alternative: Capped Highway

New Alternative: Capped Highway



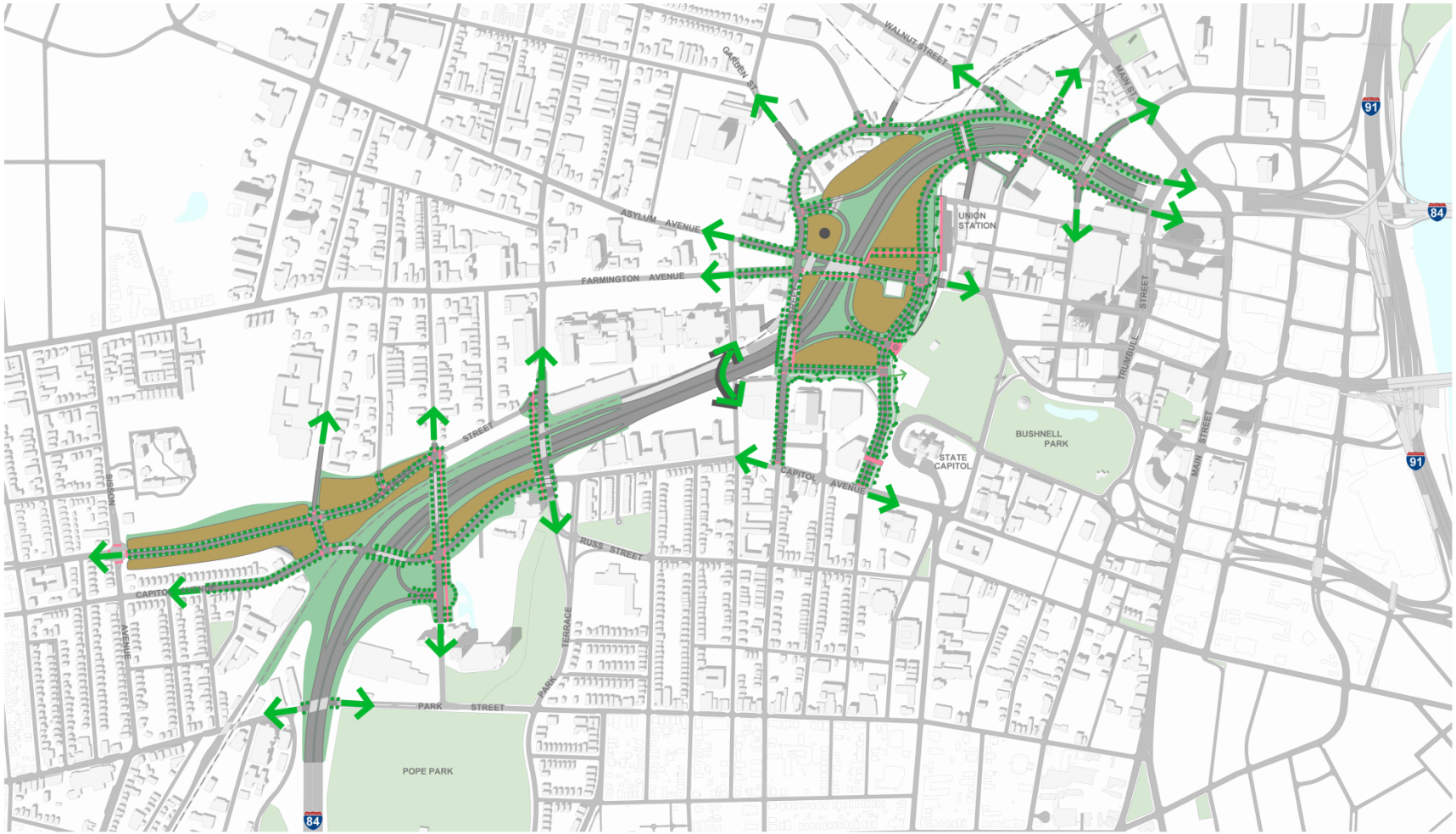
Urban Design Opportunities



I-84 Urban Design Goals

- Reconnect the City across the highway
- Strengthen the character and functioning of districts on either side of the highway
- Integrate highway access points within urban fabric
- Promote TOD around Union Station

Lowered Options W3-3 & 3B E2(S)



