US 169/I-70 North Loop
Planning & Environmental Linkages Study

BEYOND THE LOOP

Initial Strategies Report

Draft – September 6, 2017

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List of Acronyms and Abbreviations

ADA	Americans with Disabilities Act
AM	Morning
APE	Area of potential effect
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
BGPA	Bald and Golden Eagle Protection Act
BMcD	Burns & McDonnell
BMPs	Best Management Practices
C-D	Collector-Distributor
CWA	Clean Water Act
dBA	A-weighted decibels
EDR	Environmental Data Resources, Inc.
EA	Environmental assessment
EIS	Environmental impact statement
EPA	US Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
GDAP	Greater Downtown Area Plan
GIS	Geographic information system
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
I-29	Interstate 29
I-35	Interstate 35
I-70	Interstate 70
Hg	Hg Consult, Inc.
KCATA	Kansas City Area Transportation Authority
KC EDC	Kansas City Economic Development Council
KCK	Kansas City, Kansas
KCMO	Kansas City, Missouri
KDOT	Kansas Department of Transportation
L_{eq}	Equivalent sound level
LOS	Level of service
LUST	Leaking underground storage tank
MARC	Mid America Regional Council
MBTA	Migratory Bird Treaty Act
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
MoDOT	Missouri Department of Transportation
MP	Milepost
Mph	Miles per hour
MPO	Metropolitan Planning Organization

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NAC	Noise abatement criteria
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
PEL	Planning and Environmental Linkages
PM	Evening
RCBC	Reinforced concrete box culvert
ROW	Right-of-way
TAZ	Transportation analysis zone
TNM	Traffic noise model
TOD	Transit-oriented development
UG	Unified Government of Wyandotte County/Kansas City, KS
US-169	US Highway 169
USACE	US Army Corps of Engineers
USCG	US Coast Guard
USDOT	US Department of Transportation
USGS	US Geological Survey
USFWS	US Department of Interior Fish and Wildlife Service
UST	Underground storage tank
VMS	Variable message sign
Vpd	Vehicles per day
Vph	Vehicles per hour
WOUS	Waters of the United States

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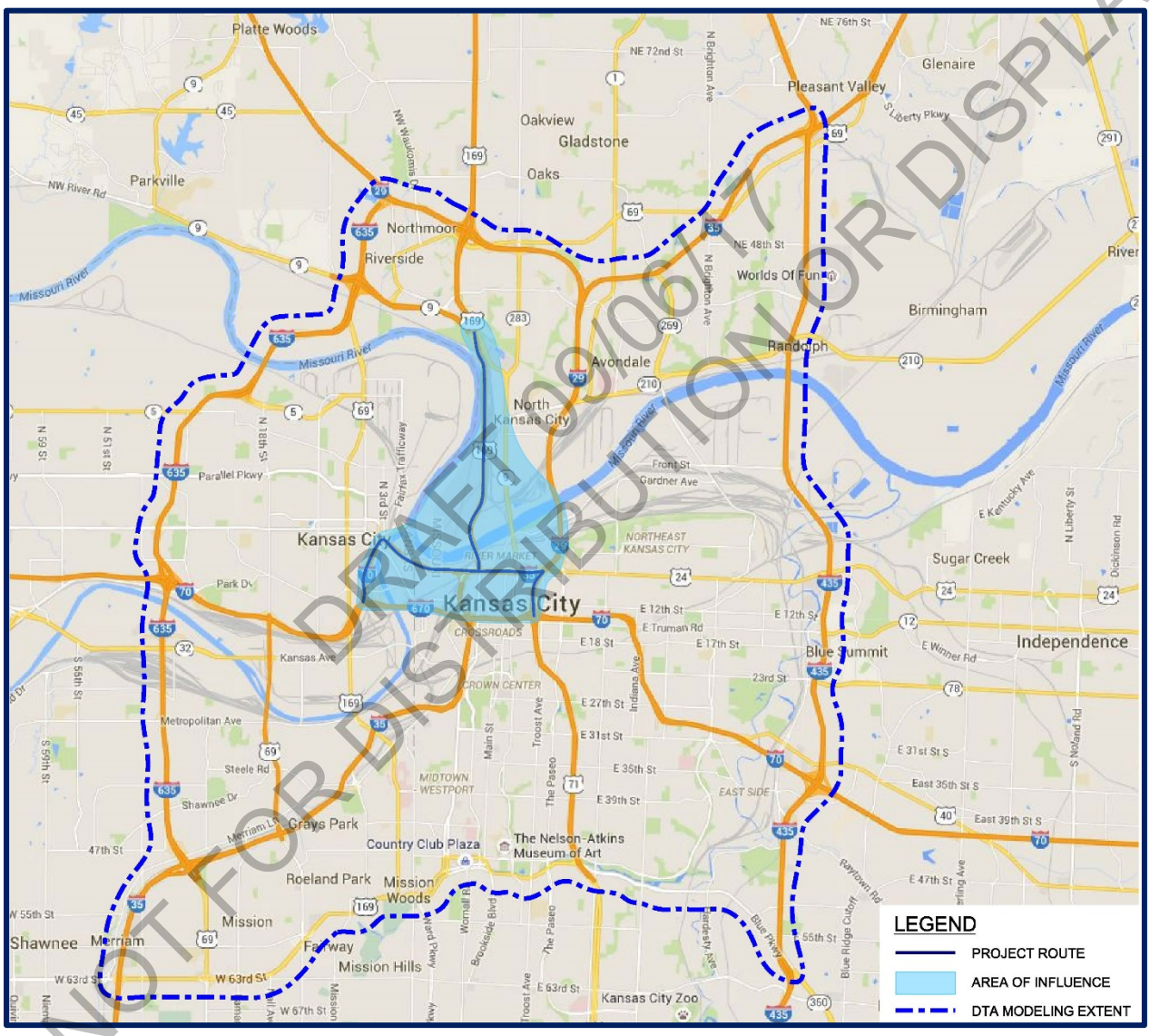
1. Introduction and Overview

The purpose of this report is to document the evaluation process and findings as they relate to the US-169/I-70 North Loop Planning and Environmental Linkages (PEL) Study, an area generally northwest of downtown Kansas City, MO. The study area includes US-169/MO Route 9, I-670, and I-70, and is generally limited by the US-169/MO Route 9 interchange to the north, I-670 to the south, the I-70/670 interchange in Wyandotte County, Kansas to the west, and the I-70/ I-670 interchange in Jackson County, Missouri, to the east, including the US-169 Buck O'Neil Bridge over the Missouri River.



US-169/I-70 North Loop Planning and Environmental Linkages (PEL) Study Area Map

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The study is led by the Mid America Regional Council (MARC), the metropolitan planning organization for the Kansas City metropolitan region, in cooperation with FHWA, the Missouri Department of Transportation, (MoDOT), and Kansas City, Missouri (KCMO). A broad range of alternatives and strategies have been developed, and this report will evaluate each of these strategies to determine how well they met the identified purpose and need. It considers features along the US-169 corridor including access connections to the Downtown Wheeler Airport, replacement or reuse of the US 169 Buck O'Neil Bridge, and the connections to the 5th/6th Street interchange with I-70. Features along the I-70 corridor include the connection to US-169 and the downtown loop, traffic flow, and connection of the street grid between the River Market and downtown Kansas City, Missouri. Additional features considered include access to the Port of Kansas City, airspace around the Downtown Airport, Missouri River navigation, bicycle and pedestrian accommodations on major bridges, impacts to transit and railroads, recommendations and plans relating to the KDOT Lewis and Clark Viaduct study and design, and potential downtown interstate access and routing. Improvement alternatives will address future access needs, mobility, safety, system preservation, and redevelopment.

This Initial Strategies Report summarizes the universe of initial conceptual strategies identified to respond to the project's stated needs and objectives clearly defined in the study's Statement of Purpose and Need. This initial analysis considered and applied data obtained from a variety of sources, including MoDOT traffic and safety evaluations, MARC and KCMO traffic models, and information obtained from other federal, state and local agencies. The full spectrum of data sources is identified and documented in the companion Data Collection Report. Information gathering has benefited from a comprehensive agency and stakeholder coordination effort, and is expected to continue as the PEL study proceeds. The findings of the baseline information are documented in the detailed Study Area Condition Assessment Report which is referenced in support of the Purpose and Need statement. It is anticipated that the findings and recommendations of this report will be used to inform future project-level National Environmental Policy Act (NEPA) studies.

The identification and development of the strategies was supported by reference to the MARC Congestion Management Toolbox (CMT), which was updated in 2013 as a component to MARC's current Congestion Management Process (CMP) adopted in 2011 to meet the needs of the Kansas City metropolitan area. The CMP is intended to formulate a systematic approach to monitor, measure, and diagnose causes of current and projected future congestion on the region's multi-modal transportation system. The Process formulates the framework for evaluating and recommending alternative strategies to manage congestion, and to ultimately monitor the performance of implemented strategies. The CMP is integrated into the regional metropolitan process, and conforms with the requirements promulgated by federal transportation legislation (23 CFR 450.320).

The CMT was developed as a companion component to the CMP to provide a reference of alternative strategies to consider in corridor studies and subsequent NEPA documents. In 2013, the Toolbox was updated to expand the number of strategy categories, include additional contemporary strategies, and additional supporting information. In addition to supporting the identification and development of strategy concepts, the Toolbox also provides a general framework for establishing criteria for analyzing and evaluating the strategies as outlined in the Evaluation Criteria Methodology technical memorandum for this PEL study.

On August 22, 2017, a public meeting was conducted to present the conceptual strategies that were selected to be advanced to a higher level of detail, refinement, analysis. Graphics and other information presented to the public are provided in the appendix to this report. Results of public input and response

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to the strategies are documented separately from this report, with additional information provided at the project website – beyond the loop kc.com. The PEL process will culminate with the ultimate screening of the detailed strategies to a final set of reasonable strategies which would be carried through the subsequent NEPA process which will formulate the basis for the selection of the preferred strategies upon reconciliation of any future project commitments.

1.1 Consistency with Purpose and Need

The Purpose and Need Statement sets the stage for consideration of the strategies for the study area. The Purpose defines the transportation problem to be solved, and the Need provides the data to support the problem statemen (Purpose). The Purpose and Need Statement captures what is to be accomplished and why is it necessary. This statement is then used to guide the development of strategies, so that only those strategies that meet the Purpose and Need are carried forward.

STUDY PURPOSE:

The study purpose is to seek the most effective approach to improving the transportation facilities in the Study Area, including the development of alternative strategies, which, when implemented, will meet the identified current and future needs while balancing the interests of the various stakeholders.

For this study, the interests of the stakeholders can be grouped into three distinct groups:

- Federal/State – The federal interest includes maintaining the viability of the interstate highway system for long-distance travel. The state interest includes improving the condition of the transportation assets on the state highway network in both Missouri and Kansas, providing opportunities for improved goods movement, and improving the travel conditions for long-distance travel.

- Regional – The regional interest includes improving the ability of the traveling public to access the Central Business District (CBD) and other regional destinations for work, services, recreation, or commerce, as well as maintaining access to critical infrastructure and industry.

- Local – The local interest includes improving the economic viability of the downtown core in both Missouri and Kansas, including adjacent neighborhoods and economic centers, through improved accessibility, modal options, and environmental sustainability.

STUDY NEEDS:

The strategies were presented and discussed with the members of a Study Management Team (SMT) consisting of staff from MARC, KCMO, MoDOT, the Kansas Department of Transportation (KDOT), and the Unified Government of Wyandotte, County/Kansas City, Kansas (UG). The review included a qualitative assessment of the strategies in relation to how they perform in satisfying the project needs, goals, and objectives summarized as follows:

- NEED 1: Improve Physical Conditions – Ensure that existing and new transportation assets in the Study Area better serve the region and are maintained in a state of good repair.

- NEED 2: Optimize System Performance – Manage the operations of the existing transportation facilities to achieve reliable and efficient performance.

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- NEED 3: Improve Safety & Security – Identify reasonable improvements to ensure the safety and security of the affected area.

STUDY GOALS:

The following goals and objectives are considered in the comparative evaluation of strategies developed to address the stated needs:

- GOAL 1: Improve Transportation Choices – Provide viable, accessible, multimodal transportation.
- GOAL 2: Improve Economic Vitality and Placemaking – Improve transportation and land-use linkages in the Study Area.
- GOAL 3: Improve Sustainability – Protect and enhance the region's natural, cultural, and social resources. Explore ways to mitigate the adverse impacts of the existing system and proposed alternatives.

1.2 Geographical Segments

The study area contains a number of different physical and operational characteristics. To facilitate the evaluation, screening, and refinement of the potential strategies, the study area has been divided into geographical segments. These are not distinct segments of independent utility at this time, rather as subsequent detailed strategy development and evaluation activities proceed, certain refinements will be necessary to address how these different segments will interrelate, and potentially how they will be phased and constructed. Each segment below includes a do-nothing strategy, i.e. No Build.

Missouri River Bridge: This segment includes US 169 from the north bank of the Missouri River to I-70 at the northwest quadrant of the Kansas City downtown central business district (CBD). This set of strategies also includes connections linking US 169 with I-70, I-35, and directly with the downtown Kansas City local roadway network.

I-70 North Loop: This segment includes the 3/4-mile section of I-70 from the northeast quadrant of the CBD to the northwest quadrant. This segment is currently co-designated as I-35. Strategies in this area include alternative modifications to access and the overall transportation system serving the various land uses served in the study area.

Downtown Wheeler Airport: This segment includes US 169 from just north of the Downtown Wheeler Airport (NW Lou Holland Drive), to the north bank of the Missouri River. This set of strategies includes maintaining and improving access to the Downtown Wheeler Airport to the west, and the Harlem area of Kansas City to the east. It also includes alternatives to improve access between the airport and US 169 that are independent of the alternative interchange strategies.

West Bottoms: This segment includes I-70 from US 169 to the Kansas River. This set of strategies are focused on maintaining access and connections from the Louis and Clark Viaduct (LCV) into the West Bottoms industrial area, which are potentially affected by alternatives along the Missouri River Bridge and North Loop segments.

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Transportation System Management (TSM): A set of strategies were developed that largely aim to improve efficiencies by reducing congestion, primarily by improving transportation system capacity and efficiency. TSM strategies may also address a wide range of other solutions such as pedestrian/driver safety, efficiency, congestion, travel time, and driver satisfaction. These strategies are developed in accordance with the MARC Congestion Management Toolbox. During this initial screening process, these strategies are evaluated apart from the geographical segments described above. Once these strategies are screened, then those TSM strategies that warrant further study, and meet the purpose and need, can then be incorporated into each of the individual geographical segment strategies where feasible.

SUGGEST GRAPHIC MAP FIGURE DEPICTING THE FOUR GEOMETRIC SEGMENTS DESCRIBED ABOVE

1.3 Evaluation and Screening of Strategies

A set of potential strategies were developed for each geographical segment. The strategies were developed at a concept level of limited detail to provide a general location and notion of traffic operational operations for mainline and access movements. The strategies were presented and discussed with the members of the study team's Technical Advisory Group (TAG) at a meeting on June 29, 2017, and evaluated qualitatively against their potential to effectively satisfy the needs and goals parameters defined in the study statement of Purpose and Need.

An initial, Level 1, screening was performed within each geographical segment based on two primary components. First a detailed matrix was developed based on a comprehensive list of quantitative and qualitative measurable items developed to provide the best relative assessment of alternatives possible based on current available data. Elements that were relatively simple to quantify, like area of bridge to be replaced, were calculated and provided in the matrix. Other elements where information could not be obtained, was not available, or was prohibitively cumbersome to calculate, such as detailed traffic operational analysis, were given a qualitative measure based on expert opinion and relative performance. Ultimately every measure was scored for each alternative within each geographic area providing the project team with data sufficient to evaluate the ability of those alternatives to meet the project needs and goals.

This information was then rolled up, or aggregated, into a simplified matrix more practical for review by the general public. These aggregated scores provided a single qualifier under each need and goal for each alternative in each geographic area in terms of that alternative's ability to best meet the need or goal. For example, eight different individual measures were aggregated together to give each alternative an overall rating for the goal of "Improve Sustainability."

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2. Missouri River Bridge

2.1 Constraints and Conditions

The existing US-169 Buck O'Neil Bridge over the Missouri River is nearing its design life and currently being reviewed for replacement or rehabilitation by MoDOT. Three alternate alignments are being considered for a new bridge. In addition, given its current condition and status of potential inclusion in the Missouri five-year State Transportation Improvement Program (STIP), a major rehabilitation of the existing bridge will constitute the No-Build alternate. The bridge strategies are defined by their relative position to the existing bridge, the river, and touchdown point on the south side. The new bridge alignments assume a tie-in to the existing US 169 alignment in the proximity of the immediate southern limits of the Wheeler Airport on the north side as constrained by the BNSF railroad to the east, and the existing building to the immediate west. Also, since the bridge alignment directly influences the type and location of interchange for connections with I-35, I-70, and the CBD, interchange alternative concepts will be considered as inclusive with the overall comprehensive definition of these strategies. Details related to these and other alternative strategy features and will be included in subsequent alternate refinement, evaluation and screening activities.

Figure 2-1 shows the physical and environmental constraints that limited the potential options that control the location of reasonable for a bridge crossing locations, particularly on the south side of the Missouri River.

These strategies were developed and screened based on their ability to meet the purpose and need, and since the purpose and need does not specifically address bridge type, then bridge type is not a singular separate consideration. Each bridge strategy is, however, considered only if it is structurally feasible (i.e. that there is no fatal flaw in the alignment). The determination of bridge type will be refined during later stages of project development.

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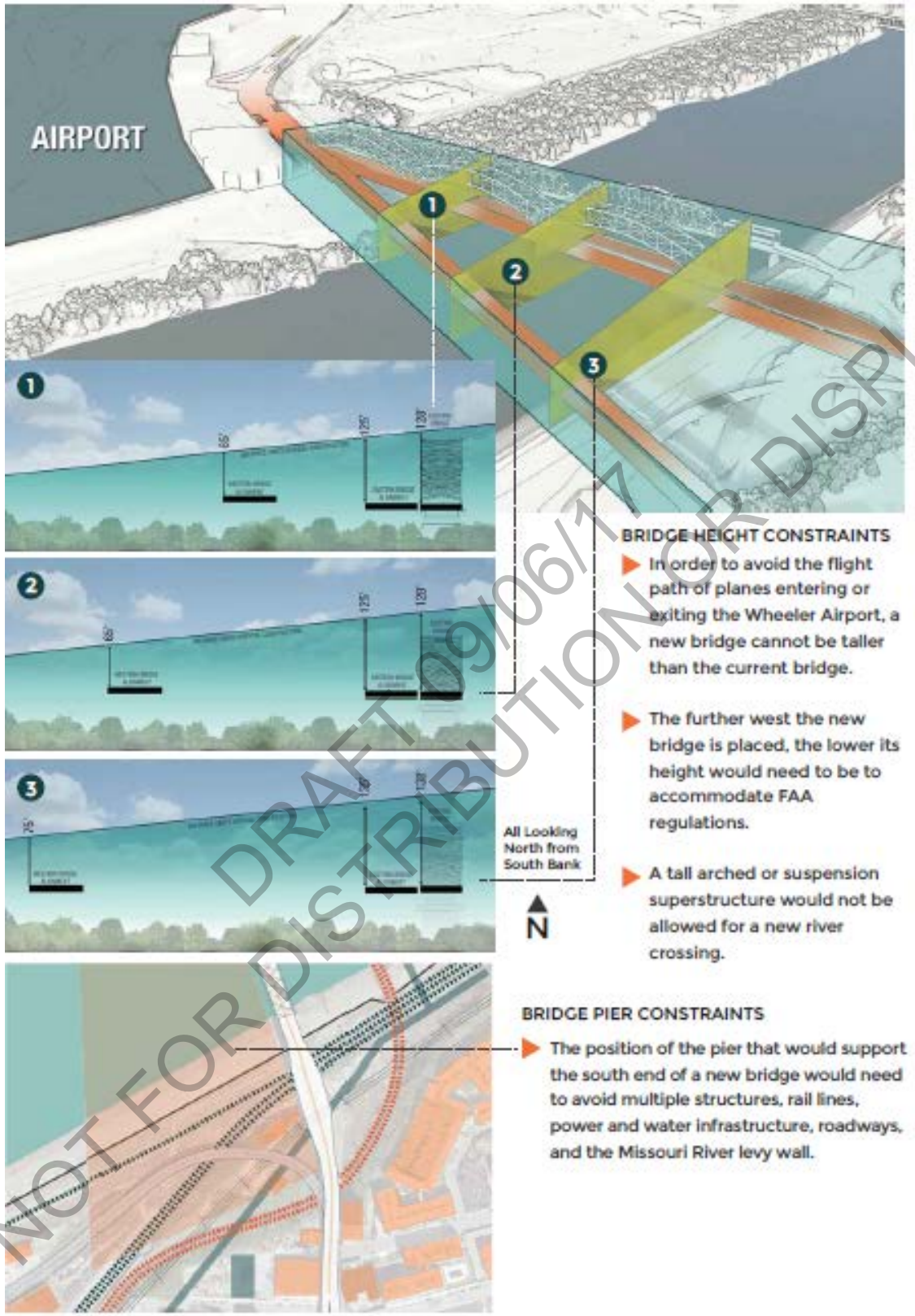

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Figure 2-1 Bridge Crossing Constraints

2.2 Conceptual Strategies

Five alternatives were identified to address the need of crossing the Missouri River by either using or replacing the US-169 Buck O'Neal bridge. Each alternative has a set of underlying trade-offs as they relate to local and regional mobility during and after construction, and how well each alternative addresses the project needs and accomplishes the desired goals. This section briefly describes the alternative and includes an assessment of the alternative based on a set of performance measures derived to understand the ability of an alternative to achieve the desired outcomes at an early level of review.

Strategy A1-No Build: Rehabilitate the Existing O'Neil Bridge (No-Build Condition)

The rehabilitation of the existing bridge as currently programmed would consist of a $52 million project, restores the structure to satisfactory physical condition, and extends the expected life of the bridge 35 years. This is considered the No-Build condition as it constitutes the future condition of the bridge absent the construction of a replacement structure. Connections with Broadway and I-35 could be improved under this strategy by a total reconstruction of the existing interchange with a high capacity type interchange such as a single point urban or possible diverging diamond, but these improvements are not included in the rehabilitation scope or cost. A new six-foot widewalk will be incorporated into the structural rehabilitation of the bridge although connections to existing facilities have not yet been established.

Strategy A2: Western Alignment - Skewed approximately 28° to the Missouri River

This alternative consists of a new bridge that is skewed approximately 28 degrees from normal to the navigation channel of the Missouri River. It is the straightest connection between US-169 north of the river to I-35 south of the river. US-169 connects directly to I-35 with directional flyover ramps. Local access is provided to downtown at a service interchange connecting with 4th and 5th Street and the existing Broadway interchange at I- 70

Strategy A3: Central Alignment - Skewed approximately 20° to the Missouri River

This alternative consists of a new bridge that is skewed approximately 20-degrees from normal to the navigation channel of the Missouri River. The south abutment is located approximately halfway between the existing bridge at Broadway and I-35 at the west side of the loop. Connections to I-35 and downtown consists of splitting the alignment both horizontally and vertically with directional flyover ramps to I-35 and local service ramps toward the existing Broadway interchange at 5th Street.

Strategy A4: Eastern Alignment - Skewed approximately 10° to the Missouri River

This alternative consists of a new bridge that is skewed approximately 10-degrees from normal to the navigation channel of the Missouri River. Similar to the No-Build strategy, this alternative would require the total reconstruction of the existing interchange on Broadway to improve traffic operations from current conditions.

Strategy A5: New Bridge with Rehabilitated and Re-purposed O'Neil Bridge

This alternative consists of the construction of a new bridge at either the previously described A2 or A3 alternative locations, but is combined with the rehabilitation of the existing bridge. Under this concept, the new bridge carries the west loop traffic directly to I-35. The existing bridge would be configured to carry traffic into downtown and to I-70, and would include a dedicated bike/pedestrian facility.

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Strategy A6: Combination New Bridge with New Railroad Bridge

This strategy consists of a combination of replacing both the highway bridge and the existing Hannibal Bridge that carries the BNSF railway. The strategy is targeted at maximizing efficiency of the freight rail movements by increasing track speeds currently controlled by tight horizontal curvature at both approaches to the existing bridge. This strategy could also address long term potential for expanding transit service to the north. However, any extension of fixed rail transit is currently planned along Route 9 and the Heart of America Bridge. A variety of concepts were developed, including the sharing common substructure and foundation elements or constructing a new separate railroad bridge upstream of the existing O'Neil Bridge. An alternative was also considered that constructed a combination bridge to accommodate a lower railroad lift span telescoping into an upper highway bridge span, similar to the existing ASB Bridge downstream of the existing O'Neil Bridge.

