

Louisville-Southern Indiana Ohio River Bridges Project
Technical Memorandum
One Bridge/Highway Alternatives:
Downtown Only & East End Only

The One Bridge/Highway Alternatives include either a new Downtown Bridge or a new East End Bridge. Both of these One Bridge/Highway Alternatives also include the reconstruction of the Kennedy Interchange. These alternatives were evaluated (using the Louisville-Southern Indiana Ohio River Bridges (LSIORB) Supplemental Environmental Impact Statement (SEIS) time-of-day (TOD) travel demand forecasting model) as non-tolled facilities using the same population and employment data that were used for the FEIS Selected Alternative and the Modified Selected Alternative. The volume forecasts from the model were used to examine VHD, bridge crossings as a percentage of bridge capacity, and peak-hour bridge LOS as performance measures in regard to satisfying purpose and need. Additionally, although VMT and VHT are not being evaluated as performance measures for satisfying purpose and need, they have been taken into consideration for the purpose of comparing project alternatives. A summary of the key findings for these alternatives are presented in the following paragraphs.

For purposes of this analysis, it was assumed that the One Bridge/Highway alternatives would not be tolled. In general, any build alternative would tend to perform better (in terms of its ability to meet purpose and need) if it is not tolled, because there would be less traffic diversion than under a tolled scenario. Thus, if the non-tolled version of the alternative does not meet the purpose and need, it can be inferred that the tolled version of the same alternative also would not meet purpose and need.

As explained below, this analysis showed that the One Bridge/Highway Alternatives do not meet purpose and need. Because these alternatives do not meet the purpose and need, an in-depth financial feasibility analysis was not conducted. As with any non-tolled alternative, a One Bridge/Highway Alternative would be financially feasible only if the project sponsors are willing and able to cover the full cost of the project with public (non-toll) funding sources. No determination has been made regarding the amount of public funding that would be available for a non-tolled alternative.

Downtown Bridge Only

As shown in Table 1, the Downtown Bridge Only Alternative would offer only a minimal decrease in VHD of less than 1% over the No-Action Alternative while the FEIS Selected, East End Only, and Modified Selected alternatives all offer much greater improvements in delay (13.8%, 11.9%, and 10.6%, respectively). The Downtown Bridge Only Alternative would also result in a slight increase (less than 1%) in VMT and daily trips compared to the No-Action Alternative.

Projected daily Ohio River vehicle crossings are shown in Table 2a and Table 2b¹. Under the Downtown Bridge Only Alternative, the Kennedy Bridge would include the existing Kennedy Bridge and a new downtown/I-65 bridge. Period percent capacities² are shown in Table 3. The downtown I-65 crossing

¹ As noted in chapter 2 of the SEIS, comparisons of daily projected traffic to daily capacity were performed two ways: using daily capacities consistent with the FEIS Daily Model (Table 2a) and aggregated daily capacities consistent with the SEIS TOD Model (Table 2b). Table 3 shows the forecasted period volumes compared to the period capacity used by the SEIS TOD Model. See SEIS Section 2.2.1 for further explanation.

² “Percent capacity” in this context refers to demand as a percentage of the bridge’s capacity. Thus, if the “percent capacity” is below 100%, the demand is less than capacity – i.e., there is some unused capacity. If the percent capacity is above 100%, the demand exceeds the capacity, resulting in traffic congestion.

(Kennedy Bridge and new bridge) is projected to experience a percent capacity of 82% in the southbound direction during the AM peak-period and 94% in the northbound direction during the PM peak-period.

Table 4 (which presents the worst-case bridge crossing LOS out of northbound in the AM peak hour, southbound in the AM peak hour, northbound in the PM peak hour, and southbound in the PM peak hour for each bridge under each alternative) shows that the downtown I-65 crossing (Kennedy Bridge along with the new downtown bridge) would operate at a peak-hour LOS D under this alternative. Again, this improvement over the No-Action Alternative, under which the Kennedy Bridge would operate at LOS F, is because of the additional capacity provided by the new downtown bridge.

Because the Downtown Bridge Only Alternative would bring only a slight reduction in VHD within the LMA, it would not meet the project's purpose and need with regard to improving cross-river mobility. In addition, because this alternative would not provide a cross-river connection in the east end, it would also not meet the project's purpose and need with regard to improving system linkage.

