



# **Eastern Gateway Concept Study**

Leavenworth County, Kansas | September 2020



**EXPERIENCE** | Transportation



# Eastern Gateway Concept Study

Leavenworth County, Kansas  
September 2020



## Leavenworth County, Kansas

Leavenworth County, Kansas is located in the northwestern portion of the bi-state Kansas City region. The vision of the Public Works Department is to see that its efforts result in improved public streets, roads, bridges, rights of way, and traffic safety; providing convenience, safety, and comfort to the users of public infrastructure.

Bill Noll, *Infrastructure and Construction Services Director*

## Consultant Team

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# SECTION 1 | INTRODUCTION

## Purpose

Leavenworth County, Kansas expressed interest in exploring a new potential roadway connection, referred to as the Eastern Gateway, to provide connectivity across the Missouri River. There are currently two river crossings that generally serve Leavenworth County:

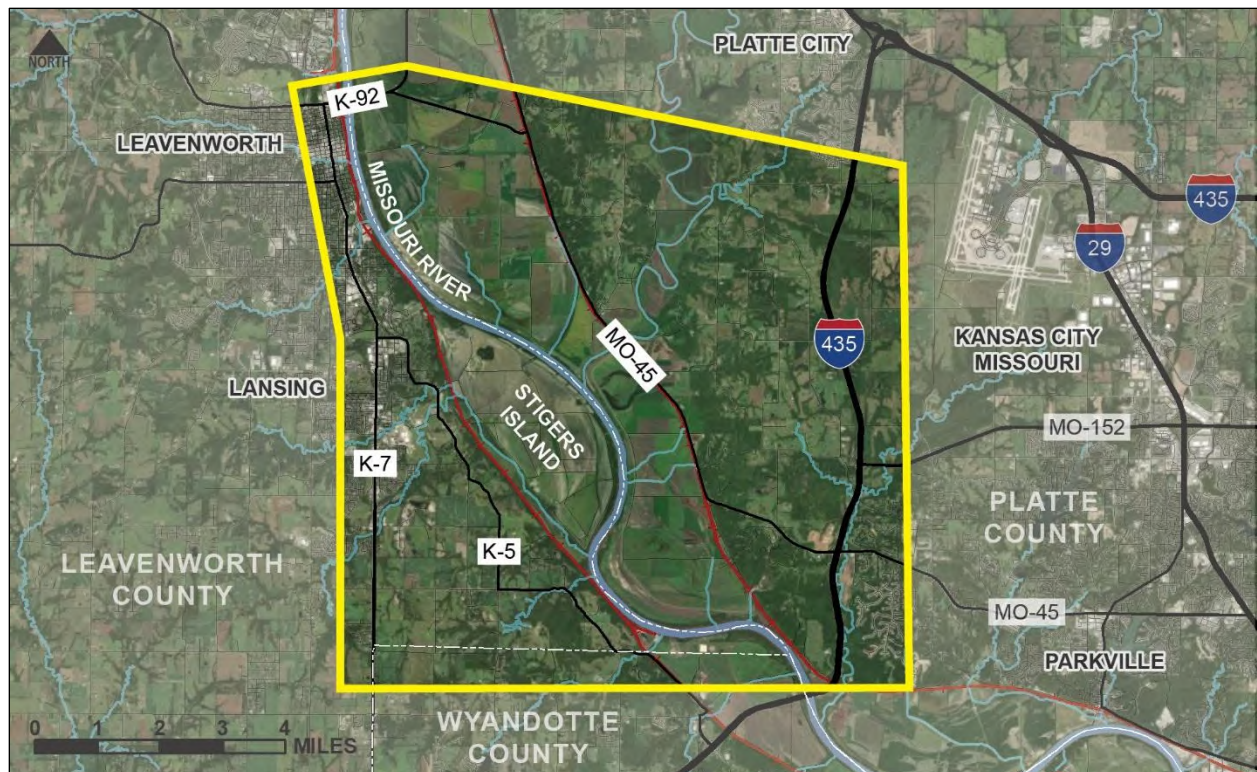
- Centennial Bridge (K-92) located in northern Leavenworth County, Kansas
- Interstate 435 Bridge (I-435) located in northern Wyandotte County, Kansas

With a distance of approximately 12 miles between the Centennial Bridge (K-92) crossing and the I-435 Bridge crossing, there is limited bi-state connectivity to areas within Leavenworth County, particularly the City of Lansing. Therefore, this study evaluated a new potential connection across the Missouri River from K-7 in Leavenworth County, Kansas to I-435 in Platte County, Missouri. The study is a high-level feasibility study to achieve consensus on the next stage of the Eastern Gateway concept.

## Study Area

The study area, displayed in Exhibit 1.1, generally contains the bi-state area bounded by K-92 to the north, Leavenworth County/Wyandotte County border to the south, K-7 to the west, and I-435 to the east. Several potential connections between K-7 and I-435 were evaluated within this study area.

Exhibit 1.1: Study Area



Source: TranSystems, 2020



## SECTION 2 | ALTERNATIVE ASSESSMENT

### Alignment Development

#### Mapping Analysis

The study utilized available GIS data including transportation networks, environmental features, terrain models, and aeriels to develop a basemap for the study area. Initial alignment development considered major physical features such as the Missouri River and its tributaries, floodplains, terrain, and railroads.

#### Initial Traffic Analysis

Initial traffic projections for a new Missouri River bridge crossing were developed by the Mid-America Regional Council (MARC), the metropolitan planning organization for the bi-state Kansas City region, using the regional travel demand model. The model assumed a four-lane facility, limited access (an intersection at K-5 in Kansas and an intersection near MO-45 in Missouri), and a design speed of 70 mph. For comparison purposes, two scenarios were tested:

- *North Alignment:* K-7/Gilman Road in Kansas to I-435/MO-152 in Missouri
- *South Alignment:* K-7/Gilman Road in Kansas to I-435/MO-45 in Missouri

The traffic model scenarios are summarized in Exhibit 2.1. Overall, the model indicates that the potential corridor will attract approximately 17,000 daily trips. Many of the trips appear to be new trips across the river, indicating that the new corridor may make work or shipping trips between Kansas and Missouri more attractive due to increased access. Maps of the initial traffic model scenarios are included in Appendix B.

Exhibit 2.1: Traffic Model Scenarios

Location	2017 Existing Traffic <sup>1</sup>	2015 Base Year Model	2050 No Build Scenario	2050 North Alignment	2050 South Alignment
Centennial Bridge	12,100	15,200	20,700 +5,500	16,400 +1,200	16,900 +1,700
Eastern Gateway	N/A	N/A	N/A	15,900	17,500
I-435 River Bridge	34,200	27,100	46,300 +19,200	44,700 +17,600	48,000 +20,900

<sup>1</sup> Based on 2017 Kansas Department of Transportation (KDOT) traffic counts

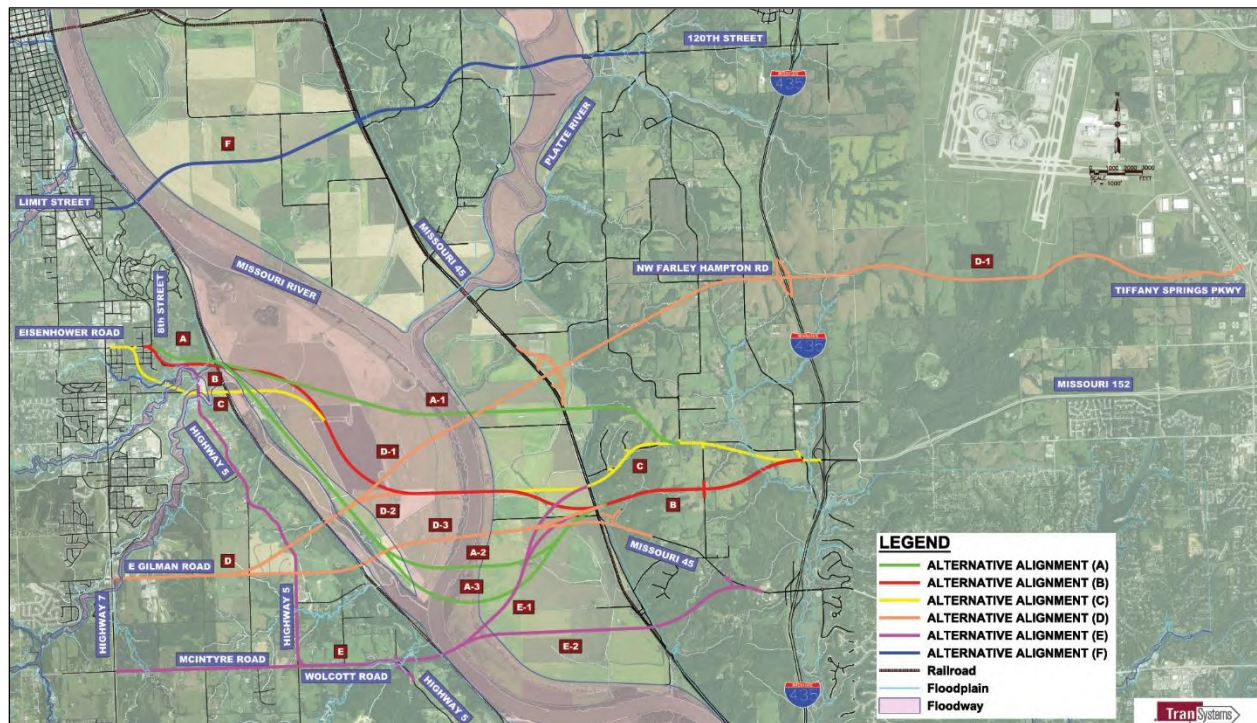
The potential river crossing in the study area was fairly sensitive to speed. For example, utilizing a design speed of 45 mph, instead of 70 mph, resulted in an approximately 30 percent reduction in traffic on the new roadway. This should be considered when planning access points along the route as they will have a negative effect on the attractiveness of the route due to the impact on travel speeds on the corridor.

