

OPEN HOUSE #2 OUTLINE

This Open House is the second of three scheduled open houses on the Route 92 Centennial Bridge Study. A summary of input received at the first Open House, held in January 2015, is provided below. Material presented at the first Open House focused upon Existing Conditions. The material at this meeting advances the study by presenting information on the major elements below. Your comments and questions are welcome.

- 1 Travel Aspects
- 2 Corridor Screening
- 3 Bridge Design
- 4 Assessment Review
- 5 Alternatives
- 6 Roadway Approaches

OPEN HOUSE #1 SUMMARY

The first public Open House was held in two sessions on January 14 and 15, 2015. Approximately 140 individuals attended the Open House with 60 percent completing an open-ended comment form. Thirty percent of the written comments included support for bicycle and pedestrian accommodations on the bridge. Of those who provided comments on tolling, 53 percent were against tolling, with 38 percent in favor of tolling with some conditions. Only 5 percent of those who provided comments felt that a replacement bridge is not needed.

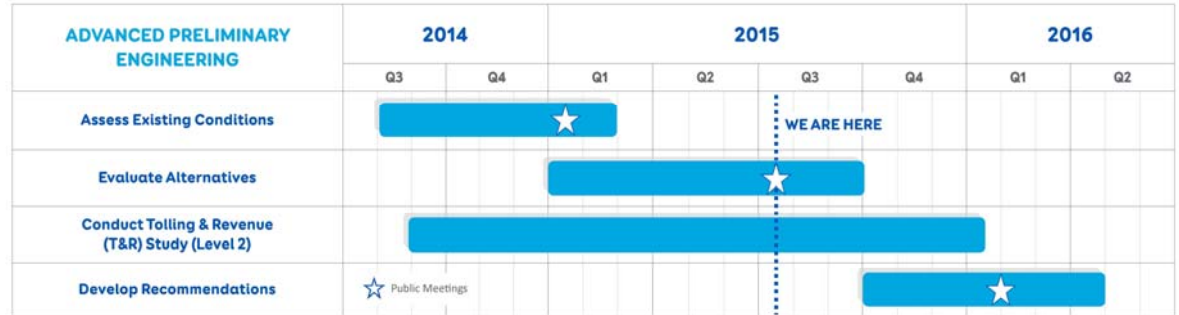


NEXT STEPS

As this phase of the study progresses, additional detail about the bridge and associated transportation connections, as well as probable costs and funding for such improvements, will become clearer. Future phases of implementation will be dependent upon the level of anticipated environmental documentation and development of a funding plan.

STUDY SCHEDULE

The study includes four tasks. Three public meetings will be held to engage the public, stakeholders, and the community throughout the study. The study is anticipated to conclude in Spring 2016.



Next steps could include a Level 3 Tolling & Revenue (T&R) study and the appropriate level of environmental documentation. Then, design plans with right-of-way acquisition and construction could eventually occur. This tentative schedule forms the basis for revenue assumptions. Currently, there is no funding dedicated for construction.



STUDY PURPOSE

The Route 92 Centennial Bridge Study will assess existing conditions, evaluate alternatives, conduct a Tolling & Revenue study, and develop a recommendation. The study will determine:

- ✓ Bridge location
- ✓ Bridge type
- ✓ Probable costs
- ✓ Potential funding mechanisms
- ✓ Preliminary assessment of the potential environmental impact

STAY INFORMED

Thank you for your interest in the Route 92 Centennial Bridge Study. To find out more information about the study, visit the KDOT KC Metro Area website at:

[www.ksdot.org/kc metro](http://www.ksdot.org/kcmetro)

Find us on Twitter: #Rt92CentennialBridge



TRAVEL CHARACTERISTICS

The regional travel demand model is being utilized to develop traffic forecasts with and without tolling. To gain a better understanding of the types, frequencies, and destinations of trips across the Centennial Bridge, a series of supplemental data is being collected including Origin-Destination studies and a Stated Preference survey for the value of time.

The travel demand model will be reviewed and refined to reflect traffic volumes, directional characteristics, and paths to various destinations. Tolling can divert trips to alternate routes or redirect discretionary trips. In this region, the travel demand model has a limited roadway network and may be modified to reflect the network used by motorists.

