



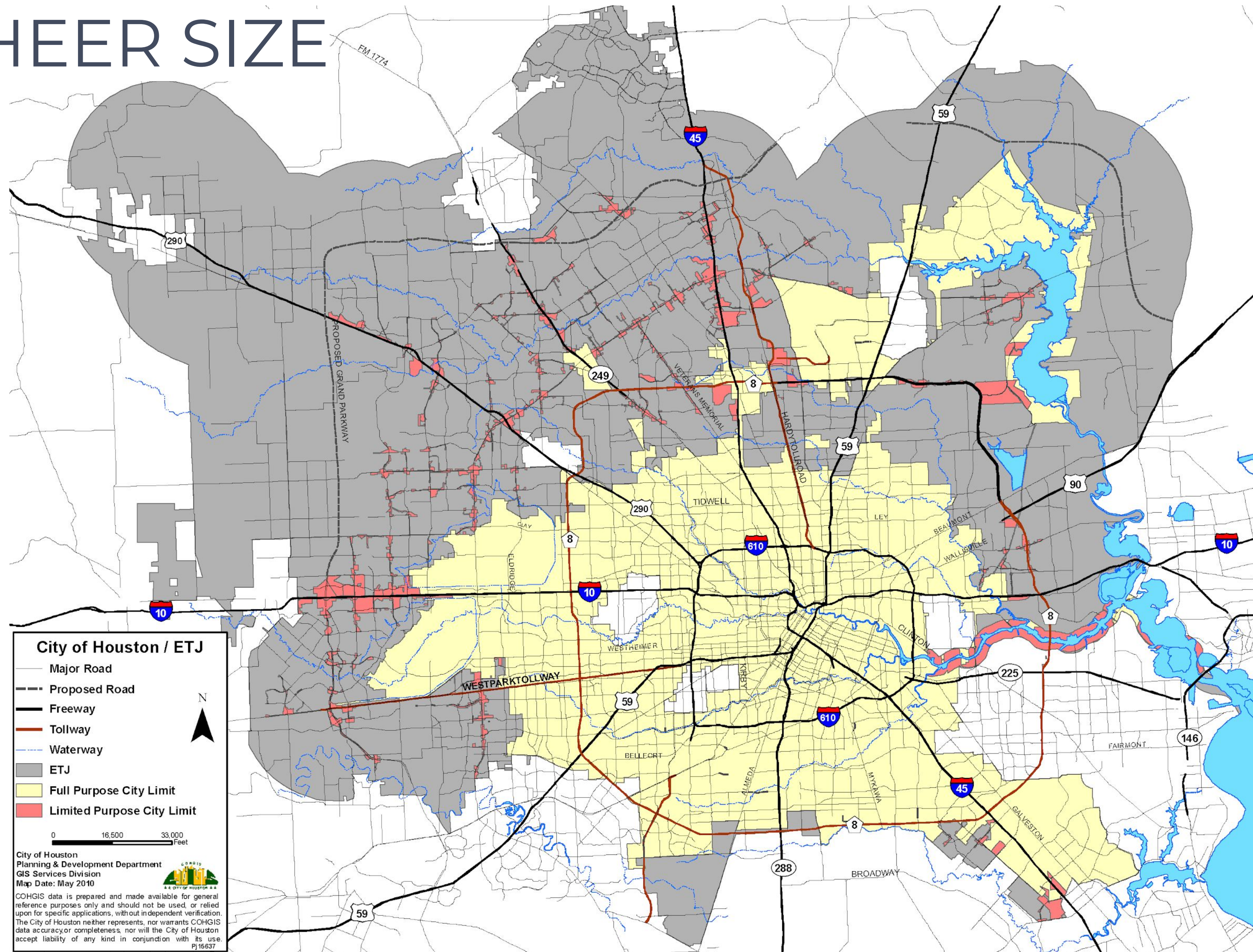
NHHIP

CIVIC OPPORTUNITIES

BILL BALDWIN

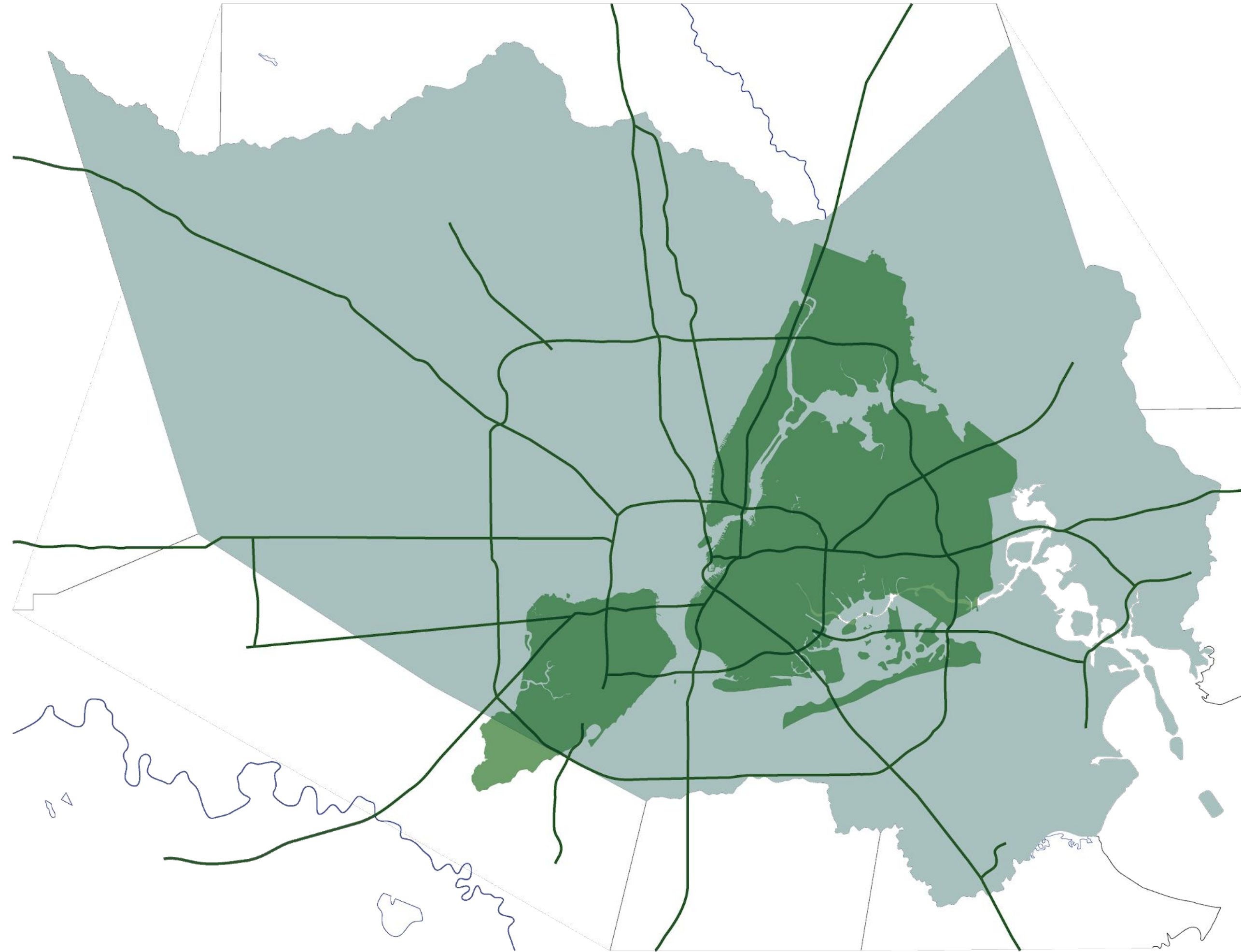
HOUSTON

OUR SHEER SIZE



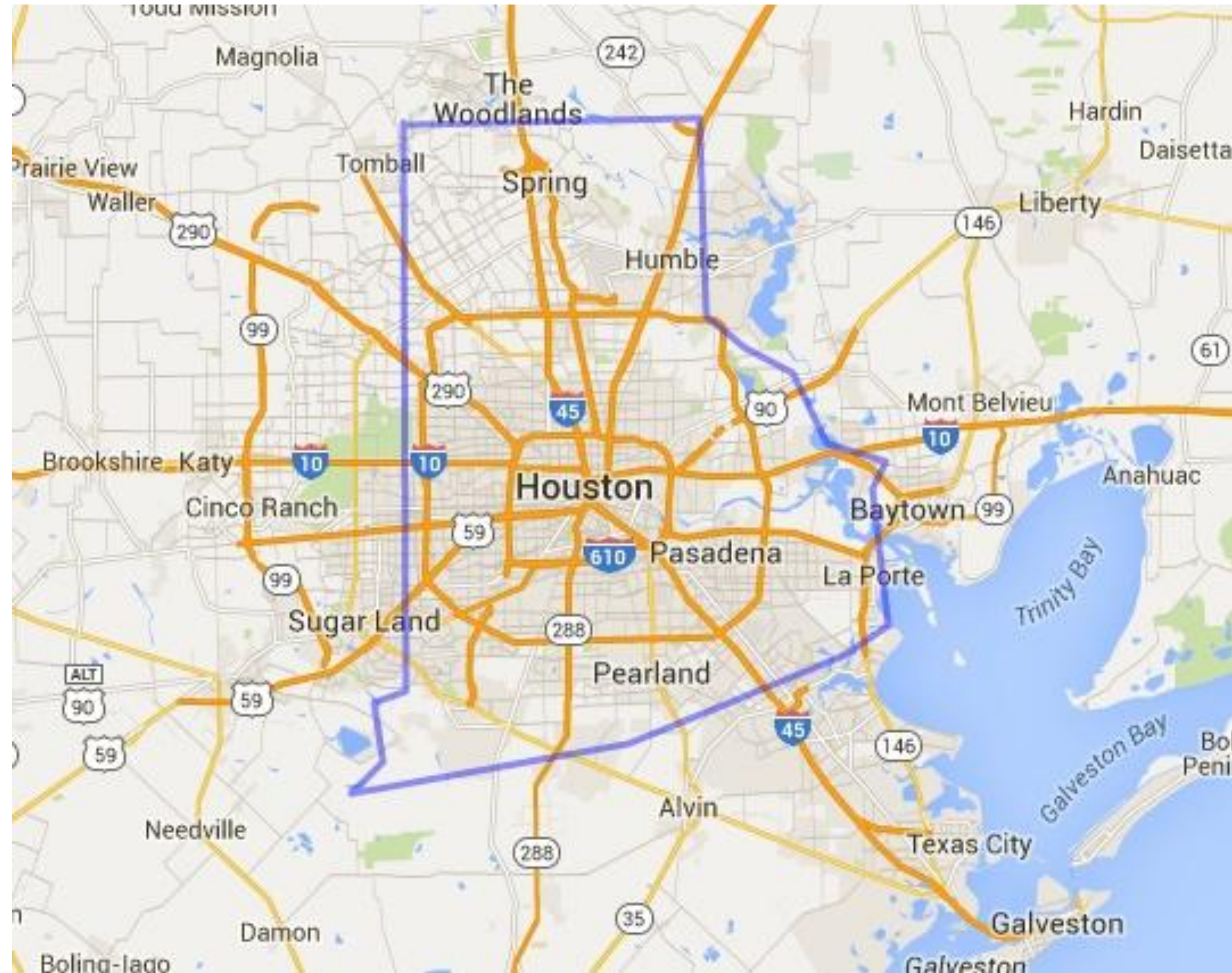
HOUSTON VS. NY'S 5 BOROUGHS

OUR SHEER SIZE



HOUSTON VS. RHODE ISLAND

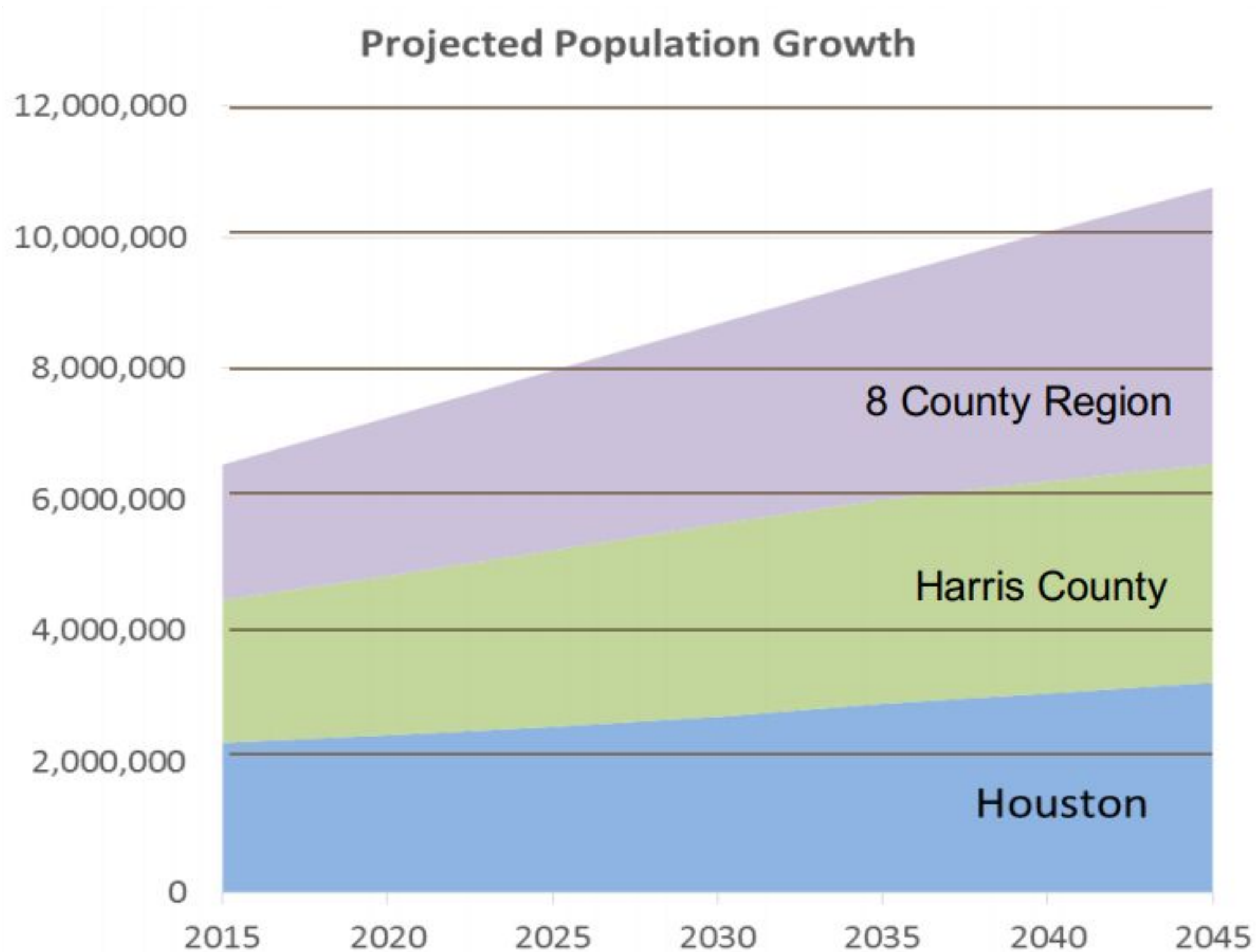
OUR SHEER SIZE



HOUSTON IS GROWING

WE ARE REALLY
PLANNING A CITY
FOR THE NEXT 50
YEARS

WE WANT THEM
TO BE SAFE AND
HAVE A HIGH
QUALITY OF LIFE

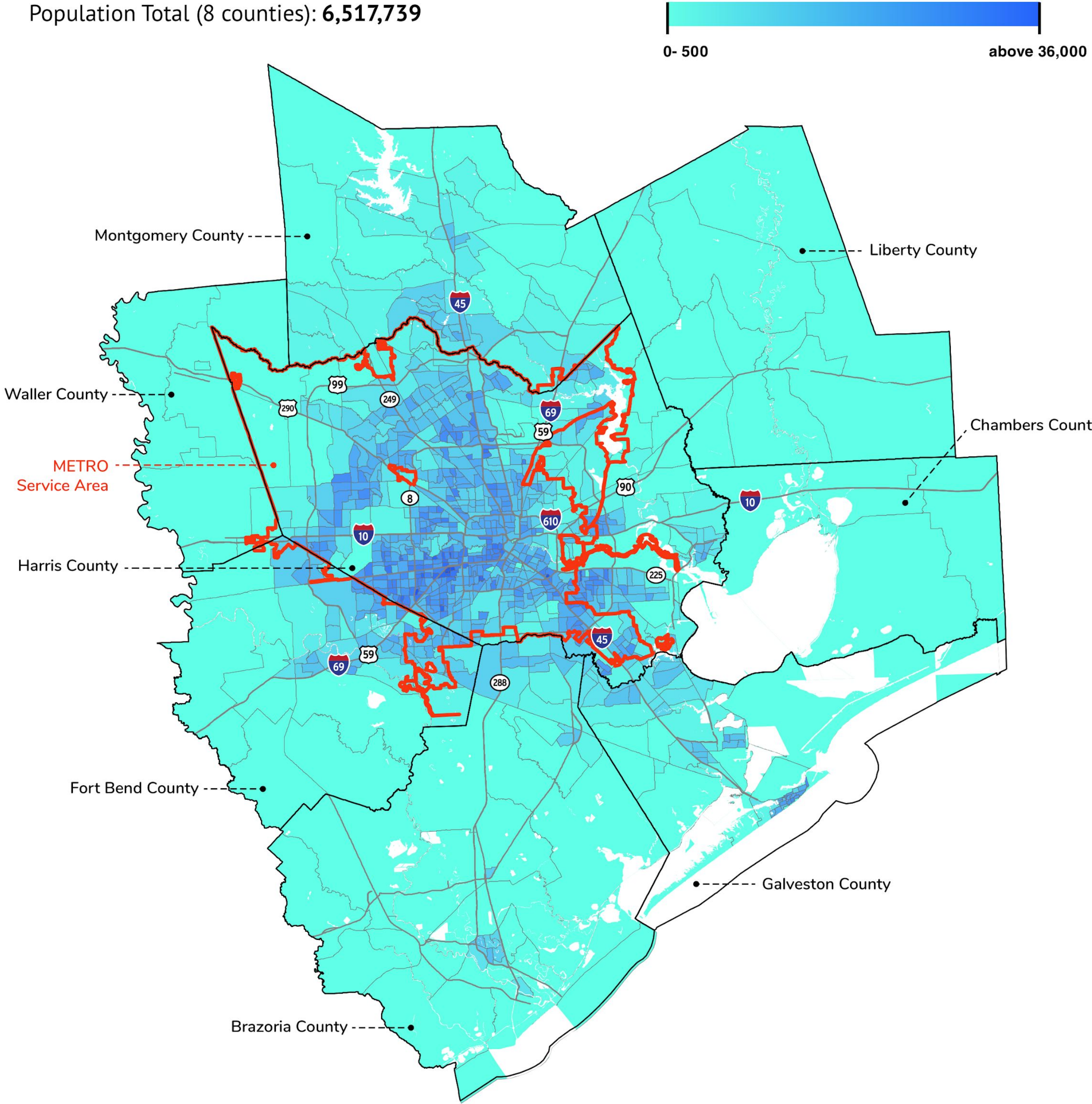


GREATER HOUSTON IS GROWING

2015
6.5 MILLION
8-COUNTY REGION

2015

Population Total (8 counties): 6,517,739

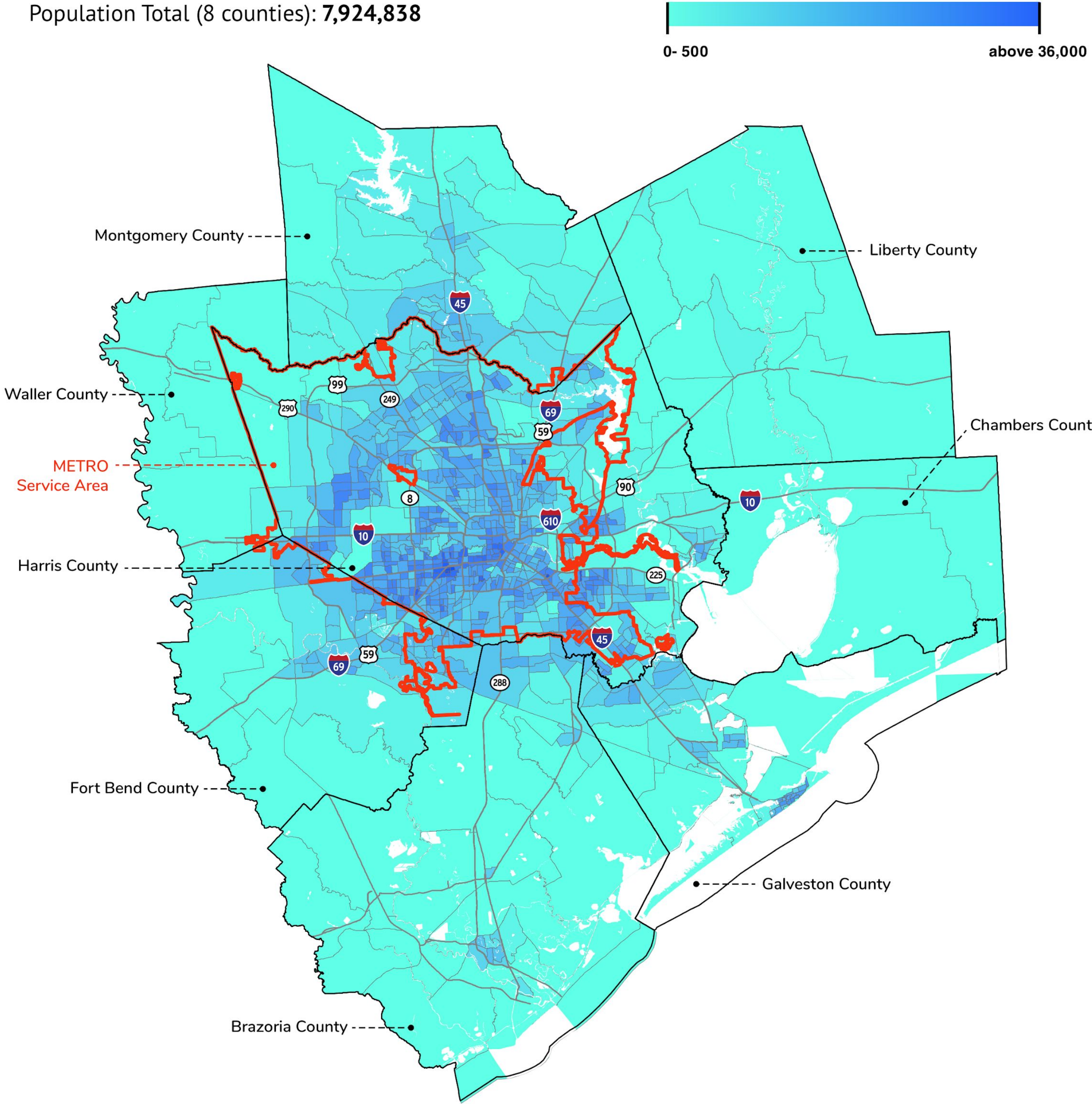


2025

Population Total (8 counties): 7,924,838

PLANNING TO PERMITTING

**GREATER
HOUSTON
IS GROWING
PROJECTED 2025
7.9 MILLION
8-COUNTY REGION**

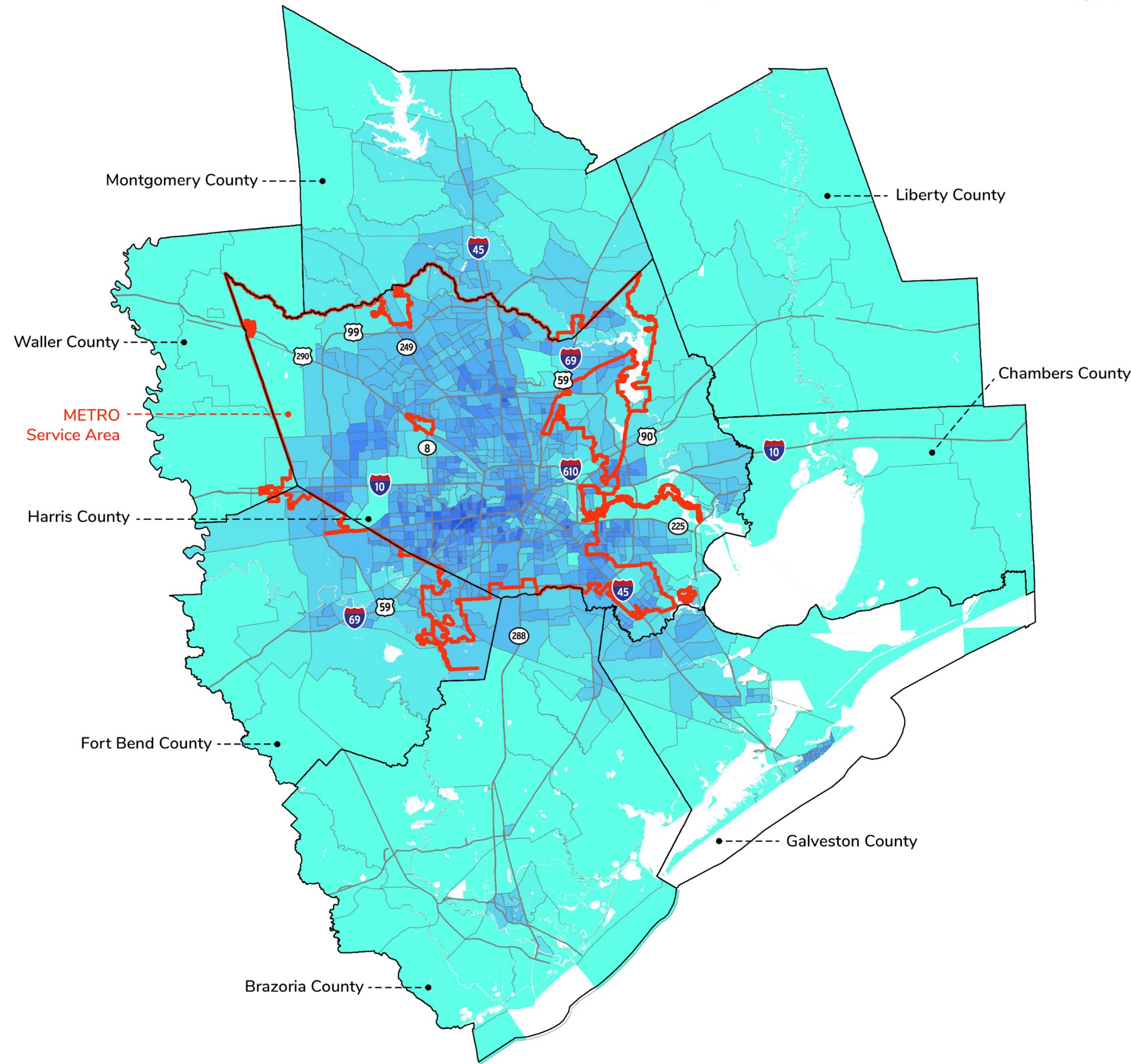
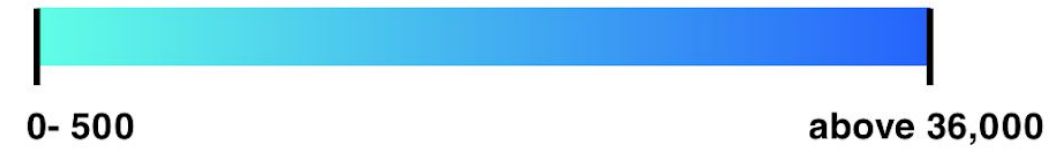