While the model assumed a four-lane facility, this was done in order to not artificially constrain the demand for traffic on the facility. The projected 17,000 trips per day can feasibly be accommodate by a two-lane facility, particularly if access along the route is limited. For an urban roadway with frequent access, 17,000 trips per day is near the upper threshold for capacity for a two-lane facility, even with auxiliary turn lanes provided at access points.

## Alignment Alternatives

Based on this initial mapping and traffic analysis, a series of high-level potential alignments were developed within the study area. Initial alignments are displayed in Exhibit 2.2. Roadway approach connections under consideration generally included Limit Street, Eisenhower Road, Gilman Road, and McIntyre Road/Wolcott Road (K-5) in Kansas and 112th Street, NW Farley Hampton Road, MO-152, and MO-45 in Missouri.

Exhibit 2.2: Alignment Alternatives



Source: TranSystems, 2020

Larger versions of the map are included in Appendix C.



## Alignment Assessment

The alignment alternatives were assessed based on technical, financial, and institutional feasibility:

- **Technical:** Terrain Limitations; Transportation Resources; Historic and Cultural Resources
- **Financial:** Project Construction Cost; Related Construction Cost; Land Impacts
- **Institutional:** Connectivity Benefits; Stakeholder Input; Economic Development Potential

### Technical Feasibility

#### *Terrain Limitations*

The Missouri River floodway, its tributaries, and associated floodplains were major considerations in the technical feasibility assessment of a potential corridor alignment. Based on Federal Emergency Management Agency (FEMA) data, the majority of the valley west of the Missouri River (Stigers Island) is within the floodway. This presents a significant challenge as embankments cannot be placed within the floodway and a new roadway would need to be constructed on bridge structure, which would greatly increase construction cost. However, an elevated strip of land outside the floodway runs parallel to the western valley slope. The elevated strip separates the Missouri River floodway and the confluence of the Sevenmile Creek and Ninemile Creek floodway. Alignment alternatives utilizing this elevated strip of land were preferred.

#### *Transportation Resources*

The Union Pacific Railroad corridor follows the western bluff of the Missouri River in Kansas while the BNSF Railway corridor follows the eastern bluff of the Missouri River in Missouri. All alignment alternatives assumed bridge structures crossing the railroads would span the railroad right-of-way and meet minimum design clearances for construction. Impacts to Noah's Ark Airport, a private airport located near the NW River Road and MO-45 intersection in Missouri, were also preferred to be avoided.

#### *Historic and Cultural Resources*

Most historical and cultural resources are located within the northwestern portion of the study area near downtown Leavenworth and Fort Leavenworth. However, Leavenworth National Cemetery is located near the K-7 and K-5 intersection. Impacts to the cemetery were preferred to be avoided.

### Financial Feasibility

#### *Project Construction Cost*

Project construction cost is significantly affected by the length of bridge structure required, which is influenced by the width of the floodway at any selected location. Alignments that utilize narrower portions of the Missouri River floodway or elevated areas outside of the floodway were preferred.

#### *Related Construction Cost*

In addition to the cost of the Eastern Gateway concept, improvements to existing roadways or other new roadway connections may be required to safely accommodate traffic. Over the past several years, Leavenworth County has implemented corridor improvements to Eisenhower Road and plans to

continue roadway widening westward from 13th Street to County Road 5. Leavenworth County, in partnership with the City of Leavenworth and City of Lansing, was also recently awarded cost share funds from the Kansas Department of Transportation (KDOT) to improve the K-7 and Eisenhower Road intersection. In contrast, other potential connecting roadways such as K-5, McIntyre Road, and Gilman Road would likely require corridor improvements to meet increased traffic demands. Therefore, alignments that connect to roadways that require less related construction were preferred.

### *Land Impacts*

The majority of private property within the study area is farmland or rural residential. Residential and commercial density generally increases near K-7 in the City of Lansing and the City of Leavenworth. Fewer impacts to developed areas with increased density were preferred. In addition, impacts to Leavenworth Water Plant No 2, located near the K-5 and Eisenhower Road intersection, were also preferred to be avoided.

### **Institutional Feasibility**

#### *Connectivity Benefits*

With approximately 12 miles between the Centennial Bridge (K-92) crossing and the I-435 Bridge crossing, an alignment generally near the midpoint of these existing bridge crossings would provide the greatest benefit in terms of river crossing spacing and decreased travel times. In Missouri, a connection to a major existing interchange at I-435 is preferred. As a major limited-access highway, MO-152 was the preferred connection in Missouri to provide significant regional connectivity.

#### *Stakeholder Input*

Throughout the study, discussions with Leavenworth County staff and elected officials indicated a preference for an alignment that generally connected to Eisenhower Road in Kansas and MO-152 in Missouri. Leavenworth County staff also considered connections to other east-west city streets south of Eisenhower Road, such as Gilman Road and McIntyre Road/Wolcott Road (K-5), as acceptable options.

#### *Economic Development Potential*

Increased transportation access afforded by a new connection may increase interest in economic development opportunities. Discussions with Leavenworth County suggested that a potential connection could trigger redevelopment of neighborhoods near K-7 and Eisenhower Road. The neighborhoods would likely remain residential but would experience new and redeveloped housing stock. Based on discussions with the Platte County Economic Development Council in Missouri, mixed-use is envisioned near the I-435 and MO-152 interchange with residential development further from the interchange. Some smaller industrial tracts in the area have the potential for development in areas with level terrain. Large lot residential is the anticipated development along MO-45 due to the terrain. No future development is expected in the floodplain. Based on the economic development potential, connections near Eisenhower Road in Kansas and at the MO-152 interchange in Missouri were preferred.



## Alignment Assessment Summary

Each alignment alternative was assessed based on the outlined technical, financial, and institutional feasibility criteria. The high-level assessment, displayed in Exhibit 2.3, ranked the alignments as high, moderate, or low in terms of meeting the preferred criteria.

Exhibit 2.3: Alignment Assessment Summary

Assessment Criteria		A-1	A-2	A-3	B	C	D-1	D-2	D-3	E-1	E-2	F
Technical	Terrain Limitations	○	●	●	○	○	○	○	●	○	●	●
	Transportation Resources	●	●	●	●	●	●	●	●	●	●	●
	Historic and Cultural Resources	●	●	●	●	●	●	●	●	●	●	●
Financial	Project Construction Cost	○	●	●	○	○	○	○	●	●	●	●
	Related Construction Cost	●	●	●	●	●	○	○	○	○	○	○
	Land Impacts	●	●	●	●	○	●	●	●	●	●	○
Institutional	Connectivity Benefits	●	●	●	●	●	○	●	●	●	○	○
	Stakeholder Input	●	●	●	●	●	○	●	●	●	○	○
	Economic Development	●	●	●	●	●	○	●	●	●	○	●
Assessment Summary		●	●	●	●	●	○	○	○	●	○	○

Meets Preferred Criteria

- High
- Medium
- Low

## SECTION 3 | PREFERRED ALTERNATIVES

### Preferred Alternative Descriptions

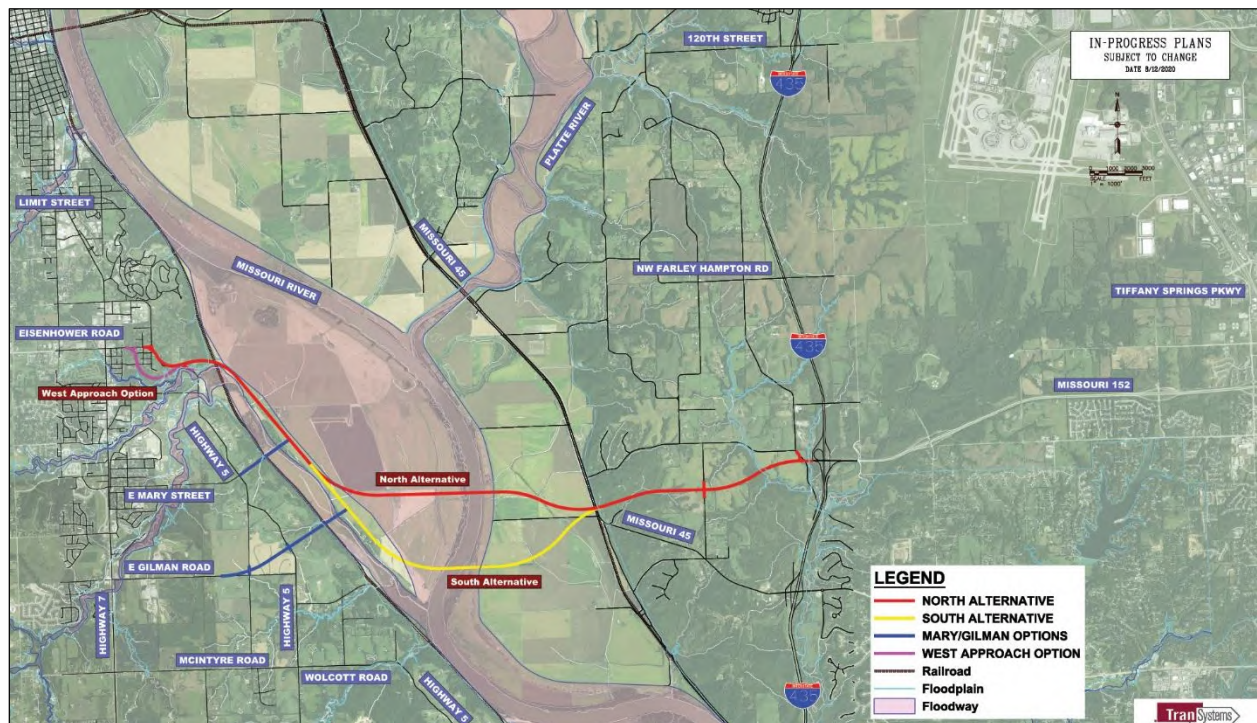
Based on the assessment of several alignment alternatives, two alternatives (A-2, A-3) were refined as preferred alignments. The preferred alternatives are displayed in Exhibit 3.1.

