Kentucky Transportation Cabinet

I-65/I-264 Interchange Planning Study

Final Executive Summary

PROJECT NO.: 05-559

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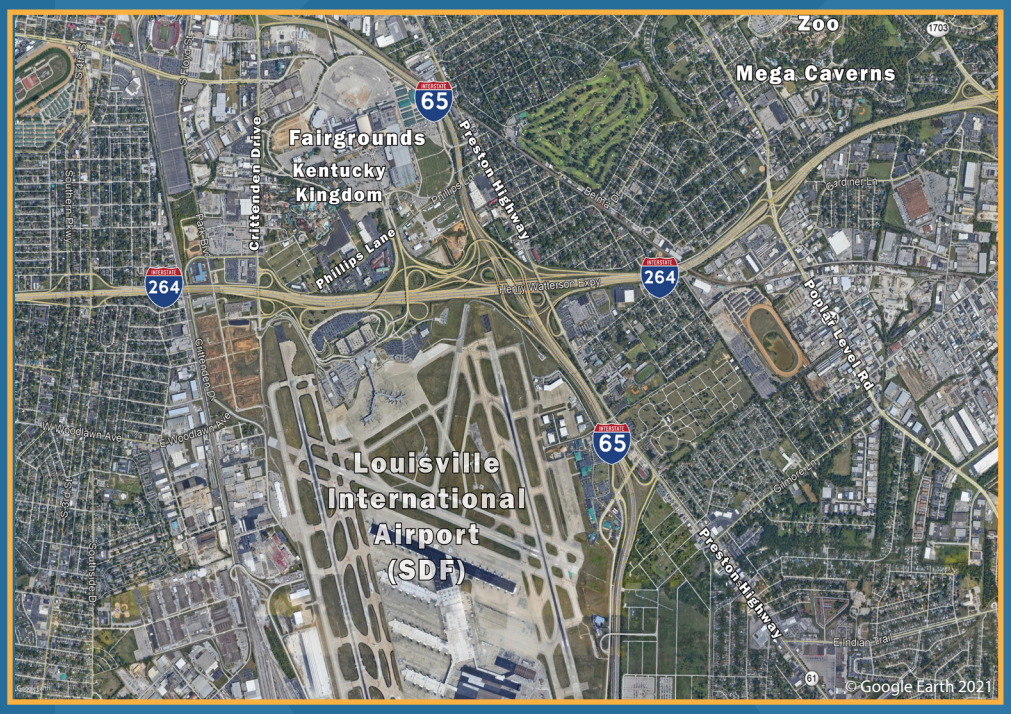

Prepared for:

KENTUCKY TRANSPORTATION CABINET

In partnership with:

wsp

EXECUTIVE SUMMARY

The Kentucky Transportation Cabinet (KYTC) initiated a planning study to identify potential concepts to improve safety and reduce congestion through the I-65/I-264 Interchange in Louisville, Kentucky. The study area encompasses I-65 from Mile Point (MP) 129.3 to MP 131.6 and I-264 from MP 10.6 to MP 13.4. The study includes both short-term and long-term improvement strategies that KYTC and other local agencies may use for further project development and implementation. The study area is shown in **Figure ES-1.**

The goals of this study are to improve safety for all users, manage and reduce roadway congestion where appropriate, ensure timely and efficient movement of freight entering, departing, and through the region, and reduce and/or mitigate negative environmental impacts, including climate change. Based on existing conditions data that was collected, objectives were developed as summarized below:

- Examine existing traffic, roadway, environmental, and safety conditions along the existing routes.
- Identify roadway problems and/or deficiencies.
- Define the study's purpose, goals, and objectives.
- Develop a list of improvement strategies (projects).
- Evaluate the list of improvement strategies, considering transportation, community, environmental, geotechnical, and economic benefits and impacts, as well as local official/stakeholder (LO/S) and public input.
- Provide recommendations based on the Study's identified purpose, goals, and objectives.
- Develop a draft Purpose and Need statement for any feasible project(s) chosen for further development following KYTC and FHWA guidance. The Purpose and Need statement will clearly identify project issues, goals, and needs within the study area.
- Prioritize projects to allow for a phased implementation approach, if applicable.

While KYTC has the ultimate responsibility for constructing and maintaining safe and efficient highways, KYTC desires to incorporate LO/S and public input into the evaluation and decision-making process. Therefore, all eight study objectives were completed in coordination with input from the LO/S and the public.

Figure ES-1: Major Destinations near Study Area

The consultant team conducted a detailed inventory that examined existing roadway characteristics, interchange signing, lighting, guardrail, right of way, existing and future traffic volumes, level of service (LOS), capacity, and crash data. The project team identified areas of concern with regards to roadway features and traffic operations and performed a safety analysis to identify significant contributors to crashes in the study area. Additionally, a robust public involvement process ensured local elected officials, stakeholders, and the public were able to provide input by helping identify issues in the study area and provide feedback on potential improvement strategies.

Seven low cost improvement strategies were developed to address the safety concerns and infrastructure deficiencies identified in the safety analysis and during the public involvement process. These are described in detail below.