Preliminary

Subject to change based upon ongoing analysis and design

THE I-84 HARTFORD PROJECT

Existing Conditions

THE I-84 HARTFORD PROJECT

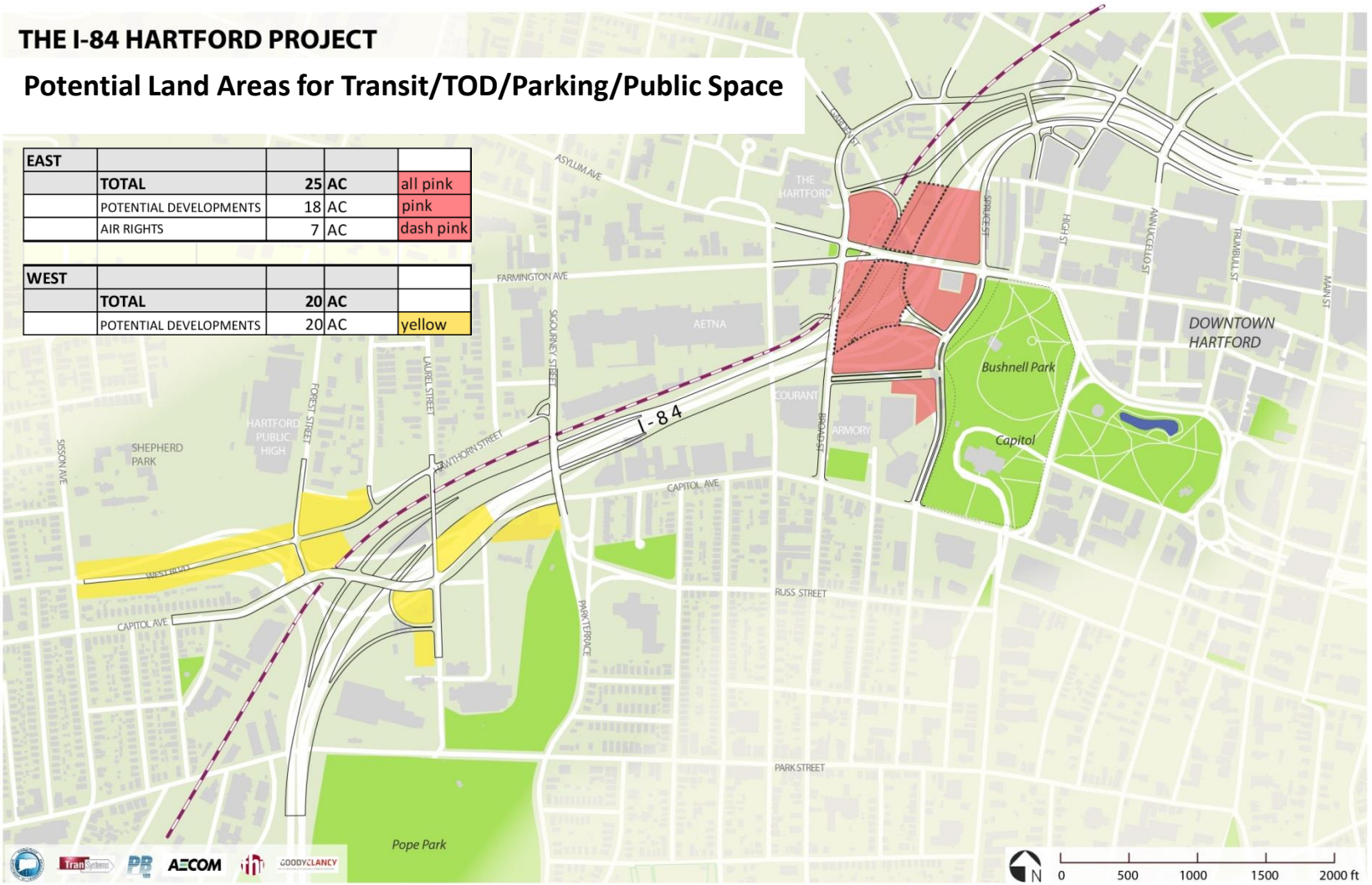
Lowered Highway Alternative 3B

THE I-84 HARTFORD PROJECT

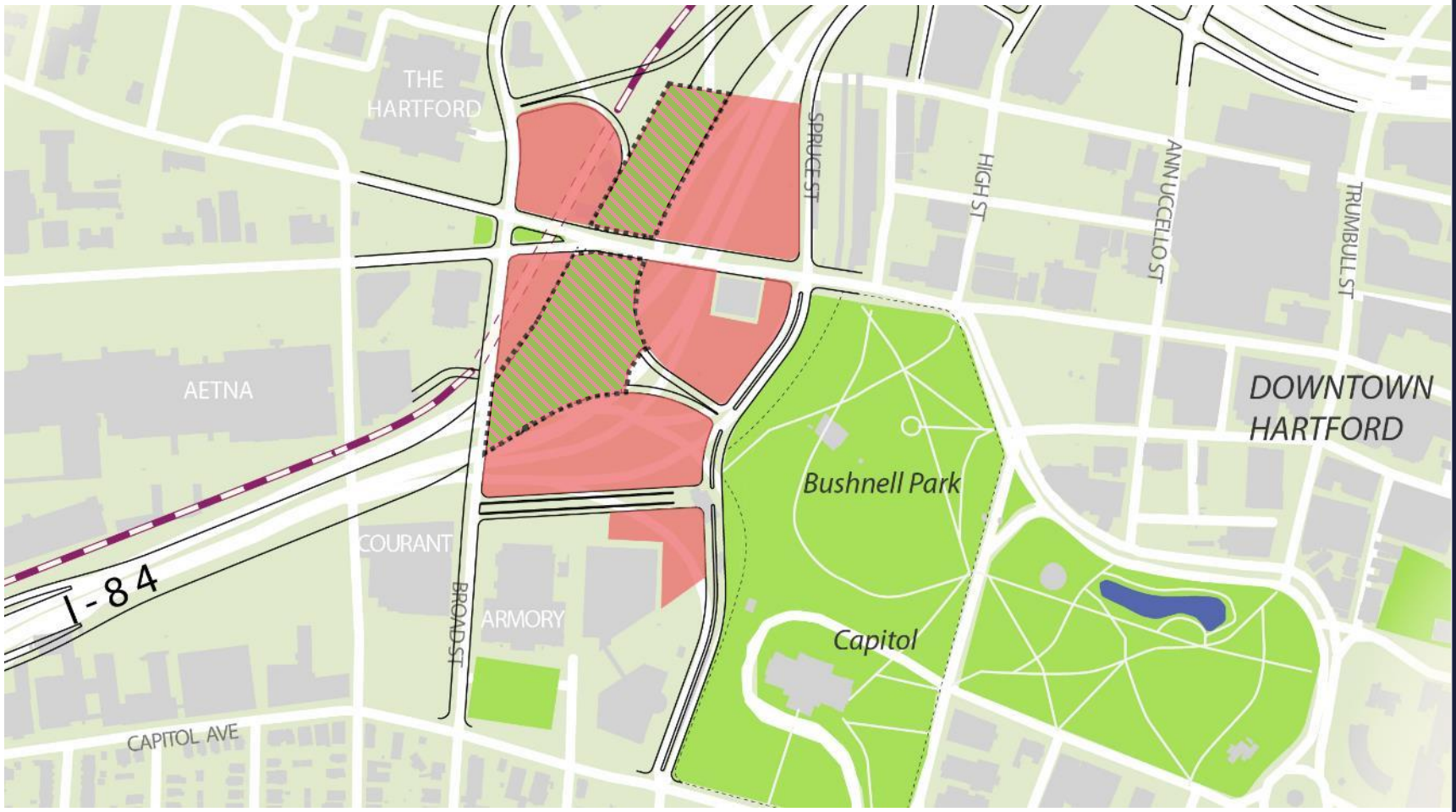
Potential Land Areas for Transit/TOD/Parking/Public Space

EAST				
	TOTAL	**25**	**AC**	all pink
	POTENTIAL DEVELOPMENTS	18	AC	pink
	AIR RIGHTS	7	AC	dash pink

WEST				
	TOTAL	**20**	**AC**	
	POTENTIAL DEVELOPMENTS	20	AC	yellow



Asylum/Broad - Urban Design Analysis



Asylum/Broad – Air-Rights and Solid Ground Parcels

Air-rights parcels

- Significant development cost premiums/feasibility challenges for private sector development
- May provide major opportunity for public/transit parking

Solid Ground parcels

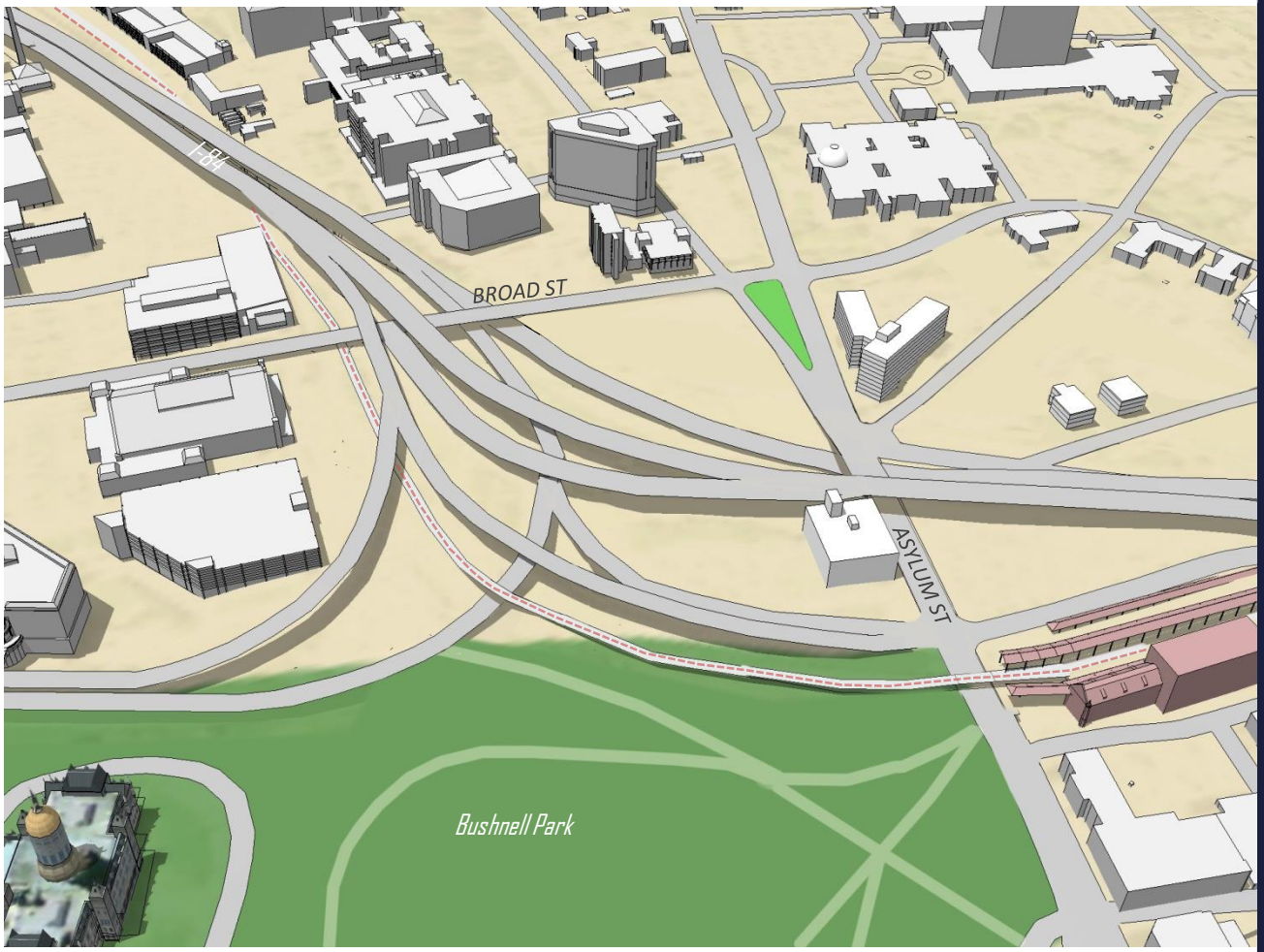
- Significant development opportunities
- But without complementary development of air-rights it may result in fragmented/piecemeal development pattern and lost opportunity

Asylum/Broad - Urban Design Analysis

Principles of strong street edges

- Development fronting onto public streets
- Parking behind development
- Create generous pedestrian and bike space amenities along street
- Create inviting, walkable corridors

Existing Conditions – Elevated Highway



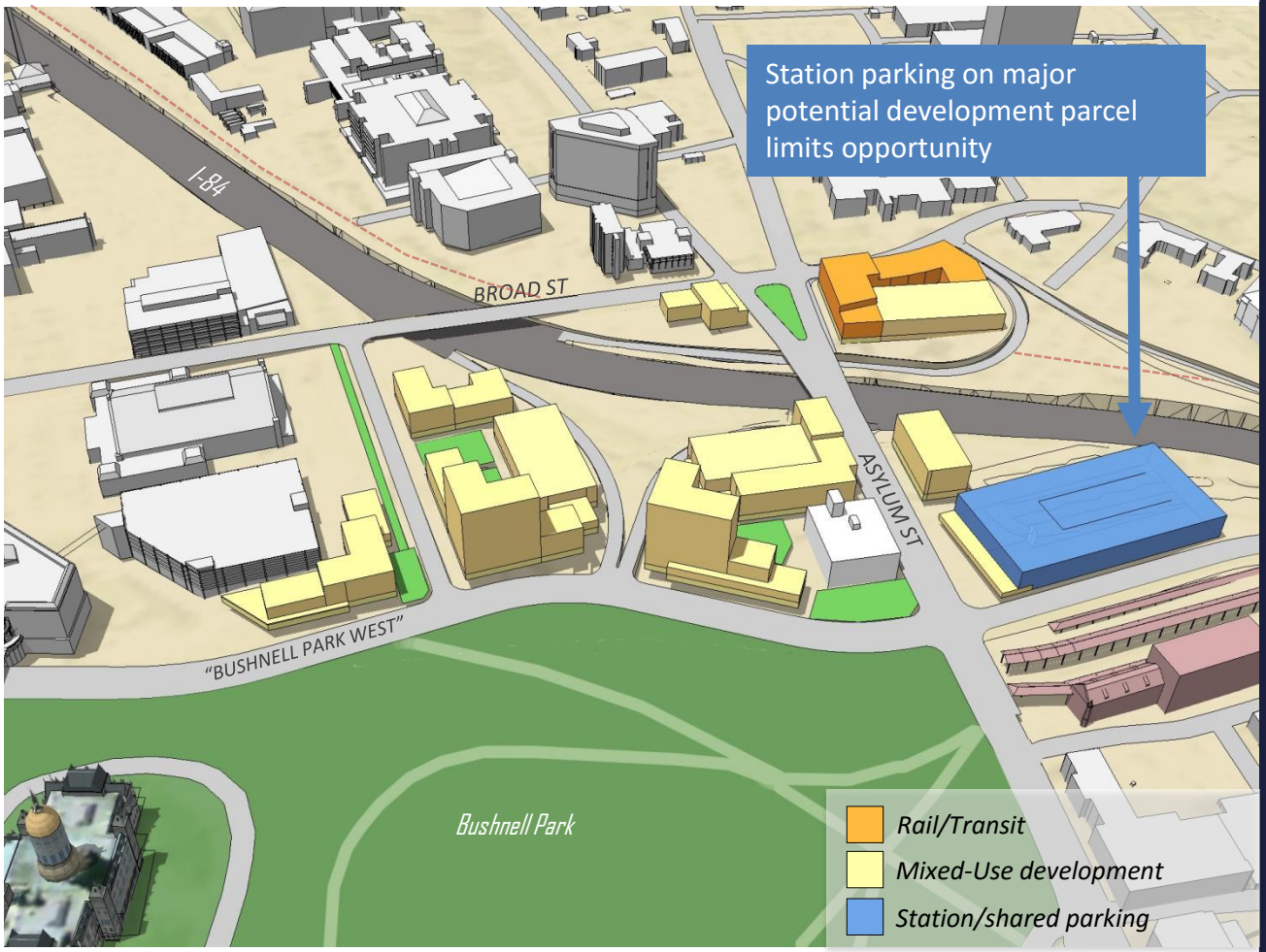
Base Scenario: Lowered Highway Alternative (No Cap)