- **North Alternative (A-2):** The North Alternative (shown in red) connects Eisenhower Road in Kansas to MO-152 in Missouri. The approximately 8-mile alignment utilizes the elevated strip of land west of Stigers Island and has a longer bridge structure length over the Missouri River floodway.
- **South Alternative (A-3):** The South Alternative (shown in yellow) also connects Eisenhower Road in Kansas to MO-152 in Missouri. The approximately 8.5-mile alignment generally shares the same alignments as the North Alternative on the easternmost and westernmost ends, but shifts further south to utilize more of the elevated strip of land west of Stigers Island. This shift allows for a shorter bridge structure length over the Missouri River floodway.

### Other Roadway Connection Options

Two other roadway connections from Mary Street and Gilman Road (shown in blue) were also explored to connect to the Eastern Gateway concept. These potential connections are also displayed in Exhibit 3.1.

Exhibit 3.1: Preferred Alignment Alternatives



Source: TranSystems, 2020

Larger versions of the map are included in Appendix C.



## West Approach Options

As displayed in Exhibit 3.2, the west approach to the Eastern Gateway concept presents two different options at Eisenhower Road. Option A generally follows the existing K-5 (Wolcott Road) corridor to an improved intersection, such as a conceptual roundabout, at Eisenhower Road and K-5 (Wolcott Road). Option B shifts the approach further south and west to connect to Eisenhower Road as the primary through movement. Both options remain north of local streams and avoid impacts to major resources such as the Leavenworth National Cemetery and Leavenworth Water Plant No. 2. However, some residential property impacts are likely in both options.

Exhibit 3.2: West Approach Options



Source: TranSystems, 2020

Larger versions of the map are included in Appendix C.

## Refined Traffic Analysis

After selection of the North Alternative (red) and South Alternative (yellow), traffic projections were refined by MARC. The model continued to assume a four-lane facility but with a design speed of 60 mph and limited access with up to five signalized intersections. Intersections were conceptually anticipated at the Mary Street connector (45 mph design speed), Gilman Road connector (45 mph design speed), MO-45, NW Fox Road, and MO-152.

The refined traffic model scenarios are summarized in Exhibit 3.3. Overall, the model indicates that the potential corridor will attract 16,600 vehicles per day on the North Alternative (red) and 16,900 vehicles per day on the South Alternative (yellow). The refined traffic model scenarios are generally similar to the initial traffic analysis, which projected approximately 15,900 to 17,500 vehicles per day. For an urban roadway with access, 17,000 trips per day is near the upper threshold for capacity

for a two-lane facility. Maps of both the initial traffic model scenarios and the refined traffic model scenarios are included in Appendix B.

Exhibit 3.3: Refined Traffic Model Scenarios

Location	2017 Existing Traffic <sup>1</sup>	2015 Base Year Model	2050 No Build Scenario	2050 North Alternative	2050 South Alternative
Centennial Bridge	12,100	15,200	20,700 +5,500	15,600 +400	15,800 +600
Eastern Gateway	N/A	N/A	N/A	16,900	16,600
I-435 River Bridge	34,200	27,100	46,300 +19,200	46,500 +19,400	45,800 +18,700

<sup>1</sup> Based on 2017 Kansas Department of Transportation (KDOT) traffic counts

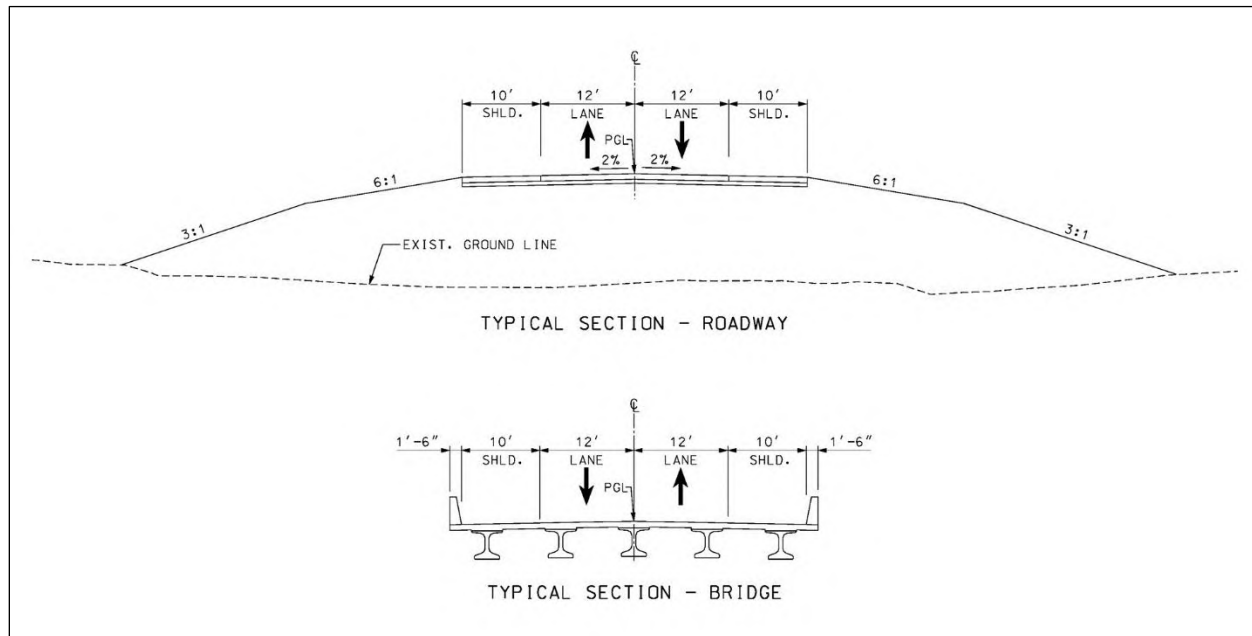
## Bridge and Roadway Typical Section

Basic design criteria was established for the Eastern Gateway concept. A design speed of 55 mph was utilized in establishing the horizontal and vertical alignments. Based on the traffic demand anticipated by the traffic analysis, a typical section including two 12-foot lanes with 10-foot shoulders was utilized in establishing pavement and earthwork quantities (using Bentley OpenRoads Concept Station software). The bridge and roadway typical sections are displayed in Exhibit 3.4.

MARC has a policy regarding bicycle and pedestrian facilities on major river bridges. In summary, the policy states that safe, practical, and appropriate bicycle and pedestrian accommodations will be considered in the planning and design of all surface transportation projects that cross major rivers. For this study, a 10-foot shared-use path has been included in the bridge typical section for cost estimating purposes. Furthermore, the extension of the 10-foot shared-use path on all roadway approaches is included as an additional option in the cost estimate. The bridge and roadway typical sections with the shared-use path option are displayed in Exhibit 3.5.

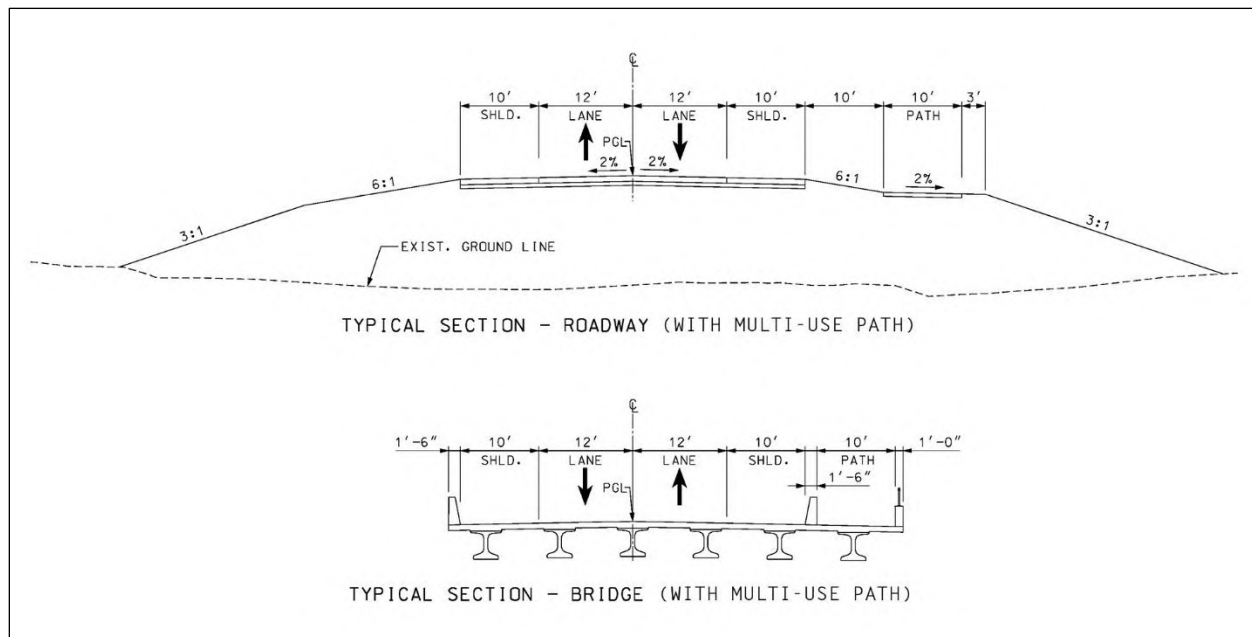


Exhibit 3.4: Typical Section



Source: TranSystems, 2020

Exhibit 3.5: Typical Section with Shared-Use Path



Source: TranSystems, 2020

## Cost Estimate

A cost estimate summary is provided in Exhibit 3.6. The North Alternative costs approximately \$301.4 million. The South Alternative, which requires a shorter bridge structure length, is less expensive with a cost of approximately \$253.9 million. The additional cost of including a 10-foot shared-use path beyond the bridge structure throughout the remainder of the roadway project limits adds an additional \$5.4 million to \$6.9 million to the project cost depending on the alternative.