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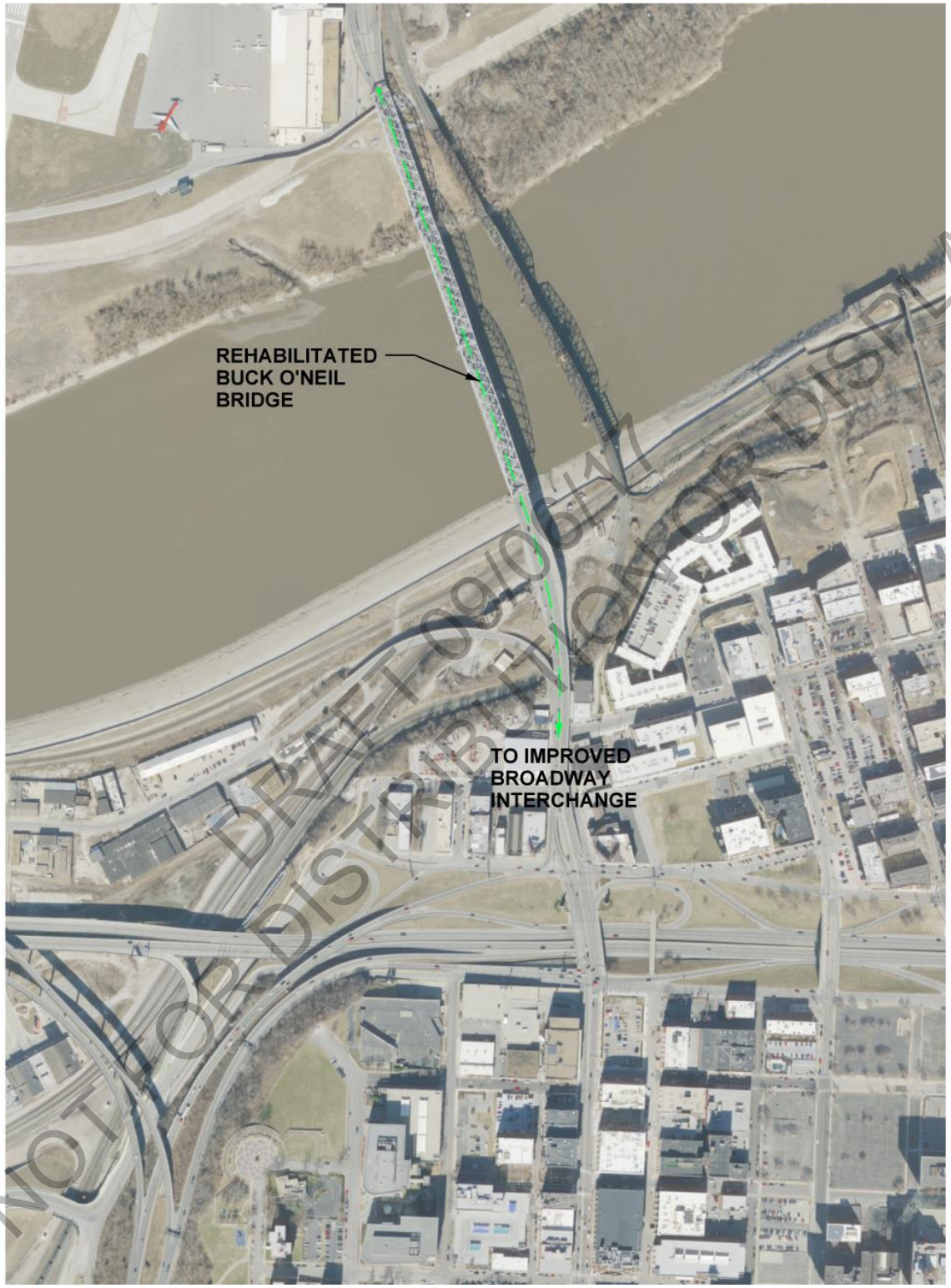

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Figure 2-2 Strategy A1 – Rehabilitate Existing Bridge (No-Build)

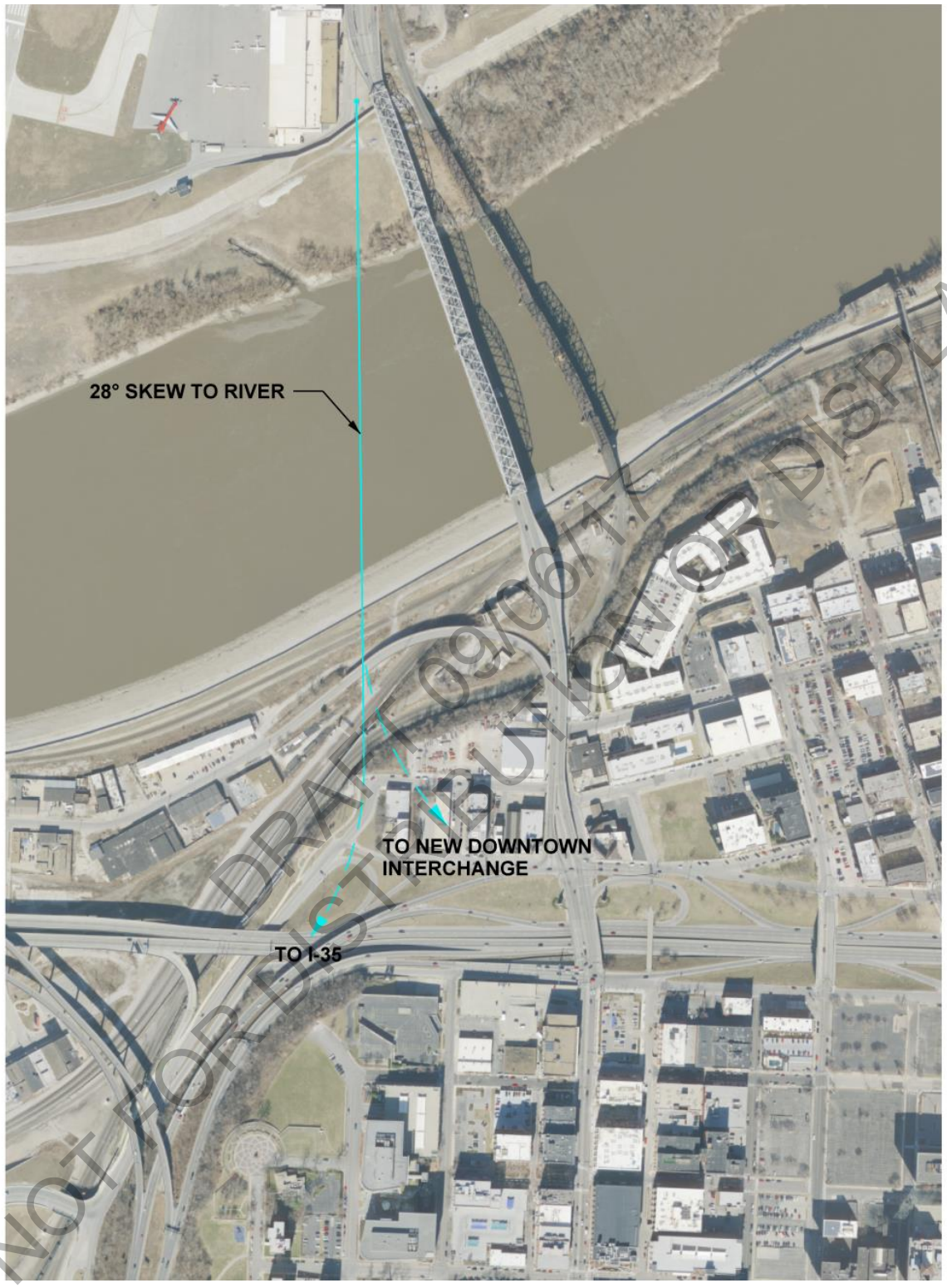

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Figure 2-3 Strategy A2 – Western Alignment - Skewed approximately 28° to the Missouri River

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Figure 2-4 Strategy A3 – Central Alignment - Skewed approximately 20° to the Missouri River

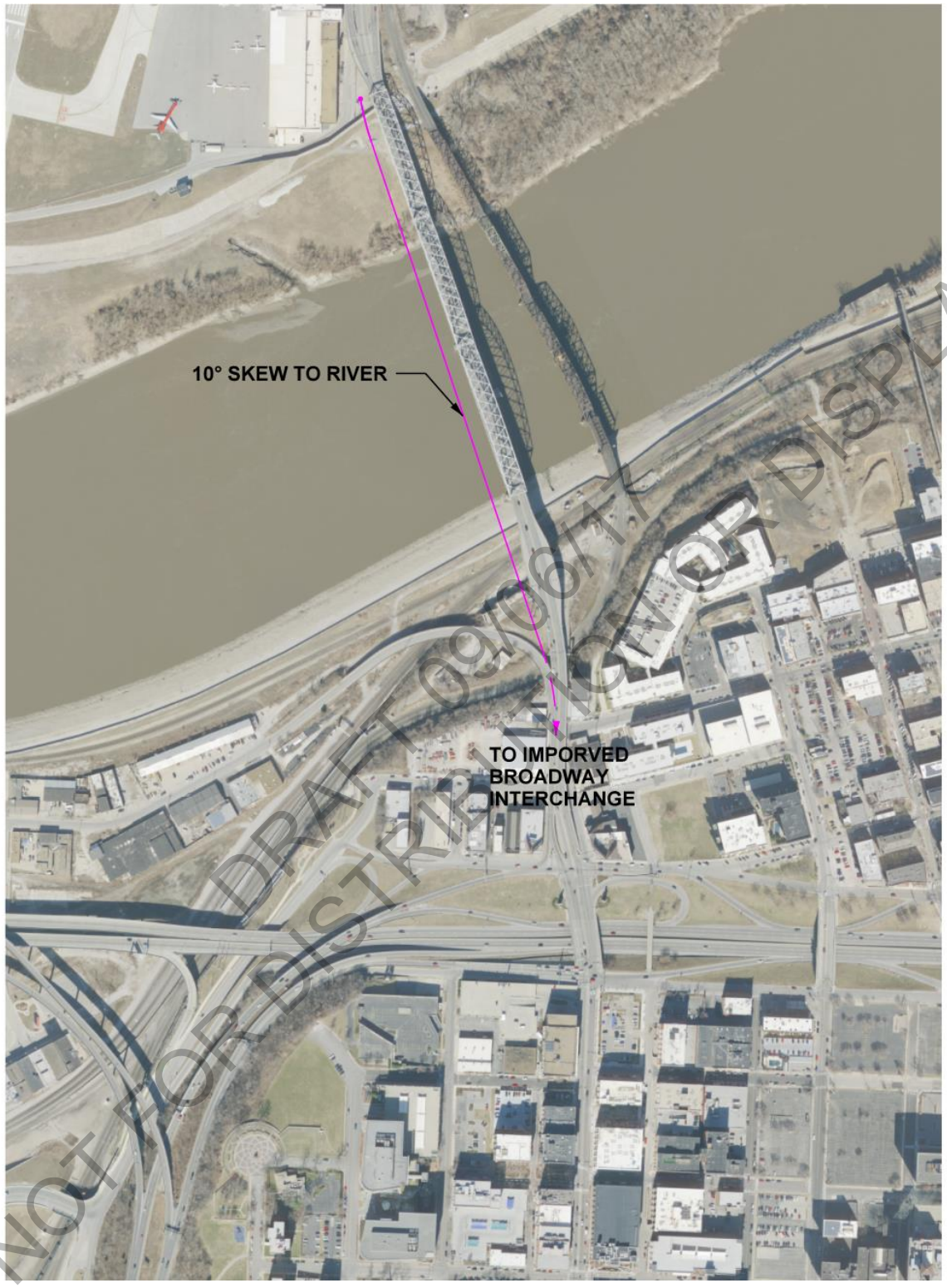

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Figure 2-5 Strategy A4 – Eastern Alignment - Skewed approximately 10° to the Missouri River

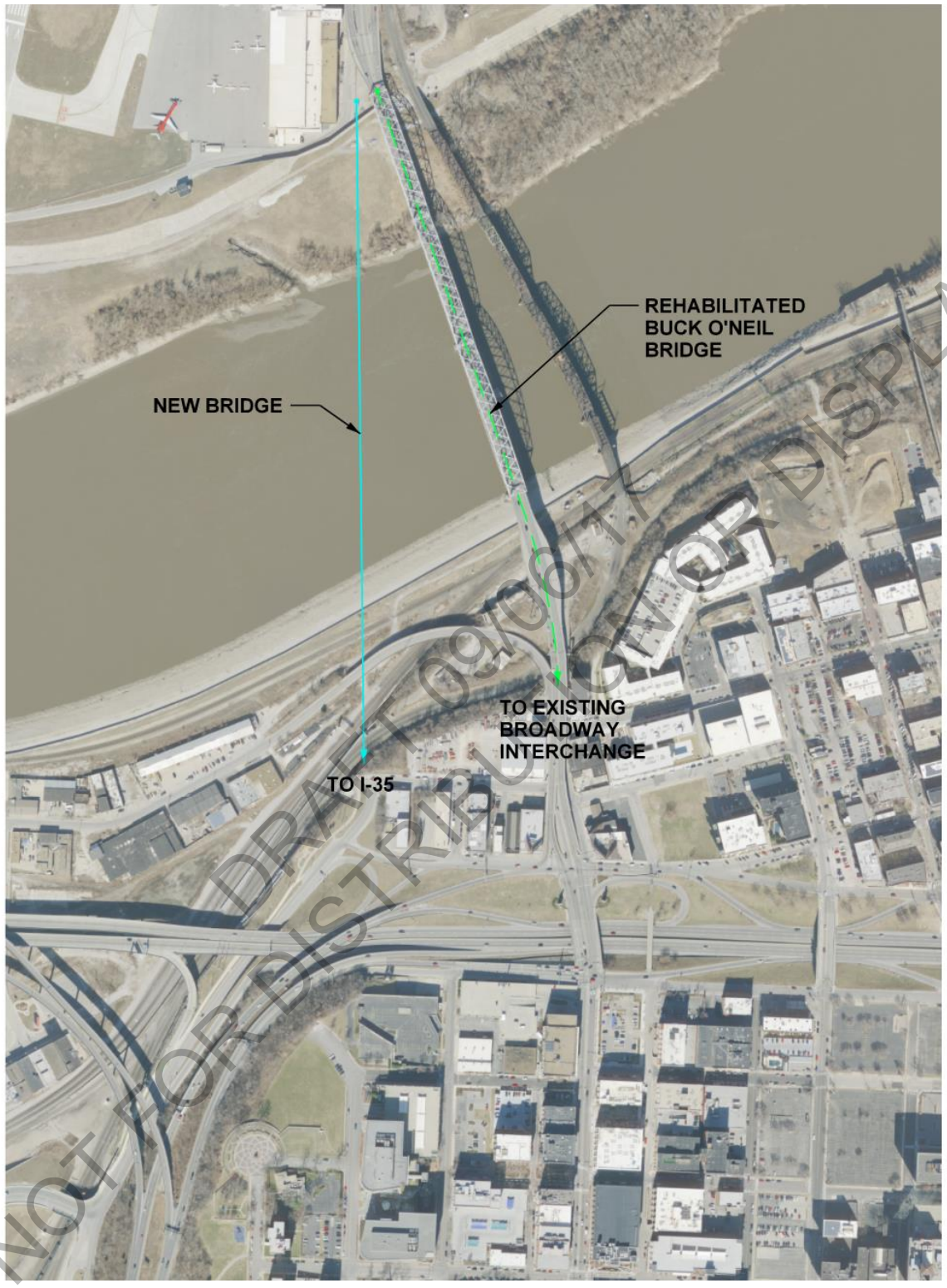

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Figure 2-6 Strategy A5 – : New Bridge with Rehabilitated and Re-purposed O'Neil Bridge

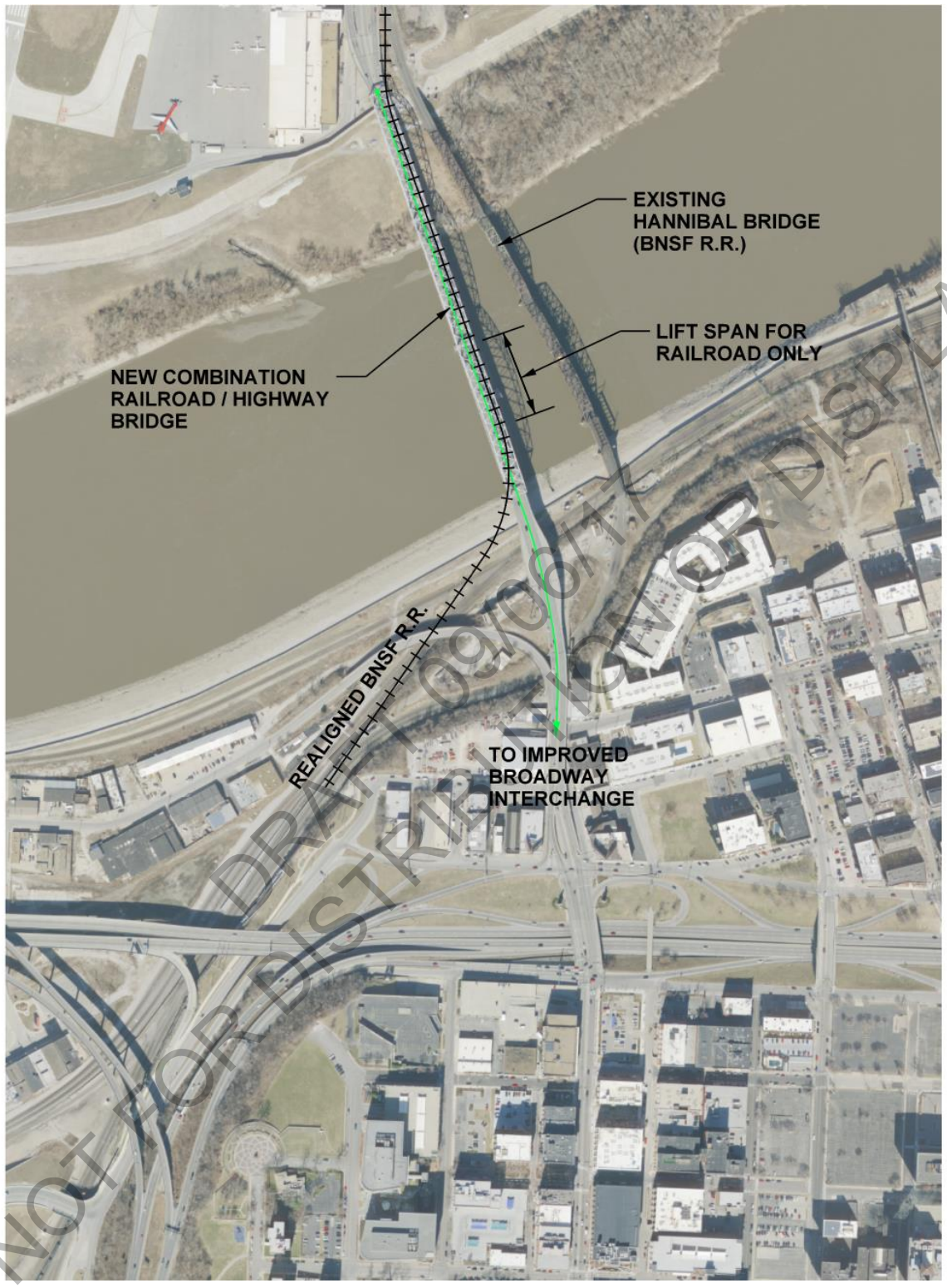

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Figure 2-7 Strategy A6 – Combination New Bridge with New Railroad Bridge

2.3 Level 1 Screening

Strategy A1 (Rehabilitation of the existing O'Neil Bridge) constitutes the No-Build alternative and will advance for further evaluation to be compared to the other strategies and alternates.

Strategies A2, A3 and A4 all address the needs to improve Physical Condition with the construction of a new bridge with an extended 75 to 100-year life. All address the need to Optimize System Performance and Improve Safety and Security, albeit at different levels of effectiveness depending on how connections with I-70, I-35, and downtown access are configured. Goals to Improve Transportation Choices and Improve Economic Vitality and Placemaking can all be potentially satisfied with the incorporation of facilities that link new and potentially expanded land uses with alternative transportation modes. The extent to achieve the goal to Improve Sustainability will vary between the three location alternates with tradeoffs to be considered relating to impacts to right-of-way, potential residential relocations, environmental features, and cultural and natural resources.

The Western Alignment (Strategy A2) is oriented at the largest skew from perpendicular and its navigation span requirement is the longest, but this has a manageable structural solution. The skew is oriented to minimize impacts to residential and commercial right-of-way on the south side of the river along 4th and 5th Streets. This alignment is perched on the westernmost corner of the bluff and crosses directly above the convergence of several lines of UP and BNSF tracks. The skew of the tracks to this alignment and the area of convergence will be a challenge to coordinate with the railroad companies. This will likely result in very long spans which are skewed and curved. This complex geometry and proximity to the tracks has the most challenging constructability of Strategies A1, A2 and A3, and will most likely result in a higher construction cost. The scope of this study does not include detailed correspondence with the railroads and this strategy will require significant coordination and input prior to preliminary design.

The Central Alignment (Strategy A3) is aligned between the Western and Eastern Alignments and has the greatest impact to right-of-way. This alignment may result in a negative net result relating to the goals of improving Economic Vitality and Placemaking, and Environmental Sustainability due to the potential impacts to businesses and potentially historic district in the area between 4th and 5th Streets, west of Broadway. However, the alignment crosses at a much more favorable location and orientation to the diverged railroad tracks below. The connections to both I-35 and downtown are reasonably direct with much simpler a simpler structural solution.

The Eastern Alignment (Strategy A4) is parallel and adjacent to the existing bridge. Similar to the Western Alignment, the orientation was selected to minimize impacts to right-of-way. A direct connection to I-35 is unfavorable at this location, because of difficulties with both the horizontal alignment and the vertical profile. An alternate to a direction connection is to improve traffic conditions by replacing the existing Broadway Bridge over I-70 with a single-point urban interchange. However, all I-35 and downtown traffic will still be routed through the intersection at 5th Street and Broadway, which may not significantly Optimize System Performance from the current conditions.

Bridge Strategy Alternates A2, A3, and A4 were all perceived to collectively and positively address the needs, and were determined to be alternatives worthy of advancing to a higher level of detail and evaluation.

The strategy of constructing a new bridge in combination with rehabilitating the existing O'Neil Bridge (Strategy A5) imposes institutional factors related to the ownership and maintenance responsibilities of an additional Missouri River bridge at this location. These issues outweigh the positive advantages of this

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alternate in terms of addressing the needs of System Performance, Safety and Security, and Transportation Choices. This strategy is eliminated from further study.

The strategy of building a combination rail/highway bridge (Strategy A6) cannot be reasonably constructed within the constraints of adjacent facilities and other institutional and logistic challenges. There are no pending plans identified to date to replace the Hannibal Bridge, and BNSF funding participation for the new bridge is unlikely. Furthermore, the timeframe for planning, designing, and constructing any type of structure that would include participation by the BNSF would preclude any near-term bridge replacement project, should a committed funding source be identified with the immediate commencement of NEPA activities to support the selection of a preferred alternative. This strategy is eliminated form further study.

2.4 Summary and Evaluation Matrix

A summary of the Missouri River Bridge Strategies is provided Table 2-1. This identifies those strategies that will be advanced for further study, and those that will no longer be considered. A more detailed evaluation matrix which comparatively scores the strategies as discussed in Section 1.3 is provided in Appendix xx.

New Buck O'Neil Bridge	Strategy	Description	Status
Rehabilitate the Existing O'Neil Bridge (No-Build Condition)	**A1**	Rehabilitation of the existing bridge as currently programmed would consist of a $50 million project and would restore the structure to satisfactory physical condition, and would extend the expected life of the bridge an additional 35 years	Advanced
Western Alignment	**A2**	Approximate 28 degree skew to river. Most direct connection to I-35.	Advanced
Central Alignment	**A3**	Approximate 20 degree skew to river. South abutment approximately half-way between the existing bridge at Broadway and I-35 at the west side of the loop.	Advanced
Eastern Alignment	**A4**	Approximate 10 degree skew to river. Location just upstream of existing bridge. Requires reconfiguration of existing Broadway interchange	Advanced
New Bridge with Rehabilitation and Re-purposed O'Neil Bridge	**A5**	Construction of a new bridge at either the previously described A1 or A2 alternative locations, combined with the rehabilitation of the existing bridge.	Screened Out
Combination New Bridge with New Railroad Bridge	**A6**	Construction of a structure that combines a new highway bridge with a replacement of the existing Hannibal Bridge that carries the BNSF railway.	Screened Out

Table 2-1 Buck O'Neil Bridge Strategies Summary

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3. I-70 North Loop

3.1 Constraints and Conditions

The north side of the loop consists of ramps and interchanges at Broadway, Delaware and Missouri Route 9 Highway. Additional grade separation structures are located at Wyandotte, Walnut and Grand. Figure 3-1 illustrates the I-70 North Loop geographic area. Conceptual strategies were developed that would modify or reconfigure the north loop with the objective of advancing those that collectively best serve the identified long-term needs in the study area.

The North Loop strategies are divided into two categories: Local and Regional Access; and the Broadway Interchange. The Local and Regional Access strategies include interchange modifications along I-70 North Loop which can be built independently of a new US 169 bridge, or the other high-impact build alternates. The concepts were developed under the consideration that they could ultimately be incorporated into subsequent phased deployment of other long-term strategies. The Broadway Interchange strategies are considered separately.

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Figure 3-1 I-70 North Loop Area

3.2 Conceptual Strategies (Local and Regional Access)

Strategy B1: Re-Use I-70 Mainline and Consolidation of Ramps and Access Points

Strategy B1 consists of consolidating ramp and access points along the north loop, removing the freeway-to-freeway directional-ramp interchange connections with Missouri Route 9 (Heart of America Bridge), extending Independence Avenue to connect to West Independence Avenue, and replacing access with at-grade intersections at Grand Boulevard and Charlotte Street. This strategy is similar to one that was developed in 2005 to support the original I-29/I-35 corridor EIS in response to potential impacts that a new or improved I-35 bridge (now the Christopher "Kit" Bond Bridge) would have on traffic on the downtown loop. Figure 3-2 illustrates the improvements associated with Strategy B1.

Strategy B2: New Collector Distributor (CD) System

Strategy B2 removes short sections of auxiliary lanes from the existing I-70 mainline and constructs a new CD System within the I-70 right-of-way to consolidate and distribute access into the River Market and CBD. Figure 3-3 illustrates the improvements associated with Strategy B2.

Strategy B3: Reduced I-70 Footprint

Strategy B3 includes options to compress the I-70 footprint by eliminating exit and entrance ramps. This expands development and land use potential in the excess right-of-way. Access to the CBD and River Market is provided along either enhanced Independence Avenue on the north side, or 6th Street on the south side. Similar to B1, the freeway-to-freeway interchange connections with Route 9 (Heart of America bridge) are removed and replaced with the reconnection of Independence Avenue and at-grade intersections at Grand Boulevard and Charlotte Street. This strategy can be accomplished under three scenarios: a north alignment, immediately adjacent to Independence Avenue; a central alignment generally following the location of the existing freeway centerline; and a southern location generally adjacent to 6th Street. A secondary connection to I-70 in the proximity of the Grand or Walnut could be considered as an alternate consideration for this strategy, if necessary to support access and traffic circulation related to local development. Figure 3-4 illustrates the improvements associated with Strategy B3.

Strategy B4: Reconfiguration of the Downtown Loop to One-Way Directional

Strategy B4 reconfigures the entire downtown loop system to carry traffic one-way in the counter clockwise direction. This would eliminate all current ramp movements from the clockwise direction, which would significantly impose unnecessary impact on access and circulation for both interstate and local traffic. This strategy was developed to possibly maximize freeway capacity by utilizing all of the available freeway lanes in a single direction. Figure 3-5 illustrates the improvements associated with Strategy B4.

Strategy B5: Reconfiguration of the Downtown Loop to One-Way Directional with CD System

Strategy B5 mimics Strategy B4 and includes a CD system in the opposing direction to mitigate the major missing directional connections on the east and west legs of the loop. Figure 3-6 illustrates the improvements associated with Strategy B5.

Strategy B6: Reconfiguration of the Downtown Loop to Partial One-Way Directional

Strategy B6 reconfigures the downtown loop to partial one-way counter clockwise circulating interstate system. This strategy was developed to possibly maximize freeway capacity on the east and west legs of the loop by utilizing all of the available freeway lanes in a single direction. Northbound I-35 is carried on the east side of the loop and southbound I-35 is carried on the west side of the loop. I-70 (north loop) and

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I-670 (south loop) are maintained as two-way interstates. Figure 3-7 illustrates the improvements associated with Strategy B6.

Strategy B7: Redesignate and Reclassify the North Loop

Strategy B7 removes I-70 from the North Loop, currently dual-designated as I-70/I-35, and reestablishes the roadway grid system connecting the CBD, River Market area, and Columbus Park neighborhood. This section of I-70/I-35 would be removed from interstate status and replace with a single or pair of bi-directional arterial streets along the approximate locations of existing Independence Avenue and 6th Street. The area occupied by the current I-70 right-of-way and other available vacant developable tracts would be reclaimed by the local authority for expanded land use improvements and reconnection of the CBD with the River Market area and Columbus Park. Similar to other strategies, Route 9 is converted to an at-grade intersection with Independence Avenue. Figure 3-8 illustrates the improvements associated with Strategy B7.

Under this strategy, the south leg (currently I-670) would be redesignated as I-70 and I-35. The west leg of the loop would continue to function under interstate status to maintain the freeway connection with the Lewis & Clark Viaduct. The portion of the west leg, the Lewis & Clark Viaduct, and the segment of I-70 in Kansas City, KS to the current interchange with I-670 could be designated as I-670. This would redesignate the segment of I-670 between I-35 at the southwest quadrant and the current I-70 interchange in Kansas City, KS as I-70.