- Open land areas
- Bridges over highway at Broad and Asylum
- Rail moved west of I-84
- New park frontage road: "Bushnell Park West"

Scenario #1: Development on Solid Land Only

- Large gaps in Asylum/Broad corridors
- Fragmented urban fabric
- Challenging corner parcel at Farmington and Broad
- Noise impacts
- Good park frontage

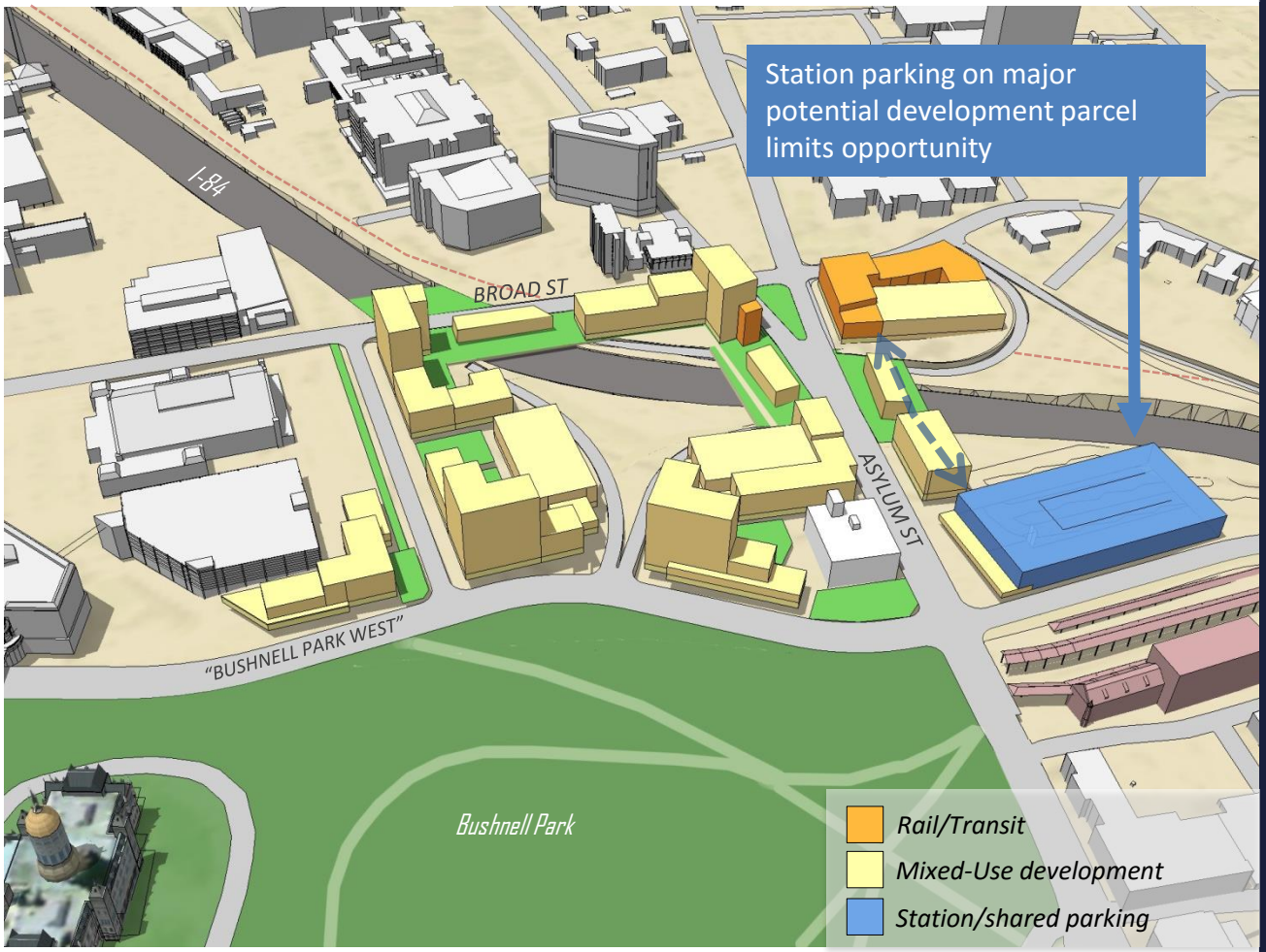
- ***Missed opportunity*** *to connect Asylum Hill to Downtown and Frog Hollow through continuous urban fabric*



Scenario #2: Small Highway Decks

- Connects Asylum corridor
- Connects Broad corridor
- Overcomes sense of crossing a highway
- Provides continuous urban experience
- Open space, plazas, or rail station access on decks
- Good park frontage

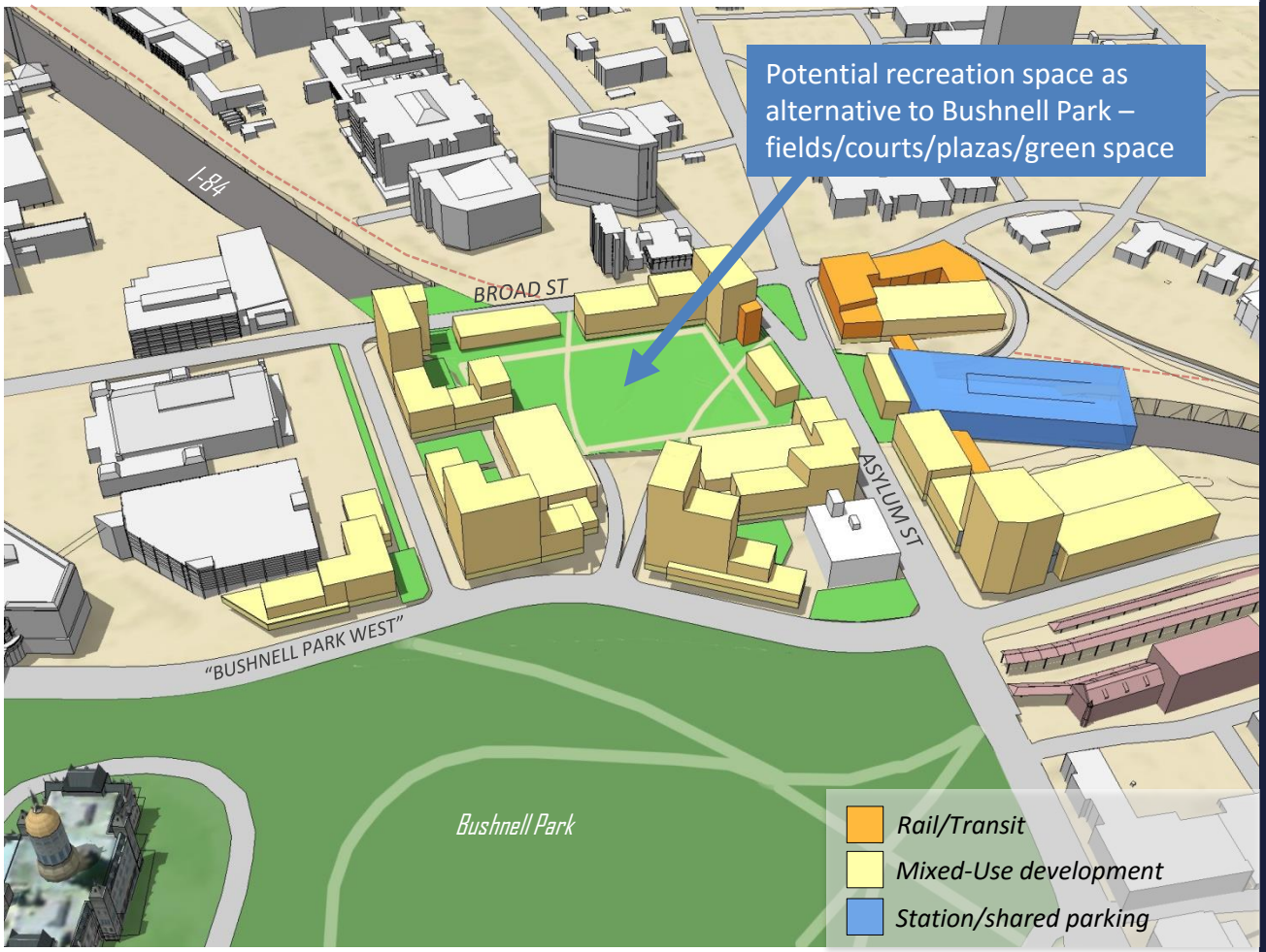
- ***Improved conditions*** *but not perfect*