GUIDE SIGNAGE

Install new guide signage to help drivers identify their destination by incorporating improved messaging, high-visibility retroreflective sheeting, symbols for popular destinations, consistent designations for exit-only lanes, and overhead arrow-per-lane signage. The improved signage will help drivers identify proper lane position to navigate the study area and reduce unnecessary/last minute lane changes.

HIGH FRICTION SURFACE TREATMENT

Install skid-resistant pavement treatment and diagonal pavement markings along the shoulders of the curves of the ramps from northbound I-65 to westbound I-264 and from westbound I-264 to southbound I-65. The High Friction Surface Treatment prevents roadway departures and the diagonal pavement markings give drivers visual cues to slow down in the curve. **Figure ES-2** identifies locations where the High Friction Surface Treatment is recommended.

Figure ES-2: Segments benefitting from High Friction Surface Treatments

ELONGATED PAVEMENT MARKINGS (PAVEMENT TATTOOS)

Install shield markings directly on the roadway to identify destinations without drivers needing to look away from the roadway. To improve visibility of the markings consider using a black background and avoid installation on downward slopes. This improvement strategy should be used in conjunction with guide signing to help drivers identify proper lane position to navigate the interchange and reduce unnecessary/last minute lane changes.

ENHANCED STRIPING

Update roadway markings to improve delineation in places where drivers make decisions including merges, diverges, and places where lanes are added or dropped. The new striping should include dotted lane line extensions and chevron markings in the gore areas. The recommended striping will improve delineation and reduce crashes at decision points throughout the interchange.

BLACK CONTRAST STRIPING

Install black contrast striping over the current roadway markings to improve visibility of lane markings in areas where pavement is lightly colored and subject to glare from the sun. Black contrast striping helps drivers see lane markings.

GUARDRAIL

Replace all existing guardrail and end treatments throughout the study area. New guardrail should adhere to the current KYTC standards. The upgraded guardrail will improve roadside safety and reduce crash severity in the event of a roadway departure.

LIGHTING

Install new LED lighting along ramps that are not included in the statewide lighting contract to improve interstate lighting. This includes the ramps from northbound I-65 to westbound I-264, southbound I-65 to eastbound I-264, and westbound I-264 to southbound I-65. The new system will include new standard cobra arm mounted LED fixtures, new LED wall pack lighting under bridges, new conduit, wiring, and light pole bases, and additional items to address the possibility of encountering rock. Increased lighting levels improve visibility for drivers at night and upgraded uniformity will reduce the occurrence of blind spots that result from sudden changes in lighting levels.

Table ES-1 highlights the public feedback received for each short-term potential improvement strategy cost, and either the number of crashes that must be reduced to have a positive return on investment or benefit/cost (B/C) ratio. Green denotes the highest ranking, orange denotes a middle ranking, and red denotes the lowest ranking performance in each category. The project team reviewed the rankings along with public feedback to determine the final priority ranking of each potential improvement solution.

Table ES-1: Short Term Potential Improvement Strategy Evaluation Matrix

Potential Improvement Strategy	Public Feedback	Cost	# of Crashes for Positive ROI	B/C
Improve Guide Signs	High	$2,100,000	31	--
High Friction Surface Treatment	Medium	$1,150,000	--	2.4
Pavement Tattoos	High	$750,000	13	--
Enhanced Striping	Medium	$1,370,000	22	--
Black Contrast Striping	Low	$575,000	15	--
Upgrade Guardrail	Medium	$2,300,000	2*	--
LED Lighting Upgrade	High	$280,000	4	--

** Denotes the the number of crashes that must be reduced in severity (from fatal or severe injury to property damage only) to realize a positive return on investment.*

Long-term potential improvement strategies were developed based on the detailed analyses of roadway conditions and deficiencies, the traffic operations and safety analysis, comments received from the public, and a project team brainstorming session. Three major improvement strategies were identified to address the deficiencies of the I-65/I-264 interchange. Each of the three potential strategies address different needs in the study area:

POTENTIAL IMPROVEMENT STRATEGY A

Potential Improvement Strategy A addresses issues along I-264 eastbound including movements onto the Collector-Distributor (CD) prior to I-65 and the merge onto I-264 eastbound from I-65 and the I-65 Northbound CD. Three variations of Potential Improvement Strategy A were modeled to evaluate the change in congestion on I-65 northbound by modifying the access to I-264 eastbound from Preston Highway.

- Potential Improvement Strategy A-1 (***Figures ES-2*** & ***ES-4***) closes the northbound I-65/eastbound I-264 ramp from Preston Highway. The ramp from I-65 northbound to I-264 eastbound is widened to two lanes and the I-65 southbound traffic merges directly onto I-264 eastbound, west of the current merge location.
- Potential Improvement Strategy A-2 (***Figures ES-2*** & ***ES-5***) moves the on-ramp from Preston Highway to I-264 eastbound to the north, making it part of a partial tight diamond interchange. The I-65 northbound exit ramp to I-264 eastbound is widened to two lanes in this scenario as well. Vehicles from I-65 northbound merge with the traffic from I-65 southbound as they currently do, without the merge from Preston Highway.
- Potential Improvement Strategy A-3 does not close the Preston Highway ramp access or widen the I-65 northbound ramp to I-264 eastbound to two lanes but moves the I-65 southbound ramp to merge with I-264 eastbound to the west of the current merge location. The I-65 northbound and Preston Highway ramp remains as a two-lane on-ramp to merge with I-264 eastbound.

POTENTIAL IMPROVEMENT STRATEGY B

Potential Improvement Strategy B (***Figure ES-6***) addresses an issue identified by both the collected data and public feedback: slow vehicle traffic occurs regularly on I-264 westbound due to the tight radius of the I-264 westbound ramp to I-65 southbound. This strategy improves the radius of the loop ramp from I-264 westbound to I-65 southbound and moves the traffic using this ramp from Exit 12, I-264 westbound to Preston Highway / I-65, to Exit 11, I-264 westbound to Crittenden Drive and Airport / Fair / Expo Center. The loop ramp would become an add lane of traffic to I-65 southbound just north of the bridge over I-264. By improving the radius of the loop ramp and separating this exit from the Preston Highway and I-65 northbound exit, sight distances would be improved and the weave between Poplar Level Road and I-65 would be improved, which would reduce driver confusion and result in better traffic flow. A positive with this improvement strategy is that the I-65 southbound to I-264 eastbound ramp can use the bridge from the I-264 westbound to I-65 southbound loop ramp to improve the radius and sight distance.

POTENTIAL IMPROVEMENT STRATEGY C

Potential Improvement Strategy C addresses I-65 southbound in the northern section of the study area. Data and public opinion suggest driver confusion is a serious issue on southbound I-65 approaching the exit ramps to I-264. This potential improvement strategy reconfigures the I-65 southbound exits to I-264 westbound and eastbound. The I-264 westbound exit is removed from Exit 131B and joins with the I-264 eastbound Exit 131A, just north of its existing location on southbound I-65. This results in two exits: Exit 131-B to the Fair/Expo Center and Exit 131A to I-264 westbound and I-264 eastbound. The improvement allows more time and distance for better driver decision making for the ramp movements.

The long-term potential improvement strategies were evaluated using criteria that includes traffic, safety, environmental, right of way, constructability, public feedback, cost estimates, and benefit-cost ratio (B/C). Traffic and safety analyses are the quantitative data used to calculate B/C. Environmental and right of way impacts, constructability, public feedback, and cost estimates are qualitative measures used in determining their feasibility. **Table ES-2** shows the matrix comparing the long-term potential improvement strategies with green ranking the highest, orange ranking in the middle, and red ranking the lowest performance in each category.

Table ES-2: Long Term Potential Improvement Strategy Evaluation Matrix

Potential Improvement Strategy	Environmental Impact	ROW Impact	Constructability	Public Feedback	Delay Savings	Safety Benefit	Cost	B/C
A-1	Low	Low	Good	High	$10,510,086	$181,590	$14,480,000	11.8
A-2	Low	Low	Medium	Medium	$7,603,269	$181,590	$14,075,000	8.8
A-3	Low	Low	Medium	Low	$2,604,245	$163,431	$13,635,000	3.2
B-1	Low	Low	Medium	High	$23,606,836	$0	$11,130,000	33.9
C-1	Low	Low	Poor	Low	$497,488	$0	$4,995,000	1.6

The project team used the results of the evaluation of potential improvement strategies to identify those to advance into the next phase of project development. All seven of the short-term safety improvement strategies yield positive ROI (Return on Investment) and are recommended to be carried forward. Long-term Improvement Strategy A-1 has that highest B/C of the "A" improvement strategies, and ranked highest in public feedback and constructability, and is recommended to be carried forward. Additionally, due to previous public feedback with regards to closing the Preston Highway Ramp, it is recommended that Potential Improvement Strategy A-2 be moved forward to Phase 1 Design for another round of public involvement. Potential Improvement Strategy A-3 is not recommended to move forward due to low scores from public feedback as well as a low benefit to cost ratio. Potential Improvement Strategy B-1 has the highest B/C of all the long-term potential improvement strategies due to the significant reduction in delay. It also received positive feedback from the public, thus it is recommended to move forward. Potential Improvement Strategy C-1 does have a positive B/C, however it was not highly favored by the public, and the benefit for the cost is low comparatively, therefore C-1 is not recommended to move forward. All long-term improvement strategies that are recommended as part of this study can be moved forward concurrently or independently. ***Figures ES-3***, ***ES-4***, ***ES-5***, and ***ES-6*** show the long-term strategies recommended to be moved forward to Phase 1 Design.

Figure ES-3: CD Modification for Potential Improvement Strategy A

Figure ES-4: Potential Improvement Strategy A-1

Figure ES-5: Potential Improvement Strategy A-2

Figure ES-6: Potential Improvement Strategy B

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