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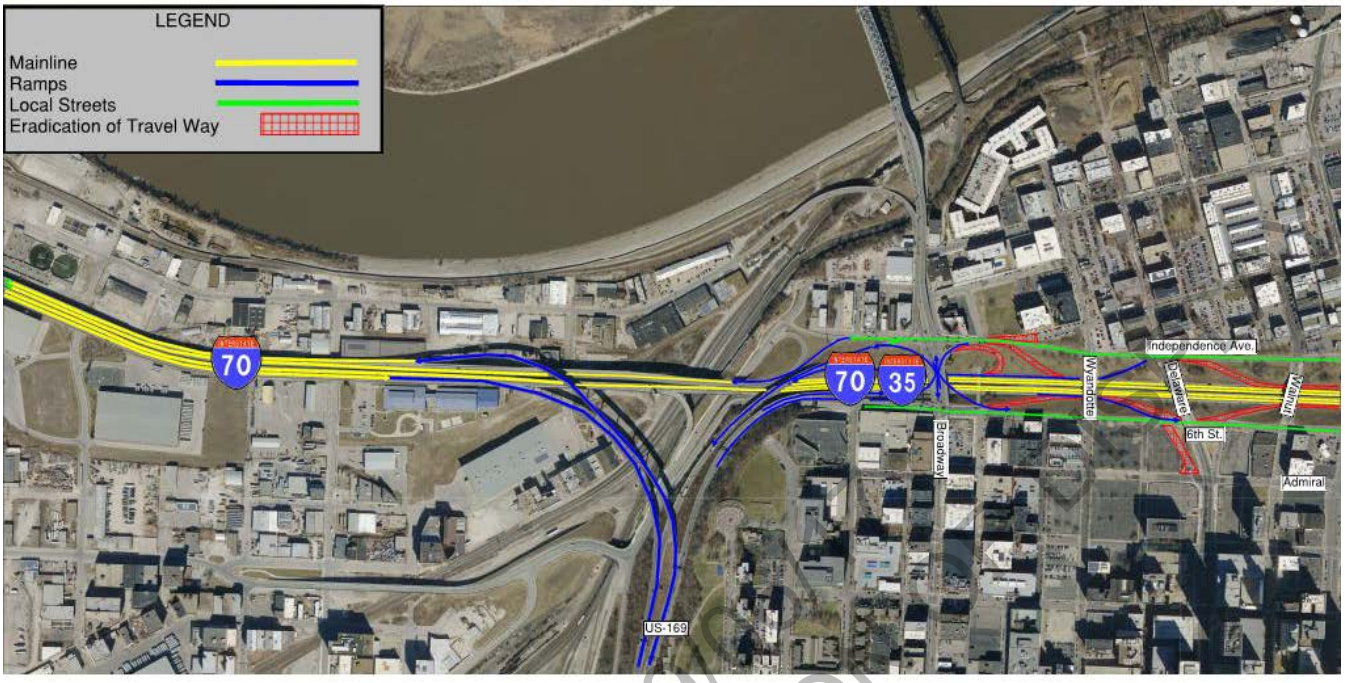

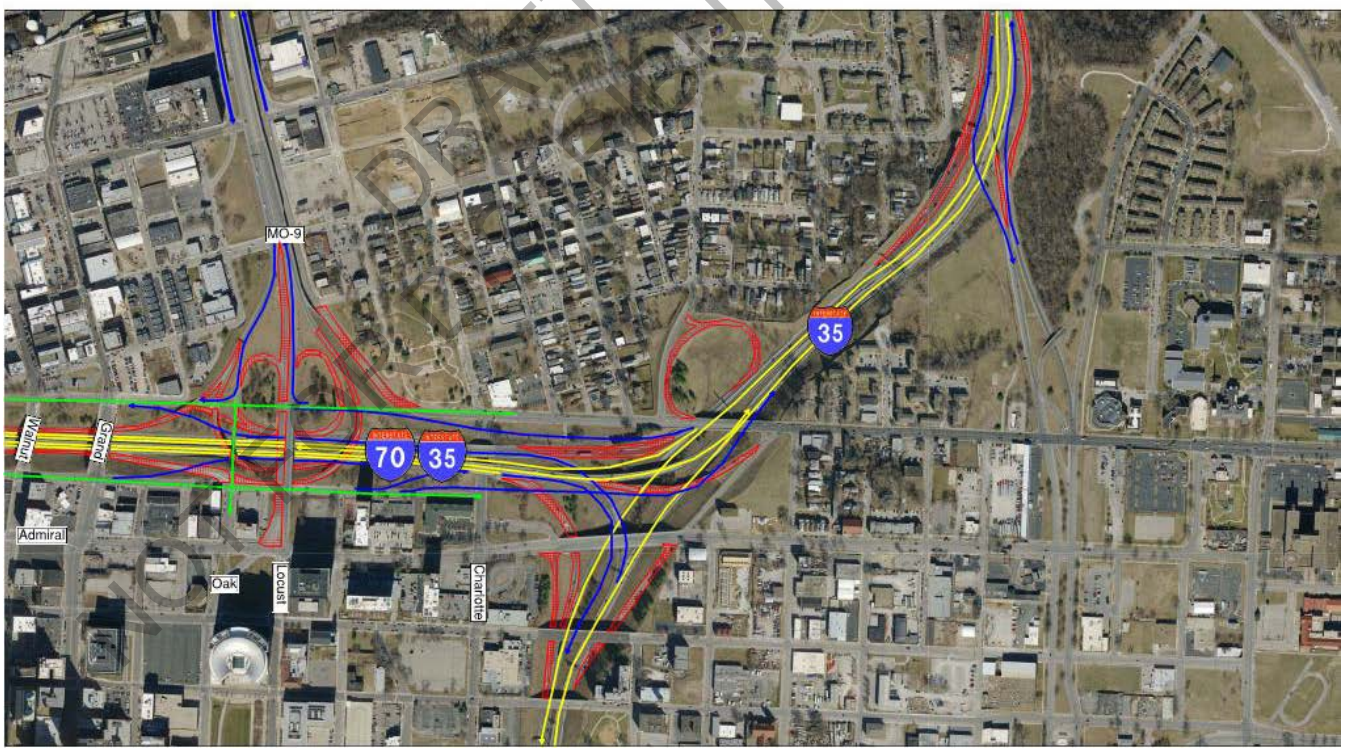

Figure 3-2 Strategy B1: Re-Use I-70 Mainline and Consolidation of Ramps and Access Points

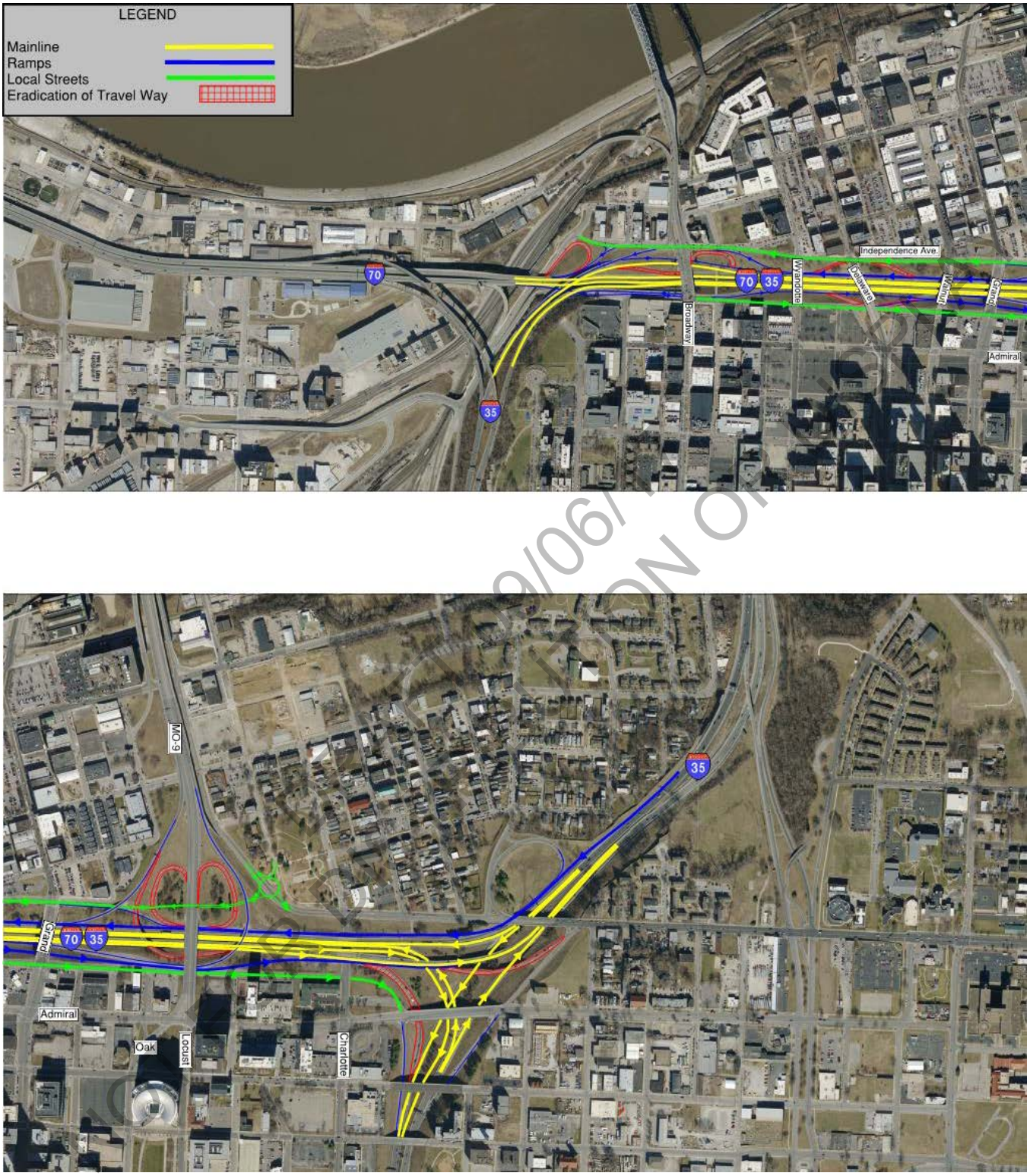

Figure 3-3 Strategy B2: New Collector Distributor (CD) System

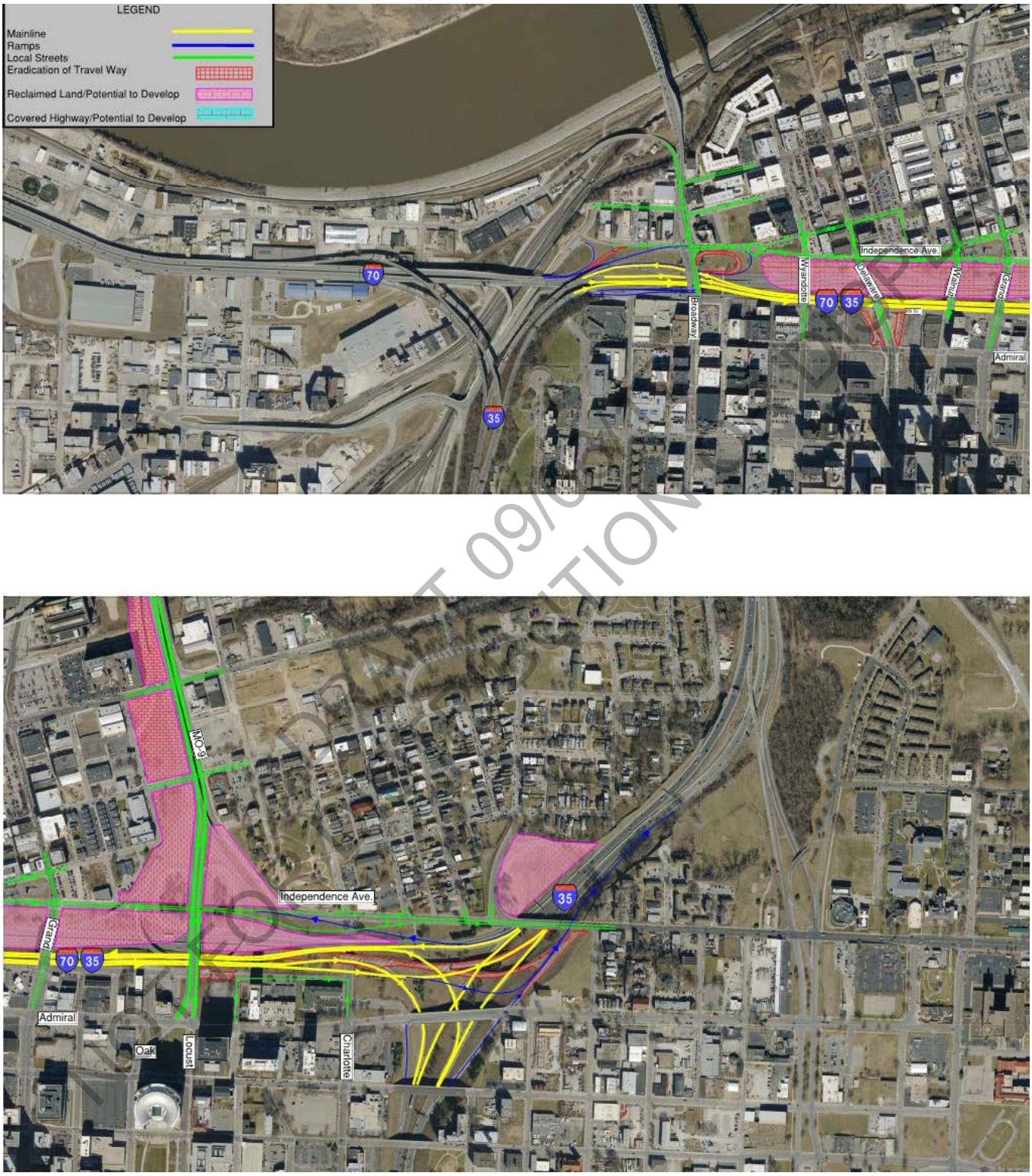

Figure 3-4 Strategy B3a: Reduced I-70 Footprint (South Location)

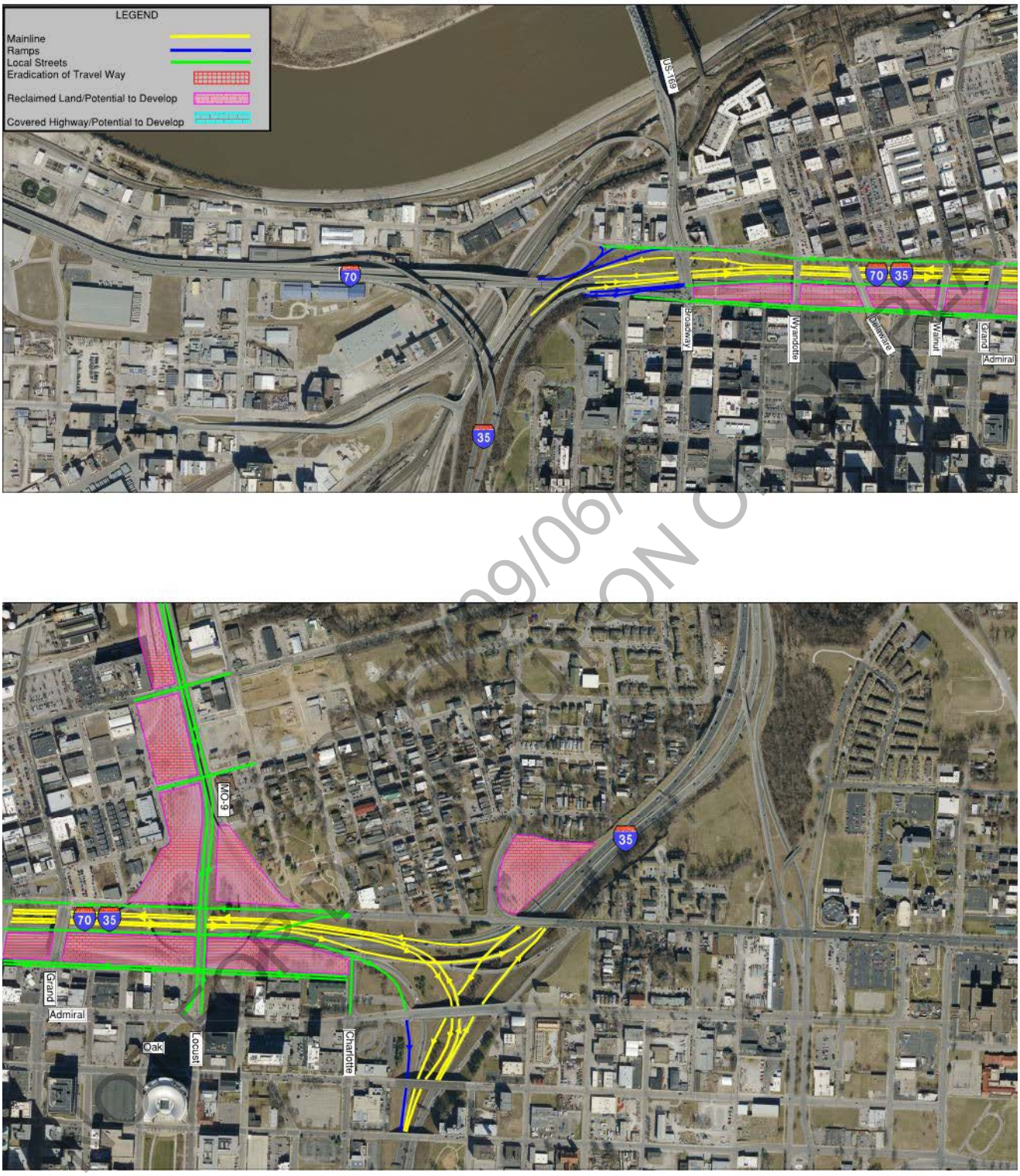

Figure 3-5 Strategy B3b: Reduced I-70 Footprint (North Location)

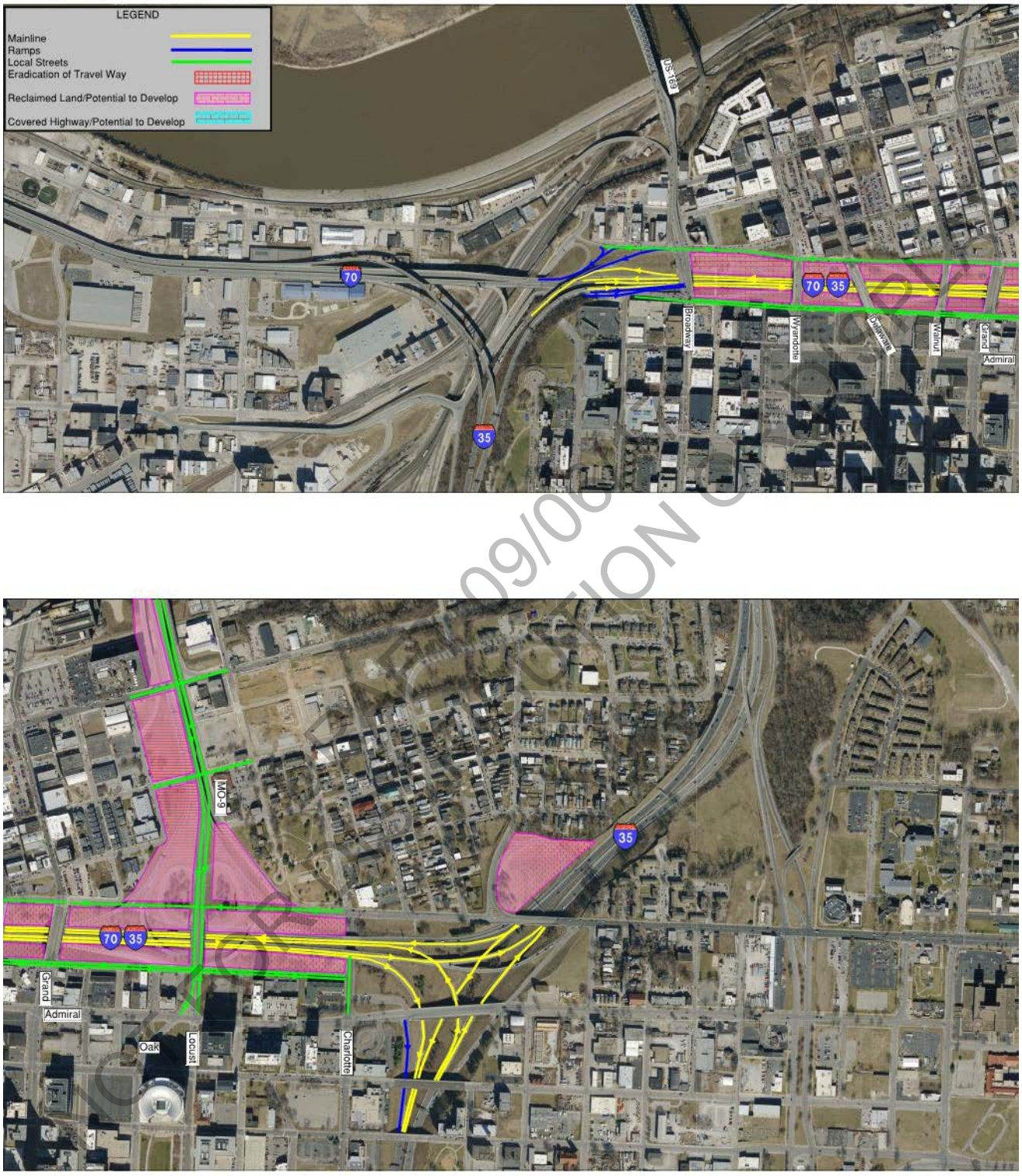

Figure 3-6 Strategy B3c: Reduced I-70 Footprint (Existing Centerline Location)

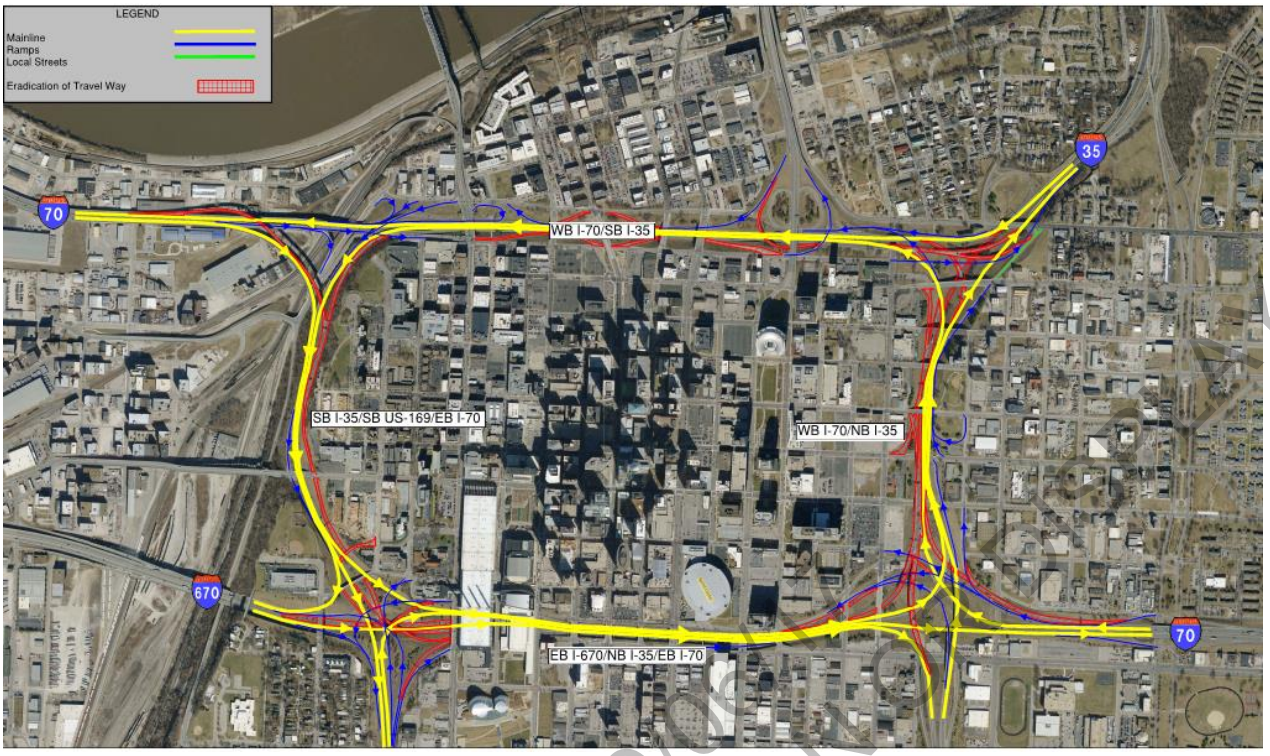

Figure 3-7 Strategy B4: Reconfiguration of the Downtown Loop to One-Way Directional

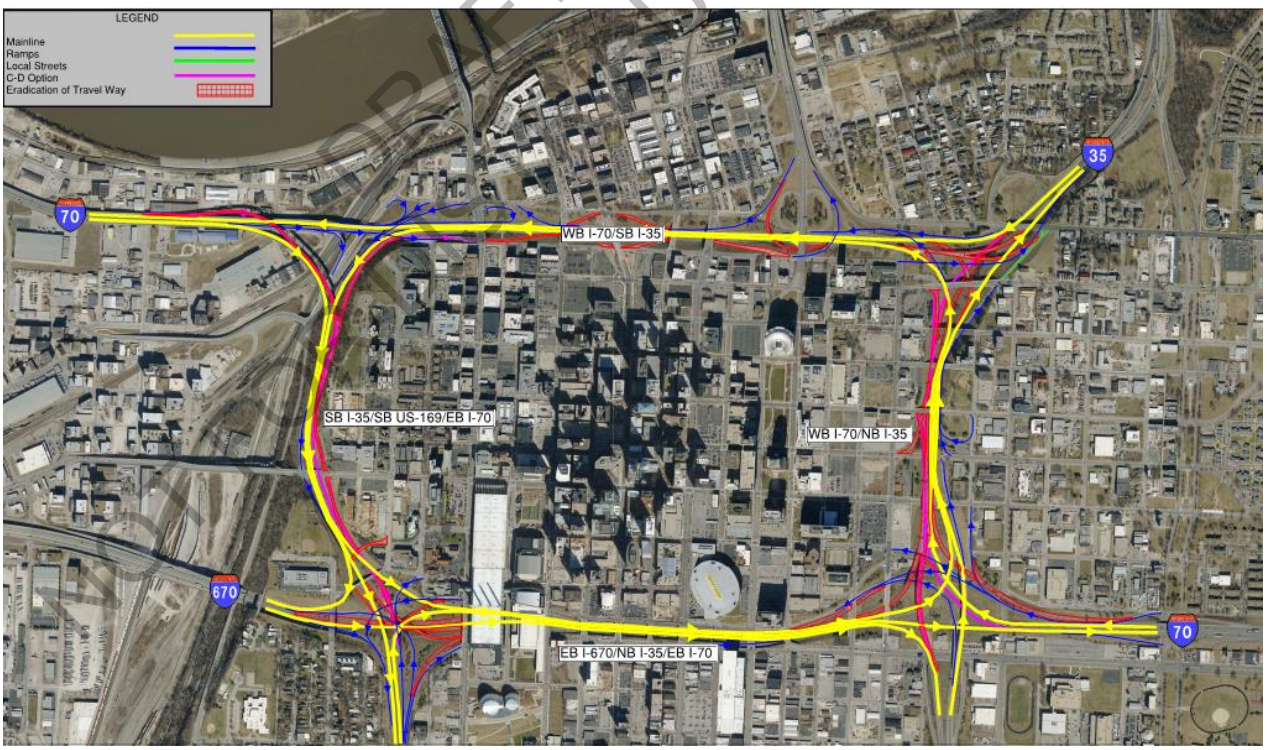

Figure 3-8 Strategy B5: Reconfigure Downtown Loop to One-Way Directional with CD System

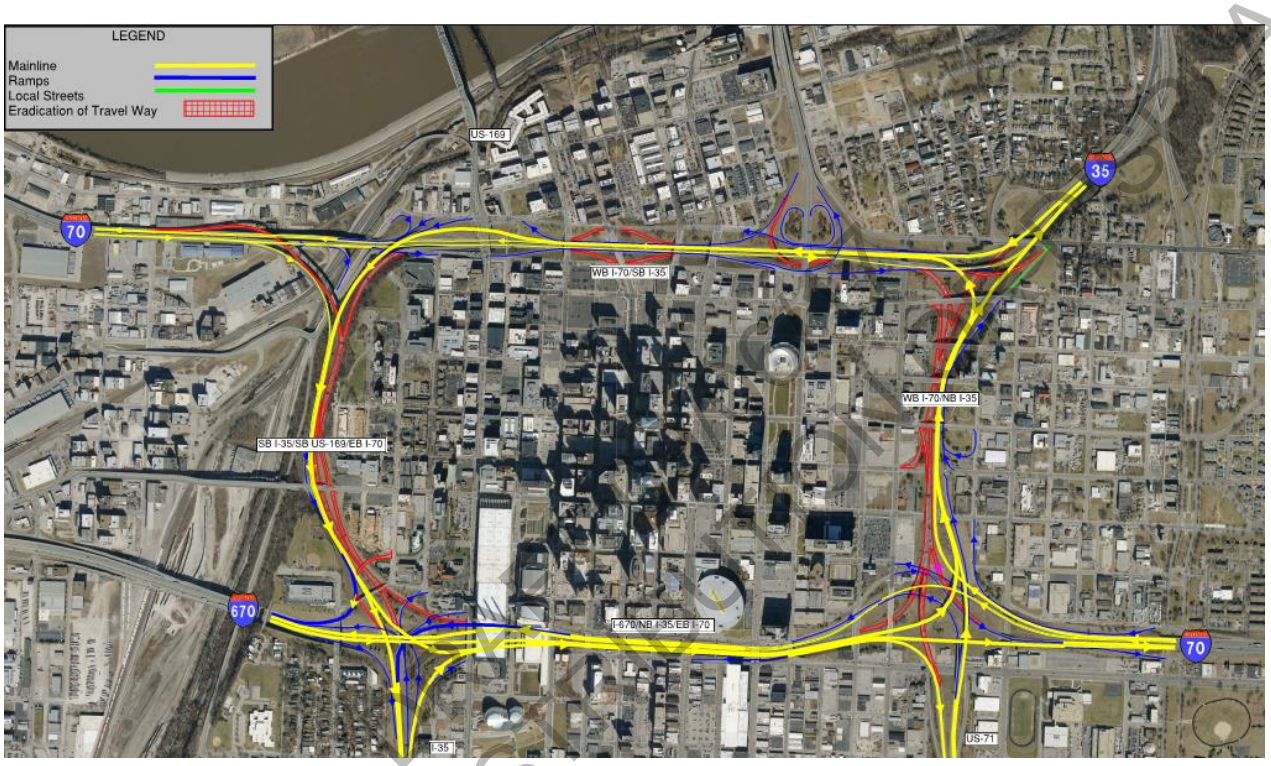

Figure 3-9 Strategy B6: Reconfigure Downtown Loop to Partial One-Way Directional

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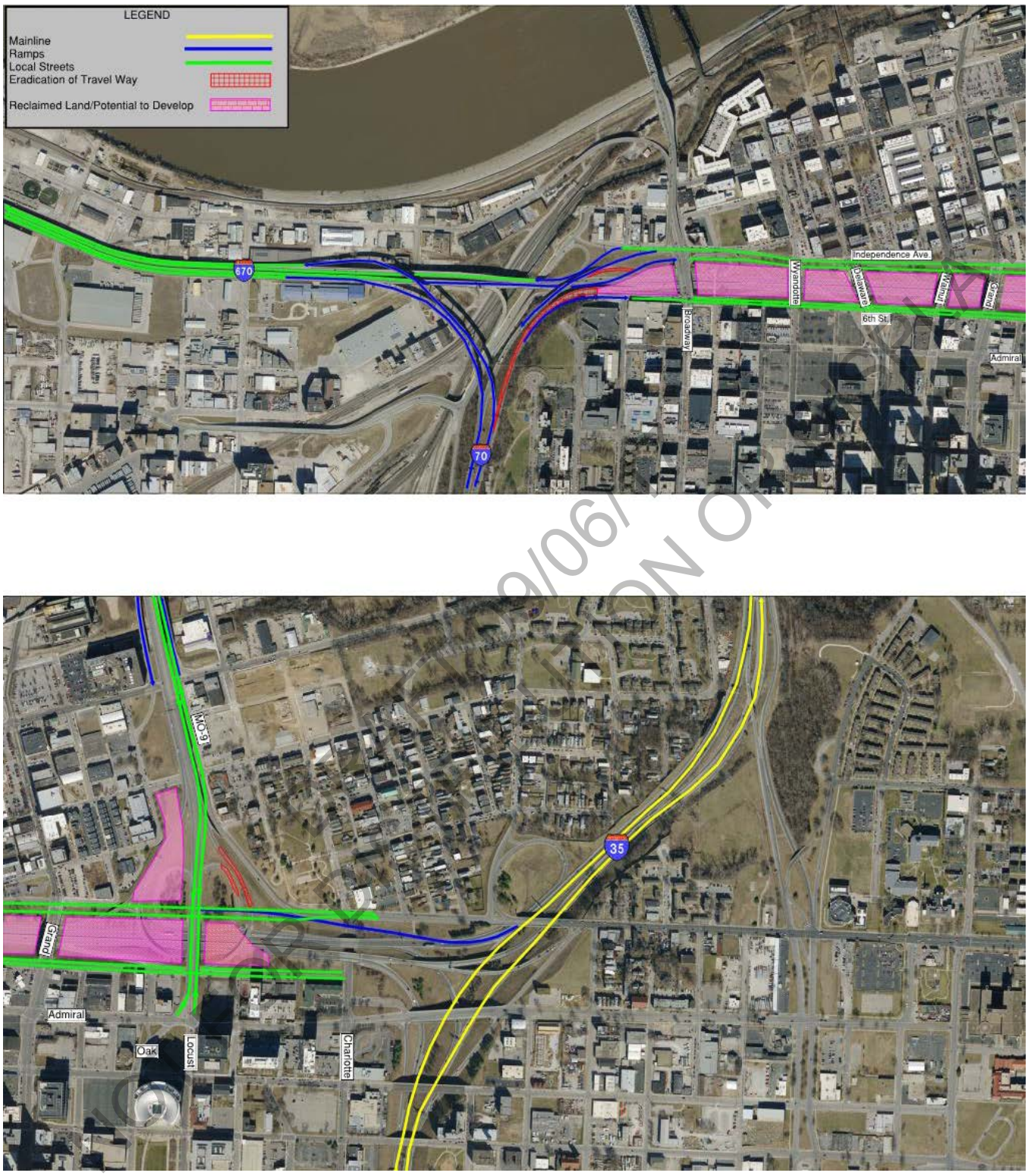

Figure 3-10 Strategy B7: Redesignate and Reclassify the North Loop

3.3 Level 1 Screening (Local and Regional Access)

Strategies B1 and B2 both address the needs to Improve the Physical Conditions, Optimize System Performance, and Improve Safety and Security. However, these alternates have limited potential to address the goals relating Transportation Choices, Economic Vitality, and Environmental Sustainability. Alternative B2 (Collector Distributor System) could be perceived to have negative impacts on several of the goals by construction of additional high speed lanes in the existing right-of-way, and the resulting lack of Economic Vitality and Placemaking potential. For these reasons, Strategy B2 was eliminated from further consideration and detailed evaluation.

