PARSONS

CONCEPTUAL ALTERNATIVE ANALYSIS

J6S3270 – ST. LOUIS COUNTY, BIG BEND ROAD OVER I-44

Big Bend Road / INTERSTATE MISSOURI 44

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Project Overview

The Missouri Department of Transportation (MoDOT) initiated this Conceptual Alternative Analysis to objectively establish the most effective solution to replace the Big Bend Road Bridge (A1716) over Interstate 44. The Conceptual Alternative Analysis assesses multiple span configurations, and structure types for the Big Bend Road replacement bridge.

MoDOT also directed the Conceptual Alternative Analysis to include an study of the existing interchange, and identify improvements that could be made to Big Bend and the I-44 ramps to improve mobility, safety, and access. Included in this analysis is a study of ways to maintain traffic during the construction of any recommended bridge or roadway improvements. If the bridge was going to be replaced, MoDOT wanted to take advantage of the disruption to users to improve Big Bend and the interchange with I-44, if recommended by this Conceptual Alternative Analysis.

Big Bend Road over I-44 (A1716)

The Big Bend Road over I-44 (Bridge A1716) was originally constructed in 1967 and is nearing the end of its service life. The bridge was rehabilitated in the mid 1980's and is now scheduled for replacement. The existing bridge is a four-span concrete box girder structure. In June 2018, the A1716 bridge received deck rating and superstructure rating of 4 (poor condition) and the substructure rating of 5 (fair condition). Pending completion of the field survey, the existing vertical clearance is given at 15'-3". The project design criterion established the vertical clearance to be a minimum of 16'-6". Appendix H includes the full State Bridge Inspection Report.

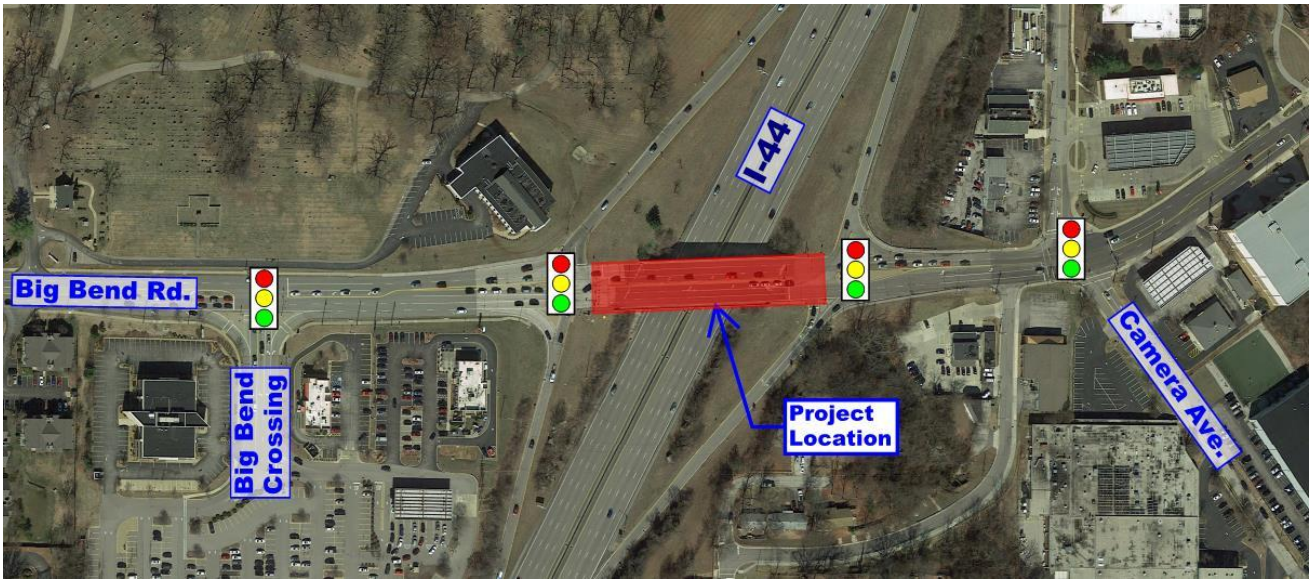


Figure 1 - Project Location

Big Bend Road and Interchange with I-44

Big Bend Road currently carries two through lanes in each direction across the bridge over I-44. There are dedicated left-turn lanes for each direction from Big Bend Road onto I-44, and traffic is controlled by traffic signals at each of the I-44 ramp terminal intersections. There are adjacent signalized intersections within 500' east and west of each of the signalized ramp intersections. The proximity of the signalized intersections often results in congestion and backups. There is a large commercial development immediately west of the interchange, and the traffic volumes it generates further affects mobility through the interchange.

Each of the on-ramps to I-44 are single lane entrance ramps. The exit ramps from I-44 are single lane exit ramps with the following characteristics:

- The westbound exit ramp splits into left/right lanes at the intersection with Big Bend Road. The right-turning traffic onto westbound Big Bend Road is yield controlled, and the left-turning traffic is signalized.
- The eastbound exit ramp develops a second lane ahead of the intersection with Big Bend Road such that the left and right turn lanes are separated, with approximately 175' of storage provided. Both directions are signal controlled.

Conceptual Alternative Analysis

This Conceptual Alternative Analysis was ordered into three distinctive components.

1. Maintenance of Traffic
2. Roadway Improvements
3. Bridge Replacement

The maintenance of traffic section analyzed different approaches to sequencing construction. It was first analyzed in a macro approach, in terms of full closure versus maintaining traffic during construction. This was an important factor to determine, since it influenced the roadway improvements and bridge replacement sections. Once those two sections were complete, the maintenance of traffic would be reanalyzed on a micro level to confirm the findings.

The roadway section analyzed different improvements that could be made to Big Bend Road and the I-44 interchange. Different lane configurations were considered, and traffic was analyzed to determine which improvements had the most benefit while considering construction costs. The limits of our analysis were restricted to the signalized intersections at the interchange and did not include corridor traffic analysis or extend to the signalized intersections east and west of the interchange. After the bridge analysis was completed, this section was reexamined in terms of profile revisions required to provide minimum vertical clearances above I-44. The potential profile revisions would impact the I-44 interchange ramps, which would then influence the maintenance of traffic.

Finally, numerous bridge solutions were developed for the conceptual alternative analysis for the replacement of A1716 and summarized in a matrix. Each alternative was evaluated to determine the feasibility, cost-effectiveness, impacts to vertical clearance, roadway profile modifications required and opportunities for enhancing the maintenance of traffic solutions. The major identifiable quantities for each structure were calculated and fiscal year 2019 unit costs were used to establish a cost-comparison for each bridge solution. The square footage cost of each bridge solution was calculated to provide a means to assess the cost-comparison for the replacement of Bridge A1716. A discussion of the advantages and disadvantages for the recommended conceptual alternative is provide here within.

Big Bend Road and I-44 Maintenance of Traffic Analysis

Three options were evaluated for the Big Bend maintenance of traffic during construction. Two of the options (B and C) require a complete closure of Big Bend and the third option (A) maintains one lane of through traffic in each direction. All the options will require short term lane closures on I-44 during construction of the bridge overhead.

Our team evaluated the traffic performance of maintaining a single EB and WB lane for Big Bend Road (Option A). The first step was to make some assumptions regarding traffic diversions. When the bridge is replaced, it is assumed that the following traffic diversions will take place:

- I-44 EB and WB traffic exiting to Big Bend: would utilize either US67 or Berry Road exits, depending on their destination and would not enter the project area during construction
- EB Big Bend traffic to EB I-44: two-thirds would utilize US 61 and would leave the project area; one-third would utilize Berry Road and would pass through the project area during construction
- EB Big Bend traffic to WB I-44: would utilize US 61 and not enter the project area during construction
- WB Big Bend traffic to EB I-44: would utilize Berry Road and not enter the project area during construction
- WB Big Bend traffic to WB I-44: the full volume would utilize US 61, passing through the project area during construction
- The exception is that traffic assumed to be going to or from Big Bend Crossing (where there is a Sam's Club), determined by percentage of traffic volumes, was maintained during the detour and re-routed.

Applying the traffic diversions above significantly reduces the traffic volumes across the bridge during construction. The volumes on the bridge in the AM are 1055 WB and 585 EB, which can be accommodated by a single lane (WB will be nearly at capacity). The resulting LOS at the adjacent signals would be LOS A/B (assuming all the turn lanes stay open approaching these intersections). The volumes in the PM are 990 WB and 885 EB on the bridge, which can be accommodated by a single lane. The resulting LOS at the adjacent intersections are also A/B. For additional detail see Appendix B.

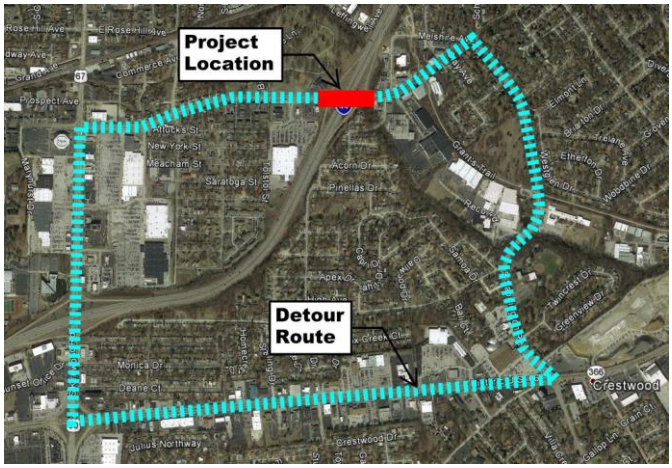


Figure 2 - Detour Routes

The alternative to maintaining traffic on Big Bend Road during construction is to completely shut down the road while the bridge is being replaced. This option results in a reduction in construction duration as well as increased safety for workers and motorists. Furthermore, a full closure at this location is made more feasible by the presence of multiple detour routes for traffic diverted above. The I-44 interchange at Route 61/67 (Lindbergh Boulevard) is 1 mile to the west and serves as access to I-44 for those motorists wishing to use the Big Bend Road interchange. Locally, there are multiple local connections which would serve as alternative routes. The official local detour route would be signed along the north-south routes of Route 61/67 (Lindbergh Boulevard) to the west, and Sappington Road to the east. The east-west detour route would be Route 366 (Watson Road). All these routes are multi-lane collector roads which could accommodate the detoured traffic. Based on the presence of reasonable detour routes, two additional alternatives can be analyzed for maintenance of traffic.

The second option analyzed was an Accelerated Bridge technique. The new bridge would be constructed offline on temporary abutments, and then slid into place once the new substructure has been completed (Option B). Option B would

result in the least impact to traffic during construction as the Ramps and Big Bend would remain open until the new bridge was nearly ready to be slid into place. Only at that time would Big Bend and the ramps be closed while the existing bridge was demolished, and the new foundations constructed, and the final bridge slid into place. Final roadway improvements would be completed at this time. This option carries the extra cost of constructing temporary abutments for the proposed replacement bridge. While this option does reduce the number of days existing traffic is impacted, the full benefit of a slide is not realized if the Big Bend Road profile needs to be raised and rebuilt to provide minimum vertical clearance over I-44. Full closures are required after the bridge slide to tie the revised Big Bend Road profile to the new bridge elevation. If the Big Bend profile remains at the existing elevation, the closure time would be very limited. Similarly, the closure time would be extended as the profile is raised.

The third and final option considered was a full closure of Big Bend Road and the interchange ramps during construction (Option C). As noted in Options A and B, there are numerous alternative routes available to motorists in this area. Users would also use unofficial detour routes which suit their needs. Option C would result in the greatest impact to traffic during construction as Big Bend would be closed throughout construction. However, Option C would have the overall shortest Construction duration, and it creates the opportunity for larger scale improvements at the I-44 interchange.

Table 1: BIG BEND OVER I-44 MAINTENANCE OF TRAFFIC OPTIONS

MOT OPTION	DESCRIPTION OF MAIN PHASES OF MOT	MAINTAIN ONE LANE OF TRAFFIC EACH WAY	BRIDGE SLIDE
A	(1) Close ALL Left-Turn Lanes. (Big Bend and I-44 Ramps).	YES	NO
	(2) Switch EB traffic onto existing WB Big Bend over I-44. Maintain One Lane Each Direction		
	(3) Demo of Existing EB Bridge. Reconstruct ½ New Bridge in place.		
	(4) Switch EB and WB traffic onto new EB Structure		
	(5) Demo of Existing WB Bridge. Reconstruct Remaining Bridge		
	(6) Temporary Full-Closure of Big Bend for reconstruction of pavement and ramps		
	(7) Switch traffic to final configuration		
B	(1) Construct New bridge off-alignment on temporary piers. Big Bend Traffic remains in place.	NO	YES
	(2) Full Closure of Big Bend Road (Short-Term)		
	(3) Demo of Existing Bridge. Construct New Foundations. Slide Previously Constructed bridge.		
	(4) Reconstruct Big Bend pavement and ramps.		
	(5) Switch traffic to final configuration		
C	(1) Full Closure of Big Bend Road (Long-Term)	NO	NO
	(2) Demo of Existing Bridge. Construct New Bridge		
	(3) Reconstruct Big Bend pavement and ramps.		
	(4) Switch traffic to final configuration		

The maintenance of traffic for I-44 under Big Bend was not developed in detail. Removal of the existing bridge and construction of the replacement structure will require work along the median/inside shoulder for pier and barrier construction. There will also be some work along the outside shoulder for foundation and MSE wall construction. I-44 EB and WB lanes can be narrowed and shifted toward the outside shoulder for completion of the median work. The same narrowed lanes can be shifted toward the median for work along the outside shoulder. The required MOT of I-44 was constant among all alternatives and was not used as a factor in the determination of a preferred alternative.

Big Bend Road and Interstate 44 Roadway Analysis

When considering replacement of interchange bridges in urban areas, it is prudent to look at the existing and projected traffic to determine whether the existing bridge configuration meets the traffic demands. The traffic analysis for Big Bend over I-44 is included in Appendix A1 and A2. Several interchange modifications were analyzed to address the existing and projected traffic demands.

- Diverging Diamond Interchange (DDI): this interchange type was a potential alternative due to the high volume of turning vehicles at this interchange. Removing the protected left turns from the ramp intersections would increase mobility along Big Bend. Unfortunately, the presence of the existing signalized intersections near the interchange limits the use of this interchange type. Major reconfiguration of Big Bend, and the intersections at Big Bend Crossing/Big Bend Road and Camera Avenue/Big Bend Road would be required to accommodate a DDI. These improvements are not feasible given the space limitations and are beyond the scope of this analysis.
- Single-Point Urban Interchange (SPUI): this interchange type was also a potential alternative due to the traffic improvements that could be shown at the interchange. However, there were again serious geometric constraints at this interchange. Big Bend Road and I-44 intersect at a skew, and the existing ramps are pulled very tight to the interstate. It is possible to fit the SPUI in to this interchange, but it either results in a very large bridge structure, or property acquisition to accommodate ramps with a more sweeping alignment. Due to these factors, a SPUI option was eliminated from this analysis.
- Roundabout Interchange: this interchange type was considered because it could potentially reduce the size of bridge required and eliminate signals from the project. Both would be considered benefits in terms of reduced future maintenance costs. Unfortunately, the adjacent signalized intersections again interfere with feasibility of this interchange type. Traffic leaving the roundabouts at the ramp intersections would immediately be metered by the adjacent signalized intersections and likely cause traffic backups into the roundabouts. This would eliminate any benefit of the roundabouts and cause more impact to motorists. This option was not considered any further.
- Existing Tight Diamond Interchange: given the site constraints, the existing and future traffic patterns could be analyzed, and geometric improvements made to improve mobility to the extent possible without large-scale interchange modifications. This option has benefits because too much additional capacity at this interchange would almost certainly overwhelm the adjacent signalized intersections, and hinder access to the adjacent commercial and residential developments.

Through a collaborative process with MoDOT Traffic and the Core Team, the solution of maintaining the existing tight diamond interchange while providing dual left turn lanes from the I-44 Exit Ramps to Big Bend was selected as the recommended alternative. This solution was selected for several reasons:

- Shortens the Ramp Signal Phase and provides increased green time for Big Bend traffic.
- Does not geometrically affect the adjacent Big Bend intersections east or west of I-44
- Sufficiently addresses the traffic demands without increasing bridge costs or significant interchange modifications

In addition, the future geometry of Big Bend was modified from its existing layout to remove the third eastbound though lane approaching the I-44 WB ramp terminal intersection. This lane was omitted from future geometrics at MoDOT's direction to accommodate the potential for permitted left-turns for westbound traffic, which is a dual-thru movement.

See Appendix C for Conceptual Roadway Plans which depict this recommended alternative.

As shown in Appendix A2, the investigation confirmed that the addition of dual left-turn lanes on the exit ramps would improve operations at both intersections. The less-than-desirable LOS at the EB I-44 exit would improve to within the range of acceptability. Although the operational improvements to the WB I-44 exit would be minimal, the additional left-turn lane is recommended for geometric balance at the interchange and to match driver expectations.

Some reconstruction of Big Bend Road will be required due to the bridge construction. The magnitude of the impacts to Big Bend are dependent upon the structure depth of the recommended bridge alternative and potentially increasing the vertical clearance over I-44 to 16'-6" from 15'-3" to meet minimum requirements.

For an increase in the vertical profile of less than six inches, the pavement will be milled and overlayed. A break in grade of 0.20% will be used to minimize the length of pavement mill and overlay and the maximum depth of the overlay is determined by the structure depth and desired vertical clearance over I-44. For an increase in the vertical profile greater than six inches, the existing pavement will be replaced. The length of the existing pavement replacement is approximately 335' for the recommended alternative as described below.

PROPOSED PAVEMENT DESIGN

EXISTING PAVEMENT CONDITIONS

The existing typical section of the Big Bend Road over I-44 has two 11 feet through lanes and dedicated 11' left turn lanes in each direction. There is a 4' raised concrete median across the bridge. Along the westbound side of Big Bend there is a 1' shoulder separating the bridge barrier from traffic. On the eastbound side there is a 1' shoulder separating a raised sidewalk from traffic. The 4' wide sidewalk has bridge barrier and railing on its outside edge. The existing Big Bend Road pavement consists of concrete base with asphalt overlay pavement.

PROPOSED PAVEMENT TREATMENT

The proposed pavement treatment is a combination of mill and overlay and full-depth reconstruction. For mill and overlay, the project has been estimated with a 2" Coldmill and replace with 1 ¾" (min.) SP125CLP w/ PG 70-22. Additional asphalt wedging would be proposed when required. The proposed limits of mill and overlay were estimated at reasonable termini to take advantage of the bridge replacement maintenance of traffic and could be expanded or reduced based on available funding. Nearly all of the pavement work in the recommended alternative consists of mill & overlay. Only the ramp widening and short sections of Big Bend between the bridge approach slabs and ramp intersections are estimated for reconstruction.

For the purposes of this Conceptual Study Report, the typical section for full-depth reconstruction and ramp widening was quantified as 8" of PCC Pavement on 4" of Type 5 Aggregate for Base.

Conceptual pavement types on the ramps match those on Big Bend Road. All pavement design will be confirmed by MoDOT prior to final design.

OTHER DESIGN CONSIDERATIONS

DRAINAGE IMPROVEMENTS

There are some existing curb inlets along Big Bend Road off the bridge within our current project limits. These inlets will be adjusted to grade. Existing drainage patterns will be maintained as part of this project.

PROPOSED TRAFFIC SIGNAL DESIGN

The two sets of signals at the I-44 ramp intersections will be replaced and upgraded as part of this project. This upgrade will include new traffic signal heads, pedestrian signal heads, pedestrian push buttons, cabinets, posts, and foundations. ADA compliant curb ramps, islands, and truncated domes will also be provided.