East End Bridge Only

On a regional level, the East End Bridge Only Alternative would reduce VHD by 11.9% compared to the No-Action Alternative. This projected decrease in VHD is comparable to that projected for the FEIS Selected Alternative and the Modified Selected Alternative. VHT would decrease by 4.1%, daily trips would increase less than 1%, and VMT would increase by 1.0% -- all comparable to the FEIS Selected Alternative and the Modified Selected Alternative.

With the East End Bridge Only Alternative, the period percent capacity for the Kennedy Bridge shows traffic congestion on the Kennedy Bridge during the critical morning and afternoon peak periods. (This is primarily because it does not include a new downtown bridge, which would increase capacity). The analysis shows that the Kennedy Bridge would experience a percent capacity of 133% in the southbound direction during the AM peak-period and 121% in the northbound direction during the PM peak-period. This indicates that the I-65 demand would be well over capacity during peak-periods of the day, resulting in severe congestion on this critical downtown river crossing. Under this alternative, the Kennedy Bridge is projected to operate at an unacceptable peak-hour LOS F. Because the East End Bridge Only Alternative would not improve the level of service to LOS D or better on the Kennedy Bridge and would result in peak period percent capacities of 133% (AM southbound) and 121% (PM northbound) on the Kennedy Bridge, this alternative would not meet the project's purpose and need with regard to reducing traffic congestion on the Kennedy Bridge. The East End Bridge Only Alternative also only partially addresses traffic congestion associated with the Kennedy Interchange because this alternative would not provide a new I-65 bridge (i.e. additional travel lanes) across the Ohio River adjacent to the Kennedy Interchange. The Kennedy Bridge effectively serves as a leg of the Kennedy Interchange, with the two facilities operating interdependently. Deficiencies in the Kennedy Bridge (i.e. inadequate number of travel lanes, resulting in severe traffic congestion) can adversely affect the performance of the adjacent Kennedy Interchange, particularly during heavy congestion or as a result of incidents (crashes) on the bridge.

The East End Bridge Only Alternative also would not satisfy the need to improve safety within the Kennedy Interchange and on the Kennedy Bridge and its approach roadways, which have experienced historically high crash rates. Although this alternative would improve the geometrics of the Kennedy Interchange, it would not remedy the geometric deficiencies of the Kennedy Bridge in order to bring that facility into conformance with current roadway design standards. Thus, although this alternative would provide some improvement to the Kennedy Interchange, it would not meet the identified need for improved safety on the Kennedy Bridge.

Table 1

Regional Daily Trips, VHD, VMT, and VHT and Percent Change from No-Action Alternative

Total KIPDA Region	No-Action	FEIS Selected		East End Only		Downtown Only		Modified Selected (with tolls)	
Daily Trips	3,393,000	3,400,000	<1%	3,398,000	<1%	3,395,000	<1%	3,399,000	<1%
VHD	405,000	349,000	- 13.8%	357,000	- 11.9%	402,000	-<1%	362,000	-10.6%
VMT	33,081,000	33,475,000	1.2%	33,428,000	1.0%	33,252,000	<1%	33,522,000	1.3%
VHT	1,098,000	1,046,000	-4.7%	1,053,000	-4.1%	1,097,000	-<1%	1,059,000	-3.6%

* Percent change is relative to the No-Action Alternative.

** VMT and VHT are shown for comparison of alternatives, not as performance measures for purpose and need.

Source: SEIS TOD Model

Table 2a

Daily Ohio River Vehicle Crossings and Percent Capacity (FEIS Daily Model)

Bridge	Sherman Minton (I-64)	Clark Memorial (US 31)	Kennedy (I-65)	East End	TOTAL
No-Action	112,000 104%	25,000 83%	155,000 123%	---	292,000 111%
FEIS Selected	100,000 93%	28,000 93%	136,000 63%	60,000 56%	324,000 70%
East End Only	100,000 93%	25,000 83%	134,000 106%	62,000 57%	321,000 86%
Downtown Only	108,000 100%	25,000 83%	174,000 81%	---	307,000 87%
Modified Selected (with tolls)	122,000 113%	35,000 117%	104,000 48%	52,000 72%	313,000 73%

Note: In each row, the top number is the projected average daily traffic from the SEIS TOD Model; the bottom number is the demand-to-capacity ratio expressed as a percentage. Percents greater than 100 were highlighted as problematic in the 2003 FEIS.