Strategy B1 incrementally Optimizes System Performance and Improves Safety and Security by improving traffic operations along the mainline achieved through consolidation of closely spaced interchanges. The possible reconfiguration of Route 9 to an at-grade arterial would support the goal to Improve Economic Vitality and Placemaking, with limited opportunity address the other goals to Improve Transportation Choices and Improve Sustainability. Nonetheless, this alternative is recommended to be advanced to further evaluation due to its potential to be phased with other long-term strategies under consideration.

Strategy B3 addresses the need to improve the Physical Conditions of the freeway network, and positively addresses the other identified needs. The relocation of I-70 to either to the north or south edges of the existing right-of-way affords opportunities for increased and enhanced land use development, while providing additional benefits to the environment by fostering possible development of higher sustainable land uses, increased multi-modal opportunities, and potential quality of life improvements. Several renditions to this alternate will be developed to a higher level of detail for subsequent evaluation and secondary screening, depending on comparative impacts and ability to effectively carry traffic.

Strategies B4, B5, and B6 which entail reconfiguration of the loop to either a total or partial one-way circulating system are perceived to provide no net positive impacts on serving the stated needs of the project. The possible capacity benefits of utilizing most of the entire travel way along the freeway to serve operations in a one-way circulating system, are offset by the adverse travel distances for certain movements, negative impacts to local access to the freeway, and the additional requirements of new costly highway connections that do not exist today to maintain route continuity. For these reasons, it was collectively agreed upon by the SMT that B4, B5, and B6 are eliminated from further consideration and detailed evaluation.

Strategy B7, which removes the interstate status from the North Loop, redesignates the other three legs of the system, and best reconnects the existing grid system and adjacent land-use demographics. As a result, this strategy meets the stated Goals to Improve Transportation Choices, Improve Economic Vitality and Placemaking, and Sustainability. For the purposes of this initial high-level screening assessment, this strategy is considered to have no effect on the need to Optimize System Performance under the presumption that the traffic operational impacts related to the removal of I-70 from the North Loop can be mitigated with additional capacity elsewhere. For these reasons, this strategy will be advanced to a higher level of detail for subsequent evaluation and possible screening. The potential impacts to the regional transportation system and the external needs to mitigate the projected effects on traffic will be assessed when the detailed Dynamic Traffic Assignment (DTA) model is completed, and the results available to provide the necessary data to support the strategy evaluation and screening in subsequent activities.

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3.4 Conceptual Strategies (Broadway Interchange)

The Broadway interchange at the south end of the O'Neil Bridge serves a mix of origins and destinations including the Downtown Kansas City Central Business District, I-70, and I-35. The ramp terminals are comprised of 5th Street on the north side (westbound), and 6th Street on the south side (eastbound). Peak hour traffic demand regularly exceeds the interchange capacity and results in long queues and delays, particularly in the southbound direction on the O'Neil Bridge in the morning, and along I-35 northbound and the 6th Street intersection in the evening.

Traffic data suggests that about 45% of the southbound traffic on the bridge in the morning peak, and 35% of the northbound traffic on the bridge in the evening peak is destined to or originating from I-35 along the west leg of the loop. Preliminary traffic analysis at this location suggests the existing interchange can provide sufficient capacity (under existing demand conditions) to serve the remaining traffic should the I-35 west leg component of traffic be diverted to a new bridge. Therefore, using the existing interchange in place could be a viable alternative for consideration in combination with new river bridge strategies that provide direct connections with I-35.

Strategies that would continue to route the I-35 traffic through the existing interchange area at Broadway (i.e. the No-Build and A3-immediately adjacent to the existing bridge), will require a new interchange to provide adequate capacity through future year traffic conditions. Furthermore, the design and layout of safe and efficient connections with shared use non-motorized facilities on the bridge will be more challenging in comparison with strategies that separate the I-35 traffic from the CBD

Diverging Diamond Interchange (DDI)

This type of interchange handles high volumes of left-turning vehicles more efficiently than conventional diamond interchanges but is still considered an unconventional design since it shifts traffic moving through the interchange to the left-side of the roadway. This alternate could better serve the high volume of eastbound left-turns at 6th Street and westbound at 5th Street, but would require a special attention to handle the eastbound through movement at 6th Street and bike/pedestrian connections with the bridge, or provide alternative routes to eliminate the through movement.

Single Point Urban Interchange (SPUI)

A SPUI interchange was included in the 2005 I-29/I-35 corridor EIS North Loop plan to replace the Broadway interchange at the 5th and 6th Street intersections. The conceptual design removes all of the exit and entrance ramps between Broadway and Wyandotte Street and maintains the continuity of 5th and 6th Street across Broadway. While the left-turns are more efficiently handled by the single point intersection, the capacity of the southbound movement to the I-35 along the west leg will remain constrained without widening the approach. Detailed traffic analysis of this concept will validate its viability as alternates for the bridge are evaluated, including the development of alignments and connections between the structure and the interchange.

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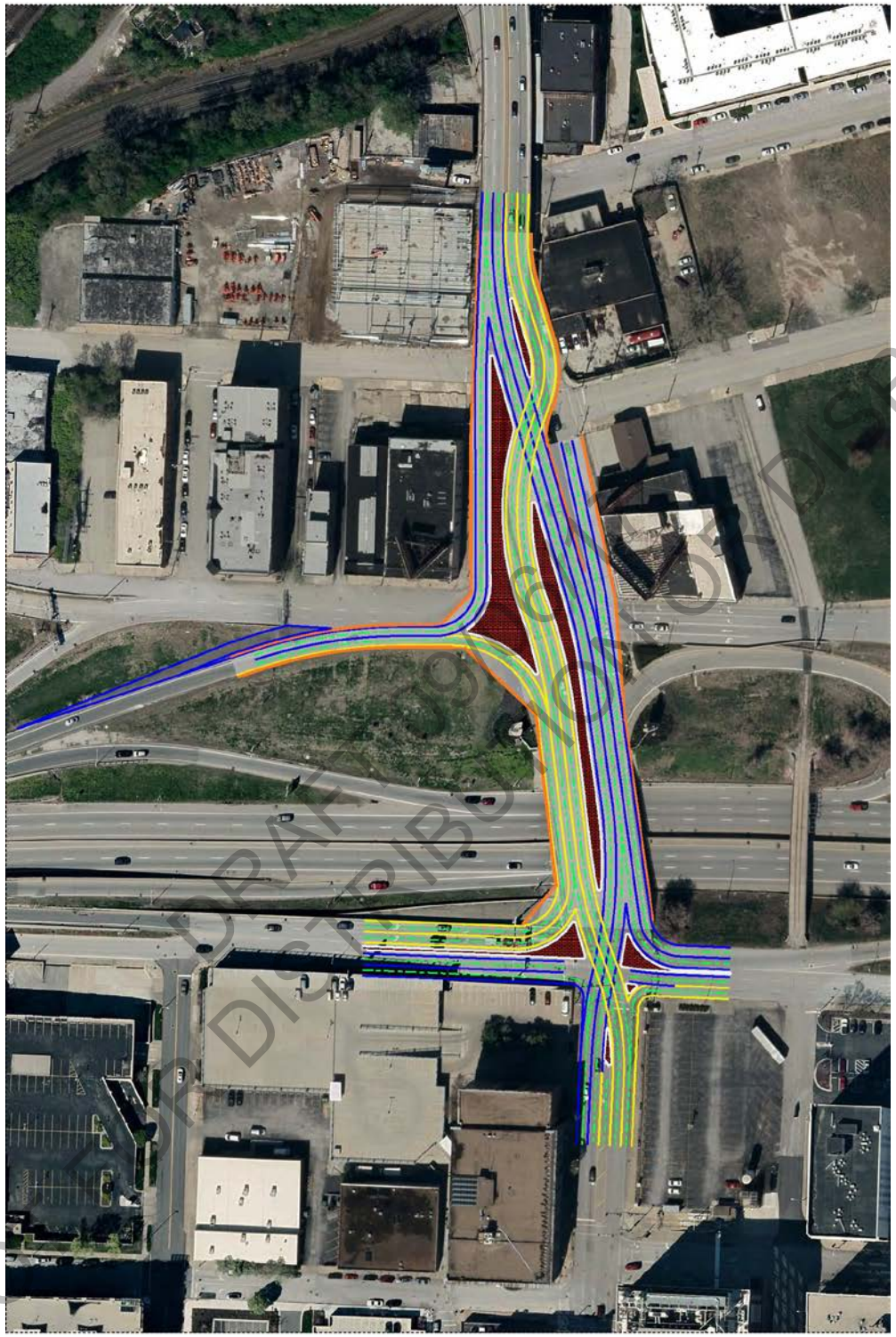

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Figure 3-5 I-70/Broadway Diverging Diamond Interchange Concept

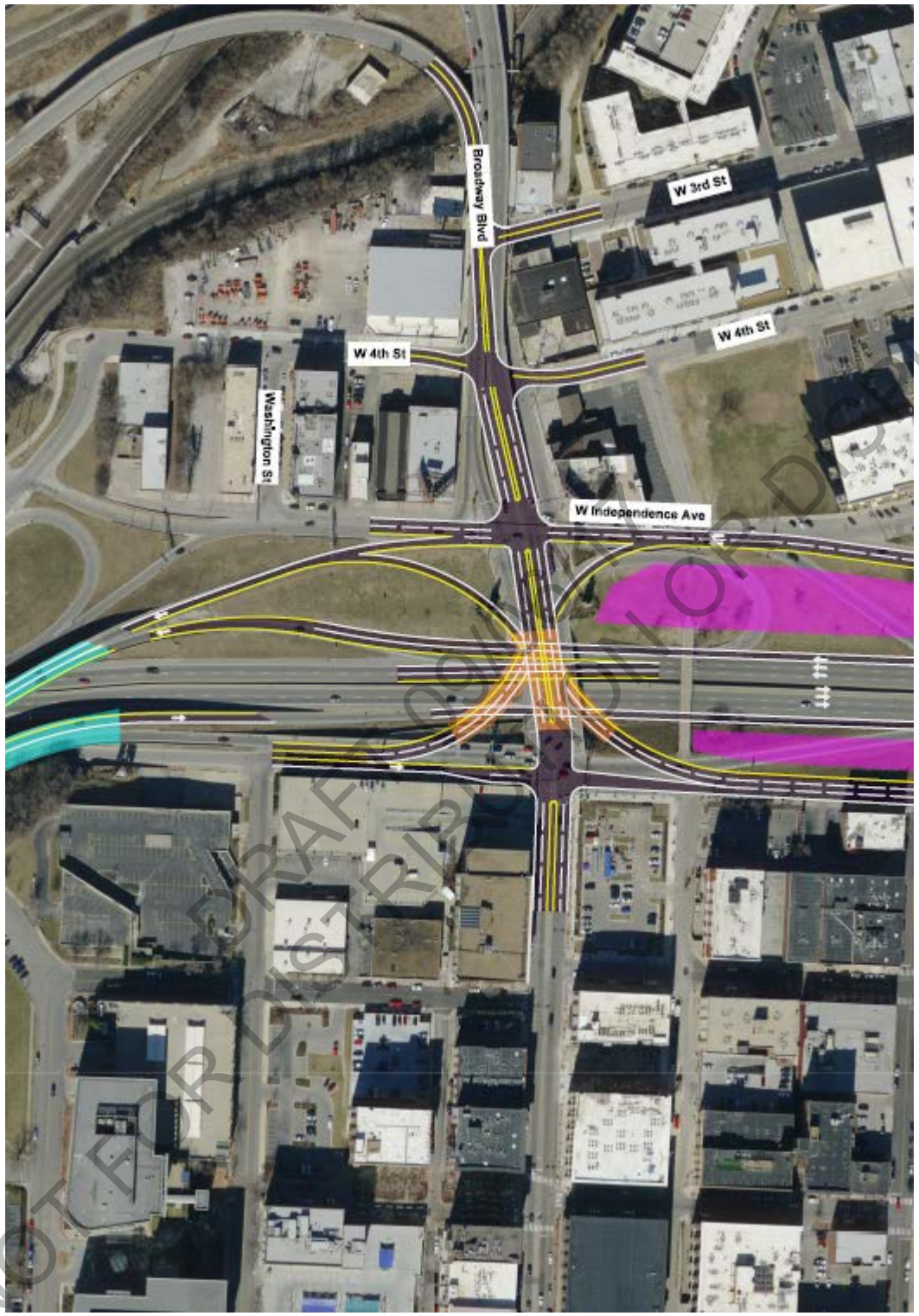

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Figure 3-6 I-70/Broadway Single Point Urban Interchange Concept

3.5 Summary and Evaluation Matrix

A summary of the I-70 North Loop Strategies is provided Table xxx. This identifies those strategies that will be advanced for further study, and those that will no longer be considered. A more detailed evaluation matrix which comparatively scores the strategies as discussed in Section 1.3 is provided in Appendix xx.

North Loop	Strategy	Description	Status
Re-Use I-70 Mainline and Consolidation of Ramps and Access Points	**B1**	Replicates the design concept that was developed in 2005 to support the original I-29/I-35 corridor EIS.	Advanced
New Collector Distributor (CD) System	**B2**	Removes short sections of auxiliary lanes from the existing I-70 mainline and constructs a new CD System within the I-70 right-of-way to consolidate and distribute access into the River Market and CBD	Screened Out
Compressed Footprint Strategies			
Compressed Footprint South Option	**B3-a**	Compressed I-70 Along South Side of Corridor with Access at Independence Ave. Roundabout and Oak Trafficway	Advanced
Compressed Footprint North Option	**B3-b**	Compressed I-70 Along North Side of Corridor with Access at Broadway and Oak Trafficway	Advanced
Compressed Footprint on Existing Mainline Location	**B3-c**	Compressed I-70 Along Centerline of existing I-70	Advanced
One-way Circulation Strategies			
Reconfiguration of the Downtown Loop to One-Way Directional	**B4**	Reconfigures the entire loop system to carry traffic one-way in the counter clockwise direction.	Screened Out
Reconfiguration of the Downtown Loop to One-Way Directional with CD System	**B5**	Mimics Strategy B4 and includes a CD system in the opposing direction to mitigate the major missing directional connections on the east and west legs of the loop.	Screened Out
Reconfiguration of the Downtown Loop to Partial One-Way Directional	**B6**	Reconfigures the downtown loop to partial one-way counter clockwise circulating interstate system.	Screened Out
Redesignate and Reclassify North Loop			
Independence Ave Parkway	**B7**	Independence Avenue converted to Parkway and connected across Oak Trafficway, 6th Street two-way between Broadway and Charlotte.	Advanced

Table 3-1 North Loop Strategies Summary

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4. Downtown Wheeler Airport

4.1 Constraints and Conditions

The US-169 interchange with Harlem Road features left-side on and off ramps, no acceleration lane for the southbound US 169 movement, and a complex nine-legged roundabout that serves the interchange, Richards Road, Lou Holland Drive, and Harlem Road. The left-side on-ramp in the southbound direction is of particular concern due to confusion relating with signing and lack of deceleration lane.

At a minimum, access provisions to US-169 for airport patrons and on-site business will be maintained at current levels; one north bound off-ramp, two southbound on-ramps, and two southbound off-ramps. Conceptual improvements have also been developed to address safety concerns at the southbound off-ramp at the north side of the airport property and the southbound right-in / right-out located on the east side of the airport.

All of the strategies for this area will work with any of the Missouri River Bridge Strategies listed in Section 2.2.

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Figure 4-1 Downtown Wheeler Airport Area

4.2 Conceptual Strategies Descriptions

Strategy C1: Half Diamond Interchange with Existing Harlem Road Access

Strategy C1 represents a half diamond interchange, with the exit and entrance ramps on the right side. Harlem Road Eastbound and Westbound traffic remain in the existing location and condition (separated with individual railroad under crossings) and connect to Richards Road, which is relocated slightly west.

Strategy C2: Half Diamond Interchange with Direct Connection to Northbound Richards Road

Strategy C2 represents a half diamond interchange, with the exit and entrance ramps on the right side. Harlem Road eastbound and westbound traffic remain is their existing location and configuration (separated with individual railroad under crossings) and the US 169 northbound exit ramp connects to Richards Road.

Strategy C3: Half Diamond Interchange with Relocated Harlem Railroad Crossing and Direct Connection to Northbound Richards Road

Strategy W3 represents a half diamond interchange, with the exit and entrance ramps on the right side. The Harlem Road railroad undercrossing is relocated either to the south (just north of the O'Neil Bridge) or to the north (across from entrance to airport parking). The complex intersection in Strategy C2 is replaced with traditional intersection due to the removed Harlem Road connection.

Strategy C4: Half Diamond Interchange with Split Lou Holland Undercrossing

Strategy C4 represents a half diamond interchange, with the exit and entrance ramps on the right side of US-169. Harlem eastbound and southbound traffic remain in their existing location and configuration (separated with individual railroad under crossings) and connect to Richards Road, which is locally relocated to the west. Northbound Lou Holland drive splits near the levee retaining wall and provided direct connection to northbound US 169 and Richards Road via a weaving movement.

Strategy C5: Half Diamond Interchange with New Single Harlem Road Railroad Crossing

Strategy C5 represents a half diamond interchange, with the exit and entrance ramps on the right-hand side similarly to Strategy C1, with the exception that Harlem Road to the east is served by a new railroad undercrossing structure.

Strategy C6: Button-Hook Interchange with Relocated Harlem Railroad Crossing

Strategy C6 represents a half diamond interchange with button-hook style ramps connecting directly with Richards Road. Access to Harlem would be made from a new railroad undercrossing either to the north across from the main airport parking lot, or to the south just north of the end of the O'Neil Bridge end.

Strategy C7: Right-In/Right-Out At-Grade Access Improvements

Strategy C7 reconfigures the existing at-grade intersection just north of the main airport terminal to provide dedicated southbound acceleration and deceleration lanes. The lanes would function similarly to diamond interchange ramps, removing the traffic they serve from the adjacent mainline lanes under current layout.

Strategy C8: Interchange Improvements at Richards Road (North)

Strategy C8 constructs a new folded diamond interchange at the north end of Richards Road by reconstructing the southbound off-ramp from US 169 and constructing a new southbound on-ramp loop.

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The new loop ramp provides the second southbound access to US 169 with the removal of the left-side on-ramp ramp at the existing Harlem Road interchange that is not included in the new interchange concept strategies.

Other conceptual strategies were considered that provided access from Route 9 to the east either as a secondary access, or to replace the existing access from the Harlem Road interchange. Currently Harlem can be access from Route 9 via 10th Street in North Kansas City, but requires several crossings of active BNSF railroad lines along Atlantic Street. In the long term, if a redevelopment plan is developed for Harlem that would require a secondary access or a replacement of the existing, a direct connection could be considered that extends Harlem Road east to a grade separated crossing of the railroad to an at-grade intersection with Route 9 north of the existing levee. This strategy could be incorporated into a long-term plan for the area if needed, and would likely be incorporated into a funding package for the infrastructure to support the development plan, as appropriate. Given the shorter-term planning for the O'Neil Bridge replacement and the companion interchange, the advancement of an alternate access to Harlem from Route 9 will not be included in this specific planning study.

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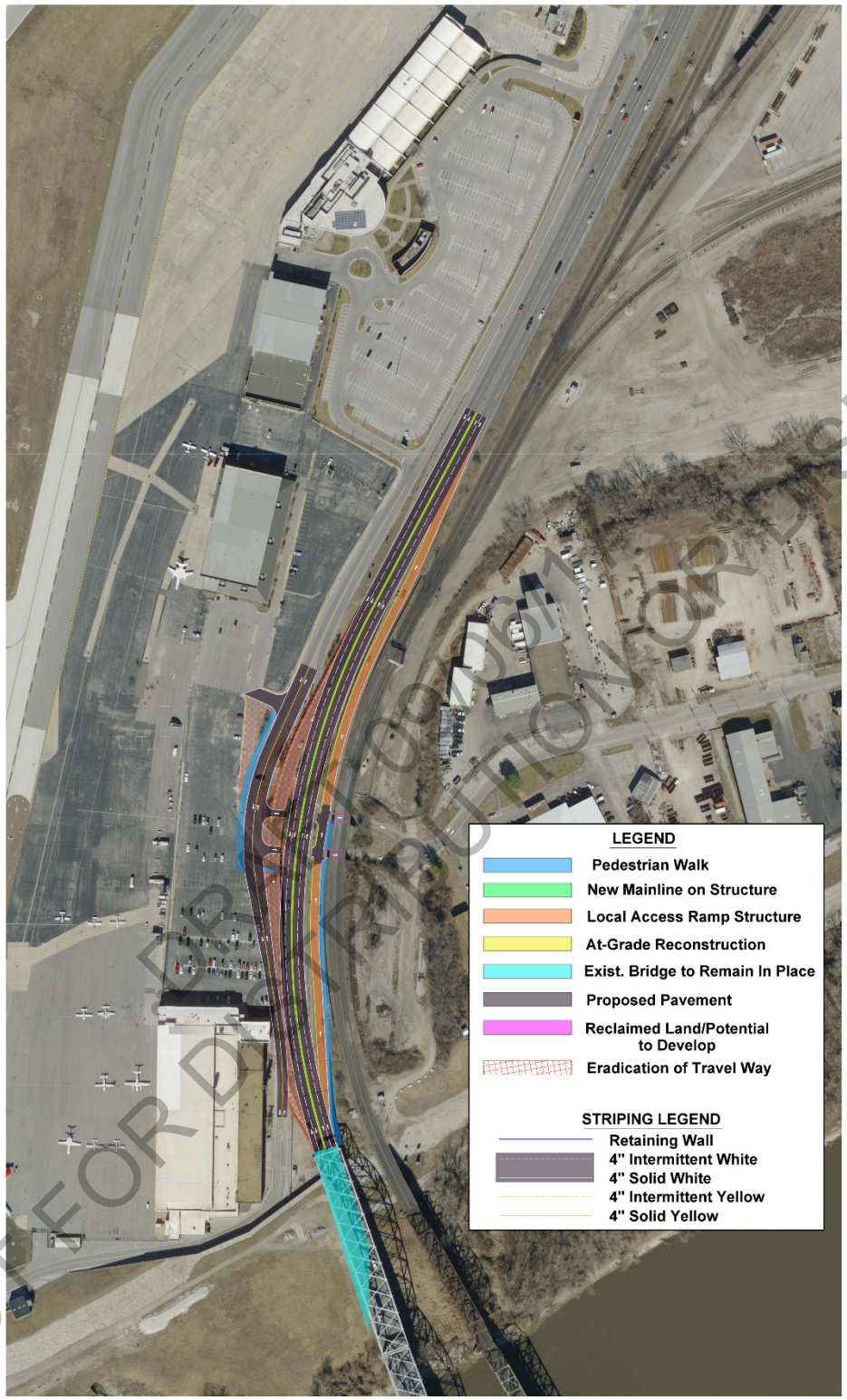

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Figure 4-2 Strategy C1: Half Diamond Interchange with Existing Harlem Road Access

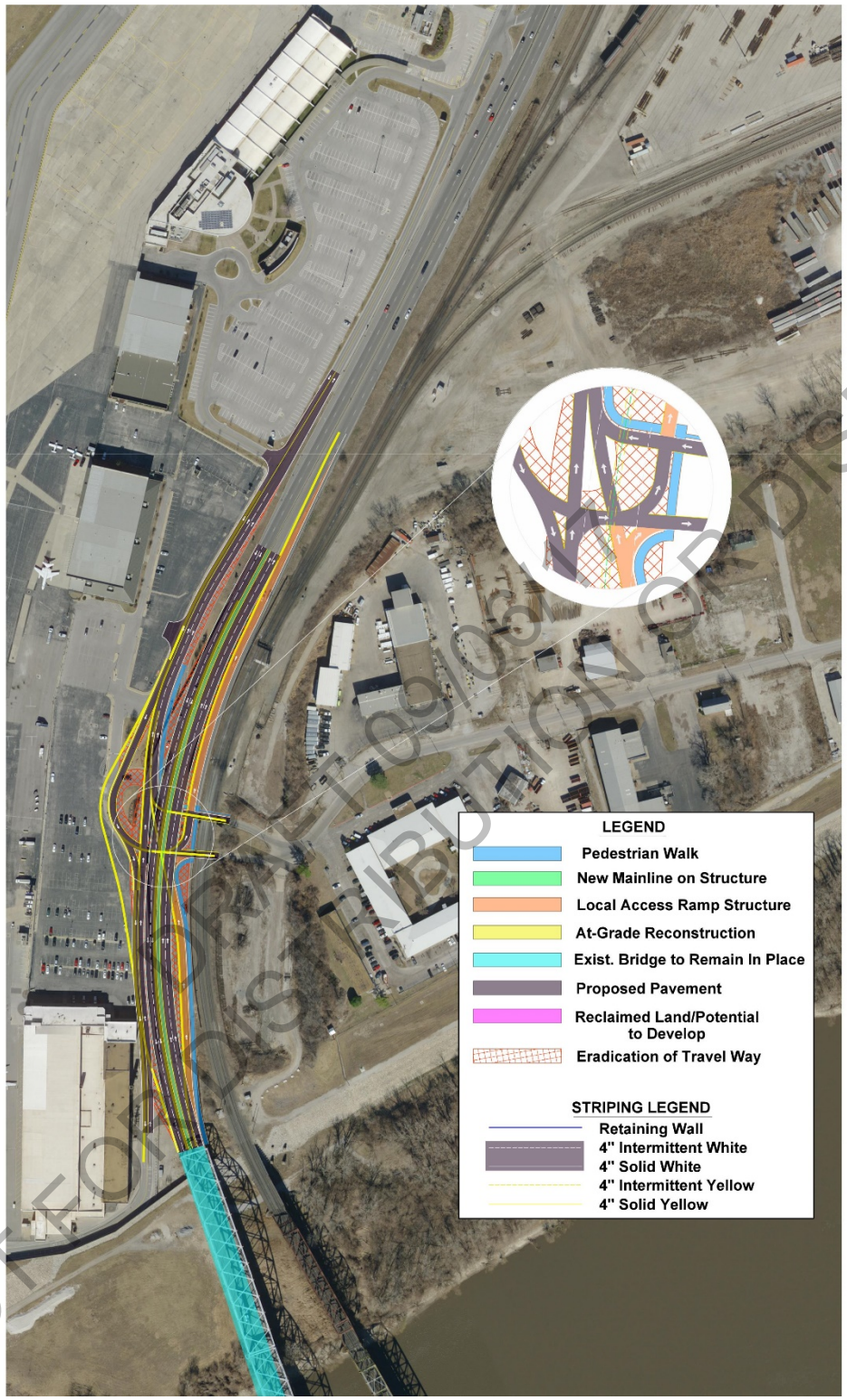

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Figure 4-3 Strategy C2: Half Diamond Interchange with Direct Connection to Northbound Richards Road