PEDESTRIAN ACCESS

Currently, pedestrian access is only provided along the eastbound side of the Big Bend bridge over I-44. However, pedestrian facilities are provided on both sides of Big Bend Road off the bridge. As part of this project, sidewalks will be provided on both sides of the bridge. These sidewalks will be separated from traffic by Concrete Traffic Barrier, and ADA compliant connections will be made to the existing sidewalk facilities at the project limits. Barrier height transitions and other design details should be considered during final design to maintain adequate intersection sight distance (ISD). Signals at the intersections will be upgraded to included pedestrian push buttons and signal heads.

UTILITIES

The project limits occur in a mix of residential and commercial areas. As such, it is anticipated that there will be minor utility conflicts during the construction of this project. This work includes:

- Power – There are existing street lights within the project limits. It is assumed that the lights will be able to stay in place, but there may be some minor adjustments required for handholes.
- Water – There will likely be minor water valve adjustments required as part of this project.
- Gas – There will likely be minor gas valve adjustments required as part of this project.

SAFETY

Replacement of all existing guardrail components has been included in the cost estimate to account for new MASH standards.

RIGHT OF WAY

No property acquisitions were identified as part of this Conceptual Alternatives Analysis. However, minor temporary easements could be required as part of this project, depending on design refinements.

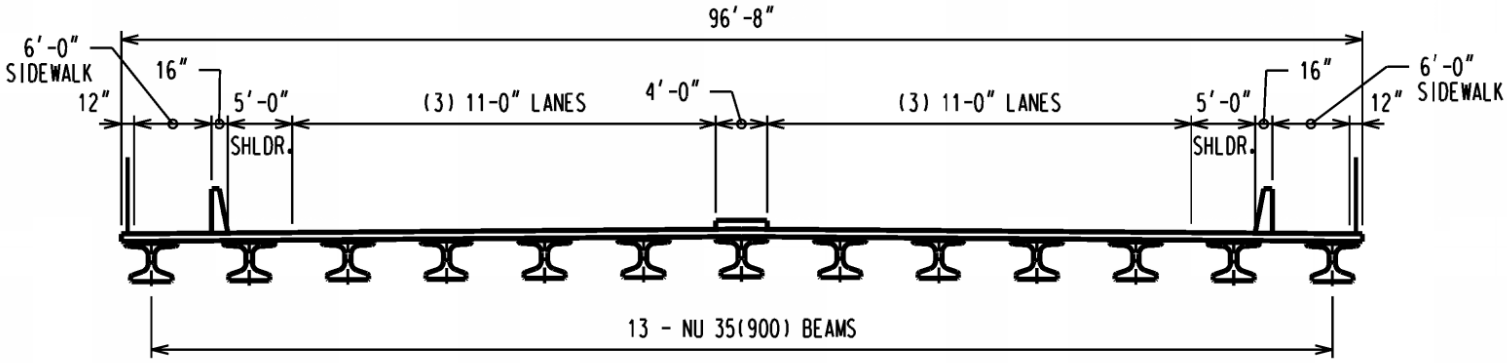
Big Bend Road Bridge over I-44 (A1716) Analysis

The A1716 bridge solutions considered multiple span configurations with and without MSE retaining walls, and various structure types. The feasibility of the structure types was confirmed utilizing span limit charts from various sources including the MoDOT Engineering Policy, previous engineering designs, and through preliminary engineering using software. Quantities for each solution were determined and unit cost applied to calculated quantity item. Appendix E contains conceptual cost estimates for all bridge options. The table below identifies the span layouts and structure type considered. See Appendix D for the complete bridge matrices.

Table 2: BIG BEND ROAD OVER I-44 BRIDGE REPLACEMENT SOLUTIONS

	STRUCTURE TYPE	SINGLE SPAN W/MSE WALL 16,170 SF	TWO SPAN W/MSE WALL 16,856 SF	TWO SPAN W/O MSE WALL 22,344 SF	THREE SPAN W/O MSE WALL 22,344 SF	FOUR SPAN W/O MSE WALL 22,736 SF
SPREAD BEAMS	P/S Concrete I Girder - MoDOT Standard Girder Type 3		X			X
	P/S Concrete I Girder - MoDOT Standard Girder Type 4					
	P/S Concrete I Girder - MoDOT Standard Girder Type 6			X		
	P/S Concrete I Girder - MoDOT Standard Girder Type 7	X			X	
	P/S Concrete I Girder - NU 35 (900)		X			X
	P/S Concrete I Girder - NU 43 (1100)			X		
	P/S Concrete I Girder - NU 63 (1600)				X	
	P/S Concrete I Girder - NU 78 (2000)	X				
	Concrete Box Girder – MoDOT Box Beam (39" x 48")		X			
	Concrete Box Girder – MoDOT Box Beam (27" x 48")					X
	Steel Superstructure – Steel Rolled Beam (W36)					X
	Steel Superstructure – Steel Rolled Beam (W44)		X			
	Steel Superstructure – Steel Plate Girder (Grade 50)	X	X	X	X	X
ADJACENT BEAMS						
	Precast Concrete Inverted Tee 30"					X

Each bridge solution accommodates the existing I-44 configuration only; there were no allowances made for future changes to the I-44 configuration. Quantities and costs for the bridge solutions listed in the table were calculated based on a replacement bridge width of 98-feet. Preliminary bridge width is shown below.



A1716 REPLACEMENT BRIDGE - ACCELERATED BRIDGE CONSTRUCTION (ABC)

The construction of the replacement bridge for Big Bend over I-44 provides opportunities for the incorporation of accelerated bridge construction (ABC) techniques. However, not all of the ABC techniques are applicable to each structure type.

PREFABRICATED BRIDGE ELEMENTS

Each structure type has the potential to incorporate prefabricated bridge elements which would serve to reduce the duration of the construction and improve quality as the elements are produced in a controlled setting. Examples of prefabricated items or modular systems include: approach slabs, precast prestressed piling, precast end bent pile cap, precast columns, precast intermediate caps, precast prestressed beams, precast prestressed deck panels, pretopped girder section, and modular steel girder/cast-in-place deck system. As the purpose of the report is to investigate conceptual alternatives, it is premature to select specific bridge elements. The use of prefabricated bridge elements and modular systems will be investigated in future phases of the project.

SLIDE-IN-BRIDGE CONSTRUCTION (SIBC)

It is feasible to construct the bridges off-alignment, adjacent to the Big Bend eastbound (EB) or westbound (WB) lanes, and slide all of the spread beam and adjacent beams structure types with exception to the post-tensioned concrete slab. Utilizing SIBC would consist of constructing temporary end bents and intermediate bents when applicable to support the superstructure of the replacement bridge in a temporary alignment. The advantage to incorporating bridge slides on this project would be reducing the full-closure of Big Bend Road. From Parsons experience with bridge slides we feel that it is feasible to reduce the construction time from 90 days to 45 days (a savings of 45 days in full bridge closure); thereby mitigating impacts to Big Bend traffic and enhancing safety for the contractor and traveling public.

To accurately compare Maintenance of Traffic concepts and their overall costs; we calculated a road user cost differential between a complete closure (detour) and a slide-in bridge construction (shorter duration detour). The difference in road user costs are then compared against the additional costs of using Slide-In Bridge Construction. The most likely detour from one side of the project to the other would utilize Sappington Road, Watson Road and the Lindbergh Avenue interchange to the south.

The Indiana Department of Transportation (InDOT) and The Ohio Department of Transportation (ODOT) Road User Cost calculations were utilized for this exercise. The calculations are included in Appendix G. Several assumptions and/or approximations were required for the calculation of roadway user costs.

- ADT: The ADT for Big Bend over I-44 is approximately 23,000. It is not anticipated that all 23,000 vehicles will require the worst-case 3.5-mile detour from one side of the project to the other. Some portion of the daily traffic will utilize alternate routes based on their origin and destination with negligible impact. As such; 11,500 vehicles were estimated to be impacted with Road user costs during construction.
- Duration of Closure: At this time, it is estimated that a Full Closure would last for 90 days; a closure for SIBC would require 45 days and staged construction would require no detours. 45 days is the difference between each alternative and is the basis for road user costs.

The ODOT method resulted in a road user cost of $14,811 per day or a total of $666,505 over the 45-day duration. The InDOT method resulted in a slightly lower cost of $520,440. Averaging the two values results in a Road User cost of $593,000 or $13,180/day.

In summary; the road user costs for each maintenance of traffic concept would be as follows:

Option A (Staged Construction) - $0.00

Option B (Slide-In Bridge Construction) - $593,000

Option C (Full Closure) - $1,186,000

These costs should be used in concert with additional factors of construction costs, motorist and worker safety and bridge durability.

Considering the cost of sliding the bridge we can then easily calculate the potential dollars saved. If road user cost is greater than the cost of sliding the bridge, it is money saved when considering the entire project cost (construction dollars + road user cost during construction.

The graph below outlines the potential at this location based upon the calculation of road user cost compared to the fixed cost of sliding the Big Bend Road bridge. Sliding a 2-span structure is estimated to be $328,000. The Road user cost of ($13,180/day) *(45 days) – ($328,000 Slide-Cost) = $265,000. Variables of potential ADT and Construction Days Saved were graphed to understand a possible break-even point of road-user costs vs. slide-in bridge construction costs.

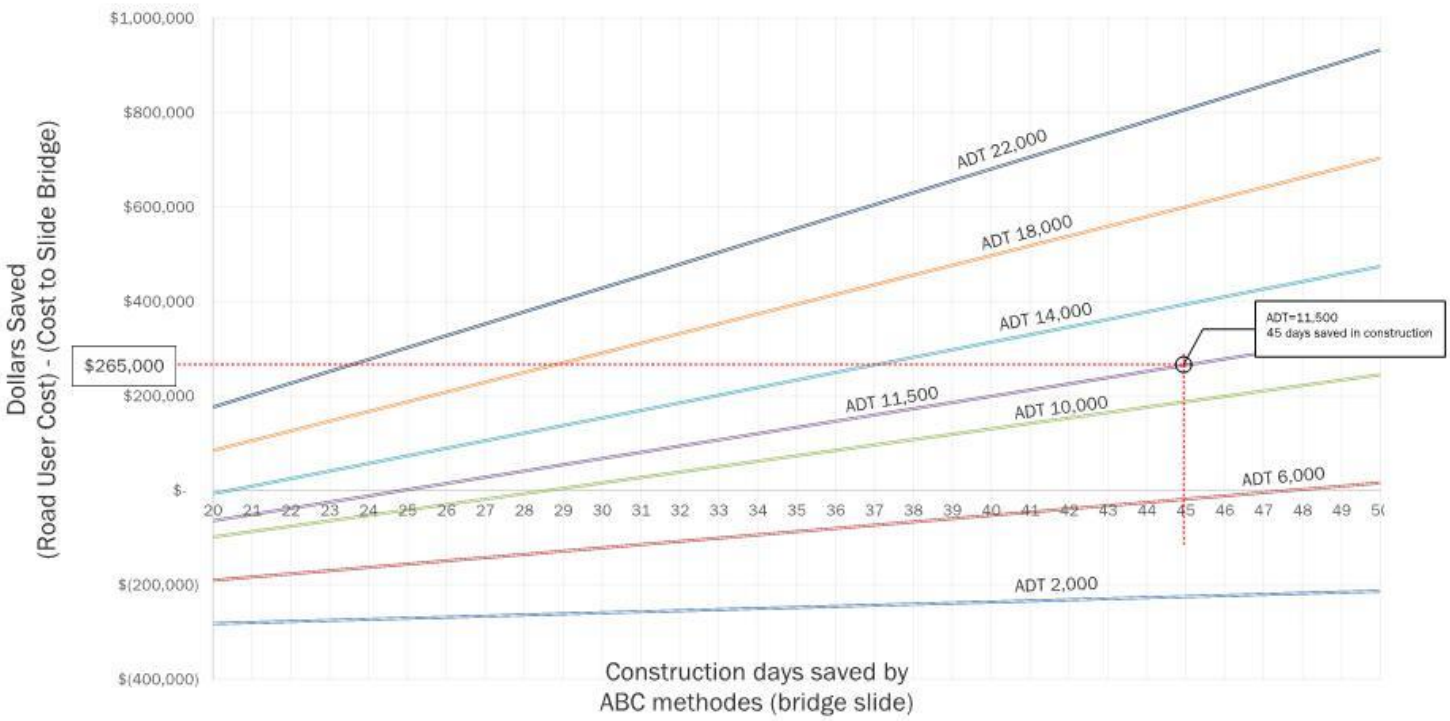


Figure 3 - Potential Dollars Saved utilizing SBIC Construction Methods

Results and Recommendations

Big Bend Road and I-44 Interchange Recommendation

The recommended roadway improvements to Big Bend Road and the I-44 interchange include:

- Profile adjustments to provide minimum required vertical clearance for the proposed bridge type described below
- Minimal Reconstruction of Big Bend Road to account for profile adjustment. Big Bend Road will be milled and overlaid beyond the tie-ins and along the ramps to take advantage of the road closure during construction. Mill and overlay could be expanded or reduced based on available funding.
- Widening of I-44 exit ramps to accommodate dual left-turn lanes onto Big Bend Road. Mill & overlay shown to provide a uniform driving surface and clear pavement markings for new lane configurations.
- Signal and pedestrian upgrades to provide ADA compliant facilities on both sides of Big Bend Road

See Appendix C for Conceptual Roadway Plans which depict this recommended alternative

Maintenance of Traffic Recommendation

We would recommend that the reconstruction of the Big Bend Road bridge be done with a complete closure of Big Bend Road. Phased construction of the bridge brings additional cost as well as potential construction quality issues. Detour routes are plentiful in this urban setting.

A possible bridge slide at this location is warranted and should be discussed further with MoDOT. As can be seen in the Figure 3 the potential savings by utilizing a bridge slide comes by adding in the road user cost to the project. The impact of a complete closure will affect some people. An innovative bidding structure can potentially maximize project savings.

There will be some impacts to I-44 traffic under the Big Bend bridge during removal of the existing bridge and construction of the new bridge. It is anticipated that these impacts were constant among all the bridge and MOT options.

Big Bend Road over I-44 (A1716) Recommendation

Bridge options were narrowed to three for their overall bridge cost efficiency; MoDOT Standard Girder Beam Type 3, NU 35 and Concrete Box Beams. All three are 2-Span options utilizing MSE walls. A 2-Span bridge will require some construction in the I-44 median; however, this was not considered to be a differentiator or negative given that I-44 median work will be required for removal of the existing bridge piers.

The three bridge options were father evaluated regarding the required roadway work associated with each bridge type. The table below summarizes the key factors for each of the three bridge alternatives.

We recommend a 2-span bridge with NU 35 (900) precast beams. Utilizing an MSE wall here will allow for a reduction in span length as well. The NU35 beam gives an efficient structure depth that provides the least impact on the vertical profile while still achieving the 16.5' minimum vertical clearance.

Table 3: BRIDGE REPLACEMENT OPTIONS

	2 - SPAN OPTIONS WITH MSE WALLS		
BEAM TYPE	2-1 MODOT STANDARD GIRDER BEAM TYPE 3	2-2 NU 35 (900)	2-3 MODOT CONCRETE BOX BEAM (39" X 48")
Bridge Length (ft)	172	172	172
Bridge Area (SF)	16,856	16,856	16,856
Superstructure Depth (in)	50	46.4	38
Profile Grade Increase at Bridge (in) 16.5' clearance on I-44 obtained	14	10.4	2
Total Project Roadway Length for reconstruction (ft)	565	335	300
Structure Estimate	$ 2,508,000	$ 2,669,000	$ 2,746,000
Roadway Estimate	$ 1,808,000	$ 1,533,000	$ 1,533,000
Subtotal	$ 4,316,000	$ 4,202,000	$ 4,279,000
10% Contingency	$ 431,600	$ 420,200	$ 427,900
Total Estimated Construction Cost	$ 4,747,600	$ 4,622,200	$ 4,706,900
(note: estimate rounded to nearest $1,000)			

New Bridge Width = 98 ft (for estimating purposes)
New Minimum Vertical Clearance = 16.5' (Per EPG)
Existing Vertical Clearance = 15.25'
Existing Structure Depth = 51" (Existing 4'3" Concrete Box Beam)

A conceptual construction cost for the above roadway, bridge and maintenance of traffic recommendations has been provided in Appendix F.

APPROVED:

Jennifer Becker, PE Date
MoDOT Project Manager

Tom Blair, PE Date
MoDOT St. Louis District Engineer

Appendix A1 – Traffic Memo (Existing)

MEMORANDUM

Date: April 1, 2018

To: Chris Watts
From: Carrie A. Falkenrath

Subject: Existing Traffic Analysis Update

Project: I-44 over Big Bend Planning Study
T^2 Job No: 2017-05

This memo is intended to document the current status of MoDOT's review and approval of the Existing Traffic Analysis performed for the I-44 over Big Bend project.

As discussed during the project meeting with MoDOT on February 8, the existing geometry and current operations at the I-44 ramp terminals on Big Bend are tricky to model accurately in Synchro. This is primarily due to the fact that the existing ramps have channelized right-turn lanes that are yield-controlled only. However, some drivers treat them as signalized (or right-turn-on-red), due to the presence of signals for the left-turn lanes. Google photos and an aerial of the study area are shown below for illustration:

I-44 Westbound Exit Ramp approaching Big Bend

226 CENTRAL AVENUE
ST. LOUIS, MO 63119
314.375.3748
WWW.TSQUAREDTT.COM

I-44 Eastbound Exit Ramp approaching Big Bend

Aerial of Study Area

226 CENTRAL AVENUE
ST. LOUIS, MO 63119
314.375.3748
WWW.TSQUAREDTT.COM

When SYNCHRO treats the right-turn lanes as yield-controlled, the analysis returns levels of service (LOS) A for both right-turn movements from the ramps, resulting in a LOS A for the westbound (WB) ramp terminal and a LOS B for the eastbound (EB) ramp terminal in both the AM and PM peak hours. Furthermore, the maximum queues for the ramp approaches are 180' and 145' (in the higher PM peak hour) controlled by the left-turn movement.

Both MoDOT Traffic and T^2 feel these results are higher (more favorable) than existing conditions. Therefore, MoDOT traffic requested the approaches be modeled to represent a signalized (or RTOR) condition as some drivers are treating them.

However, this method results in levels of service that are lower (poorer) than existing conditions. Synchro calculates the right turn movements for both ramps as LOS F, resulting in LOS F for the approaches in three of four modeled peak hour periods. Furthermore, the maximum queues on the ramps (in the PM which controls) are 900' for the WB right-turn and 670' for the EB right-turn lane. For reference, the exit ramp lengths (gore to stop bar) are approximately 750' for the WB exit ramp (stop bar to gore) and 685' for the EB exit ramp. Field observations found that the ramps do not queue to the ramp gores. The maximum observed ramp queues (on a single day) were approximately half of the ramp length.

The results of these two analyses are shown in **Table 1**, for clarification.

In considering this dilemma, the treatment of this approach for existing may not be critical. It is proposed that for the future design, the channelized right-turn is designed/treated in a way that increases drivers understanding of the yield-control (e.g. a larger splitter island or curve radius). In this way, modeling the future conditions as yield-control only will be entirely appropriate to the geometry and return more reliable analysis results.

Furthermore, a future design approach similar to that which was used for McKnight Road during the I-64 redesign project (for example) is proposed. While planning for future traffic volumes, it was acknowledged that McKnight Road has significant queuing during the AM and PM peak hours approaching and departing the I-64 interchange. However, rather than expand the interchange to accommodate the existing (and possibly latent) demand at a higher level of operations, it was decided to keep McKnight Road as a "local" interchange, in order not to overwhelm the adjacent road network. The existence of a nearby interchange with a major arterial (Brentwood Boulevard) supported this decision.