Scenario #3A: Asylum/Broad Cap

- Public garage directly linked to new rail annex
- Allows development flexibility on other parcels
- Allows flexibility on cap
- Parking shared with surrounding private development and transit

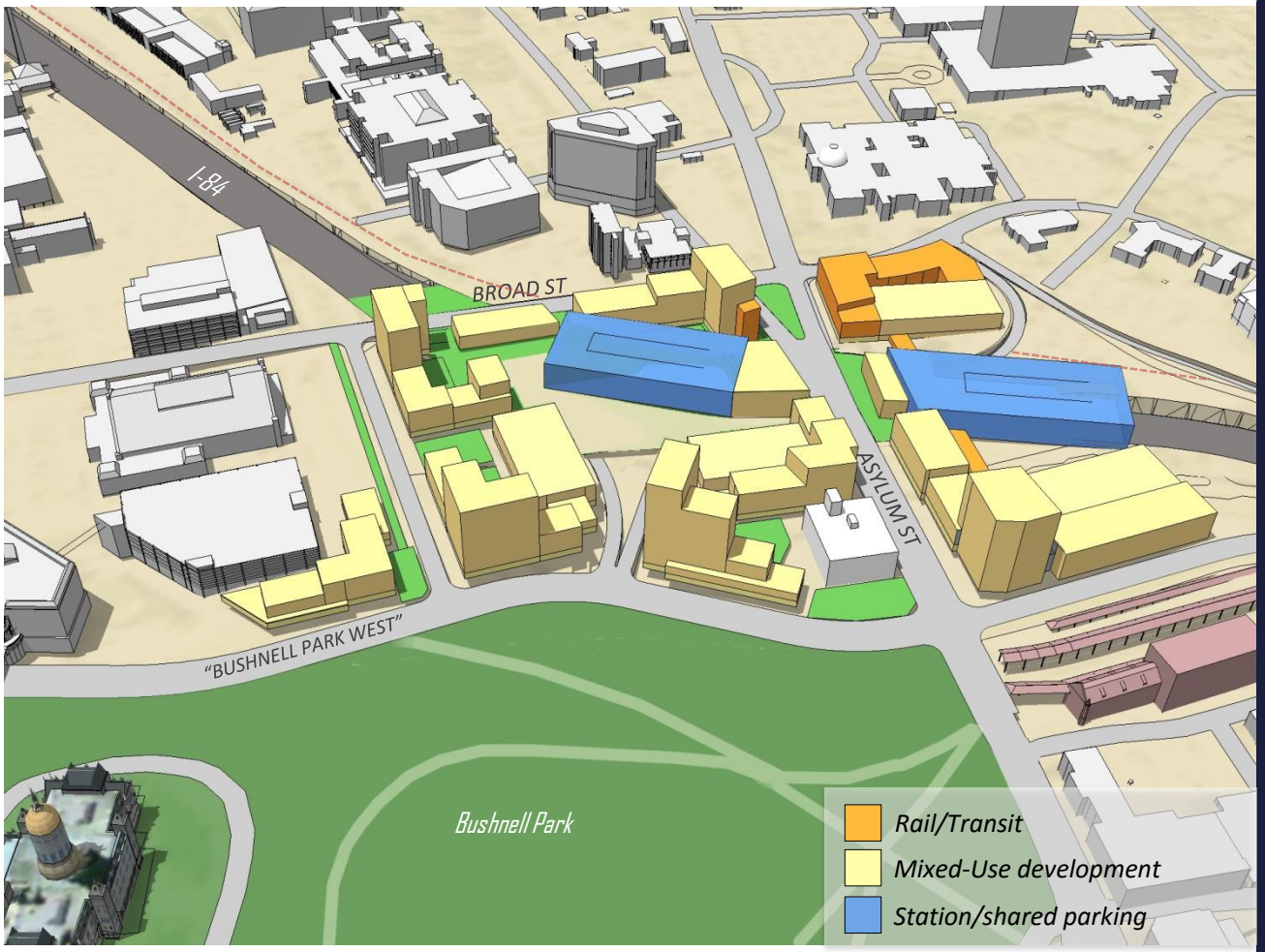
- ***Optimal enhancements*** *for continuity of urban fabric, public space, parking, and development opportunity*



Scenario #3B: Asylum/Broad Cap

- Centralized public garages
- Allows development flexibility on other parcels
- Parking shared with surrounding private development and transit

- ***Optimal enhancements*** *for continuity of urban fabric, public space, parking, and development opportunity*



Asylum Avenue

Existing view looking east towards Downtown

Asylum Avenue

Potential view looking east towards Downtown

Broad Street

Existing view looking south towards Armory

Broad Street

Existing view looking south towards Armory

Street-view Visualizations

Spruce / Asylum intersection looking towards Capitol: Existing

Street-view Visualizations

Spruce / Asylum intersection looking towards Capitol: Potential

Street-view Visualizations

Asylum Street looking west towards rail viaduct: Existing

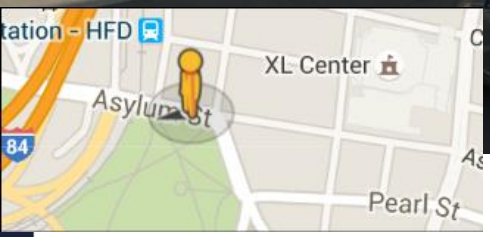
Street-view Visualizations

Asylum Street looking west towards rail viaduct: Potential

Street-view Visualizations

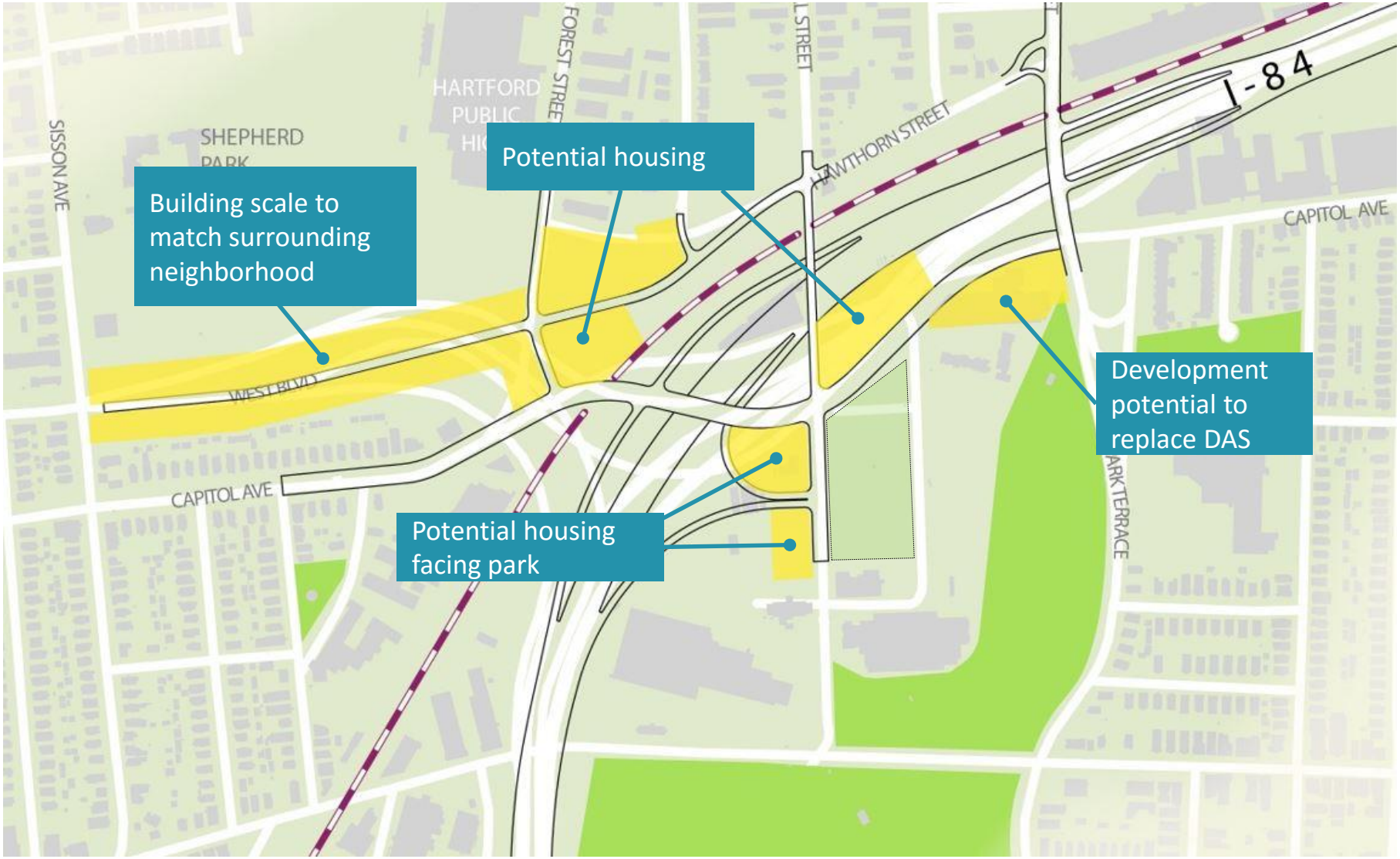
Asylum Street looking east towards rail viaduct: Existing