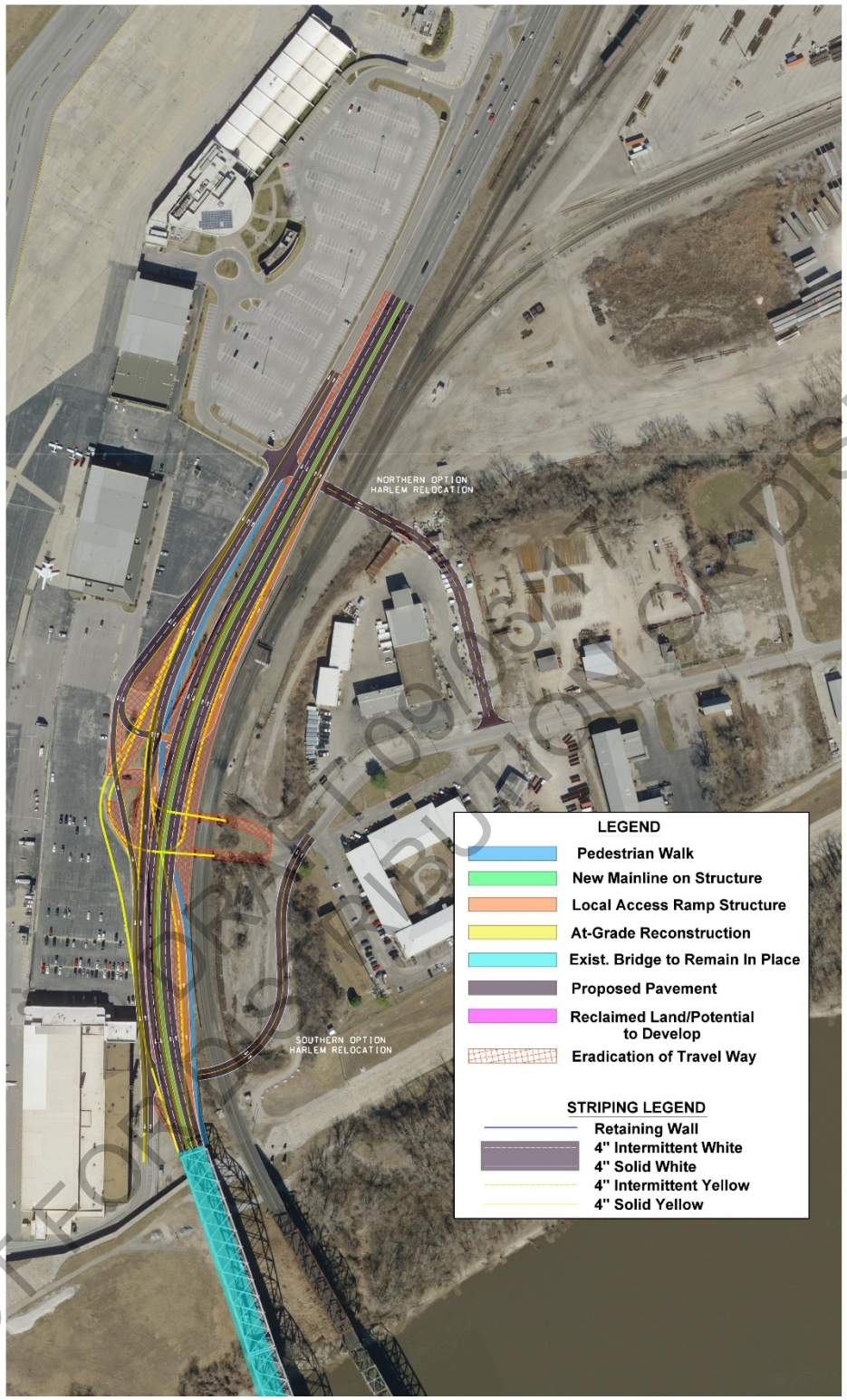

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Figure 4-4 Strategy C3: Half Diamond Interchange with Relocated Harlem Railroad Crossing and Improved Direct Connection to Northbound Richards Road

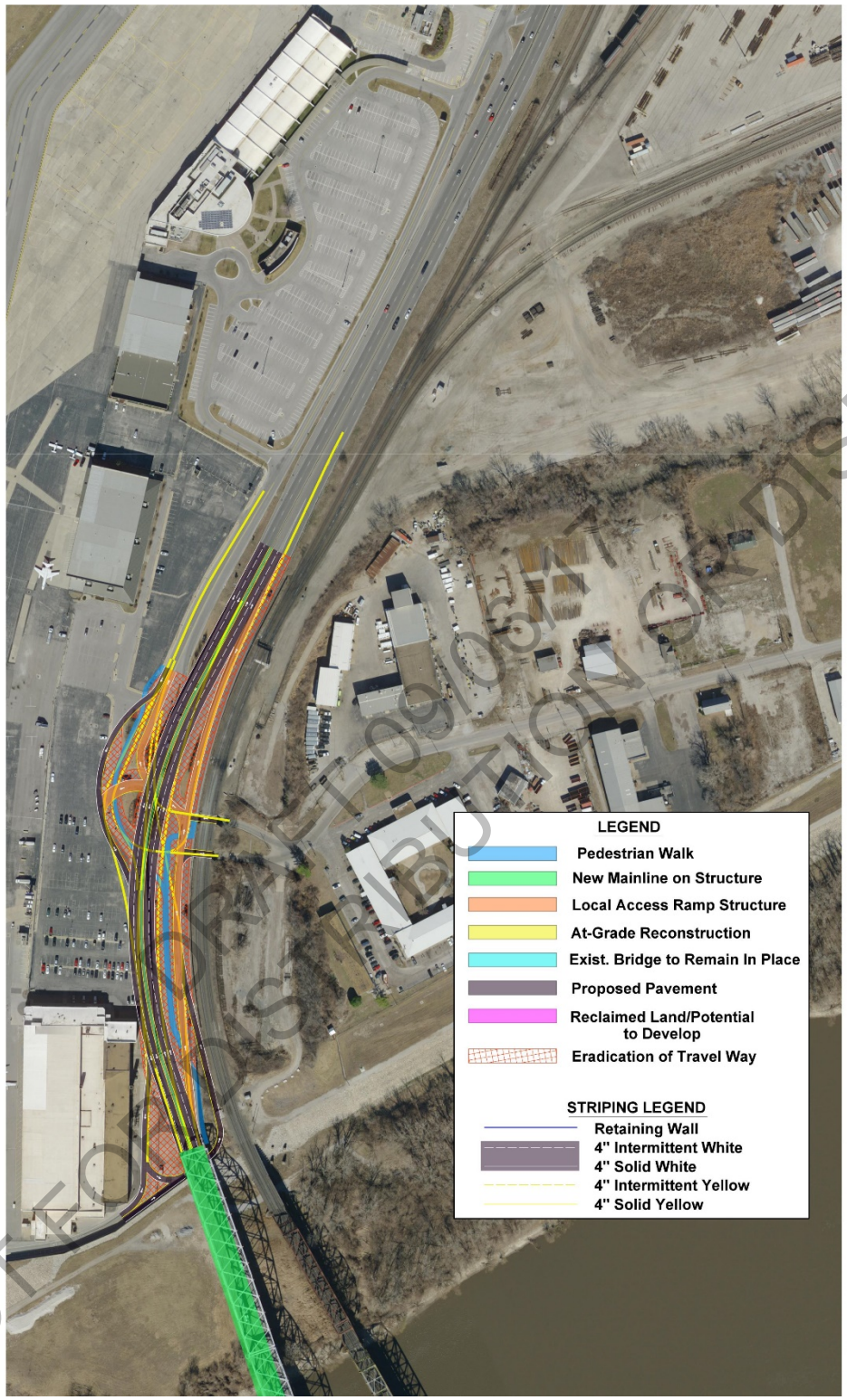

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Figure 4-5 Strategy C4: Half Diamond Interchange with Split Lou Holland Undercrossing

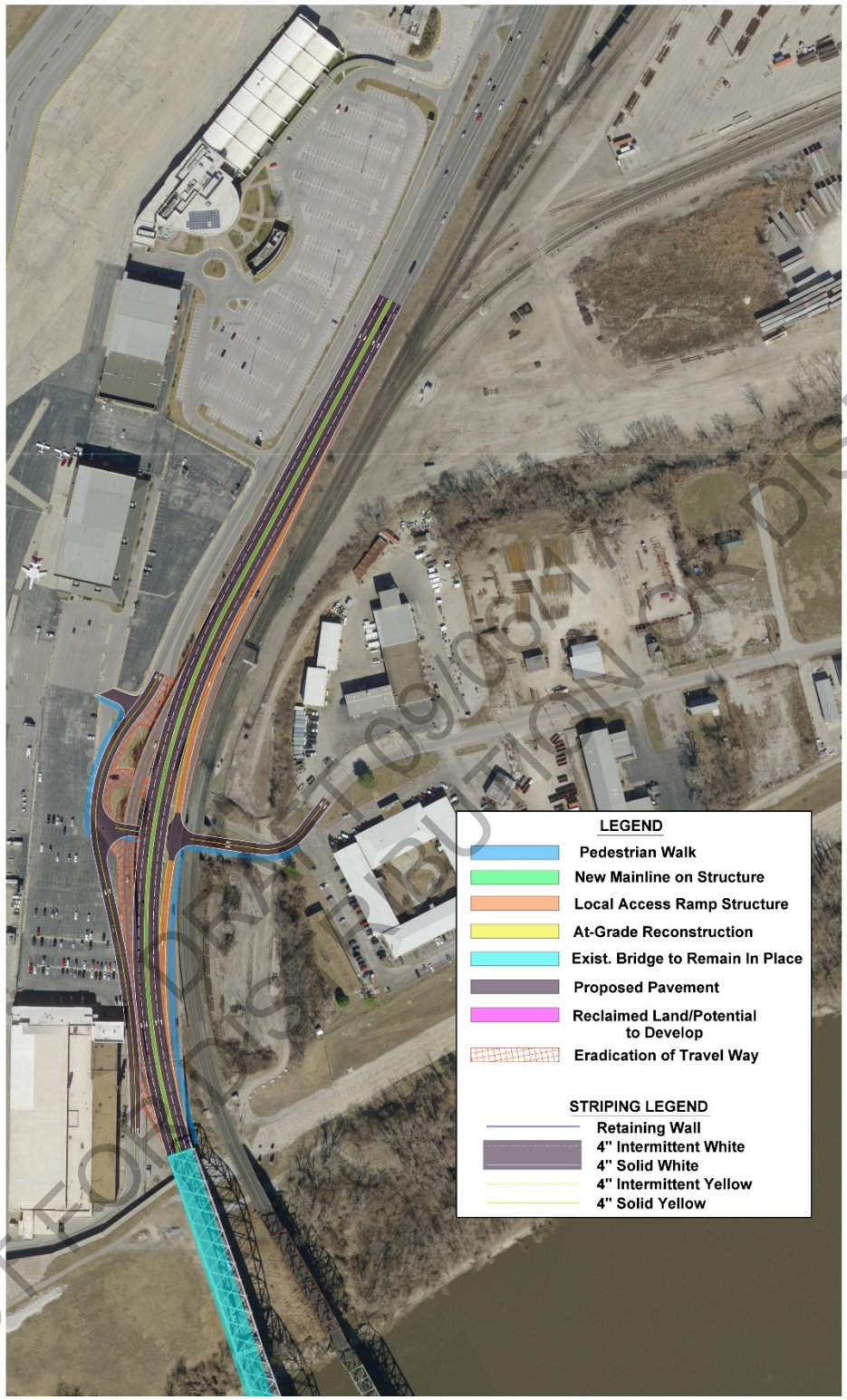

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Figure 4-6 Strategy C5: Half Diamond Interchange with New Single Harlem Road Railroad Crossing

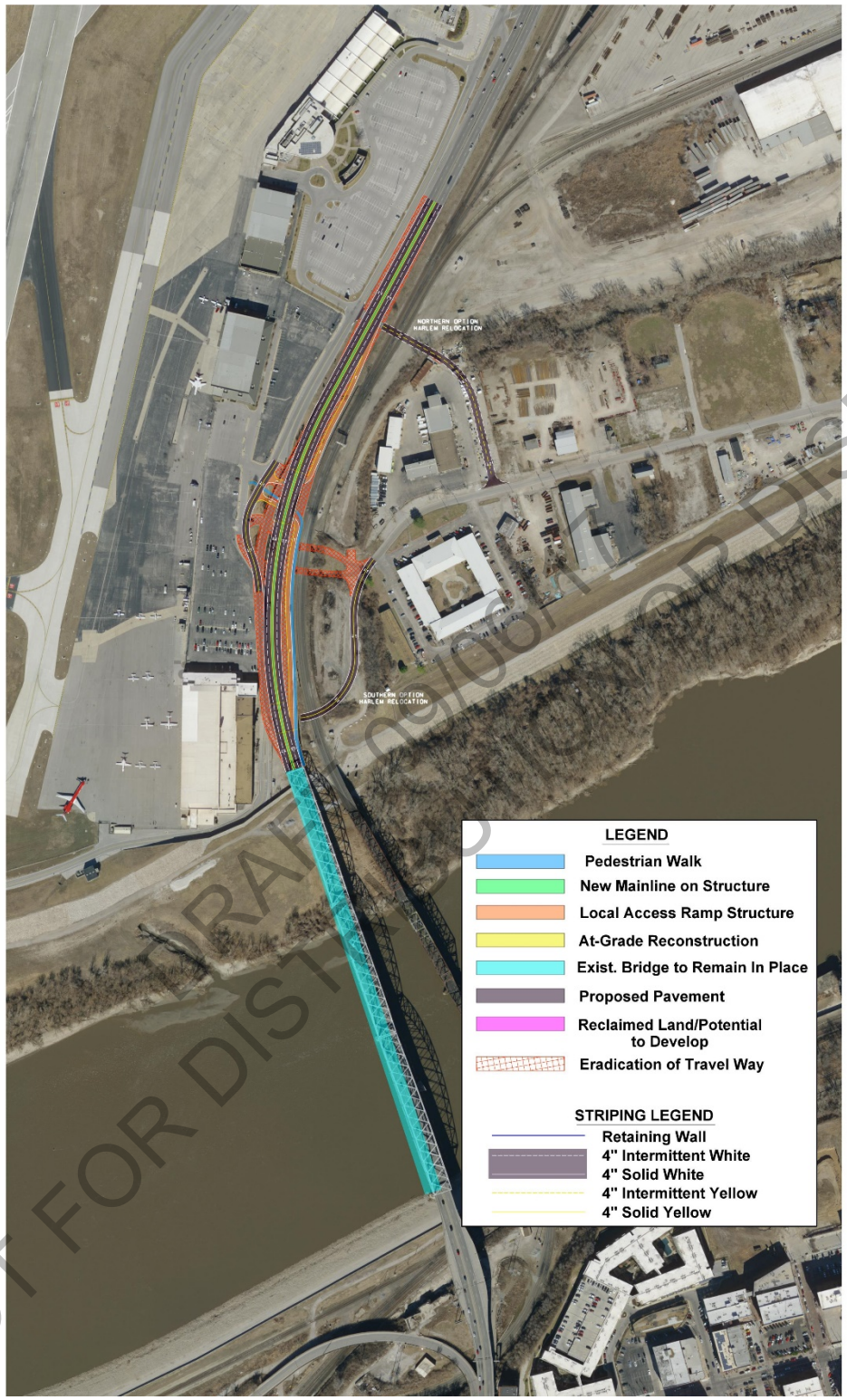

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Figure 4-7 Strategy C6: Button-Hook Interchange with Relocated Harlem Road Railroad Crossing

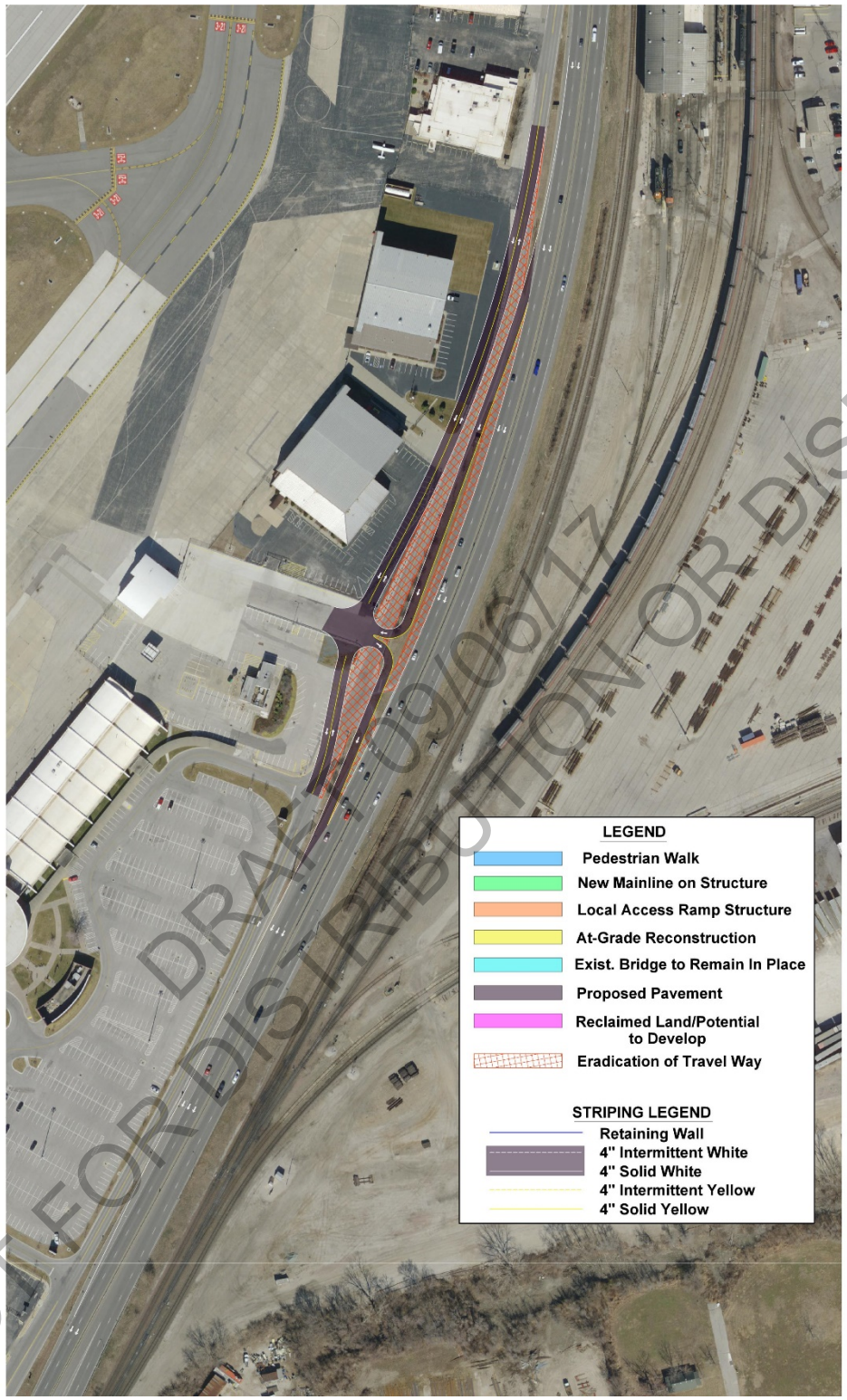

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Figure 4-8 Strategy C7: : Right-In/Right-Out At-Grade Access Improvements

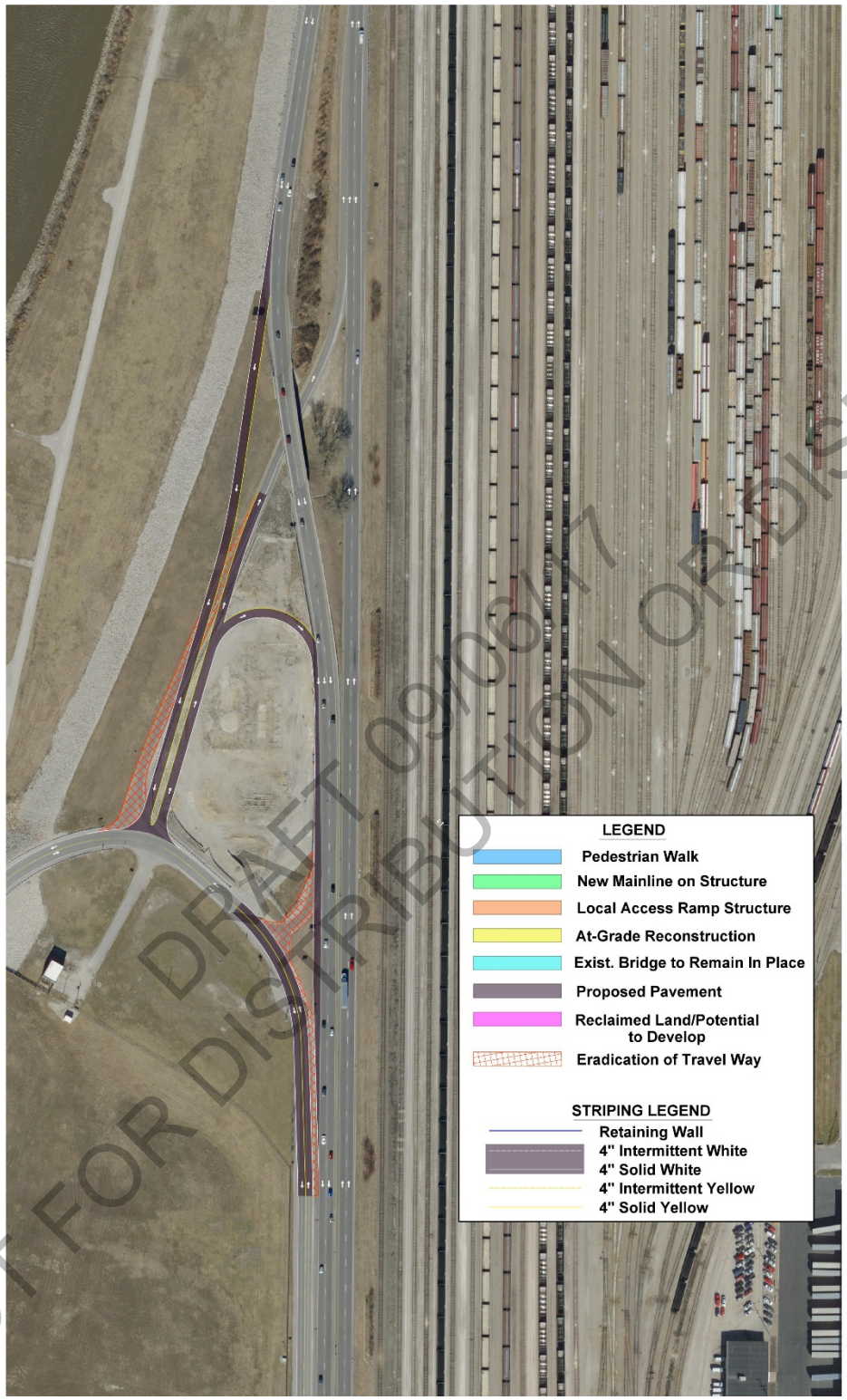

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Figure 4-9 Strategy C8: : Interchange Improvements at Richards Road (North)

4.3 Level 1 Screening

In comparison with the existing interchange and its inherent physical condition and geometric characteristics that do not conform to current design and traffic standards, the proposed strategies meet the needs to Improve the Physical Conditions, Optimize System Performance, and Improve Safety and Security. Strategies C2 and C3 both provide direct access to northbound Richards Road and the main airport terminal building, but at the tradeoff of no convenient or direct access to business operations at the south area of the airport property including Executive Beechcraft and Signature Aviation. Strategy C3 entails a new railroad underpass structure to maintain access to the Harlem area at either of two alternative locations. Prevailing grades present difficulties for the northern location to be constructed, leaving only the southern alternate as the only reasonable possible location. Currently there are no formal re-development plans to support the determination of the best location for access so this strategy would require construction of a new road to connect with existing Harlem Road. In discussions with the BNSF, they have no current plans to replace the existing bridges over Harlem Road. As such, they stated that they would not participate in sharing the costs of any new bridges unless future inspections of the existing structures suggested significant repairs or replacement are necessary. Therefore, due to their relative costs and lack of ability to meet the goal of supporting Economic Vitality as it relates to providing access to existing development on the airport site, Strategies C2 and C3 will not be advanced for further study.

Strategy C4 provides a more direct access to Richards Road in both directions in comparison with the C1 and C5 conventional diamond interchanges. The configuration of Richards Road and the shared use trail circulation will require additional refinement and assessment to minimize conflict points as this strategy is advanced to the next level of evaluation and screening.

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4.4 Summary and Evaluation Matrix

A summary of the Downtown Wheeler Airport Strategies is provided Table 4-1. This identifies those strategies that will be advanced for further study, and those that will no longer be considered. A more detailed evaluation matrix which comparatively scores the strategies as discussed in Section 1.3 is provided in Appendix xx.

Harlem / Wheeler Airport Access	Strategy	Description	Status
Interchange Improvements			
Half Diamond Interchange with Existing Harlem Road Access	**C1**	A half diamond interchange, with the exit and entrance ramps on the right-hand side.	Advanced
Half Diamond Interchange with Direct Connection to Northbound Richards Road	**C2**	Similar to strategy C1 except US-169 NB exit ramps connects to Richards Road	Screened Out
Half Diamond Interchange with Relocated Harlem Railroad Crossing and Improved Direct Connection to Northbound Richards Road	**C3**	Similar to strategy C1 except the Harlem Road railroad crossing is relocated	Screened Out
Half Diamond Interchange with Split Lou Holland Undercrossing	**C4**	Similar to strategy C1 except Northbound Lou Holland drive splits near the levee retaining wall and provided direct connection to Northbound US-169 and Richards Road via a weaving movement.	Advanced
Half Diamond Interchange with New Single Harlem Road Railroad Crossing	**C5**	A half diamond interchange, with the exit and entrance ramps on the right-hand side. Harlem Eastbound and Westbound traffic is brought together for a Single railroad undercrossing.	Advanced
Button-Hook Interchange with Relocated Harlem Railroad Crossing	**C6**	A half diamond interchange with button-hook style ramps, along with the exit and entrance ramps on the right-hand side. The Harlem Road railroad undercrossing is relocated either to the north or south	Screened Out
Auxiliary Improvements			
Right-In/Right-Out At Grade Improvements	**C7**	Improve existing RIRO by providing separated accel/decel lanes	Advanced
Interchange Improvements at Richards Road (North)	**C8**	SB on and off ramp connections and NB On ramp Connections	Advanced

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Table 4-1 Wheeler Airport/Harlem Strategies Summary

5. West Bottoms

5.1 Constraints and Conditions

The LCV extends approximately 1.3 miles between I-35 at the west end of the North Loop, across the Kansas River, to an interchange serving local access into downtown Kansas City, Kansas and the Fairfax Industrial district. Local access to and from this portion of the West Bottoms is served from the Woodswether Viaduct bridge which connects with 4th Street at the east end beneath the US 169/Broadway Bridge approach span, and Woodswether Road at the west end. Woodswether Road and viaduct also carry a KCATA transit route that serves the northern region of the Bottoms, connecting the River Market to the east with James Street and Kansas City, Kansas to the west.

The current configuration of the Broadway intersection at 5th Street prohibits the Woodswether traffic from connecting directly with I-35 southbound or I-70 westbound. Truck traffic destined for these routes often traverse through the River Market residential and commercial areas on 3rd Street to Wyandotte or other streets that provide connections to the freeway system. In addition to vehicular traffic, Woodswether Road is signed as a bike route as an integral part of the Greater Kansas City Regional Trails and Bikeway system, connecting downtown and the River Market area with the Riverfront Heritage Trail that runs beneath the LCV and across the Kansas River to the west.