In order to reduce the number of cost estimate combinations, the study evaluated the difference between the two West Approach options. Overall, West Approach Option B that extends further west (see Exhibit 3.2) has an additional cost of approximately \$2.4 million.

Other roadway connection options that were explored include approximately \$25.3 million for the Mary Street Connector and approximately \$27.7 million for the Gilman Road Connector.

Exhibit 3.6: Cost Estimate Summary (2020 Dollars)

Alternative	Cost Estimate	Optional Cost with Shared-Use Path <sup>1</sup>
North Alternative	\$301,372,000	\$306,787,000
South Alternative	\$253,935,000	\$260,818,000
Mary Street Connector	\$25,311,000	N/A
Gilman Road Connector	\$27,691,000	N/A

<sup>1</sup> Includes cost to extend the shared-use path beyond the river bridge structure throughout the remainder of the roadway project limits.

## Cost Estimate Assumptions

Detailed cost estimates are provided in Appendix A. The cost estimates are divided into major elements of work such as roadway, river bridge, railroad bridges, interchange and intersections, and major drainage structures. Cost estimates include right-of-way for each alignment based on a per acre of square foot costs, utility costs, environmental permitting and mitigation costs, and railroad permitting costs. Percentage factors are also included for future engineering services and contingency.

Other cost estimate assumptions included:

- *Typical Section:* The cost estimate assumes two 12-foot lanes with 10-foot shoulders. The shoulder costs are included in the concrete pavement cost.
- *Shared-Use Path:* It is assumed that MARC would require a 10-foot shared-use path on the bridge. Therefore, the shared-use path cost has been included in the river bridge structure cost. The optional cost with the shared-use path represents the additional cost to extend the path throughout the remainder of the roadway project limits.



- *River Coordination:* Navigation clearance and requirements are under the jurisdiction of the U.S. Coast Guard (8th District). Further coordination would be required to establish sailing line and horizontal and vertical clearance requirements at the final bridge location. For this study, a vertical clearance of 70 feet was utilized to establish the alternate profiles. A haunched steel plate girder structure with an overall river bridge length of 880 feet was assumed for cost estimating purposes. This structure length would accommodate a 400-foot horizontal navigation clearance requirement.
- *Levee Coordination:* Farmland along the Missouri River is protected by a levee system, which is managed by a levee district with oversight provided by the U.S. Army Corps of Engineers (USACE). USACE general requirements include no construction or permanent structures within 500 feet of the land side and 300 feet of the river side. However, approval is typically granted to construct deep foundations within this no-build zone provided USACE requirements for design and construction are met. Additional requirements and inspection during construction may include levee stability, settlement and seepage analysis, site monitoring during construction, contingency flood condition measures, and special backfill measures. A minimum vertical clearance over the levee of 14.0 feet was assumed for this study.
- *Railroad Coordination:* Minimum clearance for railroad grade separations must meet the requirements of the American Railway Engineering and Maintenance-of-Way Association (AREMA) or be in accordance with the requirements of the railroad having jurisdiction. In general, all piers and abutments shall be located outside the railroad right-of-way limits and no permanent obstructions shall be within a vertical height of 23.5 feet above the top of rail. All alternatives for this study assumed the bridge structures crossing the railroads would span railroad right-of-way and meet minimum design clearances for new construction. Railroad coordination cost estimates also included plan review, flaggers, and inspections.

## SECTION 4 | NEXT STEPS

### Summary

The purpose of the study was to evaluate a new potential connection, referred to as the Eastern Gateway concept, across the Missouri River between Leavenworth County, Kansas and Platte County, Missouri. The study is a high-level feasibility study to achieve consensus on the next stage of the potential connection.

An assessment of alignment alternatives included a review of technical, financial, and institutional factors. Based on this assessment, two alternatives were refined as preferred alignments. The North Alternative connects Eisenhower Road in Kansas to MO-152 in Missouri. The South Alternative also connects Eisenhower Road in Kansas to MO-152 in Missouri, but shifts further south to utilize more of an elevated strip of land west of Stigers Island, thereby allowing a shorter bridge structure length over the Missouri River floodway. The North Alternative costs approximately \$301.4 million while the South Alternative is less expensive at a cost of approximately \$253.9 million, primarily due to the need for less bridge structure.

### Next Steps

Next steps to advance the study could include coordination with the bi-state Kansas City region, an economic development study, environmental permitting, and conceptual design.

#### Bi-State Region Coordination

As a potential major bi-state project, advocacy, communication, and coordination with several government entities will be needed. At a minimum, coordination should include Leavenworth County, Platte County, Fort Leavenworth, City of Leavenworth, City of Lansing, City of Parkville, City of Kansas City Missouri, Kansas Department of Transportation, Missouri Department of Transportation, and the Mid-America Regional Council. Due to the regional connectivity implications of the Eastern Gateway concept, other entities to consider including in the process are Unified Government of Kansas City Kansas and Wyandotte County, Clay County, City of Platte City, Kansas Turnpike Authority, and Kansas City International Airport (KCI).

#### Economic Development Study

An economic development study could be performed in order to better understand the positive impact of the Eastern Gateway concept on growth and economic development

#### Environmental Permitting

Based on this high-level study, National Environmental Policy Act (NEPA) documentation at the Environmental Assessment (EA) level is anticipated. This level of assessment must include an alternatives analysis, public meetings, and scoping meetings.

Overall, anticipated environmental permitting includes:

- Noise Study
- Historic and Cultural Resources Investigation
- Hazardous Materials Review
- Threatened and Endangered Species Analysis
- Farmland Policy Protection Act
- Waters of the U.S. Delineation
- Floodplain Permit
- U.S. Coast Guard Bridge Permit
- U.S. Army Corps of Engineers Section 408 Permit
- Clean Water Act Section 404 Permit/Rivers and Harbors Section 10 Permit
- Stormwater Construction Permit
- U.S. DOT Section 4(f) Analysis/Land and Water Conservation Fund Section 6(f) Analysis

Expanding upon environmental permitting, FEMA coordination will be a significant part of this project due to the Missouri River crossing. FEMA requires that an increase in the 100-year water surface elevation due to the construction of a new bridge will not occur. An Engineering “No Rise” Certificate must be obtained by demonstrating through hydrological and hydraulic analyses performed in coordinate with standard engineering practice that the proposed encroachment would not result in any increase in flood levels during the occurrence of a 100-year flood. A hydraulic modeling analysis will be required during the design phase and will serve as documentation for the Floodplain Development Permit.

### **Conceptual Design**

Engineering for the study can be advanced with a concept level design to further determine the critical elements of the project and feasible engineering solutions.

.





## **Appendix A | Cost Estimate**

### **Eastern Gateway Concept Study**

**LEAVENWORTH GATEWAY  
NORTHERN - CONCEPTUAL ALTERNATIVE  
OPINION OF PROBABLE COST**

ITEM NO.	ITEM DESCRIPTION	UNIT	UNIT COST	QUANTITY	TOTAL COST
1	CLEARING AND GRUBBING	ACRE	\$ 7,500.00	50	\$ 375,000.00
2	REMOVAL OF IMPROVEMENTS	LS	\$ 200,000.00	1	\$ 200,000.00
3	CLASS A EXCAVATION	CY	\$ 14.00	683539	\$ 9,569,546.00
4	EMBANKMENT IN PLACE	CY	\$ 20.00	1556265	\$ 31,125,300.00
5	COMPACTING EMBANKMENT	CY	\$ 3.25	569616	\$ 1,851,252.00
6	TYPE 5 AGGREGATE FOR BASE (6 IN. THICK)	SY	\$ 12.50	168262	\$ 2,103,275.00
7	CONCRETE PAVEMENT (10 IN. NON-REINFORCED, 15 FT. JOINTS)	SY	\$ 60.00	168262	\$ 10,095,720.00
8	MGS GUARDRAIL	LF	\$ 22.00	25170	\$ 553,740.00
9	CURB AND GUTTER TYPE B	LF	\$ 33.00	3670	\$ 121,110.00
10	TRAFFIC CONTROL	LS	\$ 150,000.00	1	\$ 150,000.00
11	MOBILIZATION	LS	\$ 6,635,000.00	1	\$ 6,635,000.00
12	PAVEMENT MARKING	LS	\$ 135,000.00	1	\$ 135,000.00
13	CONTRACTOR FURNISHED SURVEYING AND STAKING	LS	\$ 1,658,700.00	1	\$ 1,658,700.00
14	DRAINAGE	LS	\$ 1,280,000.00	1	\$ 1,280,000.00
15	SEEDING - COOL SEASON MIXTURES	ACRE	\$ 3,000.00	110	\$ 330,000.00
16	EROSION CONTROL	LS	\$ 3,000,000.00	1	\$ 3,000,000.00
17	LIGHTING	LS	\$ 310,000.00	1	\$ 310,000.00
18	TRAFFIC SIGNAL	EA	\$ 275,000.00	2	\$ 550,000.00
19	PERMANENT SIGNING	LS	\$ 1,000,000.00	1	\$ 1,000,000.00
20	BRIDGE	SF	\$ 150.00	559189	\$ 83,878,350.00
21	RIVER BRIDGE (with 10' sidewalk)	SF	\$ 380.00	51040	\$ 19,395,200.00

**Total Major Items** \$ 174,317,193.00

**Contingency (25%)** \$ 43,579,298.25

**Utilities** \$ 3,500,000.00

**Environmental Permitting/Mitigation** \$ 2,150,000.00

**FEMA Coordination** \$ 250,000.00

**Railroad Coordination** \$ 460,000.00

**Right of Way** \$ 11,747,000.00

**TOTAL** \$ 236,003,491.25

Section Breakout	Sub-Total
Roadway	\$ 69,183,643.00
Lighting	\$ 310,000.00
Signals	\$ 550,000.00
Signing	\$ 1,000,000.00
Bridge	\$ 103,273,550.00
<b>Total Major Items</b>	<b>\$ 174,317,193.00</b>