2040

Population Total (8 counties): 10,018,623

PLANNING TO PERMITTING

**GREATER
HOUSTON
IS GROWING
PROJECTED 2040
10 MILLION
8-COUNTY REGION**

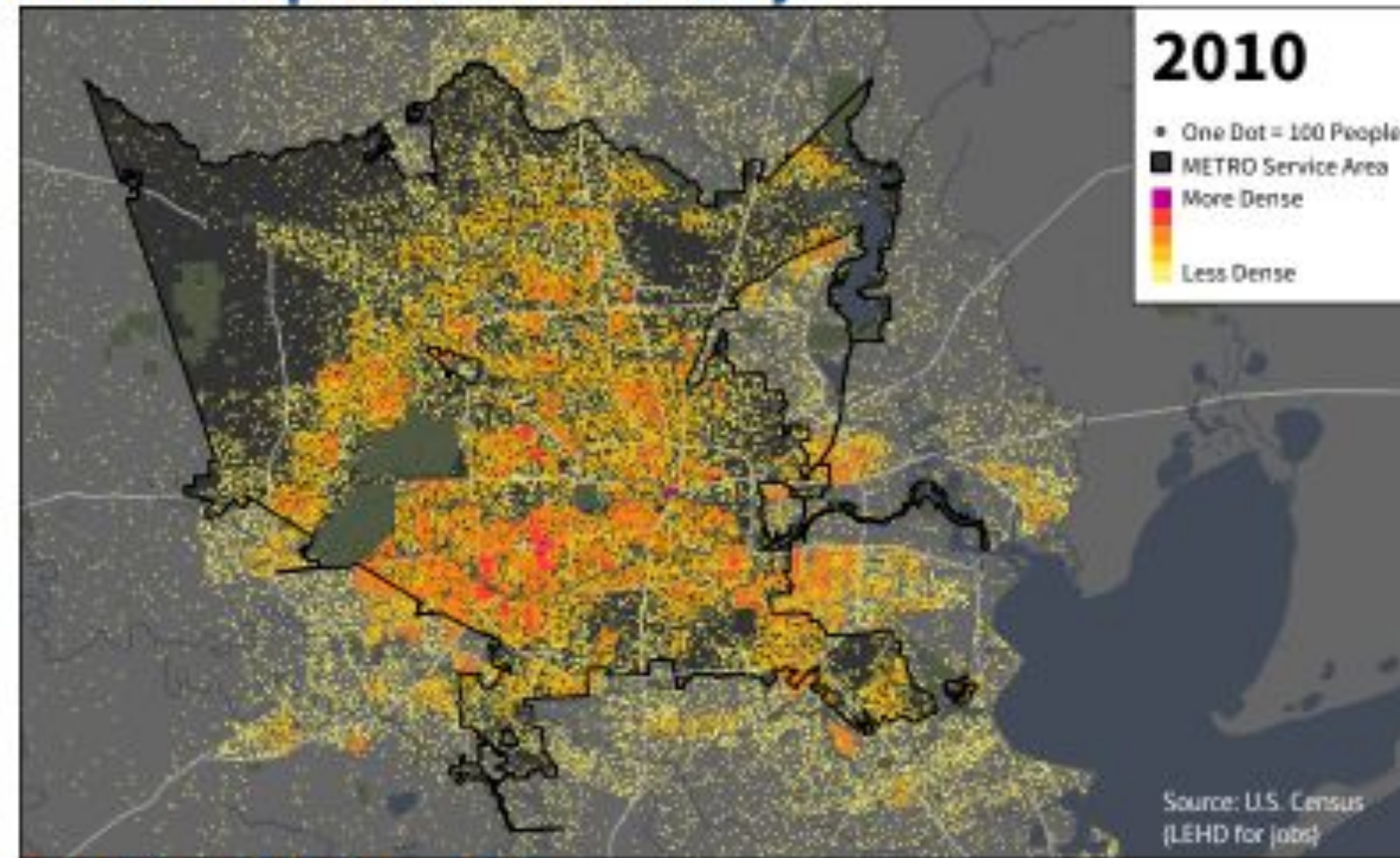


METRO*Next*

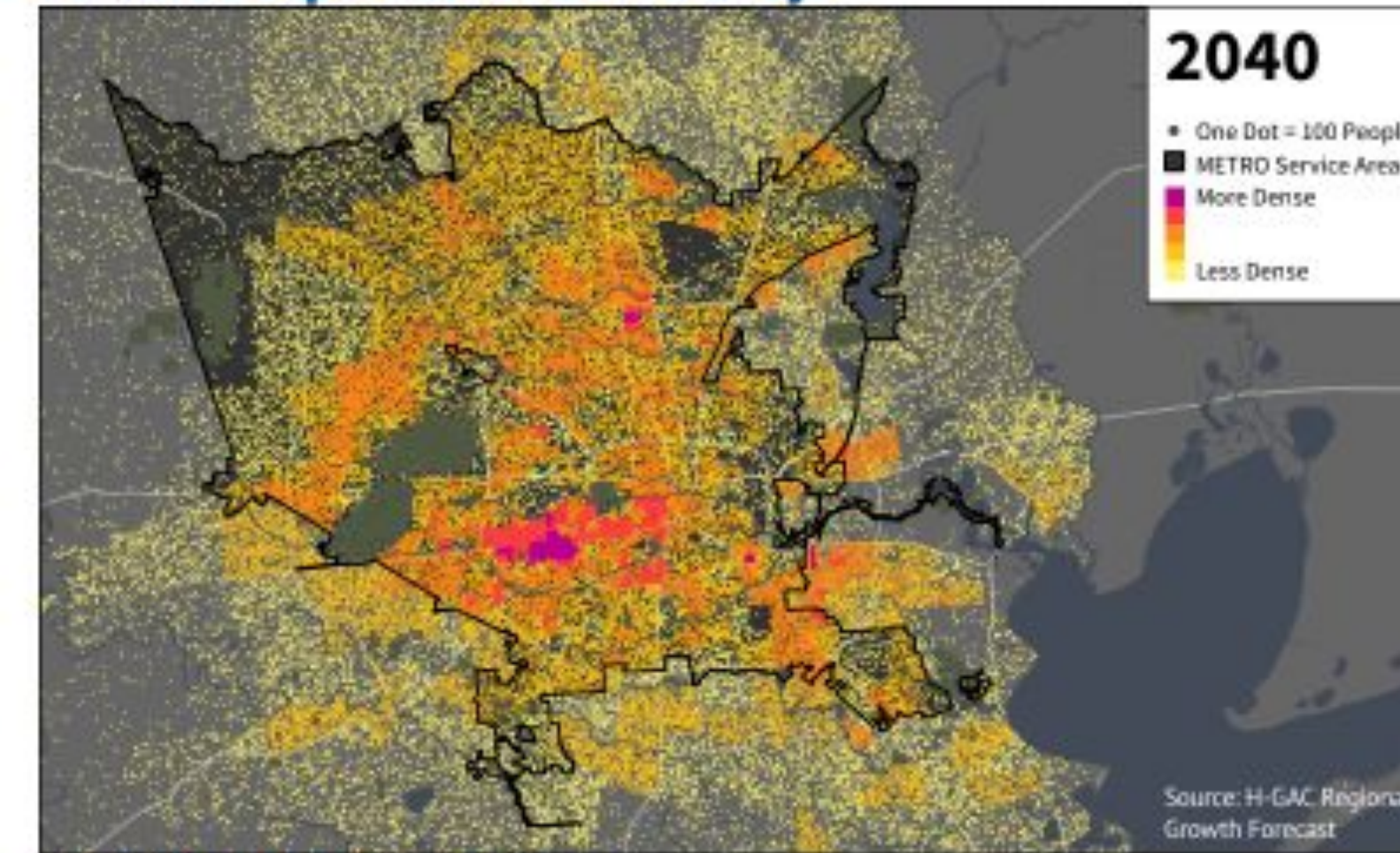


More People, More Growth, Higher Density

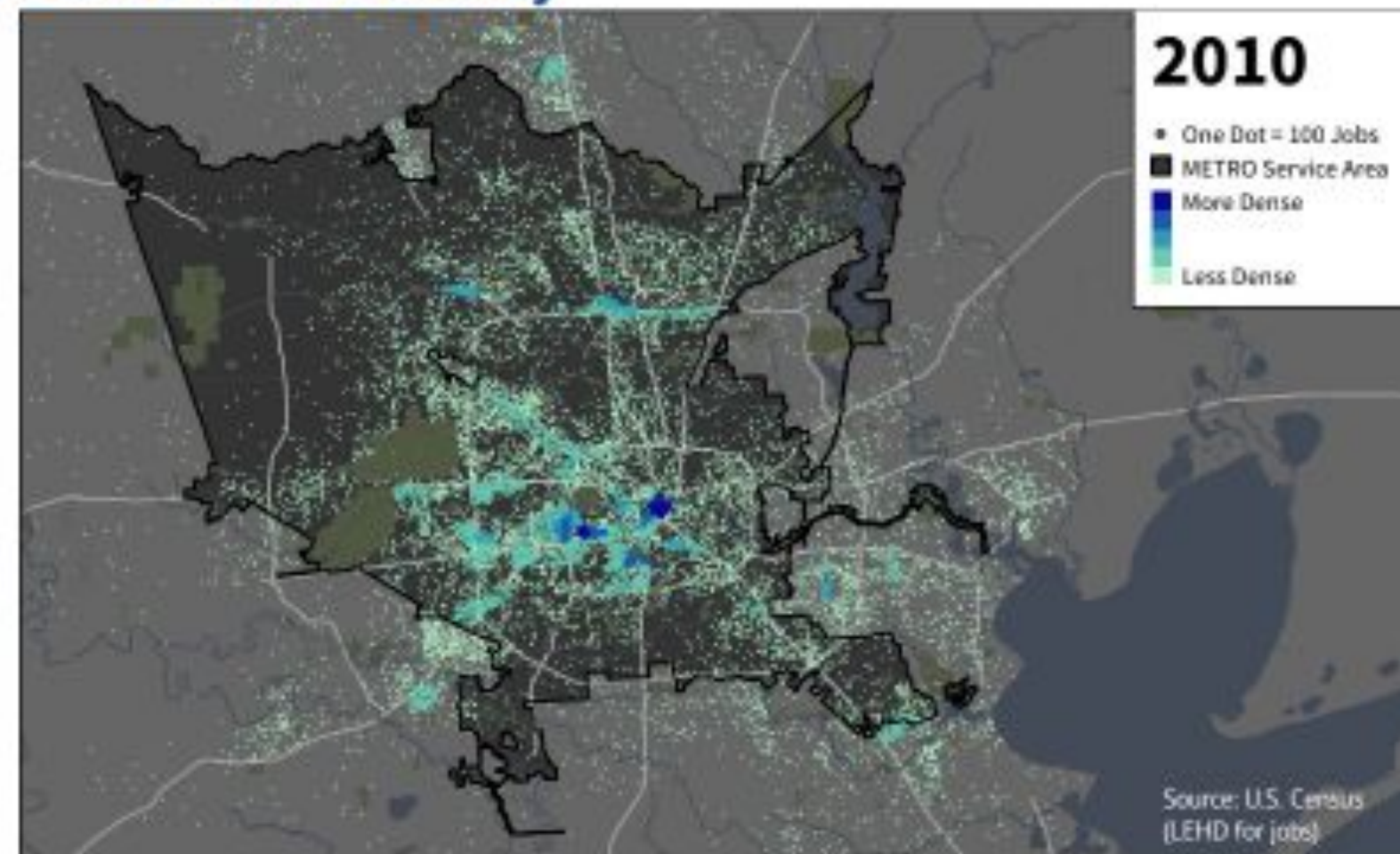
2010 Population Density



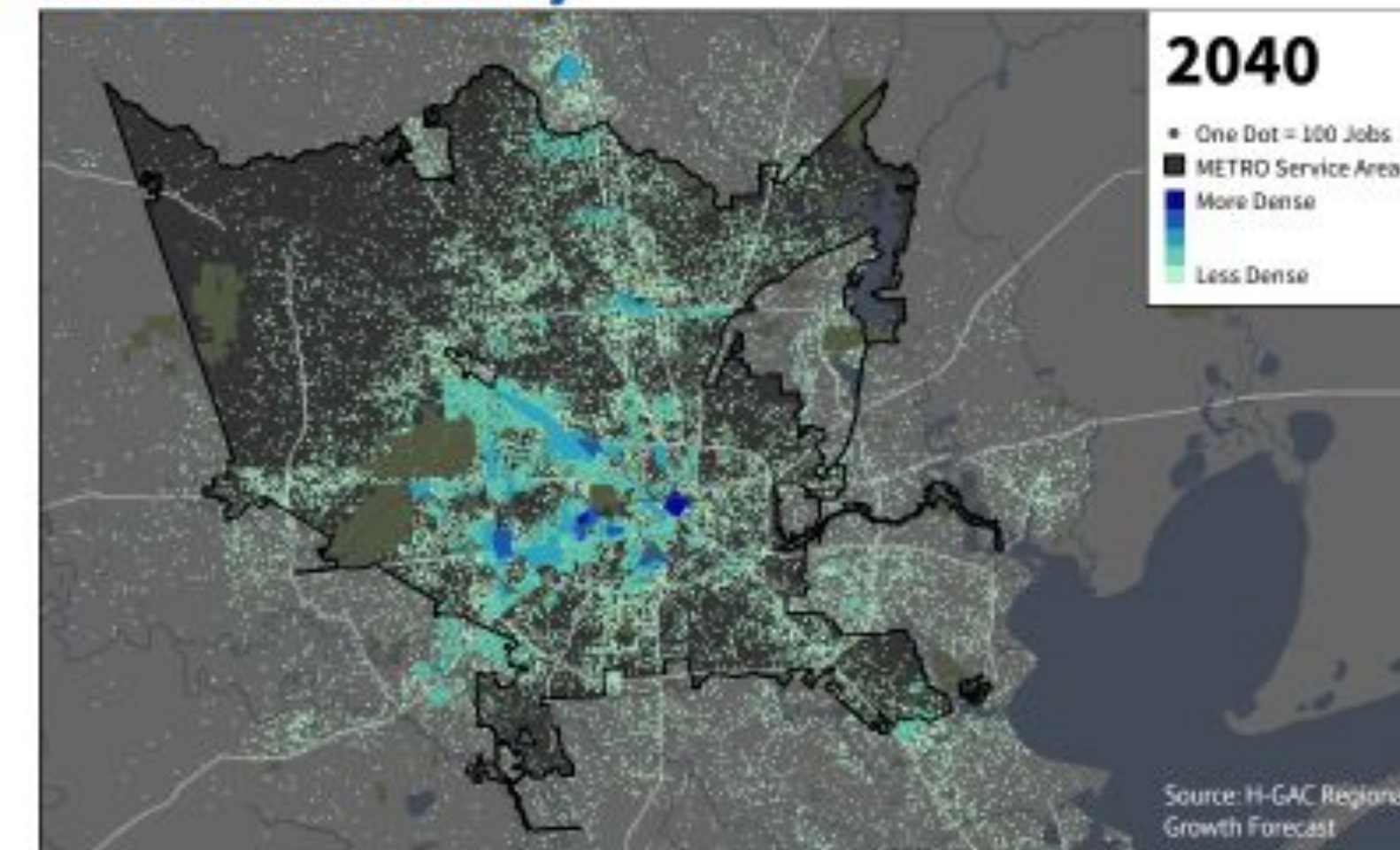
2040 Population Density



2010 Job Density



2040 Job Density



METRONext



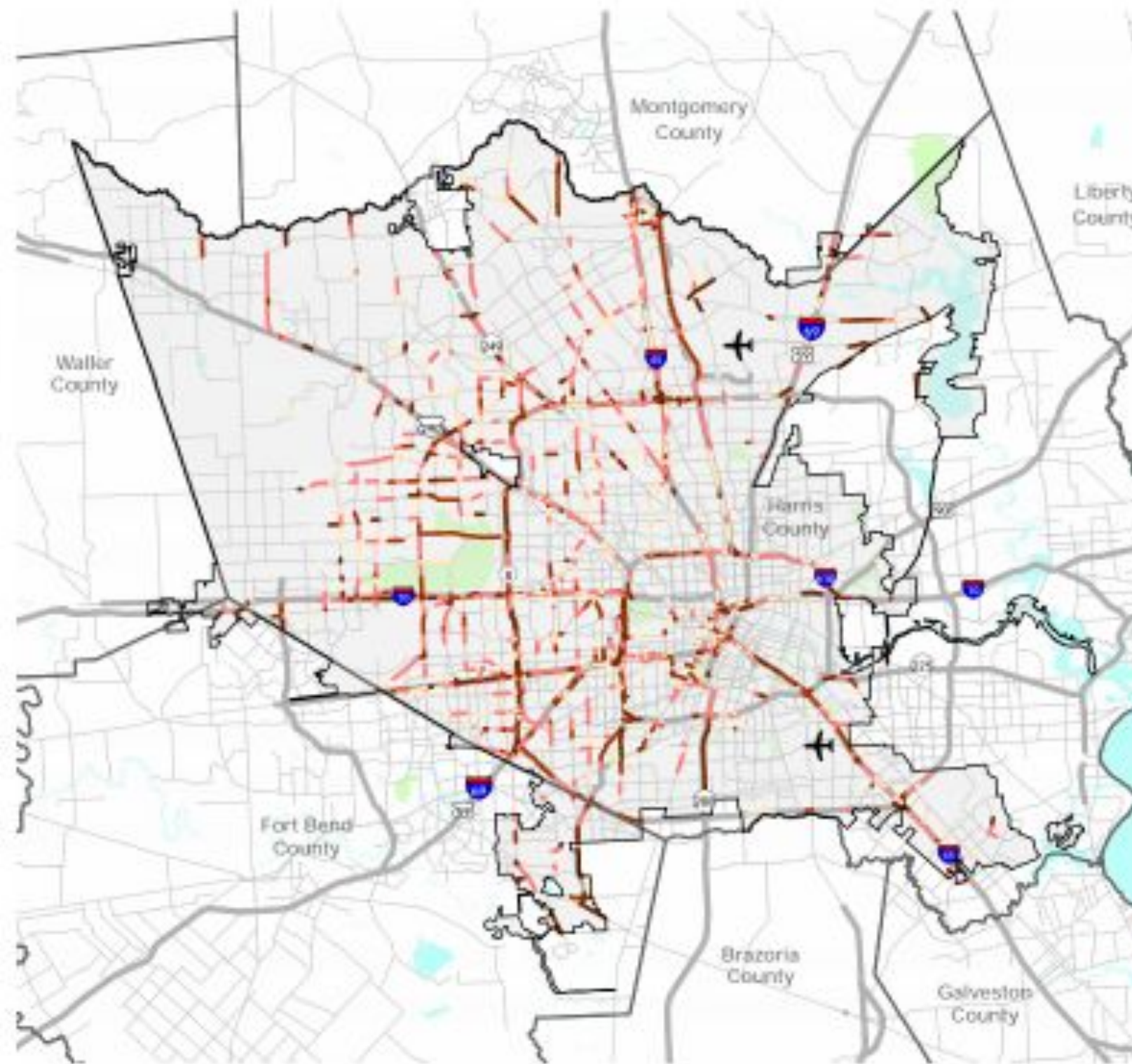
With Growth Comes Congestion

2018 Estimated AM Peak Hour Congestion

- 2018 AM Congestion**
- Slow Down
 - Congested
 - Very Congested
 - Extremely Congested
 - METRO Service Area

Note: Congestion was estimated based on Volume-to-Capacity Ratio (V/C), which compares roadway demand (vehicle volumes) with roadway supply (carrying capacity).

Source: H-GAC Travel Demand Model

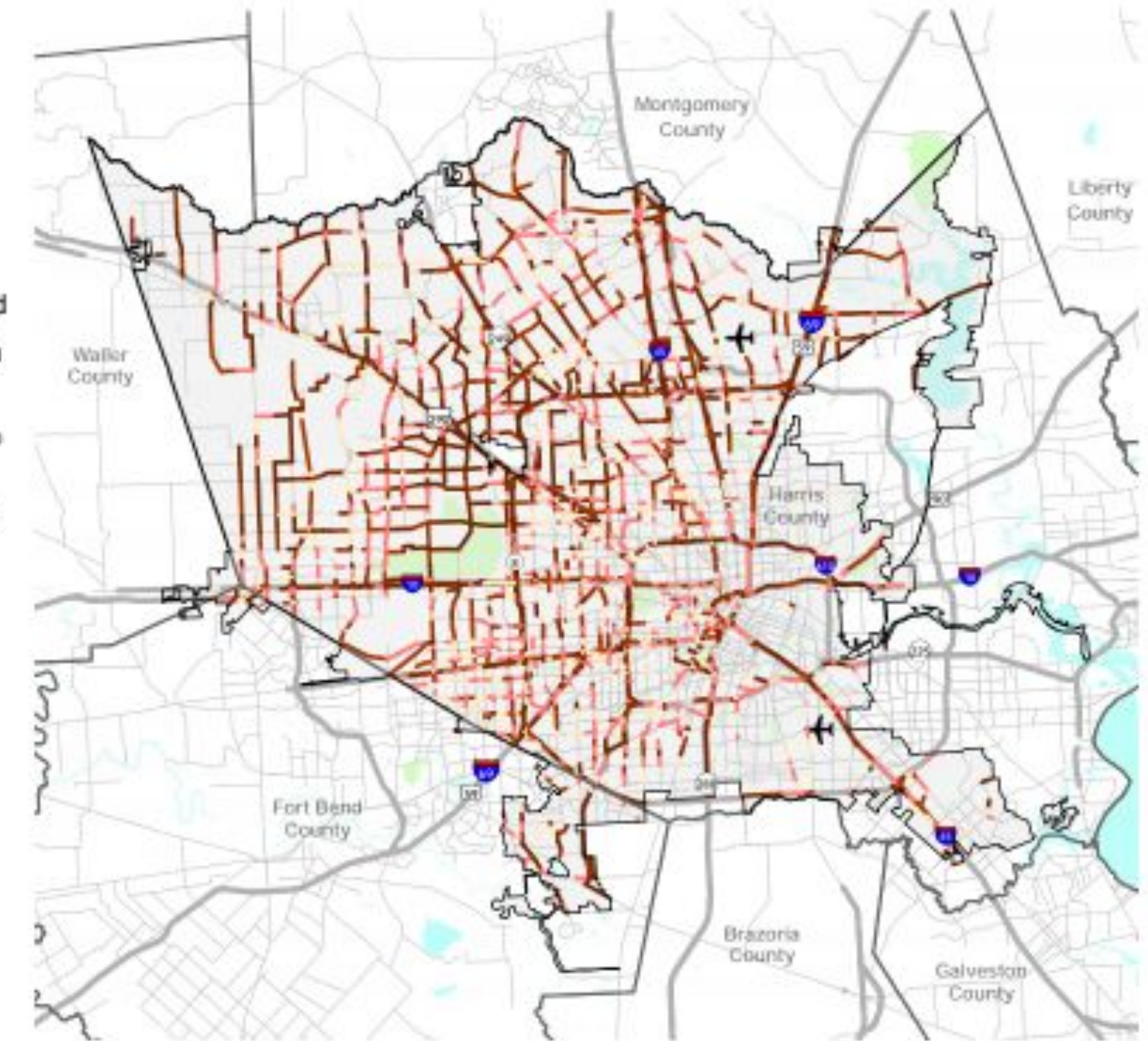


2040 Estimated AM Peak Hour Congestion

- 2040 AM Congestion**
- Slow Down
 - Congested
 - Very Congested
 - Extremely Congested
 - METRO Service Area

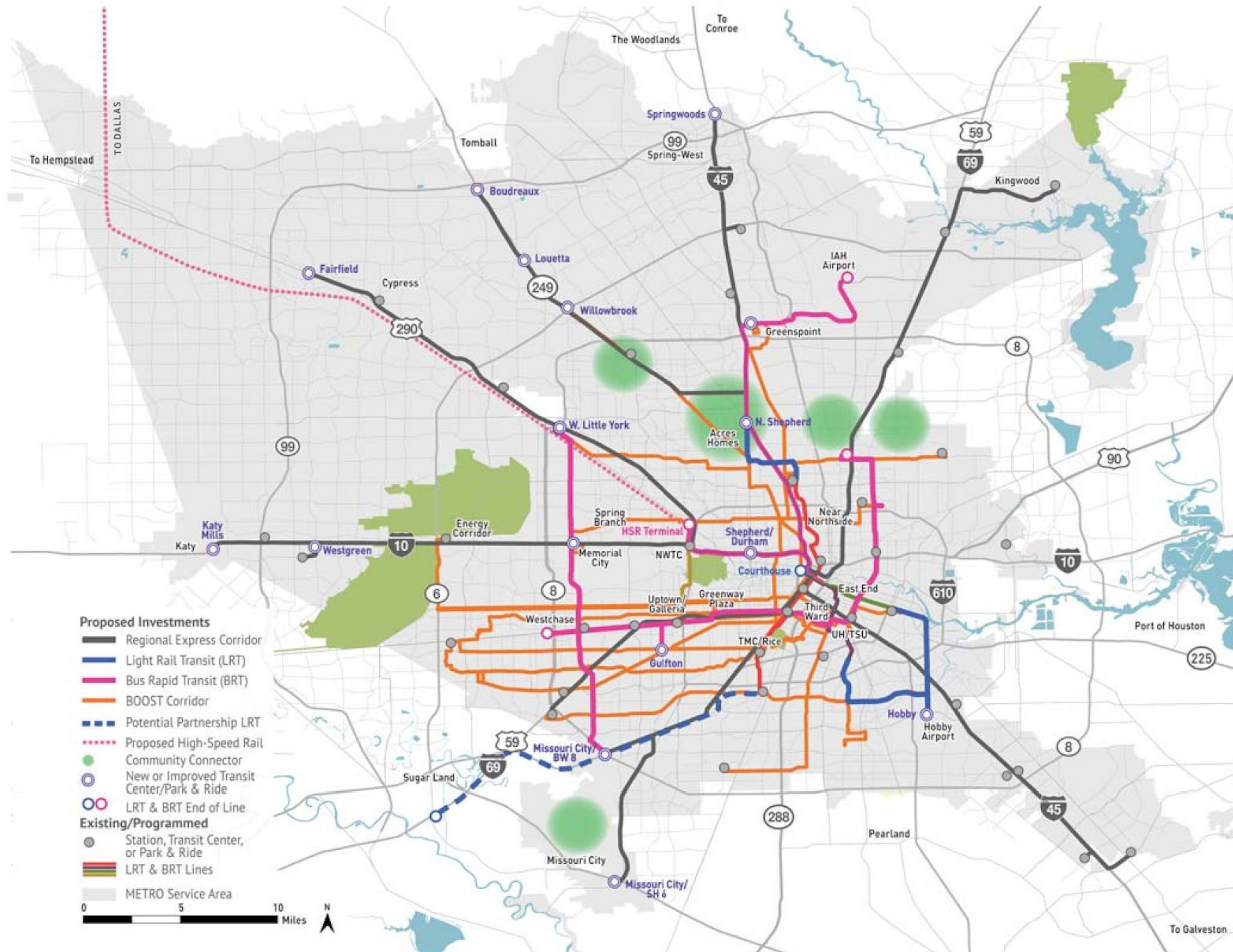
Note: Congestion was estimated based on Volume-to-Capacity Ratio (V/C), which compares roadway demand (vehicle volumes) with roadway supply (carrying capacity).

Source: H-GAC Travel Demand Model





Moving Forward Plan



SERVING MORE PEOPLE, MORE PLACES



- Almost 250% more people within walking distance will have access to the Light Rail Transit (LRT) and Bus Rapid Transit (BRT) networks.



- The IAH Airport BRT provides direct access between Downtown, Greenspoint, and IAH Airport delivering faster and more convenient trips.
- Extension of the existing Green and Purple light rail lines provides direct connections to Hobby Airport.



- Inner Katy BRT Line provides a rapid transit connection between Uptown and Downtown with fast connections to the proposed High-Speed Rail Terminal.
- The University Corridor BRT Line provides a rapid and vital east-west connection between multiple activity centers.



- The plan more than doubles ridership compared to current year.
- The METRO system will provide 632,000 daily passenger trips in 2040.

FASTER, MORE RELIABLE, AND MORE OFTEN



- Improvements in all major freeway/HOV corridors create new options for commuters to avoid traffic and enjoy faster trips.
- The Inner Katy BRT Line's dedicated bus lanes benefit all commuters in the IH 10 West and US 290 corridors.



- New investments significantly improve transit travel times.
- Increased service on more routes improves reliability.



- METRONext will eliminate 134,000 more auto trips daily.

BETTER ACCESS & CUSTOMER EXPERIENCE



- Universal accessibility, bus stop improvements, and first/last mile connections make it easier to connect with transit.



- More than 280% low-income households within walking distance will have access to the LRT/BRT network.



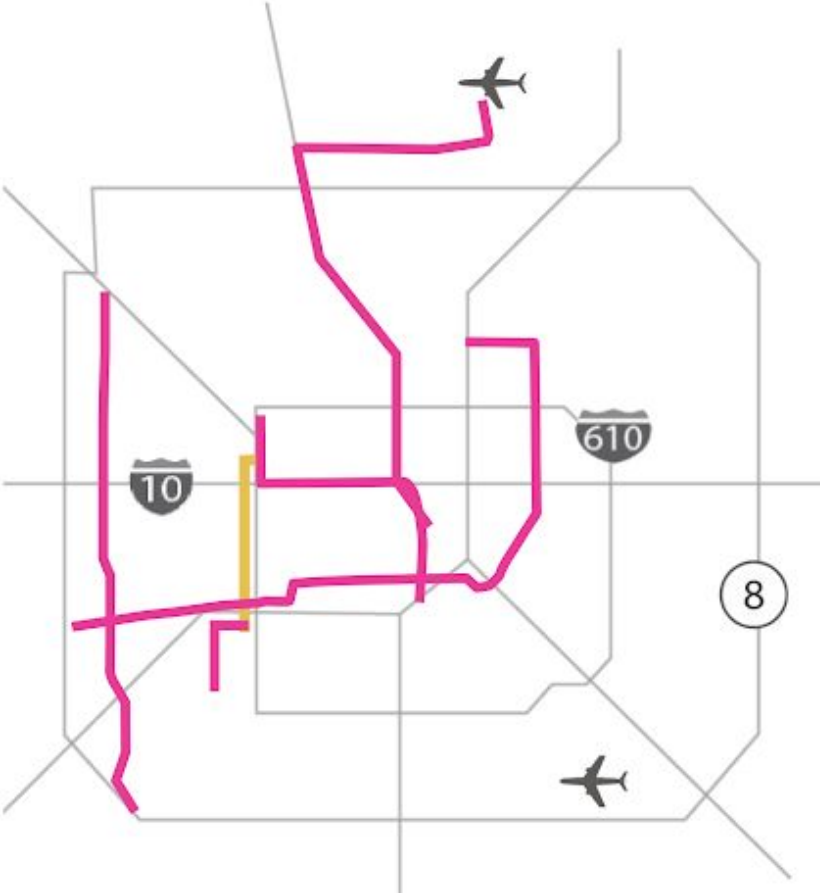
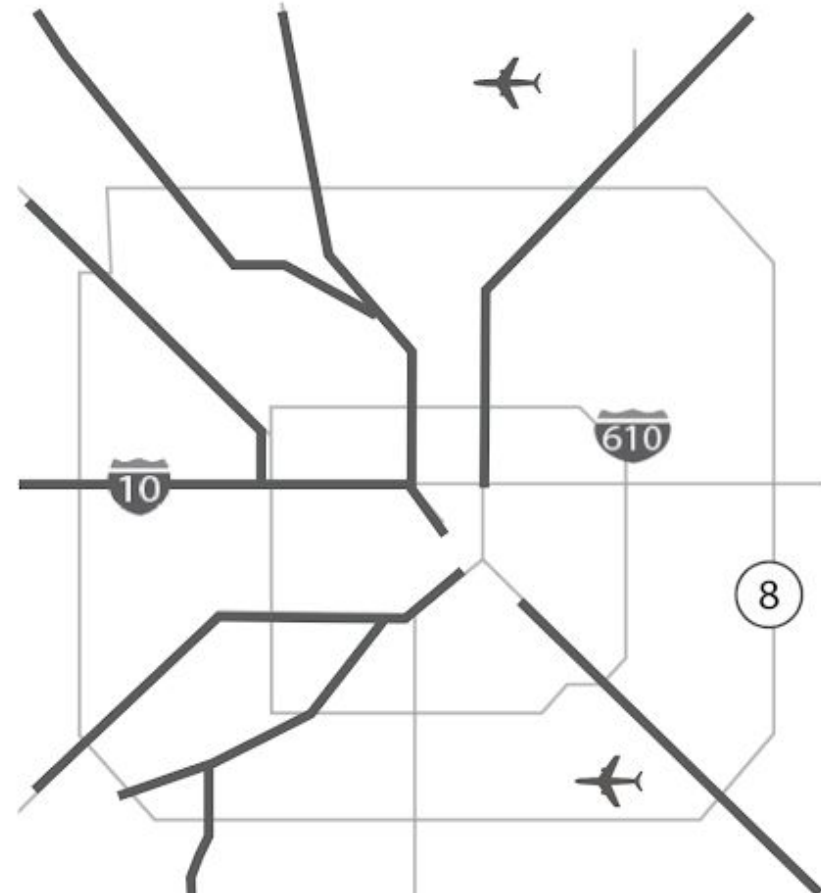
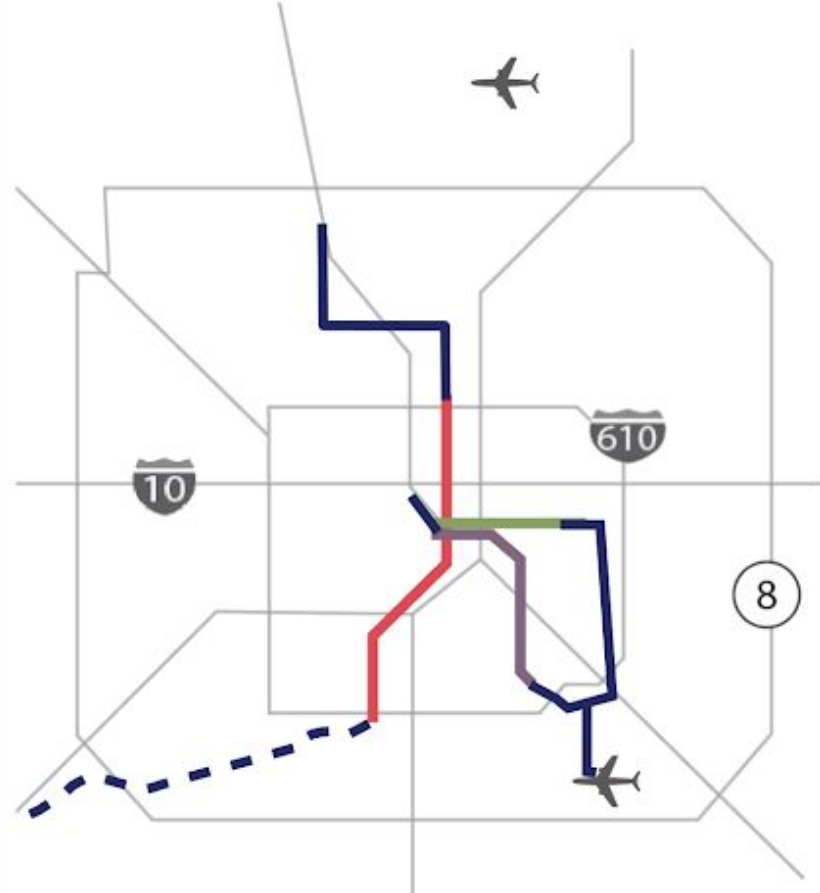


- New Community Connectors efficiently increase transit access in lower-density areas.



- 25% increase in bus service, new routes, and improved amenities will improve reliability and access to transit.



Moving Forward Plan

METRORAPID (BRT)	REGIONAL EXPRESS	METRORAIL (LRT)	BOOST AND SIGNATURE	SYSTEM ENHANCEMENTS
 <ul style="list-style-type: none"> • APPROXIMATELY 75 MILES OF METRORAPID SERVICE • FIVE NEW METRORAPID CORRIDORS <p>The METRORapid Bus Rapid Transit (BRT) network is designed to provide station-to-station service similar to METRORail, but has the flexibility to accommodate multiple routes. A METRORapid line will provide a direct connection between Downtown and George Bush Intercontinental Airport. Another METRORapid line will provide direct, rapid service between Downtown, Uptown, Northwest Transit Center and the proposed High-Speed Rail terminal. Exclusive lanes could be used for autonomous vehicle transit in the future. METRORapid projects include:</p> <ul style="list-style-type: none"> • Interstate Highway 45 North to George Bush Intercontinental Airport and Greenspoint • Inner Katy Corridor to Northwest Transit Center / Proposed High Speed Rail / Uptown • University Corridor between Westchase and Tidwell • Uptown Corridor extension to Gulfton • West Houston Corridor between West Little York Park & Ride and Missouri City 	 <ul style="list-style-type: none"> • APPROXIMATELY 110 MILES OF NEW OR IMPROVED HOV • REVERSE COMMUTE OPTIONS <p>The Regional Express Network is designed to provide transit trips between job centers and other major destinations throughout the day, seven days a week. It will use two-way HOV lanes providing direct access to existing and new transit centers and Park & Rides. The commuter buses will use improved bus lanes in Downtown and the Texas Medical Center, and provide connections to the METRORail and METRORapid networks. Regional Express projects include:</p> <ul style="list-style-type: none"> • United States Highway 90A Two-Way HOV • Interstate Highway 10 West Two-Way HOV • Interstate Highway 45 North Two-Way HOV • United States Highway 59/Interstate Highway 69 South Two-Way HOV Downtown to Edloe • State Highway 249 Two-Way Diamond Lanes/HOV • 4 Off-Peak Direction Diamond Lane Corridors 	 <ul style="list-style-type: none"> • APPROXIMATELY 16 MILES OF METRORAIL EXTENSIONS • FOUR NEW EXTENSIONS + ONE PARTNERSHIP PROJECT <p>The expansion of the METRORail Light Rail Transit (LRT) system is designed to serve more people and places. The Red Line will extend northwest to a new multimodal center at the North Shepherd Park & Ride with connections to METRORapid, Regional Express Network, and local bus routes. The Green and Purple lines, combined, will extend to William P. Hobby Airport in the southeast, while to the west of Downtown the lines will be extended to the City of Houston Municipal Courthouse. METRORail projects include:</p> <ul style="list-style-type: none"> • Connecting the Green Line and Purple Line and extending the combined lines to William P. Hobby Airport • Extensions of Green and Purple Lines to the City of Houston Municipal Courthouse • Extension of Red Line to North Shepherd • Potential Red Line Extension - Fannin South Transit Center to Missouri City and Sugar Land (Phase 1 project development only; further project development requires a defined partnership) 	 <ul style="list-style-type: none"> • APPROXIMATELY 290 MILES OF BOOST AND SIGNATURE NETWORK • 16 BOOST ROUTES + ONE SIGNATURE BUS SERVICE <p>The BOOST network includes 16 of METRO's high-ridership, frequent bus routes where speed, reliability and access improvements are designed to enhance the customer experience. Improvements could include bus stop relocation, new shelters and accessibility upgrades, transit signal priority, and real-time passenger information. The Westheimer Signature Bus Service is designed to include infrastructure and service improvements to provide fast transit connections between Downtown, Greenway, Uptown, Westchase, and West Oaks (at State Highway 6). The Signature Service will use a new two-way HOV facility on United States Highway 59/Interstate Highway 69 South between Midtown and Edloe Street.</p>	 <ul style="list-style-type: none"> • Approximately 21 new or improved Park & Rides and Transit Centers • Approximately 10 new Community Connectors / Circulators • Systemwide route improvements • Bus stop enhancements, such as new shelters, accessibility upgrades, and enhanced passenger information • Bus Operating Facility • Downtown, Midtown, and Texas Medical Center transit improvements • Park & Ride Service Enhancements • Accessibility and usability improvements and other investments designed to reduce barriers for seniors, the disabled and other users of METRO's transit system, including METROLift services • Improvements to facilitate portions of a rider's trip before and after use of METRO's transit system (First Mile/Last Mile) • Safety and Security Enhancements
COST: \$3.23 BILLION*	COST: \$1.56 BILLION*	COST: \$2.10 BILLION*	COST: \$179 MILLION*	COST: \$414 MILLION*

**NHHIP
MORE THAN
A WIDER 45**

THE HIGHWAY SHOULD...

DISAPPEAR

BUILD AN ***ICONIC*** BRAND

CELEBRATE AND CONNECT ***NEIGHBORHOODS***

NHHIP MORE THAN A WIDER 45

VERTICAL HABITAT

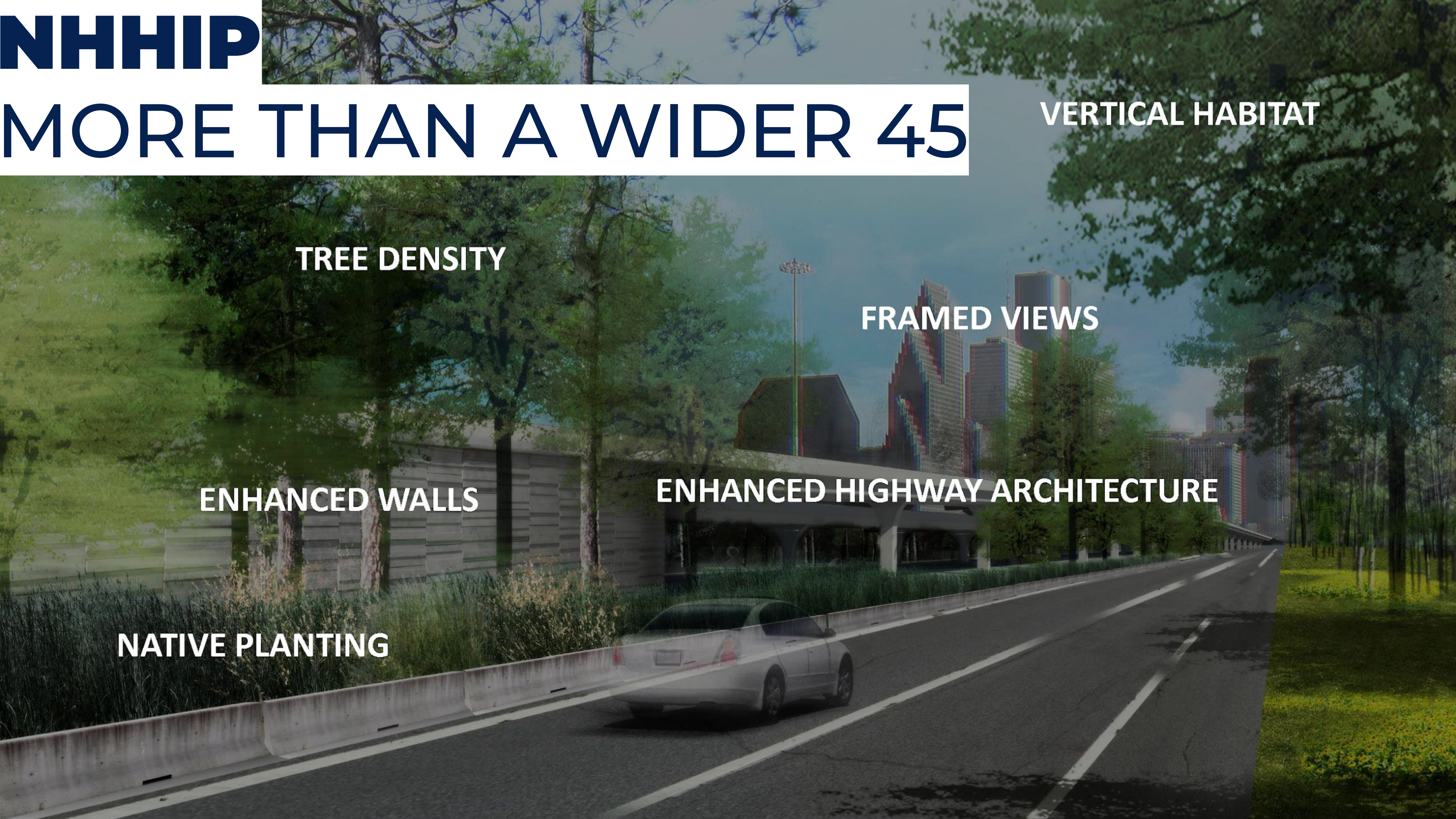
TREE DENSITY

FRAMED VIEWS

ENHANCED WALLS

ENHANCED HIGHWAY ARCHITECTURE

NATIVE PLANTING



NHHIP
MORE THAN
A WIDER 45

OPEN VIEWS

MANICURED LANDSCAPE

ICONIC ELEMENTS

THEMATIC IDENTITY FEATURES

BRANDED COLUMNS



NHHIP MORE THAN A WIDER 45

SHADE TREES

NEIGHBORHOOD IDENTITY

LOCALLY SOURCED ART

PLAY SPACE

ENHANCED CROSSWALKS

BIKE AND PED TRAILS



PLANNING TO PERMITTING

NORTH HOUSTON HIGHWAY IMPROVEMENT PROJECT

SEGMENT 1

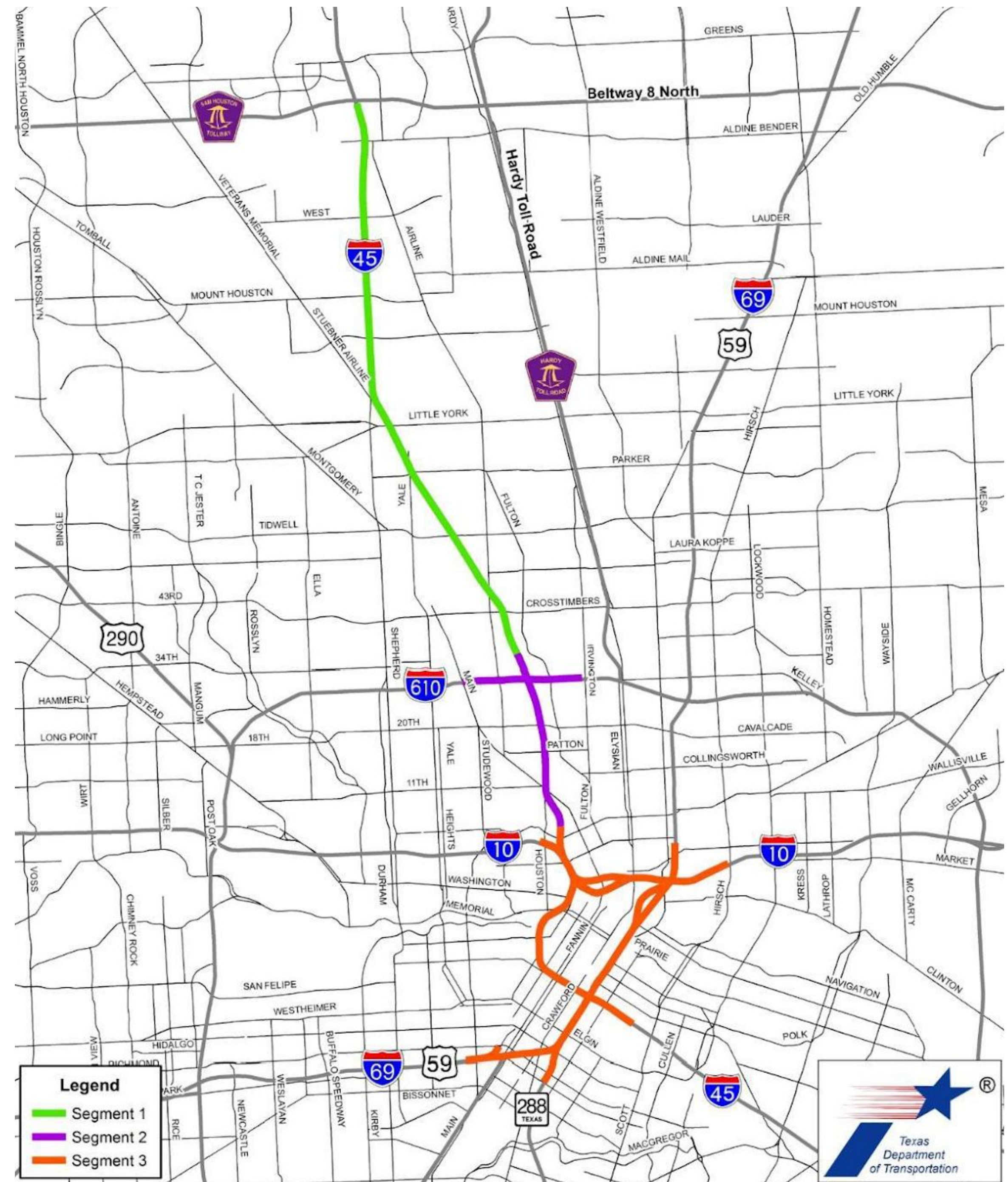
Beltway 8 to I-610 (9 mi)

SEGMENT 2

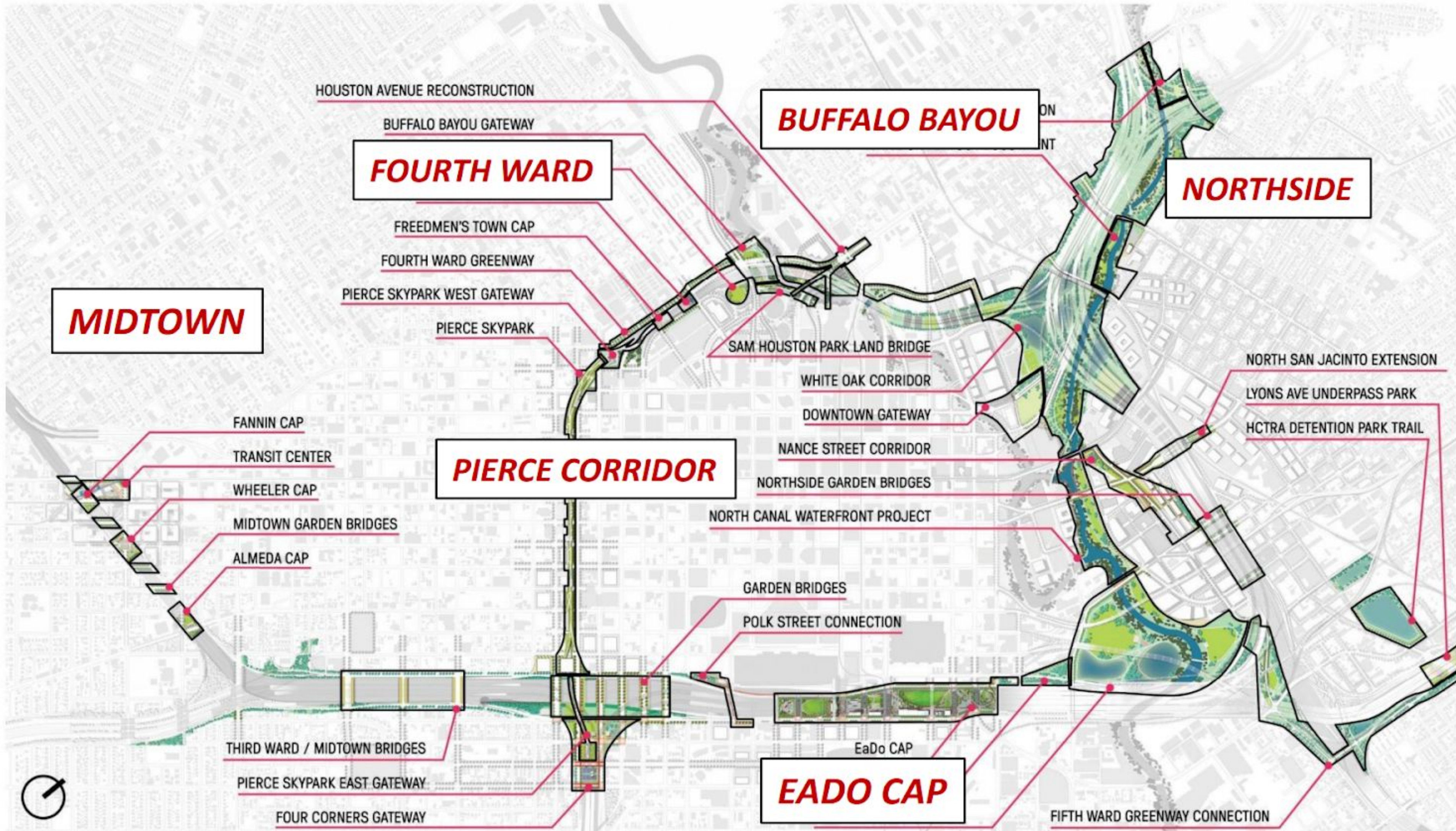
I-610 to I-10 (3 mi)

SEGMENT 3

Downtown Loop System (12.3 mi)



NHHIP Segment 3 Potential Projects



Infrastructure Connectivity Projects

National Examples



Chicago 606



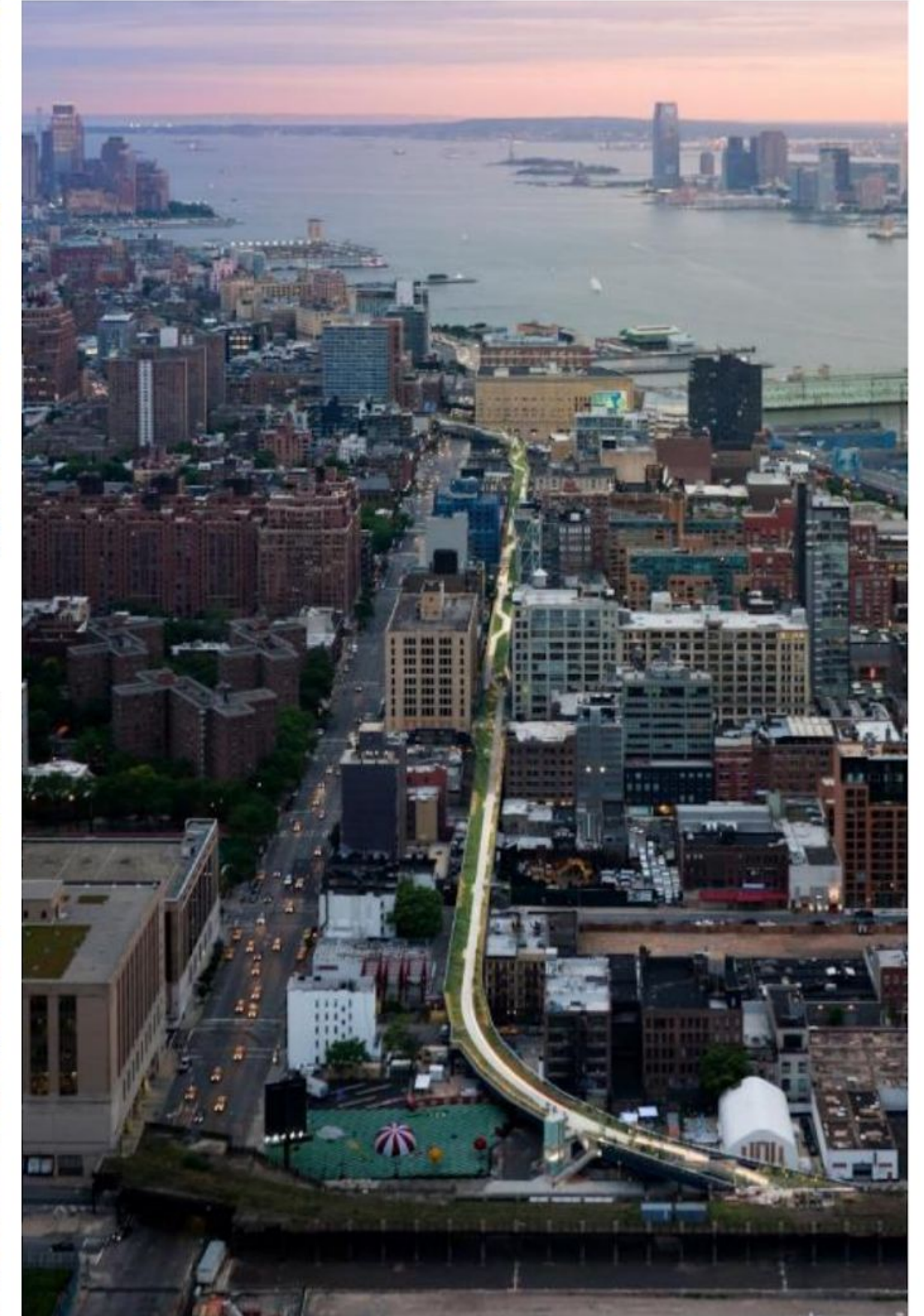
5th Street Bridge Atlanta



Atlanta Beltline



Klyde Warren Park Dallas



The Highline NYC

Cultural Trails



HOUSTON - GREEN LOOP



NYC - THE HIGH LINE



INDIANAPOLIS - CULTURAL TRAIL



CHICAGO - THE 606



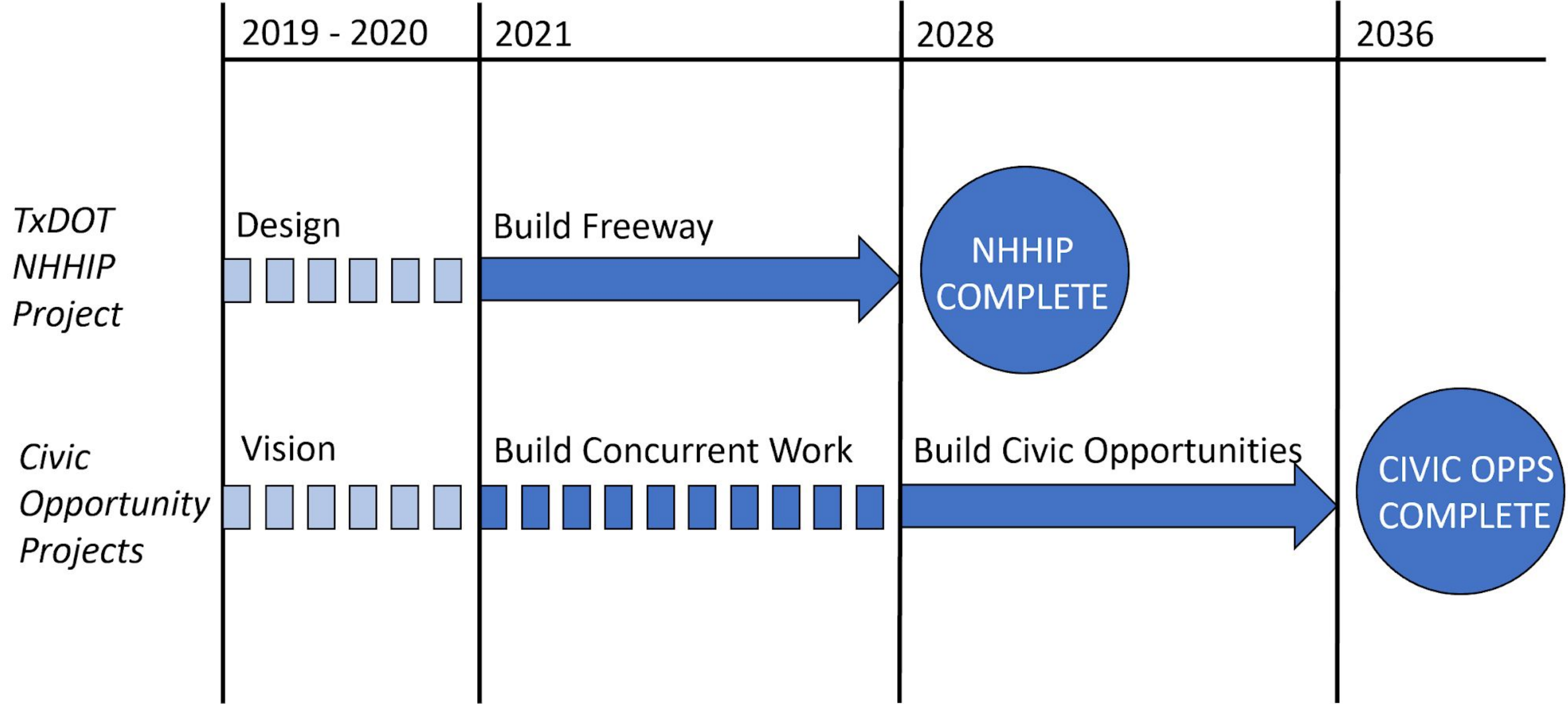
MIAMI - THE UNDERLINE



ATLANTA - BELTLINE

Segment 3 Civic Opportunities

Potential Funding Timeline



NHHIP – Segment 3

Schedule Update

2019

Request for Qualifications

Short list RFQ proposers

August 2019

Late 2019

2020

Draft Request for Proposals

Final EIS

FEIS Comments/ Record of Decision

Final Request for Proposals

Midtown (Design-Bid-Build) letting

Early 2020

February 2020

March/ April 2020

Mid 2020

August 2020

2021

Proposal Submissions to TxDOT

Recommend Conditional Award

Contract execution

Start of Design

Construction start

Early 2021

Early 2021

Mid 2021

Mid 2021

Late 2021

NHHIP – Existing Highways



NHHIP – Civic Opportunities



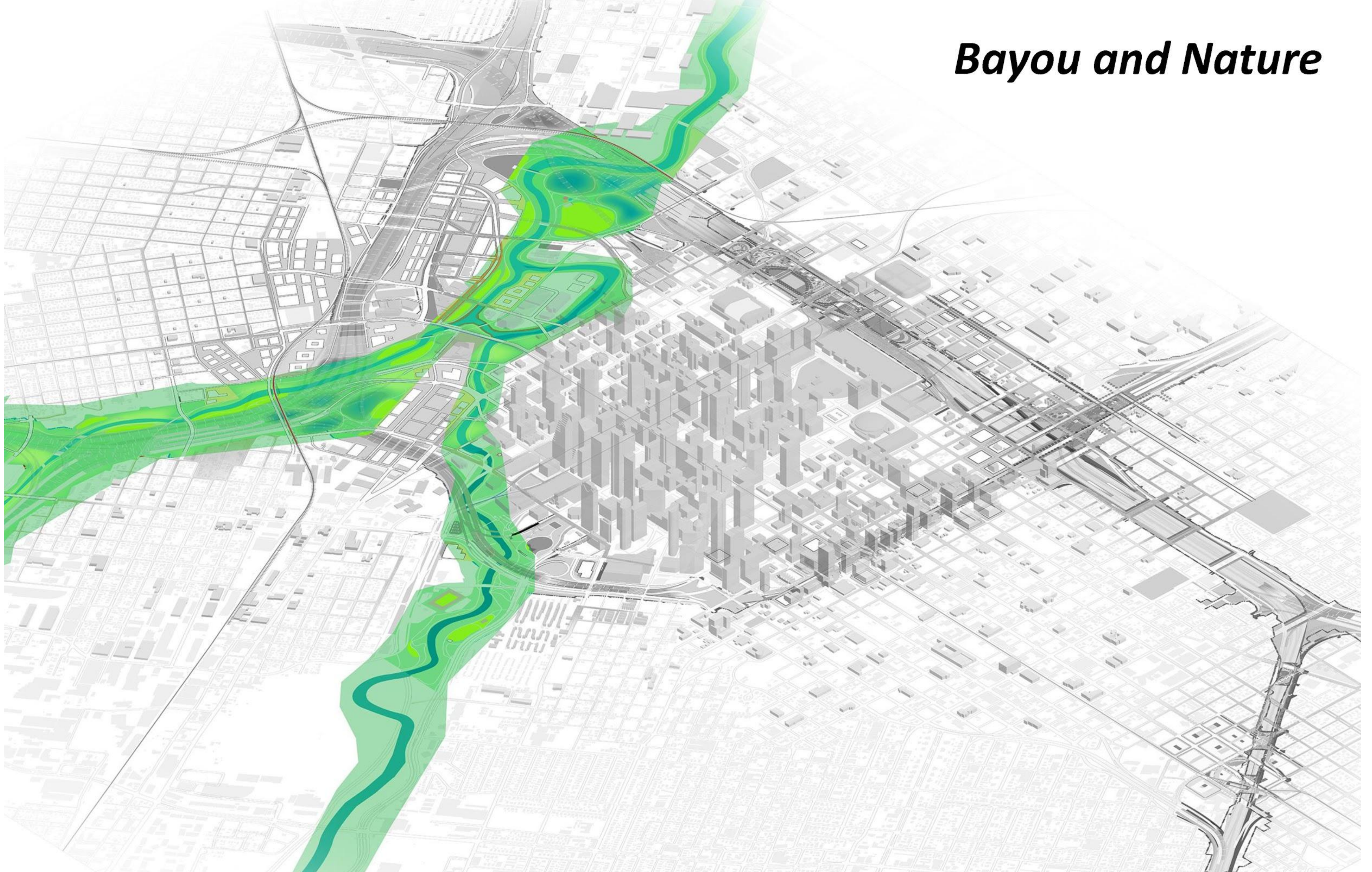
Existing Highways



New Highway Alignment



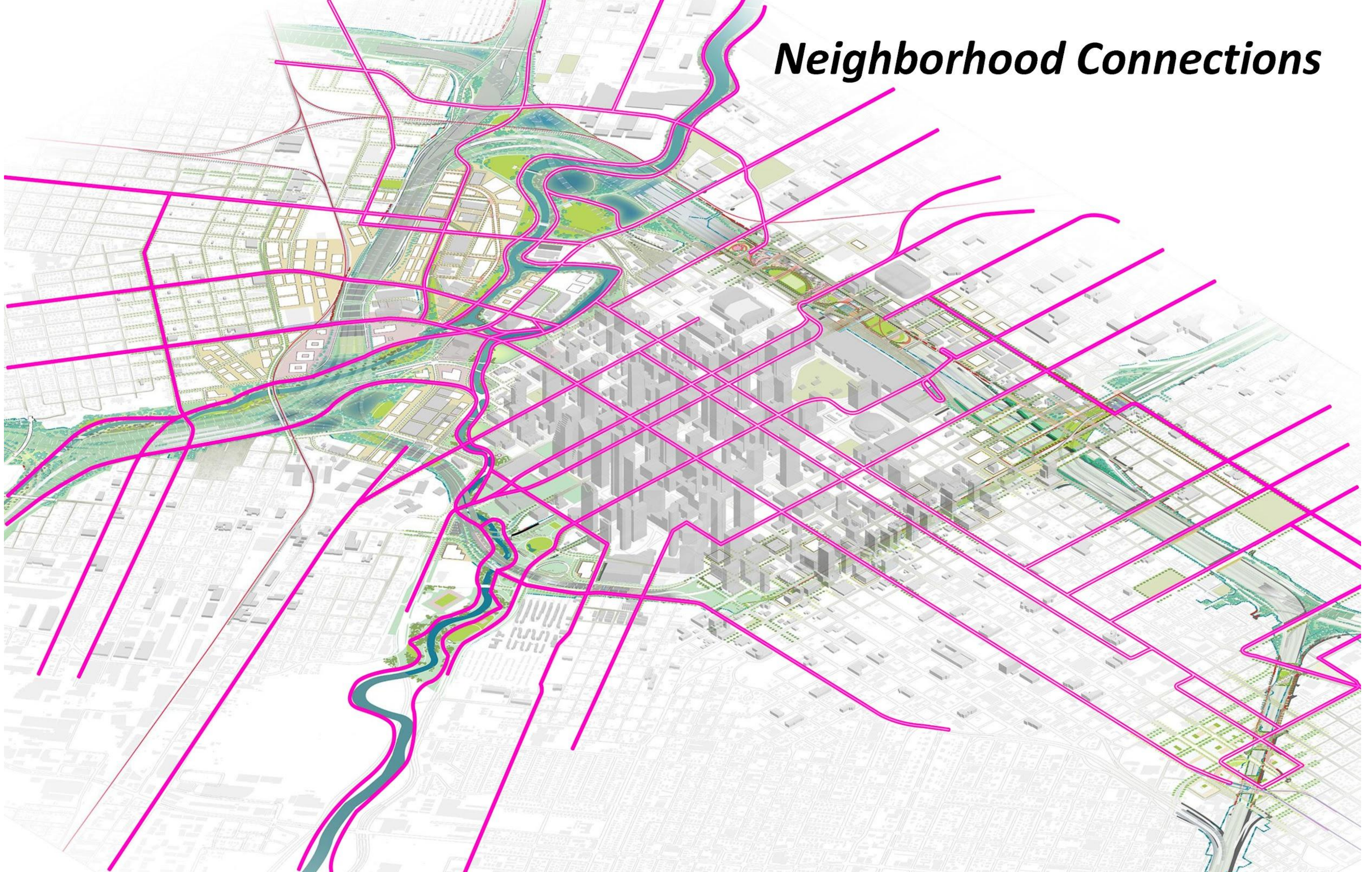
Bayou and Nature



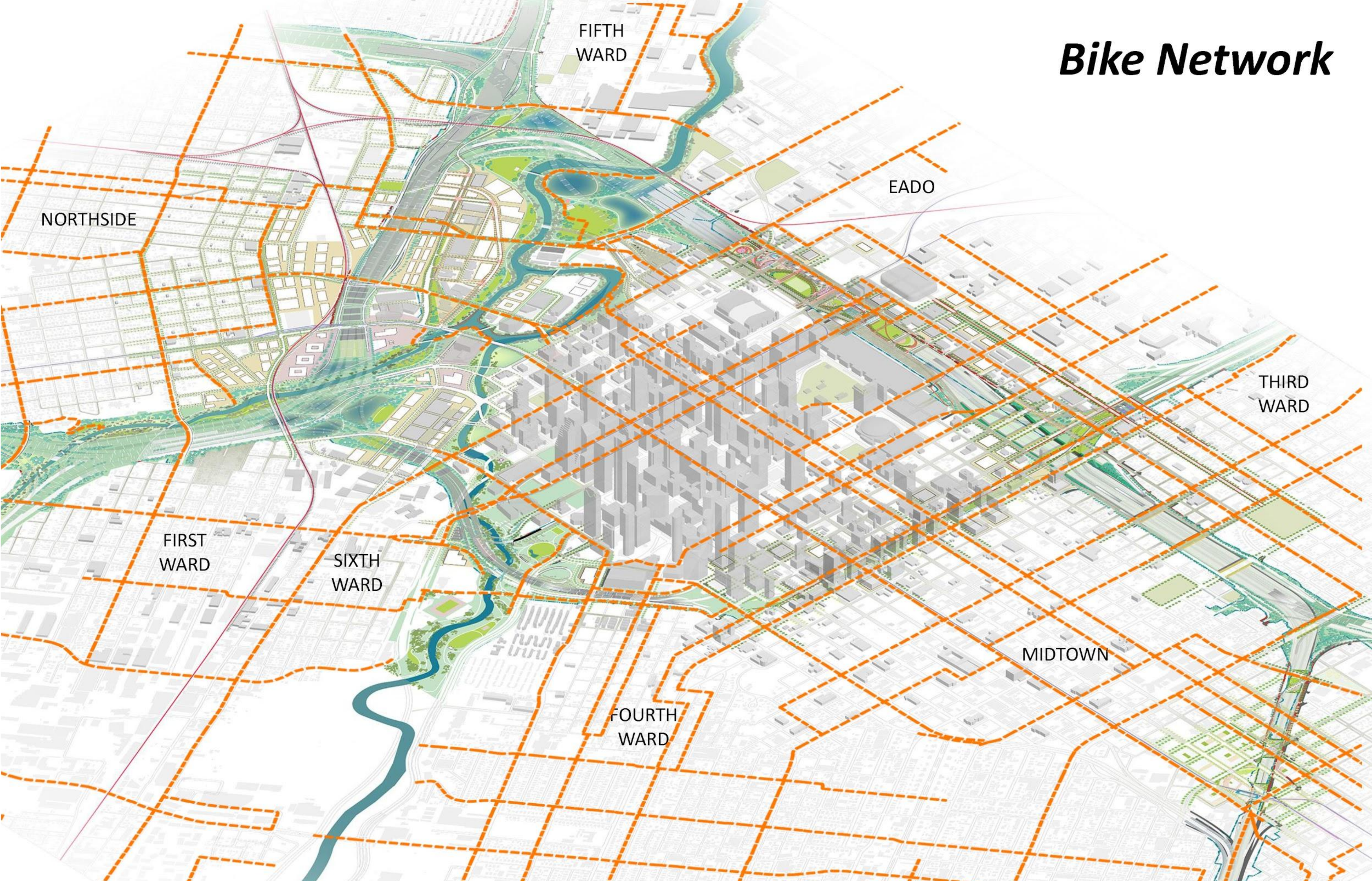
Neighborhoods



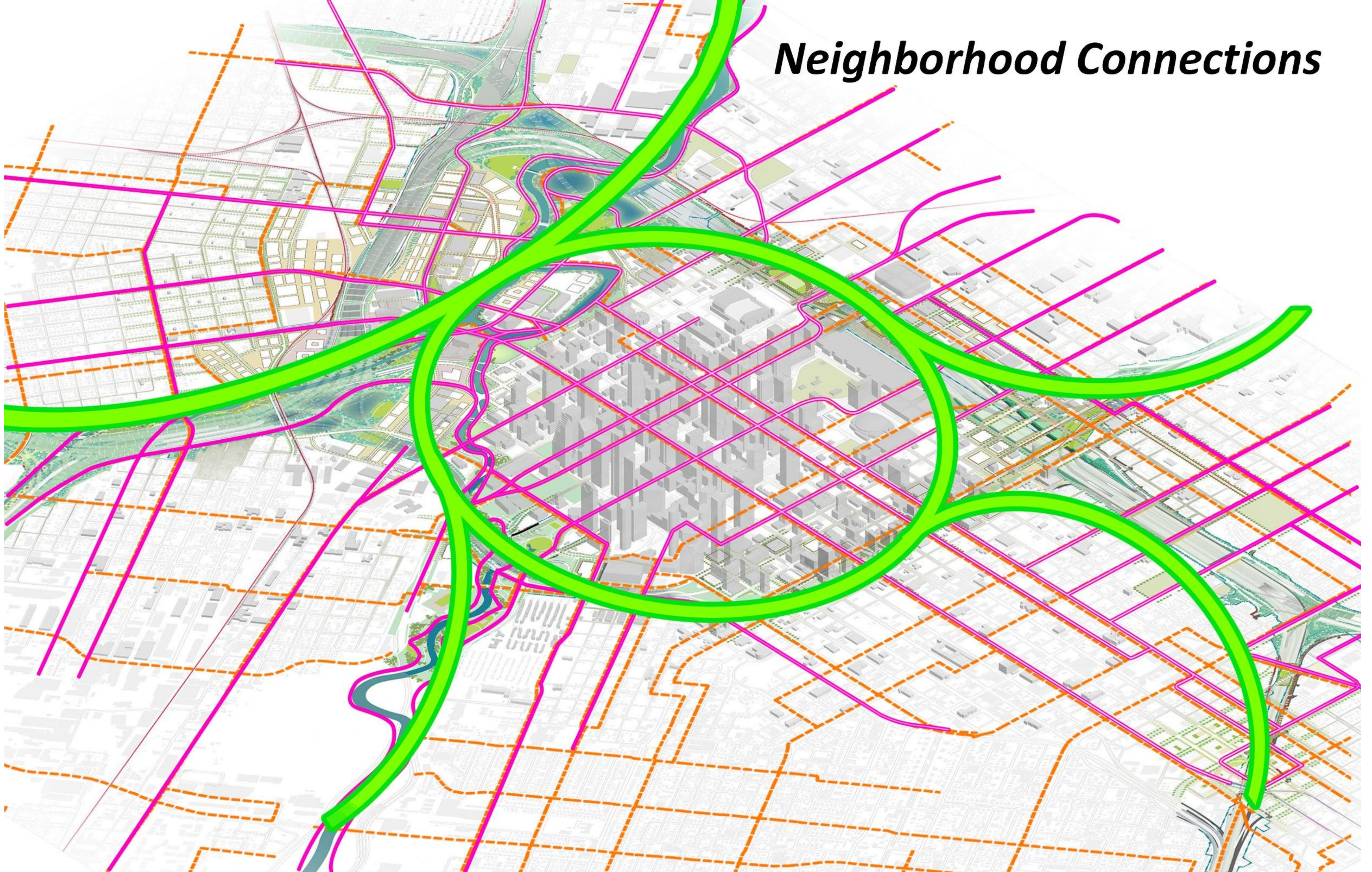
Neighborhood Connections



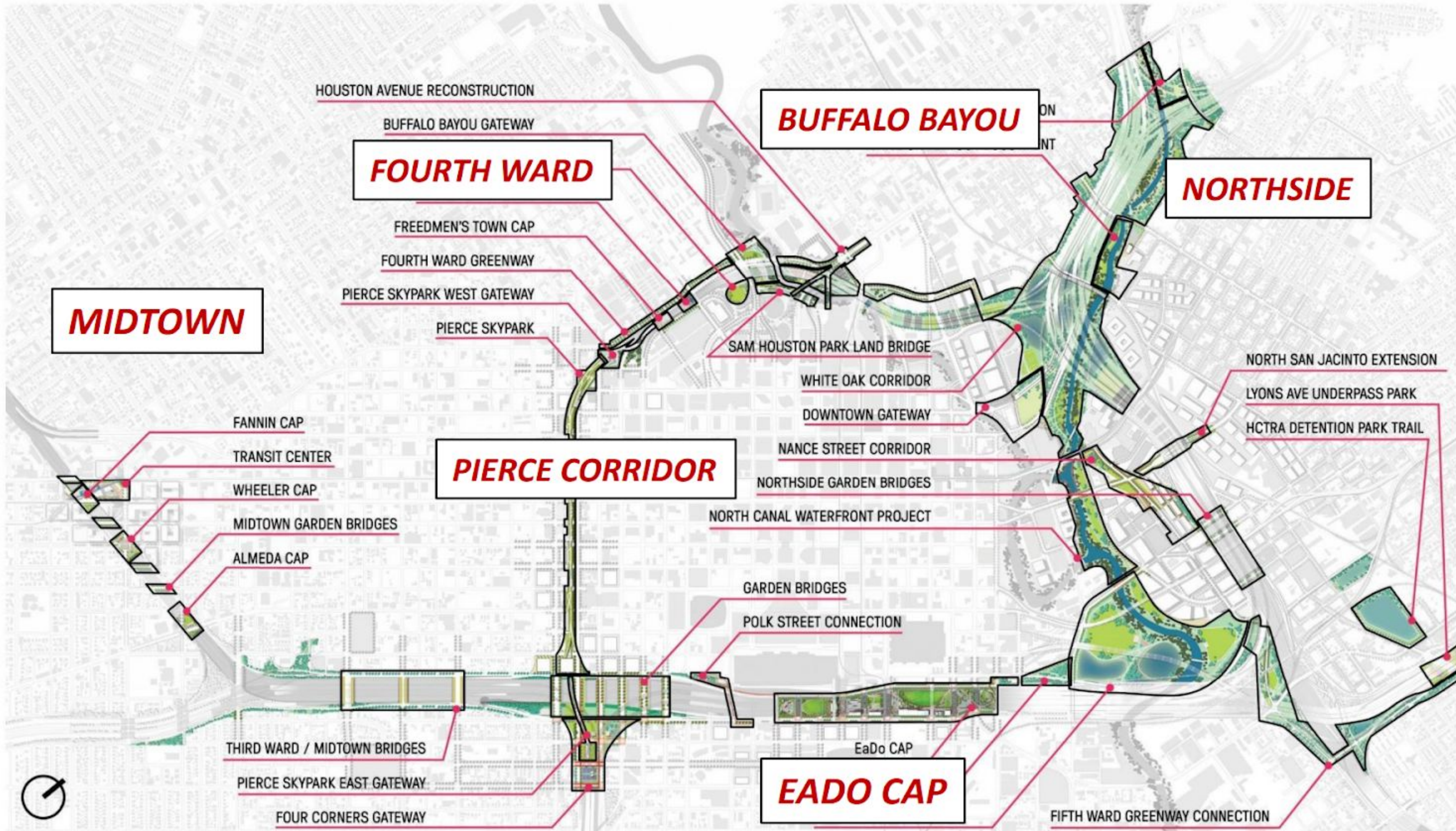
Bike Network



Neighborhood Connections

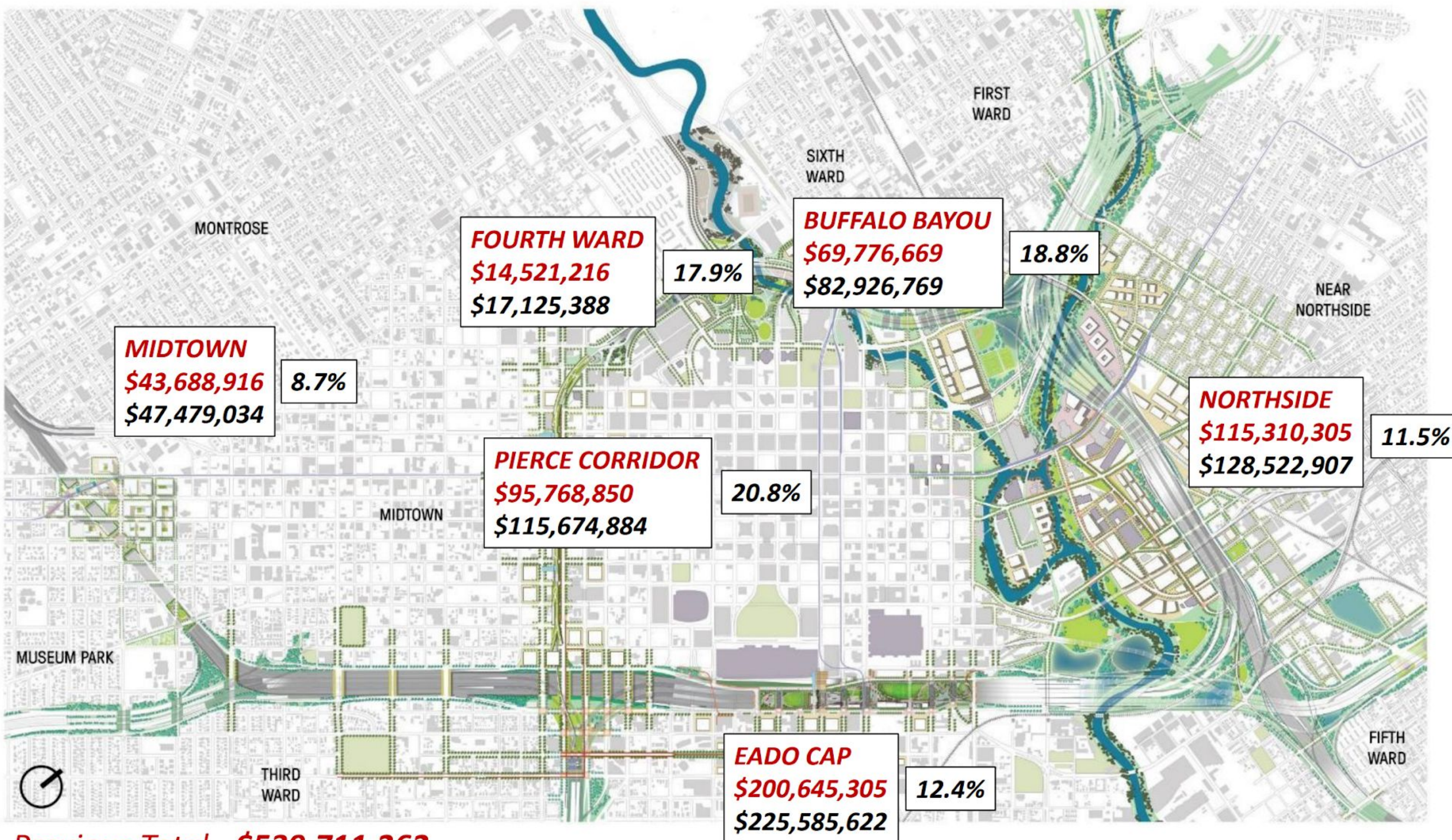


NHHIP Segment 3 Potential Projects



4. Civic Opportunities – **Cost / Escalation**

Cost with 2% Escalation



Previous Total - **\$539,711,262**

Escalated Total - **\$617,314,604** 14.4%

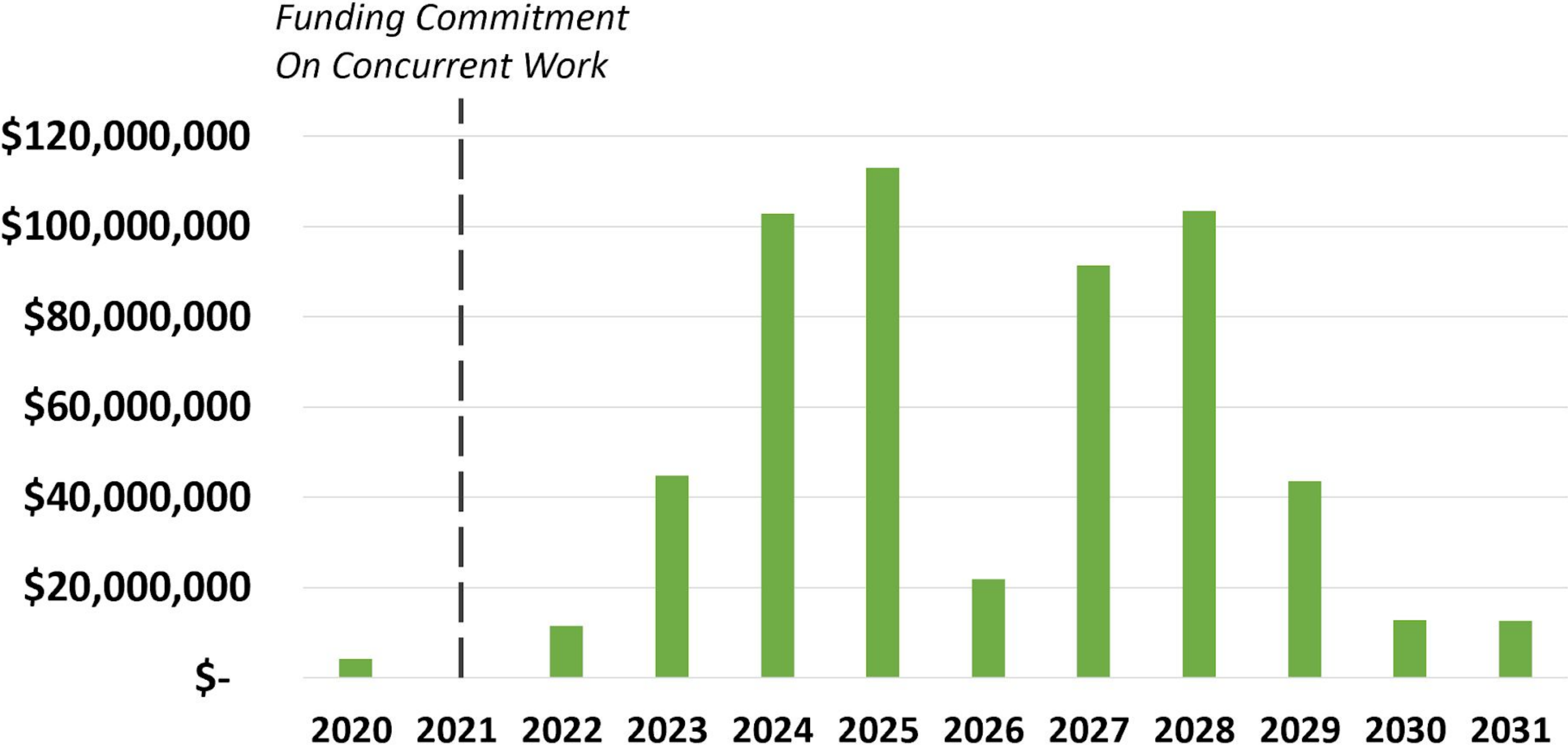
Segment 3 Civic Opportunities

Potential Funding Sources

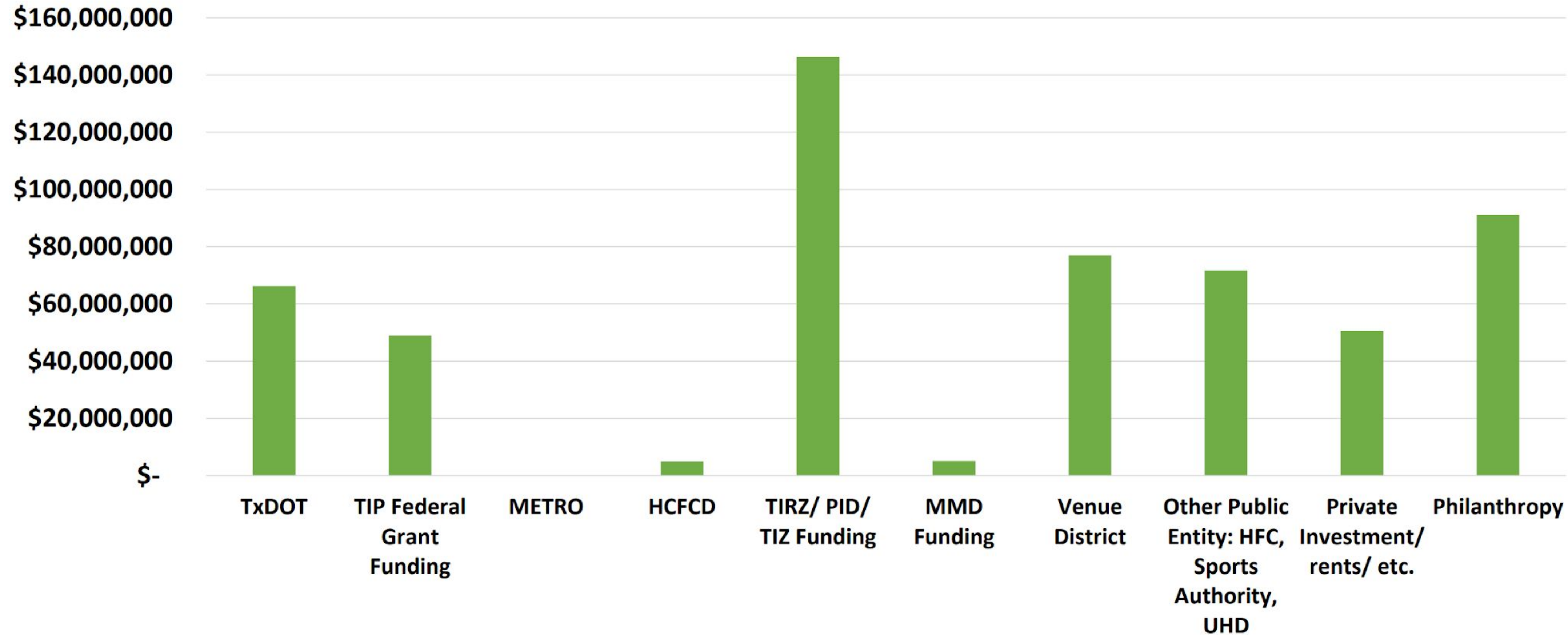
- *TxDOT*
- *Tax Increment Reinvestment Zones*
- *Municipal Management Districts*
- *TxDOT- City land swaps- sale of excess R.O.W.*
- *Houston First Corporation*
- *Harris County Houston Sports Authority*
- *New Venue District*
- *Harris County Flood Control District*
- *H-GAC Transportation Improvement Program*
- *Public Private Partnerships (P3)*
- *Revenue from operations*
- *Corporate sponsorship*
- *Charitable contributions*

Segment 3 Civic Opportunities

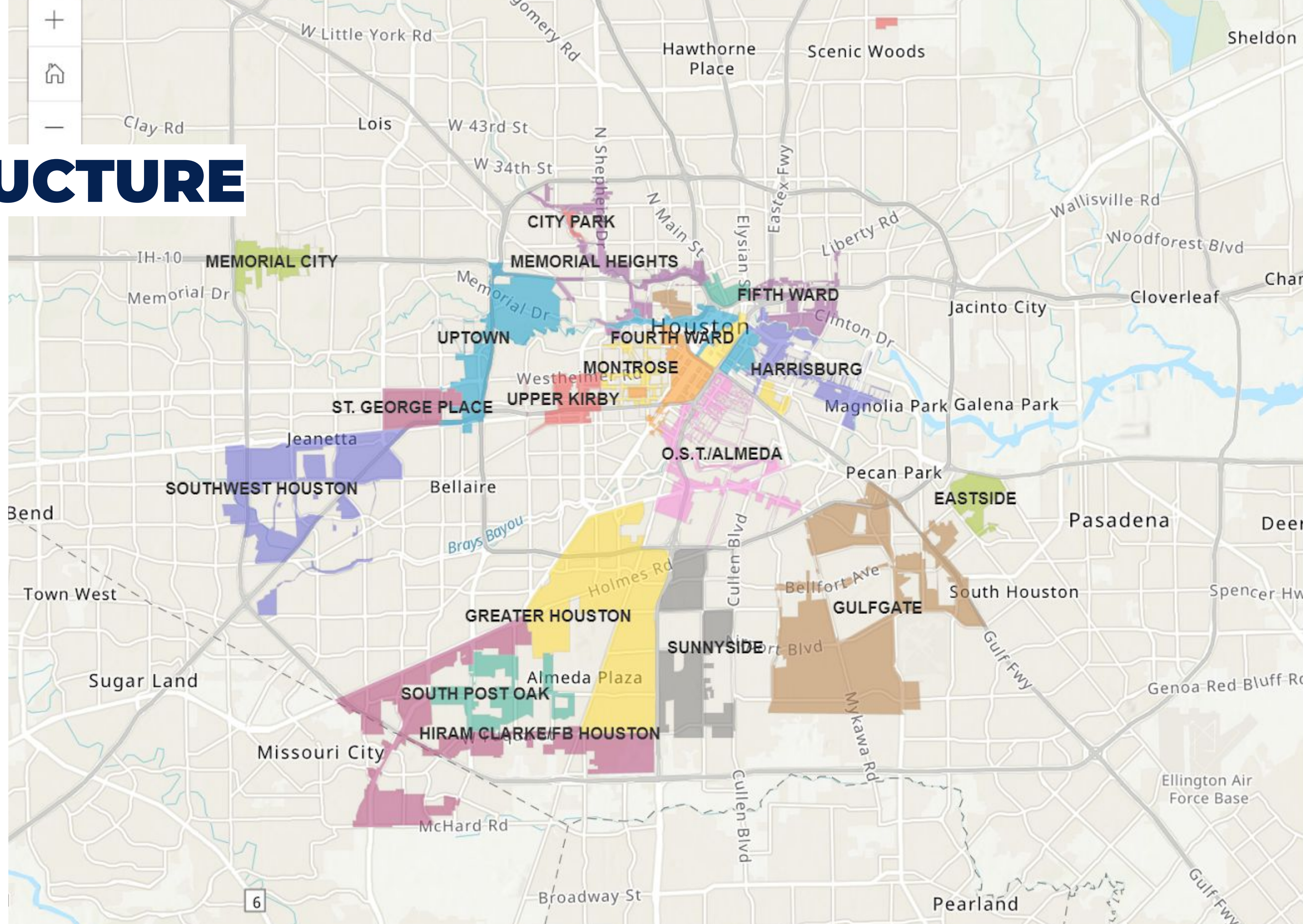
Potential Capital Funding



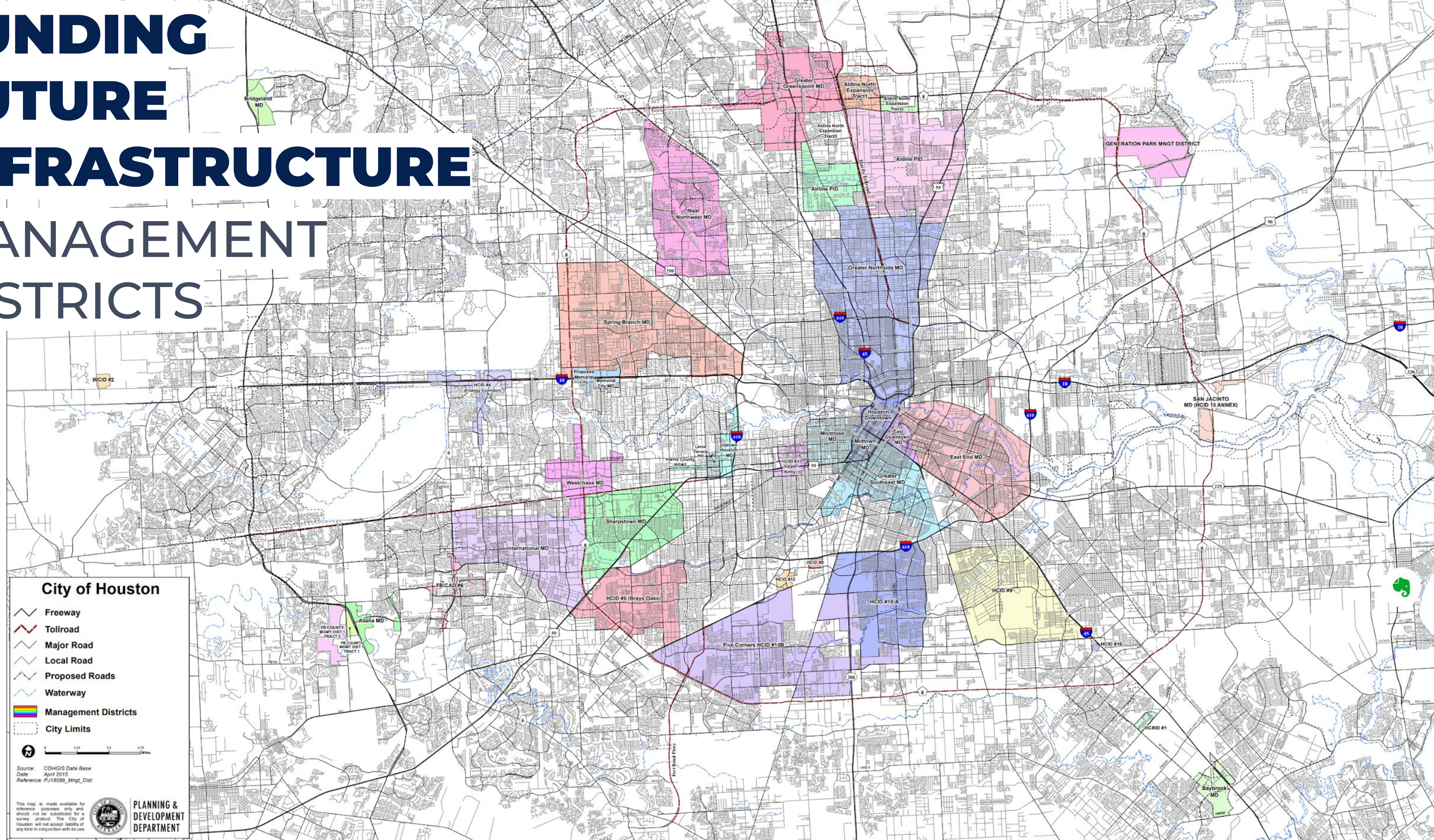
Civic Opportunities – Potential Capital Cost Funding Mix



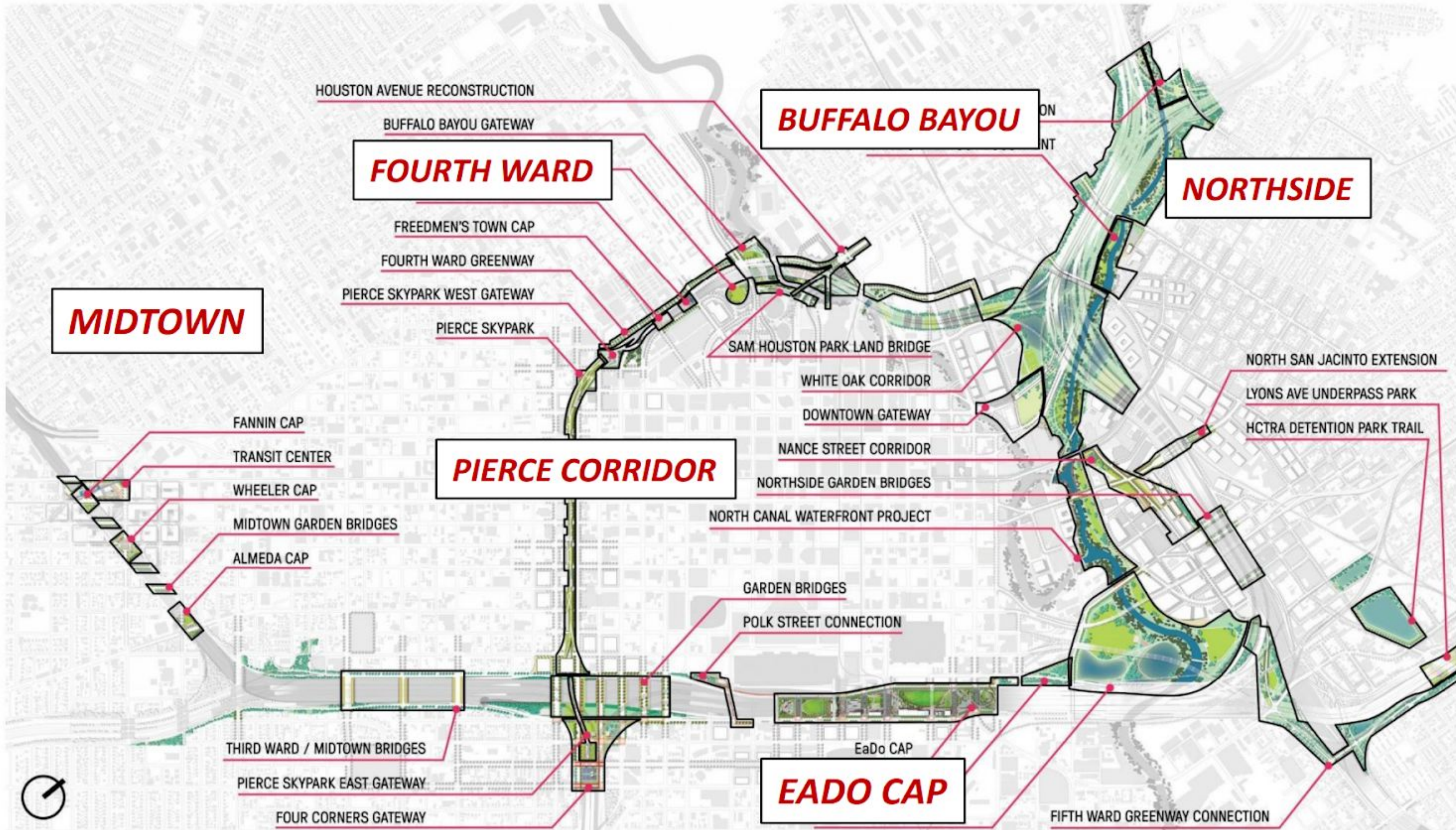
FUNDING FUTURE INFRASTRUCTURE TIRZes



FUNDING FUTURE INFRASTRUCTURE MANAGEMENT DISTRICTS



NHHIP Segment 3 Potential Projects



Create a Front Door to Buffalo Bayou from Downtown

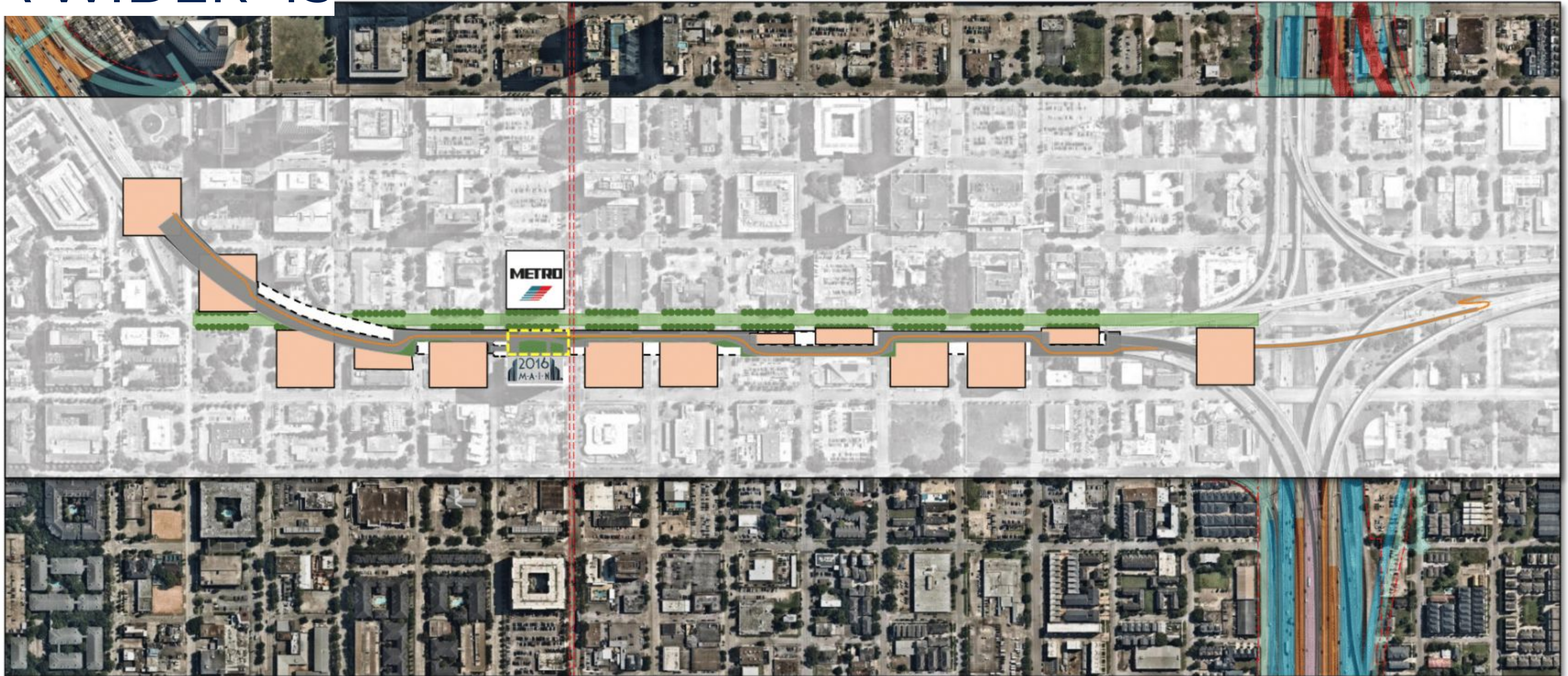
This stretch of Buffalo Bayou becomes the primary gateway to Buffalo Bayou East from eastern Downtown. Improvements in this area require close collaboration between BBP and a variety of public entities. Key plan components include:

- The North Canal, a new hydrological connection between White Oak Bayou and Buffalo Bayou (1), is required for flood mitigation and can increase the bayou-frontage of the Warehouse District (12) opposite the renewed James Bute Park (4,5).
- TxDOT's planned freeway reconstruction provide the opportunity for detention that creates valuable habitats (7).
- Widening the main Bayou channel to mitigate flooding and erosion will allow generous Bayou lawns to be built, creating an open space gateway to Buffalo Bayou Park upstream and Buffalo Bayou East downstream (8,9).
- Connecting the new highway deck park (11) to the Bayou through a greenway and extended urban grid (6, 10) will allow people to walk or cycle on a grade-separated trail from Downtown. The existing rail bridge, repurposed for pedestrians and bicycles, will improve connectivity across to the Near Northside and Fifth Ward.



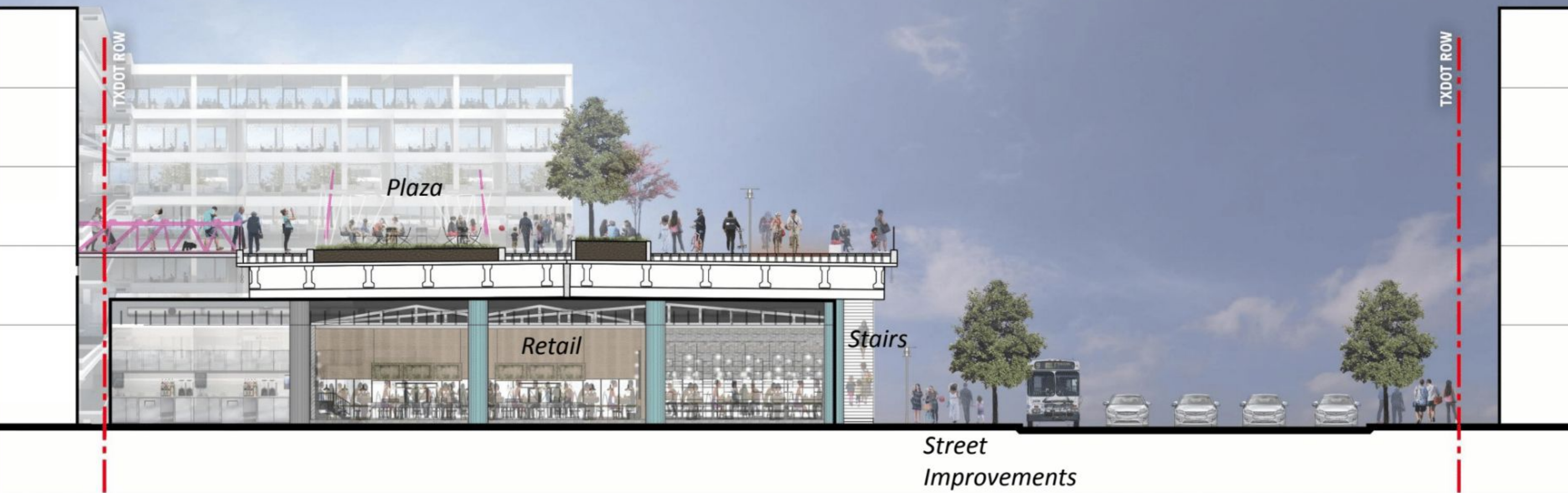
NHHIP

MORE THAN
A WIDER 45



NHHIP

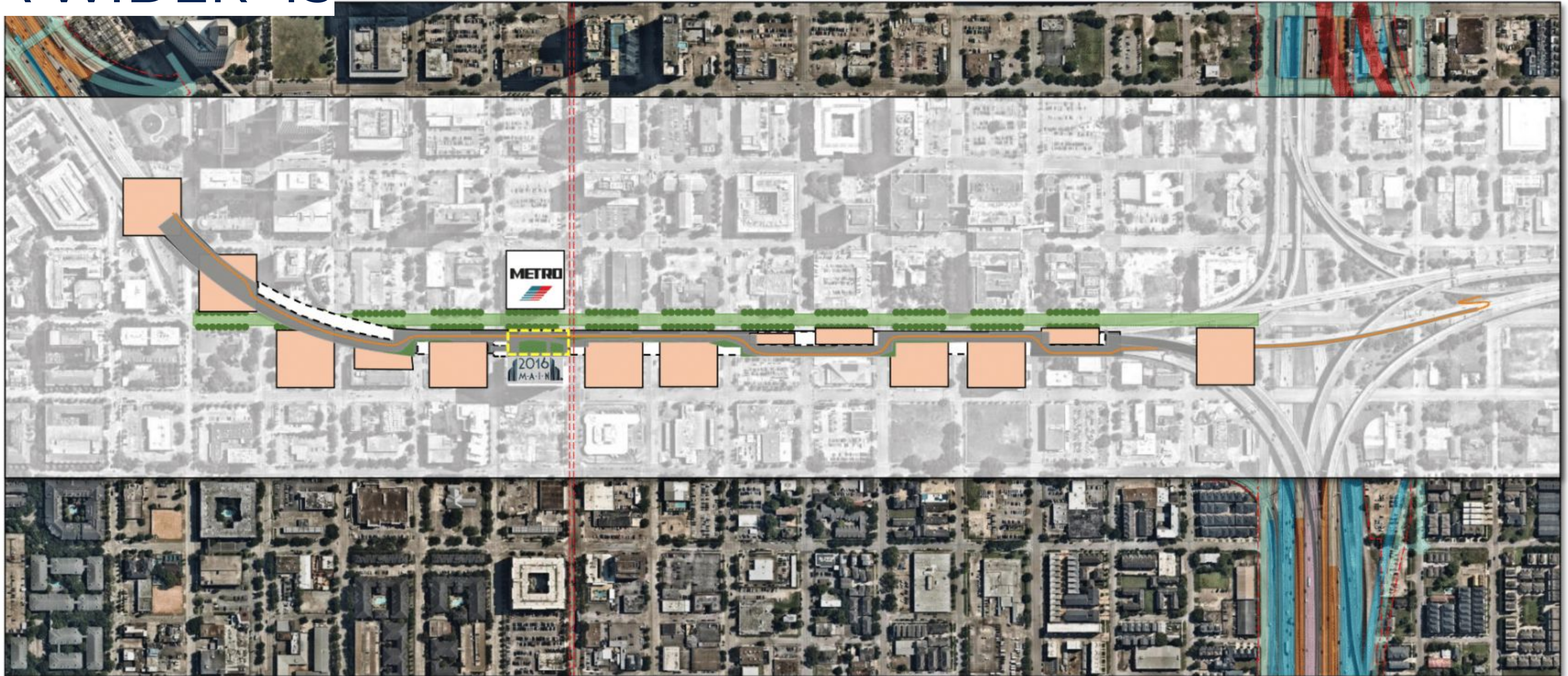
MORE THAN A WIDER 45



Pierce Corridor – Section at Pierce Skypark Plaza

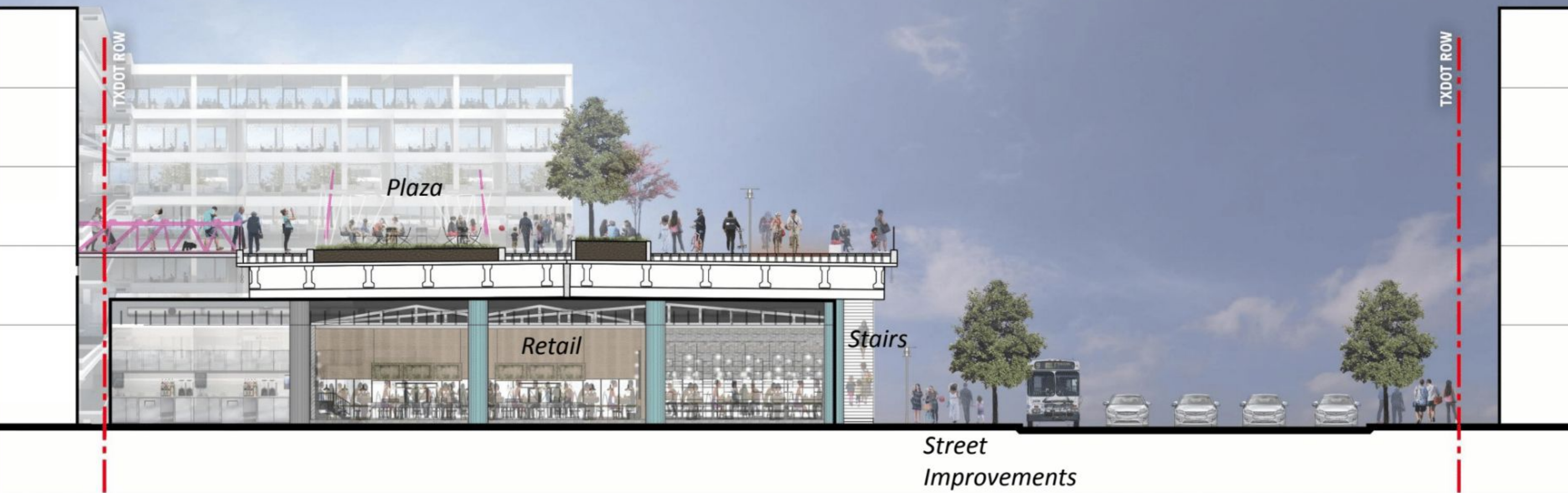
NHHIP

MORE THAN
A WIDER 45



NHHIP

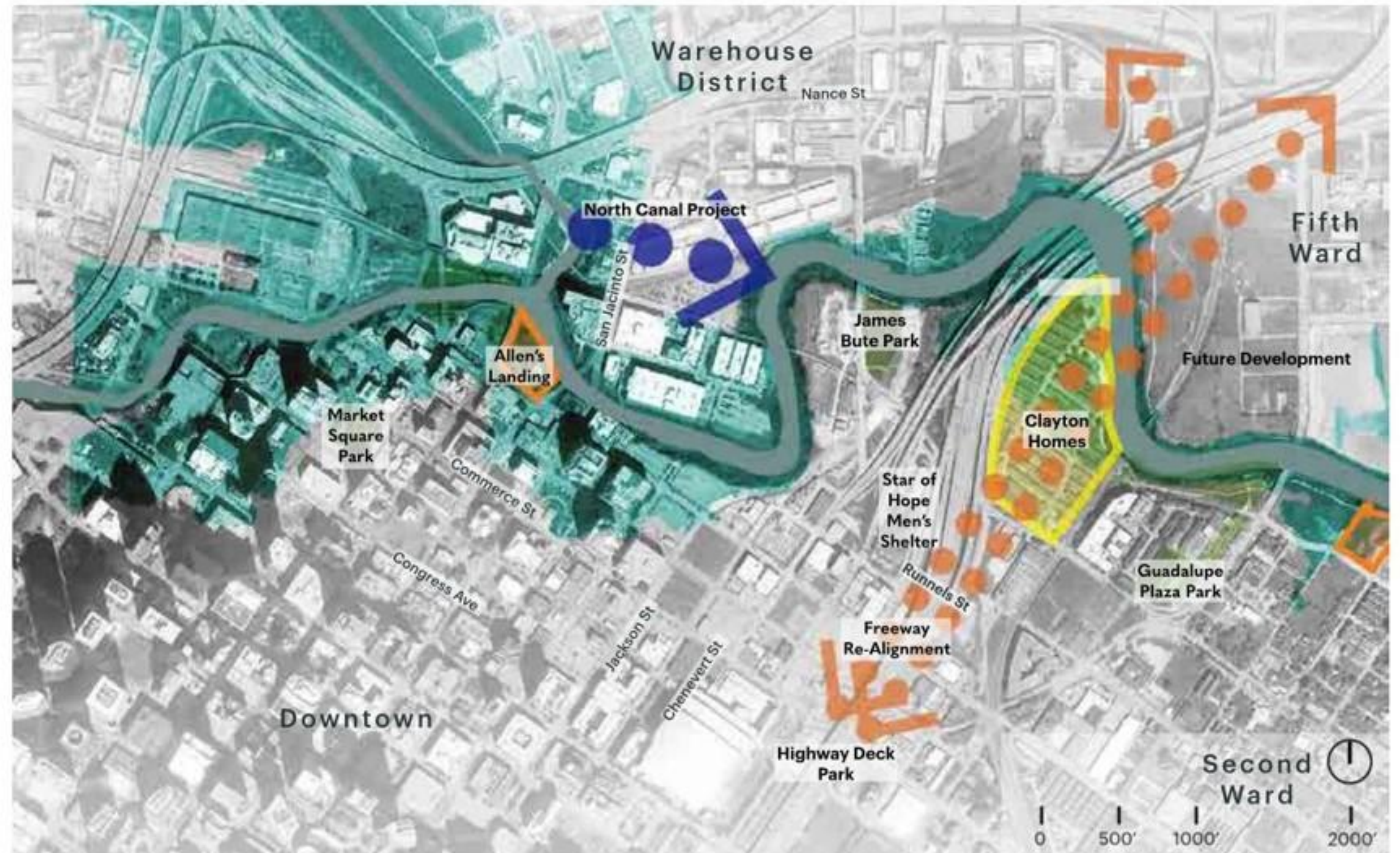
MORE THAN A WIDER 45



Pierce Corridor – Section at Pierce Skypark Plaza

Major infrastructure projects will reconfigure much of the existing conditions in northern Downtown.

- TxDOT's North Houston Highway Improvement Project (NHHIP) will significantly reroute major freeways around Downtown and change Buffalo Bayou bank conditions.
- The proposed Downtown deck park over the reconstructed freeway between Downtown and EaDo will alter access routes to the Bayou.
- The North Canal and other flood and erosion mitigation measures will improve new and existing waterfront areas.
- Erosion is extensive along the Bayou's banks throughout the area removing almost 100 feet of bank in some areas during Hurricane Harvey.
- Allen's Landing currently marks the eastern end of the existing Downtown Trails system.
- As the Bayou moves east from Downtown, its banks become steeper, and fewer parcels fall within the 500-year floodplain.



••• NHHIP Improvements

— Clayton Homes

Existing Parks

BBP Ownership

••• North Canal Project

500-Year Floodplain

NHHIP

MORE THAN A WIDER 45

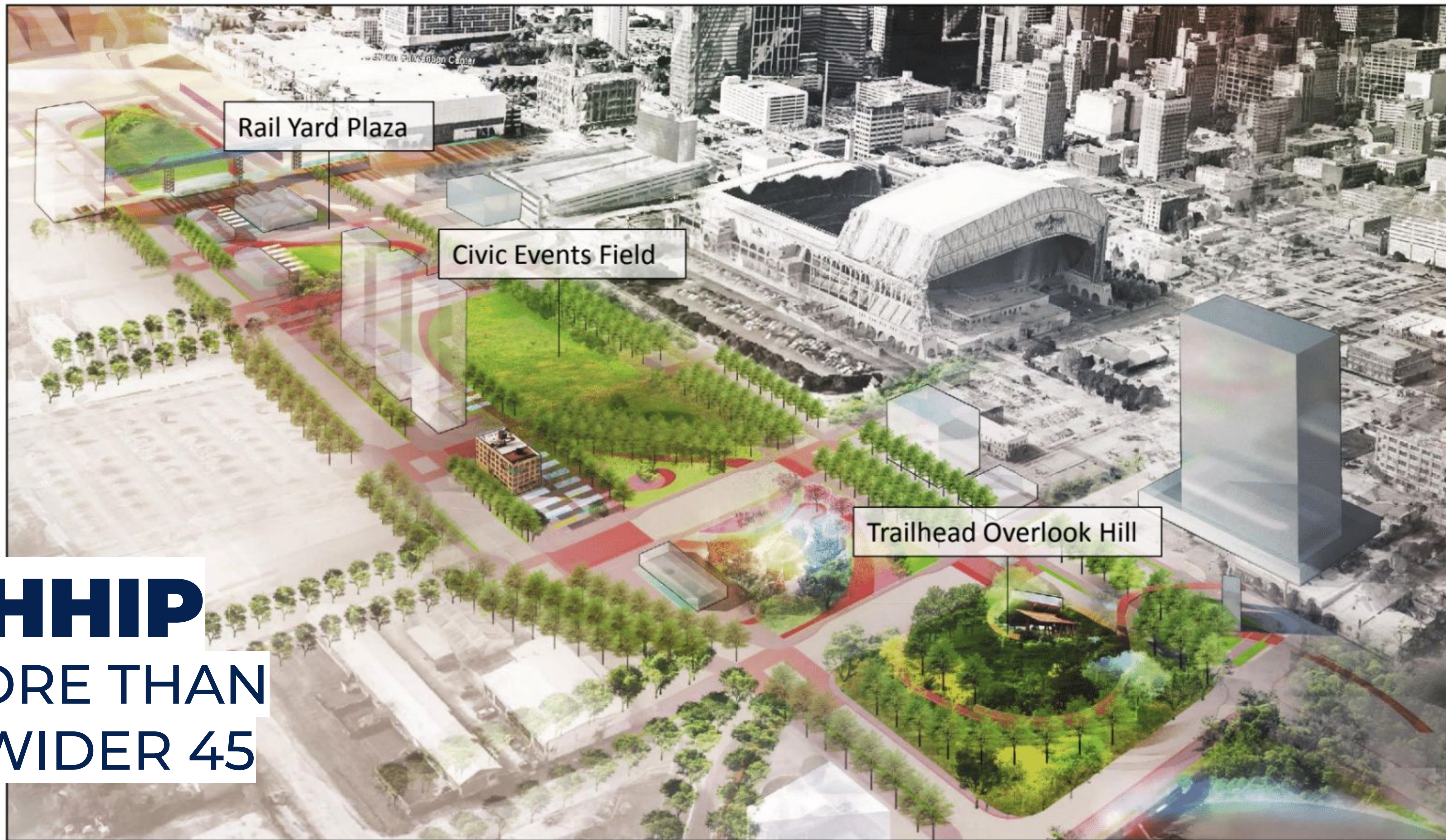


Case 1: Fully Built



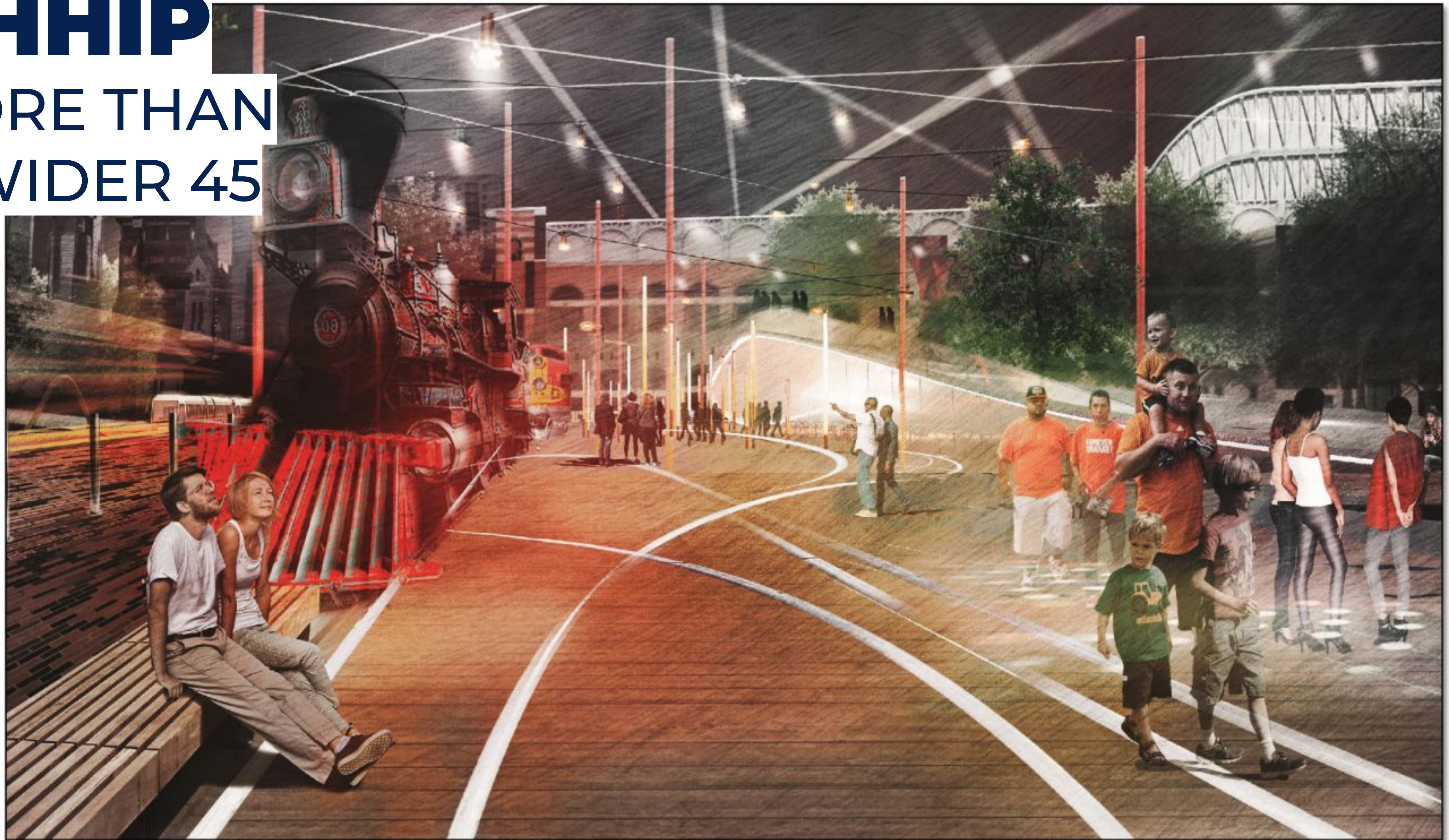
Case 2: Base Condition

EaDo Cap – Estimating Approach / 2 Cases



NHHIP
MORE THAN
A WIDER 45

NHHIP
MORE THAN
A WIDER 45



EaDo Cap – Rail Yard Plaza

NHHIP

MORE THAN A WIDER 45



EaDo Cap – Civic Events Field

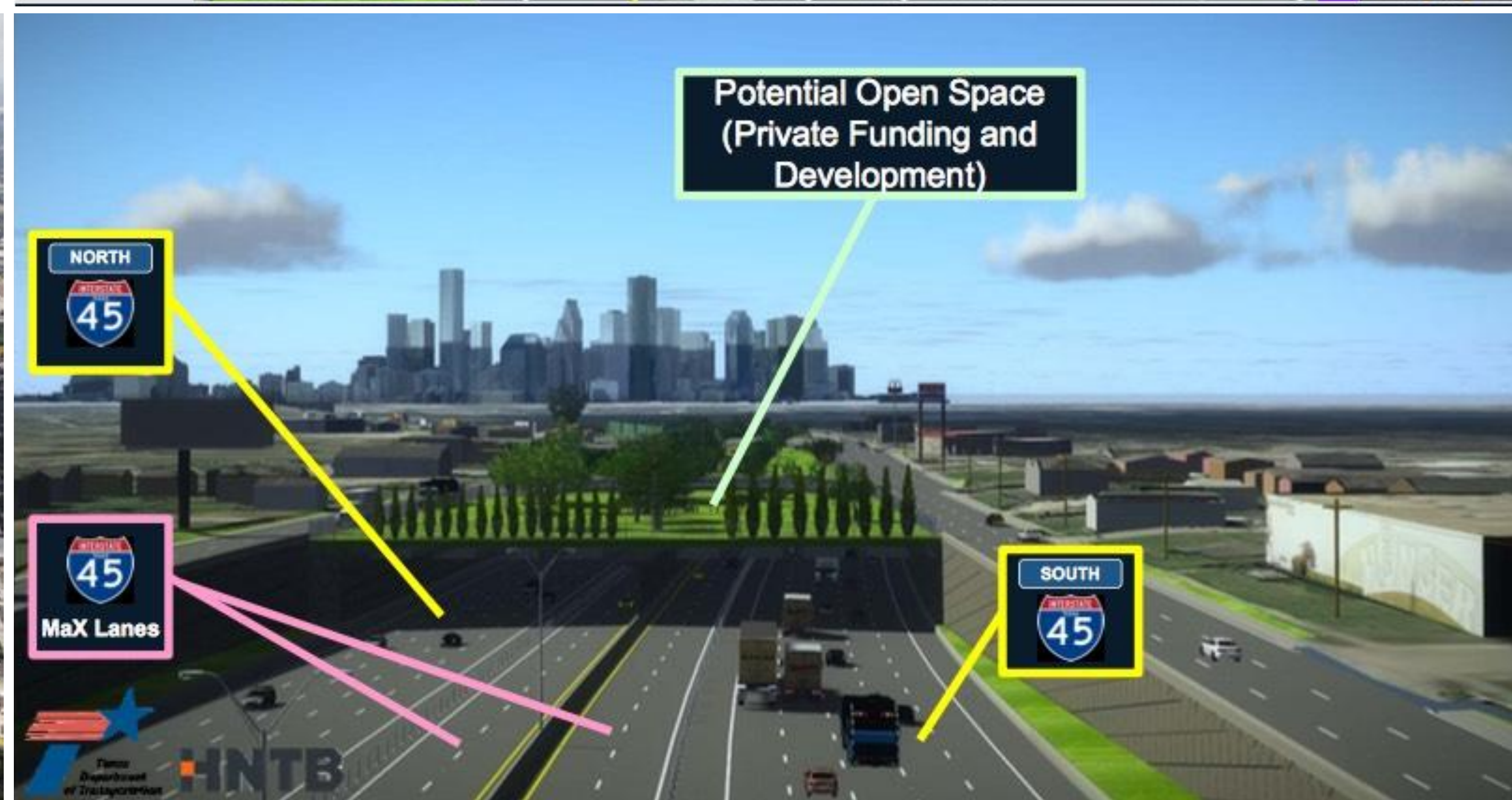
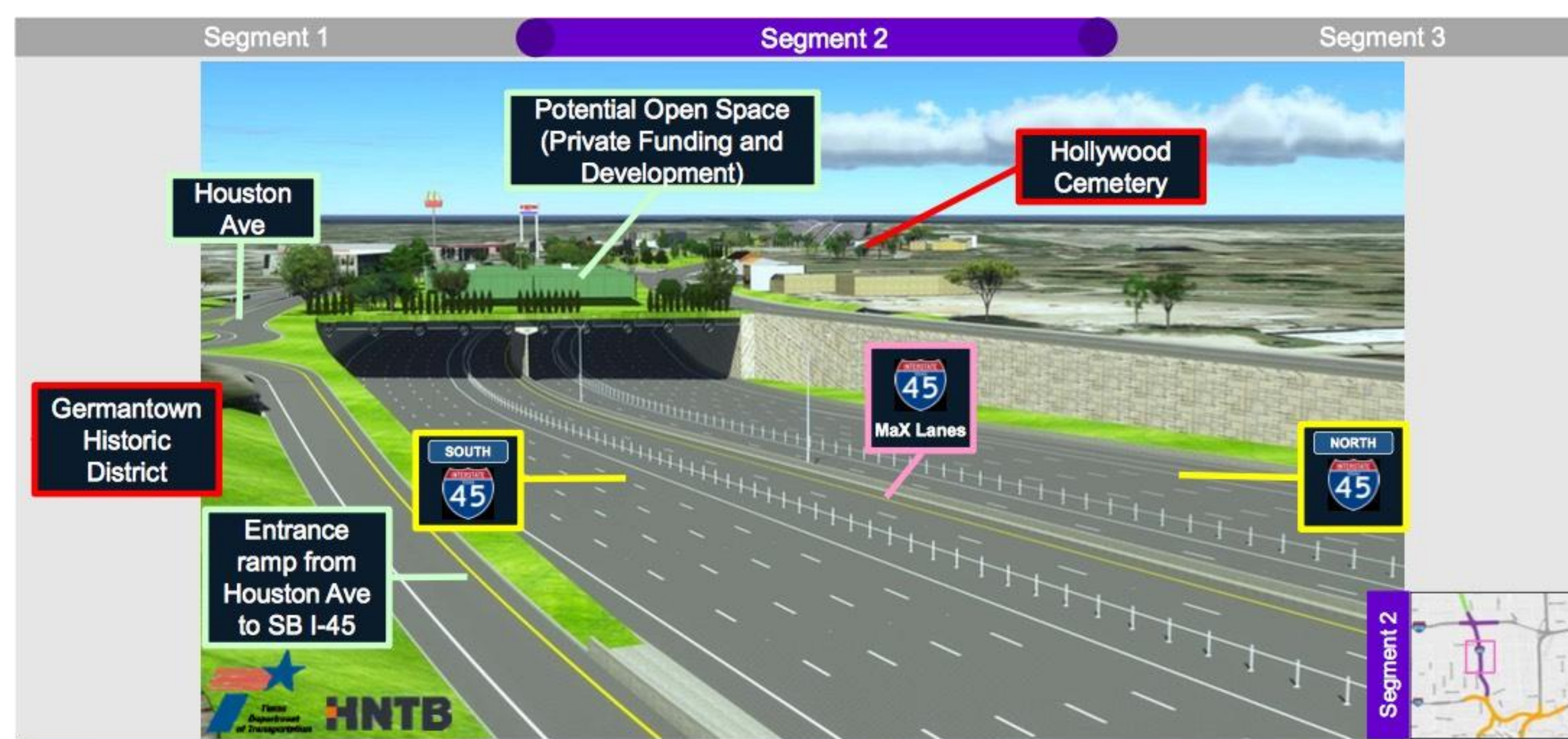
NHHIP

MORE THAN A WIDER 45

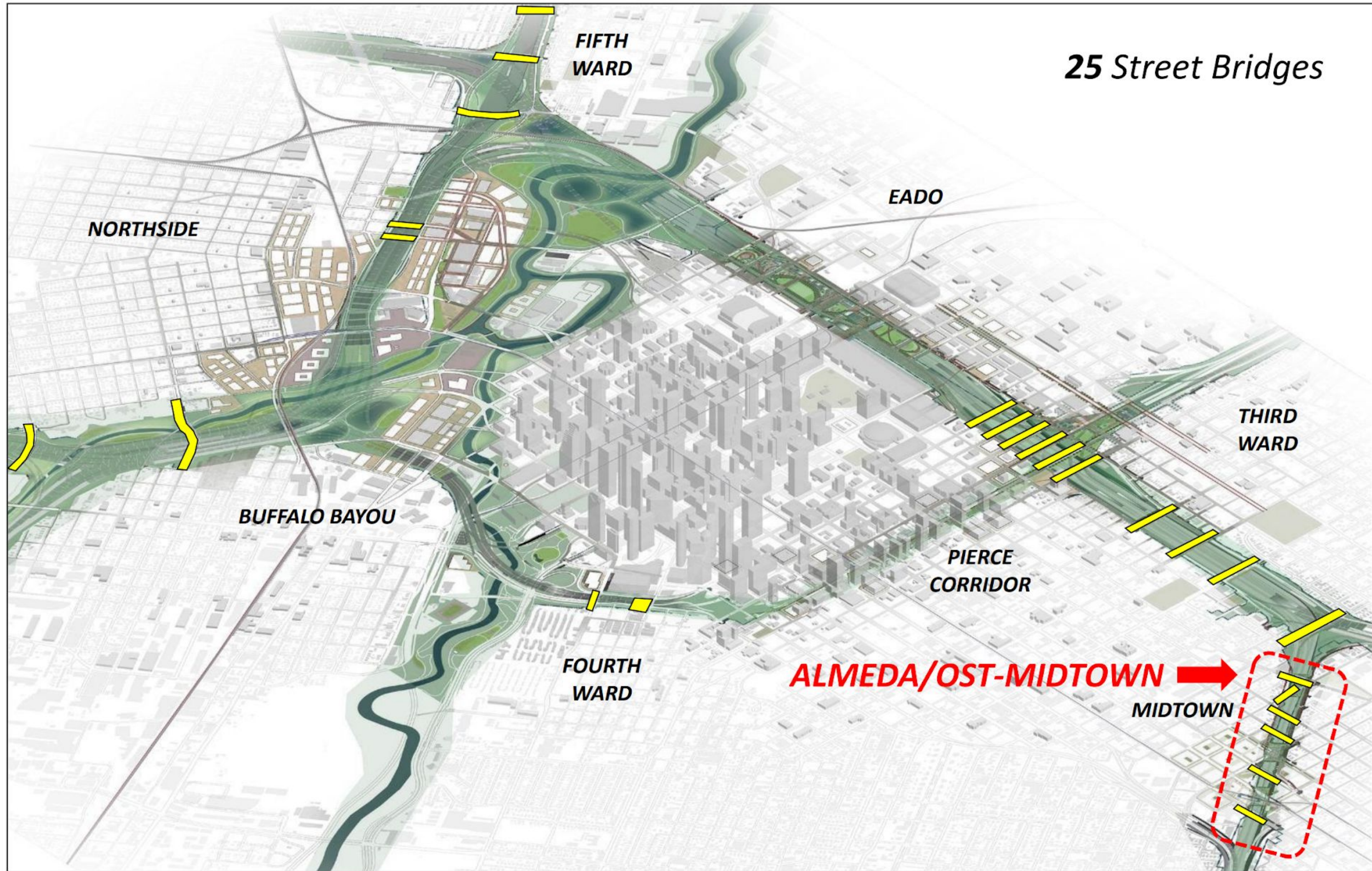


Northside – Frosttown Park

NHHIP MORE THAN A WIDER 45



3. Civic Opportunities – TxDOT Coordination: Midtown



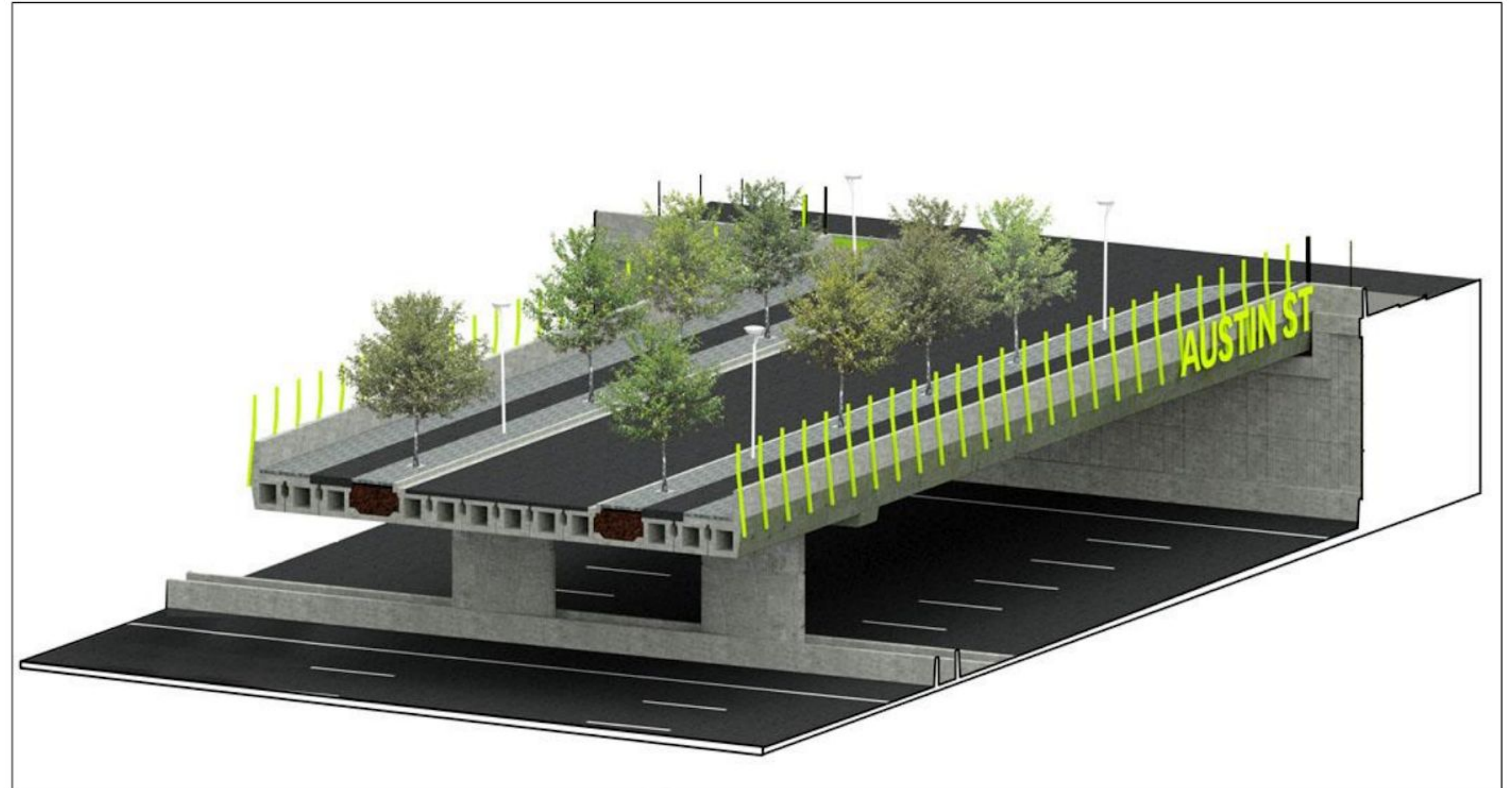
3. Civic Opportunities – **TxDOT Coordination: Midtown** Scope by Entity

PROVIDED BY TXDOT:

- Concrete Box Beams
- Concrete Trench Inserts
- Crash Railing
- Basic Fencing on Crash Railing
- Concrete Curb & Roadway
- Waterproof Membrane
- Topping Slab on Box Beams for Pedestrian Realm area
- Concrete Bike Lane & Sidewalk
- Roadway Light Poles

PROVIDED BY OTHERS:

- Engineered Soil
- Trees
- Planting
- Enhanced Lighting
- Architectural Signage



Typical Bridge Section at Austin St Bridge

3. Civic Opportunities – TxDOT Coordination: Midtown

TxDOT Bridge Layout - Option 1



Conceptual Plan Layout



3. Civic Opportunities – **TxDOT Coordination: Midtown** *Comfortable Experience*



Montrose Bridge

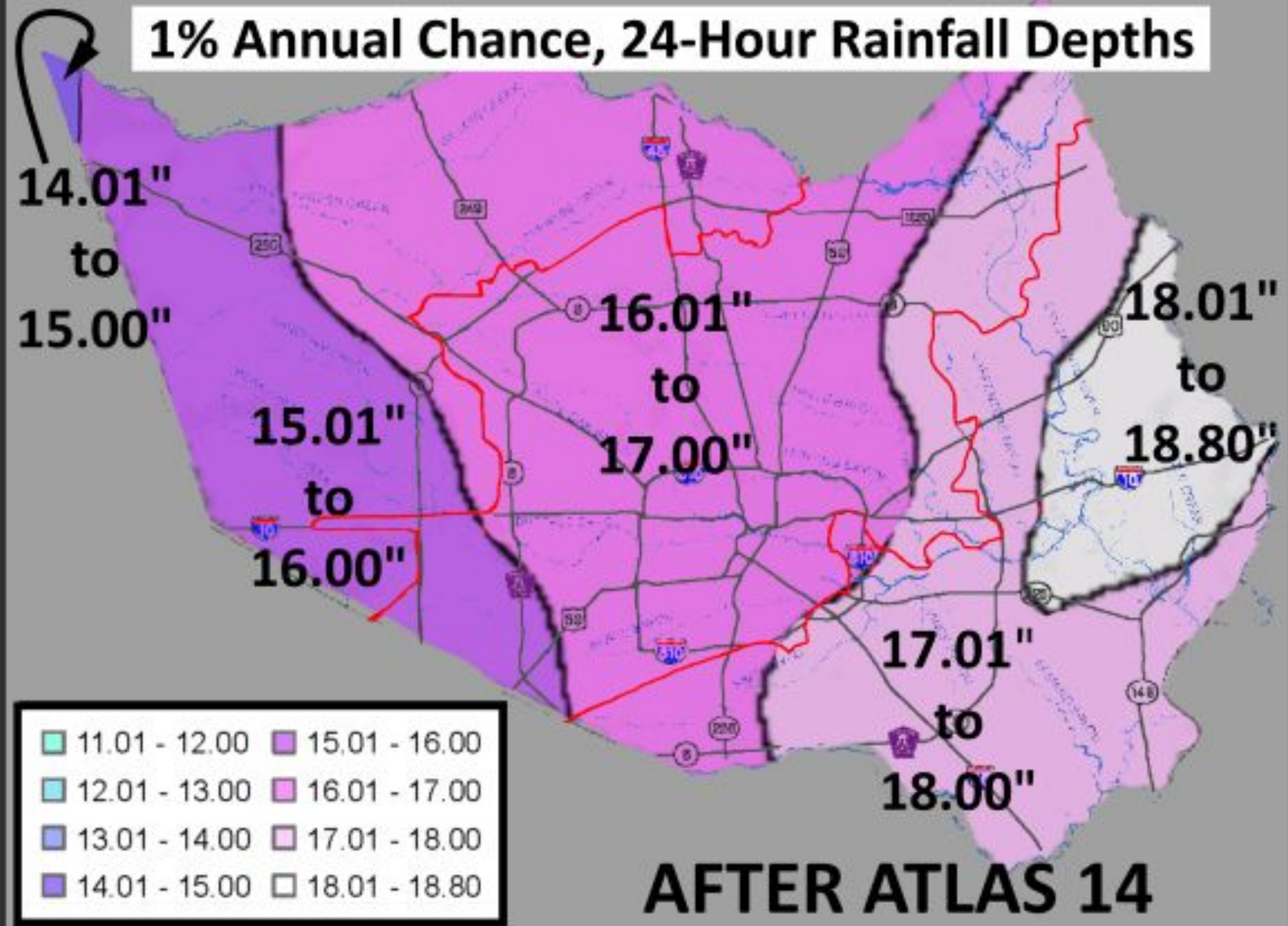


Proposed Alameda Road Bridge

Current Rainfall “Estimates” vs. Reality

Duration	Harvey August 2017	Allison June 2001	Tax Day April 2016	100-yr Rainfall Estimate	500-yr Rainfall Estimate
1-hr	6.8"	5.7"	4.7"	4.3"	5.5"
2-hr	11.9"	9.9"	7.3"	5.7"	7.6"
3-hr	14.8"	13.5"	8.3"	6.7"	9.2"
6-hr	18.9"	21.2"	13.9"	8.9"	12.8"
12-hr	20.9"	28.3"	16.7"	10.8"	15.5"
24-hr	25.6"	28.4"	17.4"	13.2"	18.9"
2 days	35.2"	28.5"	17.5"	14.5"	20.0"
4 days	47.7"	38.5"		15.9"	21.1"

ATLAS 14 Rainfall Estimates

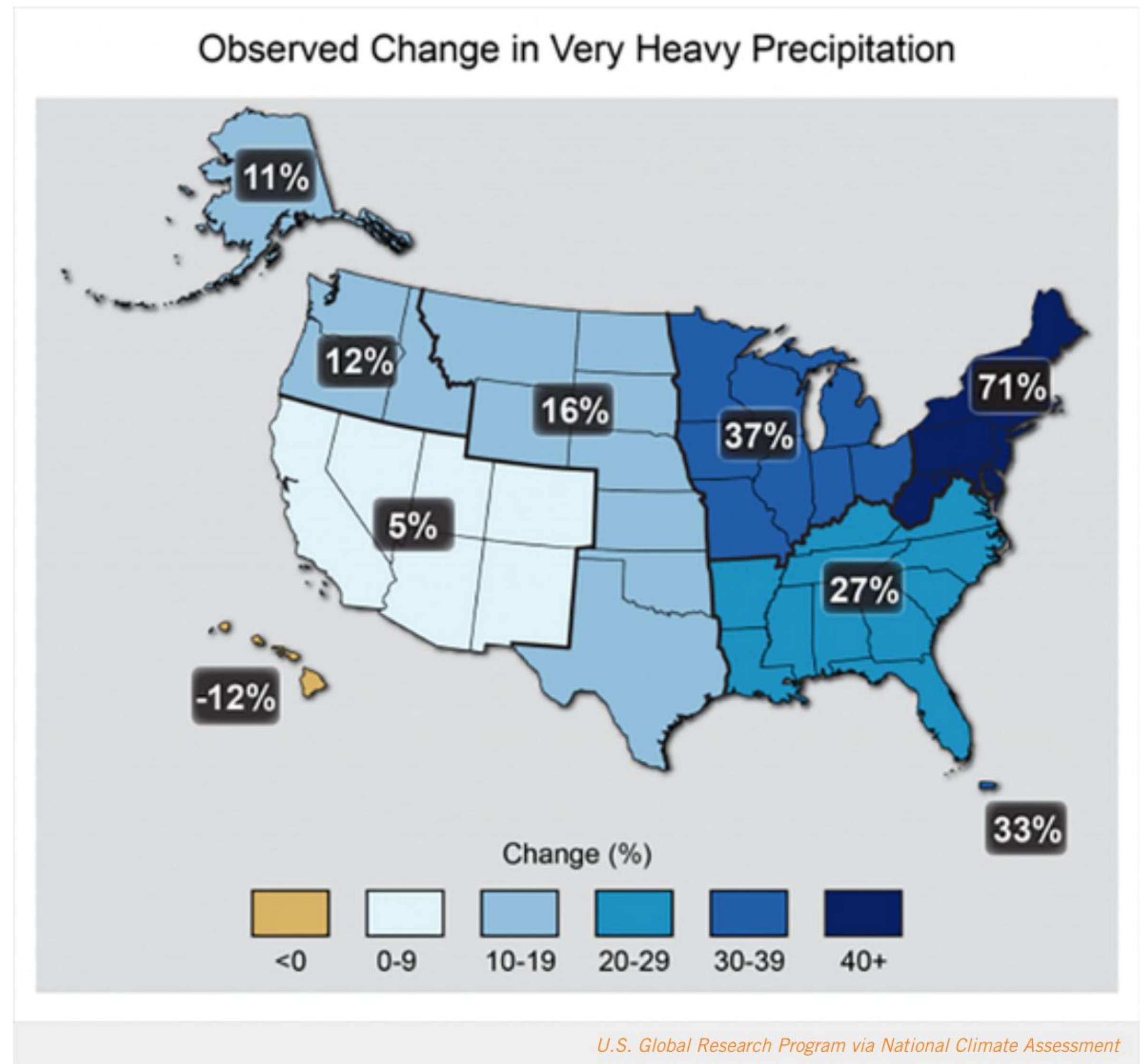


**Imelda was the 7th most
intense rainfall event in our
region.**

**Early property damage reports are
about 2500 as of today.**

Rainfall Is Increasing Everywhere

National changes since 1991



Street Drainage

All the water wants to get to Galveston Bay somehow, some way.



Street Drainage





Detention

The temporary, short-term storage of excess stormwater.



Retention

Implies that stormwater is stored indefinitely.

Remember

The streets
are designed
to flood



Brenda Stardig

Yesterday at 5:44 PM • 



Friendly reminder: please do not leave your car in the street overnight if possible. Most streets are designed to detain water during high water events.

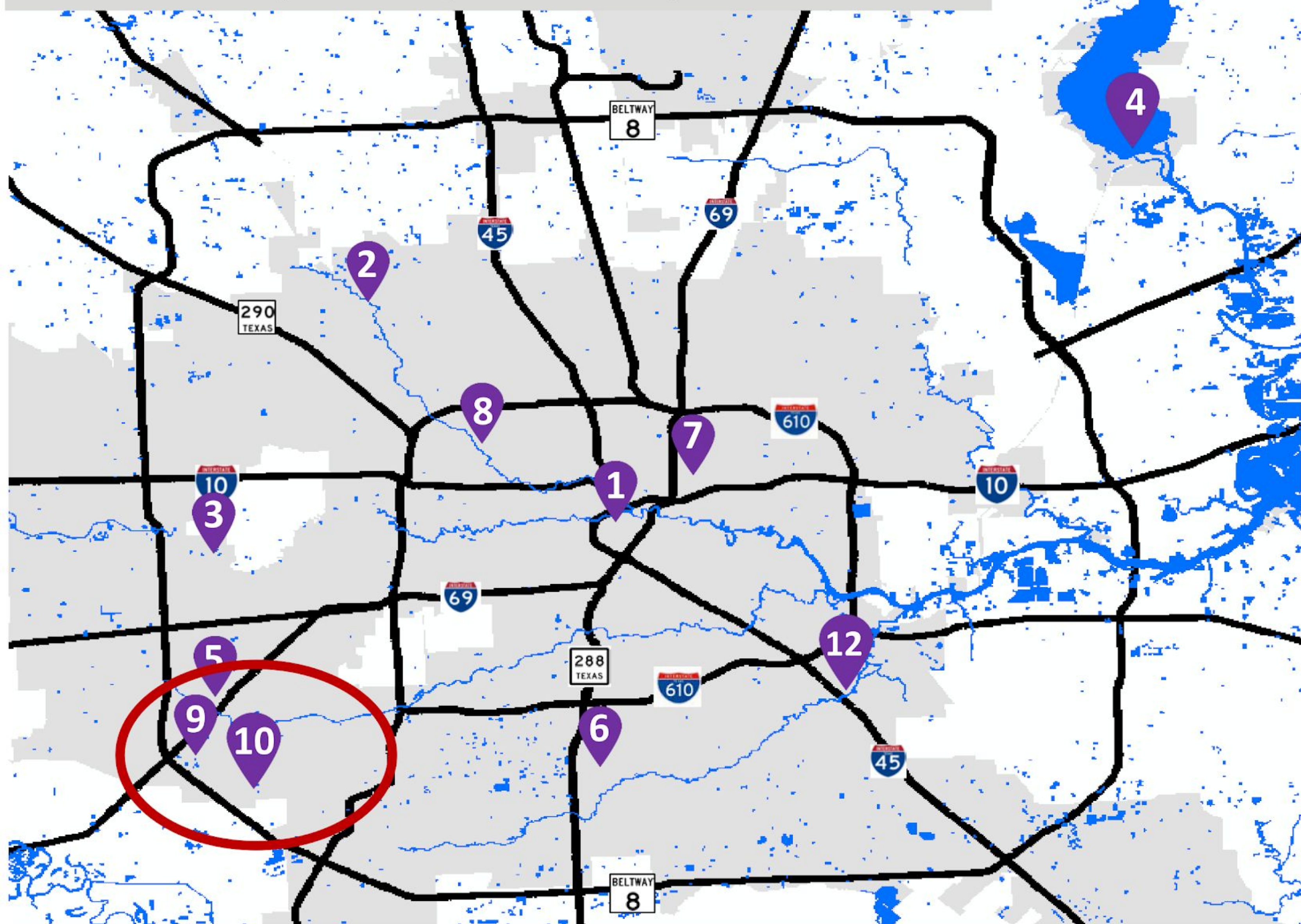


28

6 Comments 8 Shares

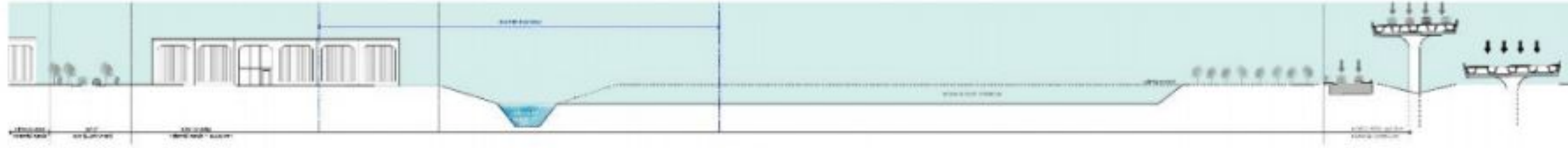
FLOOD RESILIENCE PROJECTS OPPORTUNITIES

Increased channel conveyance and detention + storm water system improvements)

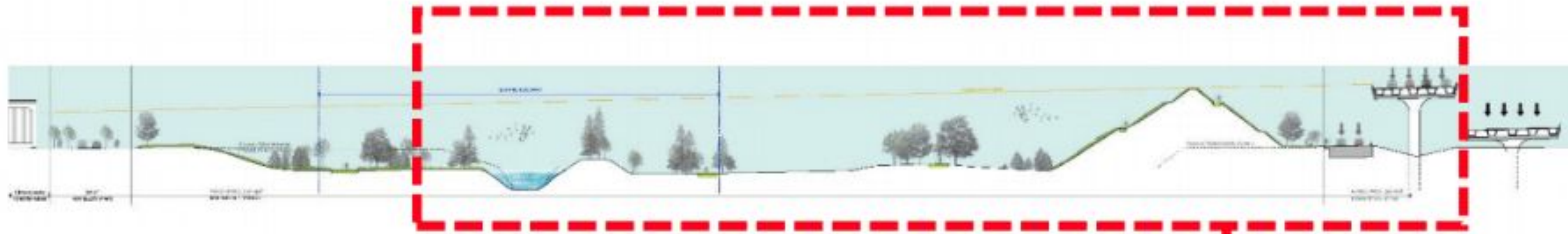


Project	
1	North Canal (HMGP)
2	Inwood Golf Course Detention (HMGP)
3	TIRZ 17 Detention (HMGP)
4	Lake Houston Dam (HMGP)
5	Country Creek Detention
6	Sunnyside/Belfort Landfill
7	Fifth Ward Urban Drainage
8	Turkey Gully
9	Keegans Bayou
10	Ruffino Landfill
11	West Fork Dredging
12	SWAT: Pine Gully and Plum Creek

Flood Control, Houston Parks Bd and TxDOT



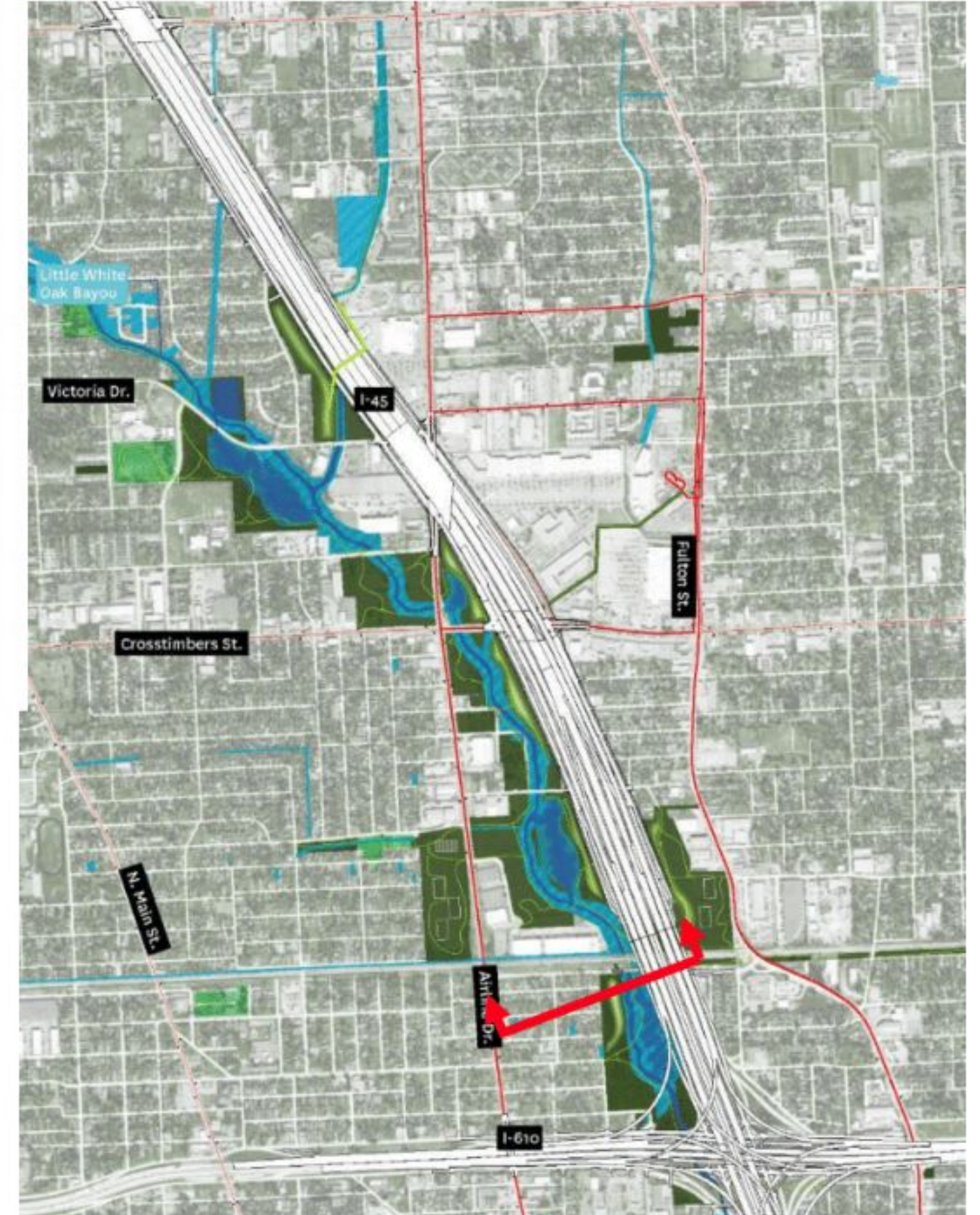
TxDOT PROPOSED SECTION AT RIGGS ROAD



HPB PROPOSED SECTION AT RIGGS ROAD



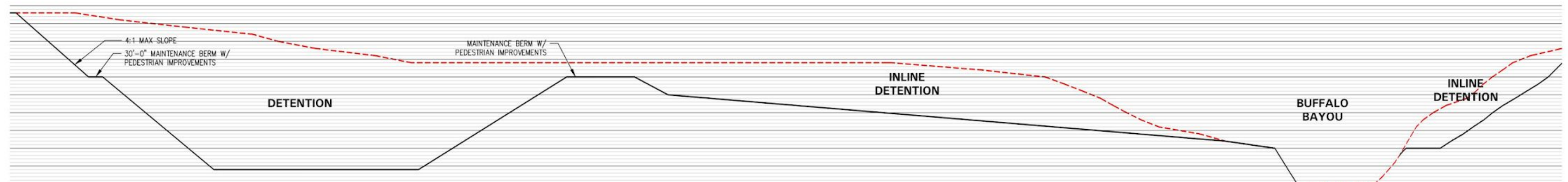
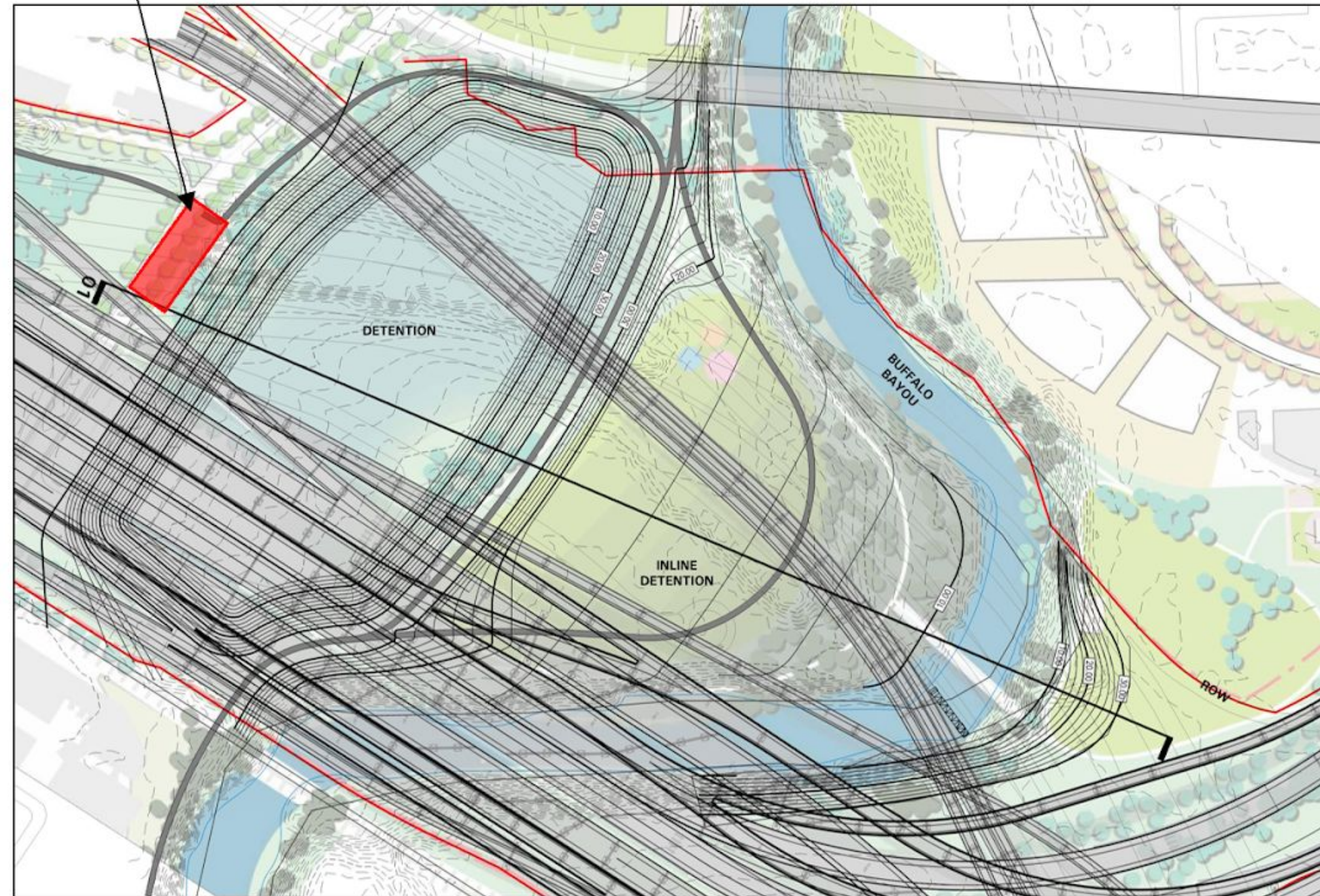
I-45 SECTION 1B CONCEPT PLAN AND SECTIONS



Segment 3 – Detention & Pump Stations

South Canal

PROPOSED
PUMP
STATION



CONCEPTUAL LAYOUT
NHHP

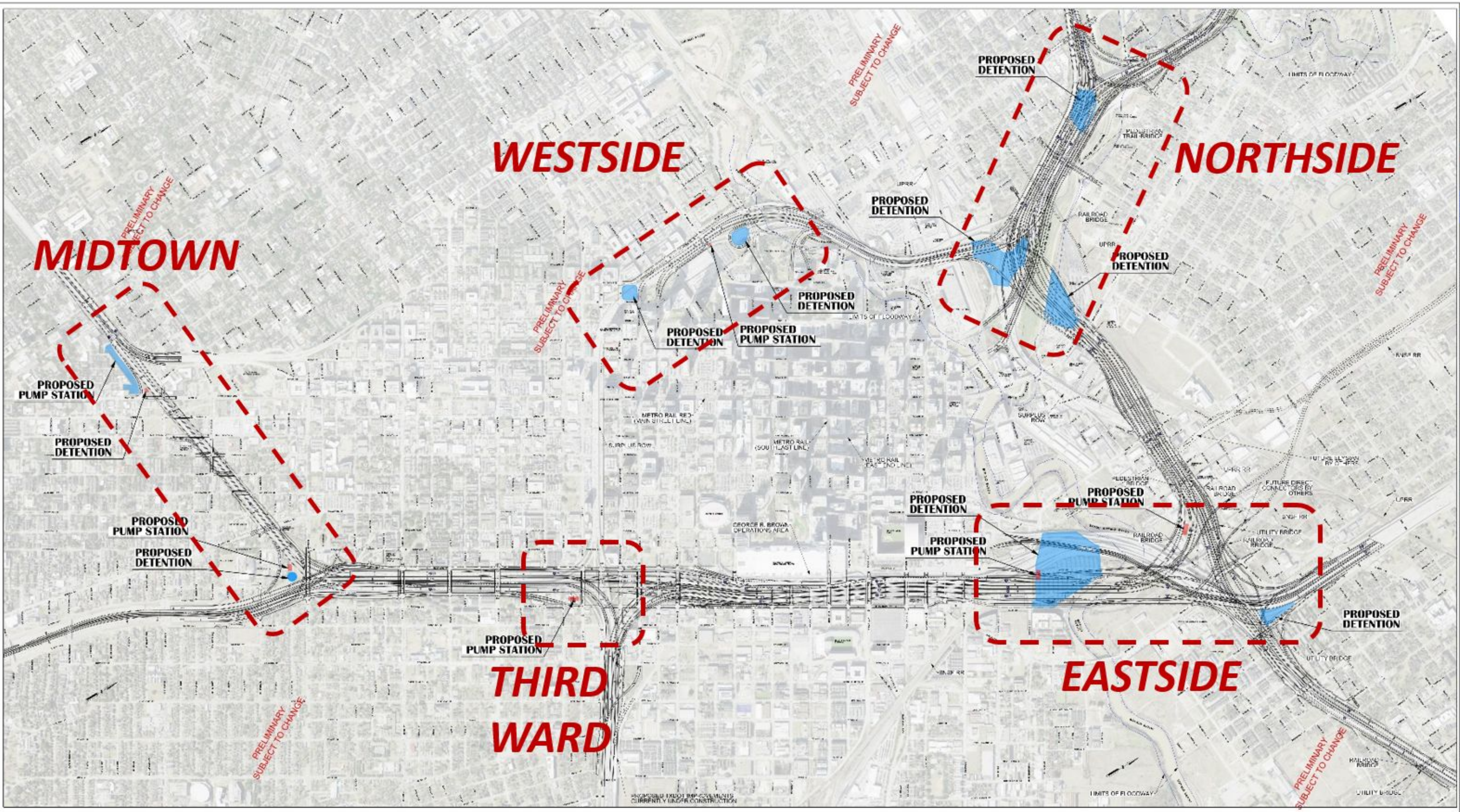
PROPOSED
DETENTION
AND
PUMP STATIONS

SCALE



LEGEND

PROPOSED DETENTION
PROPOSED PUMP STATION



Segment 3 – Detention & Pump Stations

I-69 and SH 288

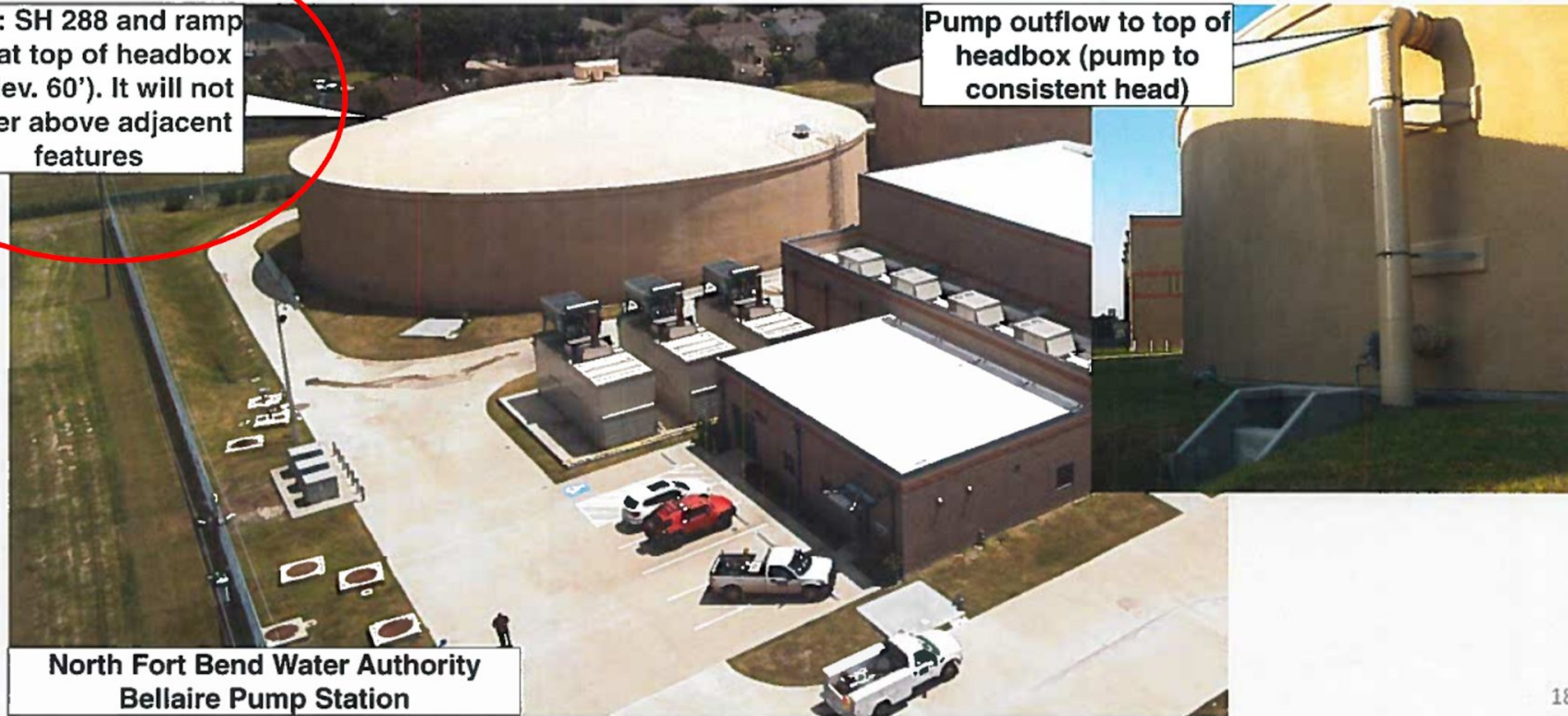
EXAMPLE

Pump Station Headbox

Similar to a water supply ground storage tank

Note: SH 288 and ramp are at top of headbox (~ elev. 60'). It will not tower above adjacent features

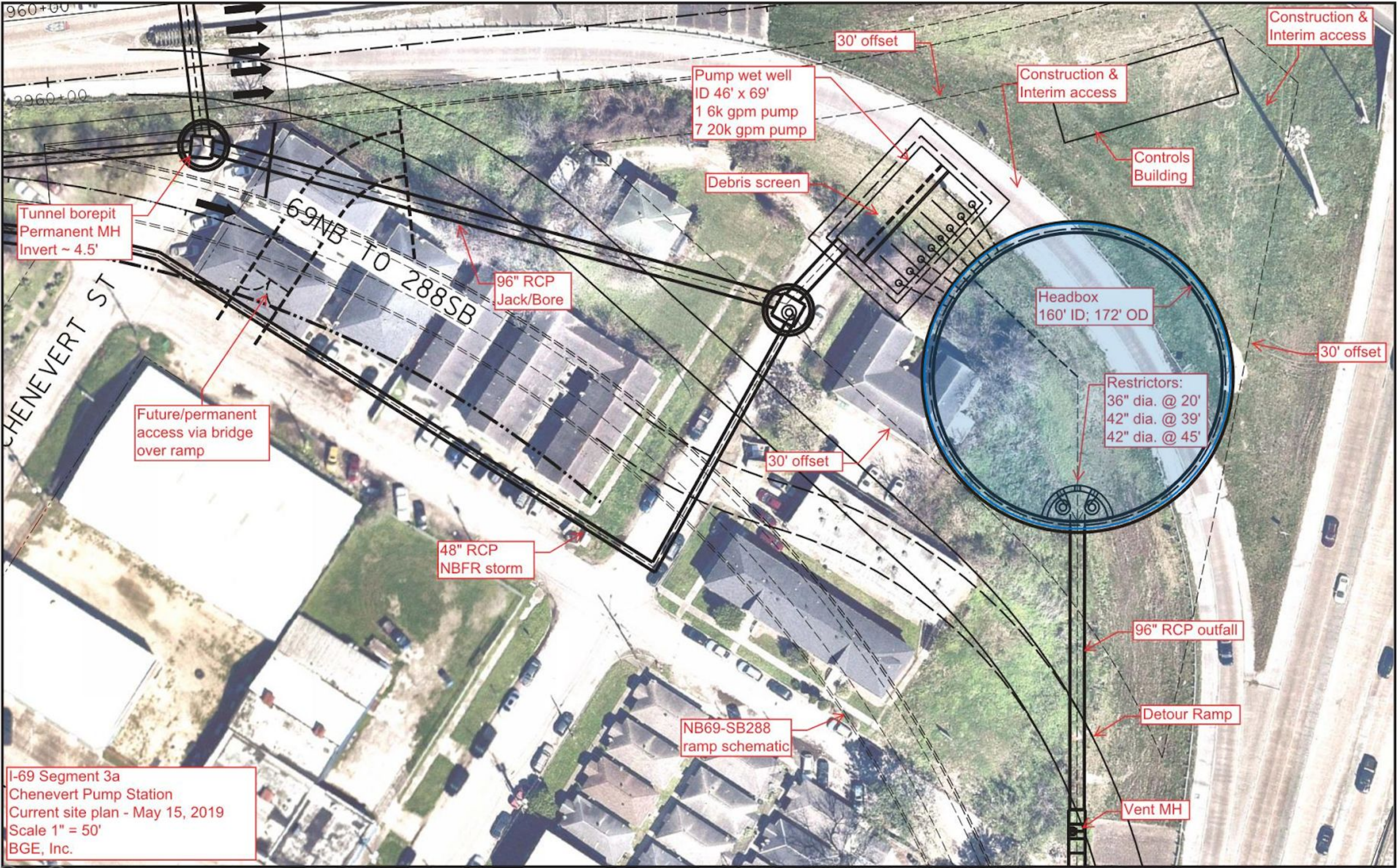
Pump outflow to top of headbox (pump to consistent head)



North Fort Bend Water Authority
Bellaire Pump Station

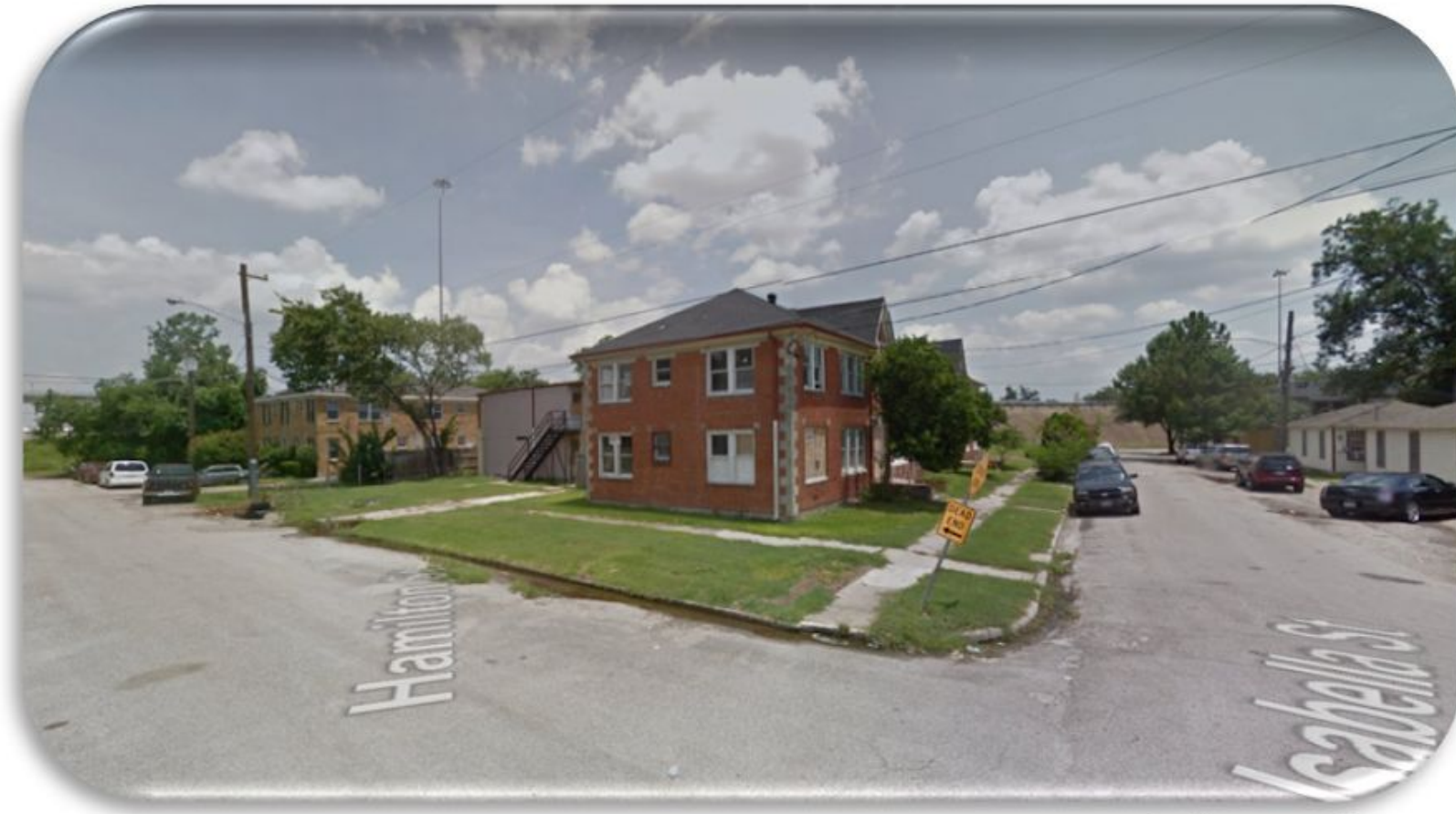
Segment 3 – Detention & Pump Stations

I-69 and SH 288



Segment 3 – Detention & Pump Stations

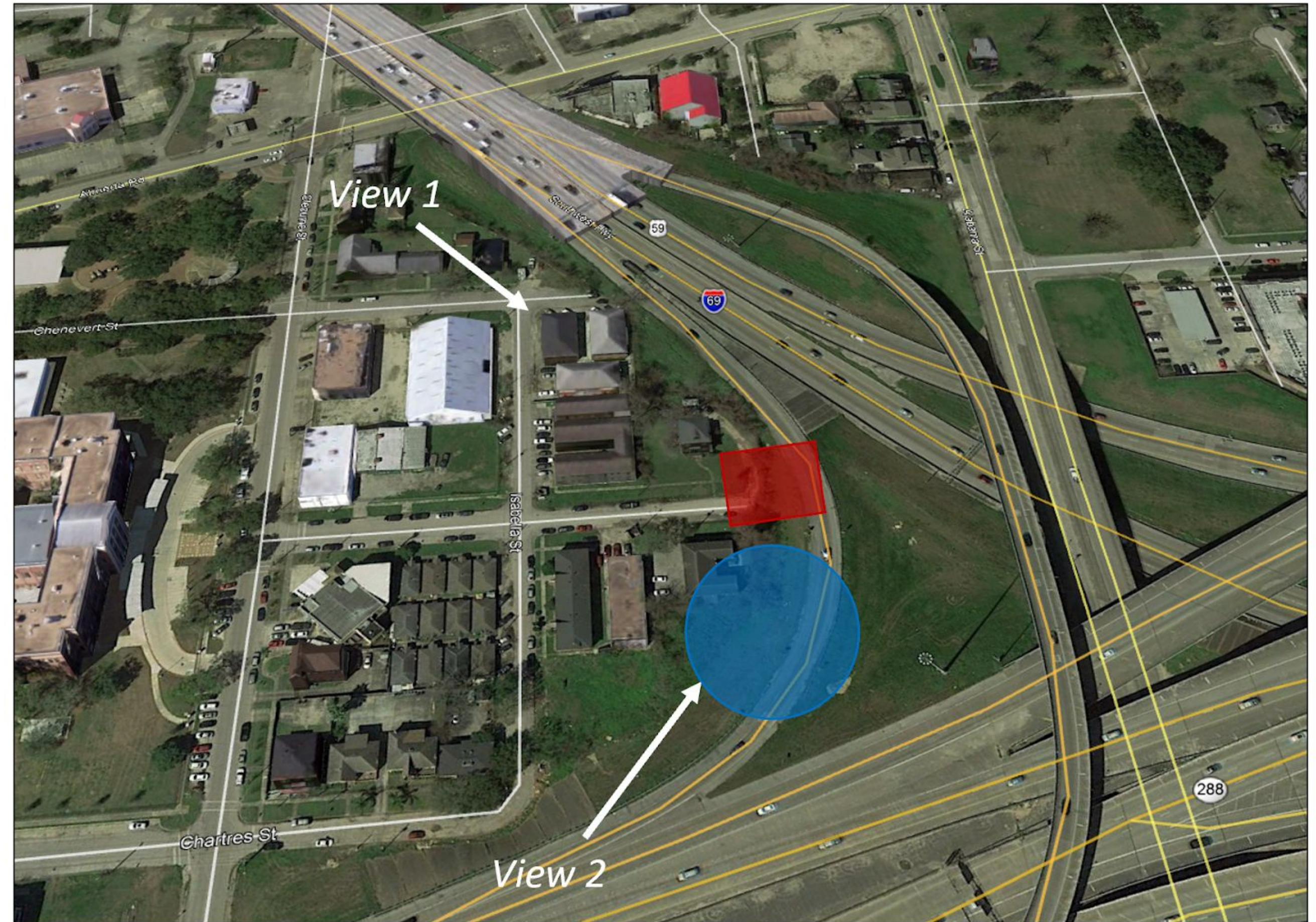
I-69 and SH 288



View 1



View 2



Segment 3 – Detention & Pump Stations

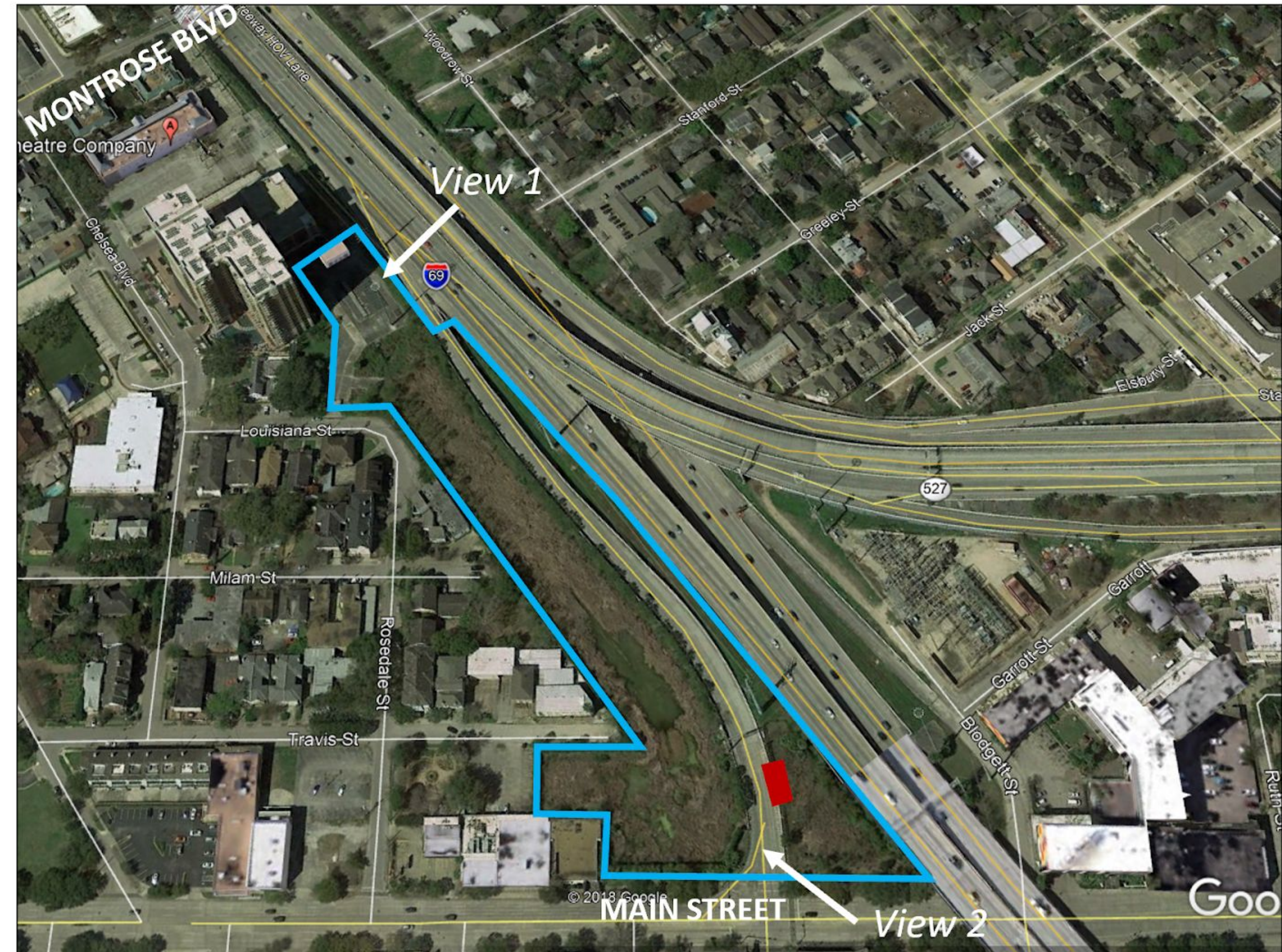
I-69 and Main Street



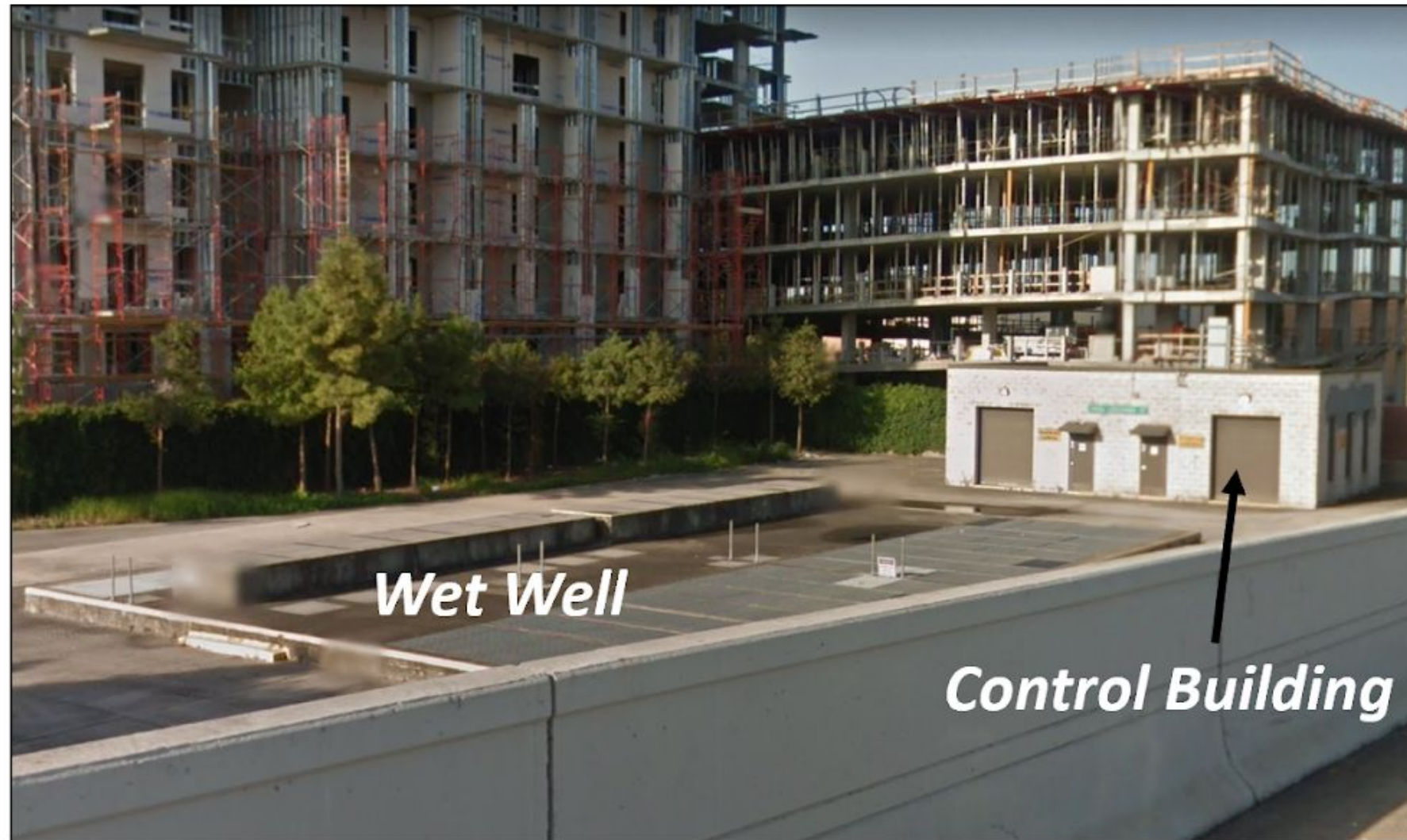
View 1



View 2



Segment 3 – Pump Stations



Montrose Pump Station

Pump Stations

- *Mechanically lift storm water runoff from the roadway to a discharge place or outfall*
- *Can be designed to be unobtrusive, efficient, and reliable*

Wet Wells

- *Receive inflow of storm water prior to pumping and has a system for collecting trash and sediment*

Control Buildings

- *House the control and communication systems needed for the Pump Stations*

Segment 3 – Detention

Urban Drainage Approach

Collect stormwater from the roadway and convey it safely to an adequate receiving body through the use of various components including:



Detention Ponds

- *Hold water temporarily*
- *Used for controlling flood water*



Storage Tanks

- *Similar to Detention Ponds, they collect and hold water temporarily*
- *Can be reduced in height by using submersible pumps*
- *Can be hidden with vegetation*

REALTOR AND THE CITY PRESENTATIONS

Starting in February
3-hr CE Course
har.com/education



FLOODPLAIN

ORDINANCE SURVIVAL

2-hr CE Course