Street-view Visualizations

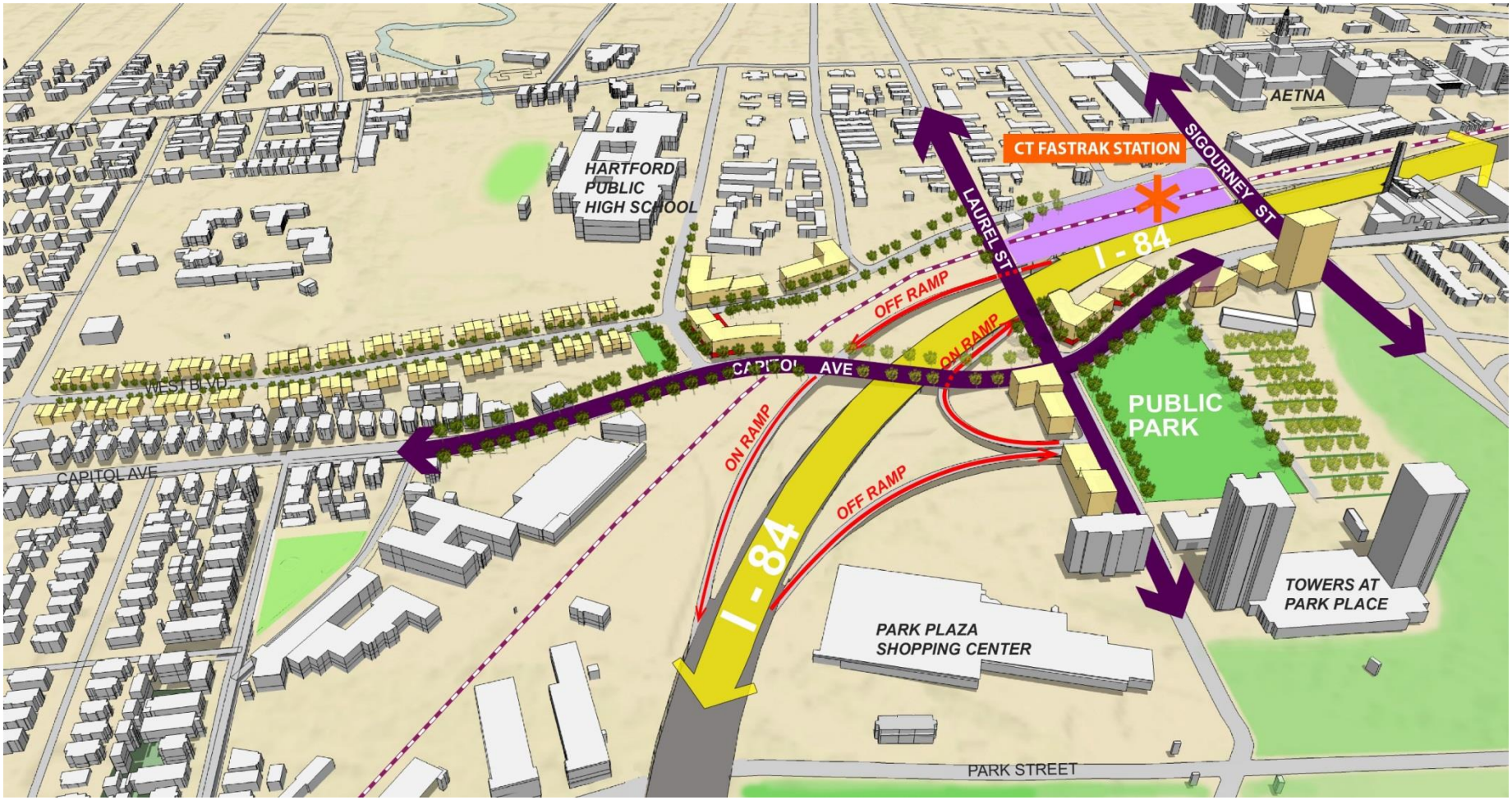


Asylum Street looking east towards rail viaduct: Potential

Sisson Avenue - Urban Design Analysis



Asylum/Broad - Urban Design Analysis



Sisson Ramps

Existing aerial view looking north

Sisson Ramps

Potential Aerial View Looking North

Capitol Avenue

Existing view looking east towards Sigourney Street

Capitol Avenue

Potential view looking east towards Sigourney Street

Sigourney Street

Existing view looking south to Park Terrace

Sigourney Street

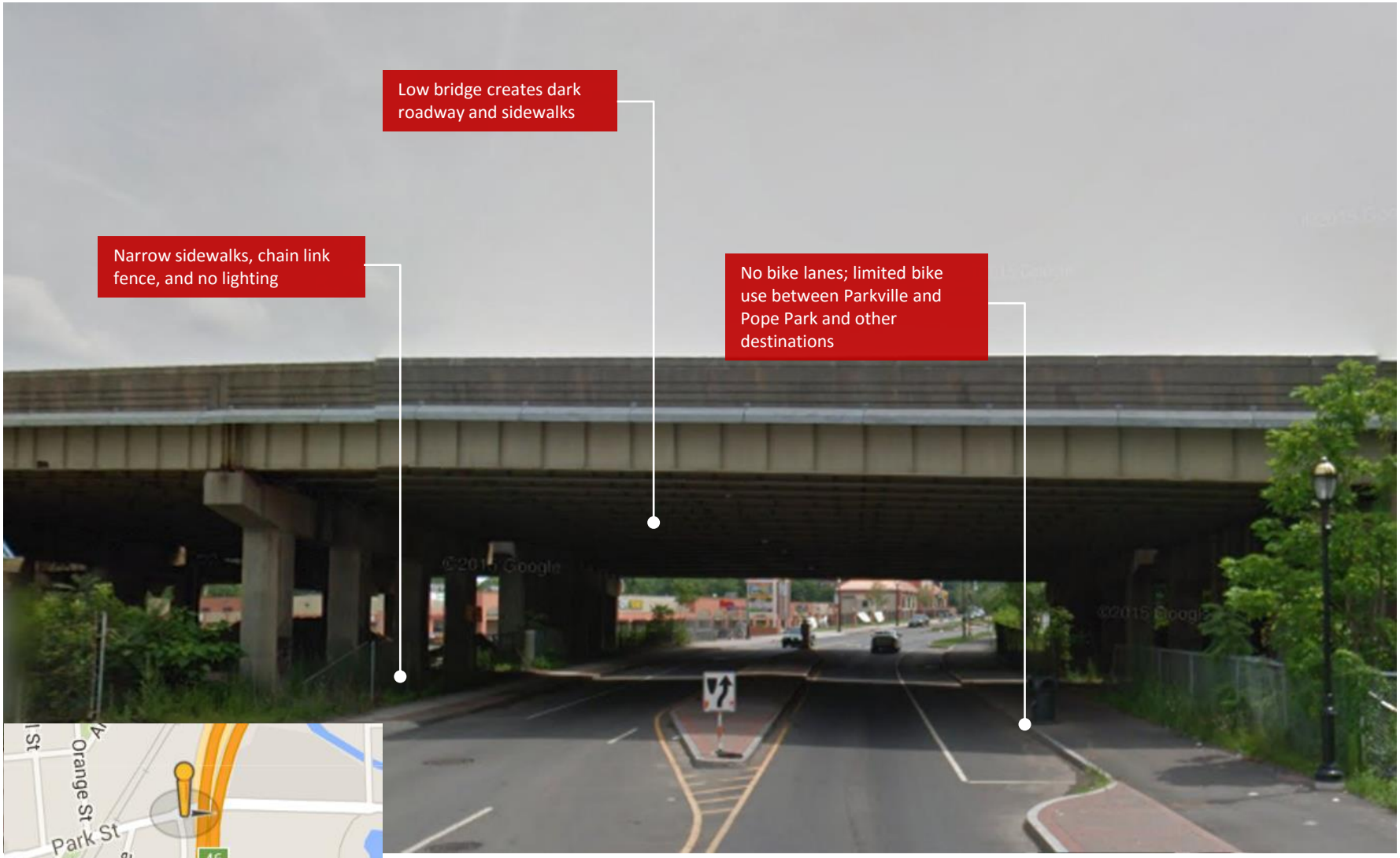
Potential view looking south to Park Terrace