Potentially, a similar determination be made for I-44 at Big Bend Road. Additional capacity at this interchange would almost certainly overwhelm the adjacent signals (maintained by St. Louis County) and roadway network, making access to nearby commercial parcels problematic. As with the example, the adjacent interchange, at US 61/Lindbergh Boulevard is a larger service interchange that can accommodate higher volumes of traffic. A decision to maintain the existing,

local, scale of the Big Bend Rd. interchange would set clear goals and guidelines for the future design and operational analysis.

Table 1 – Operating Conditions of Existing Study Ramp Terminal Intersections

	Yield Control		***Signal Control (RTOR)***	
Intersection/Movement	***Weekday AM Peak Hour***	***Weekday PM Peak Hour***	***Weekday AM Peak Hour***	***Weekday PM Peak Hour***
Big Bend at I-44 Westbound Ramps (signalized)				
Eastbound Big Bend Approach THRU RIGHT	C (33.9) D (36.1) 295′ A (0.0) 0′	D (37.6) D (43.8) 410′ A (0.2) 0′	C (33.9) D (36.1) 295′ A (0.0) 0′	D (37.6) D (43.8) 410′ A (0.2) 0′
Westbound Big Bend Approach LEFT THRU	B (12.7) B (17.3) 245′m A (10.0) 180′m	B (11.8) B (18.7) 30′ A (6.0) 0′	B (11.9) B (16.3) 235′m A (9.4) 170′m	A (7.4) B (13.1) 30′m A (2.7) 0′m
Southbound I-44 WB Ramps Appr. LEFT RIGHT	A (7.5) D (39.5) 165′ A (1.0) 0′	A (7.6) D (41.2) 170′ A (1.3) 0′	**F (107.7)** D (39.5) 165′ F (121.7) 790′#	**F (163.1)** D (41.2) 170′ F (185.7) 900′#
Overall Intersection	**B (18.9)**	**C (21.2)**	**D (45.5)**	**E (63.6)**
Big Bend at I-44 Eastbound Ramps (signalized)				
Eastbound Big Bend Approach LEFT THRU	C (28.6) D (52.5) 200′# A (0.1) 0′	A (9.6) C (24.7) 20′m A (40.9) 0′m	C (27.9) D (51.2) 200′# A (0.1) 0′	A (7.3) B (17.7) 25′m A (1.3) 0′m
Westbound Big Bend Approach	D (48.3) 700′#	**E (57.6) 595′#**	E (55.3) 700′#	**F (100.1) 595′#**
Northbound I-44 WB Ramps Appr. LEFT RIGHT	B (11.7) E (65.2) 140′ A (0.6) 0′	B (11.2) E (65.7) 145′ A (0.7) 0′	D (38.7) E (61.3) 140′ C (34.0) 270′#	**F (153.9)** D (52.2) 145′ F (173.4) 670′#
Overall Intersection	**C (33.5)**	**C (27.1)**	**D (41.5)**	**E (71.8)**

X (XX.X) XXX′: Level of Service (avg. veh delay in sec/veh) 95th Percentile Queue Length in feet
m: volume is metered by upstream signal; #: volume exceeds capacity

Appendix A2 – Traffic Memo (Improvements)

MEMORANDUM

Date: June 25, 2018

To: Chris Watts
From: Carrie A. Falkenrath

Subject: Traffic Alternatives Memo

Project: Big Bend over I-44 Reconstruction Planning Study
T^2 Job No: 2017-05

This memo is intended to document the investigation into future geometric design alternatives for the eastbound and westbound I-44 ramp approaches for the I-44 at Big Bend bridge reconstruction project. This memo discusses only the ramp approach alternatives. In addition, the future geometry of Big Bend was modified from its existing layout to remove the third eastbound lane approaching the I-44 WB ramp terminal intersection. This lane was omitted from future geometrics at MoDOT's direction to accommodate the potential for permitted left-turns for westbound traffic, which is a dual-thru movement.

Synchro v.9 was utilized to evaluate two alternatives:

- The current ramp terminal geometry (a single left- and single right-turn lane at both ramp approaches)
- Adding a second left-turn lane at both ramp approaches

The results of the analysis are shown in **Table 1**. As illustrated by the results, in the design year 2037, both ramp terminal intersections would operate at an acceptable intersection LOS in both the AM and PM peak hour. However, in the AM peak, the westbound approach would operate at a LOS E, with another individual movements (northbound left-turn) operating at a LOS F.

Therefore, in an attempt to improve those operations, a second alternative which added a second left-turn from both I-44 ramps was investigated. This configuration was selected as a way to increase capacity at the intersections without enlarging the width of Big Bend Boulevard.

The investigation confirmed that the additional lane would improve operations at both intersections. The less-than-desirable LOS at the EB I-44 exit would improve to within the range of acceptability. Although the operational improvements to the WB I-44 exit would be minimal, the additional left-turn lane is recommended for geometric balance at the interchange and to match driver expectations.

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Table 1 – Projected Operating Conditions Ramp Alternatives, Design Year 2037

	Future Existing Geometry		***Future with Added Ramp Lanes***	
Intersection/Movement	***Weekday AM Peak Hour***	***Weekday PM Peak Hour***	***Weekday AM Peak Hour***	***Weekday PM Peak Hour***
Big Bend at I-44 Westbound Ramps (signalized)				
EB Big Bend Approach THRU RIGHT	C (24.8) C (26.4) 445′ A (0.1) 0′	C (24.5) C (28.5) 565′# A (0.2) 0′	C (27.5) C (29.3) 485′ A (0.1) 0′	C (29.5) C (34.2) 675′# A (0.2) 0′
WB Big Bend Approach LEFT THRU	A (6.6) B (16.5) 50′m A (0.9) 5′m	C (30.4) E (64.1) 405′#m A (2.7) 24′m	A (8.4) C (20.9) 95′m A (1.2) 5′m	C (30.0) E (62.9) 560′#m A (3.1) 5′
SB I-44 WB Ramps Appr. LEFT RIGHT	A (9.7) D (51.5) 170′ A (1.1) 0′	B (11.0) E (61.3) 210′# A (1.7) 0′	A (8.4) D (43.8) 85′ A (1.1) 0′	A (9.0) D (48.5) 100′ A (1.7) 0′
Overall Intersection	**B (13.9)**	**C (22.5)**	**B (15.2)**	**C (23.9)**
Big Bend at I-44 Eastbound Ramps (signalized)				
EB Big Bend Approach LEFT THRU	D (39.8) E (73.0) 340′#m A (0.2) 0′m	B (16.7) D (44.8) 155′#m A (0.6) 0′m	D (40.7) E (74.5) 335′#m A (0.3) 0′m	B (16.5) D (43.2) 95′m A (1.3) 0′m
WB Big Bend Approach	**E (68.6) 665′#**	C (29.2) 545′#m	D (52.3) 695′#	C (25.6) 635′#
NB I-44 WB Ramps Appr. LEFT RIGHT	B (14.7) F (82.1) 175′# A (0.7) 0′	B (11.0) E (64.1) 155′# A (0.8) 0′	B (10.0) D (54.9) 75′ A (0.7) 0′	A (9.8) E (56.1) 80′ A (0.8) 0′
Overall Intersection	**D (46.9)**	**B (20.0)**	**D (39.4)**	**B (18.3)**

X (XX.X) XXX′: Level of Service (avg. veh delay in sec/veh) 95th Percentile Queue Length in feet
m: volume is metered by upstream signal; #: volume exceeds capacity

Appendix B – Traffic (MOT) Memo

MEMORANDUM

Date: June 26, 2018

To: Chris Watts
From: Carrie A. Falkenrath

Subject: MOT Operations Investigation

Project: I-44 over Big Bend Planning Study
T^2 Job No: 2017-05

Per your request, T^2 investigated the operations of a potential partial closure of Big Bend Boulevard during reconstruction of the bridge over I-44. This memo documents the results of that investigation. In short, the analyses (utilizing SYNCHRO software v9.2) found that maintaining one lane each way during construction is operationally feasible.

MOT Geometry

The proposed MOT scheme would include full closure of all four I-44 ramps with one through lane in each direction through the existing overpass limits. The existing intersections at Big Bend Crossing and Camera Avenue would remain fully open; reducing the corridor to two signalized intersections. A schematic of this geometry is shown in the SYNCHRO image below.

Potential MOT Schematic with 1-lane Maintained Each Direction

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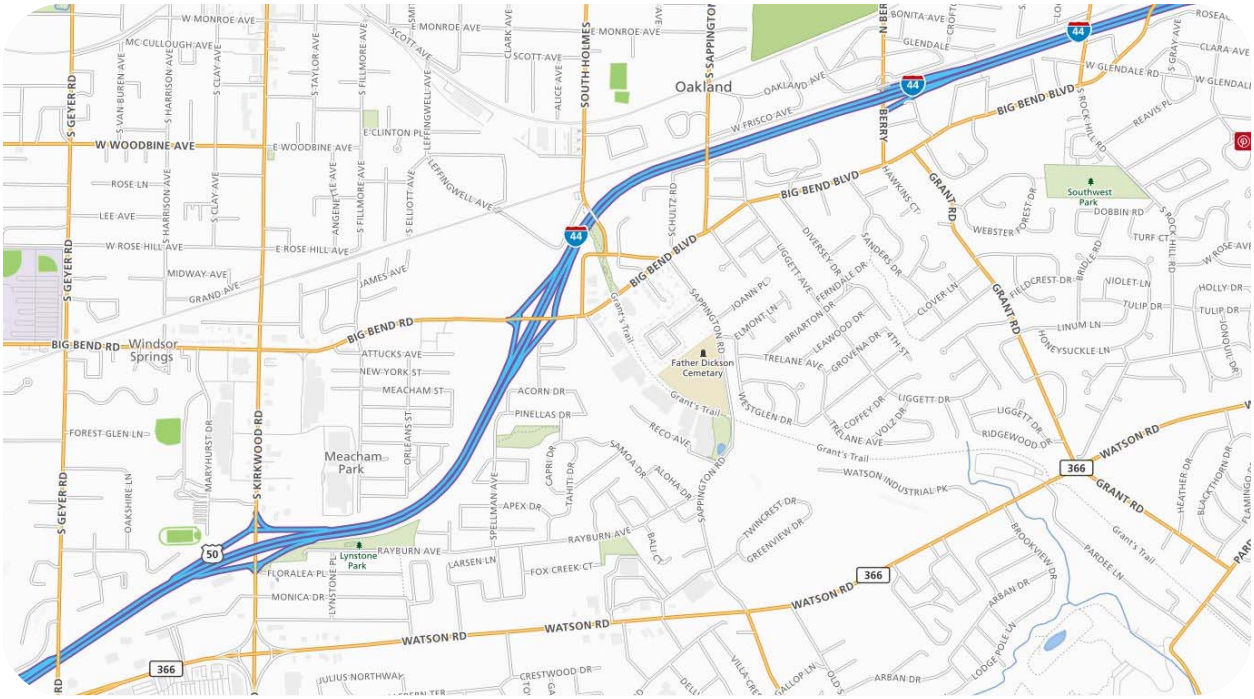
Traffic Diversion

Full closure of the I-44 ramps would result in relocation of the I-44 on- and off-ramp movements to adjacent interchanges. There are two nearby interchanges that would accommodate the existing movements: a full interchange southwest of Big Bend at S. Kirkwood/Lindbergh Road (US 61) and a partial interchange (to- from- the east only) northeast of Big Bend at Berry Road. Both of these interchanges are connected to Big Bend via an arterial street, as seen in the map below.



Adjacent Interchanges to Big Bend: S. Kirkwood/Lindbergh Rd (US 61) & Berry Road

In an effort to be conservative, the diversion estimates assumed:

- *I-44 EB and WB traffic exiting to Big Bend:* would utilize either US67 or Berry Road exits, depending on their destination; and all volumes from I-44 would not enter the project area during construction
- *EB Big Bend traffic to EB I-44:* two-thirds would utilize US 61 and would leave the project area; one-third would utilize Berry Road and would pass through the project area during construction
- *EB Big Bend traffic to WB I-44:* would utilize US 61 and not enter the project area during construction
- *WB Big Bend traffic to EB I-44:* would utilize Berry Road and not enter the project area during construction

- *WB Big Bend traffic to WB I-44:* the full volume would utilize US 61, passing through the project area during construction
- **The exception* is that traffic assumed to be going to or from Big Bend Crossing (where there is a Sam's Club), determined by percentage of traffic volumes, was maintained during the detour and re-routed.

Therefore, traffic volumes within the project corridor decreased significantly during construction with full closure of the I-44 ramps.

Traffic Diversion

The AM and PM construction traffic volumes were input to the SYNCHRO I-44 & Big Bend interchange with MOT geometry. Signal timings for the intersections of Big Bend Crossing and Camera/S. Holmes Avenues were optimized using existing timing parameters, for analysis purposes (it should be noted that construction timings would likely be determined by St. Louis County who maintains both signals). Again, it should be noted that this analysis assumed all approach lanes to these signals (e.g. turning lanes) will remain open during construction staging.

The images below show the calculated construction volumes and levels of service (LOS) for both the AM and PM peak periods during construction. All projected LOS for both peak hours are "D" or better and are generally the same or better for individual approaches when compared with existing LOS.

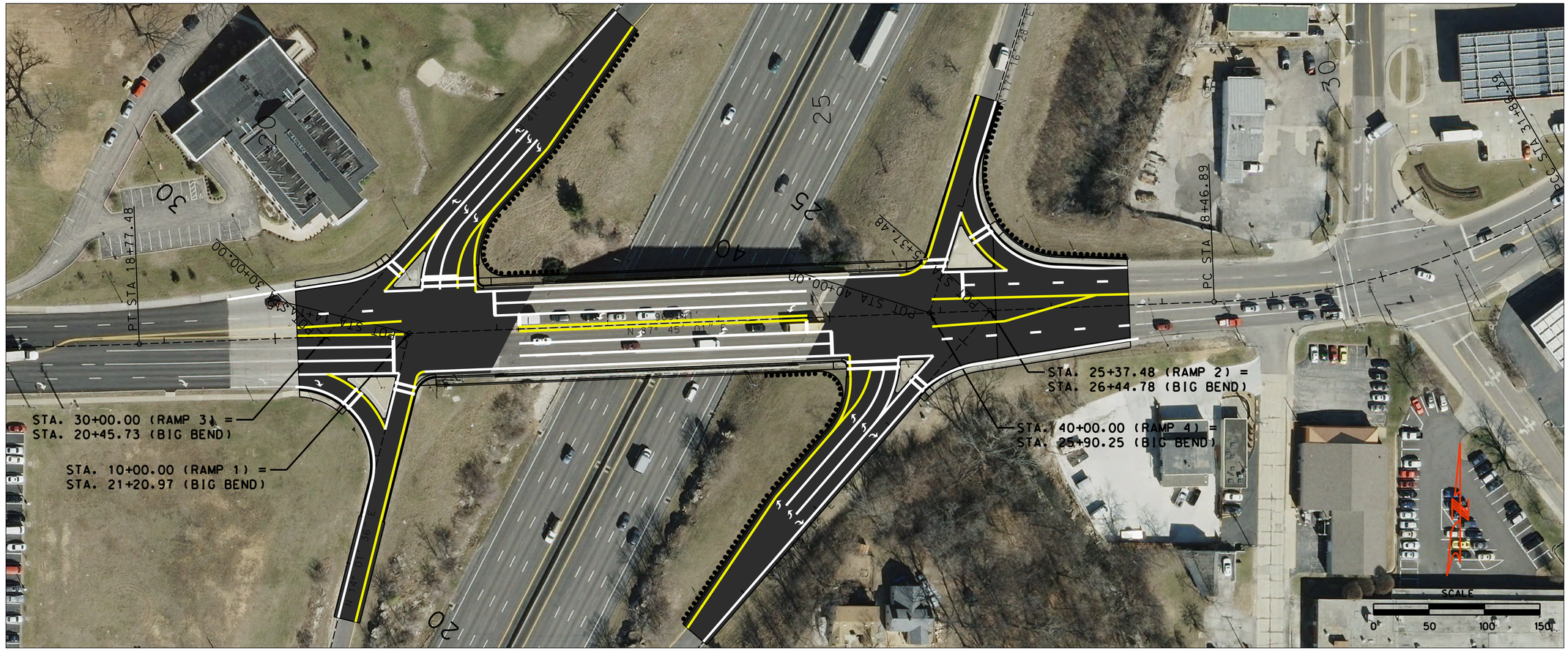
In addition, queues at the signals generally decrease due to the reduction in overall traffic volumes and the higher spacing between signals with the ramp terminal closures. The queues that will be most relevant to the construction closure are approximated below:

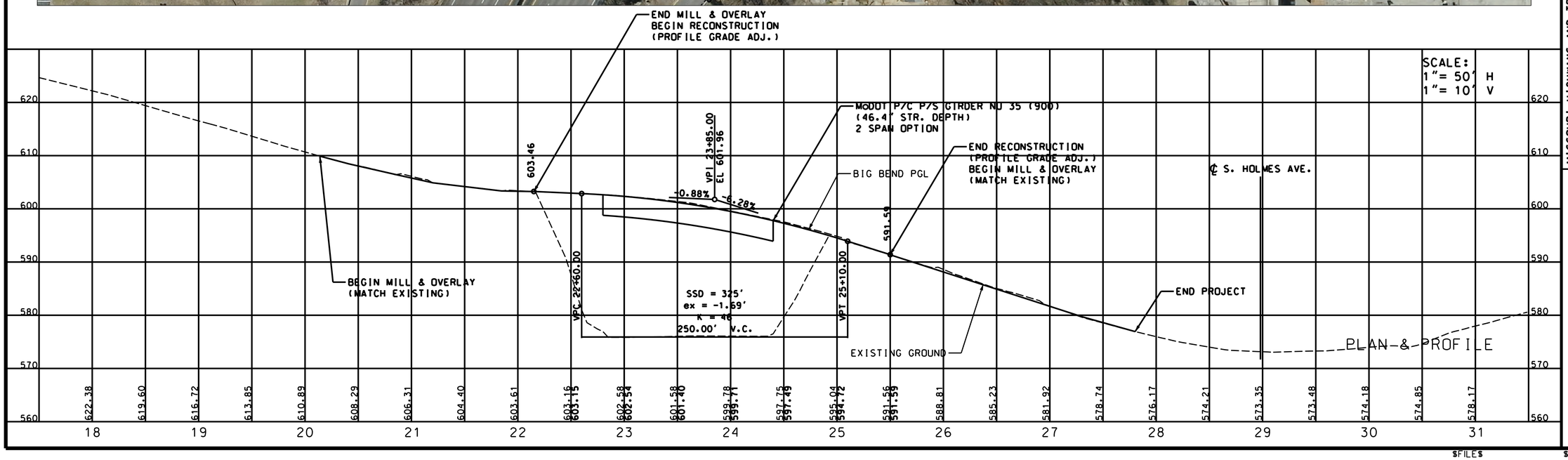
- EB queues at Camera/S. Holmes Avenue:
  - AM ~115'
  - PM ~145'
- WB queues at Beg Bend Crossing:
  - AM ~70'
  - PM ~65

AM MOT Traffic Analysis Volumes and Projected Intersections LOS

PM MOT Traffic Analysis Volumes and Projected Intersections LOS

Appendix C – Conceptual Roadway Plans





DATE PREPARED
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SL	-

COUNTY
ST. LOUIS

JOB NO.
J6S3270

CONTRACT ID.
-

PROJECT NO.
-

BRIDGE NO.
A1716

DATE	DESCRIPTION
180720	CONCEPTUAL REPORT

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Appendix D – I-70 over I-44 Bridge Options Matrices

J6S3270 **Big Bend Road over I-44** **OPTION 1: SINGLE SPAN OPTION WITH MSE WALLS**

Min. Vert. Clr = 16.500 ' (per EPG)
Exist. Vert Clr = 15.250 '
Exist. Struct Depth = 51.00 in (Existing 4'-3" Concrete Box Girder)
Prop. Bridge Length = 165.00 ' (end of bridge to end of bridge, single span)
Prop. Bridge Width = 98.00 ' (based on - six 11-ft lanes, two 5-ft shoulders, two 6-ft sidewalks, two 1.5-ft ped barriers, two 1.5-ft bridge barriers, 4-ft median island)

Proposed Bridge Area = **16,170** sq. ft.