TRAVEL STUDY SUMMARY

Intercept Origin-Destination Study

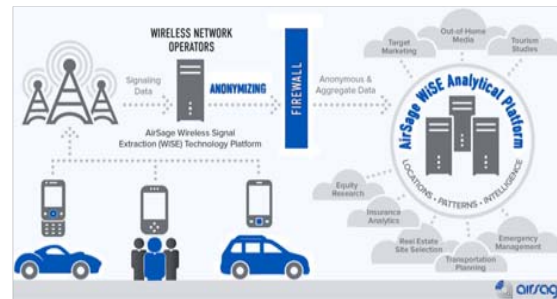
The Intercept Origin-Destination survey was conducted on Wednesday, April 1, 2015 along both Route 92 and Spur 45 in the eastbound direction from 7:00 AM to nearly 7:00 PM. Over 700 motorists were interviewed which results in a precision of +/- three percent at the 95 percent level of confidence. Below are highlights from the Intercept Origin-Destination survey responses.

Trip Origin	
Leavenworth, Kansas	91%
Fort Leavenworth*	22%
Atchison, Kansas	3%
Lansing, Kansas	2%
Other	4%
Trip Frequency	
Five times per week	33%
Once per week	22%
Unique trip	21%
Other	24%
State of Vehicle Registration	
Kansas	47%
Missouri	38%
Other State	15%

* The Fort Leavenworth data (22%) is a subset of the Leavenworth, Kansas data (91%).

AirSage® Origin-Designation Study

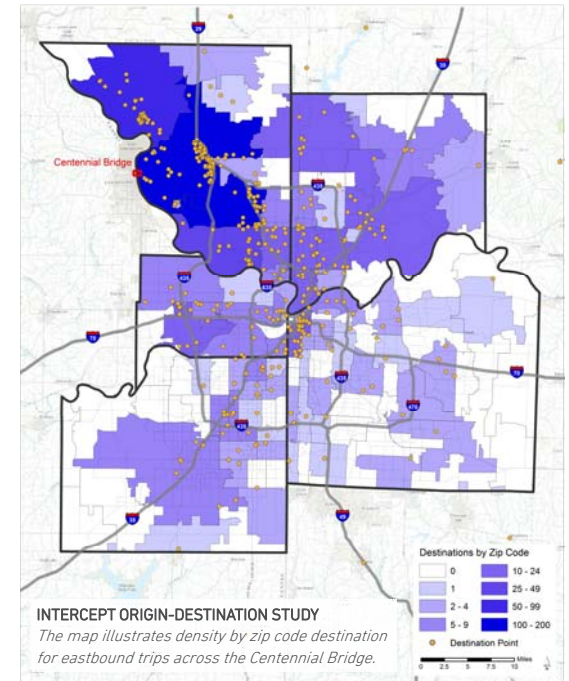
AirSage® uses real-time GPS technology to capture the movement of cell phones in an area that are connected to the wireless network. The study team will analyze the movement of cell phone data collected in the study area over a month-long period. Information is collected anonymously and without inconvenience to the users. The graphic below illustrates the AirSage® process.



Additional Surveys

A Stated Preference survey is also underway that will help to define the value of time and willingness to pay varying toll rates. Combined, the surveys provide input along with a series of other operating characteristics to assist in evaluating the coverage of potential tolling.

Before any decision can be made, the project's total cost and financial responsibilities of the various involved parties would need to be determined based upon the location and type of bridge, as well as cost for the bridge and associated roadway improvements.



CORRIDOR SCREENING

OVERVIEW

A series of **potential bridge crossing locations**, referred to here as corridors, were developed based upon review of former bridge crossings. Three broad corridors have been assessed: a North Corridor, an Existing Corridor, and a South Corridor. A summary of each corridor and its primary characteristics is provided below.

The intent with all corridor alignments is to avoid or minimize impacts. Combined with common information on bridge design (type, section, and elevation), the various corridors were assessed for environmental, traffic service, and financial impacts.