**Prelim. Engineering (15%)** \$ 32,684,473.69

**Construction Engineering (15%)** \$ 32,684,473.69

**GRAND TOTAL (2020 dollars)** \$ **301,372,438.63**

**10' Multi-use Path (optional)** \$ 5,414,632.01

**GRAND TOTAL (2020 dollars) with Optional 10' path** \$ **306,787,070.64**

**LEAVENWORTH GATEWAY  
SOUTHERN - CONCEPTUAL ALTERNATIVE  
OPINION OF PROBABLE COST**

ITEM NO.	ITEM DESCRIPTION	UNIT	UNIT COST	QUANTITY	TOTAL COST
1	CLEARING AND GRUBBING	ACRE	\$ 7,500.00	50	\$ 375,000.00
2	REMOVAL OF IMPROVEMENTS	LS	\$ 200,000.00	1	\$ 200,000.00
3	CLASS A EXCAVATION	CY	\$ 14.00	679569	\$ 9,513,966.00
4	EMBANKMENT IN PLACE	CY	\$ 20.00	2098302	\$ 41,966,040.00
5	COMPACTING EMBANKMENT	CY	\$ 3.25	566308	\$ 1,840,501.00
6	TYPE 5 AGGREGATE FOR BASE (6 IN. THICK)	SY	\$ 12.50	207150	\$ 2,589,375.00
7	CONCRETE PAVEMENT (10 IN. NON-REINFORCED, 15 FT. JOINTS)	SY	\$ 60.00	207150	\$ 12,429,000.00
8	MGS GUARDRAIL	LF	\$ 22.00	39974	\$ 879,428.00
9	CURB AND GUTTER TYPE B	LF	\$ 33.00	3670	\$ 121,110.00
10	TRAFFIC CONTROL	LS	\$ 150,000.00	1	\$ 150,000.00
11	MOBILIZATION	LS	\$ 5,505,000.00	1	\$ 5,505,000.00
12	PAVEMENT MARKING	LS	\$ 135,000.00	1	\$ 135,000.00
13	CONTRACTOR FURNISHED SURVEYING AND STAKING	LS	\$ 1,376,100.00	1	\$ 1,376,100.00
14	DRAINAGE	LS	\$ 1,080,000.00	1	\$ 1,080,000.00
15	SEEDING - COOL SEASON MIXTURES	ACRE	\$ 3,000.00	120	\$ 360,000.00
16	EROSION CONTROL	LS	\$ 3,210,000.00	1	\$ 3,210,000.00
17	LIGHTING	LS	\$ 310,000.00	1	\$ 310,000.00
18	TRAFFIC SIGNAL	EA	\$ 275,000.00	2	\$ 550,000.00
19	PERMANENT SIGNING	LS	\$ 1,000,000.00	1	\$ 1,000,000.00
20	BRIDGE	SF	\$ 150.00	260084	\$ 39,012,600.00
21	RIVER BRIDGE (with 10' sidewalk)	SF	\$ 380.00	58000	\$ 22,040,000.00

**Total Major Items** \$ 144,643,120.00

**Contingency (25%)** \$ 36,160,780.00

**Utilities** \$ 3,500,000.00

**Environmental Permitting/Mitigation** \$ 1,925,000.00

**FEMA Coordination** \$ 250,000.00

**Railroad Coordination** \$ 460,000.00

**Right of Way** \$ 12,755,000.00

**TOTAL** \$ 199,693,900.00

Section Breakout	Sub-Total
Roadway	\$ 81,730,520.00
Lighting	\$ 310,000.00
Signals	\$ 550,000.00
Signing	\$ 1,000,000.00
Bridge	\$ 61,052,600.00
<b>Total Major Items</b>	<b>\$ 144,643,120.00</b>

**Prelim. Engineering (15%)** \$ 27,120,585.00

**Construction Engineering (15%)** \$ 27,120,585.00

**GRAND TOTAL (2020 dollars)** \$ **253,935,070.00**

**10' Multi-use Path (optional)** \$ 6,882,946.74

**GRAND TOTAL (2020 dollars) with Optional 10' path** \$ **260,818,016.74**



**LEAVENWORTH GATEWAY  
STRANGER (E. Mary St.) CONNECTION - CONCEPTUAL ALTERNATIVE  
OPINION OF PROBABLE COST**

ITEM NO.	ITEM DESCRIPTION	UNIT	UNIT COST	QUANTITY	TOTAL COST
1	CLEARING AND GRUBBING	ACRE	\$ 7,500.00	8	\$ 60,000.00
2	REMOVAL OF IMPROVEMENTS	LS	\$ 50,000.00	1	\$ 50,000.00
3	CLASS A EXCAVATION	CY	\$ 14.00	144550	\$ 2,023,700.00
4	EMBANKMENT IN PLACE	CY	\$ 20.00	0	\$ -
5	COMPACTING EMBANKMENT	CY	\$ 3.25	63828	\$ 207,441.00
6	TYPE 5 AGGREGATE FOR BASE (6 IN. THICK)	SY	\$ 12.50	11430	\$ 142,875.00
7	CONCRETE PAVEMENT (10 IN. NON-REINFORCED, 15 FT. JOINTS)	SY	\$ 60.00	11430	\$ 685,800.00
8	MGS GUARDRAIL	LF	\$ 22.00	1800	\$ 39,600.00
9	CURB AND GUTTER TYPE B	LF	\$ 33.00	0	\$ -
10	TRAFFIC CONTROL	LS	\$ 50,000.00	1	\$ 50,000.00
11	MOBILIZATION	LS	\$ 538,000.00	1	\$ 538,000.00
12	PAVEMENT MARKING	LS	\$ 15,000.00	1	\$ 15,000.00
13	CONTRACTOR FURNISHED SURVEYING AND STAKING	LS	\$ 134,400.00	1	\$ 134,400.00
14	DRAINAGE	LS	\$ 80,000.00	1	\$ 80,000.00
15	SEEDING - COOL SEASON MIXTURES	ACRE	\$ 3,000.00	7	\$ 21,000.00
16	EROSION CONTROL	LS	\$ 150,000.00	1	\$ 150,000.00
17	LIGHTING	LS	\$ 50,000.00	1	\$ 50,000.00
18	TRAFFIC SIGNAL	EA	\$ 275,000.00	2	\$ 550,000.00
19	PERMANENT SIGNING	LS	\$ 25,000.00	1	\$ 25,000.00
20	BRIDGE	SF	\$ 150.00	62275	\$ 9,341,250.00
21	RIVER BRIDGE (with sidewalk)	SF	\$ 380.00	0	\$ -

Total Major Items	\$ 14,164,066.00
Contingency (25%)	\$ 3,541,016.50
Utilities	\$ 1,000,000.00
Environmental Permitting/Mitigation	\$ 220,000.00
FEMA Coordination	\$ 250,000.00
Railroad Coordination	\$ 230,000.00
Right of Way	\$ 594,200.00
<b>TOTAL</b>	<b>\$ 19,999,282.50</b>

Section Breakout	Sub-Total
Roadway	\$ 4,197,816.00
Lighting	\$ 50,000.00
Signals	\$ 550,000.00
Signing	\$ 25,000.00
Bridge	\$ 9,341,250.00
<b>Total Major Items</b>	<b>\$ 14,164,066.00</b>

Prelim. Engineering (15%)	\$ 2,655,762.38
Construction Engineering (15%)	\$ 2,655,762.38
<b>GRAND TOTAL (2020 dollars)</b>	<b>\$ 25,310,807.25</b>

**LEAVENWORTH GATEWAY  
GILMAN CONNECTION - CONCEPTUAL ALTERNATIVE  
OPINION OF PROBABLE COST**

ITEM NO.	ITEM DESCRIPTION	UNIT	UNIT COST	QUANTITY	TOTAL COST
1	CLEARING AND GRUBBING	ACRE	\$ 7,500.00	4	\$ 30,000.00
2	REMOVAL OF IMPROVEMENTS	LS	\$ 50,000.00	1	\$ 50,000.00
3	CLASS A EXCAVATION	CY	\$ 14.00	121435	\$ 1,700,090.00
4	EMBANKMENT IN PLACE	CY	\$ 20.00	19984	\$ 399,680.00
5	COMPACTING EMBANKMENT	CY	\$ 3.25	101196	\$ 328,887.00
6	TYPE 5 AGGREGATE FOR BASE (6 IN. THICK)	SY	\$ 12.50	35320	\$ 441,500.00
7	CONCRETE PAVEMENT (10 IN. NON-REINFORCED, 15 FT. JOINTS)	SY	\$ 60.00	35320	\$ 2,119,200.00
8	MGS GUARDRAIL	LF	\$ 22.00	1500	\$ 33,000.00
9	CURB AND GUTTER TYPE B	LF	\$ 33.00	0	\$ -
10	TRAFFIC CONTROL	LS	\$ 50,000.00	1	\$ 50,000.00
11	MOBILIZATION	LS	\$ 546,000.00	1	\$ 546,000.00
12	PAVEMENT MARKING	LS	\$ 12,000.00	1	\$ 12,000.00
13	CONTRACTOR FURNISHED SURVEYING AND STAKING	LS	\$ 136,400.00	1	\$ 136,400.00
14	DRAINAGE	LS	\$ 340,000.00	1	\$ 340,000.00
15	SEEDING - COOL SEASON MIXTURES	ACRE	\$ 3,000.00	11	\$ 33,000.00
16	EROSION CONTROL	LS	\$ 150,000.00	1	\$ 150,000.00
17	LIGHTING	LS	\$ 50,000.00	1	\$ 50,000.00
18	TRAFFIC SIGNAL	EA	\$ 275,000.00	0	\$ -
19	PERMANENT SIGNING	LS	\$ 25,000.00	1	\$ 25,000.00
20	BRIDGE	SF	\$ 150.00	52875	\$ 7,931,250.00
21	RIVER BRIDGE (with sidewalk)	SF	\$ 380.00	0	\$ -