	Shape	OPTION	Comparison Cost ($)	Comparison Cost ($/sq. ft)	Beam Type	# of Beams	Beam Spacing (ft)	Overhangs (ft)	Flange Width (in)	Deck Panel Width (ft)	Beam Height (in)	Slab Depth (in)	Super Depth (in)	Incr. Superstr. (in)	MSE Wall (sf)	Select Granular (cy)	Embankment Fill (cy)	Profile Adjustment Impact	Notes
SPREAD BEAMS		1-1	$2,629,000	$162.59	MoDOT Std. Girder Beam Type 7 (Modified Bulb Tee)	14	7.167	2.41	42	4.17	72.00	8.5	82.50	31.5	4100	0	0	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		1-2	$2,538,000	$156.96	NU 78 (2000)	13	7.583	3.50	48.2	4.07	78.75	8.5	89.25	38.3	4100	0	0	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		1-3	$3,275,000	$202.54	Composite Plate Girder (GR 50)	10	10.17	3.25	40	7.33	75.50	8.5	86.00	35.0	4100	0	0	Approach & Pavement Reconstruction	71,000 lbs steel per girder
																(w/ wall)	(see roadway)		

DESIGN CRITERIA

165.00' Single Span
Max Overhang = 5.5'
Precast Panels min. = 4'-0" max. = 9'-6"
HL-93 Loading
Beam Concrete: f'ci = 6ksi (max), f'c = 8ksi (max)
CIP concrete = f'c = 4ksi
Mild Reinforcement = grade 60
Overhang dimension is edge of deck to centerline beam.
Assumed 2" Haunch in structure depth calculations

COMMENTARY

-MSE Wall, single span eliminates intermediate bent
-Profile grade would need to be increased substantially (4-ft to 6-ft) to obtain 16.5-ft clearance over I-44

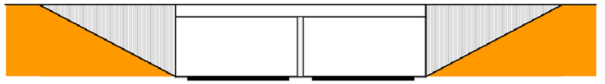
Optional Lateral Bridge Slide Cost

Bridge Slide Cost ($)
$217,000

Bridge Slide Conditions and Assumptions

1 Proposed bridge constructed adjacent to existing bridge on temporary supports.
2 No approaches or roadway constructed adjacent to existing roadway for MOT purposes.
3 Construction sequence would require short-term closure of Big Bend Road for demolition of existing bridge, construction of substructure and bridge slide.
4 Construction costs for lateral bridge slide include the following: temporary bents, slide bearings, and equipment for slide.

J6S3270 **Big Bend Road over I-44** **OPTION 2A: TWO SPAN OPTION WITH MSE WALLS**



Min. Vert. Clr = 16.500 ' (per EPG)
Exist. Vert Clr = 15.250 '
Exist. Struct Depth = 51.00 in (Existing 4'-3" Concrete Box Girder)
Prop. Bridge Length = 172.00 ' (end of bridge to end of bridge, 2 span cont. - 86', 86')
Prop. Bridge Width = 98.00 ' (based on - six 11-ft lanes, two 5-ft shoulders, two 6-ft sidewalks, two 1.5-ft ped barriers, two 1.5-ft bridge barriers, 4-ft median island)

Proposed Bridge Area = **16,856** sq. ft.

	Shape	OPTION	Comparison Cost ($)	Comparison Cost ($/sq. ft)	Beam Type	# of Beam Lines	Beam Spacing (ft)	Overhangs (ft)	Flange Width (in)	Deck Panel Width (ft)	Beam Height (in)	Slab Depth (in)	Super Depth (in)	Incr. Superstr. (in)	MSE Wall (sf)	Select Granular (cy)	Embankment Fill (cy)	Profile Adjustment Impact	Notes
SPREAD BEAMS		2-1	$2,508,000	$148.79	MoDOT Std. Girder Beam Type 3	14	7.08	2.96	13	6.50	39.00	9.0	50	-1.0	4100	0	0	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		2-2	$2,669,000	$158.34	NU 35 (900)	13	7.67	2.98	48.2	4.15	35.40	9.0	46.40	-4.60	4100	0	0	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		2-3	$2,746,000	$162.91	MoDOT Conc. Box Beam (39" x 48")	14	7.50	0.25	48	4.00	27.00	9.0	38.00	-13.00	4100	0	0	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		2-4	$3,530,000	$209.42	Steel Rolled Beam (W44x335)	10	10.17	3.25	16.7	9.28	44.02	9.0	55.02	4.02	4100	0	0	Approach & Pavement Reconstruction	64,000 lbs steel per girder
		2-5	$2,990,000	$177.38	Composite Plate Girder (GR 50)	10	10.25	2.88	18	9.25	47.50	9.0	58.50	7.50	4100	0	0	Approach & Pavement Reconstruction	48,000 lbs steel per girder
																(w/ wall)	(see roadway)		

DESIGN CRITERIA

172.00' Two Span - Continuous
Max Overhang = 5.5'
Precast Panels min. = 4'-0" max. = 9'-6"
HL-93 Loading
Beam Concrete: f'ci = 6ksi (max), f'c = 8ksi (max)
CIP concrete = f'c = 4ksi
Mild Reinforcement = grade 60
Overhang dimension is edge of deck to centerline beam
Assumed 2" Haunch in structure depth calculations

COMMENTARY

-Negative moment over the interior bent will require additional deck slab reinforcing; increased deck slab thickness allows for greater 'd'

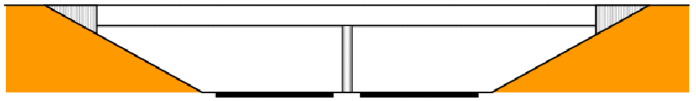
Optional Lateral Bridge Slide Cost

Bridge Slide Cost ($)
$328,000

Bridge Slide Conditions and Assumptions

1 Proposed bridge constructed adjacent to existing bridge on temporary supports.
2 No approaches or roadway constructed adjacent to existing roadway for MOT purposes.
3 Construction sequence would require short-term closure of Big Bend Road for demolition of existing bridge, construction of substructure and bridge slide.
4 Construction costs for lateral bridge slide include the following: temporary bents, slide bearings, and equipment for slide.

J6S3270 **Big Bend Road over I-44** **OPTION 2B: TWO SPAN OPTION WITHOUT MSE WALLS**



Min. Vert. Clr = 16.50 ' (per EPG)
Exist. Vert Clr = 15.25 '
Exist. Struct Depth = 51.00 in (Existing 4'-3" Concrete Box Girder)
Prop. Bridge Length = 228.00 ' (end of bridge to end of bridge, 2 span cont. - 124', 124')
Prop. Bridge Width = 98.00 ' (based on - six 11-ft lanes, two 5-ft shoulders, two 6-ft sidewalks, two 1.5-ft ped barriers, two 1.5-ft bridge barriers, 4-ft median island)

Proposed Bridge Area = **22,344** sq. ft.

	Shape	OPTION	Comparison Cost ($)	Comparison Cost ($/sq. ft)	Beam Type	# of Beams	Beam Spacing (ft)	Overhangs (ft)	Flange Width (in)	Deck Panel Width (ft)	Beam Height (in)	Slab Depth (in)	Super Depth (in)	Incr. Superstr. (in)	Profile Adjustment Impact	Notes
SPREAD BEAMS		2-7	$2,820,000	$126.21	MoDOT Std. Girder Beam Type 6	14	7.17	2.42	24	5.67	54.00	9.0	65	14	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		2-8	$3,061,000	$136.99	NU 43 (1100)	13	7.58	3.50	48.2	4.07	43.30	9.0	54.30	3.30	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		2-9	$3,516,000	$157.36	Composite Plate Girder (GR 50)	10	10.25	2.88	16	9.42	57.00	9.0	68.00	17.00	Approach & Pavement Reconstruction	74,000 lbs steel per girder

DESIGN CRITERIA

228.00' Two Span - Continuous
Max Overhang = 5.5'
Precast Panels min. = 4'-0" max. = 9'-6"
HL-93 Loading
Beam Concrete: f'ci = 6ksi (max), f'c = 8ksi (max)
CIP concrete = f'c = 4ksi
Mild Reinforcement = grade 60
Overhang dimension is edge of flange to edge of deck
Assumed 2" Haunch in structure depth calculations

COMMENTARY

-Negative moment over the interior bent will require additional deck slab reinforcing; increased deck slab thickness allows for greater 'd'
-Eliminates MSE wall

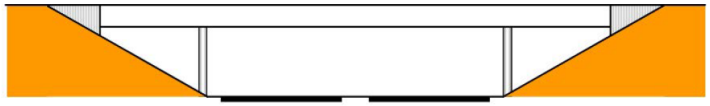
Optional Lateral Bridge Slide Cost

Bridge Slide Cost ($)
$328,000

Bridge Slide Conditions and Assumptions

1 Proposed bridge constructed adjacent to existing bridge on temporary supports.
2 No approaches or roadway constructed adjacent to existing roadway for MOT purposes.
3 Construction sequence would require short-term closure of Big Bend Road for demolition of existing bridge, construction of substructure and bridge slide.
4 Construction costs for lateral bridge slide include the following: temporary bents, slide bearings, and equipment for slide.

J6S3270 **Big Bend Road over I-44** **OPTION 3: THREE SPAN OPTION WITHOUT MSE WALLS**



Min. Vert. Clr = 16.50 ' (per EPG)
Exist. Vert Clr = 15.25 '
Exist. Struct Depth = 51.00 in (Existing 4'-3" Concrete Box Girder)
Prop. Bridge Length = 240.00 ' (end of bridge to end of bridge, 3 span cont. - 50',140', 50')
Prop. Bridge Width = 98.00 ' (based on - six 11-ft lanes, two 5-ft shoulders, two 6-ft sidewalks, two 1.5-ft ped barriers, two 1.5-ft bridge barriers, 4-ft median island)

Proposed Bridge Area = **23,520** sq. ft.

	Shape	OPTION	Comparison Cost ($)	Comparison Cost ($/sq. ft)	Beam Type	# of Beams	Beam Spacing (ft)	Overhangs (ft)	Flange Width (in)	Deck Panel Width (ft)	Beam Height (in)	Slab Depth (in)	Super Depth (in)	Incr. Superstr. (in)	Profile Adjustment Impact	Notes
SPREAD BEAMS		3-1	$3,284,000	$139.63	MoDOT Std. Girder Beam Type 7 (Modified Bulb Tee)	14	7.17	2.42	24	5.67	78.50	8.5	89	38	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		3-2	$3,207,000	$136.35	NU 63 (1600)	13	7.58	3.50	48.2	4.07	63.00	8.5	73.50	22.50	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		3-3	$3,551,000	$150.98	Composite Plate Girder (GR 50)	10	10.25	2.88	30	8.25	67.50	8.5	78.00	27.00	Approach & Pavement Reconstruction	68,000 lbs steel per girder

DESIGN CRITERIA

240.00' Three Span - Continuous
Max Overhang = 5.5'
Precast Panels min. = 4'-0" max. = 9'-6"
HL-93 Loading
Beam Concrete: f'ci = 6ksi (max), f'c = 8ksi (max)
CIP concrete = f'c = 4ksi
Mild Reinforcement = grade 60
Overhang dimension is edge of flange to edge of deck
Assumed 2" Haunch in structure depth calculations

COMMENTARY

-Eliminates intermediate bent in median
-Eliminates MSE wall

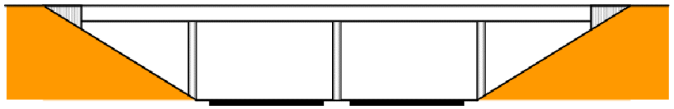
Optional Lateral Bridge Slide Cost

Bridge Slide Cost ($)
$417,000

Bridge Slide Conditions and Assumptions

1 Proposed bridge constructed adjacent to existing bridge on temporary supports.
2 No approaches or roadway constructed adjacent to existing roadway for MOT purposes.
3 Construction sequence would require short-term closure of Big Bend Road for demolition of existing bridge, construction of substructure and bridge slide.
4 Construction costs for lateral bridge slide include the following: temporary bents, slide bearings, and equipment for slide.

J6S3270 **Big Bend Road over I-44** **OPTION 4: FOUR SPAN OPTION WITHOUT MSE WALLS**



Min. Vert. Clr = 16.50 ' (per EPG)
Exist. Vert Clr = 15.25 '
Exist. Struct Depth = 51.00 in (Existing 4'-3" Concrete Box Girder)
Prop. Bridge Length = 232.00 ' (end of bridge to end of bridge, 4 span cont. - 46', 70', 70', 46')
Prop. Bridge Width = 98.00 ' (based on - six 11-ft lanes, two 5-ft shoulders, two 6-ft sidewalks, two 1.5-ft ped barriers, two 1.5-ft bridge barriers, 4-ft median island)

Proposed Bridge Area = **22,736** sq. ft.

	Shape	OPTION	Comparison Cost ($)	Comparison Cost ($/sq. ft)	Beam Type	# of Beams	Beam Spacing (ft)	Overhangs (ft)	Flange Width (in)	Deck Panel Width (ft)	Beam Height (in)	Slab Depth (in)	Super Depth (in)	Incr. Superstr. (in)	Profile Adjustment Impact	Notes
SPREAD BEAMS		4-1	$2,941,000	$129.35	MoDOT Std. Girder Beam Type 3	14	7.17	2.42	13.00	6.58	39.00	9	50	-1	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		4-2	$3,217,000	$141.49	NU 35 (900)	14	7.33	1.33	48.20	exceeds min.	35.40	9	46.40	-4.60	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		4-3	$3,276,000	$144.09	P/C P/S Conc. Box Beam (27" x 48")	14	7.33	1.34	48.00	exceeds min.	27.00	9	38.00	-13.00	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		4-4	$4,548,000	$200.04	30" Inverted T Beam (adjacent)	14	0.00	0.00	81.00	n/a	30.00	6	36.00	-15.00	Approach & Pavement Reconstruction	Pre-cast Deck Panel or Full-depth C.I.P Deck
		4-5	$4,213,000	$185.30	Steel Rolled Beam (W36x302)	11	9.08	3.58	16.70	8.19	37.30	9	48.30	-2.70	Approach & Pavement Reconstruction	75,000 lbs steel per girder
		4-6	$3,238,000	$142.42	Composite Plate Girder (GR 50)	10	10.25	2.88	14.00	9.58	38.00	9	49.00	-2.00	Approach & Pavement Reconstruction	47,000 lbs steel per girder

DESIGN CRITERIA

232.00' Four Span - Continuous
Max Overhang = 5.5'
Precast Panels min. = 4'-0" max. = 9'-6"
HL-93 Loading
Beam Concrete: f'ci = 6ksi (max), f'c = 8ksi (max)
CIP concrete = f'c = 4ksi
Mild Reinforcement = grade 60
Overhang dimension is edge of flange to edge of deck
Assumed 2" Haunch in structure depth calculations

COMMENTARY

-Four span layout is not optiminal span configuration; MSE wall is eliminated

Optional Lateral Bridge Slide Cost

Bridge Slide Cost ($)
$531,000

Bridge Slide Conditions and Assumptions

1 Proposed bridge constructed adjacent to existing bridge on temporary supports.
2 No approaches or roadway constructed adjacent to existing roadway for MOT purposes.
3 Construction sequence would require short-term closure of Big Bend Road for demolition of existing bridge, construction of substructure and bridge slide.
4 Construction costs for lateral bridge slide include the following: temporary bents, slide bearings, and equipment for slide.