Capitol Avenue

Existing view looking east at Sisson Ave. Ramps

Capitol Avenue

Potential view looking east



Park Street looking east towards I-84 overpass: Existing

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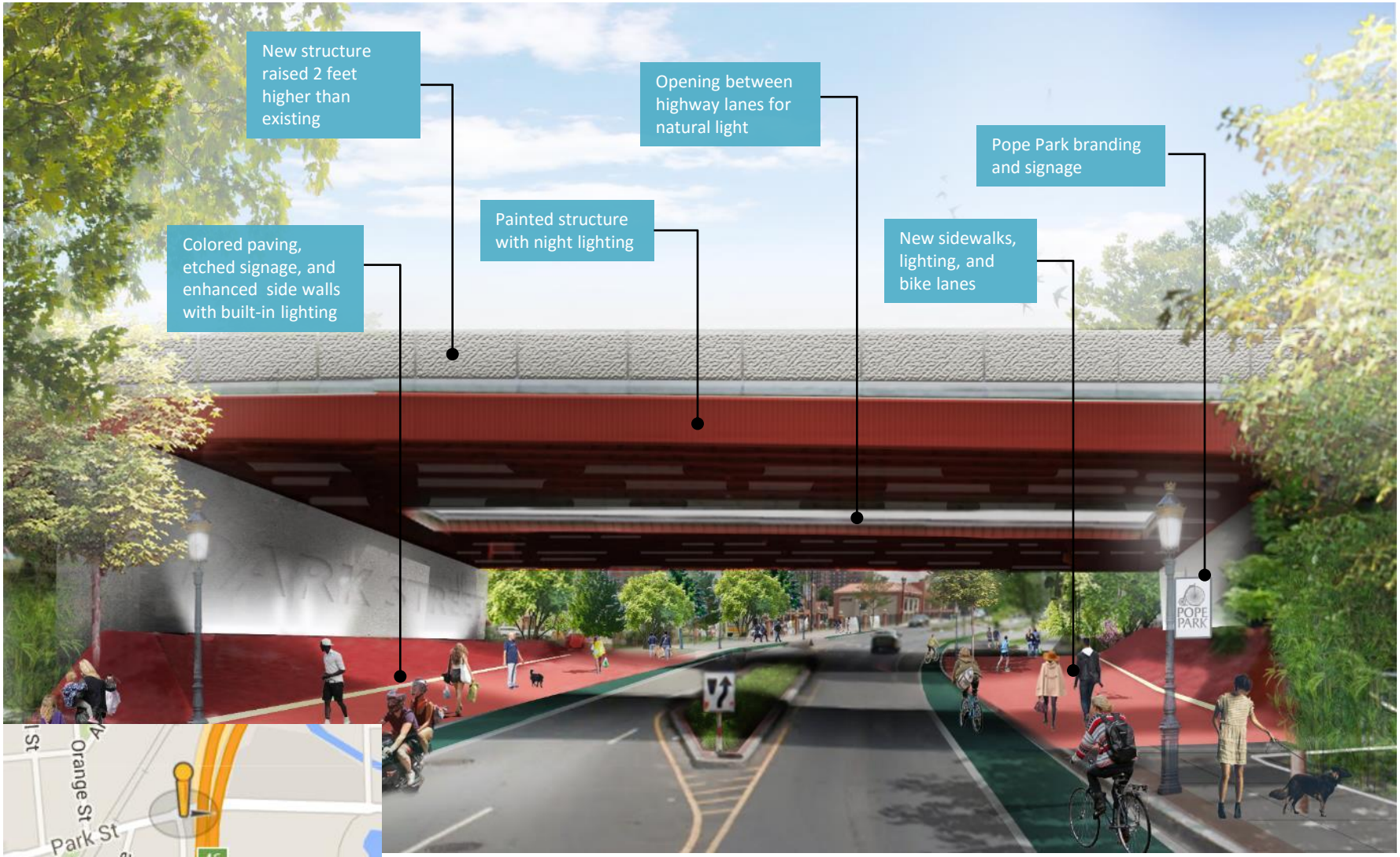
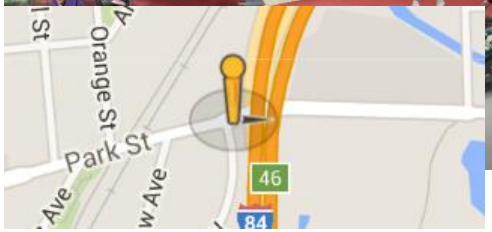
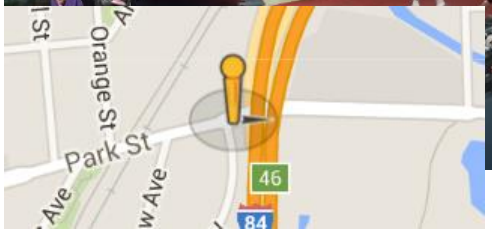




Park Street looking east towards I-84 overpass: Potential



Park Street looking east towards I-84 overpass: Potential

Construction Considerations

Construction Considerations

- Impact upon stakeholders
- Maintaining traffic affects type of construction
- Conventional vs. accelerated techniques
- Section or lane closures

Conventional Construction

- Typically has longer duration
- Bridge elements are constructed on site
- Requires temporary construction, increasing cost

Accelerated Construction Technologies

- Typically has shorter duration
- Many elements are constructed offsite, called prefabrication
- Less / no temporary construction, and associated costs

Example of ACT: I-84 Southington, CT

Section or Lane Closures on I-84

- Expedite construction
- Minimize / avoid property impacts
- Reduce community / economic impacts
- Reduce costs
- Save time

Reducing Traffic During Construction

- Promote transit options
- Free/reduced fares?
- Carpooling / rideshare
- Other (e.g. bicycling)

Transit Options

- Gather ridership data - surveys
  - Transit infrastructure capacity (bus and rail)
  - Percentage who will take transit
- Promote transit/reduce Single Occ. Vehicles
- Free/reduced fares?

Case Study: SmartFix40

- 2.5 miles of I-40 in Knoxville, TN
- Carries 103,000 vehicles/day
- Left-hand on-ramps/short weaves

Case Study: SmartFix40

- Conducted extensive public outreach
- Improved local road network
- Closed I-40 for 14 months for accelerated construction (versus 3+ years estimated for conventional construction)

Case Study: SmartFix40

What did they build?

- One cut-and-cover tunnel
- 25 bridges
- 48 retaining walls
- 7,500 linear feet of noise walls

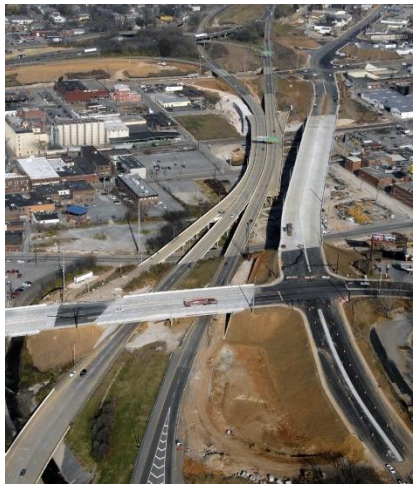


Photo Credits: Aerial Innovations

Case Study: SmartFix40

"The number one reason for closing the interstate…is time, but by rerouting traffic around the construction site, ***we're also proving safer conditions for motorists and workers****. This project will be the benchmark for future urban projects."*

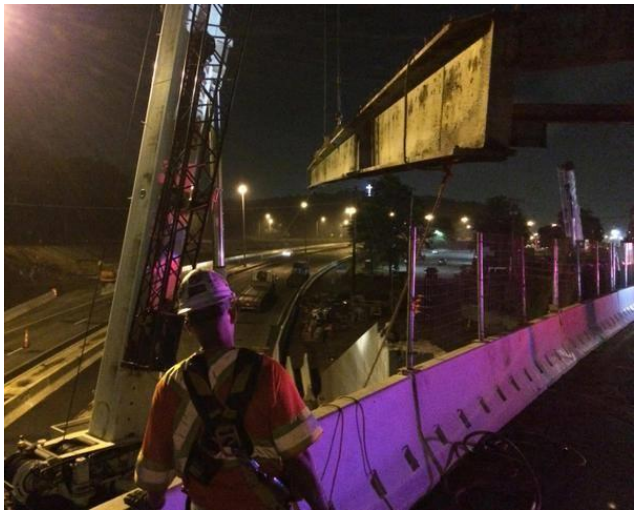
- TDOT Commissioner

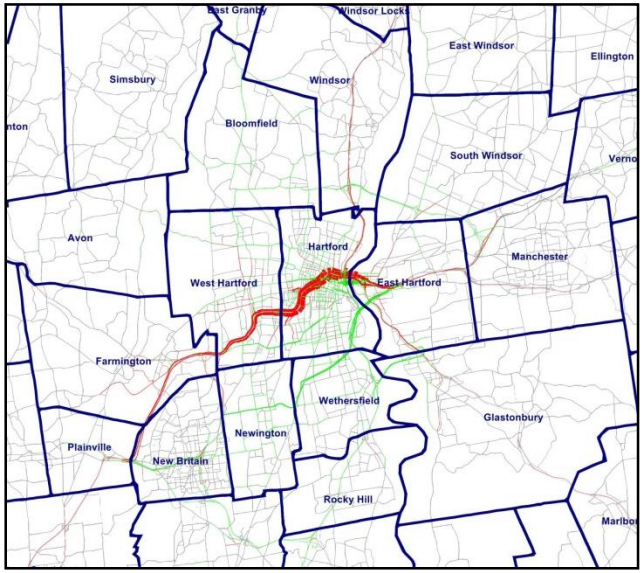
*"It was one of the first projects where TDOT took a step back and really considered the total impact and user costs, not just the construction costs. '****What is this project going to cost the total economy if construction dragged out for another couple of years****?'"*