Total Major Items	\$ 14,376,007.00
Contingency (25%)	\$ 3,594,001.75
Utilities	\$ 1,000,000.00
Environmental Permitting/Mitigation	\$ 615,000.00
FEMA Coordination	\$ 250,000.00
Railroad Coordination	\$ 230,000.00
Right of Way	\$ 2,234,600.00
<b>TOTAL</b>	<b>\$ 22,299,608.75</b>

Section Breakout	Sub-Total
Roadway	\$ 6,369,757.00
Lighting	\$ 50,000.00
Signals	\$ -
Signing	\$ 25,000.00
Bridge	\$ 7,931,250.00
<b>Total Major Items</b>	<b>\$ 14,376,007.00</b>

Prelim. Engineering (15%)	\$ 2,695,501.31
Construction Engineering (15%)	\$ 2,695,501.31
<b>GRAND TOTAL (2020 dollars)</b>	<b>\$ 27,690,611.38</b>

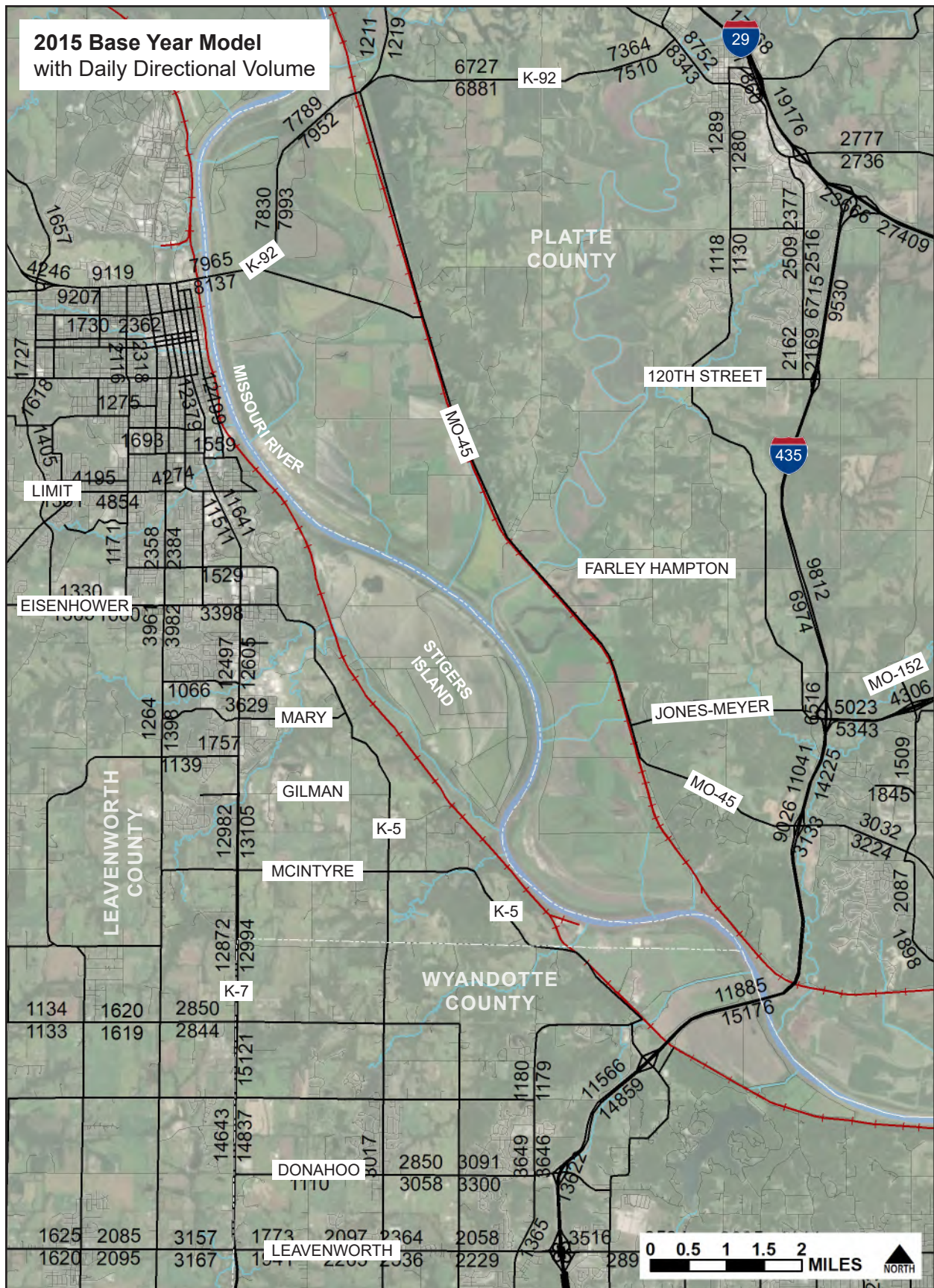


## **Appendix B | Traffic Analysis Maps**

### **Eastern Gateway Concept Study**



**2015 Base Year Model**  
with Daily Directional Volume





**2050 No Build Scenario**  
with Daily Directional Volume

The map displays the Missouri River and surrounding areas, including Leavenworth County, Platte County, and Wyandotte County. Key locations and roads are labeled, such as Stigers Island, Farley Hampton, Jones-Meyer, and various highways (K-92, MO-45, K-5, K-7, I-29, I-435, MO-152). A scale bar at the bottom indicates distances from 0 to 2 miles, and a north arrow is provided.



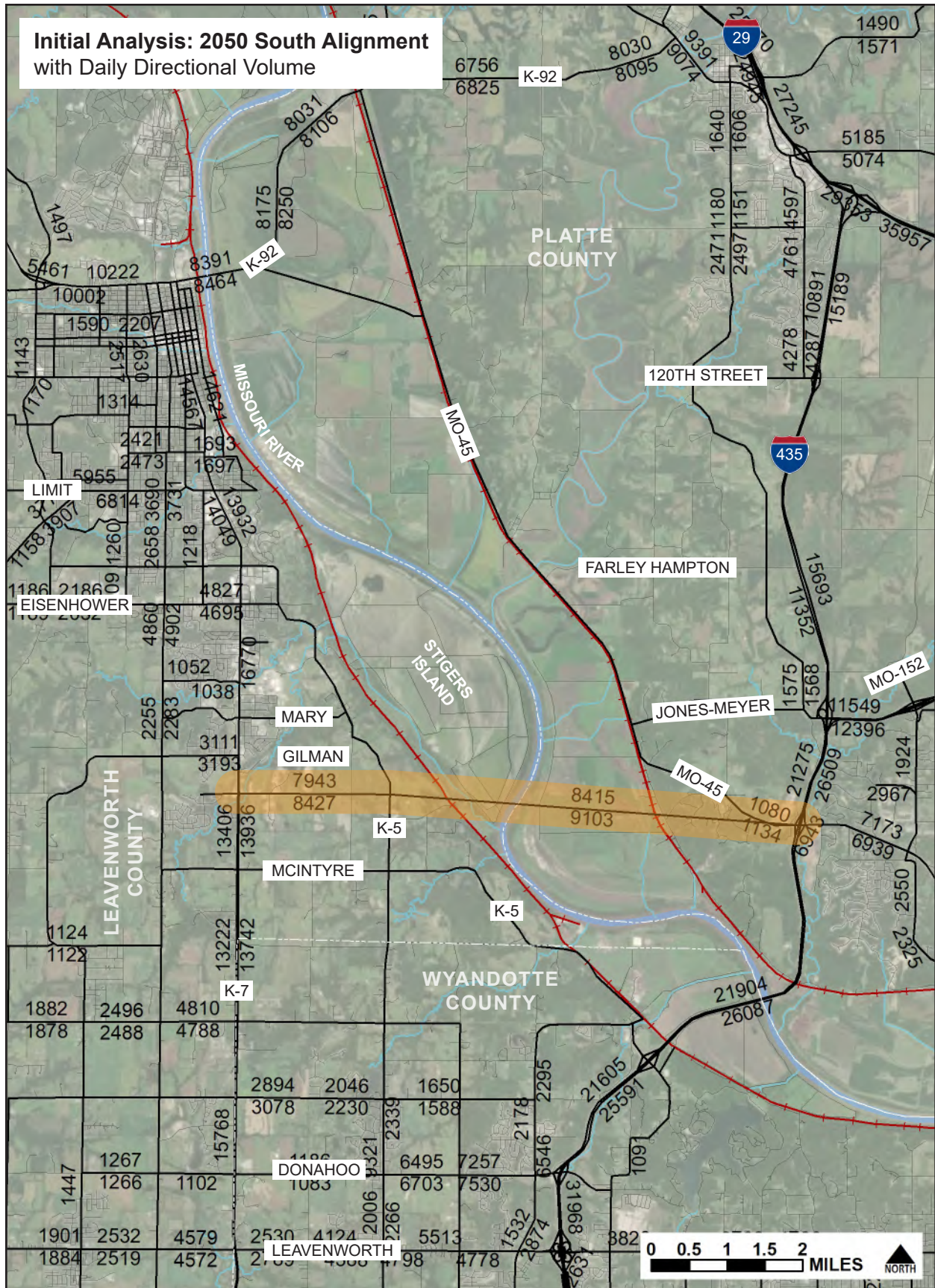
**Initial Analysis: 2050 North Alignment with Daily Directional Volume**

The map displays the Missouri River and the proposed 2050 North Alignment. The alignment is shown as a red line with a dashed centerline, running from the northwest to the southeast. The map includes the following labels and features:

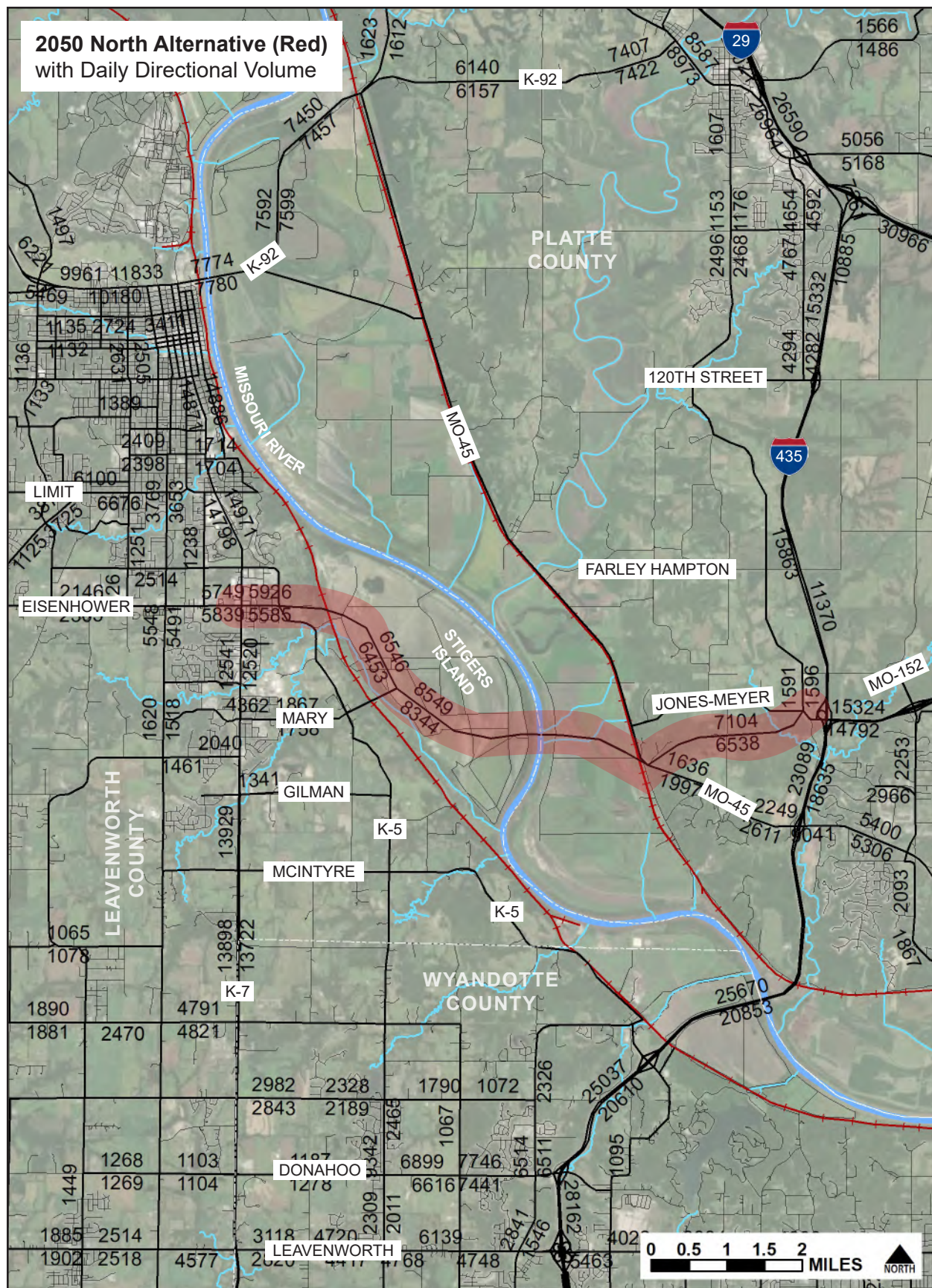
- Counties:** PLATTE COUNTY, LEAVENWORTH COUNTY, WYANDOTTE COUNTY.
- Roads:** K-92, K-5, K-7, MO-45, MO-152.
- Landmarks:** EISENHOWER, MARY, GILMAN, MCINTYRE, DONAHOO, LEAVENWORTH.
- Islands:** STIGERS ISLAND.
- Scale:** 0 0.5 1 1.5 2 MILES.
- North Arrow:** NORTH.