Note: These percentages are computed using the daily capacities from the FEIS Daily Model.

Source: SEIS TOD Model forecasts.

Table 2b

Daily Ohio River Vehicle Crossings and Percent Capacity (SEIS TOD model)

Bridge	Sherman Minton (I-64)	Clark Memorial (US 31)	Kennedy (I-65)	East End	TOTAL
No-Action	112,000 79%	25,000 66%	155,000 94%	---	292,000 85%
FEIS Selected	100,000 71%	28,000 74%	136,000 48%	60,000 42%	324,000 54%
East End Only	100,000 71%	25,000 66%	134,000 81%	62,000 44%	321,000 66%
Downtown Only	108,000 76%	25,000 66%	174,000 62%	---	307,000 67%
Modified Selected (with tolls)	122,000 86%	35,000 93%	104,000 37%	52,000 55%	313,000 56%

Note: In each row, the top number is the projected average daily traffic from the SEIS TOD Model; the bottom number is the demand-to-capacity ratio expressed as a percentage. Note: These percentages are computed using the aggregated daily capacities from the SEIS TOD travel demand model.

Source: SEIS TOD Model forecasts.

Table 3
Period Ohio River Vehicle Crossings and Percent Capacity

	Period	Kennedy (I-65)		Sherman Minton (I-64)		Clark Memorial (US 31)		East End		TOTAL	
		NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
No-Action	AM	63%	139%	60%	119%	25%	94%	---	---	58%	125%
	Midday	76%	108%	75%	79%	44%	84%	---	---	72%	92%
	PM	120%	113%	126%	81%	117%	81%	---	---	122%	95%
	Night	77%	90%	66%	53%	66%	38%	---	---	72%	59%
FEIS Selected	AM	32%	76%	54%	105%	28%	103%	70%	39%	46%	76%
	Midday	41%	45%	67%	71%	68%	81%	35%	35%	47%	51%
	PM	85%	46%	113%	72%	114%	75%	43%	75%	84%	60%
	Night	42%	34%	59%	47%	80%	53%	32%	32%	46%	38%
East End Only	AM	48%	133%	51%	112%	25%	100%	69%	45%	53%	97%
	Midday	62%	94%	66%	70%	58%	75%	38%	35%	56%	67%
	PM	121%	92%	115%	70%	111%	67%	47%	74%	98%	78%
	Night	64%	73%	60%	46%	69%	38%	32%	33%	54%	45%
Downtown Only	AM	50%	82%	59%	107%	28%	97%	---	---	51%	91%
	Midday	55%	60%	73%	77%	68%	63%	---	---	62%	65%
	PM	94%	65%	116%	80%	119%	58%	---	---	103%	69%
	Night	55%	48%	65%	53%	79%	31%	---	---	60%	48%
Modified Selected (with tolls)	AM	18%	65%	66%	119%	89%	97%	88%	51%	47%	79%
	Midday	30%	35%	83%	89%	91%	91%	47%	47%	51%	55%
	PM	74%	33%	125%	86%	100%	94%	58%	94%	86%	61%
	Night	32%	22%	78%	62%	93%	91%	41%	42%	49%	40%

Note: These percentages are computed using the period capacities from the SEIS TOD Model.

Source: SEIS TOD Model forecasts

Table 4
Projected 2030 Peak-Hour Bridge Level of Service

Bridge	No-Action	FEIS Selected	East End Only	Downtown Only	Modified Selected (with tolls)
Sherman Minton (I-64)	F	E	E	E	E
Clark Memorial (US 31)	C	C	C	C	D
Kennedy (I-65)	F	D	F	D	C
East End	---	D	D	---	D

Note: For each bridge, levels of service were determined for each direction for both the AM and PM peak hours. The worst level of service is reported in this table.

Source: Highway Capacity Manual capacity analyses. (See Appendix H.6 for more details.)