NORTH CORRIDOR

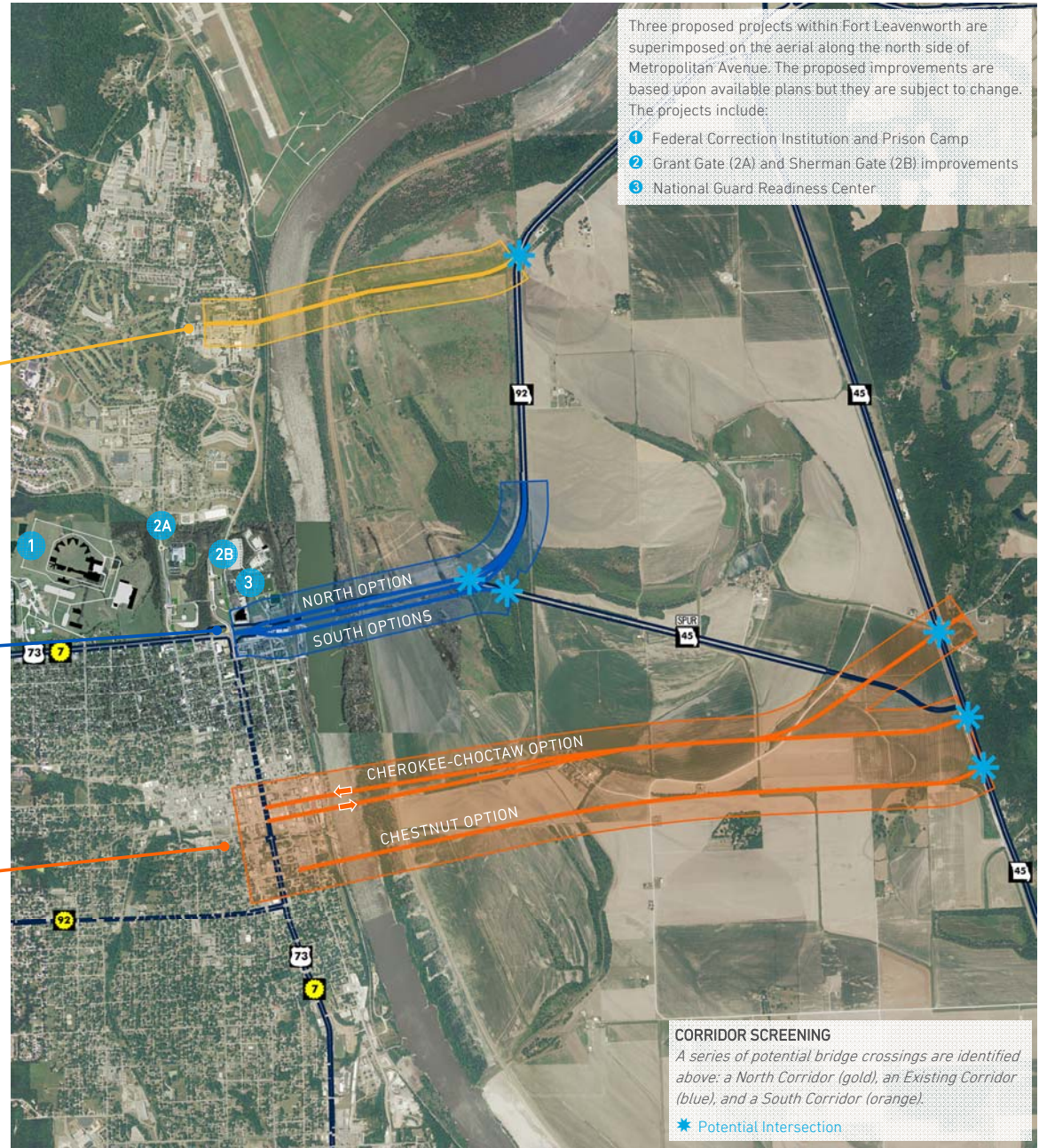
The North Corridor leads directly into Fort Leavenworth. This option utilizes the former Route 92 alignment and provides access only to Fort Leavenworth. As such, this option requires secured access and the best location for a gate might be on the Missouri side of the bridge. This location does not address the functional deficiencies with the existing bridge as all traffic is not served.

EXISTING CORRIDOR

The Existing Corridor is located immediately north or south of the existing Centennial Bridge. Several concepts are explored in this corridor: one immediately north of the existing bridge and two south of the existing bridge. One southern concept has direct property impacts while the other southern concept has indirect impacts.

SOUTH CORRIDOR


The South Corridor is located near the former railroad bridge crossing into downtown Leavenworth. This option utilizes the former railroad swing-bridge alignment which tied into railroad tracks. As a potential highway bridge, the bridge would be elevated over the railroad, making the profile grades greater than desired to connect with Route 92 or the truck route on 3rd Street. Extensive new roadways would also be needed on the Missouri side, adding to costs and impacts.



Three proposed projects within Fort Leavenworth are superimposed on the aerial along the north side of Metropolitan Avenue. The proposed improvements are based upon available plans but they are subject to change. The projects include:

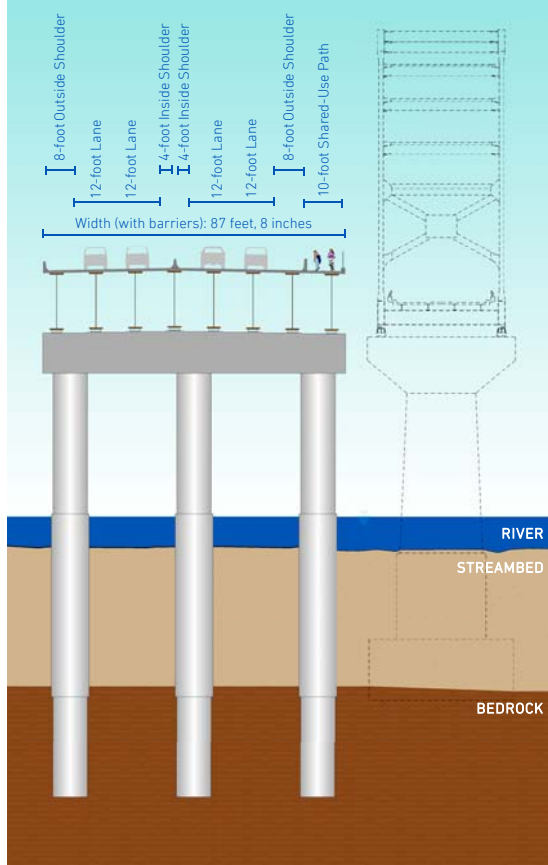
- 1 Federal Correction Institution and Prison Camp
- 2 Grant Gate (2A) and Sherman Gate (2B) improvements
- 3 National Guard Readiness Center

CORRIDOR SCREENING
A series of potential bridge crossings are identified above: a North Corridor (gold), an Existing Corridor (blue), and a South Corridor (orange).

 Potential Intersection

BRIDGE CROSS SECTION - MAIN SPAN

The typical section of the new bridge is displayed with an outline of the existing Centennial Bridge shown to the right for comparison.



TYPICAL BRIDGE SECTION AND ELEVATION

The typical section consists of four 12-foot wide lanes, two lanes in each direction, with 4-foot wide inside shoulders and 8-foot wide outside shoulders.

A 10-foot wide shared-use path is also provided on one side of the bridge. For the safety of bicyclists and pedestrians on the shared-use path, barrier separation from traffic is provided as well as appropriate height fencing along both sides.

It has been agreed by KDOT and MoDOT to advance this typical section through the study phase.

The proposed bridge provides the opportunity to address current navigational impediments downstream of the existing bridge along the east bank of the Missouri River. After coordination with the U.S. Coast Guard and barge operators along the river, the main span of the proposed bridge was shifted 200 feet west of the existing primary channel opening.

BRIDGE TYPES AND COSTS

Three economical structure types considered for practical alternatives for spanning the Missouri River were an arch bridge, cable-stayed bridge, and welded steel haunched plate girder bridge. These bridge types were advanced through a conceptual phase to provide an estimated construction cost of the alternatives. The bridge types ranged in costs from \$50 to \$95 million. The haunched plate girder bridge proved to be the most economical, approximately 30 percent less than the other alternatives.

PRACTICAL/ECONOMICAL BRIDGE DESIGN

To develop a practical and economical bridge design, the following principles are being employed as bridge and roadway approach alignments and their profiles are being prepared to:

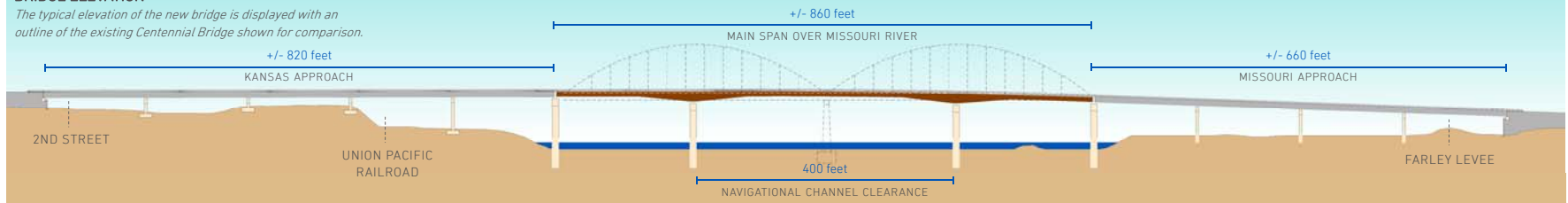
- ✓ Minimize impacts to existing buildings, utilities, and right-of-way
- ✓ Balance span layout to optimize girders and provide efficient use of materials
- ✓ Provide adequate clearances for 2nd Street, the Union Pacific Railroad, Missouri River navigation, and the Farley Levee
- ✓ Focus on long-term durability by providing: a deep foundation to prevent scour, multiple girder lines without any fracture-critical elements, weathering steel to prevent corrosion and reduce future painting costs, epoxy-coated reinforcing and additional corrosion protection measures, and minimal use of expansion joints.

AESTHETICS

The type of bridge as proposed, a haunched plate girder bridge, is a cost-effective and efficient solution similar to other Missouri River bridges. A number of aesthetic treatments can be added to the bridge including but not limited to lighting, fencing, form liners on piers, gateway or monument markers, and landscaping. However, payment for additional project costs will need to be determined beyond state funding. A future phase of this project will address specific aesthetic treatments.

BRIDGE ELEVATION

The typical elevation of the new bridge is displayed with an outline of the existing Centennial Bridge shown for comparison.



ASSESSMENT METHODOLOGY

A methodology was developed to assess potential impacts. At this screening level, three primary components were reviewed: environmental, traffic service, and financial. A comparative analysis is made to determine if an alignment is better than, no different, somewhat worse, or significantly worse than other alignments.

ASSESSMENT RESULTS

Environmental

In terms of environmental impacts, the matrix indicates that the South Corridor has a greater potential for impacts to numerous resources due to the longer routes.

One resource that each of the three corridors affects is historic resources. There are several existing National Register sites and districts in the City of Leavenworth that could be adversely affected by the corridors. The Centennial Bridge has also been reviewed by the State Historic Preservation Office and was found to be an eligible resource meeting the criterion of Engineering/Architecture. Consequently, mitigation options will be explored including potential reuse, finding a willing buyer, or documentation according to the appropriate process.

Traffic Service

In terms of traffic service impacts, a common element for all corridors is the need for the existing Centennial Bridge to remain in service while the new bridge is built.

Financial

In terms of financial impacts, the South Corridor scores poorly as the need for nearly 2.5 miles of new highway on the Missouri side results in greater right-of-way impacts and construction costs. The North Corridor would require greater operation and maintenance costs due to the need for secured access via a gate into Fort Leavenworth.

COMPARATIVE SUMMARY

Consideration of environmental, traffic service, and financial considerations suggest that the North Corridor and South Corridor be removed from further consideration. The comparative assessment suggests only the Existing Corridor should be advanced.

Legend	
Better Than	
No Different	
Somewhat Worse	
Significantly Worse	

Comparative Summary		Corridors		
		North	Existing	South
Overall Summary	Environmental			
	Traffic Service			
	Financial			

Environmental		Corridors		
		North	Existing	South
Noise	Local Noise Study			
Archaeology	Abandoned Shipwrecks			
Floodplain	Federal Emergency Management Agency			
Wetlands	National Wetlands Inventory			
Streams	U.S. Coast Guard			
	Kansas Division of Water Resources			
	Missouri Division of Water Resources			
Wildlife	Kansas Department of Wildlife, Parks, and Tourism			
	Missouri Department of Conservation			
	U.S. Fish and Wildlife Service			
Hazardous Waste	Sites			
	Underground Storage Tanks			
	Landfills			
Farmland	Conversion			
Historic	District			
	Bridge			
Traffic Service		Corridors		
		North	Existing	South
Operations	Intersection Capacity			
	Design Criteria			
	Mobility and Access			
	Maintenance of Traffic			
Financial		Corridors		
		North	Existing	South
Costs	Construction of Bridge/Roadway			
	Right-of-way			
	Land Use Impacts			
	Operations and Maintenance			

BRIDGE ALTERNATIVES

At this time, **two bridge alternative options**, described below, are under further review.

Alternative 1 - North of Existing Bridge

A new bridge immediately adjacent to the existing bridge is dictated by the proximity of the new bridge piers to the existing bridge piers, adjacent underground natural gas lines, and the City of Leavenworth's Waterworks facility. The necessary safe distance places the new bridge's centerline approximately 72 feet from the existing bridge's centerline.

Alternative 2 - South of Existing Bridge

Immediately south of the bridge in Leavenworth is an office building in a former industrial complex. To minimize potential impacts to the buildings, the bridge alignment has shifted further south and is elevated over the surface parking lots, thereby avoiding direct impacts to the adjacent buildings.

Legend

The graphics to the right illustrate the north bridge alternative (top) and the south bridge alternative (bottom). The thin *yellow line* indicates existing gas lines. The thin *white line* on the south side of the bridges that then loop to travel along the levee on the Missouri site of the river illustrates a shared-use path.

DESIGN ELEMENTS

Intersection Tie-in

The new bridge alignments tie into 4th Street at Metropolitan Avenue. The eastbound approach adds a second through lane, which would also require widening for an exclusive right-turn lane.

Vertical Profile

While the proposed bridge type would have a deck approximately 10 feet higher relative to the existing deck at main span over the Missouri River, the length of bridge structure allows for a nominal profile grade approaching the abutments. Once the existing bridge is removed, the difference in elevation will not be noticed.



Lane Balancing Transitions

With traffic volumes nearly equally balanced between Route 92 and Spur 45, dedicated auxiliary lanes at the fork of Route 92 and Spur 45 will afford an easy transition to and from the four-lane bridge.

Median Width

The median width on Metropolitan Avenue would be designed for an urban arterial while the median width on Route 92 in Missouri would be designed for a rural highway. The total width of the median on the new bridge would be a nominal 10 feet. Separation of the eastbound and westbound traffic with a safety barrier is under study.

Trail Connectivity

The bridge includes a shared-use path on one side, indicated on the south side of the new structure in the figures above. KDOT typically requires a funded plan from local agencies that provide connectivity to a trail system from the new bridge.

Within the City of Leavenworth, a connection can easily be made by extending the path westward. Within Platte County, concepts are being explored that show an intended connection on top of the levee, which passes beneath the bridge, that other entities could extend north and south along the Missouri River.

KANSAS: METROPOLITAN AVE

Sherman Gate (4th Street)

The change to the gate operations at Fort Leavenworth in February 2015 effectively closed Sherman Gate except for exiting traffic between 3:30 PM and 6:00 PM.

Grant Gate (7th Street)

The Grant Gate now serves as the primary entry into Fort Leavenworth. Traffic counts were collected in April after the gate circulation reconfiguration and before Metropolitan Avenue was under reconstruction. As the Grant Gate is the primary entry, particularly from the east and south (via 4th Street), the westbound right-turn movement has reached a significant level of congestion that warrants improvements. While extensive queuing may be addressed by lengthening the turn lane, the bottleneck is likely associated with driver behavior entering the gate.



MISSOURI: ROUTE 92 AND SPUR 45 INTERSECTION

A series of potential improvements have been prepared at the intersection of Route 92 and Spur 45. These concepts address congestion yet vary by the cost and the speed of traffic movement through the junction.

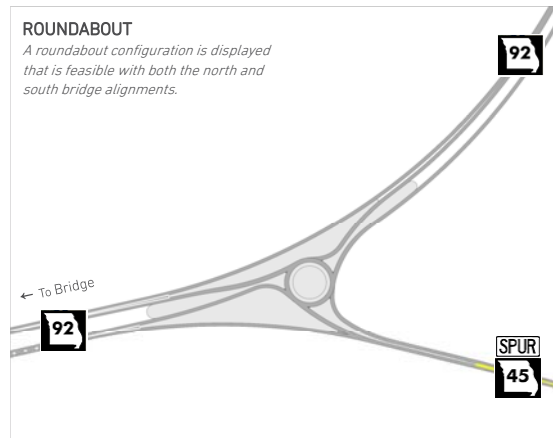
Each intersection configuration transitions from four lanes east of the bridge to two lanes on Route 92 and Spur 45, which reflects the current nearly-equal split of daily traffic volumes. Traffic operations at this intersection warrant some improvement for the Spur 45 westbound approach. The extent of improvements is dependent upon costs and any right-of-way impacts.

A roundabout option and traffic signal option are explored to the right. A flyover option that grade separates the westbound Spur 45 movements over Route 92 was also considered. However, the flyover configuration has been removed from further study due to the significant increase in costs for this option.

Both the roundabout and traffic signal intersection configuration options can apply to either the north or south alignment under review.

Roundabout

A roundabout is displayed conceptually with the south alignment option that enables Route 92 to approach the intersection at a perpendicular angle. The speeds approaching the roundabout are 20 mph, which is similar to the approaches at the Route 45 and Route K roundabout in Parkville, Missouri.



Traffic Signal

An intersection configuration with a traffic signal is displayed conceptually with the north alignment option. This configuration has auxiliary lanes to allow westbound traffic movement on Route 92 to flow continuously to the bridge. Spur 45 also has its own entering and exiting lane. Posted speeds approaching the signal would be 45 mph.