Appendix E – Bridge Construction Cost Matrix

E – Bridge Construction Cost Matrix

					ONE SPAN OPTIONS (with MSE wall)					TWO SPAN OPTIONS (with MSE wall)							TWO SPAN OPTIONS (no MSE wall)			
			Bridge Width =98.00 ft (estimating purposes)		1-1	1-2	1-3	1.0-SLIDE		2-1	2-2	2-3	2-4	2-5	2.1-SLIDE		2-7	2-8	2-9	2.2-SLIDE
			Beam Type		MoDOT Std. Girder Beam Type 7 (Modified Bulb Tee)	NU 78 (2000)	Composite Plate Girder (GR 50)			MoDOT Std. Girder Beam Type 3	NU 35 (900)	MoDOT Conc. Box Beam (39" x 48")	Steel Rolled Beam (W44x335)	Composite Plate Girder (GR 50)			MoDOT Std. Girder Beam Type 6	NU 43 (1100)	Composite Plate Girder (GR 50)	
ESTIMATED QUANTITIES			Bridge Length	(FT)	165	165	165			172	172	172	172	172			228	228	228	
			Length of Barrier	(LF)	660	660	660			688	688	688	688	688			912	912	912	
			Bridge Area	(SF)	16,170	16,170	16,170			16,856	16,856	16,856	16,856	16,856			22,344	22,344	22,344	
			Deck Thickness	(in)	9	9	9			9	9	9	9	9			9	9	9	
			Deck Concrete	(CY)	424	424	424			468	468	468	468	468			621	621	621	
			Deck Reinforcement (125 lbs / CY)		53,027	53,027	53,027			58,528	58,528	58,528	58,528	58,528			77,583	77,583	77,583	
			Beam Lines	(EA)	14	13	10	0		14	13	14	10	10	0		14	13	10	0
			Fab. Struc. Steel	(LB)	0	0	728,300	0		0	0	0	658,300	498,450	0		0	0	767,675	0
			Diaph.	(EA)	52	48	36	0		52	48	52	36	36	0		78	72	54	0
			Top Flange Width	(in)	42	48	40	0		13	48	48	17	18	0		24	48	16	0
			Haunch Concrete (est. 2")	(CY)	50	53	34	0		16	55	59	15	16	0		39	73	19	0
			End Diaphragm Concrete	(CY)	100	108	104	0		60	56	46	67	71	0		79	66	82	0
			Bearings	(EA)	28	26	20	25		56	52	56	30	30	56		56	52	30	56
			End Bent Concrete	(CY)	116	116	116	128		116	116	116	116	116	128		116	116	116	128
			Abutment Pile	(LF)	528	528	528	528		528	528	528	528	528	528		528	528	528	528
			Int. Bent Concrete	(CY)	0	0	0	0		106	106	106	106	106	58		106	106	106	58
			Int. Bent Pile	(LF)	0	0	0	0		0	0	0	0	0	264		0	0	0	264
			Substructure Reinforcement		14,519	14,519	14,519	14,519		27,730	27,730	27,730	27,730	27,730	23,230		27,730	27,730	27,730	23,230
			Area of MSE Wall	(SF)	4,100	4,100	4,100	0		4,100	4,100	4,100	4,100	4,100	0		0	0	0	0
			Approach Slab	(SY)	218	218	218	0		218	218	218	218	218	0		218	218	218	0
ESTIMATED COST	$20.00	($/LF)	Bridge Removal		$431,360	$431,360	$431,360			$431,360	$431,360	$431,360	$431,360	$431,360			$431,360	$431,360	$431,360	
	$80.00	($/LF)	Bridge Barrier		$52,800	$52,800	$52,800			$55,040	$55,040	$55,040	$55,040	$55,040			$72,960	$72,960	$72,960	
	$325.00	($/SY)	Slab w/ p/s panels > 1000		$583,917		$583,917			$608,689			$608,689	$608,689			$806,867	$0	$806,867	
	$320.00	($/SY)	Slab w/ p/s panels (NU Girder or Box)			$574,933					$599,324	$599,324						$794,453		
	$310.00	($/SY)	Rein. Conc Slab Overlay																	
	$1.55	($/LB)	Deck Reinforcing		$82,191	$82,191	$82,191			$90,718	$90,718	$90,718	$90,718	$90,718			$120,254	$120,254	$120,254	
	Varies	($)	Superstr. Other					$20,000							$30,000					$30,000
	$2.00	($/LB)	Fab. Struc. Steel (W-Beam)										$1,316,600							
	$1.70	($/LB)	Fab. Struc. Steel (Pl. Girder)				$1,238,110							$847,365					$1,305,048	
	Varies	($/LF)	P/C P/S Beams		$612,150	$546,975				$385,280	$514,280	$638,120					$638,400	$829,920		
	$700.00	($/EA)	Diaph. (I-girder)							$36,400							$54,600			
	$1,200.00	($/EA)	Diaph. (Bulb Tee and NU Girders)		$62,400	$57,600					$57,600							$86,400		
	$255.00	($/EA)	Bearings		$7,140	$6,630	$5,100	$6,290		$14,280	$13,260	$14,280	$7,650	$7,650	$14,280		$14,280	$13,260	$7,650	$14,280
	$825.00	($/CY)	Class B-1 Substructure Concrete		$95,822	$95,822	$95,822	$105,404		$183,016	$183,016	$183,016	$183,016	$183,016	$153,316		$183,016	$183,016	$183,016	$153,316
	$1.35	($/LB)	Substructure Reinforcing		$19,600	$19,600	$19,600	$19,600		$37,435	$37,435	$37,435	$37,435	$37,435	$31,360		$37,435	$37,435	$37,435	$31,360
	$70.00	($/LF)	Piles		$36,960	$36,960	$36,960	$36,960		$36,960	$36,960	$36,960	$36,960	$36,960	$55,440		$36,960	$36,960	$36,960	$55,440
	$60.00	($/SF)	MSE Wall		$246,000	$246,000	$246,000			$246,000	$246,000	$246,000	$246,000	$246,000						
	$255.00	($/SY)	Approach Slab		$55,533	$55,533	$55,533			$55,533	$55,533	$55,533	$55,533	$55,533			$55,533	$55,533	$55,533	
	15.0%	(% of Total $)	Misc. Contingency (Urban)		$342,881	$330,961	$427,109	$28,238		$327,107	$348,079	$358,168	$460,350	$389,965	$42,659		$367,750	$399,233	$458,562	$42,659
	15.0%	(% of Total $)	Misc. Contingency (Staged Construction)		$0	$0	$0	$0		$0	$0	$0	$0	$0	$0		$0	$0	$0	$0
			Structure Estimate (rounded up to the $1,000)		$2,629,000	$2,538,000	$3,275,000	$217,000		$2,508,000	$2,669,000	$2,746,000	$3,530,000	$2,990,000	$328,000		$2,820,000	$3,061,000	$3,516,000	$328,000
										#2	#1	#3								

E – Bridge Construction Cost Matrix

						THREE SPAN OPTIONS (no MSE wall)					FOUR SPAN OPTIONS (no MSE wall)						
			Bridge Width =98.00 ft (estimating purposes)			3-1	3-2	3-3	3.0-SLIDE		4-1	4-2	4-3	4-4	4-5	4-6	4.0-SLIDE
			Beam Type			MoDOT Std. Girder Beam Type 7 (Modified Bulb Tee)	NU 63 (1600)	Composite Plate Girder (GR 50)			MoDOT Std. Girder Beam Type 3	NU 35 (900)	P/C P/S Conc. Box Beam (27" x 48")	30" Inverted T Beam (adjacent)	Steel Rolled Beam (W36x302)	Composite Plate Girder (GR 50)	
ESTIMATED QUANTITIES			Bridge Length	(FT)		240	240	240			232	232	232	232	232	232	
			Length of Barrier	(LF)		960	960	960			928	928	928	928	928	928	
			Bridge Area	(SF)		23,520	23,520	23,520			22,736	22,736	22,736	22,736	22,736	22,736	
			Deck Thickness	(in)		9	9	9			9	9	9	6	9	9	
			Deck Concrete	(CY)		617	617	617			632	632	632	421	632	632	
			Deck Reinforcement (125 lbs / CY)			77,130	77,130	77,130			78,944	78,944	78,944	52,630	78,944	78,944	
			Beam Lines	(EA)		14	13	10	0		14	14	14	14	11	10	0
			Fab. Struc. Steel	(LB)		0	0	698,450	0		0	0	0	0	838,625	488,450	0
			Diaph.	(EA)		52	48	36	0		52	52	52	52	30	36	0
			Top Flange Width	(in)		24	48	30	0		13	48	48	81	17	14	0
			Haunch Concrete (est. 2")	(CY)		41	77	37	0		22	81	80	135	22	17	0
			End Diaphragm Concrete	(CY)		108	89	94	0		60	56	46	44	58	59	0
			Bearings	(EA)		28	26	20	25		112	112	112	112	55	50	72
			End Bent Concrete	(CY)		116	116	116	128		116	116	116	116	116	116	128
			Abutment Pile	(LF)		528	528	528	528		528	528	528	528	528	528	528
			Int. Bent Concrete	(CY)		211	211	211	116		317	317	317	317	317	317	174
			Int. Bent Pile	(LF)		0	0	0	528		0	0	0	0	0	0	792
			Substructure Reinforcement			40,941	40,941	40,941	30,489		54,152	54,152	54,152	54,152	54,152	54,152	37,748
			Area of MSE Wall	(SF)		0	0	0	0		0	0	0	0	0	0	0
			Approach Slab	(SY)		218	218	218	0		218	218	218	218	218	218	0
ESTIMATED COST	$20.00	($/LF)	Bridge Removal			$431,360	$431,360	$431,360			$431,360	$431,360	$431,360	$431,360	$431,360	$431,360	
	$80.00	($/LF)	Bridge Barrier			$76,800	$76,800	$76,800			$74,240	$74,240	$74,240	$74,240	$74,240	$74,240	
	$325.00	($/SY)	Slab w/ p/s panels > 1000			$849,333		$849,333			$821,022				$821,022	$821,022	
	$320.00	($/SY)	Slab w/ p/s panels (NU Girder or Box)				$836,267					$808,391	$808,391				
	$310.00	($/SY)	Rein. Conc Slab Overlay											$783,129			
	$1.55	($/LB)	Deck Reinforcing			$119,551	$119,551	$119,551			$122,364	$122,364	$122,364	$81,576	$122,364	$122,364	
	Varies	($)	Superstr. Other						$40,000								$50,000
	$2.00	($/LB)	Fab. Struc. Steel (W-Beam)												$1,677,250		
	$1.70	($/LB)	Fab. Struc. Steel (Pl. Girder)					$1,187,365								$830,365	
	Varies	($/LF)	P/C P/S Beams			$890,400	$842,400				$519,680	$747,040	$860,720				
	$700.00	($/EA)	Diaph. (I-girder)								$36,400						
	$1,200.00	($/EA)	Diaph. (Bulb Tee and NU Girders)			$62,400	$57,600					$62,400					
	$255.00	($/EA)	Bearings			$7,140	$6,630	$5,100	$6,290		$28,560	$28,560	$28,560	$28,560	$14,025	$12,750	$18,445
	$825.00	($/CY)	Class B-1 Substructure Concrete			$270,209	$270,209	$270,209	$201,227		$357,402	$357,402	$357,402	$357,402	$357,402	$357,402	$249,138
	$1.35	($/LB)	Substructure Reinforcing			$55,270	$55,270	$55,270	$41,160		$73,105	$73,105	$73,105	$73,105	$73,105	$73,105	$50,960
	$70.00	($/LF)	Piles			$36,960	$36,960	$36,960	$73,920		$36,960	$36,960	$36,960	$36,960	$36,960	$36,960	$92,400
	$60.00	($/SF)	MSE Wall														
	$255.00	($/SY)	Approach Slab			$55,533	$55,533	$55,533			$55,533	$55,533	$55,533	$55,533	$55,533	$55,533	
	15.0%	(% of Total $)	Misc. Contingency (Urban)			$428,243	$418,287	$463,122	$54,390		$383,494	$419,603	$427,295	$288,280	$549,489	$422,265	$69,141
	15.0%	(% of Total $)	Misc. Contingency (Staged Construction)			$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0
			Structure Estimate (rounded up to the $1,000)			$3,284,000	$3,207,000	$3,551,000	$417,000		$2,941,000	$3,217,000	$3,276,000	$4,548,000	$4,213,000	$3,238,000	$531,000

Appendix F – Conceptual Cost Estimate

PROJECT SUMMARY REPORT

Project: Big Bend over I-44 Conceptual BRIDGE OPTION 2-2; NU 35 (900)	Job Number: J6S3270_1	Bid Date: 07/20/2018	State: MO

Location:

Project Settings

Primary County:	ST. LOUIS	**Urban / Rural:**	URBAN ROUTE
Addl Counties:		**Project Type:**	BRIDGE (NEW)
District:	St. Louis	**Work Type:**	BRIDGE CONSTRUCTION OR REHABILITATION
Latitude:	90° 23' 37"	**Traffic:**	Heavy Traffic (over 1700 DAT)
Longitude:	38° 34' 04"	**Estimator:**	travis.pfeiffer@parsons.com
Log Mile:	**Beg:**	**Constr Eng:**	0.00%
	End: 1	**Priced Date:**	7/20/2018
Station:	**Beg:** J6S3270	**Create Date:**	7/20/2018
	End:	**Fed Project No:**	
Project Length:	0.0000 miles	**Mobe Percent:**	10.00%
Route:	0.0000 0.0000 0.0000 0.002018062	**Survey Percent:**	2.00%

Project Categories

1	Category 0001	$1,133,254.00	26.97%
30	Category 0030	$300,000.00	7.14%
40	Category 0040	$100,000.00	2.38%
70	Category 0070	$2,669,000.00	63.51%
Total		**$4,202,254.00**	**100.0%**

Funding Totals

Total		

Alternates

Major Categories

BRIDGE	$2,690,600.00	64.03%
GRADE/DRAIN	$27,876.75	0.66%
MISC.	$1,242,294.75	29.56%
PAVEMENT/BASE	$241,482.50	5.75%
Total	**$4,202,254.00**	**100.0%**

STIP Information

Construction Cost	$4,202,254.00	100.00%
PE (0.00% of construction cost)	$0.00	0.00%
CE (0.00% of construction cost)	$0.00	0.00%
R/W	$0.00	0.00%
R/W Incidentals	$0.00	0.00%
Utilities	$0.00	0.00%
Incentive	$0.00	0.00%
Total	**$4,202,254.00**	**100.0%**
Contingency (10%)	**$420,225.00**	
GRAND TOTAL	**$4,622,479.40**	

Project: Big Bend over I-44 Conceptual
BRIDGE OPTION 2-2; NU 35 (900)

Job Number: J6S3270_1 | **Bid Date: 07/20/2018** | **State: MO**

Location:

					Bid Price			Comparison 2			Comparison 3		
Sort	**Pay Item**	**Description**	**Quantity**	**Unit**	**Unit Price**	**Extension**	**#**	**Unit Price**	**Extension**	**#**	**Unit Price**	**Extension**	**#**
Category: Category 0001													
0	2022010	REMOVAL OF IMPROVEMENTS	1.000	L.S.	$60,000.00	$60,000.00	0	$116,718.09	$116,718.09	310	$44,483.01	$44,483.01	899
0	2031000	CLASS A EXCAVATION	131.000	C.Y.	$10.00	$1,310.00	0	$12.71	$1,665.01	203	$8.88	$1,163.28	290
0	2035500	EMBANKMENT IN PLACE	331.000	C.Y.	$11.50	$3,806.50	0	$11.25	$3,723.75	81	$11.54	$3,819.74	219
0	2036000	COMPACTING EMBANKMENT	131.000	C.Y.	$2.75	$360.25	0	$3.97	$520.07	121	$2.25	$294.75	310
0	2072000	LINEAR GRADING CLASS 2	17.600	STA.	$1,000.00	$17,600.00	0	$1,186.00	$20,873.60	67	$292.16	$5,142.02	126
0	3040504	TYPE 5 AGGREGATE FOR BASE (4 IN. THICK)	1,997.000	S.Y.	$7.50	$14,977.50	0	$6.22	$12,421.34	81	$7.01	$13,998.97	193
0	4030101	ASPHALTIC CONCRETE MIXTURE PG 64-22 (SP125C MIX)	981.400	TON	$75.00	$73,605.00	0	$0.00	$0.00	0	$53.65	$52,652.11	37
0	4071005	TACK COAT	552.000	GAL	$2.50	$1,380.00	0	$2.59	$1,429.68	166	$2.10	$1,159.20	458
0	5021108	CONCRETE PAVEMENT (8 IN. NON-REINF)	857.200	S.Y.	$100.00	$85,720.00	0	$60.24	$51,637.73	5	$96.16	$82,428.35	28
0	5041000	CONCRETE APPROACH PAVEMENT	658.000	S.Y.	$100.00	$65,800.00	0	$86.15	$56,686.70	42	$96.55	$63,529.90	73
0	6042020	ADJUSTING BASIN OR INLET	4.000	EACH	$1,200.00	$4,800.00	0	$1,147.03	$4,588.12	16	$1,899.23	$7,596.92	24
0	6061060	MGS GUARDRAIL	703.000	L.F.	$21.00	$14,763.00	0	$21.90	$15,395.70	159	$20.70	$14,552.10	409
0	6062204A	"BRIDGE ANCHOR SECTION, 6.5 FT. POSTS (SAFETY BARRIER CURB) (NEW CONSTRUCTION ONLY)"	2.000	EACH	$2,800.00	$5,600.00	0	$2,100.00	$4,200.00	4	$2,685.00	$5,370.00	6
0	6063014	TYPE A CRASHWORTHY END TERMINAL (MASH)	3.000	EACH	$2,700.00	$8,100.00	0	$2,518.38	$7,555.14	217	$2,617.65	$7,852.95	587
0	6081010	CONCRETE CURB RAMP	59.800	S.Y.	$200.00	$11,960.00	0	$130.96	$7,831.41	29	$101.58	$6,074.48	112
0	6081012	TRUNCATED DOMES	160.000	S.F.	$29.00	$4,640.00	0	$24.08	$3,852.80	65	$26.78	$4,284.80	153
0	6083006	6 IN. CONCRETE MEDIAN STRIP	430.000	S.Y.	$75.00	$32,250.00	0	$74.50	$32,035.00	52	$74.56	$32,060.80	49
0	6084023	SIDEWALK HAND-RAILING WITHOUT BALUSTERS	595.000	L.F.	$150.00	$89,250.00	0	$0.00	$0.00	0	$97.42	$57,964.90	7
0	6086004	"CONCRETE SIDEWALK, 4 IN."	505.000	S.Y.	$48.00	$24,240.00	0	$46.86	$23,664.30	86	$46.75	$23,608.75	159
0	6091051	CURB AND GUTTER TYPE A	1,043.000	L.F.	$36.00	$37,548.00	0	$34.08	$35,545.44	13	$35.14	$36,651.02	12
0	6169901	TEMPORARY TRAFFIC CONTROL	1.000	L.S.	$50,000.00	$50,000.00	0	$0.00	$0.00	0	$0.00	$0.00	0
0	6181000	MOBILIZATION	1.000	L.S.	$375,201.25	$375,201.25	0	$44,303.11	$44,303.11	374	$49,877.52	$49,877.52	1,120
0	6200013	"COLD APPLIED TAPE PAVEMENT MARKING, 24 IN. WHITE"	186.000	L.F.	$27.00	$5,022.00	0	$20.00	$3,720.00	3	$24.80	$4,612.80	39
0	6200019	"COLD APPLIED TAPE PAVEMENT MARKING, LEFT/RIGHT ARROW"	18.000	EACH	$320.00	$5,760.00	0	$300.00	$5,400.00	3	$317.27	$5,710.86	23
0	6205902A	"6 IN. WHITE HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, TYPE L BEADS"	5,274.000	L.F.	$0.30	$1,582.20	0	$0.23	$1,213.02	242	$0.24	$1,265.76	396
0	6205903A	"6 IN. YELLOW HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, TYPE L BEADS"	2,416.000	L.F.	$0.30	$724.80	0	$0.24	$579.84	192	$0.23	$555.68	319
0	6221001	COLDMILLING BITUMINOUS PAVEMENT FOR REMOVAL OF SURFACING (3 IN. THICK OR LESS)	5,517.000	S.Y.	$2.25	$12,413.25	0	$2.13	$11,751.21	133	$0.00	$0.00	0

Project: Big Bend over I-44 Conceptual
BRIDGE OPTION 2-2; NU 35 (900)

Job Number: J6S3270_1 | **Bid Date: 07/20/2018** | **State: MO**

Location:

					Bid Price			Comparison 2			Comparison 3		
Sort	**Pay Item**	**Description**	**Quantity**	**Unit**	**Unit Price**	**Extension**	**#**	**Unit Price**	**Extension**	**#**	**Unit Price**	**Extension**	**#**
0	6274000	CONTRACTOR FURNISHED SURVEYING AND STAKING	1.000	L.S.	$75,040.25	$75,040.25	0	$8,860.62	$8,860.62	287	$9,975.50	$9,975.50	725
0	7034219A	BARRIER CURB (TYPE D)	240.000	L.F.	$90.00	$21,600.00	0	$76.28	$18,307.20	75	$85.45	$20,508.00	83
0	8031000A	TURF TYPE TALL FESCUE SODDING	200.000	S.Y.	$16.00	$3,200.00	0	$8.58	$1,716.00	55	$7.17	$1,434.00	62
0	8069901	STORMWATER COMPLIANCE MANAGER	1.000	L.S.	$25,000.00	$25,000.00	0	$0.00	$0.00	0	$0.00	$0.00	0
		Category: Category 0001				**$1,133,254.00**			**$496,194.88**			**$558,628.17**	
Category: Category 0030													
0	9029902	TRAFFIC SIGNAL (INTERSECTION)	2.000	EACH	$150,000.00	$300,000.00	0	$0.00	$0.00	0	$0.00	$0.00	0
		Category: Category 0030				**$300,000.00**			**$0.00**			**$0.00**	
Category: Category 0040													
0	9039902	OVERHEAD SIGNING	2.000	EACH	$50,000.00	$100,000.00	0	$0.00	$0.00	0	$0.00	$0.00	0
		Category: Category 0040				**$100,000.00**			**$0.00**			**$0.00**	
Category: Category 0070													
0	7059901	BRIDGE REPLACEMENT	1.000	L.S.	$2,669,000.00	$2,669,000.00	0	$0.00	$0.00	0	$0.00	$0.00	0
		Category: Category 0070				**$2,669,000.00**			**$0.00**			**$0.00**	

Project Total:	**$4,202,254.00**	**$496,194.88**	**$558,628.17**
Contingency (10%)	**$420,225.00**		
GRAND TOTAL	**$4,622,479.40**		

Appendix G – User Delay Calculations

Work Zone User Cost Calculations (InDOT)		
Detour (Using Distance & Speed)		
Project ID:	**J6S3270**	
County-Route-Section:	**BIG BEND**	
User Input:		
Construction Calendar Year:	**2021**	
	Car	**B/C Truck**
ADT of Detoured Section:	**11,500**	**0**
Length of Normal Route (Miles):	**0.3**	**0.3**
Length of Detour Route (Miles):	**3.2**	**3.2**
Avg Posted Speed on Normal Route (MPH):	**35**	**35**
Avg Posted Speed on Detour Route (MPH):	**55**	**55**
Duration of Closure (Days):	**45**	
Calculated Values:		
Vehicle Costs	$8,481.25	$0.00
User Costs	$3,084.09	$0.00
Delay Cost per day	$11,565	$0
Total Delay Cost per Day	**$11,565**	
Total Cost for the Duration	**$520,440**	

INCENTIVE / DISINCENTIVE (I/D) AMOUNT DETERMINATION
English-Units Project

I. PROJECT CHARACTERISTICS

Route Contract No. Project No.
Des. No. District:
National Highway System (NHS) Route? ☐ Yes ☐ No
Location:
Estimated Start Date of Work:
Estimated Completion Date Without I/D:
Estimated Contract Amount: $
* Estimated Local-Traffic AADT: Trucks %
* Estimated Through-Traffic AADT: Trucks %
** Length of Local-Traffic Detour: mi
** Length of Through-Traffic Detour: mi

* Use best judgment for breakdown of traffic.
** Use official detour for through traffic.