Due to its declining condition, in 2011 a Woodswether Road Viaduct Alternatives Study was commissioned by and completed for the City of Kansas City, which reported on the evaluation of a range of alignment and bridge configurations. Alternates evaluated ranged from replacing on existing alignment, to multiple new alignments which required property acquisitions. The original study ultimately recommended that the existing bridge be rehabilitated on the existing alignment. The strategy of constructing a new Woodswether Viaduct was not advanced as a viable concept for the following reasons in addition to the cost differential between a new structure in comparison with a full rehabilitation of the existing:

- Requirements for significant bridge and retaining walls over and on railroad right-of-way
- Acquisition of multiple properties
- Continued routing truck traffic through the River Market area
- Potential conflicts with the construction of a new US-169 Missouri River Bridge
- Continued operations and safety concerns with maintaining commercial truck traffic through the Broadway and 5th & 6th Street I-70 Interchange

Currently, the viaduct is closed to accommodate re-decking and other structural repairs and is expected to re-open to traffic later in 2017. As a result of the previous study recommendations, and the current commitment to repair the bridge, strategies that entailed reconstruction of the bridge on a new alignment were not advanced for further evaluation under this study.

Daily traffic on the Woodswether Viaduct is approximately 2,800 vehicles per day, of which approximately 10% is comprised of trucks and heavy vehicles. Of the six predominant access streets and highways serving the area, historical traffic data suggests that approximately 7% of the traffic generated in the area is carried on the viaduct. The conceptual strategies in this portion of the study area focused on providing an alternate means of vehicular and non-motorized access into the area to mitigate the possible removal of the viaduct to accommodate construction of a new Buck O'Neil Bridge on a new alignment west of the existing bridge.

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In addition to Woodswether Road and the viaduct, West Bottoms access is provided from five other locations serving the estimated volume distribution between the hours of 9:00 am and 3:00 pm as follows:

- Forrester Road connection to Beardsley Road to I-70 and I-35 (14%)
- 12th Street connection to I-35 on the west side of the loop (10%)
- I-670 at Wyoming Street and Genesee Street (26%)
- Central Avenue Viaduct to I-70 and from I-670 (22%)
- James Street to I -70 (21%)

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Figure 5-1 West Bottoms Service Area

Generally, the alternative West Bottoms access strategies are grouped into two categories: A new interchange on the I-70 Lewis and Clark viaduct; and local roadway improvements to carry traffic on Forrester Road and the Forrester Viaduct. The strategies were developed at a concept level of limited detail to provide a general location and conceptual analysis of circulation and traffic operations for mainline and access movements.

5.2 Conceptual Strategies (Interchange Access)

Four interchange configurations for access to the West Bottoms near Wyoming Street were evaluated. This evaluation considered interchange spacing to the I-35 directional ramps on the ramps on the east side and the proposed LCV Improvements. KDOT will receive construction bids for the first phase of the LCV in the winter of 2017. Phase 1 of the LCV will replace the existing westbound I-70 bridge over the Kansas River. Phase 2 of the LCV will construct two new bridges over the Kansas River. Phase 2 will also include

much larger curves on I-70 to remove the existing tight horizontal curve on the west side of the LCV. A committed schedule for the Phase 2 work has not been established to date.

Strategy D1: Half Diamond Interchange at Wyoming Street

Strategy D1 includes a half diamond interchange, with the exit and entrance ramps on the east side of Wyoming Street. The interchange would provide access into the West Bottoms from westbound I-70 and egress to eastbound I-70. The geometrics and location of this strategy reduces impacts to the existing Kansas City, Missouri Kaw Point wastewater treatment plant.

Strategy D2: Full Diamond Interchange at Wyoming Street

Strategy D2 constructs full diamond interchange at Wyoming Street that provides all movements at I-70 but does impacts the treatment plant.

Strategy D3: Folded Diamond Interchange at Wyoming Street

Strategy D3 provides a folded diamond interchange with ramps west of Wyoming to limit the impact to the wastewater plant and creates more separation to the I-35 directional ramps in comparison with the other two interchange alternates at Wyoming.

Strategy D4: Partial Folded Diamond Interchange at Wyoming Street

Strategy D4 revises the folded diamond interchange concept of Strategy D3 by replacing the right radius loop on-ramp for eastbound I-70 with a conventional diamond type of ramp. Eastbound ramp spacing and weave/merge movements are similar to that of Strategies D1 and D2, but reduces impacts to the wastewater treatment plant.

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Figure 5-2 Strategy D1: Half Diamond Interchange at Wyoming Stre

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Figure 5-3 Strategy D2: Full Diamond Interchange at Wyoming Street

Figure 5-4 Strategy D3: Folded Diamond Interchange at Wyoming Street

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Figure 5-5 Strategy D4: Partial Folded Diamond Interchange at Wyoming Street

5.3 Level 1 Screening (Interchange Access)

Each of the interchange strategies was reviewed in consideration of the ultimate Lewis & Clark Viaduct to the west and the existing I-35 interchange to the east. Ramp gore locations were evaluated for conformance to AASHTO design guidelines relating to consecutive ramp terminal spacings. None of the interchange strategies met the recommended minimum ramp spacing. For most alternatives, the available distance was less than half the recommended spacing.

The elevation separation between prevailing grades of the local streets serving the West Bottoms and the LCV is approximately 30 feet. Ramp grades within the constrained geometry are anticipated to be longer than a standard diamond ramp due to vertical separation that exceeds the minimum vertical clearances. In addition, ramp grades are expected to approach 7% in some cases. Longer ramp up-grades and steeper grades are a challenge for loaded trucks to reach highway speeds at the top. Historically, trucks avoid the existing Wyoming/Genesee ramps at I-670 for this same reason.

Current traffic counts and truck percentages indicate that less than 300 trucks use the Woodswether Viaduct on a daily basis. Approximately half or about 150 trucks are destined to or originating from I-70. These volumes may not support the proposed interchange or partial interchange. For these reasons collectively, Strategies D1 through D4 were not advanced for further study.

West Bottoms Area	Strategy	Description	Status
New Interchange Strategies on I-70 to mitigate possible closure of Woodswether viaduct and connection to Broadway			
Half Diamond Interchange at Wyoming Street	**D1**	Provides partial interchange access into and out of the West Bottoms from I-70. Reduces impacts to the existing Kansas City Missouri Waste Water Treatment Facility.	Screened Out
Full Diamond Interchange at Wyoming Street	**D2**	Provides all traffic movements between I-70 and Wyoming Street.	Screened Out
Folded Diamond Interchange at Wyoming Street	**D3**	Eliminates impacts to the existing Kansas City Missouri waste water treatment facility in the NW quadrant of I-70 and Wyoming Street. Provides all movements to and from I-70 at Wyoming Street. Provides additional separation distance from future Phase 2 construction of the LCV.	Screened Out
Partial Folded Diamond Interchange at Wyoming Street	**D4**	Eliminates impacts to the existing Kansas City Missouri waste water treatment facility in the NW quadrant of I-70 and Wyoming Street. Eliminates tight radius (20 mph) loop ramp for EB I-70.	Screened Out

Table 5-1 West Bottoms Area New Interchange Strategies Summary

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5.4 Conceptual Strategies (Local Street Improvements)

In lieu of strategies that construct a new interchange on I-70, a series of conceptual strategies to provide access to the West Bottoms using the local street system were developed for consideration. In addition to determining feasible access alternatives for vehicular traffic into and out of the West Bottoms, the strategies also considered accommodations for non-motorized modes to maintain bike/pedestrian connectivity. These strategies include a possible re-use of a portion of the existing Woodswether Viaduct with a segment of new structure possibly incorporated into the new Buck O'Neil Bridge substructure to maintain bicycle and pedestrian connectivity.

Three strategies were developed to carry the traffic that would typically rely on Woodswether Road and the viaduct, with the objective of routing the traffic to the Forrester Viaduct and Beardsley Road. Forrester Road and the viaduct carry approximately 3,000 vehicles per day with adequate spare capacity to serve the traffic needs at the northeast region of the Bottoms that currently relies on Woodswether. These strategies augment the existing roadway network to better define the preferred routing of traffic although other means to connect with Forrester Road or alternate general access to the region would still be available. Local intersection improvements, pavement rehabilitation, and widening at the Beardsley Road loop ramp connections to westbound I-70 are included to accommodate the additional traffic and roadway geometric needs.

Strategy D5: Madison Avenue to Santa Fe

This strategy utilizes Madison Avenue and approximately 1,000 feet of industrial roadway on new alignment to 8th Street connecting with Hickory Street, Santa Fe Street and Forrester Road. A segment of Madison under the LCV would require realignment to develop an intersection with the new roadway and Inner-City Viaduct Road in the proximity of the ramps connecting I-70 with I-35. Layout and construction of the new roadway segment would require purchase of additional right-of-way and would be heavily influenced by the presence of major utilities in the area and the I-35 ramp substructures.

Strategy D6: Mulberry Street to Forrester Road

This strategy utilizes an improved Mulberry Street to St Louis Avenue, Hickory Street, and Forester Road. Mulberry is approximately 32 feet wide with sidewalk on the east side. Local intersection improvements may be required along the new route to provide adequate turning geometrics for heavy vehicles.

Strategy D7: Wyoming Street to Forrester Road

This strategy utilizes an improved Wyoming Street for the connection between Woodswether and 9th Street which becomes Forrester Road to the east. Wyoming is approximately 32 feet wide with some improved segments that include curbing and sidewalk. Local intersection improvements at the 9th Street intersection may be required to provide adequate turning geometrics for heavy vehicles.

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Figure 5-6 Strategy D5: Madison Avenue to Santa Fe

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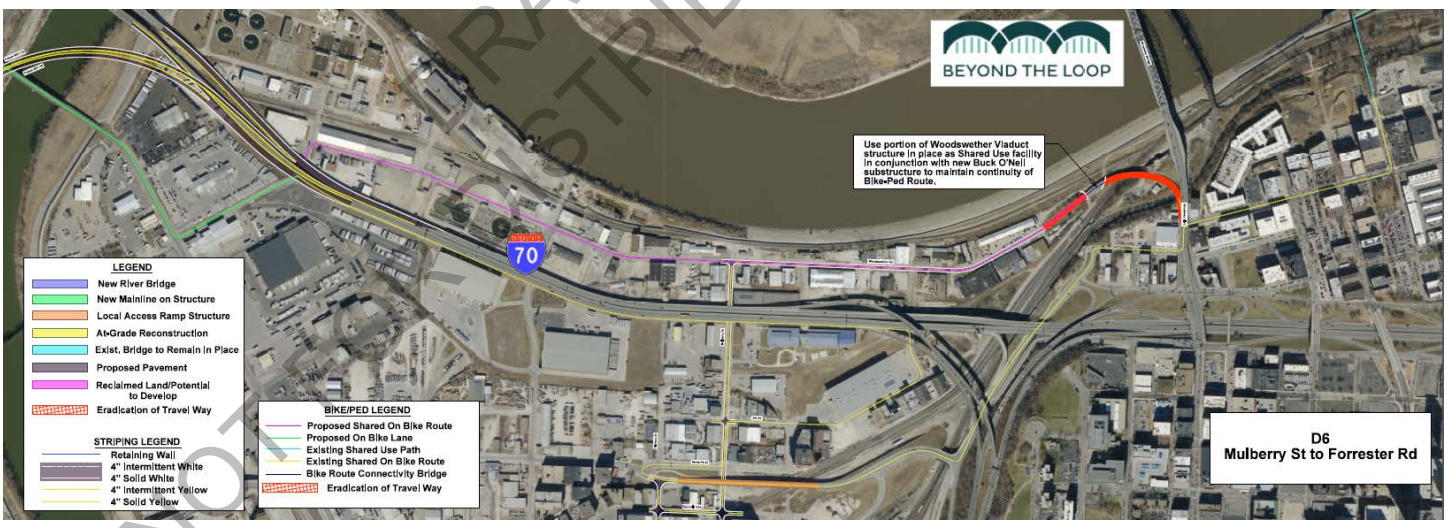

Figure 5-7 Strategy D6: Mulberry Street to Forrester Road

Figure 5-8 Strategy D7: Wyoming Street to Forrester Road

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5.5 Level 1 Screening (Local Street Improvements)

All three local street improvements strategies generally provide the same traffic operations level of connection to Forrester Road in terms of convenience and travel distance from Woodswether Road. Depending on the specific origin or destination in the region, some alternatives require more or less travel distance than others. Transit service can be maintained via Beardsley Road and Forrester Road which are currently used for other KCATA routes. Existing bike connectivity along Woodswether could be maintained by repurposing the existing viaduct, supplemented with new structure dedicated to non-motorized modes to link the segment of the bridge removed to accommodate the new river bridge. The incremental increased costs and complexities of strategy D5 (Madison Avenue) do not offer any distinct advantages in comparison with D4 and D5 (Mulberry and Wyoming) which all rely on existing streets which can be improved in a phased construction implementation plan. For these reasons, strategy D5 was not advanced for further study.

5.6 Summary and Evaluation Matrix (Local Street Improvements)

A summary of the West Bottoms Local Street Improvements Strategies is provided Table 5-2. This identifies those strategies that will be advanced for further study, and those that will no longer be considered. A more detailed evaluation matrix which comparatively scores the strategies as discussed in Section 1.3 is provided in Appendix xx.

West Bottoms Area	Strategy	Description	Status
New Local Road Improvements Strategies on I-70 to mitigate possible closure of Woodswether viaduct and connection to Broadway			
Madison Ave to Sante Fe St	**D5**	New connection between Woodswether and Forrester	Screened Out
Mulberry St to Forrester Rd	**D6**	Utilize existing Mulberry St between Woodswether and Forrester	Advanced
Wyoming St to Forrester Rd	**D7**	Utilize existing Wyoming St between Woodswether and Forrester	Advanced

Table 5-2 West Bottoms Area Local Street Improvements Strategies Summary

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6. Transportation System Management

Transportation System Management (TSM) is an approach in planning and engineering aimed at increased efficiencies, capacity and safety of existing infrastructure through low cost improvements. This section seeks to give an overview of TSM categories and initiatives as well as their suitability in potential alternatives in the Broadway PEL extents and surrounding facilities.

6.1 Strategy Definitions

System Management

System-wide TSM improvements that increase access, mobility, capacity and communications across the entire TSM platform.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
System Management	*Freeway & Arterial Bottleneck Removal*	Minor roadway geometric or traffic control improvments			
	Ramp Metering	Traffic signals on ramps control vehicles entering freeways.			
	Access Management	Careful planning of access points along roadways			
	ITS Technology	ITS applications that address travel mobility			
	Traffic Incident Management	Planned process to detect and respond to traffic incidents.			
	Travel Information	Provides information to drivers regarding traffic conditions.			
	Parking Management	Providing information regarding parking			

Travel Demand

Travel Demand TSM strategies seek to lower the demand for single passenger vehicles and to increase the multimodality of existing road facilities through innovative methods that give travelers multiple options for commuting and routing.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Travel Demand					
	Ridesharing	Includes both carpooling and vanpooling.			
	Public Transportation	Includes fixed route bus service, streetcar and paratransit service.			
	Bicycle and Pedestrian Travel	Bicycle and pedestrian facilities.			
	Land Use Management	Guide development to lessen traffic impacts.			
	Goods Movement Management	It can reduce congestion from city streets in peak hours by regulating pickups and delivery times for freights delivery			
	Telework	Promoting telework to reduce number of commuters			

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Increasing Capacity

Capacity focused TSM seek to increase the capacity of existing infrastructure while modifying lanes, signage and interchanges to prioritize travel and develop system-wide efficiencies.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Increasing Capacity					
	Add Travel Lanes	Widening existing roadways to add travel lanes.			
	Modify or Add Interchange	Adding capacity to existing interchanges or adding new interchanges to system.			
	Intersection Improvments	An intersection can be improved by installing traffic control devices for the smooth and safe passage of both pedestrians and vehicles. The devices used could be stop signs, yield signs, traffic signs, turning lanes, traffic islands, channelization, and improved design. Includes adding turn lanes, and roundabouts.			
	Geometric Design	Appropriate geometric design helps in reducing congestion and improves safety and freedom of driving. Replacement of continuous left turn lanes with a raised median and adding lanes increases capacity			
	Transit Capacity	Includes added transit service and facilities.			
	HOV and Managed Lanes	A set of lanes where operational strategies respond to changing conditions. Includes high occupancy vehicle lanes.			
	Bicycle and Pedestrian Facilities	Construct bicycle and pedestrian facilities.			

Pedestrian

Pedestrian focused TSM seek to assist and enhance pedestrian safety and mobility at intersections. These TSM support a modal shift by enhancing the pedestrian crossing timing as well as advancing pedestrian phasing for special events.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Pedestrian					
	Pedestrian Countdown Timers (ADA)	Equip all signalized intersections with Pedestrian Countdown Timers			
	Audible Pedestrian Signals(ADA)	Equip all signalized intersections with Audible devices			
	Pedestrian Operations	"Advance" pedestrian phasing, detection, timing for special events			

Cycling

Cycling focused TSM seek to assist and enhance cyclist's safety and mobility at intersections. These TSM support a modal shift by enhancing and prioritizing cyclists comfort and safety when traveling through intersections.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Cycling					
	Bike Signal	Equip intersection with Bike Signal displays containing bicycle silhouette			
	Bike Route	Provide marked and signed routes for enhanced corridor use definition.			
	Bicycle Detection	Evaluate new bicycle detection technologies			

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Transit

Transit focused initiatives assist in enhancing transit safety, mobility and overall performance of the system. These TSM strategies support a modal shift towards transit by improving the reliability and through prioritizing transit vehicles.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Transit					
	Transit Priority	Continue to implement transit priority features at signalized including: signal priority, queue jumps, queue relocation, etc.			
	Transit Detection	Evaluate new bus detection technologies			
	Access to Transit	Enhance transit stop accessiblity and information for transit passengers at transit stops.			
	Bus Schedule Adherence	Incorporate bus schedule with central traffic system and incident detection and management systems			

Traffic Control

Strategies which maintain and operate traffic signal infrastructure in the safest and most cost effective manner possible.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Traffic Control Signals					
	Traffic Signal Re-Lamping	City forces currently replace all incandescent signal bulbs, clean signal lens, and inspect signal hardware on an annual basis.			
	Inspect, Test and Maintain Conflict Monitors	Conflict monitors are installed in all traffic signal controller cabinets and continually check for conflicting signal indications and respond to a conflict by emitting a signal			
	Traffic Signal Imporvments	Several studies revealed that change in signals' physical equipment and timing optimization has helped intensively in congestion mitigation. Traffic flow could be improved by equipment update, timing plan improvement, interconnected signals, traffic signal removal, or traffic signal maintenance as needed.			
	LED Replacement	Replacement of LED signal displays			

Traffic Signs

Strategies which help manage and schedule traffic sign maintenance and consistency.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Traffic Signs					
	Traffic Signs Inspection Program	Create a traffic sign inspection program. Inspection options include the use of a reflectometer or visual inspections by trained personnel			
	Wayfinding Signage	Provide direction information for key destinations, streetcar and freeway/highway access.			
	Traffic Sign Inventory	Create a data management system for traffic signs			

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Pavement Markings

These strategies help to maintain existing pavement markings on roads and at intersections to enable a safe environment for motorists, cyclists and pedestrians.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Pavement Markings					
	Roadway Markings (Longitudinal and Transverse)	All roadway markings are applied once per year. This includes yellow dividing lines, white lane lines, edge lines, bike lanes, and cross hatching			
	Intersection Markings	Intersections, signalized and unsignalized, are painted twice per year.			

Traffic Management Center

Kansas City's Scout Traffic Management Center coordinates and manages transportation resources and ITS technologies. These TSM seek to evolve and expand the Center to better manage transportation systems and incidents.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Traffic Management Center					
	Expanded Monitoring/ Hours of Operation	Incremental increase in hours of operation to enhance traffic management capabilities resulting from increasing traffic volumes, special events, and emergency road closures and operational needs of the streetcar.			
	Outreach & Education	Provide tours of the TCM to interested groups/members of public/other agencies. Information sessions to schools as to operation of pedestrian signals			
	Informing Public on Real-Time Traffic Conditions	Provide public with real time traveler information by updating traveler information website, changing messages on permanent variable message signs, providing update to media on changing traffic conditions as a result of collisions, construction, unplanned events, etc.			
	Active Traffic and Demand Management	Builds on Integrated Corridor Management (ICM) to dynamically monitor, control, and influence travel demand, traffic demand, and traffic flow of key highway corridors. Active Traffic and Demand Management (ATDM) facilitates the use of transportation alternatives through various approaches, including dynamic ridesharing, dynamic speed limits, dynamically priced parking, and predictive traveler information to improve overall highway efficiency and to maximize investment in ICM.			

Traffic Signal and Camera Infrastructure

These TSM strategies seek to improve the communication and technological capacity of the camera and signal infrastructure to increase the safety of travelers and to gather real-time data for analysis.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Traffic Signal and Camera Infrastructure					
	Communication	Continue to enhance traffic signal and camera communications network (fiber optic, copper) Research and deploy new reliable and cost effective wireless technologies where feasible.			
	Traffic Cameras	Continue installation of traffic cameras at critical intersections in order to monitor operations and make timing changes due to incidents. Explore opportunities to use traffic cameras to support traveler information systems.			
	Local Traffic Control Equipment (Hardware and Software)	Continue replacement of aging traffic signal control equipment with new state of the art microprocessor based equipment. Continue development of City designed advanced traffic controller. Features to be developed/enhanced include: Accessible features, Transit Priority, IP communications, Streetcar, Emergency vehicle pre emption. Equip critical and remote signalized intersections with Uninterrupted Power Supplies (back-up battery).			
	Traffic Signal Timing	Update signal timing at every signalized intersection on a five year basis			
	Permanent Traffic Count Locations	Establish network of traffic sensors along critical arterial roadways to feed central traffic system. Will allow for more adaptable signal timing			

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Central Traffic Control System

A centralized traffic control system allows for traffic signals to communicate with a central computer so that traffic signals can be synchronized, monitored and adjusted. These TSM strategies continue to develop upon the current system with annual updates.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Central Traffic Control System					
	Adaptive and Demand Responsive Signal Control Systems	Explore traffic signal algorithms that automatically and continuously update traffic signal timing and offsets (synchronization) based on real time demand supplied by traffic sensors			
	Emergency Vehicle (Fire) Pre-emption	Expand GPS based emergency vehicle pre-emption network			
	Traffic System Monitoring	Continue to identify opportunities to improve system monitoring capabilities.			
	Street Car Transit Compatibility	Plan and engineer traffic system computability to support "at-grade" Streetcar applications			

Enhanced Traffic Incident Management

Traffic Incident Management is the systematic coordinated use of automated and human and technical resources to reduce the severity and amount of traffic incidents as well as to improve the response to incidents. The TSM strategies decrease congestion caused by incidents and improve emergency response to incidents for other travelers and medical professionals.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Enhanced Traffic Incident Management					
	Incident Detection	Implement real-time incident detection system			
	Incident Response	Enhance incident response and activation of a planned strategy for the safe and rapid development of the most appropriate personnel and resources to the scene			
	Traveler Information	Provide timely, accurate information to roadway users about roadway conditions and alternate routes through the use of Traveler Information Services (TIS)			
	Incident Clearance	Enhance incident clearance in a safe and timely manner			
	Emergency Detour Routes	Enhance and implement EDR's for major bridge crossings in the city, as well as major railroad level crossings			
	Incident Data Software	Procure incident logging CADD			
	Cost Sharing	Establish cost sharing formulas and agreements between MPO agencies			
	Permanent Variable Message Signs	Installation of signs at strategic locations throughout the city that will allow motorists to make informed decisions on route selection based on current conditions			

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Innovative TSM Technologies and Services

New innovations in TSM that help increase safety and mobility overall as well as to guide future technological growth in transportation jobs.

Category	TSM	Definition	Suitability Rating		
			Low	Medium	High
Innovative TSM Technologies and Services					
	Traffic Data Gathering Equipment	Collection of pedestrian, cycling, transit and vehicle data using technologies such as wireless, video, gps, etc.			
	Incident Detection Systems	Explore systems that will be able to detect incidents automatically and to predict when incidents may occur in the future			
	Highway Advisory Radio Systems	Explore feasibility of using radio systems to provide traveler information and to provide real time updates on traffic conditions			
	TIS Information for Pedestrians/Cyclists	Explore GPS technology to help guide pedestrians of cyclists through the City's recreational pathways			
	Wireless Data Collection Technology	Explore wireless technologies to collect travel times along arterial corridors			
	Intelligent Vehicle Technologies	Explore opportunities to leverage advancement in intelligent Vehicle technologies (i.e.. Vehicle to infrastructure and vehicle to vehicle)			
	Data Sharing with External Third Party Applications	Sharing data to third party developers to enhance their applications so that travelers of the City have the most up-to-date information			
	Mobility Hubs	Transportation centers located in smart growth opportunity areas served by high frequency transit service. They provide an integrated suite of transportation services, amenities, and urban design enhancements that bridge the distance between transit and an individual's origin or destination. Mobility hubs are places of connectivity, where different modes of travel—walking, biking, ridesharing, streetcar services—come together seamlessly, and where there is a concentration of employment, housing, shopping, and/or recreation. Mobility hubs feature a range of transportation choices including: bikeshare, carshare, neighborhood electric vehicles, bike parking, dynamic parking management strategies, real-time traveler information, real-time ridesharing, demand-based Bridj shuttle, bicycle and pedestrian improvements, wayfinding, urban design enhancements, and supporting systems like mobile applications, electric vehicle charging, smart intersections, and a universal payment system to make it easy to access a wide range of travel choices			
	Freeway Incident Management System	Prompt removal of a disabled vehicle from travel lanes improves traffic flow			

6.2 Consistency with Purpose and Need

Although TSM strategies can be effective in managing traffic, the strategies contained in this section are not stand-alone strategies and do not meet purpose and need alone. However, the strategies do help overall traffic operations and system mobility by augmenting the viable build strategies outlined in the previous sections. As such, the inclusion of TSM strategies will be outlined with the final build alternatives identified as reasonable and feasible.