**Initial Analysis: 2050 South Alignment**  
with Daily Directional Volume

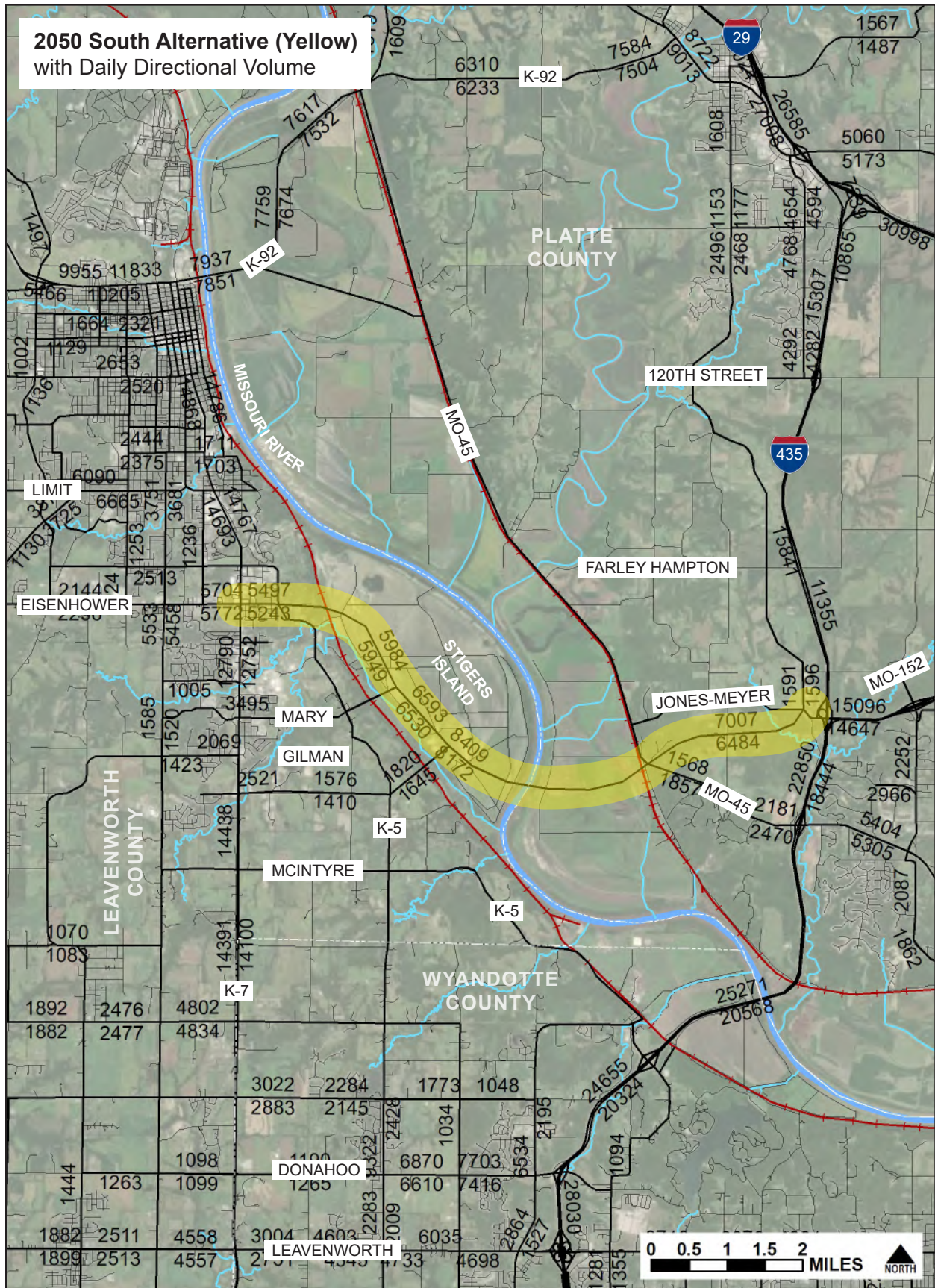








**2050 South Alternative (Yellow)**  
with Daily Directional Volume



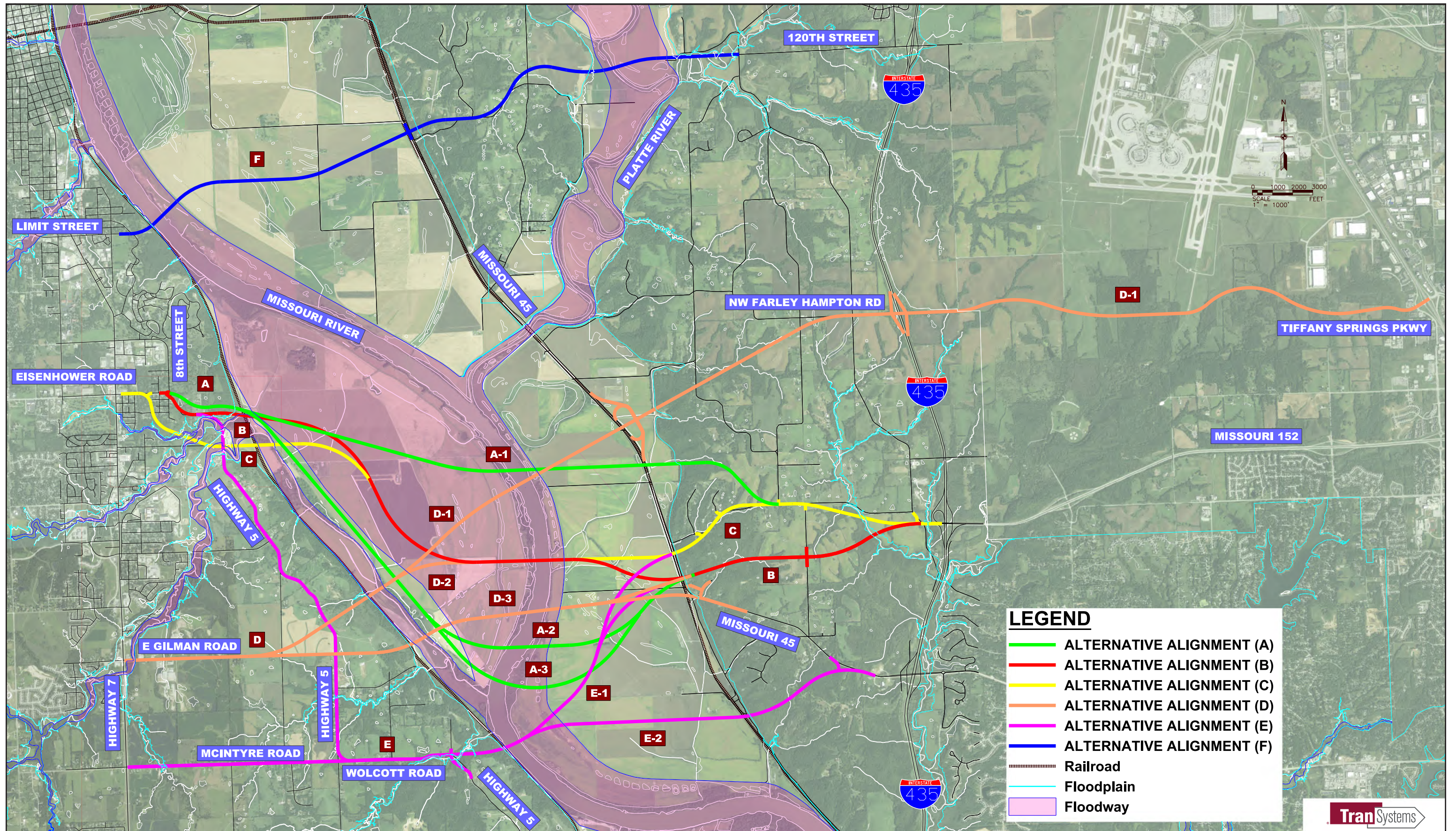




## **Appendix C | Alternative Alignment Maps**

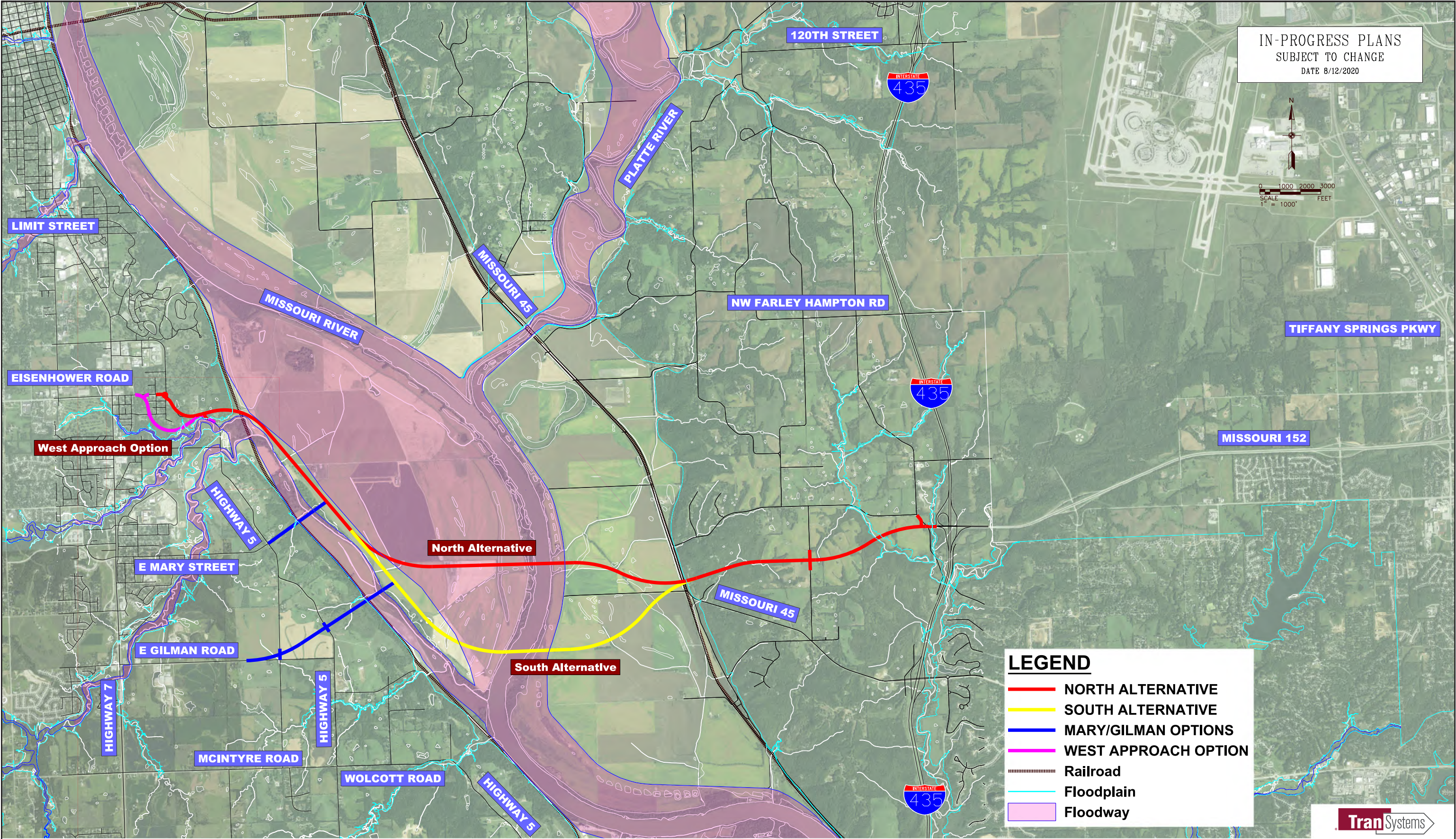
### **Eastern Gateway Concept Study**





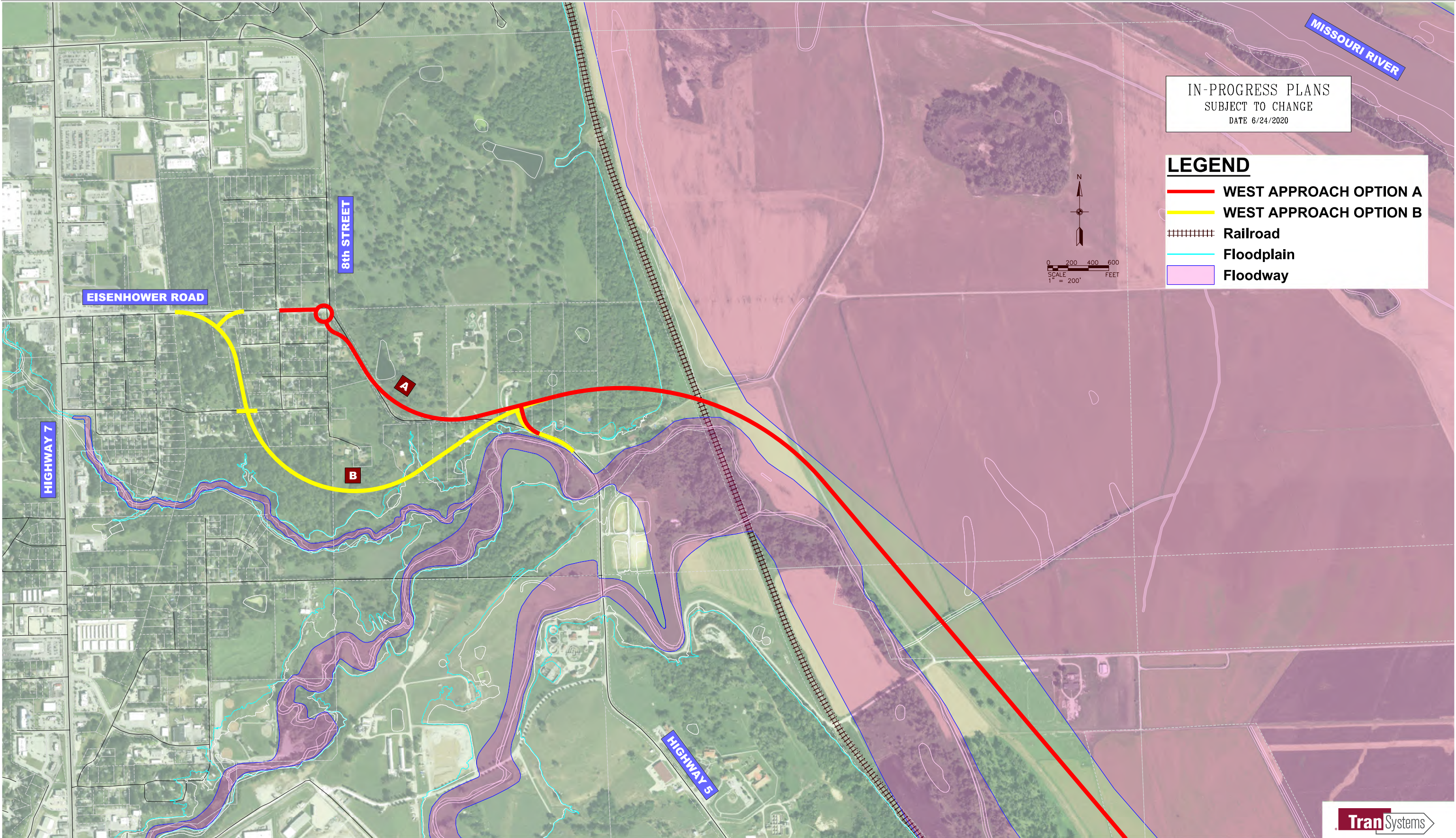
## EASTERN GATEWAY - ALIGNMENT ALTERNATIVES





# EASTERN GATEWAY - ALIGNMENT ALTERNATIVES





**EASTERN GATEWAY - ALIGNMENT ALTERNATIVES**





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