-Project Manager

Considerations

- Traffic Diversion
- Cost/Benefit analysis
- Economic analysis





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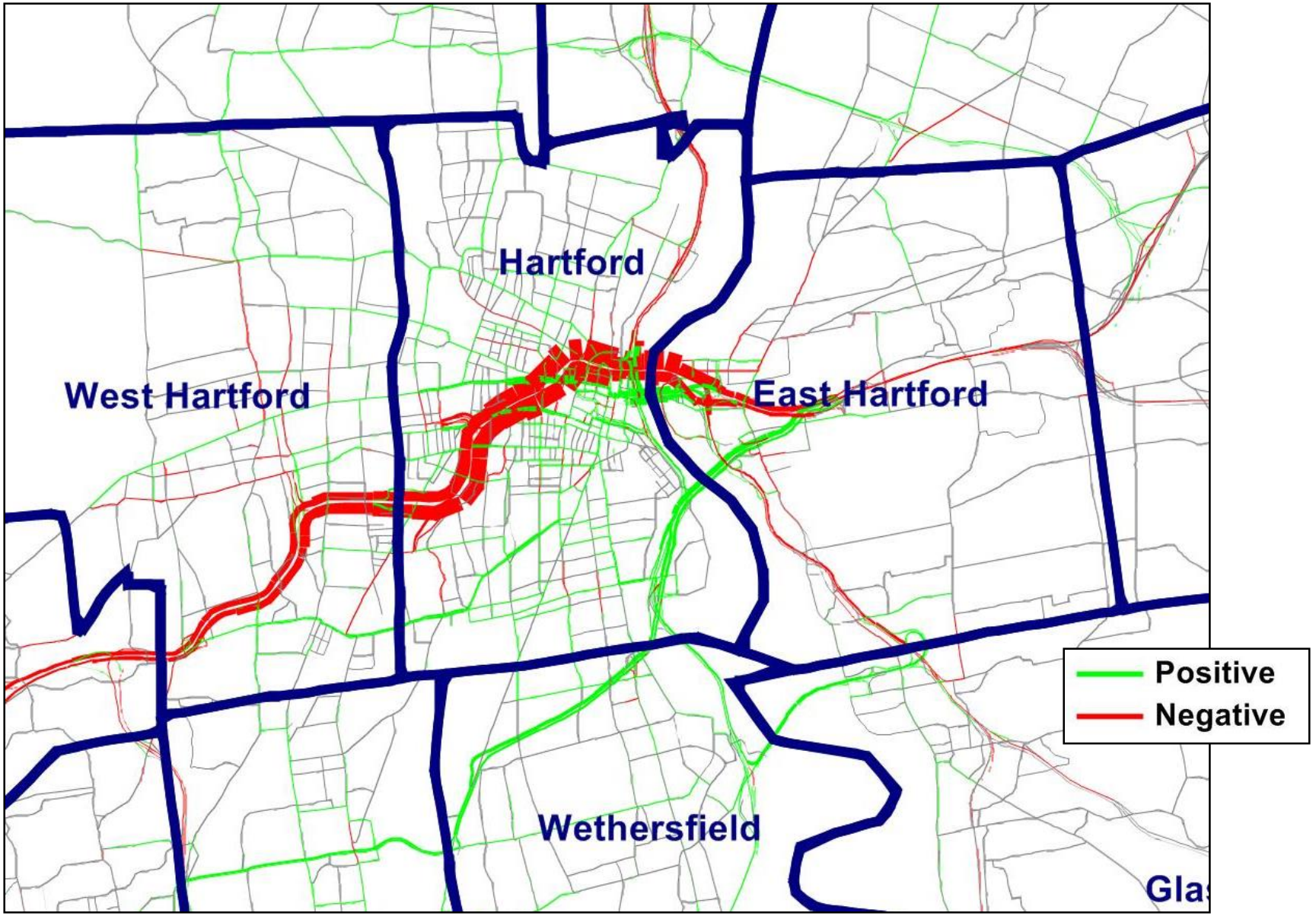

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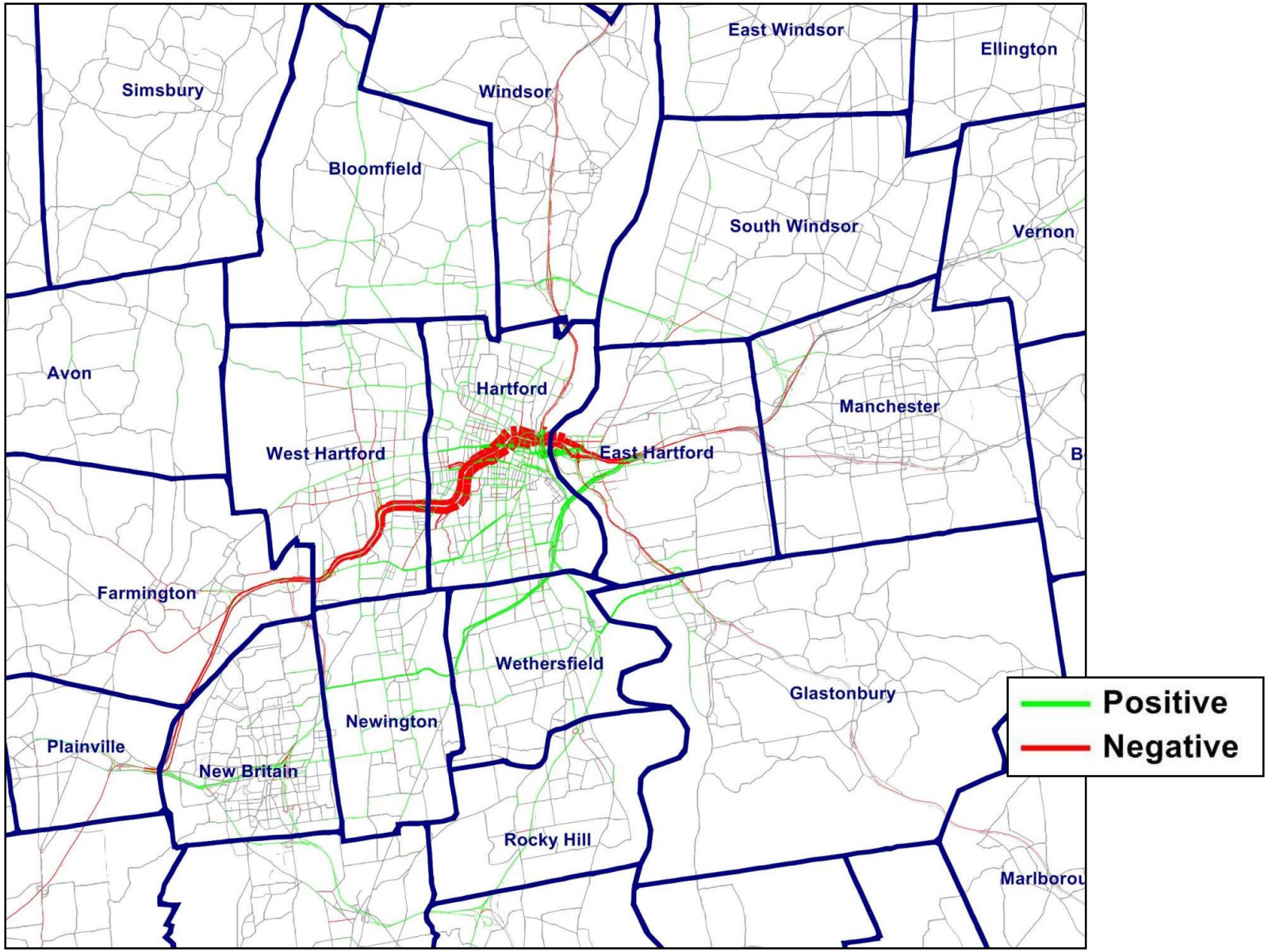


Discussion

- Questions
- Engaging regional municipalities moving forward

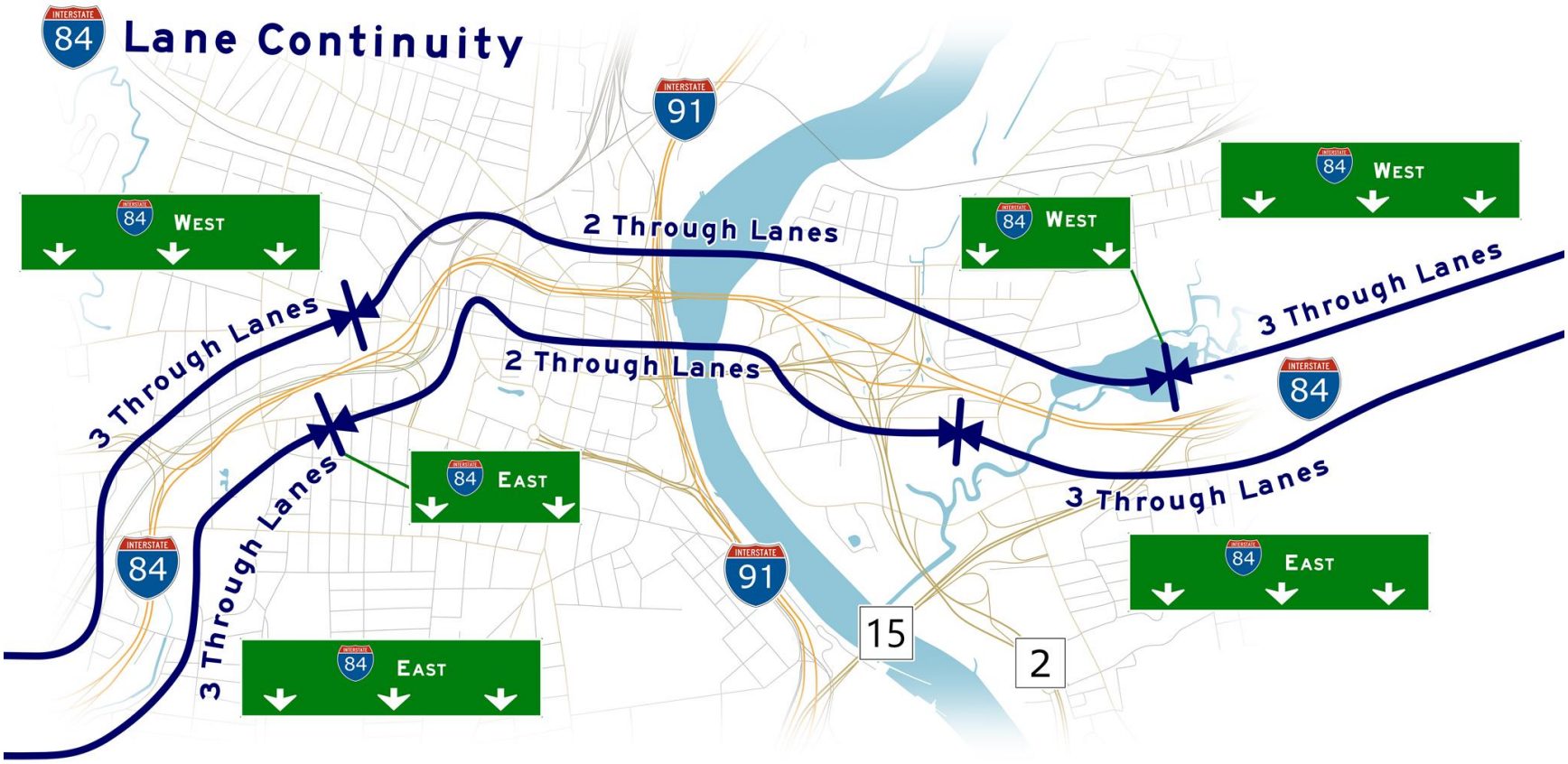
I-84/I-91 Interchange Study

I-84/I-91 Interchange Study

- Study of traffic flow and congestion relief at the I-84 / I-91 interchange in Hartford and I-84 in East Hartford.
- State Bond Commission approved $200K
- Matched by $800K in federal monies