II. I/D CONSIDERATIONS

Contract restrictions (e.g., utility adjustments, R/W acquisitions, permits, environmental constraints, closure times, special fabrication requirements):

Reasons for proposing I/D:

Critical construction elements:

Estimated Completion Date With I/D:
Estimated I/D Amount: $ per day
Proposed I/D Time: Calendar Days

Maximum I/D Adjustments = (I/D Amount) x (I/D Time):

$ x days = $

InDOT Road User Cost Calculation Method

User Vehicle Costs (UVC):	$0.25 / mi / veh (Autos & Trucks)
User Time Value (UTV):	$5.00 / h / veh
Local Design Speed:	mph
Through Design Speed:	mph
Traffic Adjustment Factor (TAF):	Suggested Value 0.35
	(TAF normal range is 0.30 to 0.45)

NOTE: Use either of the following analyses depending on the type of project (road closure-detoured or through-traffic project). Various computer programs are available such as QUEWZ for estimating queue lengths and user costs that can be used in lieu of the following for freeway work-zone lane closures. Contact the Highway Operations Division's Traffic Control Team for details.

A. <u>User Costs for Closure-Detoured Project</u>

Local Traffic:

Vehicle Costs = (UVC) (AADT) (Local-Detour Length)
($0.25) ( ) (mi) = $

User Costs = (UTV) (AADT) (Local-Detour Length) (1/Design Speed)
($5.00) ( ) (mi) (1/) = $

Local-Road User Costs (LRUC) = (Vehicle Costs + User Costs)
$ + $ = $

Through Traffic:

Vehicle Costs = (UVC) (AADT) (Through-Detour Length)
($0.25) ( ) (mi) = $

User Costs = (UTV) (AADT) (Through-Detour Length) (1/Design Speed)
($5.00) ( ) (mi) (1/) = $

Through-Road User Costs (TRUC) = (Vehicle Costs + User Costs)
$ + $ = $

Site RUC = LRUC + TRUC
$ + $ = $

B. Disruption Costs for Through-Traffic Project

NOTE: The following analysis provides delay cost for through traffic only. If the project includes ramp or intersection closures, the analysis from Part A above can be added to the through-traffic disruption costs or other factors commensurate upon the scope of the particular project.

Vehicle Costs = (UVC) (AADT) (TAF)
($0.25) ( ) ( ) = $

User Costs = (UTV) (AADT) (TAF)
($5.00) ( ) ( ) = $

Traffic Disruption Costs = (Vehicle Costs + User Costs)
$ + $ = $

C. General Comments

D. Other Factors to Consider. Is the route on or near one or more of the following?

School: ☐ Yes ☐ No
Hospital: ☐ Yes ☐ No
Emergency Route: ☐ Yes ☐ No
Hazardous-Materials Route: ☐ Yes ☐ No
Special or Seasonal Event: ☐ Yes ☐ No
Local Business: ☐ Yes ☐ No

III. SUMMARY

Recommended Maximum I/D Time: Calendar Days
Recommended I/D Date:
Recommended Maximum I/D Amount: $ per Day
Is I/D amount > 5% of contract amount? ☐ Yes ☐ No

NOTE: If the I/D amount per day is greater than the Site RUC or Traffic User Costs, I/D is not justified.

IV. APPROVALS

Work Zone User Cost Calculations (oDOT)		
Detour (Using Distance & Speed)		
Project ID:	**J6S3270**	
County-Route-Section:	**BIG BEND**	
User Input:		
Construction Calendar Year:	**2021**	
	Car	**B/C Truck**
ADT of Detoured Section:	**11,500**	**0**
Length of Normal Route (Miles):	**0.3**	**0.3**
Length of Detour Route (Miles):	**3.2**	**3.2**
Avg Posted Speed on Normal Route (MPH):	**35**	**35**
Avg Posted Speed on Detour Route (MPH):	**55**	**55**
Duration of Closure (Days):	**45**	
Calculated Values:		
Cost per Hour:	$25.23	$68.11
Travel Time Along Normal Route (Secs):	26	31
Travel Time Along Detour Route (Secs):	209	209
Delay (Secs):	184	179
Delay (Hours):	0.051	0.050
Delay Cost per Vehicle:	$1.29	$3.38
Delay Cost per Day:	$14,811.21	$0.00
Delay Cost for Closure Duration:	$666,505	$0
Total Delay Cost for Closure Duration:	**$666,505**	
Average Delay Cost per Day:	**$14,811**	

Fill in all highlighted cells.

The Average Delay Cost per Day is the MAXIMUM that may be used as incentive / disincentive.

Spreadsheet protection password: CONSTRUCTION

Date Calculated: 7/2/2018

Table 24. Historical Consumer Price Index for All Urban Consumers (CPI-U): U. S. city average, all items-Continued

www.bls.gov/cpi

CPI Year	Semiannual Average		Annual Average	% change from 2008 Annual Average	User Cost/Hour		Project Year	
	1st half	2nd half			Car	Truck		
2008	214.429	216.177	215.303		$19.22	$51.88	2009	Actual
2009	213.139	215.935	214.537	-0.36%	$19.15	$51.70	2010	
2010	217.535	218.576	218.056	1.28%	$19.47	$52.54	2011	
2011	223.598	226.280	224.939	4.48%	$20.08	$54.20	2012	
2012	228.850	230.338	229.594	6.64%	$20.50	$55.32	2013	
2013	232.366	233.548	232.957	8.20%	$20.80	$56.13	2014	
2014	236.384	237.088	236.736	9.95%	$21.13	$57.04	2015	
2015					$21.77	$58.76	2016	Estimated at 3% increase per year
2016					$22.42	$60.52	2017	
2017					$23.09	$62.33	2018	
2018					$23.79	$64.20	2019	
2019					$24.50	$66.13	2020	
2020					$25.23	$68.11	2021	
2021					$25.99	$70.16	2022	
2022					$26.77	$72.26	2023	
2023					$27.57	$74.43	2024	
2024					$28.40	$76.66	2025	

Information Last Updated: 3/2/15

Appendix H – Bridge Inspection Report

Missouri Department of Transportation
State Bridge Inspection Report

June 25, 2018
11:04:14AM

COUNTY: ST. LOUIS **DISTRICT: SL** **CLASS: STATBR** **FED-ID: 1412** **BRIDGE: A1716**

GENERAL STRUCTURE INFORMATION

ROUTE: CSTBIG BEND RDE
FEATURE: IS 44
STATUS: P-POSTLOAD
LOG MILE: 8.952
DETOUR: 2.00 MILES
NHS: NO
BUILT: 1967
REHAB: 1984
LOCATION: S 12 T 44 R 6 E
LATITUDE: 38 34 4.12 (DMS)
LONGITUDE: 90 23 37.48 (DMS)

 # SPANS: 4
LANES ON: 3
LANES UNDER: 8
COMPASS DIRECTION: WEST to EAST
DIRECTION OF TRAFFIC: 1-WAY TRAF
FUNCTIONAL CLASS: UR-MINOR ARTERIAL
NBI OWNER: MODOT
NBI MAINTAINED: MODOT
MAINTENANCE DISTRICT: SL
MAINTENANCE COUNTY: ST. LOUIS
SUB AREA: 7F35

PLACE CODE: 71746 SUNSET HILLS CITY
LENGTH: 256 FT 0 IN
MAXIMUM SPAN: 81 FT 0 IN
APPROACH ROADWAY: 48 FT 0 IN
CURB TO CURB: 38 FT 0 IN
OUT TO OUT: 42 FT 10 IN
AADT: 12519
AADT YEAR: 2017
AADT TRUCK: 5.0%
FUTURE AADT: 17527
FUTURE AADT YEAR: 2037

BRIDGE INSPECTION INFORMATION

DATE: 06/15/2018 **RESPONSIBILITY:** DISTRICT
FREQUENCY: 24 **CALCULATED INTERVAL**:** 24
TEAM LEADER: CHUCK DOLEJSI **ELEMENT:** NO
INSPECTOR 2: JOSEPH MOLINARO **INSPECTOR 4:**
INSPECTOR 3:

** When calculated interval exceeds the frequency, a justification comment per BIRM is required.

GENERAL INSPECTION COMMENTS

FRACTURE CRITICAL INSPECTION INFORMATION

DATE: **RESPONSIBILITY:** **CATEGORY:**
FREQUENCY: **CALCULATED INTERVAL**:** **NBI:**
TEAM LEADER: **INSPECTOR 3:** **METHOD:**
INSPECTOR 2: **INSPECTOR 4:**

** When calculated interval exceeds the frequency, a justification comment per BIRM is required.

FRACTURE CRITICAL INSPECTION COMMENTS

INDEPTH INSPECTION INFORMATION

DATE: **RESPONSIBILITY:** **CATEGORY:**
FREQUENCY: **CALCULATED INTERVAL**:** **NBI:**
TEAM LEADER: **INSPECTOR 3:** **METHOD:**
INSPECTOR 2: **INSPECTOR 4:**

** When calculated interval exceeds the frequency, a justification comment per BIRM is required.

INDEPTH INSPECTION COMMENTS

SPECIAL INSPECTION INFORMATION

DATE: **RESPONSIBILITY:** **CATEGORY:**
FREQUENCY: **CALCULATED INTERVAL**:** **NBI:**
TEAM LEADER: **INSPECTOR 3:** **METHOD:**
INSPECTOR 2: **INSPECTOR 4:**

** When calculated interval exceeds the frequency, a justification comment per BIRM is required.

SPECIAL INSPECTION COMMENTS

UNDERWATER INSPECTION INFORMATION

DATE: **RESPONSIBILITY:** **CATEGORY:**
FREQUENCY: **CALCULATED INTERVAL**:** **NBI:**
TEAM LEADER: **INSPECTOR 3:** **METHOD:**
INSPECTOR 2: **INSPECTOR 4:**

** When calculated interval exceeds the frequency, a justification comment per BIRM is required.

UNDERWATER INSPECTION COMMENTS

OTHER SPECIAL INSPECTIONS

DATE	FREQUENCY	CATEGORY	NBI	CALCULATED INTERVAL	RESPONSIBILITY	METHOD

OTHER UNDERWATER INSPECTIONS

DATE	FREQUENCY	CATEGORY	NBI	CALCULATED INTERVAL	RESPONSIBILITY	METHOD

COUNTY: ST. LOUIS **DISTRICT: SL** **CLASS: STATBR** **FED-ID: 1412** **BRIDGE: A1716**

STRUCTURE POSTING

APPROVED CATEGORY: S-C3 WEIGHT LIMIT 65 TONS.
Ton 1: 65 **Ton 2:** **Ton 3:**
COMMENTS:

FIELD CATEGORY: S-C3 WEIGHT LIMIT 65 TONS.
Ton 1: 65 **Ton 2:** **Ton 3:** **PROBLEM:** **PROBLEM DIRECTION:**
COMMENTS:

GENERAL COMMENTS/MAJOR RATED ITEMS

GENERAL COMMENTS: (BOWDEJ1, 04/20/2007)--(50'-81'-81'-40') CONT CONC BOX GDR SPANS

[ITEM 58] DECK: 4-POOR CONDITION
RATING : 06/13/2016
COMMENTS: (CROARM, 06/17/2014)--JUDGEMENT BASED ON SUPER CONDITION

[ITEM 59] SUPER: 4-POOR CONDITION
RATING : 06/13/2016
COMMENTS: (CAMPBL1, 09/12/2012)--HEAVY SPALLS UNDER SPANS 2 & 3
(CAMPBL1, 06/13/2016)--SAME SAT AS WB BRIDGE SO RATE EQUALLY

[ITEM 60] SUB: 5-FAIR CONDITION
RATING : 06/18/2018
COMMENTS: (CAMPBL1, 06/18/2018)--BENT 3 SPALL/CRACKS & DELAMS IN ALL COLS/MINOR SAT

[ITEM 61] BANK/CHANNEL: N-NOT APPLIC NO WATRWAY
RATING : 05/18/2001
COMMENTS:

[ITEM 113] SCOUR: N-NOT APPLIC NOT WATERW
RATING : 05/18/2001
EVALUATION TYPE :
COMMENTS:

[ITEM 71] WATERWAY ADEQUACY: NOT APPLICABLE
RATING : 05/18/2001
COMMENTS:

[ITEM 72] APPRRDWY ALIGNMENT: 8-VERYGOOD
RATING : 05/18/2001
COMMENTS:

RAILING AND APPROACH PAVEMENT COMPONENTS AND RATINGS

[ITEM 36A] BRIDGE RAILING RATING: *DOESNT MEET CURRNT STND-0* ***RATING :*** *10/16/2006* ***COMMENTS:***

MATERIAL	CONSTRUCTION	DIRECTION	COMMENTS
REINFORCED CONCRETE	PARAPET	SOUTH	
ALUMINUM	CIRCULAR TUBE	SOUTH	
REINFORCED CONCRETE	SIDEWALKS	RIGHT	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
DELAMINATION	TOP		LARGE	
LONGITUDINAL CRACKS	THROUGHOUT		MANY	
MAP CRACKS	THROUGHOUT		MANY	
PATCHES	RANDOM		MANY	
RUST STAINS	BOTTOM		MINOR	
SATURATION	BOTTOM		HEAVY	
SCALING	RANDOM		HEAVY	

MATERIAL	CONSTRUCTION	DIRECTION	COMMENTS
REINFORCED CONCRETE	RAISED MEDIAN	LEFT	(CAMPBL1, 05/18/2016)--2016- MODOT CREW REPAIRED LONGITUDINAL DELAMS

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
DELAMINATION	THROUGHOUT		MANY	
LONGITUDINAL CRACKS	THROUGHOUT		MANY	
RUST STAINS	THROUGHOUT		MINOR	

[ITEM 36B] TRANSITION RAILING RATING: *NOT PROVIDED-0* ***RATING :*** *05/18/2001* ***COMMENTS:***

[ITEM 36C] APPROACH RAILING RATING: *NOT PROVIDED-0* ***RATING :*** *05/18/2001* ***COMMENTS:***

[ITEM 36D] RAIL END TREATMENT RATING: *NOT PROVIDED-0* ***RATING :*** *05/18/2001* ***COMMENTS:***

APPROACH PAVEMENT: *Overall condition assigned for each approach pavemenet component is shown below.

MATERIAL	CONSTRUCTION	DIRECTION	CONDITION*	COMMENTS
ASPHALT/CONCRETE	BITUMINOUS MAT/SLAB	BOTH	POOR	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
PATCHES	THROUGHOUT		MANY	
RUTTING	THROUGHOUT		HEAVY	(CAMPBL1, 06/17/2016)--EAST APPR
SETTLEMENT	THROUGHOUT		HEAVY	(CAMPBL1, 06/17/2016)--EAST APPR_1.5"
SPALLS	THROUGHOUT		LARGE	

DRAINAGE, EXPANSION DEVICES, BANK/SLOPE, AND DECK PROTECTIVE COMPONENTS

DECK PROTECTIVE COMPONENTS:

SERIES TYPE-#	COMPONENT	MATERIAL	CONSTRUCTION	THICKNESS	YEAR APPLIED	MANUFACTURE	OVERALL CONDITION
MAIN SERIES-1	*WEARING SURFACE*	*ASPHALT*	*BITUMINOUS SEAL COAT*	*2 IN*			*POOR*

COMMENT: (BOWDEJ1, 03/05/2009)--SEALCOATED OVER LOW SLUMP 1990 & 2007

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
FAILING	THROUGHOUT		NOT APPLICABLE	
OTHER	THROUGHOUT		NOT APPLICABLE	(CAMPBL1, 06/17/2016)--MANY CRACKS & MOD STRIPPING
PATCHES	THROUGHOUT		MANY	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
DECK PROTECTION	*NOTAPPLICABLE*	*NONE*		

COMMENT:

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
MEMBRANE	*LIQUID SEALANT*	*BUILT-UP*		

COMMENT:

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT

DRAINAGE COMPONENTS:

COMPONENT	MATERIAL	CONSTRUCTION	DIRECTION	COMMENTS
DRAINAGE	*GALVANIZED STEEL*	*FLOOR DRAIN*		(BOWDEJ1, 04/20/2007)--EPOXY SEAL AROUND DRAINS

EXPANSION DEVICE COMPONENTS:

SUB UNIT-#	SUB LABEL	COMPONENT	MATERIAL	CONSTRUCTION	THICKNESS	YEAR APPLIED	MANUFACTURE	OVERALL CONDITION

COMMENT:

BANK/SLOPE PROTECTION COMPONENTS:

COMPONENT	MATERIAL	CONSTRUCTION	DIRECTION	COMMENTS
BANK PROTECTION	*ROCK*	*BLUFF*	*WEST*	
SLOPE PROTECTION	*PLAIN CONCRETE*	*PAVEDSLOPE*	*BOTH*	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
OTHER	OTHER		NOT APPLICABLE	(CAMPBL1, 10/01/2012)--FEW PANELS POPPING UP

DECK COMPONENTS

SPAN TYPE-#	COMPONENT	MATERIAL	CONSTRUCTION	COMMENTS
MAIN SPANS-1	*DECK*	*REINFORCED CONCRETE*	*CAST-IN-PLACE*	*(CAMPBL1, 05/07/2015)--2015- MODOT CREW REPAIRED 140SF TOTAL FOR TWIN BR'S (VAR SPANS)*

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
EFFLORESCENCE	OVERHANGS		MINOR		
PATCHES	DRIVING SURFACE		MODERATE		(CAMPBL1, 06/17/2016)--RANDOM
SPALLS	AT JOINTS		FEW		
TRANSVERSE CRACKS	OVERHANGS		MODERATE		

SPAN TYPE-#	COMPONENT	MATERIAL	CONSTRUCTION
MAIN SPANS-2	*DECK*	*REINFORCED CONCRETE*	*CAST-IN-PLACE*

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
EFFLORESCENCE	OVERHANGS		MINOR		
PATCHES	DRIVING SURFACE		FEW		(CAMPBL1, 10/01/2012)--LANE 1
TRANSVERSE CRACKS	OVERHANGS		MODERATE		

SPAN TYPE-#	COMPONENT	MATERIAL	CONSTRUCTION
MAIN SPANS-3	*DECK*	*REINFORCED CONCRETE*	*CAST-IN-PLACE*

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
EFFLORESCENCE	OVERHANGS		MINOR		
SATURATION	OVERHANGS		HEAVY		
TRANSVERSE CRACKS	OVERHANGS		MODERATE		