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APPENDIX A – LEVEL 1 EVALUATION MATRICES

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	River Bridge + Connections to North Loop Evaluation Matrix								
				Measures	Units	Alternative A1 / No Build	Alternative A2	Alternative A3	Alternative A4
NEEDS	IMPROVE PHYSICAL CONDITIONS	INFRASTRUCTURE	POTENTIAL TO IMPROVE USEFUL LIFE OF FACILITY	Service Life of River Bridge	Years	35	100	100	100
				Area of Existing Bridges Being Replaced	Area	0	175,000 SF	220,000 SF	195,000 SF
				Area of Existing Pavement Being Replaced	Area	0	180,000 SF	30,000 SF	120,000 SF
		GEOMETRY	POTENTIAL TO IMPROVE SUB-STANDARD GEOMETRY	Number of Existing Substandard Geometric Features Replaced (Red)	Count	0	12	17	11
				Number of Existing Substandard Geometric Features Replaced (Yellow)	Count	0	0	1	1
	OPTIMIZE SYSTEM PERFORMANCE	US 169	MAINLINE TRAFFIC SPEED	Average Peak Hour Travel Speed	1-4 (Best to Worst)	4	1	2	3
		INTERSECTION PERFORMANCE	US 169/INDEPENDENCE AVE (Broadway / 5th Ave)	LOS (HCM)	1-4 (Best to Worst)	4	2	1	3
		TRAFFIC CONGESTION		Total Peak Hour Delay	Hours	4	1	2	3
		PEAK PERIOD TRAVEL TIME	FREEWAY	Airport to 12th Street Interchange	1-4 (Best to Worst)	4	1	2	3
			LOCAL	Airport to 6th Street Intersection	1-4 (Best to Worst)	4	2	1	3
	IMPROVE SAFETY AND SECURITY	VEHICULAR TRAFFIC	CONFLICT POINTS AT BRIDGE TERMINALS		Qualitative	30	12	34	24
		BIKE/ PEDESTRIAN	BICYCLE/PEDESTRIAN SAFETY	Does Alternative Allow for Improve existing Bike/Ped Facilities	Qualitative	6' Path	10' Path	10' Path	10' Path
		IMPROVE EMERGENCY RESPONSE TIMES		Travel Time for Emergency Responders to Airport	Qualitative	Bad	Good	Good	Bad
GOALS	IMPROVE TRANSPORTATION CHOICES	CONTRIBUTE TO/COMPLEMENT BIKE KC PLAN		Potential for Bike/Ped Network Expansion	1-4 (Best to Worst)	4	2	2	1
		ACCOMMODATE EXISTING AND FUTURE TRANSIT		Potential for Bus/Streetcar Integration	1-4 (Best to Worst)	4	1	2	2
		BIKE/ PEDESTRIAN RIVER CROSSING		Width of bike/ped accomodation on bridge	Width (feet)	6	10	10	10
	IMPROVE ECONOMIC VITALITY AND PLACEMAKING	REVITALIZATION AREAS		Potential to Make Space Available for Commercial/Recreational Development	Area	0	0	0	0
		ENHANCE REGIONAL FREIGHT HUBS	RAIL YARDS	Average Truck Travel Time	1-4 (Best to Worst)	4	1	2	3
			DOWNTOWN AIRPORT	Average Truck Travel Time	1-4 (Best to Worst)	4	1	2	3
		PROMOTE QUALITY PLACES		Visual Character and Aesthetics	1-4 (Best to Worst)	4	2	2	2
	IMPROVE SUSTAINABILITY	COMMUNITY IMPACTS	ROW IMPACTS	Residential	Area	0	0	0	0
				Commercial	Area	0	60,000 SF	80,000 SF	10,000 SF
			EJ/LEP POPULATIONS DISPLACED	Residential	Area	0	0.37 Ac	0	0
				Commercial	Area	0	0	0	0
		PROTECT CULTURAL/NATURAL RESOURCES	CULTURAL RESOURCES	NRHP Sites Impacted	Count	0	0	0	0
				NRHP Districts Impacted	Count	0	0	0	0
				Documented Archeology Sites	Count	0	0	0	0
				Hazmat Sites Impacted	Count	0	1	1	1
			NATURAL RESOURCES	Parks Impacted	Count	0	0	0	0
				Wetlands Impacted	Area (Acres)	0	3.5	3.5	2.9
				Floodplains Impacted	Linear Feet Crossed	0	2200	2200	2100
	FEASIBILITY	TOTAL COST		Planning Level Construction Cost Estimate	Dollar Range	$50-60M	$160-190M	$160-190M	$120-150M
		OPPORTUNITY FOR PHASED IMPLEMENTATION			Qualitative	No	Yes	Yes	No

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Alternatives

A1	No Build: Rehabilitate the Existing O'Neil Bridge
A2	Western Alignment - Skewed approximately 28 degree to the Missouri River
A3	Central Alignment - Skewed approximately 20 degree to the Missouri River
A4	Eastern Alignment - Skewed approximately 10 degree to the Missouri River

I-70 PEL North Loop Strategy Evaluation Matrix

				Measures	Units	No-Build	Alternative B1	Alternative B3-6A	Alternative B3-6B	Alternative B3-7	Alternative B7-1
NEEDS	IMPROVE PHYSICAL CONDITIONS	INFRASTRUCTURE	POTENTIAL TO IMPROVE USEFUL LIFE OF FACILITY	Number of Existing Bridges Being Replaced	Area	0	7	10	10	10	11
				Area of Existing Pavement Being Replaced	Area	0 Ac	28.8 Ac	40.4 Ac	40.4 Ac	40.4 Ac	39.8 Ac
		GEOMETRY	POTENTIAL TO IMPROVE SUB-STANDARD GEOMETRY	Number of Existing Substandard Geometric Features Replaced (Red)	Count	0	46	71	71	71	63
				Number of Existing Substandard Geometric Features Replaced (Yellow)	Count	0	18	27	27	27	27
	OPTIMIZE SYSTEM PERFORMANCE	REGIONAL CONNECTIONS	NORTHLAND	Will Alternative Improve Travel Time	1-4 (Best to Worst)	4	2	3	3	3	4
			WYANDOTTE CO. AND KC, KANSAS	Will Alternative Improve Travel Time	1-4 (Best to Worst)	4	3	2	2	2	4
			SOUTHERN KC and JOHNSON CO.	Will Alternative Improve Travel Time	1-4 (Best to Worst)	4	3	2	2	2	4
		DOWNTOWN LOOP	MAINLINE TRAFFIC SPEED	Average Peak Hour Travel Speed	1-4 (Best to Worst)	4	3	2	2	2	4
			EXIT AND ENTRANCE RAMP PERFORMANCE	LOS (HCM)	1-4 (Best to Worst)	4	2	3	3	3	4
		SYSTEM-WIDE	TRAFFIC CONGESTION	Total Peak Hour Delay	1-4 (Best to Worst)	4	2	3	3	3	4
			TOTAL TRAVEL	Total Daily Travel Time	1-4 (Best to Worst)	4	2	3	3	3	4
				Total Daily Travel Distance	1-4 (Best to Worst)	3	3	2	2	2	4
	IMPROVE SAFETY AND SECURITY	VEHICULAR TRAFFIC	NUMBER OF CONFLICT POINTS	Ramp Density	Ramps per Mile	19	13	3	3	8	2
		BIKE/ PEDESTRIAN	BICYCLE/PEDESTRIAN SAFETY	Potential to Allow for Improve existing Bike/Ped Facilities	1-4 (Best to Worst)	4	4	2	2	2	1
		IMPROVE EMERGENCY RESPONSE TIMES		Will Alternative Improve Emergency Vehicle Travel Time?	1-4 (Best to Worst)	3	2	2	2	2	4
GOALS	IMPROVE TRANSPORTATION CHOICES	CONTRIBUTE TO/COMPLEMENT BIKE KC PLAN		Potential for Bike/Ped Network Expansion	1-4 (Best to Worst)	4	4	2	2	2	1
		ACCOMMODATE EXISTING AND FUTURE TRANSIT		Potential for Bus/Streetcar Integration	1-4 (Best to Worst)	4	4	2	2	3	1
	IMPROVE ECONOMIC VITALITY AND PLACEMAKING	REVITALIZATION AREAS		Potential to Make Space Available for Commercial/Recreational Development	Area	0 Ac	8.0 Ac	14.9 Ac	11.3 Ac	13.0 Ac	29.0 Ac
		ENHANCE REGIONAL FREIGHT HUBS	PORT OF KC	Average Truck Travel Time	1-4 (Best to Worst)	4	3	2	2	2	4
			RAIL YARDS	Average Truck Travel Time	1-4 (Best to Worst)	4	3	2	2	2	4
			DOWNTOWN AIRPORT	Average Truck Travel Time	1-4 (Best to Worst)	4	3	2	2	2	3
		PROMOTE QUALITY PLACES		Visual Character and Aesthetics	1-4 (Best to Worst)	4	4	2	2	2	1
	IMPROVE SUSTAINABILITY	MAINTAIN/ IMPROVE MULTI-MODAL CONNECTIONS		Potential to meet regional Bike Plan	1-4 (Best to Worst)	4	4	2	2	2	1
		COMMUNITY IMPACTS	ROW IMPACTS	Residential	Area	0	0	0	0	0	0
				Commercial	Area	0	0	0	0	0	0
			EJ/LEP POPULATIONS DISPLACED	Residential	Area	0	0	0	0	0	0
				Commercial	Area	0	0	0	0	0	0
		PROTECT CULTURAL/NATURAL RESOURCES	CULTURAL RESOURCES	NRHP Sites Impacted	Count	0	0	0	0	0	0
				NRHP Districts Impacted	Count	0	0	0	0	0	0
				Documented Archeology Sites	Count	0	0	0	0	0	0
				Hazmat Sites Impacted	Count	0	0	0	0	0	0
			NATURAL RESOURCES	Parks Impacted	Count	0	6	3	3	3	3
				Wetlands Impacted	Area (Acres)	0	0	0	0	0	0
				Floodplains Impacted	Linear Feet Crossed	0	0	0	0	0	0
	FEASIBILITY	TOTAL COST		Planning Level Construction Cost Estimate (Bridge)	Dollars	$4,500,000	$22,200,000.00	$22,500,000	$22,500,000	$20,500,000	$0
				Planning Level Construction Cost Estimate (Roadway)	Dollars	$2,200,000	$31,000,000.00	$46,300,000	$46,500,000	$34,700,000	$16,560,000
										Roadway cost w/o SPUI	
										$30,500	

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Alternatives

B1	Preservation and Ramp Consolidation (2002 North Loop Master Plan from I-35/I-29 EIS)
B3-6A	Traffic Thru with Development (compressed) with access on ends with optional access in middle - South (offset roundabouts option)
B3-6B	Traffic Thru with Development (compressed) with access on ends with optional access in middle - North (offeset roundabouts option)
B3-7	Traffic Thru with Development (compressed) with access on ends with optional access in middle - Center (tight half SPUI at Oak/route 9)
B7-1	Close-off I-70 and replaced with arterials on both sides

	Downtown Airport Strategy Evaluation Matrix								
				Measures	Units	No-Build	Alternative C1	Alternative C4	Alternative C5
NEEDS	IMPROVE PHYSICAL CONDITIONS	INFRASTRUCTURE	POTENTIAL TO IMPROVE USEFUL LIFE OF FACILITIES	Area of Existing Bridges Being Replaced	Area	0	80,000 SF	80,000 SF	82,000 SF
				Area of Existing Pavement Being Replaced	Area	0	110,000 SF	115,000 SF	120,000 SF
		GEOMETRY	POTENTIAL TO IMPROVE SUB-STANDARD GEOMETRY	Number of Existing Substandard Geometric Features Replaced (Red)	Count	0	8	8	8
				Number of Existing Substandard Geometric Features Replaced (Yellow)	Count	0	2	2	2
	OPTIMIZE SYSTEM PERFORMANCE	LOCAL ACCESS	AIRPORT	Total Delay at Airport Entrances	Hours	Worse	Better	Better	Better
			HARLEM	Travel Time from US 169 into Harlem	Red, Yellow, Green	Neutral	Better	Better	Better
		US 169	US 169 TRAVEL SPEED	Average Peak Hour Travel Speed	Red, Yellow, Green	Worse	Better	Better	Better
			EXIT AND ENTRANCE RAMP PERFORMANCE	LOS (HCM)	LOS	Worse	Better	Better	Better
	IMPROVE SAFETY AND SECURITY	VEHICULAR	Total Number of Conflict Points		Count	25	20	12	17
		BICYCLE/ PEDESTRIAN	BICYCLE/PEDESTRIAN SAFETY	Does Alternative Allow for Improve existing Bike/Ped Facilities	Qualitative	6' Path	10' Path	10' Path	10' Path
		IMPROVE EMERGENCY RESPONSE TIMES		Will Alternative Improve Emergency Vehicle Travel Time?	Qualitative	Worse	Better	Better	Better
GOALS	IMPROVE TRANSPORTATION CHOICES	CONTRIBUTE TO/COMPLEMENT BIKE KC PLAN		Potential for Bike/Ped Network Expansion	Qualitative	No	Yes	Yes	Yes
		ACCOMMODATE EXISTING AND FUTURE TRANSIT		Potential for Bus/Streetcar Integration	Qualitative	No	Better	Better	Better
	IMPROVE ECONOMIC VITALITY AND PLACEMAKING	REVITALIZATION AREAS		Potential to Make Space Available for Commercial/Recreational Development	Area	0	0	0	0
		ENHANCE REGIONAL FREIGHT HUBS	PORT OF KC	Average Truck Travel Time	Red, Yellow, Green	Neutral	Neutral	Neutral	Neutral
			RAIL YARDS	Average Truck Travel Time	Red, Yellow, Green	Neutral	Neutral	Neutral	Neutral
			DOWNTOWN AIRPORT	Average Truck Travel Time	Red, Yellow, Green	Neutral	Neutral	Neutral	Neutral
		PROMOTE QUALITY PLACES		Visual Character and Aesthetics	Qualitative	No	Yes	Yes	Yes
	IMPROVE SUSTAINABILITY	MAINTAIN/ IMPROVE MULTI-MODAL CONNECTIONS		Potential to meet regional Bike Plan	Qualitative	No	Yes	Yes	Yes
		COMMUNITY IMPACTS	ROW IMPACTS	Residential	Area	0	0	0	0
				Commercial	Area	0	0	0	0
			EJ/LEP POPULATIONS DISPLACED	Residential	Area	0	0	0	0
				Commercial	Area	0	0	0	0
		PROTECT CULTURAL/NATURAL RESOURCES	CULTURAL RESOURCES	NRHP Sites Impacted	Count	0	0	0	0
				NRHP Districts Impacted	Count	0	0	0	0
				Documented Archeology Sites	Count	0	0	0	0
				Hazmat Sites Impacted	Count	0	0	0	0
			NATURAL RESOURCES	Parks Impacted	Count	0	0	0	0
				Wetlands Impacted	Area (Acres)	0	0	0	0
				Floodplains Impacted	Linear Feet Crossed	0	0	0	0
	FEASIBILITY	TOTAL COST		Planning Level Construction Cost Estimate	Dollar Range	$8-10M	$25-30M	$25-30M	$35-40M

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Alternatives

No-Build	Only valid with No-Build Bridge Option
C1	Half diamond NB only (use existing railroad bridges at Harlem Road)
C4	New alternative developed by Chip Tousinsky with Russ J and presented to KCAD 7-19
C5	Half diamond NB only (new single bridge, wider with realigned Harlem Road)

All Options Include North area folded diamond with improved SB off, same NB on, and new SB on

West Bottoms Strategy Evaluation Matrix

				Measures	Units	No-Build	Alternative D6	Alternative D7
NEEDS	IMPROVE PHYSICAL CONDITIONS	INFRASTRUCTURE	POTENTIAL TO IMPROVE USEFUL LIFE OF FACILITIES	Number of Existing Bridges Being Replaced	Area	0	0	0
				Area of Existing Pavement Being Rehabilitated	Area	0	122899 SF	154489 SF
		GEOMETRY	POTENTIAL TO IMPROVE SUB-STANDARD GEOMETRY	Number of Existing Substandard Geometric Features Replaced (Red)	Count	0	0	0
				Number of Existing Substandard Geometric Features Replaced (Yellow)	Count	0	0	0
	OPTIMIZE SYSTEM	LOCAL ACCESS	I-70 TO LOCATION X	Average Peak Hour Commute Travel Time	Red, Yellow, Green	Neutral	Neutral	Neutral
	IMPROVE SAFETY AND SECURITY	VEHICULAR TRAFFIC	WILL ALTERNATIVE IMPROVE TOTAL NUMBER OF CONFLICT POINTS		Qualitative	No	Better	Best
		BIKE/ PEDESTRIAN	BICYCLE/PEDESTRIAN SAFETY	Does Alternative Allow Improvements to existing Bike/Ped Facilities	Qualitative	No	Potential	Potential
		IMPROVE EMERGENCY RESPONSE TIMES		Will Alternative Improve Emergency Vehicle Travel Time?	Qualitative	Neutral	Neutral	Neutral
GOALS	IMPROVE TRANSPORTATION CHOICES	CONTRIBUTE TO/COMPLEMENT BIKE KC PLAN		Potential for Bike/Ped Network Expansion	Qualitative	Yes	Yes	Yes
		ACCOMMODATE EXISTING AND FUTURE TRANSIT		Potential for Bus/Streetcar Integration	Qualitative	Yes	Yes	Yes
	IMPROVE ECONOMIC VITALITY AND PLACEMAKING	REVITALIZATION AREAS		Potential to Make Space Available for Commercial/Recreational Development	Area	No	No	No
		ENHANCE REGIONAL FREIGHT HUBS	West Bottoms	Average Truck Travel Time	Red, Yellow, Green	Neutral	Neutral	Neutral
		PROMOTE QUALITY PLACES		Visual Character and Aesthetics	Qualitative	Bad	Neutral	Neutral
	IMPROVE SUSTAINABILITY	COMMUNITY IMPACTS	ROW IMPACTS	Residential	Area	0	0	0
				Commercial	Area	0	0	0
			EJ/LEP POPULATIONS DISPLACED	Residential	Area	0	0	0
				Commercial	Area	0	0	0
		PROTECT CULTURAL/NATURAL RESOURCES	CULTURAL RESOURCES	NRHP Sites Impacted	Count	0	2	2
				NRHP Districts Impacted	Count	0	1	1
				Documented Archeology Sites	Count	0	0	0
				Hazmat Sites Impacted	Count	0	3	3
			NATURAL RESOURCES	Parks Impacted	Count	0	0	0
				Wetlands Impacted	Area (Acres)	0	5.2	5.2
				Floodplains Impacted	Linear Feet Crossed	0	5100	7600
	FEASIBILITY	TOTAL COST		Planning Level Construction Cost Estimate (Bridge)	Dollars	0	0	0
				Planning Level Construction Cost Estimate (Roadway)	Dollars	$0	$664,000	$534,400

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Alternatives

D6 Mulberry roadway improvement w/ Woodswether viaduct repurpose, local widening at Beardsley at sharp EB rt and ramp to WB I-7(

D7 Wyoming roadway improvement w/ Woodswether viaduct repurpose, local widening at Beardsley at sharp EB rt and ramp to WB I-7(

APPENDIX B

AUGUST 22, 2017 INITIAL STRATEGIES PUBLIC MEETING BOARDS

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Hi

Welcome and thank you for coming!

The Broadway/O'Neil Bridge will need to be rehabilitated or replaced in the coming years and several options have emerged for a re-imagined North Loop in the context of a reconfigured river crossing.

Public input on the changing needs and goals of the region has informed the initial series of strategies you will see today.

We need your input to further narrow the potential options as the planning team moves forward.

Planning partners from the City of Kansas City, Mo., the Missouri Department of Transportation, and the Mid-America Regional Council are available to answer questions and listen to your feedback.

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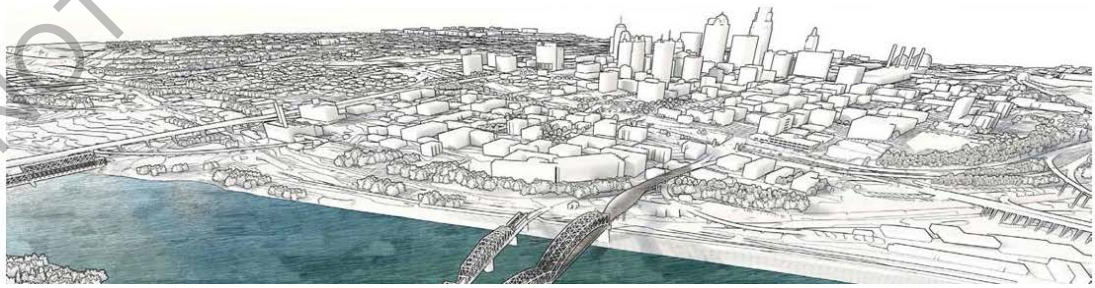

HOW DID WE GET HERE?

STEP 1 PUBLIC IDENTIFIES PROJECT GOALS & NEEDS

Earlier this year, we held a visioning session with the public. The result was three needs and three goals for the project.

NEED 1 Improve Physical Conditions	GOAL 1 Improve Transportation Choices
NEED 2 Optimize System Performance	GOAL 2 Improve Economic Vitality and Placemaking
NEED 3 Improve Safety and Security	GOAL 3 Improve Sustainability

STEP 2 TEAM NARROWS THE UNIVERSE OF ALTERNATIVES

The project team screened a large number of alternatives based on the needs & goals identified by the public.

STEP 3 TODAY

Today, you will review the project team's assessments & help us narrow the initial alternatives further.

BEYOND THE LOOP

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NEXT STEPS

STEP 4 MODEL ALTERNATIVES THE PUBLIC PREFERS

Your input & preferences will be evaluated & the top for or five alternatives will be refined further then modeled to assess regional & local traffic impacts.

The bridge alternatives will also be further refined based on public input.

STEP 5 NATIONAL, REGIONAL, LOCAL MEETINGS TO REVIEW ALTERNATIVES

The week of September 17, 2017, the Urban Land Institute (ULI) will visit Kansas City to learn about & provide input on alternatives.

The project team will then host two working charrettes. One meeting will focus on regional/commuter issues and the other on localized neighborhood issues surrounding the potential project.

STEP 6 PRESENT FINAL ALTERNATIVES TO THE PUBLIC FOR FINAL REVIEW AND COMMENT

Prior to the end of the year, the refined alternative recommendations will be presented to the public for review.

STEP 7 SUBMIT FINAL STUDY DOCUMENT

Early in 2018, the study process will conclude and a final report wil be submitted to state and federal agencies.

BEYOND THE LOOP

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BEYOND THE LOOP

What are we asking today?

1 GRAB A PACKET OF STICKERS

2 REVIEW THE INFORMATION ON EACH BOARD

3 EVALUATE EACH ALTERNATIVE BY PLACING A STICKER ON THE SCALE OF 1-10.
(One sticker per board per person, please.)

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BEYOND THE LOOP

NEEDS & GOALS

ALTERNATIVES SCREENED FOR THREE NEEDS IDENTIFIED BY THE PUBLIC

1 **NEED 1: Improve Physical Conditions** – Ensure that existing and new transportation assets in the Study Area better serve the region and are maintained in a state of good repair.

Does it improve the condition of the O'Neil Bridge, the US-169 Corridor, the I-70 North Loop, or the Lewis & Clark Viaduct?

2 **NEED 2: Optimize System Performance** – Manage the operations of the existing transportation facilities to achieve reliable and efficient performance.

Does the strategy improve regional connectivity or improve traffic operations?

3 **NEED 3: Improve Safety and Security** – Identify reasonable improvements to ensure the safety and security of the affected area.

Does the improvement provide for the safe operation of vehicular traffic, improve safety for bicyclists and pedestrians, or improve emergency response times and provide improved system redundancy?

ALTERNATIVES SCREENED FOR THREE GOALS IDENTIFIED BY THE PUBLIC

1 **GOAL 1: Improve Transportation Choices** – Provide viable, accessible, multi-modal transportation options.

Does the strategy provide for bicyclist and pedestrian opportunities or improve transit accessibility?

2 **GOAL 2: Improve Economic Vitality and Placemaking** – Improve transportation and land-use linkages in the Study Area.

Does the improvement provide for additional economic development opportunities, enhance regional freight movements, or promote quality places?

3 **GOAL 3: Improve Sustainability** – Protect and enhance the region's natural, cultural, and social resources. Explore ways to mitigate the adverse impacts of the existing system and proposed alternatives.

Does the improvement promote social equity and neighborhood revitalization, minimize impacts to historical and natural environmental resources, or integrate new transportation technologies?

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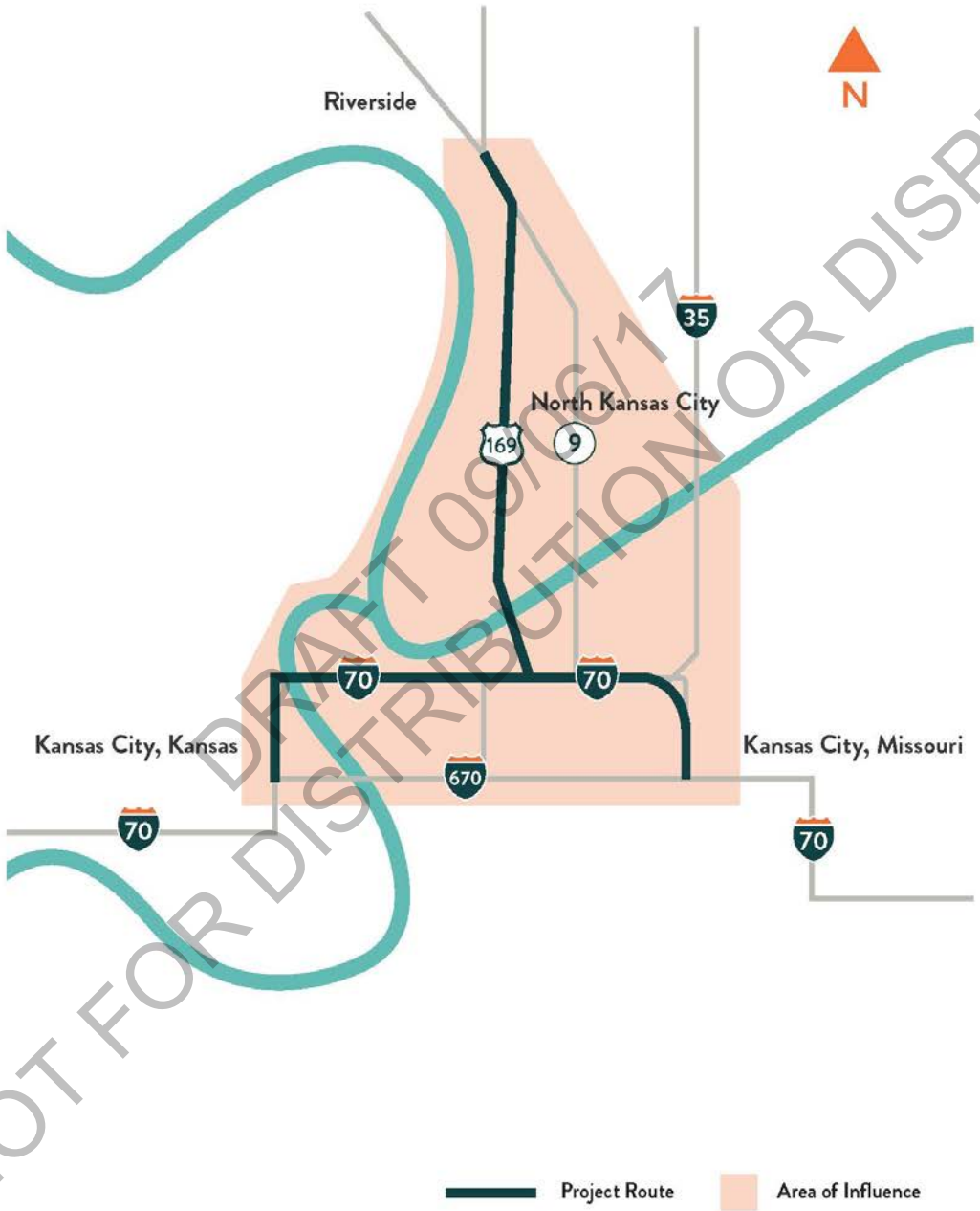
STUDY AREA



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BEYOND THE LOOP

THE OPTIONS

NORTH LOOP ALTERNATIVES

- NO BUILD ALTERNATIVE
- SAFETY ADJUSTMENTS ALTERNATIVE
- NORTH ALIGNMENT COMPRESSED
- SOUTH ALIGNMENT COMPRESSED
- CENTER ALIGNMENT COMPRESSED OPTION A
- CENTER ALIGNMENT COMPRESSED OPTION B
- FULL REMOVAL ALTERNATIVE
- CONNECTION CHOICES EDGES OF LOOP
- CONNECTION CHOICES NEAR CENTER

BRIDGE ALTERNATIVES

- REHAB OLD BRIDGE OR BUILD NEW
- NEW BRIDGE CONSTRAINTS
- NEW BRIDGE ALIGNMENT ALTERNATIVES

BIKE/PED CONNECTIONS

- POSSIBLE BIKE/PED ACCOMMODATIONS
- BIKE/PED CONNECTION OPTIONS

NEIGHBORHOOD CONNECTIONS

- CURRENT HIGHWAY 9 CONDITIONS
- ALIGNMENT OF DEVELOPMENT ALONG AT-GRADE HIGHWAY 9

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NORTH LOOP ALTERNATIVES

BEYOND THE LOOP

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NORTH LOOP NO BUILD ALTERNATIVE

BEYOND THE LOOP

This alternative is the baseline for the project. The highway, street grid, and connections remain the same as they are currently. There is additional development opportunity on surface lots adjacent to I-70 in the Central Business District (see below).

Potential right-of-way and surface parking lot development potential.

Potential use of new land available in this option.

STUDY TEAM INITIAL EVALUATION

COST $$$$$

NEED 1 Improve Physical Conditions	NEED 2 Optimize System Performance	NEED 3 Improve Safety and Security
GOAL 1 Improve Transportation Choices	GOAL 2 Improve Economic Vitality and Placemaking	GOAL 3 Improve Sustainability

DOES NOT ACHIEVE CRITERIA ---------- MEETS CRITERIA COMPLETELY

IT'S YOUR TURN:

HOW WOULD YOU RATE THIS ALTERNATIVE?

1 2 3 4 5 6 7 8 9 10

I DO NOT LIKE THIS OPTION

I REALLY LIKE THIS OPTION

Place a dot to tell us what you think of this option.

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NORTH LOOP + SAFETY ADJUSTMENTS ALTERNATIVE

BEYOND THE LOOP

This alternative would make minor safety changes to the North Loop at the west end near Broadway Blvd. Highway 9 would be lowered and at-grade crossings would occur at Missouri Ave and 5th St. Independence Avenue would be reconnected with an at grade crossing of Highway 9.

Potential right-of-way and surface parking lot development potential.

Potential use of new land available in this option.

STUDY TEAM INITIAL EVALUATION

COST $$$$$

- NEED 1 — Improve Physical Conditions
- NEED 2 — Optimize System Performance
- NEED 3 — Improve Safety and Security
- GOAL 1 — Improve Transportation Choices
- GOAL 2 — Improve Economic Vitality and Placemaking
- GOAL 3 — Improve Sustainability

DOES NOT ACHIEVE CRITERIA ..... MEETS CRITERIA COMPLETELY

IT'S YOUR TURN:

HOW WOULD YOU RATE THIS ALTERNATIVE?

1 2 3 4 5 6 7 8 9 10

I DO NOT LIKE THIS OPTION — I REALLY LIKE THIS OPTION

Place a dot to tell us what you think of this option.

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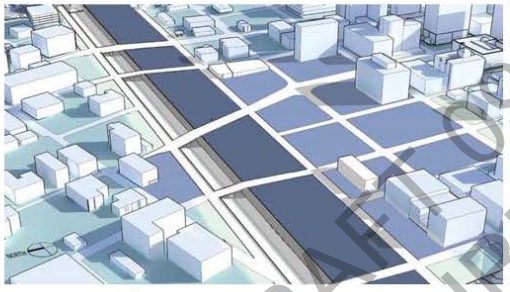
NORTH LOOP

NORTH ALIGNMENT COMPRESSED

BEYOND THE LOOP

This option would shift I-70 to the north and reduce it from three lanes to two lanes in each direction. Highway 9 would be brought down to grade and connect with the street grid. Increased development opportunities would be available on the Central Business District side.



Potential right-of-way and surface parking lot development potential.

Potential use of new land available in this option.