I-84/I-91 Interchange bottleneck

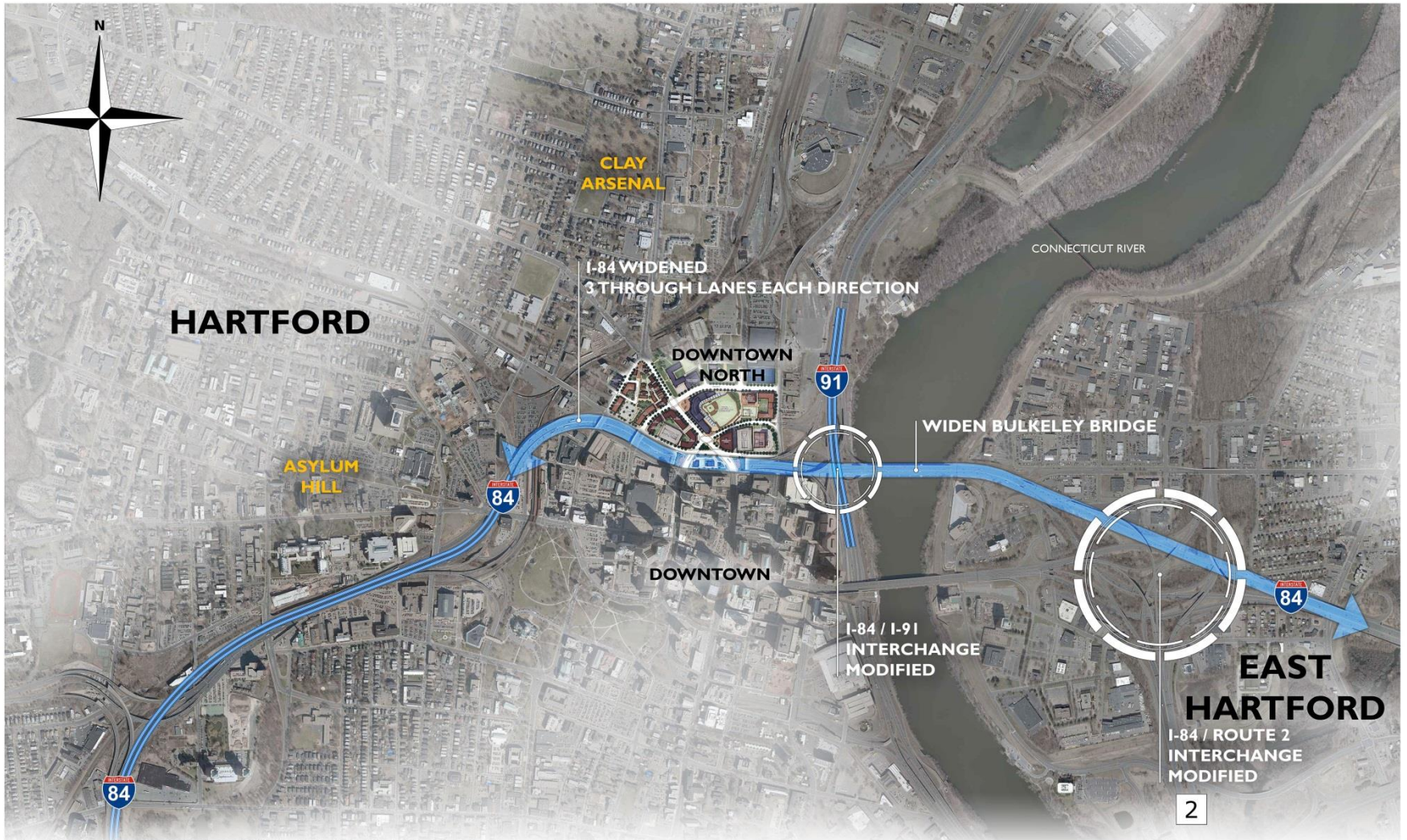
- I-84 has two through lanes in each direction
- I-91 has two through lanes in each direction



- Constructed in the 1960s; modified in the late 1980s
- Serves 275,000 veh/day
- Physical and environmental constraints

I-84 / I-91 Interchange Study

I-84 HARTFORD PROJECT

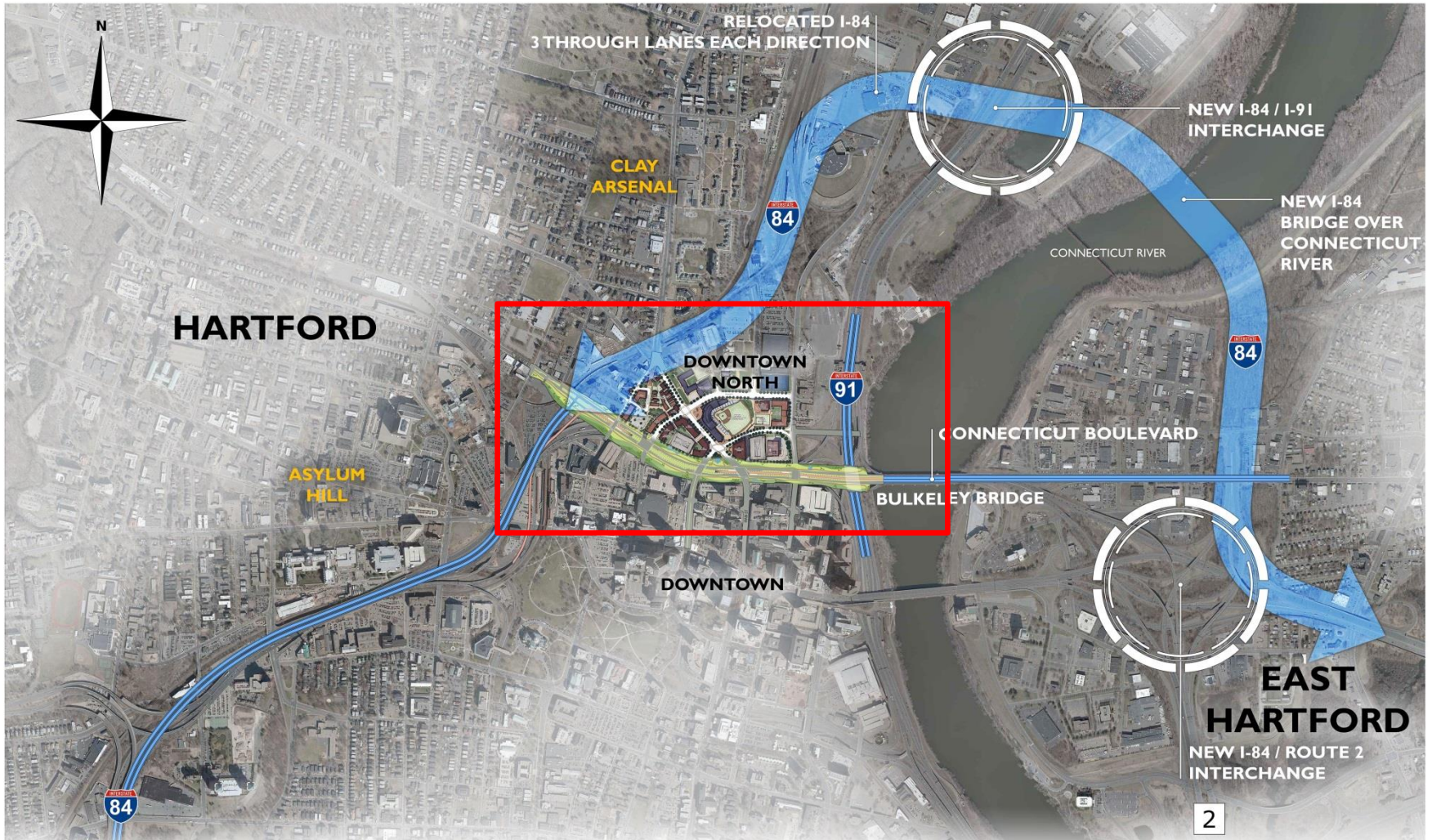


EXISTING ALIGNMENT CONCEPT

I-84 CAPACITY IMPROVEMENTS

TranSystems
EXPERIENCE | Transportation

I-84 HARTFORD PROJECT



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NORTHERN RELOCATION CONCEPT

I-84 CAPACITY IMPROVEMENTS

INTERSTATE 84 | HARTFORD, CT

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I-84 / I-91 Interchange Study

Potential repurposing of existing I-84 through Downtown Hartford

Discussion

- Questions
- Engaging regional municipalities moving forward