SPAN TYPE-#	COMPONENT	MATERIAL	CONSTRUCTION
MAIN SPANS-4	*DECK*	*REINFORCED CONCRETE*	*CAST-IN-PLACE*

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
EFFLORESCENCE	OVERHANGS		MINOR		
PATCHES	DRIVING SURFACE		LARGE		(CAMPBL1, 06/17/2016)--RANDOM_LANES 1 & 2
SATURATION	OVERHANGS		MINOR		

TRANSVERSE CRACKS	OVERHANGS	MODERATE

SUPERSTRUCTURE COMPONENTS

SERIES TYPE-#	SPAN TYPE	MATERIAL	CONSTRUCTION	LABEL	COMMENTS
MAIN SERIES-1	*CONTINUOUS SPAN*	*REINFORCED CONCRETE*	*BOX GIR-CIP MUL CELL*		

SPAN	COMPOSITE INDICATOR	LENGTH	WEATHERING STEEL	COMMENTS
MAIN SPANS-1	NON-COMPOSITE	50 FT 0 IN	NO	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
DELAMINATION	THROUGHOUT		MANY		(CAMPBL1, 06/17/2016)--BOTTOM EDGE
OTHER	EDGE		NOT APPLICABLE		(BOWDEJ1, 03/05/2009)--REPAIRS W/ SACRIFICIAL ZINC IS FLAKING OFF
PATCHES	RANDOM		MANY		
REBAR EXPOSED	THROUGHOUT		MODERATE		(CAMPBL1, 06/17/2016)--BOTTOM EDGE
RUST STAINS	BOTTOM		FEW		(CAMPBL1, 06/17/2016)--RANDOM
SATURATION	BOTTOM		MINOR	20 %	
SPALLS	THROUGHOUT		MODERATE		

SPAN	COMPOSITE INDICATOR	LENGTH	WEATHERING STEEL	COMMENTS
MAIN SPANS-2	NON-COMPOSITE	81 FT 0 IN	NO	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
DELAMINATION	EDGE		MINOR		
DELAMINATION	THROUGHOUT		MODERATE		
DIAGONAL CRACKS	THROUGHOUT		FINE		
REBAR EXPOSED	EDGE		CONSIDERABLE		
RUST STAINS	BOTTOM		MODERATE		
SATURATION	BOTTOM		MINOR	15 %	
SPALLS	OVERHANGS		MINOR		
SPALLS	THROUGHOUT		LARGE		

SPAN	COMPOSITE INDICATOR	LENGTH	WEATHERING STEEL	COMMENTS
MAIN SPANS-3	NON-COMPOSITE	81 FT 0 IN	NO	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
DELAMINATION	THROUGHOUT		MODERATE		
DIAGONAL CRACKS	THROUGHOUT		FINE		
REBAR EXPOSED	EDGE		MODERATE		
SATURATION	BOTTOM		MINOR	8 %	
SATURATION	EDGE		HEAVY		
SPALLS	EDGE		FEW		
SPALLS	OVERHANGS		MINOR		

SPAN	COMPOSITE INDICATOR	LENGTH	WEATHERING STEEL	COMMENTS
MAIN SPANS-4	NON-COMPOSITE	40 FT 6 IN	NO	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
DELAMINATION	EDGE		MODERATE		
DELAMINATION	THROUGHOUT		MINOR		
DIAGONAL CRACKS	THROUGHOUT		FINE		
OTHER	EDGE		NOT APPLICABLE		(BOWDEJ1, 03/05/2009)--REPAIRS W/ SACRIFICIAL AND OLD ZINC COATING - PATCHES CRACKING & MINOR EFF
RUST STAINS	BOTTOM		MODERATE		(CAMPBL1, 06/17/2016)--RANDOM
SATURATION	BOTTOM		MINOR	5 %	

SUBSTRUCTURE COMPONENTS

SUBSTRUCTURE	SKEW	LENGTH	MATERIAL	CONSTRUCTION	LABEL	COMMENTS
ABUTMENT-1	*LA-29 DEGREES*	*50 FT 4 IN*	*REINFORCED CONCRETE*	*INTEGRAL*		

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ASSOCIATED COMPONENT	MATERIAL	CONSTRUCTION
BEAM CAP	REINFORCED CONCRETE	CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
LEACHING	THROUGHOUT		MINOR		(CAMPBL1, 06/17/2016)--FEW
SATURATION	CAP FACE		MINOR		(CAMPBL1, 06/17/2016)--@ MEDIAN
VERTICAL CRACKS	THROUGHOUT		FINE		

PILING STEEL H-SHAPE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

TURNED BACK WINGS REINFORCED CONCRETE CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

BENT-2 LA-29 DEGREES REINFORCED CONCRETE MULTIPLE COLUMN

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ASSOCIATED COMPONENT	MATERIAL	CONSTRUCTION
COLUMN	REINFORCED CONCRETE	INTEGRAL CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
VERTICAL CRACKS	THROUGHOUT		FEW		

FOOTING REINFORCED CONCRETE SPREAD

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

BENT-3 LA-29 DEGREES REINFORCED CONCRETE MULTIPLE COLUMN

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ASSOCIATED COMPONENT	MATERIAL	CONSTRUCTION
COLUMN	REINFORCED CONCRETE	INTEGRAL CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
PATCHES	THROUGHOUT		LARGE		(CAMPBL1, 06/20/2014)--W/ DELAMS
VERTICAL CRACKS	COLUMN		FEW		(CAMPBL1, 10/01/2012)--COL. 2

FOOTING REINFORCED CONCRETE SPREAD

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

BENT-4 LA-29 DEGREES REINFORCED CONCRETE MULTIPLE COLUMN

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ASSOCIATED COMPONENT	MATERIAL	CONSTRUCTION
COLUMN	REINFORCED CONCRETE	INTEGRAL CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
DELAMINATION	THROUGHOUT		MODERATE		
VERTICAL CRACKS	THROUGHOUT		MANY		

FOOTING REINFORCED CONCRETE SPREAD

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ABUTMENT-5 LA-29 DEGREES 50 FT 4 IN REINFORCED CONCRETE INTEGRAL

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ASSOCIATED COMPONENT	MATERIAL	CONSTRUCTION
BEAM CAP	REINFORCED CONCRETE	CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

LEACHING	THROUGHOUT		MINOR	(CAMPBL1, 06/17/2016)--@ BOX JOINT
RUST STAINS	CAP FACE		MINOR	
VERTICAL CRACKS	THROUGHOUT		FINE	

PILING STEEL H-SHAPE

CONDITION	*LOCATION 1*	*LOCATION 2*	*SEVERITY*	*MEASUREMENT*	*COMMENT*

TURNED BACK WINGS REINFORCED CONCRETE CAST-IN-PLACE

CONDITION	*LOCATION 1*	*LOCATION 2*	*SEVERITY*	*MEASUREMENT*	*COMMENT*
EFFLORESCENCE	THROUGHOUT		MINOR		
VERTICAL CRACKS	THROUGHOUT		MANY		

OVER/UNDER ROUTES CLEARANCE INFORMATION

CLEARANCES OVER DECK

**NOTE: Vertical clearances for permitting purposes are taken as 2 inches less than the actual field measured clearance.

VERTICAL CLEARANCE TYPE**	VALUE	DIRECTION	DATE	COMMENT

CLEARANCES UNDER BRIDGE

**NOTE: Vertical clearances for permitting purposes are taken as 2 inches less than the actual field measured clearance.

RECORD #	ROUTE	# LANES	DIRECTION OF TRAFFIC	RIGHT LATERAL CLEARANCE	LEFT LATERAL CLEARANCE	UR-ID
1	IS 44 E	4	1-WAY TRAF	11 FT 1 IN	8 FT 6 IN	3308

VERTICAL CLEARANCE TYPE**	VALUE	DIRECTION	DATE	COMMENT
ACTUAL	16 FT 11 IN		05/10/2013	

RECORD #	ROUTE	# LANES	DIRECTION OF TRAFFIC	RIGHT LATERAL CLEARANCE	LEFT LATERAL CLEARANCE	UR-ID
2	IS 44 W	4	1-WAY TRAF	11 FT 1 IN	8 FT 6 IN	3309

VERTICAL CLEARANCE TYPE**	VALUE	DIRECTION	DATE	COMMENT
ACTUAL	20 FT 0 IN		05/10/2013	

STRUCTURE PAINT INFORMATION

CONDITION: **RUST AMOUNT :** **STEEL TONS :** 0

ORIGINAL PAINT	CONTRACT REPAINT	DEPARTMENT REPAINT	
PAINT TYPE :	**PAINT TYPE :**	**PAINT TYPE :**	**MANUFACTURE :**
NAME :	**NAME :**	**NAME :**	**SURFACE PREP :**
PAINT COLOR :	**PAINT COLOR :**	**PAINT COLOR :**	
PAINT YEAR :	**PAINT YEAR :**	**PAINT YEAR :**	
MILS :	**MILS :**	**MILS :**	

REQUESTED WORK ITEMS

GENERAL WORK COMMENTS: (CAMPBL1, 02/26/2016)--SCOPING FOR REPLACEMENT - UNFUNDED

Missouri Department of Transportation
State Bridge Inspection Report

COUNTY: ST. LOUIS **DISTRICT: SL** **CLASS: STATBR** **FED-ID: 1412** **BRIDGE: A1716**

RESPONSIBILITY	*LOCATION*	*ITEM*	*CATEGORY*	*PRIORITY*	*DATE*	*WORK ITEM COMMENT*
CONTRACT	ROADWAY SURFACE	OVERLAY DECK WITH UBAWS	DECK	3	10/12/2010	(CAMPBL1, 06/17/2016)--REMOVE CHIP SEAL, PATCH SURFACE & PLACE UBAWS
DISTRICT ROUTINE	SLOPE	CUT BRUSH & TREES	SLOPE	2	06/10/2016	
FUTURE	SEE COMMENT	MISCELLANEOUS	DECK	3	06/10/2016	(MOLINJ1, 11/03/2016)--REPLACE BRIDGE_2019
JOB ORDER CONTRACT	SEE COMMENT	MISCELLANEOUS	SUPERSTRUCTURE	3	06/10/2016	(CAMPBL1, 06/17/2016)--SHOTCRETE RIGHT EDGE OVER TRAFFIC

UTILITY ATTACHMENTS

UTILITY	*OWNER*	*METHOD*	*MEASUREMENT TYPE*	*VALUE*	*NUMBER*	*UTILITY ATTACHMENT COMMENT*
CABLE		STRAP			1	(BOWDEJ1, 04/20/2007)--FIBER OPTIC
STRUCTURAL SIGN		MOUNTED			1	(CAMPBL1, 06/17/2016)--@ SOUTH FACE

PROGRAM NOTES INFORMATION

YEAR	PROJECT #	MONTH LET	YEAR LET	ITEMS	COMMENT

COMPUTER GENERATED RATINGS AND DEFICIENCY ITEMS

NOTE: The items listed in this section are updated whenever computer edits are ran on a structure after the inspection updates have been entered in to TMS.

Rated Item	Rating	Rating Date
[Item 67] Structure Evaluation Rating:	4-MEETS MINIMUM TOLERABLE	6/16/2016
[Item 68] Deck Geometry Rating:	2-BASICALLY INTOLRBLE REQ	3/3/2012
[Item 69] Underclearance:	7-BETTER THAN PRESENT MIN	11/4/2013
Sufficiency Rating:	46.1%	4/11/2017
Deficiency:	STRUCTURAL	6/16/2016
Funding Eligibility:	FULL	----
Estimated New Structure Length:	289 FT.	----
Estimated Structure Cost:	$1,317,666	----
Estimated Total Project Cost:	$1,976,499	----
Year of Cost Estimate:	2018	----

NOTE: The above structure length and cost estimates are computer generated using algorithims in the TMS system. These algorthims are generalized to use NB items to come up with a new structure length and width to calculate a new area which is taken times a representative cost per square foot. The actual structure siz and cost may vary significantly from these numbers once site specific engineering is done.

ADVANCED SIGN INFORMATION

SIGN #	SIGN TYPE	PROBLEM	PROBLEM DIRECTION
1			

OUTFALL INSPECTION INFORMATION

 # OUTFALLS: **INSPECTOR:**
STATUS: **DATE:**
NOTES:

Missouri Department of Transportation
State Bridge Inspection Report

COUNTY: ST. LOUIS **DISTRICT: SL** **CLASS: STATBR** **FED-ID: 1413** **BRIDGE: A1716**

GENERAL STRUCTURE INFORMATION

ROUTE: CSTBIG BEND RDW
FEATURE: IS 44
STATUS: P-POSTLOAD
LOG MILE: 0.976
DETOUR: 1.00 MILES
NHS: NO
BUILT: 1967
REHAB: 1984
LOCATION: S 12 T 44 R 6 E
LATITUDE: 38 34 4.48 (DMS)
LONGITUDE: 90 23 37.23 (DMS)

 # SPANS: 4
LANES ON: 3
LANES UNDER: 8
COMPASS DIRECTION: WEST to EAST
DIRECTION OF TRAFFIC: 1-WAY TRAF
FUNCTIONAL CLASS: UR-MINOR ARTERIAL
NBI OWNER: MODOT
NBI MAINTAINED: MODOT
MAINTENANCE DISTRICT: SL
MAINTENANCE COUNTY: ST. LOUIS
SUB AREA: 7F35

PLACE CODE: 71746 SUNSET HILLS CITY
LENGTH: 256 FT 0 IN
MAXIMUM SPAN: 81 FT 0 IN
APPROACH ROADWAY: 48 FT 0 IN
CURB TO CURB: 38 FT 0 IN
OUT TO OUT: 42 FT 10 IN
AADT: 10213
AADT YEAR: 2017
AADT TRUCK: 5.0%
FUTURE AADT: 14298
FUTURE AADT YEAR: 2037

BRIDGE INSPECTION INFORMATION

DATE: 06/15/2018 **RESPONSIBILITY:** DISTRICT
FREQUENCY: 24 **CALCULATED INTERVAL**:** 24
TEAM LEADER: CHUCK DOLEJSI **ELEMENT:** NO
INSPECTOR 2: JOSEPH MOLINARO **INSPECTOR 4:**
INSPECTOR 3:

** When calculated interval exceeds the frequency, a justification comment per BIRM is required.

GENERAL INSPECTION COMMENTS

FRACTURE CRITICAL INSPECTION INFORMATION

DATE: **RESPONSIBILITY:** **CATEGORY:**
FREQUENCY: **CALCULATED INTERVAL**:** **NBI:**
TEAM LEADER: **INSPECTOR 3:** **METHOD:**
INSPECTOR 2: **INSPECTOR 4:**

** When calculated interval exceeds the frequency, a justification comment per BIRM is required.

FRACTURE CRITICAL INSPECTION COMMENTS

INDEPTH INSPECTION INFORMATION

DATE: **RESPONSIBILITY:** **CATEGORY:**
FREQUENCY: **CALCULATED INTERVAL**:** **NBI:**
TEAM LEADER: **INSPECTOR 3:** **METHOD:**
INSPECTOR 2: **INSPECTOR 4:**

** When calculated interval exceeds the frequency, a justification comment per BIRM is required.

INDEPTH INSPECTION COMMENTS

SPECIAL INSPECTION INFORMATION

DATE: 03/06/2013 **RESPONSIBILITY:** **CATEGORY:** QUALITY ASSURANCE
FREQUENCY: 999 **CALCULATED INTERVAL**:** **NBI:** NO
TEAM LEADER: **INSPECTOR 3:** PATRICK MARTENS **METHOD:**
INSPECTOR 2: CURT STEGEMAN **INSPECTOR 4:**

** When calculated interval exceeds the frequency, a justification comment per BIRM is required.

SPECIAL INSPECTION COMMENTS

UNDERWATER INSPECTION INFORMATION

DATE: **RESPONSIBILITY:** **CATEGORY:**
FREQUENCY: **CALCULATED INTERVAL**:** **NBI:**
TEAM LEADER: **INSPECTOR 3:** **METHOD:**
INSPECTOR 2: **INSPECTOR 4:**

** When calculated interval exceeds the frequency, a justification comment per BIRM is required.

UNDERWATER INSPECTION COMMENTS

OTHER SPECIAL INSPECTIONS

DATE	FREQUENCY	CATEGORY	NBI	CALCULATED INTERVAL	RESPONSIBILITY	METHOD

OTHER UNDERWATER INSPECTIONS

DATE	FREQUENCY	CATEGORY	NBI	CALCULATED INTERVAL	RESPONSIBILITY	METHOD

COUNTY: ST. LOUIS **DISTRICT: SL** **CLASS: STATBR** **FED-ID: 1413** **BRIDGE: A1716**

STRUCTURE POSTING

APPROVED CATEGORY: S-C3 WEIGHT LIMIT 65 TONS.
Ton 1: 65 **Ton 2:** **Ton 3:**
COMMENTS:

FIELD CATEGORY: S-C3 WEIGHT LIMIT 65 TONS.
Ton 1: 65 **Ton 2:** **Ton 3:** **PROBLEM:** **PROBLEM DIRECTION:**
COMMENTS:

GENERAL COMMENTS/MAJOR RATED ITEMS

GENERAL COMMENTS: (BOWDEJ1, 04/20/2007)--(50'-81'-81'-40') CONT CONC BOX GDR SPANS OVERLAY IN 1980

[ITEM 58] DECK: 4-POOR CONDITION **COMMENTS:** (CROARM, 06/17/2014)--SPAN 1 SUPER SAT INDICATES SERIOUS DECK ISSUES
RATING : 06/17/2014

[ITEM 59] SUPER: 4-POOR CONDITION **COMMENTS:** (CROARM, 06/17/2014)--SAT & EXPOSED REBAR
RATING : 06/17/2014

[ITEM 60] SUB: 5-FAIR CONDITION **COMMENTS:** (CAMPBL1, 06/18/2018)--LARGE DELAMS/SPALLS IN COLUMNS AT BENT 3 & @ LEFT WING WEST ABUT
RATING : 06/18/2018

[ITEM 61] BANK/CHANNEL: N-NOT APPLIC NO WATRWAY **COMMENTS:**
RATING : 05/18/2001

[ITEM 113] SCOUR: N-NOT APPLIC NOT WATERW **COMMENTS:**
RATING : 05/18/2001
EVALUATION TYPE :

[ITEM 71] WATERWAY ADEQUACY: NOT APPLICABLE **COMMENTS:**
RATING : 05/18/2001

[ITEM 72] APPRRDWY ALIGNMENT: 8-VERYGOOD **COMMENTS:**
RATING : 05/18/2001

RAILING AND APPROACH PAVEMENT COMPONENTS AND RATINGS

[ITEM 36A] BRIDGE RAILING RATING: *DOESNT MEET CURRNT STND-0* ***RATING :*** *12/03/2004* ***COMMENTS:***

MATERIAL	CONSTRUCTION	DIRECTION	COMMENTS
REINFORCED CONCRETE	PARAPET	LEFT	(CAMPBL1, 05/18/2016)--2016- MODOT CREW REPAIRED CURB ON WEST END.