STUDY TEAM INITIAL EVALUATION

COST $$$$$

NEED 1 Improve Physical Conditions	NEED 2 Optimize System Performance	NEED 3 Improve Safety and Security
GOAL 1 Improve Transportation Choices	GOAL 2 Improve Economic Vitality and Placemaking	GOAL 3 Improve Sustainability

DOES NOT ACHIEVE CRITERIA ..... MEETS CRITERIA COMPLETELY

IT'S YOUR TURN:

HOW WOULD YOU RATE THIS OPTION?

1 2 3 4 5 6 7 8 9 10

I DO NOT LIKE THIS OPTION

I REALLY LIKE THIS OPTION

Place a dot to tell us what you think of this option.

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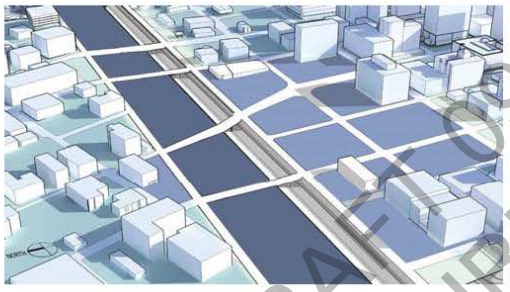
NORTH LOOP SOUTH ALIGNMENT COMPRESSED

BEYOND THE LOOP

This option would shift I-70 to the south and reduce it from three lanes to two lanes in each direction. Highway 9 would be brought down to grade and connect with the street grid. Increased development opportunities would be available on the River Market side.



Potential right-of-way and surface parking lot development potential.

Potential use of new land available in this option.

STUDY TEAM INITIAL EVALUATION

COST $$$$$

NEED 1 Improve Physical Conditions	NEED 2 Optimize System Performance	NEED 3 Improve Safety and Security
GOAL 1 Improve Transportation Choices	GOAL 2 Improve Economic Vitality and Placemaking	GOAL 3 Improve Sustainability

DOES NOT ACHIEVE CRITERIA ..... MEETS CRITERIA COMPLETELY

IT'S YOUR TURN:

HOW WOULD YOU RATE THIS OPTION?

1 2 3 4 5 6 7 8 9 10

I DO NOT LIKE THIS OPTION

I REALLY LIKE THIS OPTION

Place a dot to tell us what you think of this option.

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NORTH LOOP A CENTER ALIGNMENT COMPRESSED OPTION A

BEYOND THE LOOP

This option would center I-70 and reduce it from three lanes to two lanes in each direction. Highway 9 would be brought down to grade and connect with the street grid. A partial lid over I-70 would provide for development opportunities on both sides of I-70.

Potential right-of-way and surface parking lot development potential.

Potential use of new land available in this option.

STUDY TEAM INITIAL EVALUATION

COST $$$$$

NEED 1 Improve Physical Conditions	NEED 2 Optimize System Performance	NEED 3 Improve Safety and Security
GOAL 1 Improve Transportation Choices	GOAL 2 Improve Economic Vitality and Placemaking	GOAL 3 Improve Sustainability

DOES NOT ACHIEVE CRITERIA ..... MEETS CRITERIA COMPLETELY

IT'S YOUR TURN:

HOW WOULD YOU RATE THIS OPTION?

1 2 3 4 5 6 7 8 9 10

I DO NOT LIKE THIS OPTION

I REALLY LIKE THIS OPTION

Place a dot to tell us what you think of this option.

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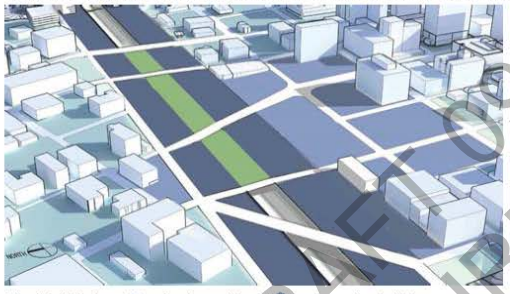
NORTH LOOP

CENTER ALIGNMENT COMPRESSED OPTION B

BEYOND THE LOOP

This alternative would center I-70 and reduce it from three lanes to two lanes in each direction. Highway 9 would be brought down to grade and connect with the street grid. A partial lid over I-70 would provide for development opportunities on both sides of I-70. Sixth Street would be substantially removed to facilitate development and a bridge would be constructed to connect across to Independence Ave.



Potential right-of-way and surface parking lot development potential.

Potential use of new land available in this option.

STUDY TEAM INITIAL EVALUATION

COST $$$$$

NEED 1 Improve Physical Conditions	NEED 2 Optimize System Performance	NEED 3 Improve Safety and Security
GOAL 1 Improve Transportation Choices	GOAL 2 Improve Economic Vitality and Placemaking	GOAL 3 Improve Sustainability

DOES NOT ACHIEVE CRITERIA ..... MEETS CRITERIA COMPLETELY

IT'S YOUR TURN:

HOW WOULD YOU RATE THIS ALTERNATIVE

1 2 3 4 5 6 7 8 9 10

I DO NOT LIKE THIS OPTION

I REALLY LIKE THIS OPTION

Place a dot to tell us what you think of this option.

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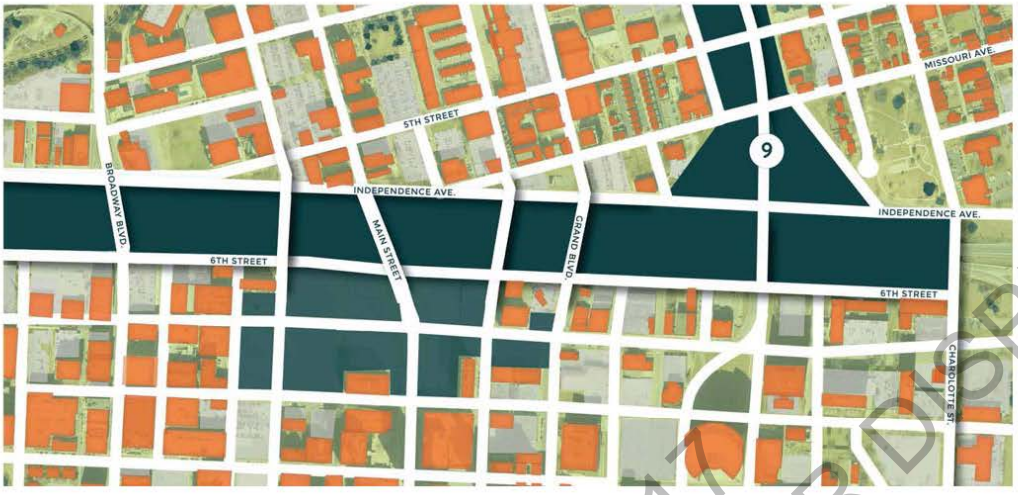
NORTH LOOP FULL REMOVAL ALTERNATIVE

BEYOND THE LOOP



This alternative would remove the highway and re-designate I-670 as the new I-70. Highway 9 would be brought down to grade and connect with the street grid. Sixth Street and Independence Ave. would serve as the primary replacements for east/west connections through the north side of downtown. Development opportunities would be at grade and continuous from the Central Business District to River Market.

Potential right-of-way and surface parking lot development potential.

Potential use of new land available in this option.

STUDY TEAM INITIAL EVALUATION

COST $$$$$

NEED 1 Improve Physical Conditions	NEED 2 Optimize System Performance	NEED 3 Improve Safety and Security
GOAL 1 Improve Transportation Choices	GOAL 2 Improve Economic Vitality and Placemaking	GOAL 3 Improve Sustainability

DOES NOT ACHIEVE CRITERIA ..... MEETS CRITERIA COMPLETELY

IT'S YOUR TURN:

HOW WOULD YOU RATE THIS ALTERNATIVE?

1 2 3 4 5 6 7 8 9 10

I DO NOT LIKE THIS OPTION

I REALLY LIKE THIS OPTION

Place a dot to tell us what you think of this option.

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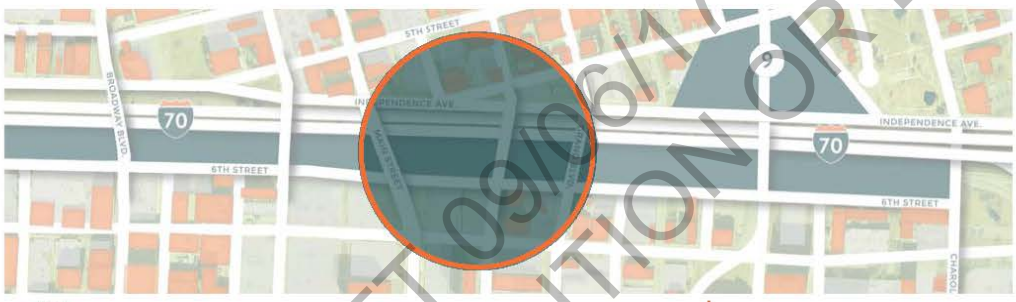
NORTH LOOP ACCESS & DEVELOPMENT CHOICES

BEYOND THE LOOP

CONNECTION CHOICES EDGES OF LOOP

▲ Increased development potential

▼ Decrease in direct roadway connectivity



CONNECTION CHOICES NEAR CENTER

▼ Decreased development potential

▲ Increase in direct roadway connectivity

The position of ramps and other connections to and from the highways and street grid in the North Loop present a tradeoff of priorities. Moving the connections to the edges increases the amount of possible developement options. Concentrating the connections near the center increases the roadway connectivity.

IT'S YOUR TURN:

HOW WOULD YOU RATE THIS OPTION?

1 2 3 4 5 6 7 8 9 10

▲ I PREFER THE CONNECTIONS ON THE EDGES

I PREFER THE CONNECTIONS NEAR THE CENTER ▲

Place a dot to tell us what you think of this option.

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BRIDGE ALTERNATIVES

BEYOND THE LOOP

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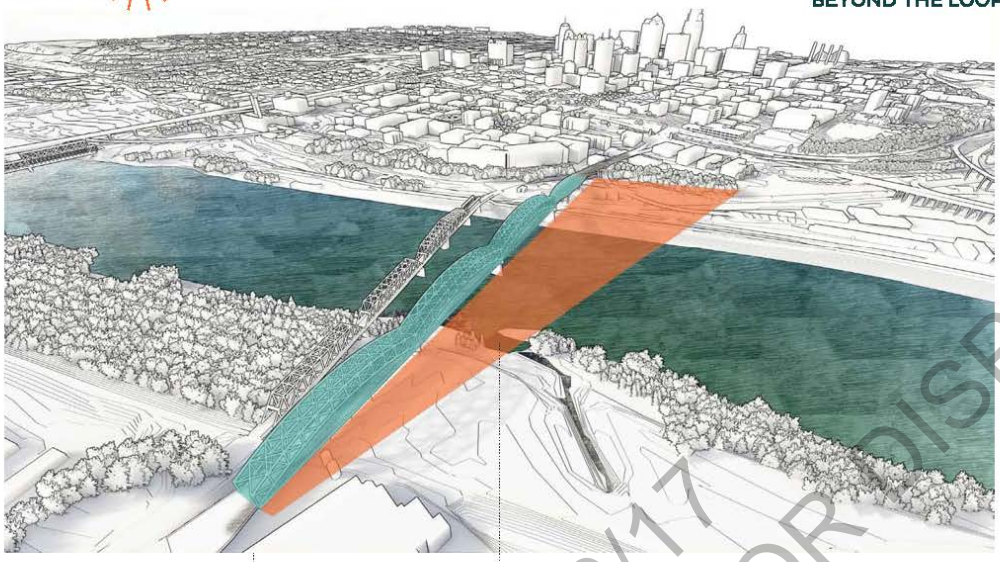
BRIDGE

REHAB OLD BRIDGE OR BUILD NEW

BEYOND THE LOOP



NO BUILD: RETAIN EXISTING BRIDGE (A)

- The current Broadway/Buck O'Neil Bridge could be completely rehabilitated for approximately $50 million.
- The rehabilitation would extend the life of the bridge another 35 years.
- The bridge would substantially function how it does today.
- The bridge connection interchange at 5th Street could be slightly improved under this option.
- Lanes would be narrowed to add a 6-foot pedestrian walkway as part of the rehabilitation.
- The bridge would need to be shut down for approximately two years to facilitate the complete rehabilitation.

CONSTRUCT A NEW BRIDGE (B)

- A new bridge could cost nearly $200 million. It would last 75-100 years.
- The new bridge could substantially improve the function of the river crossing and connections.
- More direct connections to I-35 could help congestion and back ups, particularly in the morning and evening rush hours.
- Full bike and pedestrian accommodations could be added.
- The current bridge would continue to carry traffic while the new bridge is built. A new bridge would require limited shut down of the crossing.

IT'S YOUR TURN:

WHICH DO YOU PREFER?

1 2 3 4 5 6 7 8 9 10

A — I PREFER TO REHABILITATE THE EXISTING BRIDGE

B — I PREFER A NEW BRIDGE

Place a dot to tell us what you think of this option.

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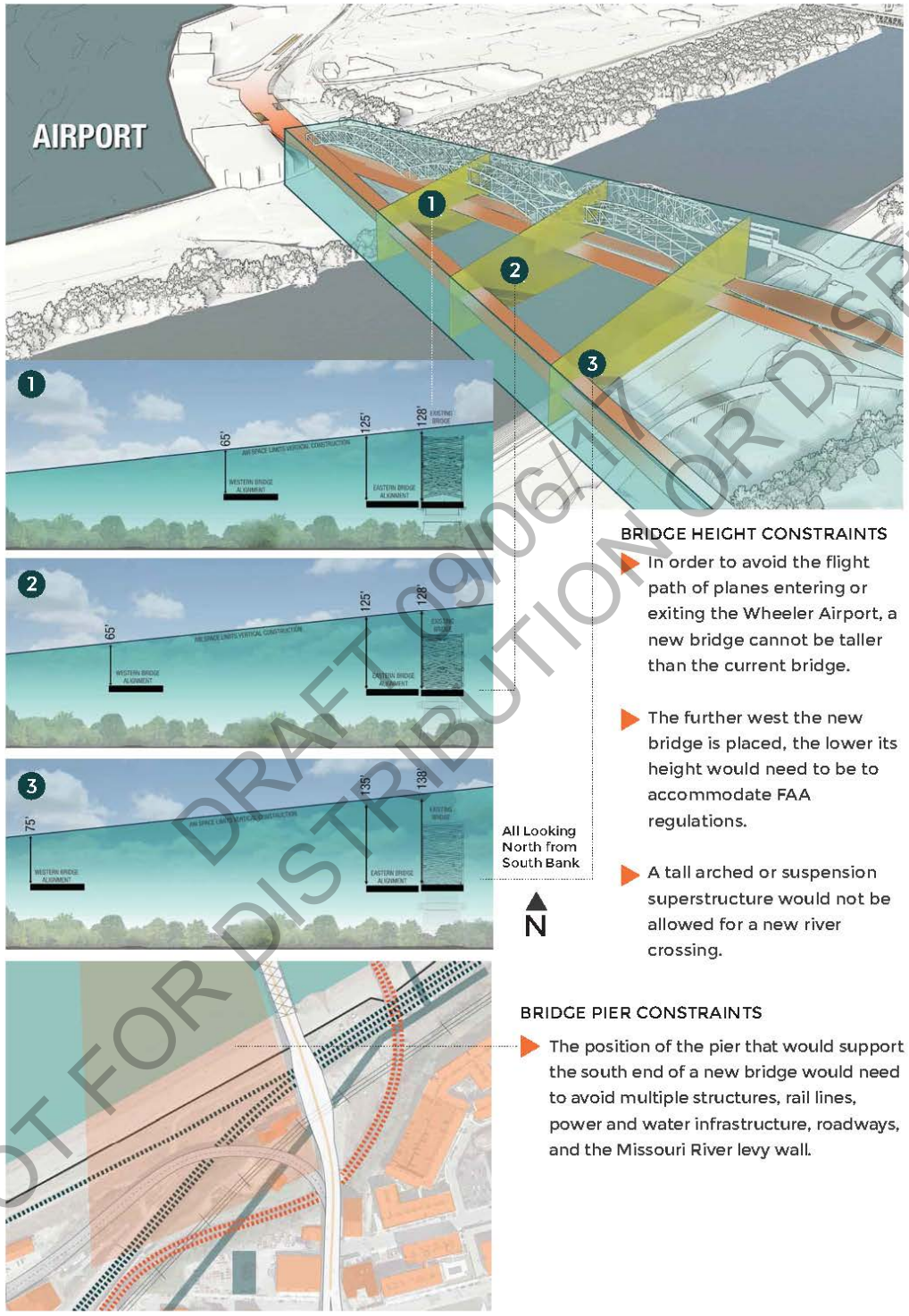
BRIDGE NEW BRIDGE CONSTRAINTS

BEYOND THE LOOP



BRIDGE HEIGHT CONSTRAINTS

- In order to avoid the flight path of planes entering or exiting the Wheeler Airport, a new bridge cannot be taller than the current bridge.
- The further west the new bridge is placed, the lower its height would need to be to accommodate FAA regulations.
- A tall arched or suspension superstructure would not be allowed for a new river crossing.

BRIDGE PIER CONSTRAINTS

- The position of the pier that would support the south end of a new bridge would need to avoid multiple structures, rail lines, power and water infrastructure, roadways, and the Missouri River levy wall.

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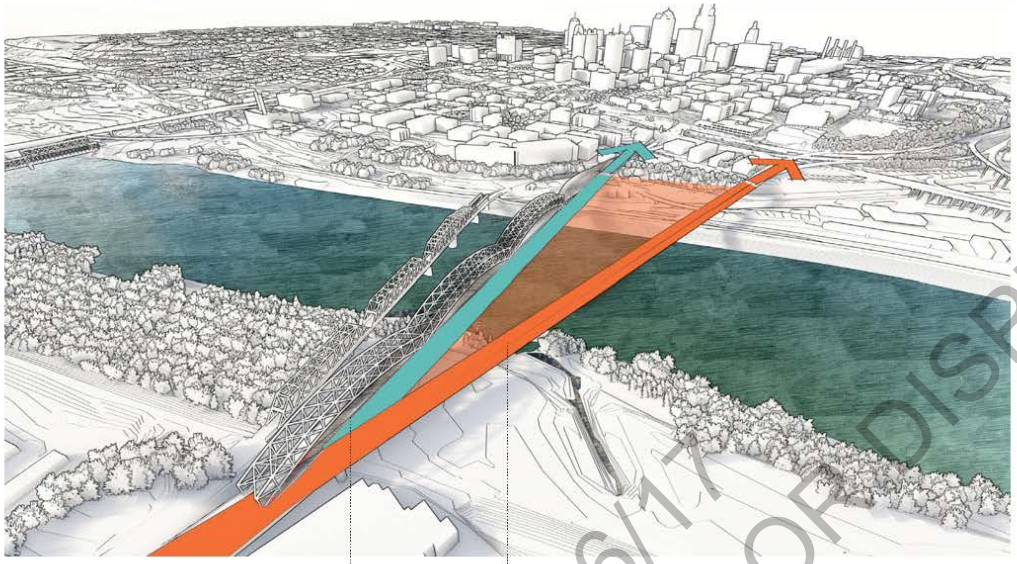
BRIDGE

NEW BRIDGE ALIGNMENT ALTERNATIVES

BEYOND THE LOOP



NEW BRIDGE CLOSER TO DOWNTOWN (A)

NEW BRIDGE MORE DIRECT TO I-35 (B)

Currently, traffic splits roughly in half as vehicles cross the bridge and travel to their final destinations.

About 55 percent of vehicles traveling south across the Broadway/O'Neil bridge enter directly into downtown. About 45 percent of southbound vehicles turn west and continue onto I-35 south.

The number of vehicles traveling south on the Broadway/O'Neil Bridge in the morning rush is greater than the number traveling north in the evening rush.

IT'S YOUR TURN:

WHICH DO YOU PREFER?

1 2 3 4 5 6 7 8 9 10

A — I PREFER A NEW BRIDGE CLOSER TO DOWNTOWN

B — I PREFER A NEW BRIDGE MORE DIRECTLY CONNECTED TO I-35

Place a dot to tell us what you think of this option.

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BIKE/PED CONNECTIONS

BEYOND THE LOOP

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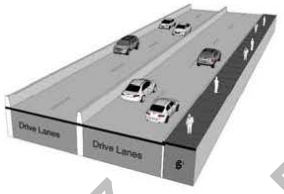
BIKE/PED

POSSIBLE BIKE/PED ACCOMMODATIONS

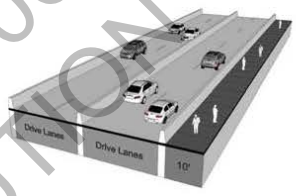
BEYOND THE LOOP

PLACE A DOT ON YOUR PREFERRED ACCOMMODATION

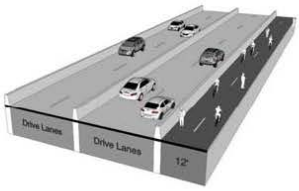
A OLD BRIDGE REHABILITATION OPTION
6' PEDESTRIAN WALKWAY (ONLY OPTION)



B NEW BRIDGE OPTION
10' PROTECTED SHARED USE PROTECTED PATH



C NEW BRIDGE OPTION
12' PROTECTED SHARED USE PROTECTED PATH



D NEW BRIDGE OPTION
10' SEPARATED & PROTECTED BIKE PATH WITH 6' SIDEWALK

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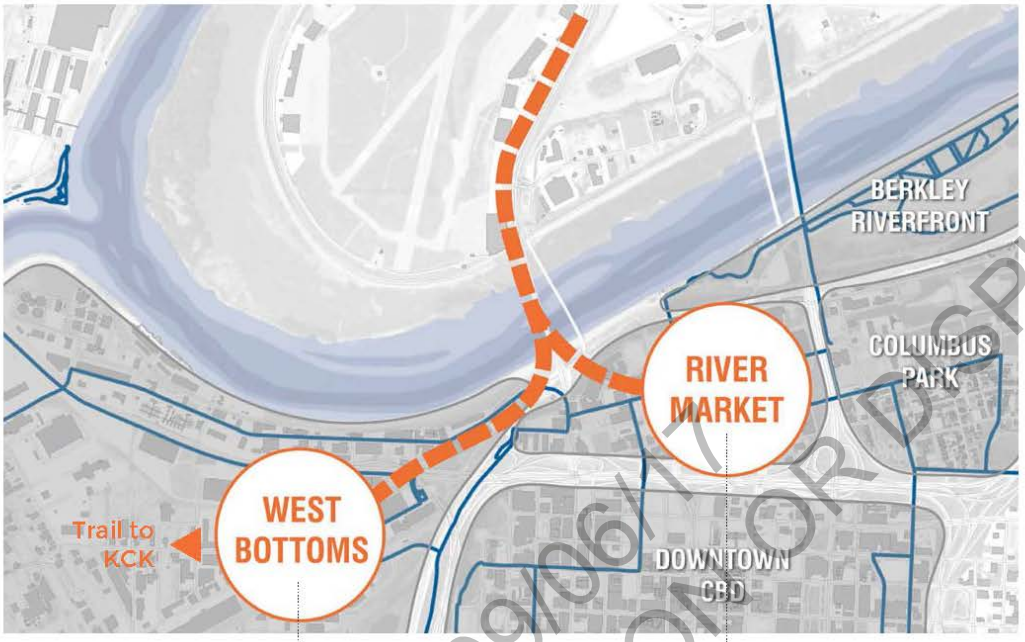
BIKE/PED

BIKE/PED CONNECTION OPTIONS

BEYOND THE LOOP



A

B

Under any scenario, the connectivity provided by the River Front Heritage Trail will be maintained in some fashion. However, enhancements could be made to the bike and pedestrian connectivity both to the neighborhoods and the Trail.

IT'S YOUR TURN:

WHICH DO YOU PREFER?

1 2 3 4 5 6 7 8 9 10

I WOULD PRIORITIZE THE CONNECTION TO THE WEST BOTTOMS

BOTH

I WOULD PRIORITIZED THE CONNECTION TO THE RIVER MARKET

Place a dot to tell us what you think of this option.

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NEIGHBORHOOD CONNECTIONS

BEYOND THE LOOP

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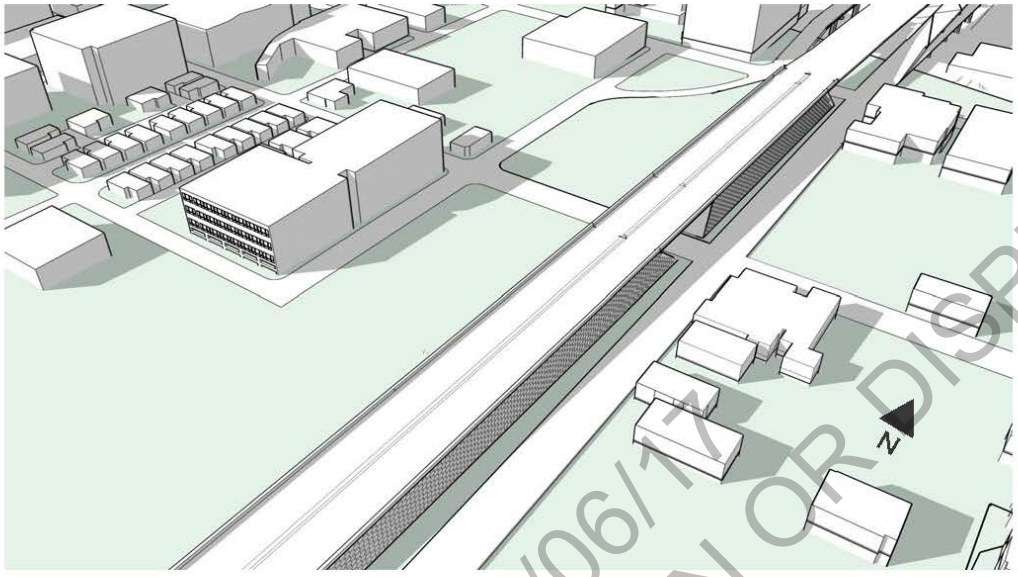
NEIGHBORHOOD CURRENT HIGHWAY 9 CONDITIONS

BEYOND THE LOOP



◀ RIVER MARKET

COLUMBUS PARK ▶

Currently, Highway 9 is elevated as it traverses between the River Market and Columbus Park. The highway is a physical barrier between the two neighborhoods, with two "tunnel" connections at 5th Street and 3rd Street.

All alternatives that re-configure the North Loop bring Highway 9 to grade, reconnecting the street grid and the two neighborhoods.

Additionally, the lowering of Highway 9 allows for the reconnection of Independence Ave. which opens the possibility of future streetcar connection to the east.

IT'S YOUR TURN:

WHICH DO YOU PREFER?

1 2 3 4 5 6 7 8 9 10

HIGHWAY 9 SHOULD NOT BE BROUGHT DOWN TO GRADE

I LIKE THE IDEA OF BRINGING HIGHWAY 9 DOWN TO GRADE

Place a dot to tell us what you think of this option.

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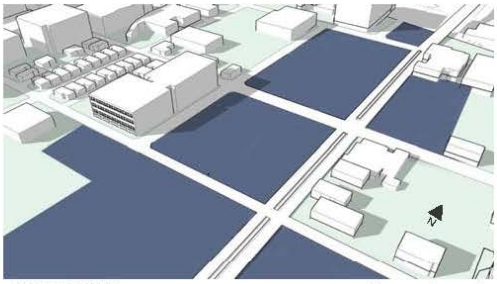
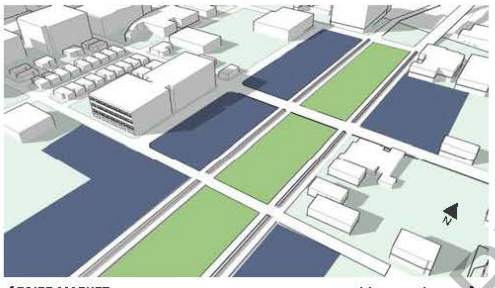
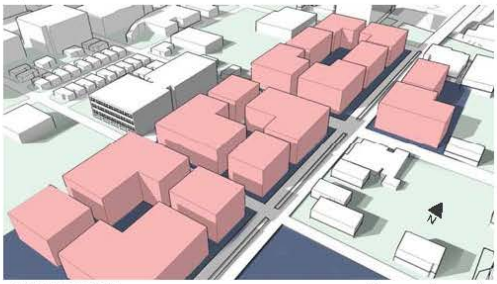
NEIGHBORHOOD

ALIGNMENT OF DEVELOPMENT ALONG AT-GRADE HIGHWAY 9

BEYOND THE LOOP







If Highway 9 were brought down to grade, several options for development could be considered.

The above example illustrates Highway 9 on the east, connecting more development toward the River Market.

The above example illustrates Highway 9 on the west, providing less development opportunities while providing a linear greenspace that connects both neighborhoods.

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IT'S YOUR TURN:

WHICH DO YOU PREFER?

1 2 3 4 5 6 7 8 9 10

CONCENTRATE DEVELOPMENT TOWARD THE RIVER MARKET

PROVIDE SEPARATION & GREENSPACE TOWARD COLUMBUS PARK

Place a dot to tell us what you think of this option.