

05 / ADDITIONAL RESEARCH

INTRODUCTION

HYDRAULICS

AFFORDABLE HOUSING AND PERMANENT SUPPORTIVE HOUSING

TRANSMISSION LINE RIGHT-OF-WAY

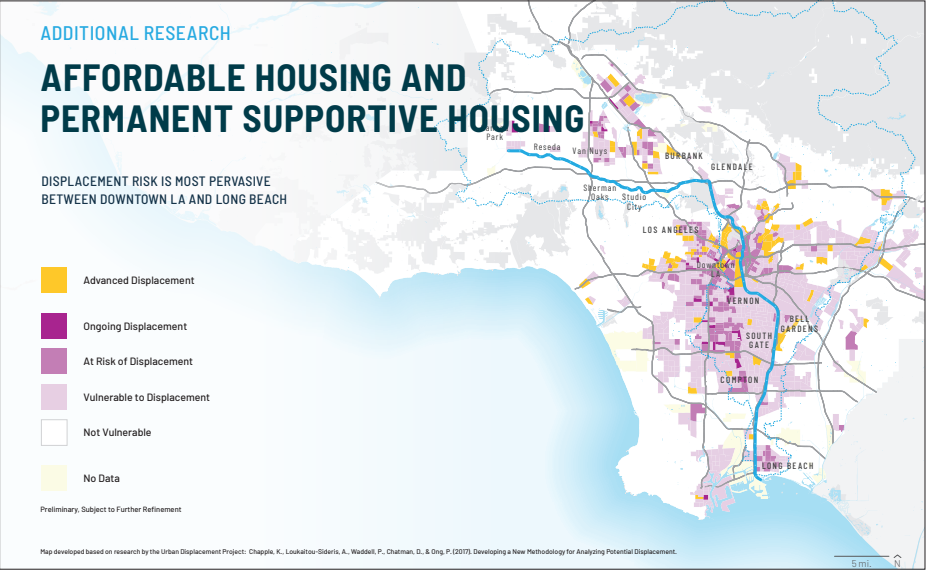
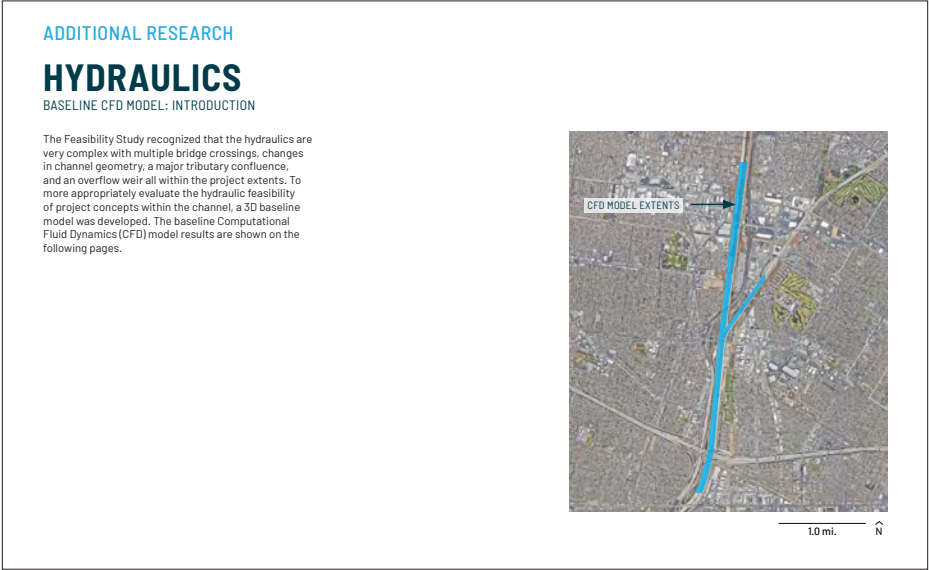
LYNWOOD CONNECTOR

FUTURE METRO WSAB AND UPRR RAIL ALIGNMENTS

ADDITIONAL RESEARCH

ADDITIONAL RESEARCH

Research in this report builds on the extensive analyses and opportunities identified in the Rio Hondo Confluence Area Feasibility Study. Specifically, additional data has been gathered regarding property ownership, existing recreation and community assets, parcel boundaries, and hydraulic feasibility. Additional 3D hydraulic analyses were performed in order to confirm and/or verify the feasibility findings and inform the development of potential conceptual strategies.



ADDITIONAL RESEARCH

TRANSMISSION LINE RIGHT-OF-WAY

CONTEXT

Within the Rio Hondo Confluence Area, there are numerous transmission line rights-of-way that have great potential for future development as open space improvements. Within the RHCAP, there are three parks in particular, the South Garfield, North Imperial, and South Imperial Transmission Rights-of-Way Parks, that advocate for enhanced utilization of largely fallow land.

- The site of the South Garfield Transmission Right-of-Way Park is currently owned by the Southern California Edison (SCE) and the transmission line right-of-way south of Circle Park, north of the future Rio Hondo Platform Park, and east of the future LA River Platform Park, is occupied with active transmission lines. The parcels are also currently leased and operated by AY Nursery.
- The site of the North Imperial Transmission Right-of-Way Park, occupies both the SCE and Los Angeles Department of Water and Power (LADWP) transmission line rights-of-way and is leased and operated by Cal-Tokyo Nursery. The site also includes fallow land south of the UPRR line.

the existing Imperial Equestrian Center, and a commercial site with unknown management. The RHCAP advocates for a continuation of operation of the Imperial Equestrian Center, which is an existing asset in the Lower LA River equestrian community. The center offers boarding and horse riding and ties to a broader regional equestrian trail network. The North Imperial Transmission Right-of-Way Park is bounded by the future Rio Hondo Platform Park to the north, the future LA River Platform Park to the east, and the future Water Education Center to its southwest.

- The South Imperial Transmission Right-of-Way Park also occupies the existing SCE and Los Angeles Department of Water and Power (LADWP) transmission line rights-of-way, but stands as fallow land, significantly lacking program. A plant nursery previously occupied the entire site on grade. The site comprises underutilized parcels, especially in relation to its proximity to Hollywood Regional Park to the south and the future SELA Cultural Center to the west.

ADDITIONAL RESEARCH

LYNWOOD CONNECTOR

OPTIONS

The Lynwood neighborhood is currently disconnected from the LA River and the east bank communities and amenities by the I-710. Several site locations for a potential connector bridge have been considered and researched in depth. Each location presents its own unique challenges and opportunities.

- Option A is located at Imperial Highway. There is an existing at grade connection at Imperial Highway, however pedestrians must cross several vehicular intersections of the highway on- and off-ramps, which can be time consuming and challenging due to multiple lanes of high speed traffic. In elevating pedestrians, they can cross the interchange more quickly and safely. If the bridge lands at Imperial Highway and Duncan Ave, pedestrians can directly access the existing commercial corridor that is directly adjacent to residential communities to the north and south. However, the retail shops are largely focused on automobiles, such as gas stations, garages, and tire shops, supplemented by several food establishments. This option would necessitate the longest bridge of all options, which would be more than .2 miles of elevated walkways.
- Option B is located south of the I-710 interchange at Imperial Highway and is the shortest potential span, landing in a public right-of-way. This location closely aligns with the City of Lynwood's proposed pedestrian bridge and is the most direct connection among the options to the future Imperial Wetlands and the SELA Cultural Center. This location is proximate to Imperial Highway and its commercial assets.
- Option C is located at Will Rogers Elementary School at the intersection of Wright Road and Beechwood Ave. The 0.12 mile long bridge lands at a 3-way intersection that would allow for street connectivity. However, this connection requires the acquisition of privately owned land, whose ownership is yet to be determined.
- Option D is located at Vista High School, is .15 miles long, and falls within publicly owned Los Angeles Unified School District (LAUSD) land. It is also proximate to Will Rogers Elementary School and Marco Antonio Firebaugh High School, both of which may support heavy usage from students. However, the bridge's landing will fall along the industrial corridor on one side and single family homes on the opposite side of the street. Similar to Option B, it will have an abrupt relationship to the many homes' locations and scales. It is also the furthest connection to the future SELA Bridge Park and consequently the longest journey to reach the river's eastern bank.

ADDITIONAL RESEARCH

FUTURE METRO WSAB AND UPRR RAIL ALIGNMENTS

SUMMARY

The existing Union Pacific Railroad (UPRR) and future Metro WSAB rail alignments cut through the RHCAP. Both rail lines dramatically impacted the development of the future LA River and Rio Hondo Platform Parks and had design implications on the future Confluence Point Park and South Imperial Transmission Right-of-Way Park. For both rail alignments, there were several factors taken into consideration, including, but not limited to: the required vertical and horizontal clearances, the maintenance access path, maximum incline and decline slopes, existing and proposed track alignments and elevations, and the existing UPRR bridge structures over the LA River and Rio Hondo. This information was largely enabled by Metro's cooperation, who provided schematic design drawings and rail guidelines. To fill in gaps, the team referenced national freight rail regulations and the USACE as-built drawings of the LA River and Rio Hondo, specifically providing elevations of existing rail tracks and the levee wall profiles.

In addition to the rail line constraints, there are several outlying considerations that deeply impact the development of the Metro WSAB and adjacent RHCAP projects. The vertical alignment is contingent on the depth of the I-710 freeway overpass, which both lines would have to clear. This depth was approximated through Google Earth imagery but requires further investigation. Further, there are LADWP and Southern California Edison (SCE) transmission lines running over the rail lines.

Each transmission line requires a radial clearance along its length that is dependent on its voltage. Further the lines are supported by steel pylons that require horizontal clearances. The UPRR and Metro WSAB alignments and their respective clearances cannot conflict with the I-710 freeway overpass, the transmission lines, or transmission towers, creating a complicated three-dimensional landscape of additional and manifold constraints.

Among the considerations, there was significant concern that the existing UPRR alignment over both the LA River and the Rio Hondo falls within the flood control channel. As a result, the rails would compromise the safety of both UPRR and Metro WSAB trains while also compromising the channels' capacities to convey water. Constructed before the channelization of the river, the UPRR bridge over the LA River has four piers that are off-access from the channel, causing hydraulic jumps. The location of this bridge also corresponds to a change in the channels shape, at which the USACE construction of the channel meets that of the LA County Flood Control District. At this point the channel narrows and its slope steepens. A further complication is that Metro anticipates utilizing the existing bridges' piers as the foundation to the new rail alignment. As both bridges in their current condition represent aging infrastructure, this causes additional concern.

ADDITIONAL RESEARCH

HYDRAULICS

BASELINE CFD MODEL: INTRODUCTION

The Feasibility Study recognized that the hydraulics are very complex with multiple bridge crossings, changes in channel geometry, a major tributary confluence, and an overflow weir all within the project extents. To more appropriately evaluate the hydraulic feasibility of project concepts within the channel, a 3D baseline model was developed. The baseline Computational Fluid Dynamics (CFD) model results are shown on the following pages.



HYDRAULICS

BASELINE CFD MODEL: MODELING APPROACH

All model simulations were run to 60 seconds for flow stabilization, which equated to about 1-2 days of actual computer time.

Data Sources:

- LIDAR (LARIAC, 2016)
- As-Builts

Modeling Methods:

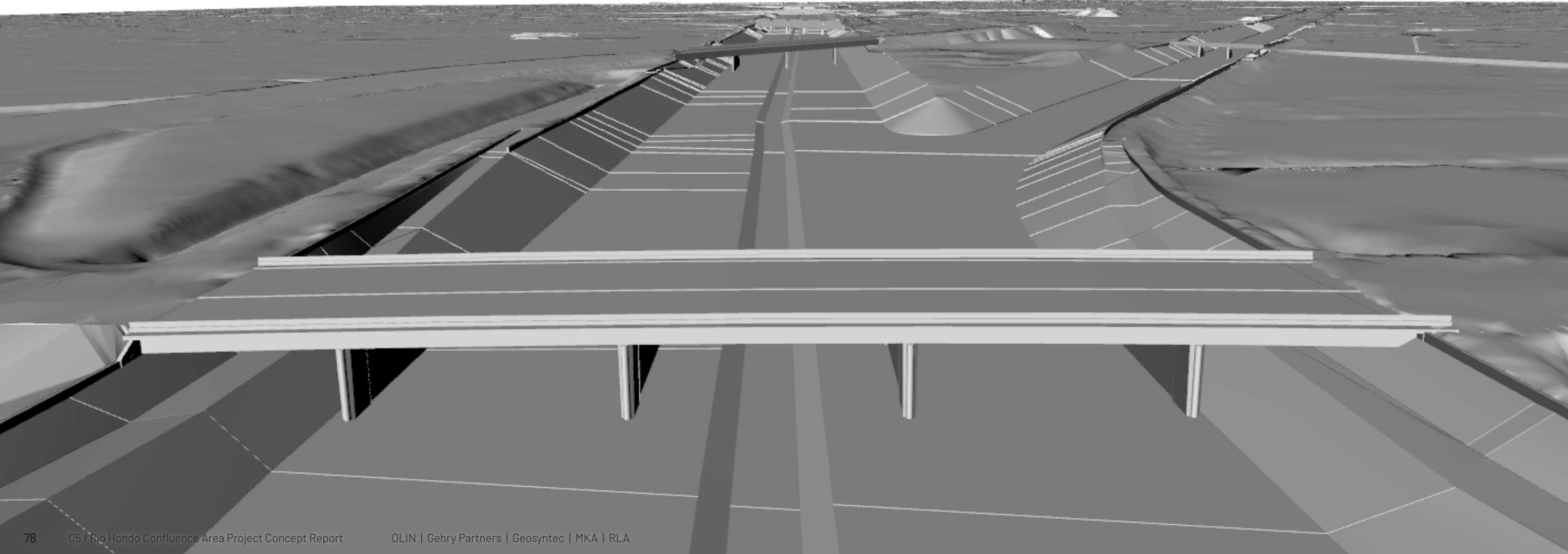
- Rhino surface modeling
- STL exports to Flow-3D

Peak Flow Scenarios (~500-yr or 0.2% flood):

- LA River (LAR) Peak - 144,000 cfs (LAR), 40,000 cfs (Rio Hondo)
- Rio Hondo (RH) Peak - 131,100 cfs (LAR), 52,900 cfs (RH)

Channel Roughness, k:

- Concrete - 0.0015 ft
- Grouted Stone - 0.06 ft



ADDITIONAL RESEARCH

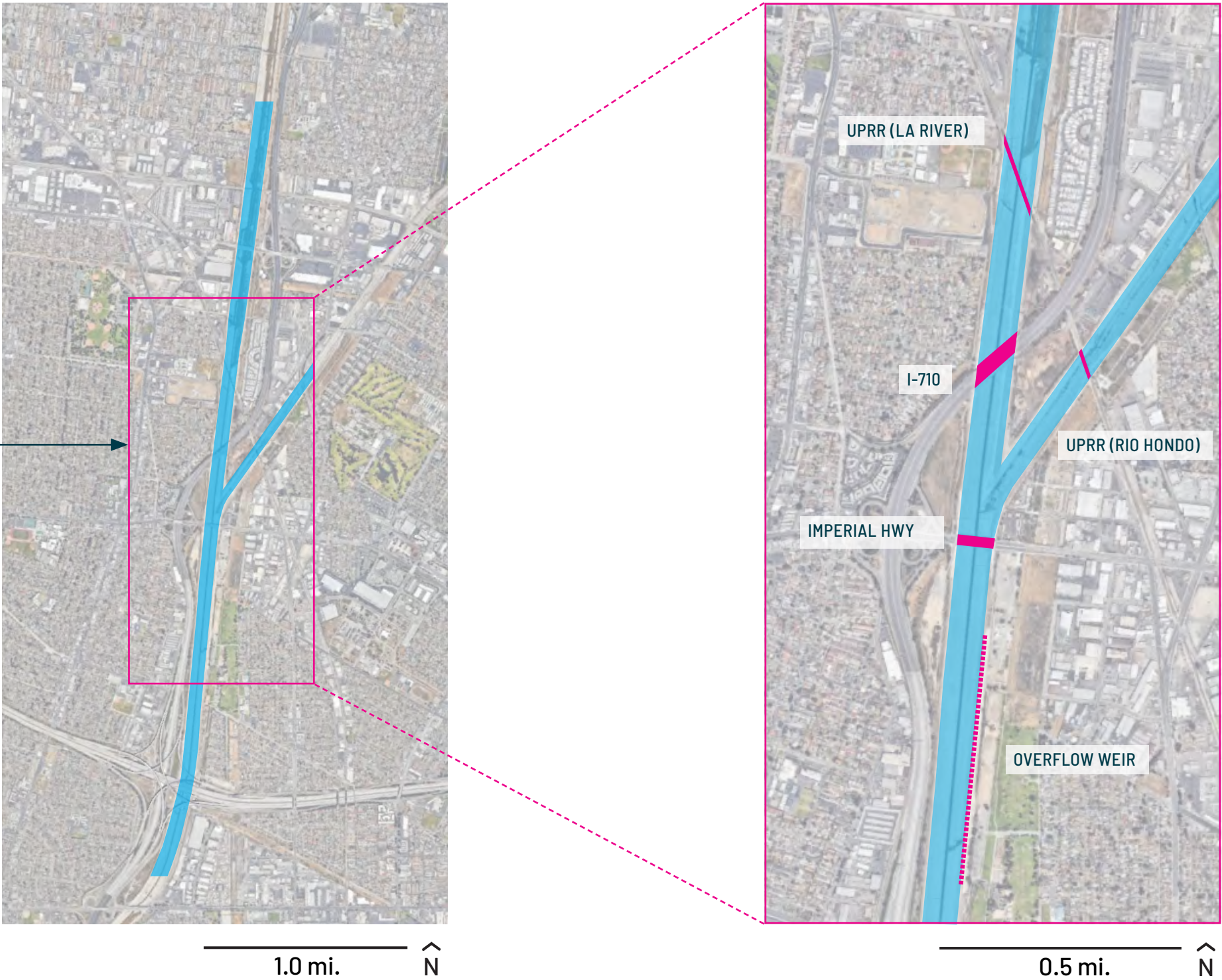
HYDRAULICS

MODELED BRIDGES AND OVERFLOW WEIR

Bridge **piers** for each bridge in the project extents (UPRR-LA River, UPRR-Rio Hondo, I-710, and Imperial Hwy) were modeled. The bridge **decks** were modeled except for the I-710 deck because it is above the peak water surface elevation and hence does not impact hydraulics within the river.

The overflow weir was included in the model and allowed flow to spill out of the channel during the design event peak flow, which is approximately the 0.2% flood event (~500-year).

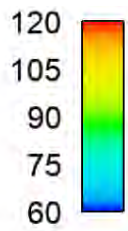
BRIDGES AND OVERFLOW WEIR
MODELED IN THIS ZONE



HYDRAULICS

BASELINE CFD MODEL RESULTS: LA RIVER PEAK AT 60.0 SECONDS

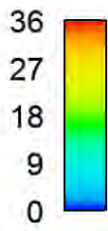
FREE SURFACE ELEVATION (FT)



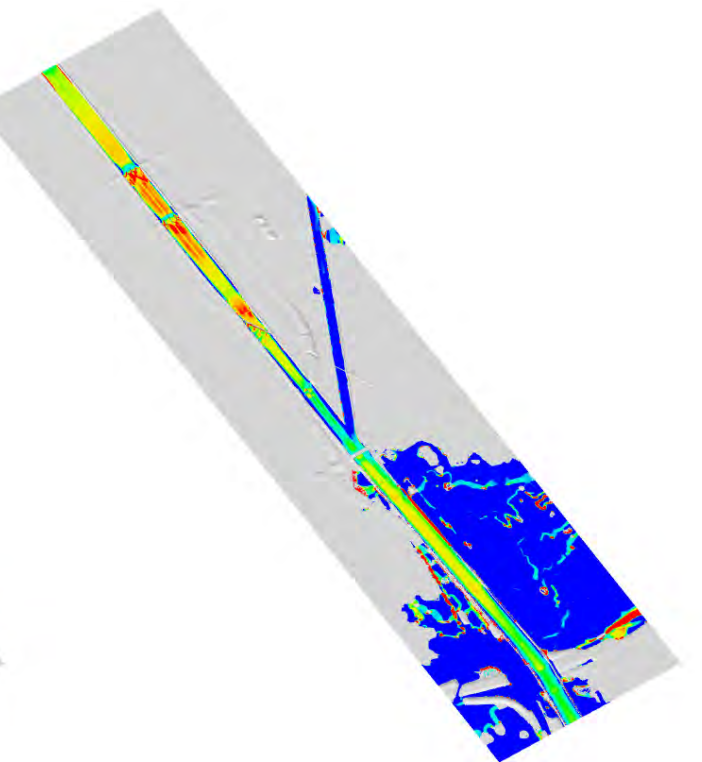
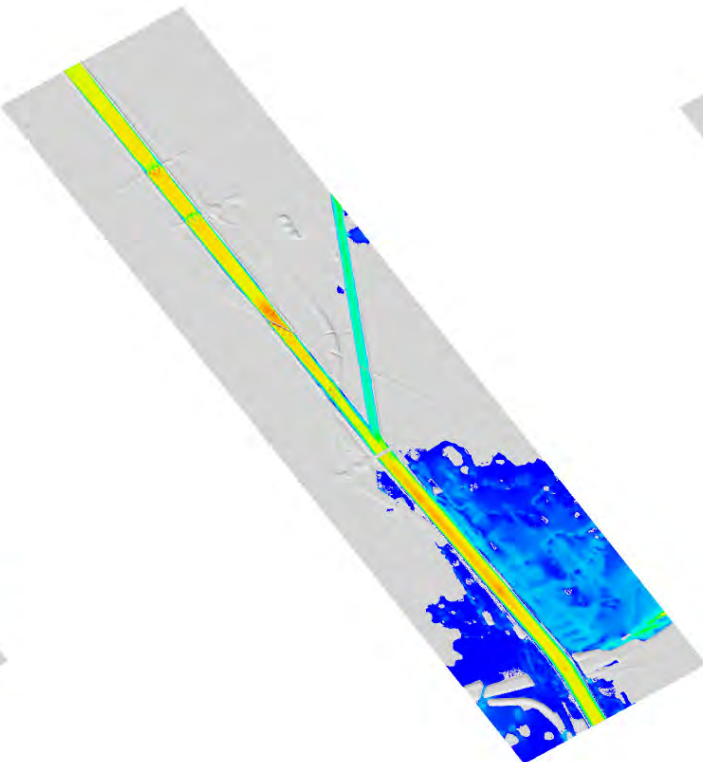
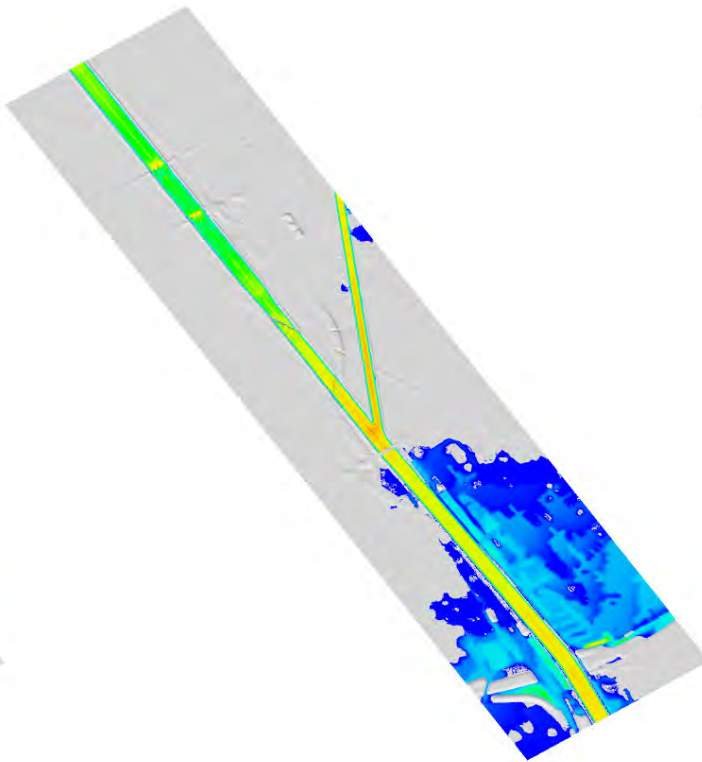
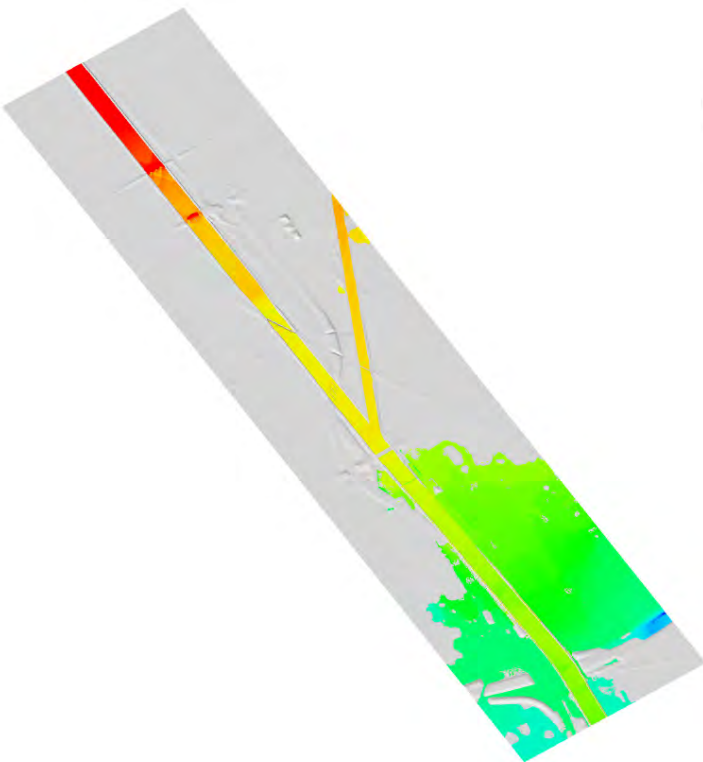
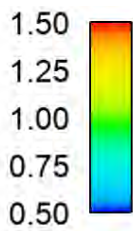
FLOW DEPTH (FT)



DEPTH AVERAGED VELOCITY (FT S⁻¹)



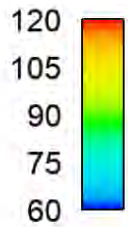
FROUDE NUMBER



HYDRAULICS

BASELINE CFD MODEL RESULTS: RIO HONDO PEAK AT 60.0 SECONDS

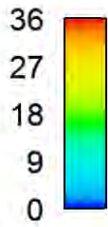
FREE SURFACE ELEVATION (FT)



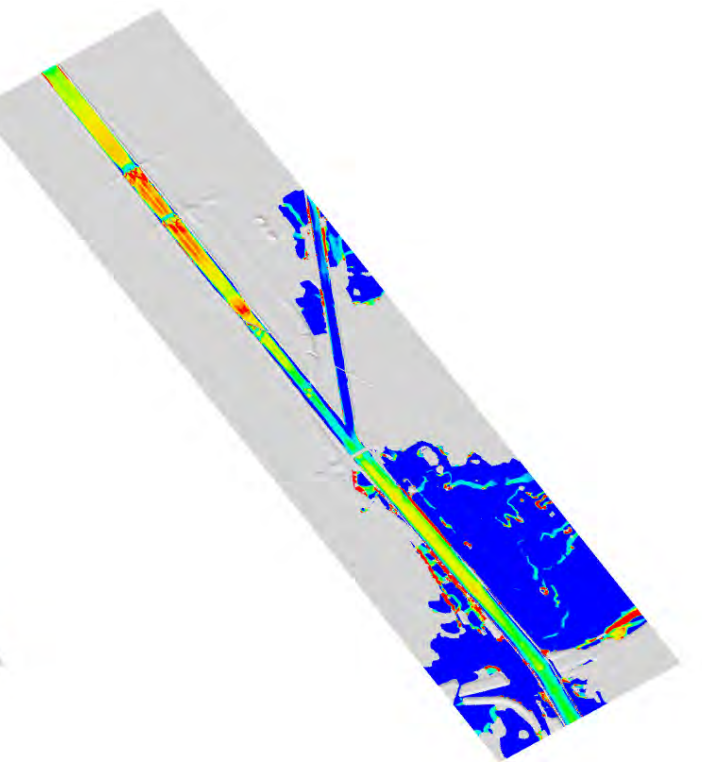
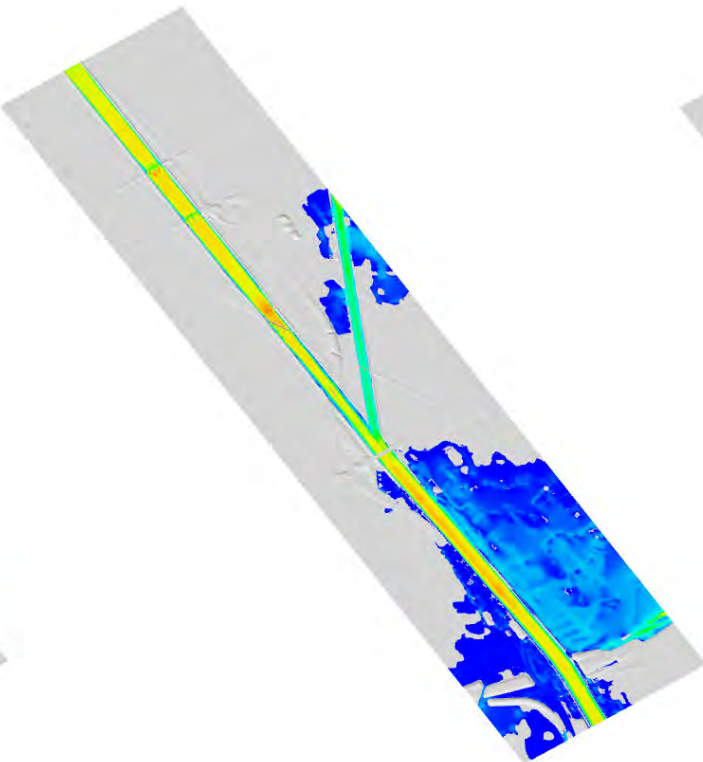
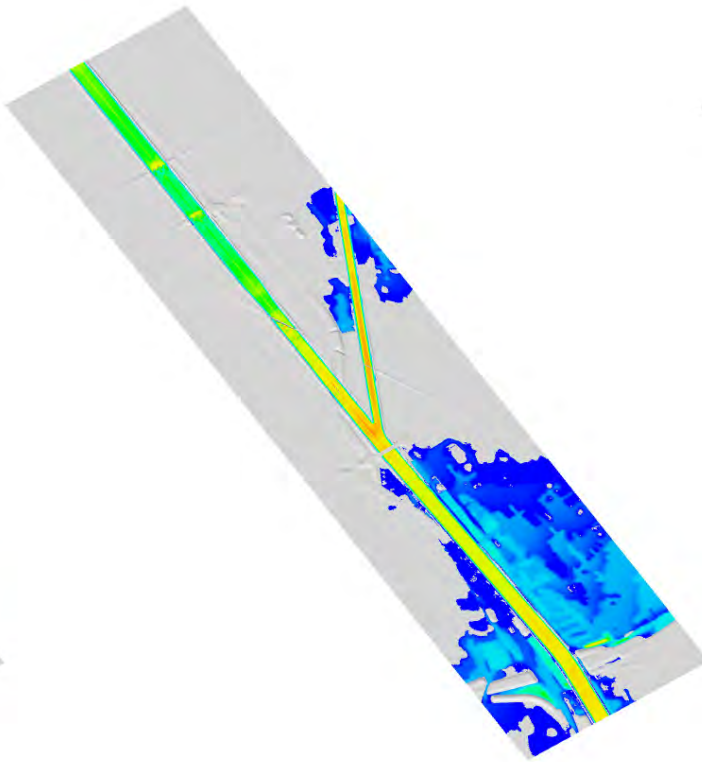
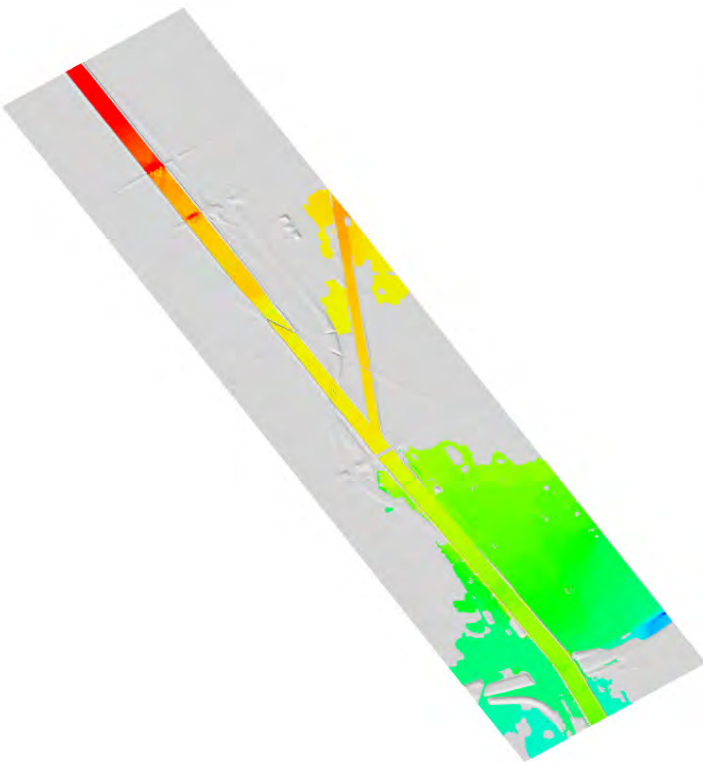
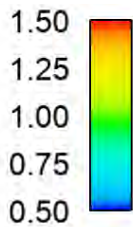
FLOW DEPTH (FT)



DEPTH AVERAGED VELOCITY (FT S⁻¹)



FROUDE NUMBER



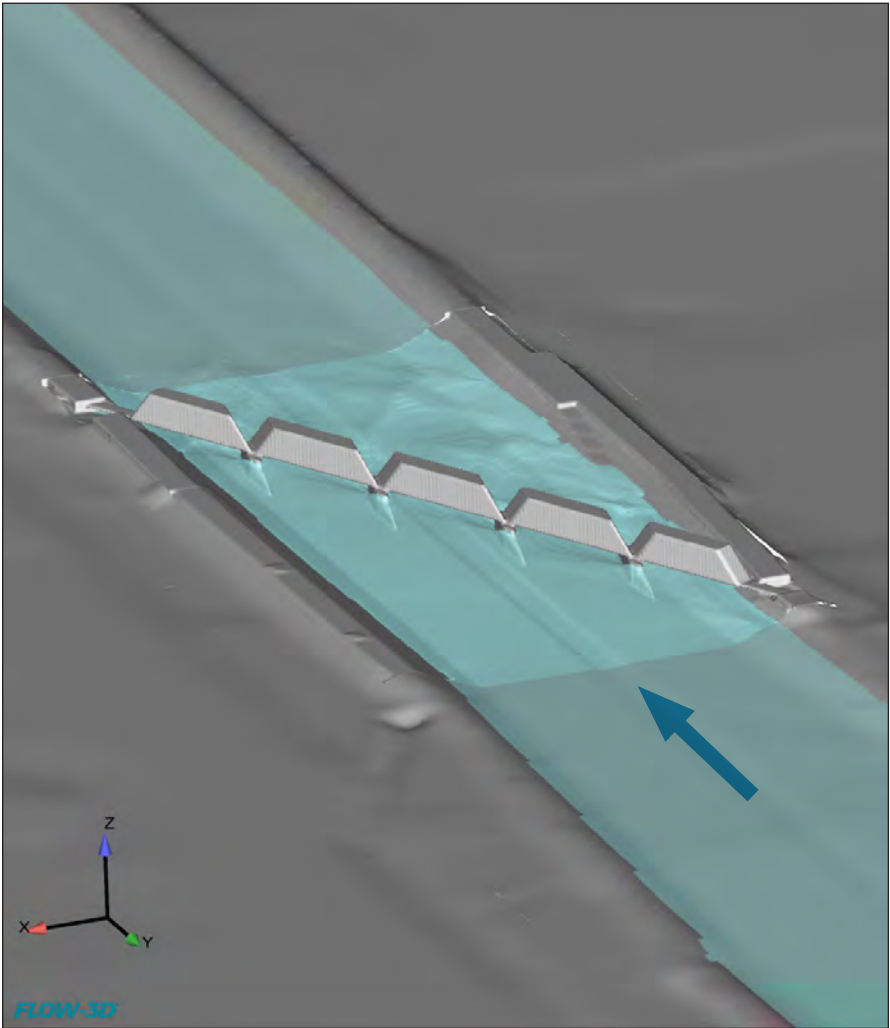
ADDITIONAL RESEARCH

HYDRAULICS

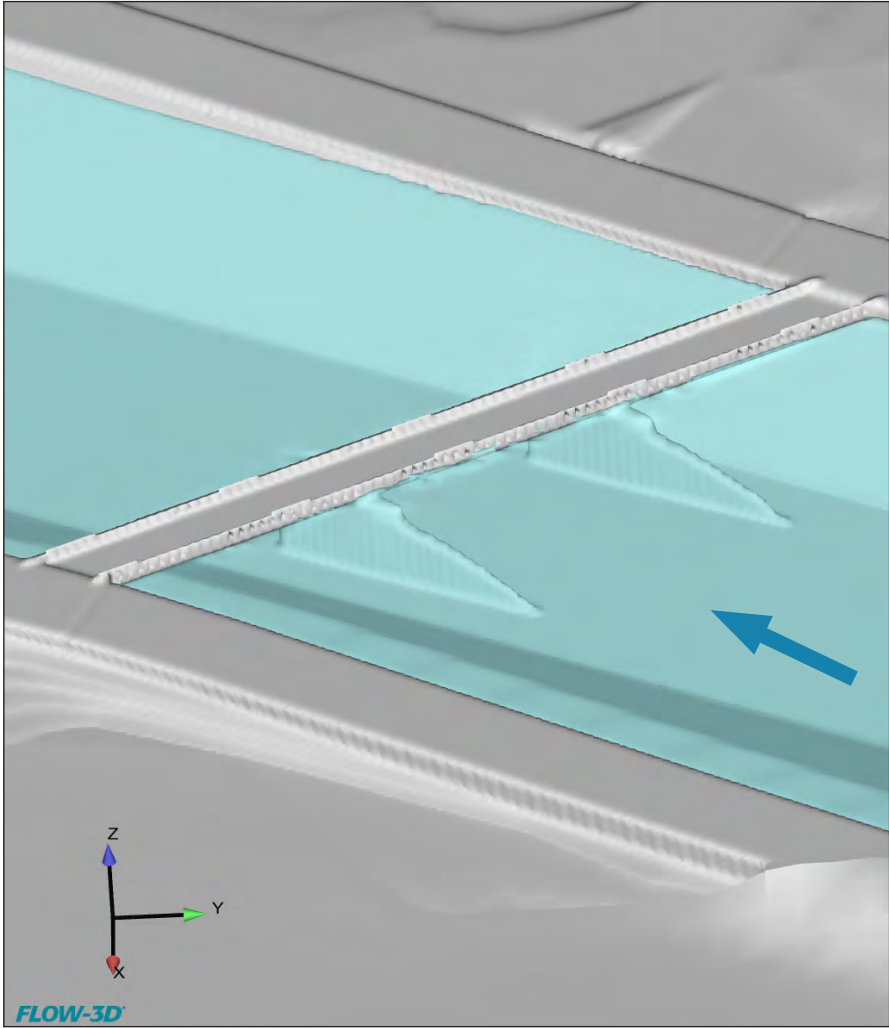
BASELINE CFD MODEL RESULTS

The model predicts these three bridge decks will be impinged by the peak flows. This is consistent with physical modeling conducted in the 1990's for the LA River Improvements.*

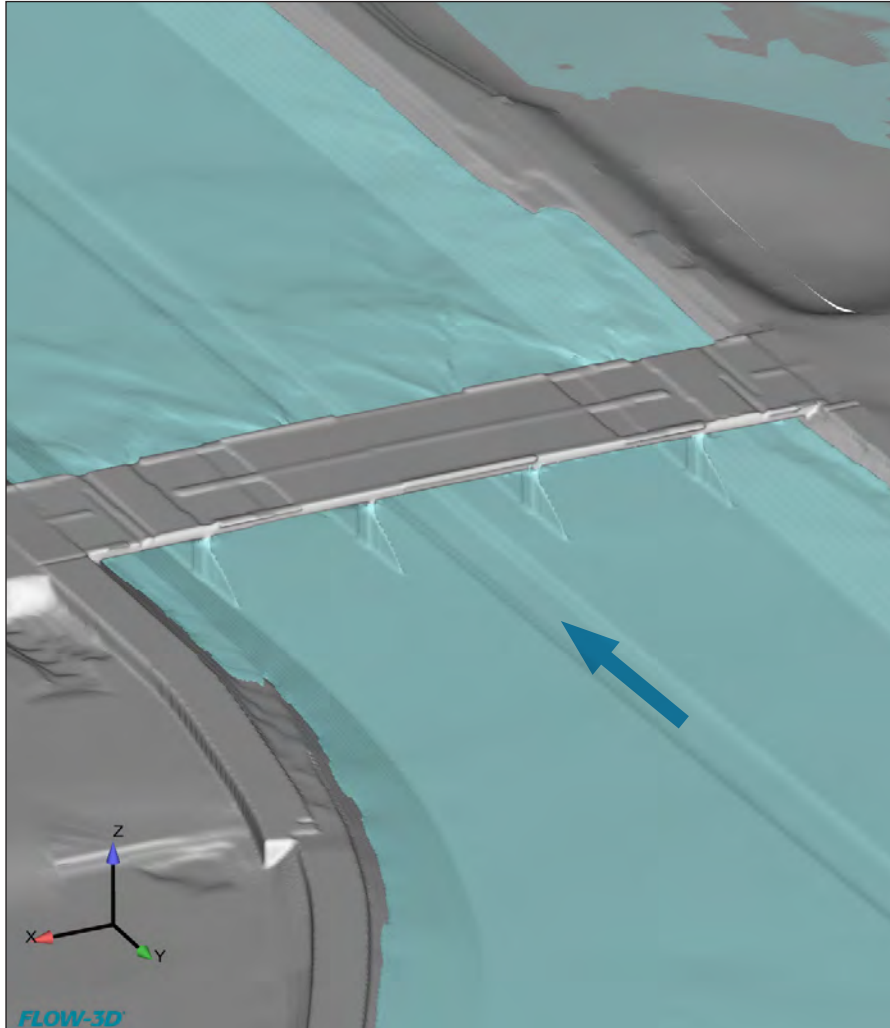
UPRR Bridge - LA River



UPRR Bridge - Rio Hondo



Imperial Hwy Bridge

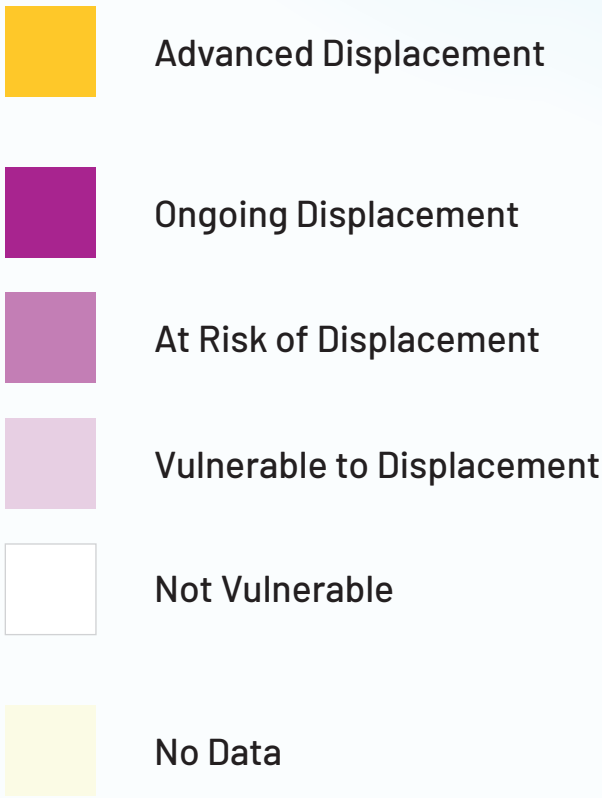


* USACE (1999). Los Angeles River Improvements Project Including Rio Hondo and Compton Creek, Final Design Memorandum No. 5

ADDITIONAL RESEARCH

AFFORDABLE HOUSING AND PERMANENT SUPPORTIVE HOUSING

DISPLACEMENT RISK IS MOST PERVASIVE
BETWEEN DOWNTOWN LA AND LONG BEACH



Preliminary, Subject to Further Refinement

Map developed based on research by the Urban Displacement Project: Chapple, K., Loukaitou-Sideris, A., Waddell, P., Chatman, D., & Ong, P. (2017). Developing a New Methodology for Analyzing Potential Displacement.

AFFORDABLE HOUSING AND PERMANENT SUPPORTIVE HOUSING

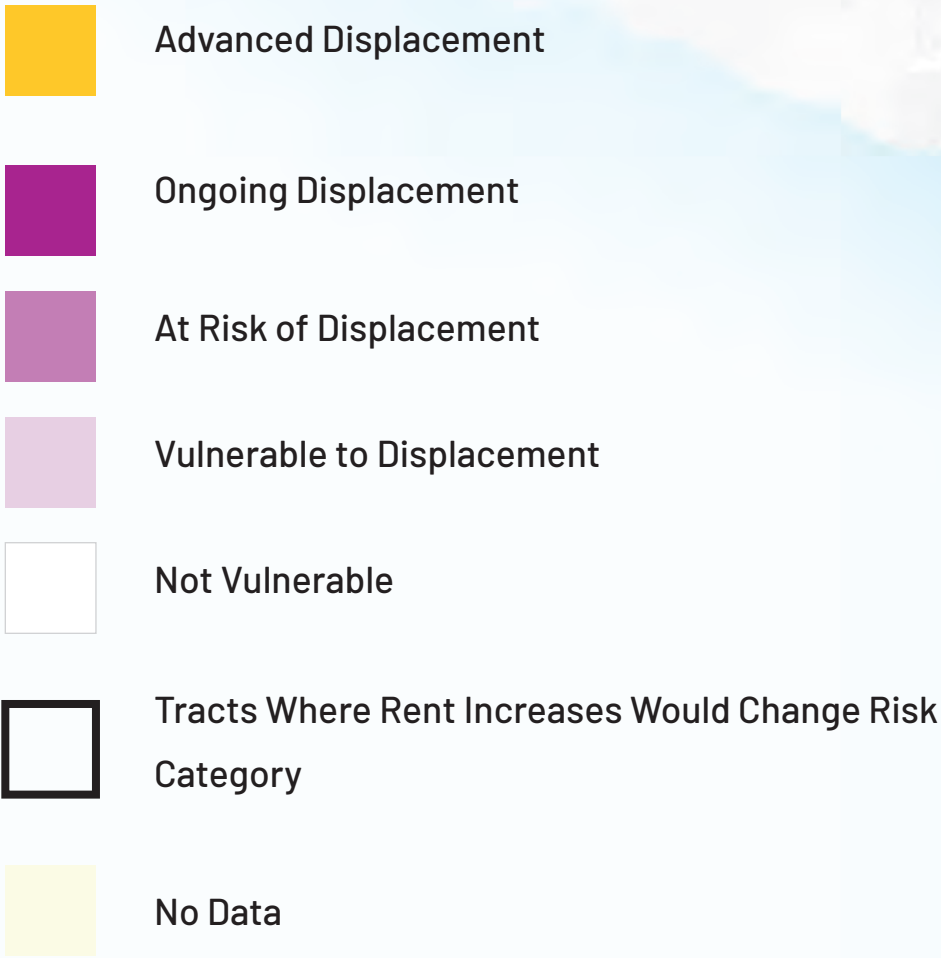
MEASURING DISPLACEMENT RISK

<div><div>VULNERABLE TO DISPLACEMENT</div><div>Areas with a high share of vulnerable households</div><div><div>High Percentages of 3 of the Following:</div><div><div>• Low-Income Households</div><div>• Non-College-Educated Adults</div><div>• Renters</div><div>• Non-White Households</div></div></div></div>	<div><div>AT RISK OF DISPLACEMENT</div><div>Low income areas with proven risk factors</div><div><div>Vulnerable Plus 2 of the Following:</div><div><div>• Nearby Rail Station</div><div>• High % Pre-1950 Buildings</div><div>• High Employment Density</div><div>• Rents Rising Faster than County Average</div></div></div></div>	<div><div>ONGOING DISPLACEMENT</div><div>Low income areas that are changing quickly</div><div><div><div>• Low Income Area</div><div>• Growing Population</div><div>• Loss of Lower Income Population</div><div>• Rents Rising Faster than County Average</div></div></div></div>	<div><div>ADVANCED DISPLACEMENT</div><div>Not currently low income but getting whiter and more expensive</div><div><div>NOT a Low Income Area Plus Above Average Growth in:</div><div><div>• College-Educated Adults</div><div>• White Population</div><div>• Median Income</div><div>• Rents</div></div></div></div>
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ADDITIONAL RESEARCH

AFFORDABLE HOUSING AND PERMANENT SUPPORTIVE HOUSING

HOW DO IMPROVEMENTS TO THE RIVER CHANGE NEED?



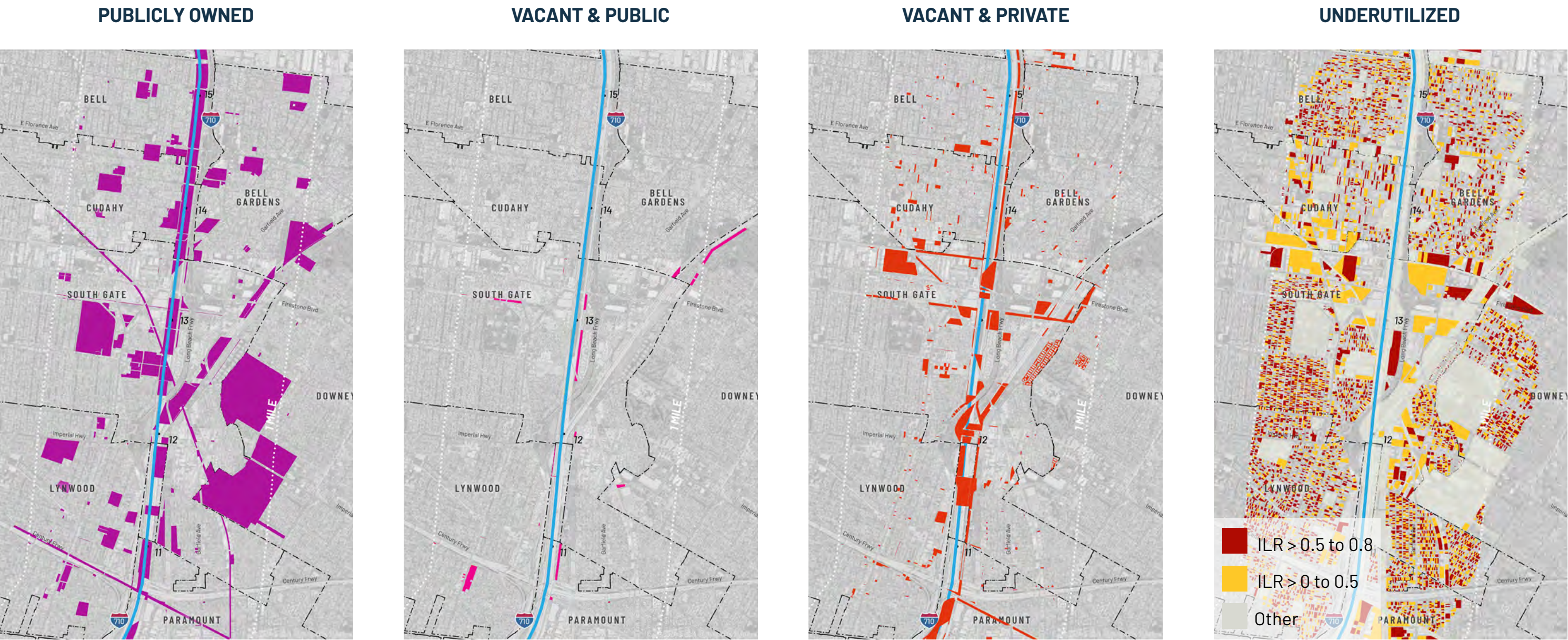
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ADDITIONAL RESEARCH

AFFORDABLE HOUSING AND PERMANENT SUPPORTIVE HOUSING

TYPES OF LAND THAT MIGHT PROVIDE OPPORTUNITIES FOR NEW AFFORDABLE HOUSING



Source: OLIN, Gehry Partners

AFFORDABLE HOUSING AND PERMANENT SUPPORTIVE HOUSING

ADDITIONAL CONSIDERATIONS FOR SITING AFFORDABLE HOUSING

<div><div><div>HIGH PRIORITY</div><div>38 CLUSTERS</div></div><div><ul style="list-style-type: none">• Include publicly- and privately-owned parcels• Predominantly very low ILR parcels• Close proximity to public resources, major streets, public transit, future development</div></div>	<div><div><div>MEDIUM PRIORITY</div><div>131 CLUSTERS</div></div><div><ul style="list-style-type: none">• Composed of low and very low ILR parcels• May necessitate environmental remediation but close to points of interest• Periphery of medium- to high-density residential neighborhood• Not currently zoned for redevelopment</div></div>	<div><div><div>LOW PRIORITY</div><div>125 CLUSTERS</div></div><div><ul style="list-style-type: none">• Composed of predominantly low ILR parcels• Include known Superfund or contaminated sites• Deeply embedded in an industrial area otherwise unlikely to be redeveloped for affordable housing</div></div>	<div><div><div>NOT PRIORITY</div><div>66 CLUSTERS</div></div><div><ul style="list-style-type: none">• Nested within existing residential fabric• Interstitial space of existing developments• Power line right-of-ways• Irregularly-shaped parcel not conducive to development</div></div>
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ADDITIONAL RESEARCH

AFFORDABLE HOUSING AND PERMANENT SUPPORTIVE HOUSING

THERE ARE 294 CLUSTERS OF
PARCELS 1+ ACRE IN SIZE THAT
ARE PUBLICLY OWNED, VACANT,
OR UNDERUTILIZED

1,887 ACRES TOTAL

LEGEND:

- City Boundary
- Rail Lines
- Site Boundary
- LA River
- 1+ acre Clusters



Source: OLIN, Gehry Partners

TRANSMISSION LINE RIGHT-OF-WAY

CONTEXT

Within the Rio Hondo Confluence Area, there are numerous transmission line rights-of-way that have great potential for future development as open space improvements. Within the RHCAP, there are three parks in particular, the South Garfield, North Imperial, and South Imperial Transmission Rights-of-Way Parks, that advocate for enhanced utilization of largely fallow land.

- The site of the South Garfield Transmission Right-of-Way Park is currently owned by the Southern California Edison (SCE) and the transmission line right-of-way south of Circle Park, north of the proposed Rio Hondo Platform Park, and east of the proposed LA River Platform Park, is occupied with active transmission lines. The parcels are also currently leased and operated by AY Nursery.
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- The South Imperial Transmission Right-of-Way Park also occupies the existing SCE and Los Angeles Department of Water and Power (LADWP) transmission line rights-of-way, but stands as fallow land, significantly lacking program. A plant nursery previously occupied the entire site on grade. The site comprises underutilized parcels, especially in relation to its proximity to Hollydale Regional Park to the south and the future SELA Cultural Center to the west.

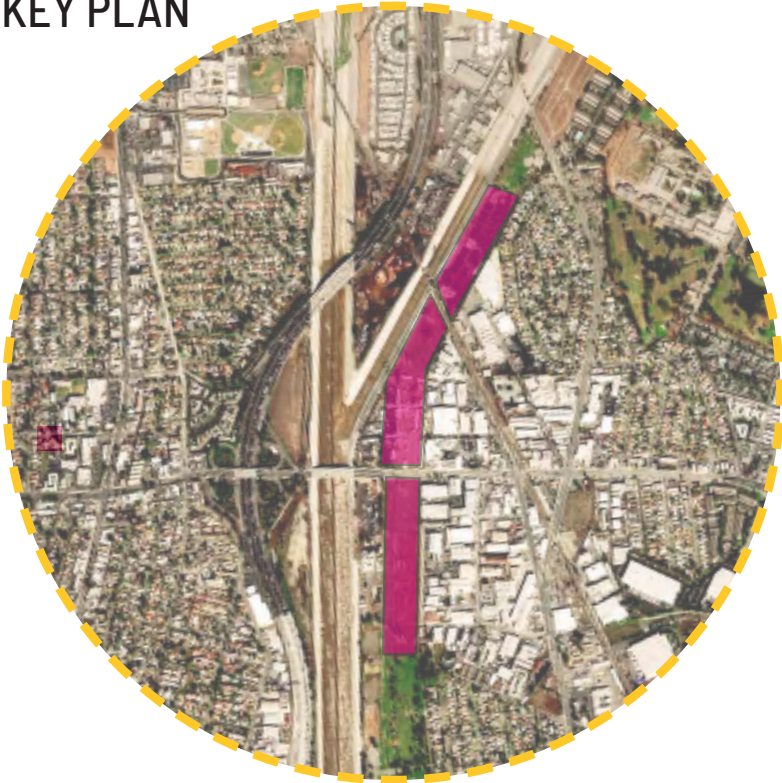
ADDITIONAL RESEARCH

TRANSMISSION LINE RIGHT-OF-WAY

LAND USE / OWNERSHIP

Transmission line rights-of-way present numerous programming and feasibility challenges due to the required clearances of the power lines, the maintenance road and access requirements, and building restrictions. They are inappropriate for certain programs, namely residential development and for tall structures and site elements, such as towering trees. Throughout LA County the land is often fallow, leased and operated by plant nurseries, or used for trails and open space. The RHCAP attempts to make improvements to the transmission line rights-of-way so that no land remains fallow, prioritizing open space and trails to enhance the broader park network in the area and alleviate park need in the surrounding communities. However, the RHCAP explores varying reallocations of the land in two schemes to also accommodate existing nurseries within desired open space development. In both schemes, the Imperial Equestrian Center remains, as it is an asset to an expanded equestrian trail network in the future.

KEY PLAN



Transmission Line ROW
Source: OLIN



TRANSMISSION RIGHT-OF-WAY SOUTH TOWARDS IMPERIAL HIGHWAY



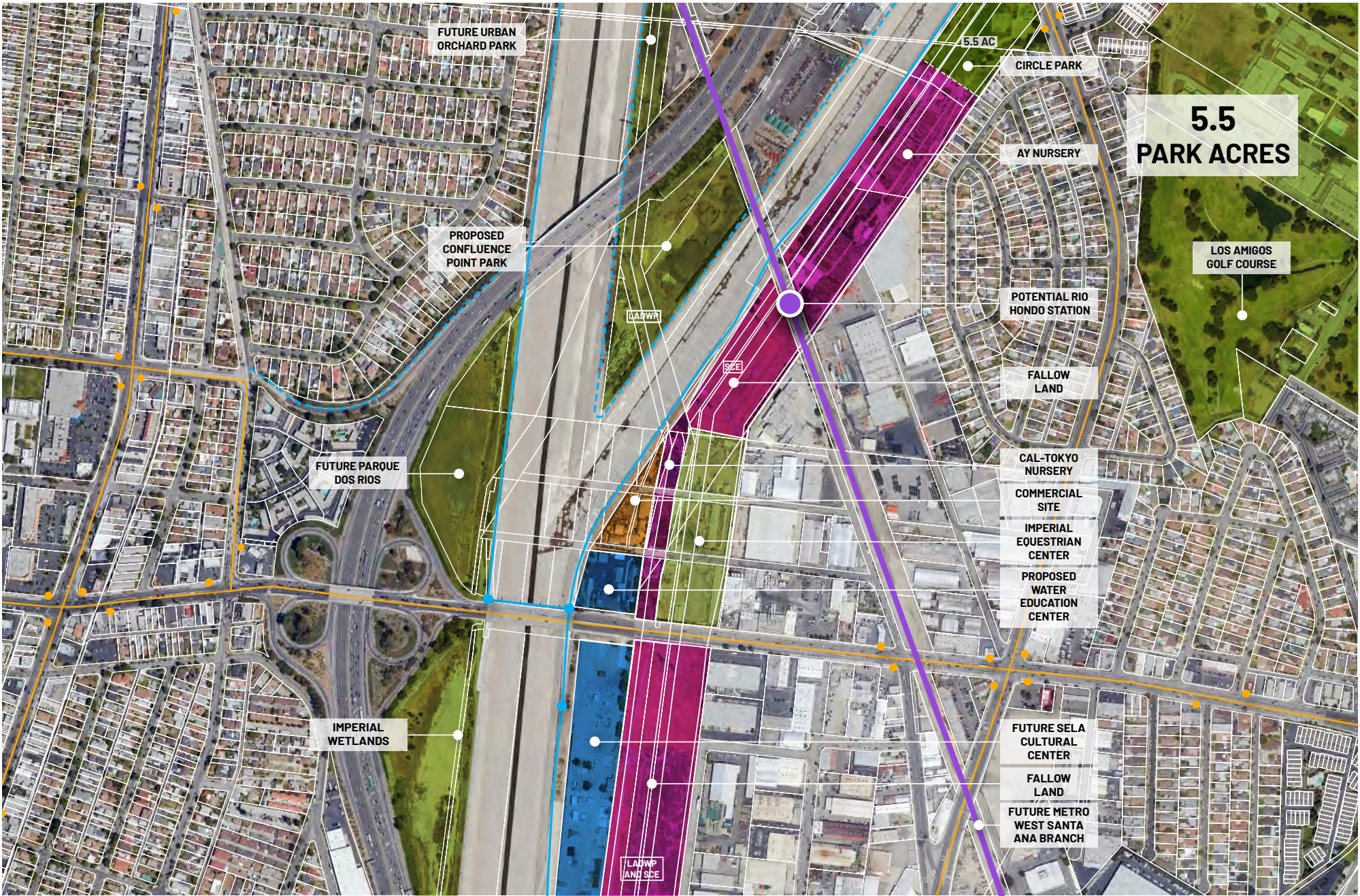
TRANSMISSION RIGHT-OF-WAY SOUTH ALONG HOLLYDALE REGIONAL PARK

ADDITIONAL RESEARCH

TRANSMISSION LINE RIGHT-OF-WAY

EXISTING AND FUTURE ASSETS

Scheme options for reallocation are predicated on the conversion of fallow land to successfully balance open space and nurseries and to avoid the eradication of existing established nurseries. Overall, the transmission line rights-of-way offer tremendous opportunity for open space improvements within a broader ecosystem of RHCAP improvements on land that is otherwise highly underutilized.



- Transmission Line ROW
- Park and Open Space
- Institutional Development
- Commercial
- Metro Route and Stop
- Bus Route and Stop
- Trail and Access Point
- Proposed Trail
- Transmission Line

TRANSMISSION LINE RIGHT-OF-WAY

MINOR REALLOCATION

In the Minor Reallocation Scheme, the commercial site adjacent to the proposed Water Education Center remains, and a narrow, western strip through each transmission line right-of-way is converted to open space. The new designated open space can house an expanded trails network and small park programming but is not wide enough for significant uses, such as sports fields, nor is it appropriate for interiorized community facilities. The remaining fallow land in the North and South Imperial transmission line rights-of-way is converted into plant nurseries to absorb some of the acreage lost by the existing nurseries currently operating within the South Garfield and North Imperial transmission line rights-of-way, 3.4 and 2.4 acres respectively. The open space in the proposed South Garfield Transmission Right-of-Way Park connects to the potential future Metro WSAB Rio Hondo Station and offers space for commuter parking.



ADDITIONAL RESEARCH

TRANSMISSION LINE RIGHT-OF-WAY

MAJOR REALLOCATION

In the Major Reallocation Scheme, the commercial site adjacent to the proposed Water Education Center is converted to open space in conjunction with the full conversion of the South Garfield Transmission Right-of-Way Park and a partial conversion of the westernmost land in the North and South Imperial transmission rights-of-way. The newly converted land in the proposed South Garfield Right-of-Way Park blends into the existing Circle Park and fully connects to the potential future WSAB Rio Hondo Station. This width provides adequate space for sports fields, parking, and other significant outdoor public programming. The remaining North and South Imperial transmission rights-of-way are converted into nurseries to absorb some of the acreage lost by those lost in the conversions of the South Garfield and North Imperial transmission line rights-of-way, 9.8 and 2.4 acres respectively.

- Transmission Line ROW
- Park and Open Space
- Institutional Development
- Commercial
- Metro Route and Stop
- Bus Route and Stop
- Trail and Access Point
- Proposed Trail
- Transmission Line



ADDITIONAL RESEARCH

LYNWOOD CONNECTOR

OPTIONS

The Lynwood neighborhood is currently disconnected from the LA River and the east bank communities and amenities by the I-710. Several site locations for a potential connector bridge have been considered and researched in depth. Each location presents its own unique challenges and opportunities.

- Option A is located at Imperial Highway. There is an existing at grade connection at Imperial Highway, however pedestrians must cross several vehicular intersections of the highway on- and off-ramps, which can be time consuming and challenging due to multiple lanes of high speed traffic. In elevating pedestrians, they can cross the interchange more quickly and safely. If the bridge lands at Imperial Highway and Duncan Ave, pedestrians can directly access the existing commercial corridor that is directly adjacent to residential communities to the north and south. However, the retail shops are largely focused on automobiles, such as gas stations, garages, and tire shops, supplemented by several food establishments. This option would necessitate the longest bridge of all options, which would be more than .2 miles of elevated walkways.
- Option B is located south of the I-710 interchange at Imperial Highway and is the shortest potential span, landing in a public right-of-way. This location closely aligns with the City of Lynwood's proposed pedestrian bridge and is the most direct connection among the options to the proposed Imperial Wetlands and the SELA Cultural Center. This

location is proximate to Imperial Highway and its commercial assets.

- Option C is located at Will Rogers Elementary School at the intersection of Wright Road and Beechwood Ave. The 0.12 mile long bridge lands at a 3-way intersection that would allow for street connectivity. However, this connection requires the acquisition of privately owned land, whose ownership is yet to be determined.
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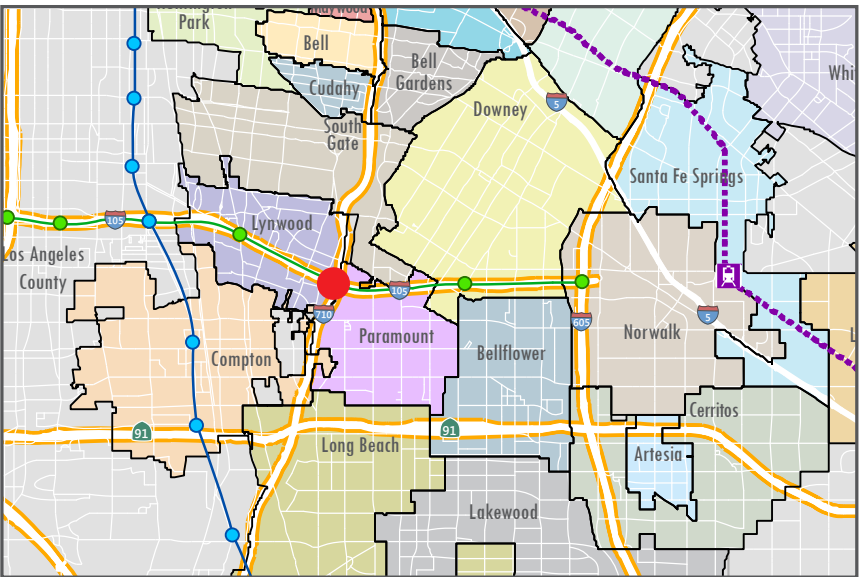
ADDITIONAL RESEARCH

LYNWOOD CONNECTOR

GATEWAY CITIES - STRATEGIC TRANSPORTATION PLAN

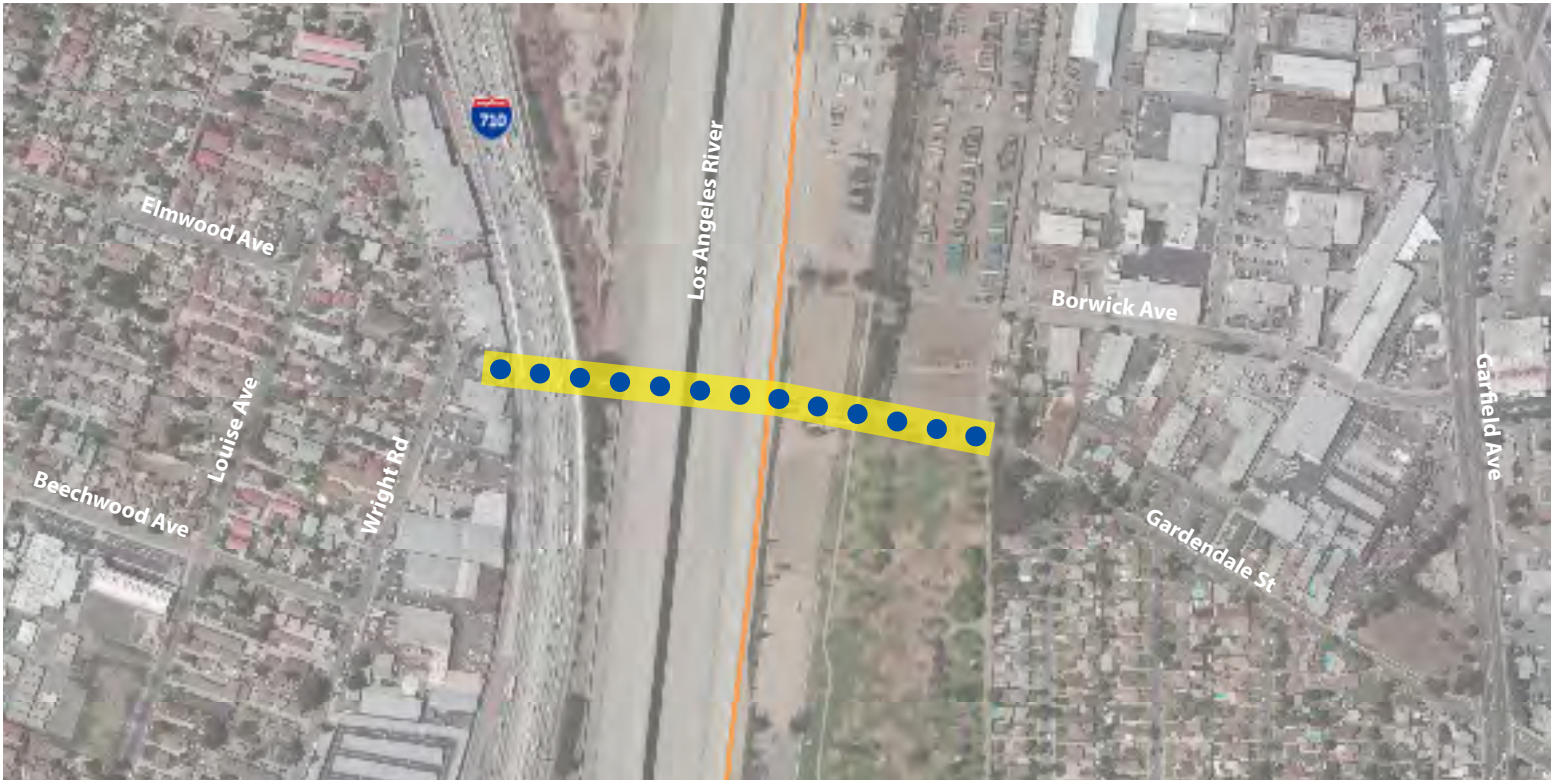
Gardendale Street / Las Flores Boulevard Bridge

Project Extent



The project extends over I-710 and the Los Angeles River between Imperial Highway and Rosecrans Avenue.

Source: Gateway Cities "Strategic Transportation Plan" and Metro, 2016



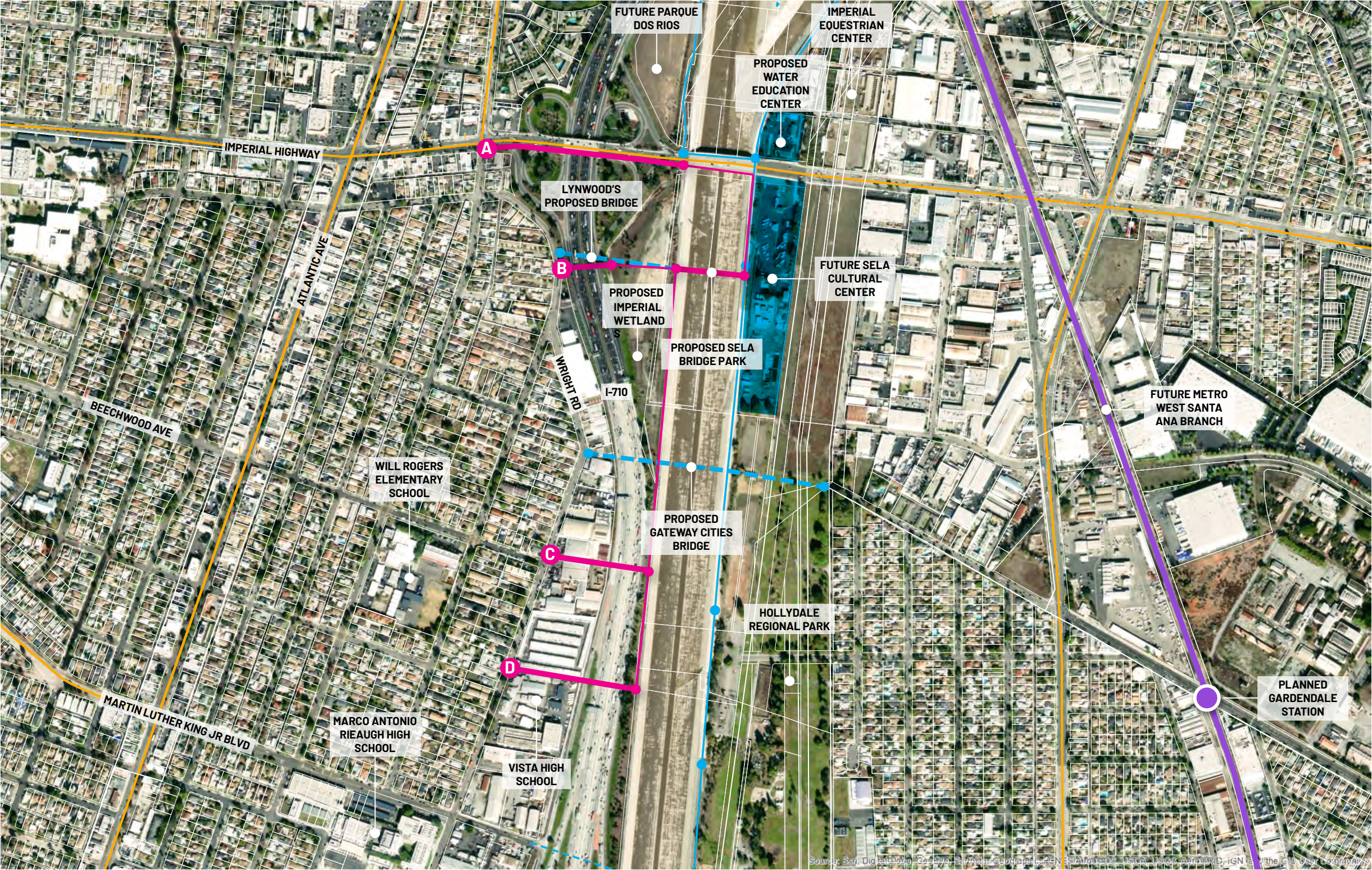
Bicycle and Pedestrian Bridge Considerations

- Approximate length of the bridge is 750 feet from Gardendale Street over Interstate 710 and the Los Angeles River to Wright Road/Los Flores Boulevard. This is a very large span and a feasibility study is recommended to determine appropriate structure type.
- An additional 450 feet of bicycle facility would have to be constructed from the proposed bridge to Wright Road/Los Flores Boulevard.
- Vertical clearance over Interstate 710 is assumed to be between 16-20 feet.
- Access ramps must meet ADA standards which is a maximum grade of five percent (20:1) without landings and 8.33 percent (12:1) with landings spaced 30 feet apart. Right-of-way is constrained on the west but could potentially fit a perpendicular ramp behind the commercial property. East of the river, ramp design has more flexibility to integrate with the existing park.
- Bridge width should consider anticipated bike and pedestrian use as well as potential use by maintenance and emergency vehicles. Preferred width for the multi-use path is 14 feet which provides a for a 10 foot path with two foot shy distance from railings.
- Design considerations for turning radius and live load will vary based on determined user type, either pedestrians and bicycles, or maintenance and emergency vehicles, if they are allowed on bridge
- Night-time safety lighting should be provided
- Protective screening of approximately eight feet high is required on the bridge over Interstate 710 to prevent objects from being thrown onto the roadway below.

ADDITIONAL RESEARCH

LYNWOOD CONNECTOR

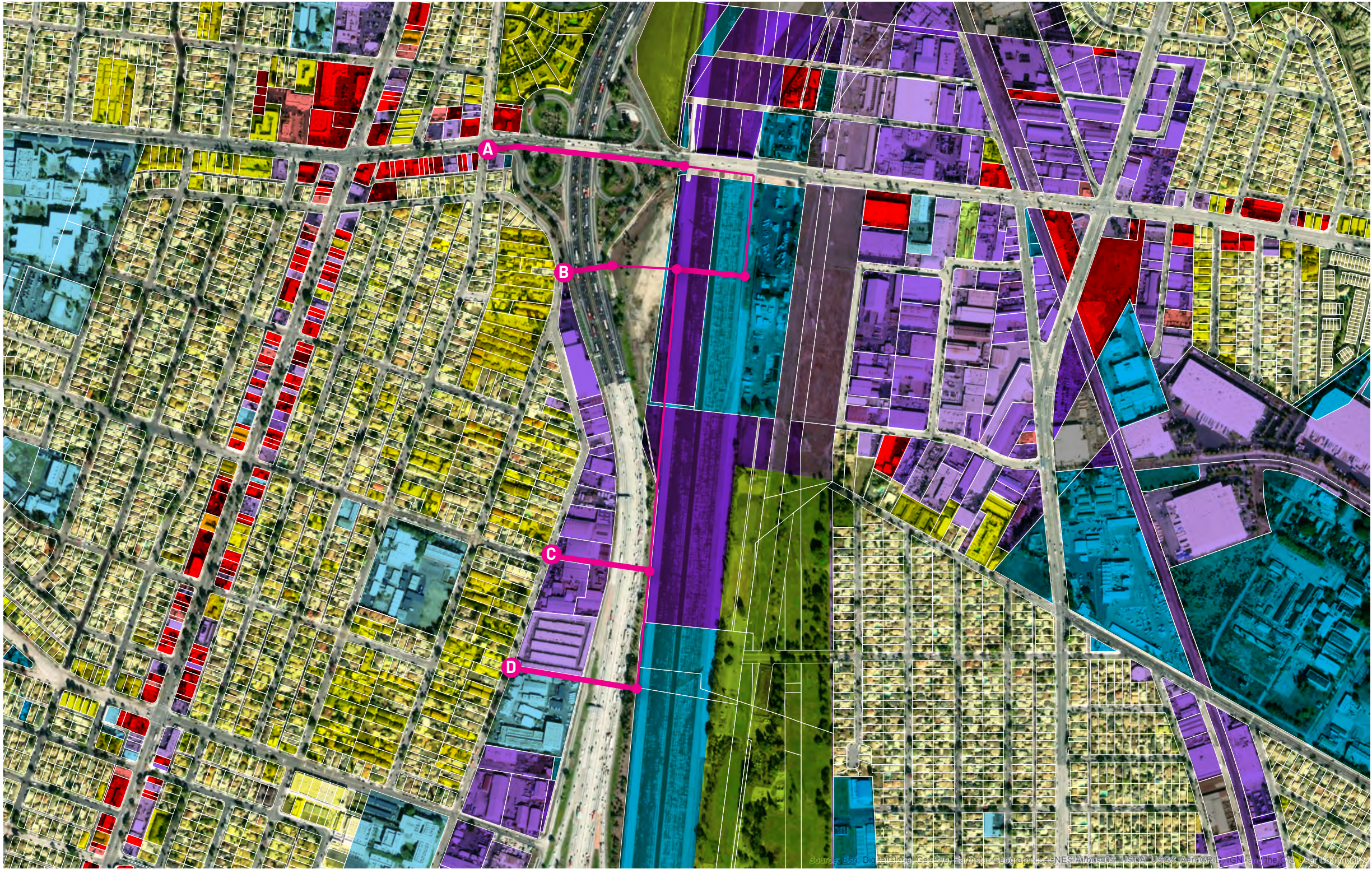
PROPOSED LOCATION OPTIONS



ADDITIONAL RESEARCH

LYNWOOD CONNECTOR

LAND USE



- COMMERCIAL
- RESIDENTIAL - SINGLE FAMILY
- RESIDENTIAL - 2 FAMILY
- RESIDENTIAL - 3 FAMILY OR MORE
- PARKS & OPEN SPACE
- SCHOOLS
- GOVERNMENT
- INDUSTRIAL

ADDITIONAL RESEARCH

LYNWOOD CONNECTOR

PREFERRED OPTION B - SHORTEST SPAN

Option B is the preferred location for the Lynwood Connector for a variety of reasons. This location aligns with the City of Lynwood's Bicycle Master Plan (2012) and is proximate to that of the Gateway Cities - Strategic Transportation Plan (2016). Option B also affords pedestrians and cyclists the opportunity to directly connect to the proposed Imperial Wetlands, which directly aligns with the proposed SELA Bridge Park and future SELA Cultural Center. This location is also advantageous as it is the shortest total bridge span, which significantly reduces construction costs. Further, as the bridge structure would touch down on publicly owned land on both ends, there are additional cost reductions as easements and/or land acquisition from private landowners are avoided. Locating the proposed Lynwood Connector at Option B well situates the bridge within its existing context, best compliments the other RHCAP projects and reinforces a broader aspiration of connectivity and access.





ADDITIONAL RESEARCH

IMPERIAL HIGHWAY

MANNY'S GARAGE

LA ISLAS MARISCOS
AND GRILL

LYNWOOD'S
PROPOSED BRIDGE

FUTURE SELA
CULTURAL
CENTER

B

PROPOSED
IMPERIAL
WETLANDS

PROPOSED
SELA BRIDGE PARK

WRIGHT RD

WASATCH

HUB CITY
KUSTOMS PAINT
& BODY

CITY FOAM

FIRST FINISH
DEVELOPMENT
CENTER

GATEWAY CITIES'
PROPOSED BRIDGE

FUTURE METRO WSAB AND UPRR RAIL ALIGNMENTS

SUMMARY

The existing Union Pacific Railroad (UPRR) and future Metro WSAB rail alignments cut through the RHCAP. Both rail lines dramatically impacted the development of the proposed LA River and Rio Hondo Platform Parks and had design implications on the proposed Confluence Point Park and South Imperial Transmission Right-of-Way Park. For both rail alignments, there were several factors taken into consideration, including, but not limited to: the required vertical and horizontal clearances, the maintenance access path, maximum incline and decline slopes, existing and proposed track alignments and elevations, and the existing UPRR bridge structures over the LA River and Rio Hondo. This information was largely enabled by Metro's cooperation, who provided schematic design drawings and rail guidelines. To fill in gaps, the team referenced national freight rail regulations and the USACE as-built drawings of the LA River and Rio Hondo, specifically providing elevations of existing rail tracks and the levee wall profiles.

In addition to the rail line constraints, there are several outlying considerations that deeply impact the development of the Metro WSAB and adjacent RHCAP projects. The vertical alignment is contingent on the depth of the I-710 freeway overpass, which both lines would have to clear. This depth was approximated through Google Earth imagery but requires further investigation. Further, there are LADWP and Southern California Edison

(SCE) transmission lines running over the rail lines. Each transmission line requires a radial clearance along its length that is dependent on its voltage. Further the lines are supported by steel pylons that require horizontal clearances. The UPRR and Metro WSAB alignments and their respective clearances cannot conflict with the I-710 freeway overpass, the transmission lines, or transmission towers, creating a complicated three-dimensional landscape of additional and manifold constraints.

Among the considerations, there was significant concern that the existing UPRR alignment over both the LA River and the Rio Hondo falls within the flood control channel. As a result, the rails would compromise the safety of both UPRR and Metro WSAB trains while also compromising the channels' capacities to convey water. Constructed before the channelization of the river, the UPRR bridge over the LA River has four piers that are off-axis from the channel, causing hydraulic jumps. The location of this bridge also corresponds to a change in the channel's shape, at which the USACE construction of the channel meets that of the LA County Flood Control District. At this point the channel narrows and its slope steepens. A further complication is that Metro anticipates utilizing the existing bridges' piers as the foundation to the new rail alignment. As both bridges in their current condition represent aging infrastructure, this causes additional concern.

ADDITIONAL RESEARCH

FUTURE METRO WSAB AND UPRR RAIL ALIGNMENTS

SUMMARY

If the UPRR bridges remain, the design of the LA River and Rio Hondo Platform Parks must adjust accordingly. Due to existing pier locations, hydraulic jumps, and the channel’s sensitivity, the platforms’ double piers are unable to tie into the existing UPRR piers, thus resulting in a significant gap upstream and downstream of the bridges.

With the constraints and assumptions established, two design schemes resulted. The first and preferred option is to replace the existing, aging UPRR bridge and integrate both the UPRR and Metro WSAB alignment into the structure of the proposed LA River and Rio Hondo Platform Parks. This optimizes the acreage of both platforms and raises both rail alignments out of the flood control channel. The second option is to build the new platform parks adjacent to the UPRR bridges and bridge over the rail lines. The resultant platform offers less acreage than the first option and does not resolve the issue of the rail lines falling within the flood control channel. This option necessitates careful hydraulic analysis to determine the precise geometries that enable the construction of the proposed platform parks within an already sensitive stretch of the rivers. Both options require immense coordination with UPRR and Metro to determine their feasibility.

West Santa Ana Branch Transit Corridor
Project Overview



Source: Lower LA River Revitalization Plan, pg 65, 2018.