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
EFFLORESCENCE	THROUGHOUT		LIGHT	
VERTICAL CRACKS	THROUGHOUT		FEW	

MATERIAL	CONSTRUCTION	DIRECTION	COMMENTS
REINFORCED CONCRETE	RAISED MEDIAN	RIGHT	(CAMPBL1, 05/18/2016)--2016- MODOT CREW REPAIRED LONGITUDINAL DELAMS

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
PATCHES	THROUGHOUT		FEW	(CAMPBL1, 06/17/2016)--LARGE

MATERIAL	CONSTRUCTION	DIRECTION
ALUMINUM	CIRCULAR TUBE	LEFT
REINFORCED CONCRETE	CURB	LEFT

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
PATCHES	THROUGHOUT		FEW	(CAMPBL1, 06/17/2016)--MODERATE

[ITEM 36B] TRANSITION RAILING RATING: *NOT PROVIDED-0* ***RATING :*** *10/16/2006* ***COMMENTS:***

[ITEM 36C] APPROACH RAILING RATING: *NOT PROVIDED-0* ***RATING :*** *10/16/2006* ***COMMENTS:***

[ITEM 36D] RAIL END TREATMENT RATING: *NOT PROVIDED-0* ***RATING :*** *10/16/2006* ***COMMENTS:***

APPROACH PAVEMENT: *Overall condition assigned for each approach pavemenet component is shown below.

MATERIAL	CONSTRUCTION	DIRECTION	CONDITION*	COMMENTS
ASPHALT/CONCRETE	BITUMINOUS MAT/SLAB	BOTH	POOR	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
DELAMINATION	OTHER		MANY	(CAMPBL1, 06/20/2014)--@ JOINT
PATCHES	THROUGHOUT		MANY	
SETTLEMENT	THROUGHOUT		MODERATE	(CAMPBL1, 06/17/2016)--EAST END
SPALLS	DRIVING SURFACE		LARGE	(CAMPBL1, 10/01/2012)--EAST SIDE

DRAINAGE, EXPANSION DEVICES, BANK/SLOPE, AND DECK PROTECTIVE COMPONENTS

DECK PROTECTIVE COMPONENTS:

SERIES TYPE-#	COMPONENT	MATERIAL	CONSTRUCTION	THICKNESS	YEAR APPLIED	MANUFACTURE	OVERALL CONDITION
MAIN SERIES-1	*WEARING SURFACE*	*ASPHALT*	*BITUMINOUS SEAL COAT*	*2 IN*			*POOR*

COMMENT: (BOWDEJ1, 03/05/2009)--SEAL COATED OVER LOW SLUMP 1990 & 2007

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
FAILING	THROUGHOUT		NOT APPLICABLE	
OTHER	THROUGHOUT		NOT APPLICABLE	(CAMPBL1, 06/20/2014)--MANY RANDOM CRACKS
SPALLS	THROUGHOUT		LARGE	(CAMPBL1, 10/01/2012)--AND STRIPPING @ E END

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
DECK PROTECTION	*NOTAPPLICABLE*	*NONE*		

COMMENT:

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
MEMBRANE	*LIQUID SEALANT*	*BUILT-UP*		

COMMENT:

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT

DRAINAGE COMPONENTS:

COMPONENT	MATERIAL	CONSTRUCTION	DIRECTION	COMMENTS
DRAINAGE	*GALVANIZED STEEL*	*FLOOR DRAIN*		

EXPANSION DEVICE COMPONENTS:

SUB UNIT-#	SUB LABEL	COMPONENT	MATERIAL	CONSTRUCTION	THICKNESS	YEAR APPLIED	MANUFACTURE	OVERALL CONDITION

COMMENT:

BANK/SLOPE PROTECTION COMPONENTS:

COMPONENT	MATERIAL	CONSTRUCTION	DIRECTION	COMMENTS
SLOPE PROTECTION	PLAIN CONCRETE	OTHER	BOTH	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	COMMENT
ERODING	THROUGHOUT		HEAVY	(CAMPBL1, 06/17/2016)--CAVING IN @ WEST END

DECK COMPONENTS

SPAN TYPE-#	COMPONENT	MATERIAL	CONSTRUCTION	COMMENTS
MAIN SPANS-1	DECK	REINFORCED CONCRETE	CAST-IN-PLACE	(CAMPBL1, 05/07/2015)--2015- MODOT CREW REPAIRED 140SF TOTAL FOR TWIN BR'S (VAR SPANS)

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
EFFLORESCENCE	OVERHANGS		MINOR		
SATURATION	THROUGHOUT		MODERATE		
SPALLS	DRIVING SURFACE		MINOR		(CAMPBL1, 06/17/2016)--NEAR JOINT
TRANSVERSE CRACKS	OVERHANGS		MODERATE		

SPAN TYPE-#	COMPONENT	MATERIAL	CONSTRUCTION
MAIN SPANS-2	DECK	REINFORCED CONCRETE	CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
DETERIORATION	EDGE		HEAVY		
EFFLORESCENCE	OVERHANGS		MINOR		
SATURATION	OVERHANGS		HEAVY		(CAMPBL1, 06/17/2016)--LEFT SIDE
SPALLS	OVERHANGS		MINOR		
TRANSVERSE CRACKS	OVERHANGS		MODERATE		

SPAN TYPE-#	COMPONENT	MATERIAL	CONSTRUCTION
MAIN SPANS-3	DECK	REINFORCED CONCRETE	CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
EFFLORESCENCE	OVERHANGS		MINOR		
SATURATION	OVERHANGS		MODERATE		(CAMPBL1, 10/01/2012)-- LEFT SIDE
SPALLS	OVERHANGS		MINOR		
TRANSVERSE CRACKS	OVERHANGS		MODERATE		

SPAN TYPE-#	COMPONENT	MATERIAL	CONSTRUCTION
MAIN SPANS-4	DECK	REINFORCED CONCRETE	CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
EFFLORESCENCE	OVERHANGS		MINOR		
PATCHES	AT JOINTS		LARGE		
SATURATION	OVERHANGS		HEAVY		(CAMPBL1, 10/01/2012)-- LEFT SIDE
TRANSVERSE CRACKS	OVERHANGS		MODERATE		

SUPERSTRUCTURE COMPONENTS

SERIES TYPE-#	SPAN TYPE	MATERIAL	CONSTRUCTION	LABEL	COMMENTS
MAIN SERIES-1	CONTINUOUS SPAN	REINFORCED CONCRETE	BOX GIR-CIP MUL CELL		

SPAN	COMPOSITE INDICATOR	LENGTH	WEATHERING STEEL	COMMENTS
MAIN SPANS-1	NON-COMPOSITE	50 FT 0 IN	NO	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
DIAGONAL CRACKS	RANDOM		LARGE		(CAMPBL1, 10/01/2012)--NEAR ABUT
LONGITUDINAL CRACKS	BOTTOM		FEW		
PATCHES	THROUGHOUT		LARGE		(ALLBRD1, 11/06/2006)--REPAIRS BY SUNRISE (2005) MANY MAP CRACKS IN PATCH. ZINC COATING APPLIED FOR CATHODIC PROTECTION
REBAR EXPOSED	BOTTOM		MODERATE		(CAMPBL1, 10/01/2012)--RIGHT EDGE
RUST STAINS	BOTTOM		MODERATE		
SATURATION	THROUGHOUT		MODERATE	15 %	
SPALLS	BOTTOM		MODERATE		(CAMPBL1, 10/01/2012)--RIGHT EDGE
TRANSVERSE CRACKS	BOTTOM		MODERATE		(ALLBRD1, 11/06/2006)--MODERATE DELAMS EDGE RIGHT SIDE

MAIN SPANS-2	NON-COMPOSITE	81 FT 0 IN	NO	

COUNTY: ST. LOUIS **DISTRICT: SL** **CLASS: STATBR** **FED-ID: 1413** **BRIDGE: A1716**

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
DETERIORATION	EDGE		HEAVY		(CAMPBL1, 10/01/2012)--RIGHT SIDE - LARGE SPALLS & DELAMS
REBAR EXPOSED	EDGE		HEAVY		(CAMPBL1, 06/17/2016)--RIGHT SIDE
SATURATION	BOTTOM		MODERATE	10 %	
TRANSVERSE CRACKS	BOTTOM		MANY		

MAIN SPANS-3 NON-COMPOSITE 81 FT 0 IN NO

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
COLLISION DAMAGE	THROUGHOUT		MINOR		
DELAMINATION	EDGE		MINOR		(CAMPBL1, 10/01/2012)--RIGHT SIDE; W/ MINOR HONEYCOMBING ON BOTTOM EDGE
LONGITUDINAL CRACKS	EDGE		MINOR		
REBAR EXPOSED	EDGE		MODERATE		
SATURATION	BOTTOM		MINOR	8 %	
SPALLS	EDGE		MODERATE		(CAMPBL1, 10/01/2012)--RIGHT SIDE

MAIN SPANS-4 NON-COMPOSITE 40 FT 6 IN NO

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
DETERIORATION	EDGE		MINOR		
EFFLORESCENCE	BOTTOM		MODERATE		
LEACHING	BOTTOM		MODERATE		
LONGITUDINAL CRACKS	BOTTOM		FEW		
PATCHES	THROUGHOUT		EXCESSIVE		(CAMPBL1, 10/01/2012)--MANY CRACKS IN PATCHES, BUT STILL SOLID. COATED WITH ZINC FOR CATHODIC-TYPE PROTECTION @ LEFT SIDE NEAR DRAINS (COATING PEELING).
RUST STAINS	BOTTOM		CONSIDERABLE		
SATURATION	THROUGHOUT		MODERATE	15 %	
SPALLS	EDGE		MODERATE		
TRANSVERSE CRACKS	BOTTOM		LARGE		

SUBSTRUCTURE COMPONENTS

SUBSTRUCTURE	SKEW	LENGTH	MATERIAL	CONSTRUCTION	LABEL	COMMENTS
ABUTMENT-1	*LA-29 DEGREES*	*46 FT 3 IN*	*REINFORCED CONCRETE*	*INTEGRAL*		

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ASSOCIATED COMPONENT	MATERIAL	CONSTRUCTION
BEAM CAP	REINFORCED CONCRETE	CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
EFFLORESCENCE	RANDOM		LIGHT		
LEACHING	RANDOM		MINOR		(CAMPBL1, 10/02/2012)--RIGHT SIDE
MAP CRACKS	RANDOM		FINE		(CAMPBL1, 10/02/2012)--RIGHT SIDE
OTHER	THROUGHOUT		NOT APPLICABLE		(ALLBRD1, 12/03/2004)--LIGHT RANDOM CRACKS THRU OUT
RUST STAINS	CAP FACE		MINOR		(CAMPBL1, 06/17/2016)--RANDOM

PILING STEEL H-SHAPE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

TURNED BACK WINGS REINFORCED CONCRETE CAST-IN-PLACE

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT
DELAMINATION	LEFT SIDE		LARGE		(MARTEP, 03/14/2013)--PATCHED AREA RE-FRACTURING
PATCHES	THROUGHOUT		EXCESSIVE		(ALLBRD1, 11/06/2006)--PATCH DONE IN 2005 AND IS DE'AM'D AGAIN.

BENT-2	*LA-29 DEGREES*		*REINFORCED CONCRETE*	*MULTIPLE COLUMN*	

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ASSOCIATED COMPONENT	MATERIAL	CONSTRUCTION			
COLUMN	REINFORCED CONCRETE	INTEGRAL CAST-IN-PLACE			
CONDITION	**LOCATION 1**	**LOCATION 2**	**SEVERITY**	**MEASUREMENT**	**COMMENT**
DELAMINATION	COLUMN		LARGE		(CAMPBL1, 06/17/2016)--COL 2
SCALING	THROUGHOUT		MINOR		
VERTICAL CRACKS	GROUND LINE		LARGE		
FOOTING	REINFORCED CONCRETE	SPREAD			
CONDITION	**LOCATION 1**	**LOCATION 2**	**SEVERITY**	**MEASUREMENT**	**COMMENT**

BENT-3 LA-29 DEGREES REINFORCED CONCRETE MULTIPLE COLUMN

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ASSOCIATED COMPONENT	MATERIAL	CONSTRUCTION			
COLUMN	REINFORCED CONCRETE	INTEGRAL CAST-IN-PLACE			
CONDITION	**LOCATION 1**	**LOCATION 2**	**SEVERITY**	**MEASUREMENT**	**COMMENT**
DELAMINATION	BOTTOM		LARGE		(CAMPBL1, 06/17/2016)--COL 1 & 2
FOOTING	REINFORCED CONCRETE	SPREAD			
CONDITION	**LOCATION 1**	**LOCATION 2**	**SEVERITY**	**MEASUREMENT**	**COMMENT**

BENT-4 LA-29 DEGREES REINFORCED CONCRETE MULTIPLE COLUMN

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ASSOCIATED COMPONENT	MATERIAL	CONSTRUCTION			
COLUMN	REINFORCED CONCRETE	INTEGRAL CAST-IN-PLACE			
CONDITION	**LOCATION 1**	**LOCATION 2**	**SEVERITY**	**MEASUREMENT**	**COMMENT**
HORIZONTAL CRACKS	TOP		FINE		(CAMPBL1, 06/17/2016)--COL 2
SCALING	THROUGHOUT		MINOR		
FOOTING	REINFORCED CONCRETE	SPREAD			
CONDITION	**LOCATION 1**	**LOCATION 2**	**SEVERITY**	**MEASUREMENT**	**COMMENT**

ABUTMENT-5 LA-29 DEGREES 46 FT 3 IN REINFORCED CONCRETE INTEGRAL

CONDITION	LOCATION 1	LOCATION 2	SEVERITY	MEASUREMENT	COMMENT

ASSOCIATED COMPONENT	MATERIAL	CONSTRUCTION			
BEAM CAP	REINFORCED CONCRETE	CAST-IN-PLACE			
CONDITION	**LOCATION 1**	**LOCATION 2**	**SEVERITY**	**MEASUREMENT**	**COMMENT**
EFFLORESCENCE	ENDS		MODERATE		(CAMPBL1, 06/17/2016)--SOUTH END
RUST STAINS	RANDOM		MODERATE		
VERTICAL CRACKS	THROUGHOUT		FEW		
PILING	STEEL	H-SHAPE			
CONDITION	**LOCATION 1**	**LOCATION 2**	**SEVERITY**	**MEASUREMENT**	**COMMENT**
TURNED BACK WINGS	REINFORCED CONCRETE	CAST-IN-PLACE			
CONDITION	**LOCATION 1**	**LOCATION 2**	**SEVERITY**	**MEASUREMENT**	**COMMENT**

*****OVER/UNDER ROUTES CLEARANCE INFORMATION*****

CLEARANCES OVER DECK

**NOTE: Vertical clearances for permitting purposes are taken as 2 inches less than the actual field measured clearance.

VERTICAL CLEARANCE TYPE**	VALUE	DIRECTION	DATE	COMMENT

CLEARANCES UNDER BRIDGE

**NOTE: Vertical clearances for permitting purposes are taken as 2 inches less than the actual field measured clearance.

RECORD #	ROUTE	# LANES	DIRECTION OF TRAFFIC	RIGHT LATERAL CLEARANCE	LEFT LATERAL CLEARANCE	UR-ID
3	IS 44 E	4	1-WAY TRAF	11 FT 1 IN	8 FT 6 IN	3311

VERTICAL CLEARANCE TYPE**	VALUE	DIRECTION	DATE	COMMENT
ACTUAL	15 FT 3 IN		05/10/2013	

RECORD #	ROUTE	# LANES	DIRECTION OF TRAFFIC	RIGHT LATERAL CLEARANCE	LEFT LATERAL CLEARANCE	UR-ID
4	IS 44 W	4	1-WAY TRAF	11 FT 1 IN	8 FT 6 IN	3312

VERTICAL CLEARANCE TYPE**	VALUE	DIRECTION	DATE	COMMENT
ACTUAL	18 FT 8 IN		05/10/2013	

STRUCTURE PAINT INFORMATION

CONDITION: **RUST AMOUNT :** **STEEL TONS :** 0

ORIGINAL PAINT	CONTRACT REPAINT	DEPARTMENT REPAINT	
PAINT TYPE :	**PAINT TYPE :**	**PAINT TYPE :**	**MANUFACTURE :**
NAME :	**NAME :**	**NAME :**	**SURFACE PREP :**
PAINT COLOR :	**PAINT COLOR :**	**PAINT COLOR :**	
PAINT YEAR :	**PAINT YEAR :**	**PAINT YEAR :**	
MILS :	**MILS :**	**MILS :**	

REQUESTED WORK ITEMS

GENERAL WORK COMMENTS: (CAMPBL1, 02/26/2016)--SCOPING FOR REPLACEMENT - UNFUNDED

RESPONSIBILITY	LOCATION	ITEM	CATEGORY	PRIORITY	DATE	WORK ITEM COMMENT
CONTRACT	SEE COMMENT	MISCELLANEOUS	DECK	3	10/12/2010	(CAMPBL1, 10/02/2012)--REPAIR EDGE SLAB & SUPER REPAIR - SHOTCRETE SPAN 2 & 3 - RIGHT EDGE
DISTRICT SPECIAL	SLOPE	MUD-JACK PROTECTION	SLOPE	3	10/12/2010	
DISTRICT SPECIAL	WEST	REPAIR CONC ABUT WING	SUBSTRUCTURE	3	09/10/2012	(CAMPBL1, 10/02/2012)--NW WING
CONTRACT	SEE COMMENT	OVERLAY DECK WITH UBAWS	DECK	3	09/10/2012	(CAMPBL1, 06/17/2016)--REMOVE CHIP SEAL & PLACE UBAWS
DISTRICT ROUTINE	SLOPE	CUT BRUSH & TREES	SLOPE	2	06/10/2016	
FUTURE	SEE COMMENT	MISCELLANEOUS	DECK	3	06/10/2016	(MOLINJ1, 11/03/2016)--REPLACE BRIDGE_2019
DISTRICT SPECIAL	WEST	REPAIR PROTECTION	SLOPE	3	06/10/2016	(CAMPBL1, 06/17/2016)--WEST END CAVING IN

UTILITY ATTACHMENTS

UTILITY	OWNER	METHOD	MEASUREMENT TYPE	VALUE	NUMBER	UTILITY ATTACHMENT COMMENT

Missouri Department of Transportation
State Bridge Inspection Report

COUNTY: ST. LOUIS | DISTRICT: SL | CLASS: STATBR | FED-ID: 1413 | BRIDGE: A1716

PROGRAM NOTES INFORMATION

YEAR	PROJECT #	MONTH LET	YEAR LET	ITEMS	COMMENT

COMPUTER GENERATED RATINGS AND DEFICIENCY ITEMS

NOTE: The items listed in this section are updated whenever computer edits are ran on a structure after the inspection updates have been entered in to TMS.

Rated Item	Rating	Rating Date
[Item 67] Structure Evaluation Rating:	4-MEETS MINIMUM TOLERABLE	7/2/2014
[Item 68] Deck Geometry Rating:	2-BASICALLY INTOLRBLE REQ	3/3/2012
[Item 69] Underclearance:	6-EQ TO PRESENT MIN CRITR	2/19/2009
Sufficiency Rating:	48.0%	5/3/2016
Deficiency:	STRUCTURAL	7/2/2014
Funding Eligibility:	FULL	----
Estimated New Structure Length:	289 FT.	----
Estimated Structure Cost:	$1,317,666	----
Estimated Total Project Cost:	$1,976,499	----
Year of Cost Estimate:	2018	----

NOTE: The above structure length and cost estimates are computer generated using algorithims in the TMS system. These algorthims are generalized to use NB items to come up with a new structure length and width to calculate a new area which is taken times a representative cost per square foot. The actual structure siz and cost may vary significantly from these numbers once site specific engineering is done.

ADVANCED SIGN INFORMATION

SIGN #	SIGN TYPE	PROBLEM	PROBLEM DIRECTION
1			

OUTFALL INSPECTION INFORMATION

 # OUTFALLS: **INSPECTOR:**

STATUS: **DATE:**

NOTES: