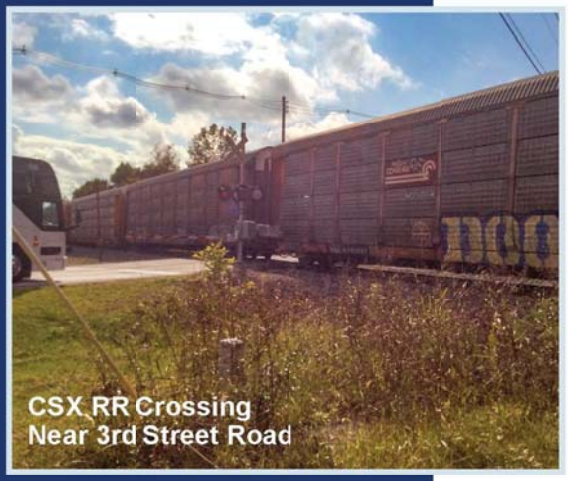
EXECUTIVE SUMMARY


Major Utilities along the Corridor


CSX RR Crossing
Near 3rd Street Road


Outer Loop Eastbound Backup
Approaching New Cut Road

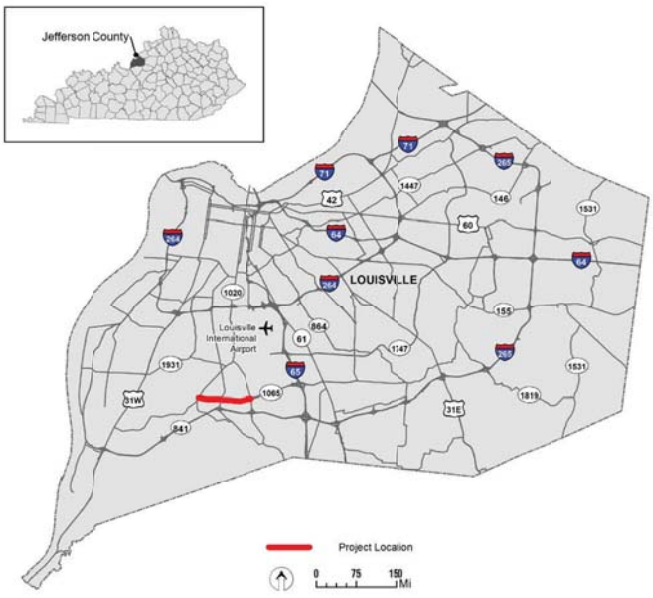

Westbound Outer Loop Motorists on
the Wrong Side of the Road Trying to
Reach Short Left Turn Pocket

KY 1065
OUTER LOOP
CORRIDOR

3rd Street Road (KY 907)
to National Turnpike (KY 1020)

Jefferson County, KY

December 2018



FINAL

KENTUCKY TRANSPORTATION CABINET

Engineering Planning

Groundbreaking by Design.

Executive Summary

The Kentucky Transportation Cabinet (KYTC) initiated a planning study in August 2017 to identify and evaluate improvements to safety, access, drainage, freight movement, and mobility for all travel modes on KY 1065 (Outer Loop) from KY 907 (3rd Street Road) to KY 1020 (National Turnpike) in Louisville, Jefferson County, Kentucky. This study serves as the first step toward identifying, documenting, and recommending appropriate transportation investment into the Outer Loop corridor.

This planning study was initiated after ranking in the top 10 out of 42 potential planning study candidates across the state for prioritization by KYTC based upon numerous factors such as safety, congestion, roadway characteristics, etc. Furthermore, in early 2017 KYTC's Highway Safety Improvement Program (HSIP) Intersection Emphasis Preliminary Report (SYP #5-9010.00) prioritized 37 intersection improvements located in KYTC District 5. The Outer Loop corridor contained priorities 6, 7, 32, and 33. Lastly, the Kentuckiana Regional Planning and Development Agency Metropolitan Planning Organization (KIPDA MPO) identified the Outer Loop intersections with New Cut Road and National Turnpike as the top and ninth highest crash intersections, respectively, (2009-2011) in the KIPDA KY region.

Study Area

The study area **(Figure ES 1)** begins at 3rd Street Road (MP 0.000) and extends east for 2.514 miles to National Turnpike (MP 2.514). There are three major intersections along the corridor: 3rd Street Road, New Cut Road, and National Turnpike, with the study area widening slightly at these intersections.

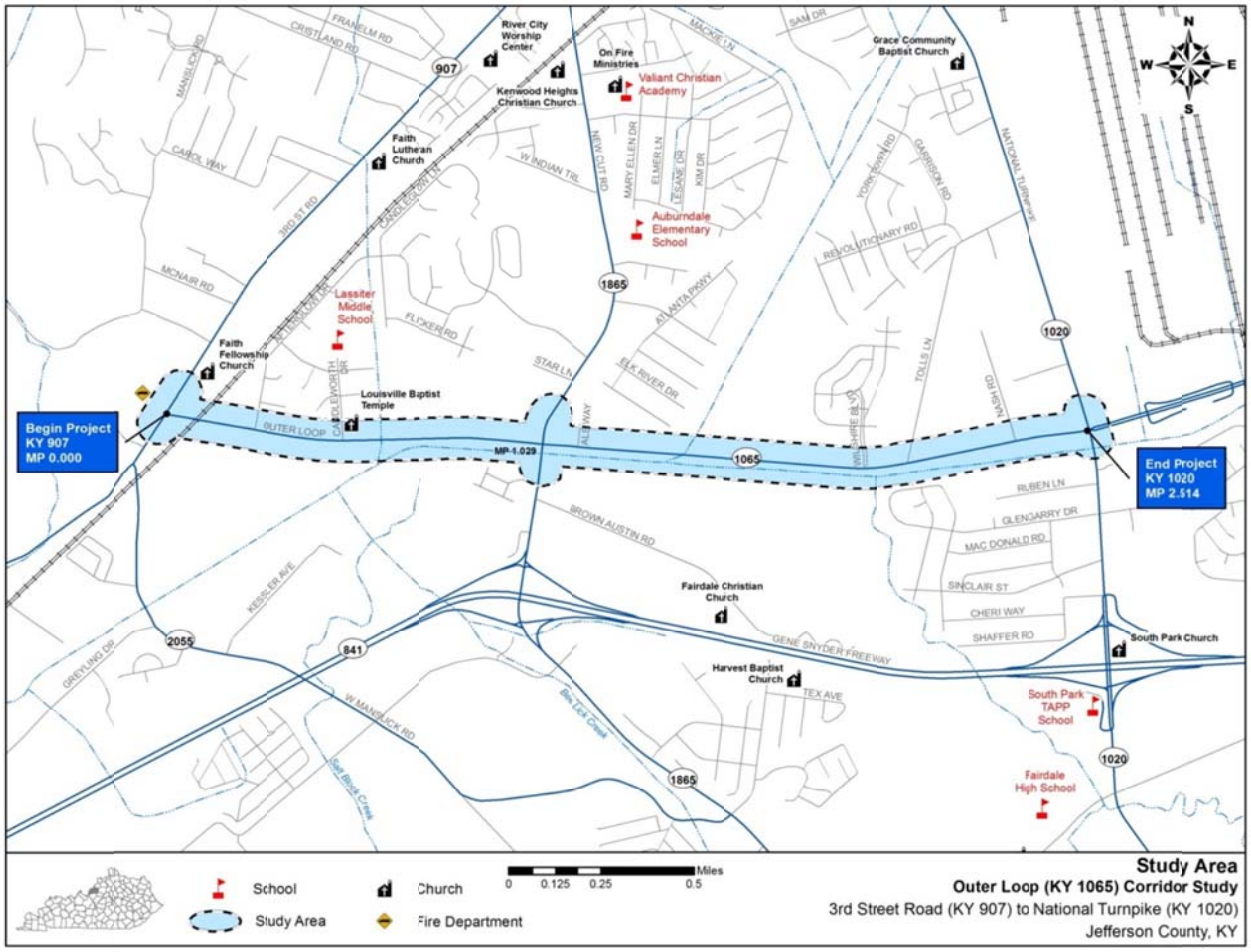


Figure ES 1: Study Area

Purpose and Need

The purpose of this project is to improve safety, targeting two major intersections (New Cut Road and National Turnpike); and improve mobility for travelers.

Safety is the primary concern along the corridor. As mentioned previously, the New Cut Road and National Turnpike intersections are identified as numbers one and nine, respectively, on the region's 2011 *Top 40 High Crash Intersections* list supplied by the KIPDA MPO. Records show 283 reported crashes along Outer Loop during 2014–2016. This number included three fatal and 51 injury collisions. Five high crash spots were identified on Outer Loop. Current crash trends mirror KIPDA's earlier findings with high crash spots at New Cut Road and National Turnpike. Business entrances and exits too close to the major intersections contribute to angle crashes as motorists must negotiate through traffic in as many as three lanes when turning left. Additional high crash spots occur at 3rd Street Road and the signalized Walmart entrance.

Mobility is another concern along Outer Loop. Annual average daily traffic (AADT) ranges from 14,000 vehicles per day (vpd) at the western end of the study area to 17,600 vpd near the eastern end. Four percent of those volumes are trucks. Travel times along the corridor range from 5 minutes in morning hours to nearly 9 minutes in evening hours. Average travel speeds along the corridor range from 17 to 30 mph during peak periods, well below the posted 45 and 55 mph speed limits. Motorists often drive into opposing travel lanes to avoid long queues and access the short left turn lanes at National Turnpike, and are also often seen using the shoulders to pass stopped, left-turning vehicles.

Outer Loop traffic volumes are not forecasted to grow; however, existing volumes on New Cut Road and National Turnpike are expected to increase from 22,000 to 28,000 vpd and from 25,000 to 34,000 vpd, respectively, by 2035. These increased volumes will contribute to intersection congestion, resulting in Level of Service (LOS[1]) E on Outer Loop in 2035.

In addition to the needs above, **Goals** for the project include:

- Improve drainage, as much of the corridor lies within the 100-year floodplain; the road is often closed due to flooding following heavy rain events.
- Improve pedestrian safety through improved sidewalk condition and connectivity.

Environmental Overview, Geotechnical Review, and Resource Agency Input

An Environmental Overview was performed including a review of Historic and Archaeological Resources by Brockington and Associates, Aquatic/Terrestrial Resources by Redwing, and a Socioeconomic Study by KIPDA. Additionally, a preliminary geotechnical overview report was prepared by American Engineers, Inc. and reviewed by the KYTC Division of Structural Design, Geotechnical Branch. Lastly, several selected state and federal resource agencies were contacted to derive their input for the corridor study.

[1] A qualitative measure used to evaluate roadway or intersection congestion LOS range from LOS "A" (free flow, no delays–best conditions) to LOS "F" (considerable delays–worst conditions). LOS D (minimal delays) or better is desirable in urban areas.

Existing Conditions

Outer Loop is a state-maintained route providing both local and regional traffic with access to work, school, shopping, and regional state routes as well as destinations beyond. It is classified as an Urban Minor Arterial. The study area consists of mainly residential and commercial development. However, the region just east of the study area is mostly comprised of industrial development surrounding the Louisville International Airport, including the Renaissance South Business Park located to the south of Outer Loop and nearer to Interstate 65.

Within the study area, Outer Loop is similar to a rural two-lane roadway with drainage handled by roadside ditches. The grass ditches drain the majority of Outer Loop to the Northern and Southern ditches, Wilson and Big Bee Lick creeks. There are a few small sections of urban curb and gutter. **Table ES 1** summarizes the existing geometric characteristics of Outer Loop. Much of the Outer Loop corridor lies within the floodplain, with documented flooding occurring in the past. An at-grade railroad crossing exists near 3rd Street Road. Sidewalks are sporadic along the corridor and no dedicated bicycle facilities exist. Transit service along Outer Loop is minimal, only served from New Cut Road and looping around the Walmart parking lot.

Table ES 1: Outer Loop Roadway Geometrics

Outer Loop	
2017 ADT	13,500–17,600 vpd
Terrain	Flat
Number of Lanes	MP 0.000–2.352: 2 Lanes MP 2.352–2.514: 3 Lanes (two lanes eastbound) MP 0.703-0.950: 3 Lanes with Two-Way Left Turn Lanes (TWLTL)
Lane Width	11–12 feet
Shoulder Width	MP 0.000–0.481: 10 feet (1–3 feet paved) MP 0.481–1.121: 10 feet (1 foot paved, south); 2 feet curbed (north) MP 1.121–2.250: 10 feet (2 feet paved) MP 2.250–2.514: 11 feet (11 feet paved)
Speed Limit	45–55 MPH
Access Points	22 between 3rd Street Road and New Cut Road 15 between New Cut Road and National Turnpike
Horizontal Alignment	All meet current guidelines
Vertical Alignment Deficiencies	2 curves approaching 3rd Street Road do not meet stopping sight distance 1 curve on SB 3rd Street Road does not meet minimum sight distance 8% grade at CSX railroad crossing exceeds maximum grade

Kentucky State Police traffic collision data was collected and analyzed for the three-year period between January 1, 2014, and December 31, 2016. Five high crash 0.1-mile spots **(Figure ES 2)** were identified with critical crash rate factors (CCRF[2]) greater than 1.0.

[2]**CCRF**: one measure of the safety of a road, expressed as a ratio of the crash rate at the location compared to the critical crash rate for roadways of the same functional classification throughout the state. A CCRF of 1.0 or greater indicates crashes may be occurring due to circumstances beyond random occurrence.

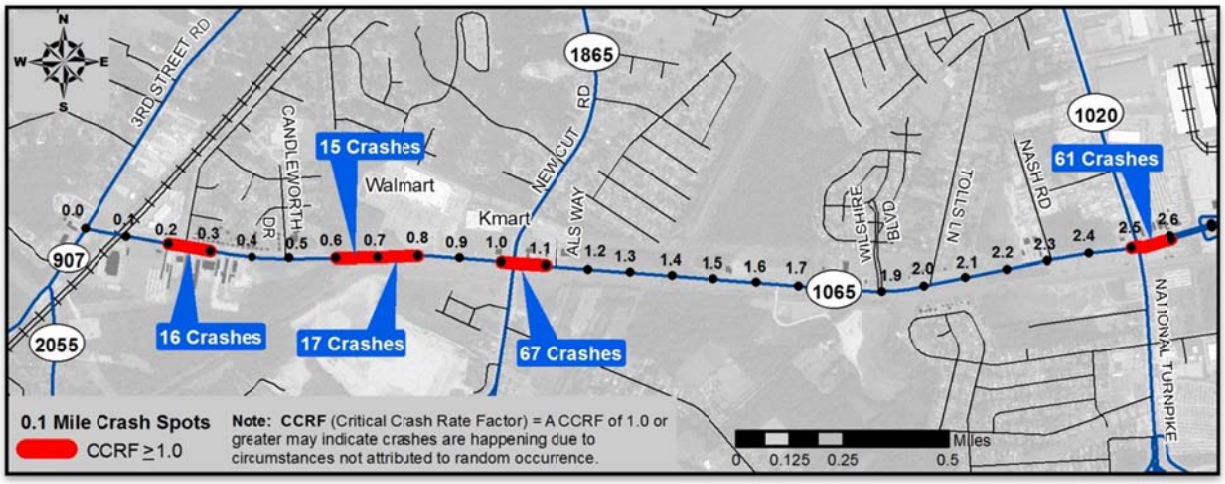


Figure ES 2: Outer Loop 0.1-Mile High Crash Spots

Traffic Analysis

Qk4 coordinated with KIPDA on travel demand modeling and traffic analysis for this study. Traffic volumes and turning movement data was collected. Traffic operations were evaluated based upon several performances measures such as traffic volumes, volume to capacity (v/c) ratios, percent time spent following (PTSF), average travel speeds (ATS), Level of Service (LOS), queue lengths, and travel times. Data was collected and existing traffic operations were analyzed for the 2017 base year. These existing conditions were then compared with a forecasted year of 2035.

The 2035 No Build traffic volumes were calculated using KIPDA's 2007 Regional Travel Demand Model (RTDM), adjusted for expected growth and more recent traffic counts. Using 2035 design year growth and supported by further information, it was concluded that future traffic operations will show minimal-to-no change from existing 2017 operations. All capacity analyses used current Highway Capacity Software (HCS).

Build alternative traffic analyses began by assessing potential effects of a conceptual interchange on Outer Loop traffic. The new interchange would connect to Outer Loop via Air Commerce Drive. Traffic analyses performed including the interchange showed a maximum 400 vehicles per day (vpd) diverted from Outer Loop, resulting in minimal traffic effects. The project team decided to move forward with Outer Loop Build traffic analyses using the worst-case traffic scenario—without a new interchange.

Public Involvement

The project team consisted of representatives from the KYTC Central and District 5 offices, the KIPDA MPO, and the consultant. Over the course of the study three project team meetings, one preliminary alternative meeting, two local officials/stakeholders meetings, and two public meetings were held.

The project team met with local officials/stakeholders and members of the public for the first time in December 2017 to provide study information, present existing conditions, verify current issues, and identify issues of specific concern. The top three improvement focus areas from 303 completed surveys were congestion/delay (93%), safety (80%) and drainage (66%).

A range of improvement concepts were developed based on existing conditions analysis, and input received both from the project team and public involvement activities. As indicated in the Purpose and Need Statement, safety and mobility are the primary concerns on Outer Loop. The project team also decided that rehabilitation of existing sidewalks to meet current ADA standards and new pedestrian facilities to improve connectivity should be included in the alternatives. However, dedicated bicycle facilities would not be included because of the low compatibility for bicycling on Outer Loop and proximity of the Louisville Loop south of the corridor.

Following alternatives/improvements development, the project team met with local officials/stakeholders and members of the public for the final time in May 2018 to present long- and short-term improvements and solicit input. Alternatives 1 and 2 were presented in two constructible segments -- western (3rd Street Road to New Cut Road) and eastern (New Cut Road to National Turnpike). Surveys were once again utilized in the prioritization process. The majority of the 316 respondents supported Outer Loop improvements (94%), and preferred Alternative 2 for western (60%) and eastern (76%) segments. The public prioritized short-term intersection improvements as (1) New Cut Road, (2) National Turnpike, and (3) 3rd Street Road. Respondents supported all four spot improvements, chose east segment construction (67%) as higher priority over west, thought the roadway should be raised above floodplain elevation (89%), and desired continuous sidewalks along Outer Loop (82%).

Alternatives/Improvements Development

In addition to the No Build[3] option, this study examined two types of improvement concepts: (1) Long-term improvements and (2) Short-term improvements.

Long-term improvements consist of Alternatives 1 **(Figure ES 3)** and 2 **(Figure ES 4)**. Both widen Outer Loop along the corridor, differentiating in lane numbers. Alternative 1 includes two and three-lane typical sections and Alternative 2 includes three, four, and five-lane sections.

Figure ES 3: Alternative 1: 3-2-3 Configuration

[3] **No Build/Do Nothing:** The No Build/Do Nothing alternative serves as a baseline for comparison of other alternatives. This alternative indicates existing conditions would remain without new construction improvements and only future maintenance would take place.

Figure ES 4: Alternative 2: 3-5-4-5 Configuration (Recommended)

Short-term improvements include relatively low-cost, stand-alone projects to address existing safety issues in a timely manner including spot improvements and intersection improvements.

Short-term spot improvements are shown in **Table ES 2**.

Table ES 2: Short-Term Spot Improvements

	Improvement	Included in
A	Construct two westbound through lanes through the National Turnpike intersection to reduce motorists' confusion.	Long-term Build Alternative 2
B	Deepen ditch at Tolls Lane.	Long-term Build Alternatives 1 and 2
C	Construct TWLTL and/or right turn lanes for Wilshire Boulevard, Tolls Lane, and Nash Road.	Long-term Build Alternatives 1 and 2
D	Construct a right turn lane at Candleworth Drive.	Long-term Build Alternatives 1 and 2

Table ES 3 summarizes brief descriptions, milepoints and phased and total costs for the recommended long-term Alternative 2 and high priority short-term spot improvements.

Table ES 3: Long-term and High Priority Spot Improvement Costs

Alternatives	Design	Right of Way	Utilities	Construction	Total
Alt 2 - Segment 1 – (3rd Street Road to New Cut Road)	$500,000	$1,600,000	$3,600,000	$4,700,000	$10,400,000
Alt 2 - Segment 2 – (New Cut Road to National Turnpike)	$1,000,000	$2,600,000	$3,600,000	$10,500,000	$17,700,000
Right Turn Lane at Wilshire Boulevard	$5,000	-	$100,000	$50,000	$155,000
Right Turn Lane at Candleworth Drive	$15,000	-	$60,000	$150,000	$225,000
New Sidewalks for Connectivity	$50,000	$250,000	$75,000	$830,000	$1,205,000

Three major intersections (3rd Street Road, New Cut Road, and National Turnpike) were identified for potential improvements and are shown on the following pages with high priority improvement costs shown (3rd Street Road, **Figure ES 5** and **Table ES 4**; New Cut Road, **Figure ES 6** and **Table ES 5**; and National Turnpike, **Figure ES 7** and **Table ES 6**).

Figure ES 5: 3rd Street Road Intersection Improvements

Table ES 4: 3rd Street Road High Priority Improvement Costs

ID	Survey Score	Design	Right of Way	Utilities	Construction	Total
a	4.03	$15,000	-	-	$150,000	$165,000
c	4.35	$11,500	$60,000	-	$115,000	$185,500
d	4.81	-	-	-	$5,000	$5,000
e	5.33	$6,000	$10,000	$60,000	$60,000	$136,000
h	5.39	$3,000	$15,000	-	$30,000	$48,000

Figure ES 6: New Cut Road Intersection Improvements

Table ES 5: New Cut Road High Priority Improvement Costs

ID	Survey Score	Design	Right of Way	Utilities	Construction	Total
a	3.78	$6,200	-	-	$62,000	$68,200
d	3.51	$7,000	$250,000	-	$70,000	$327,000
e	4.66	-	-	-	$1,000	$1,000

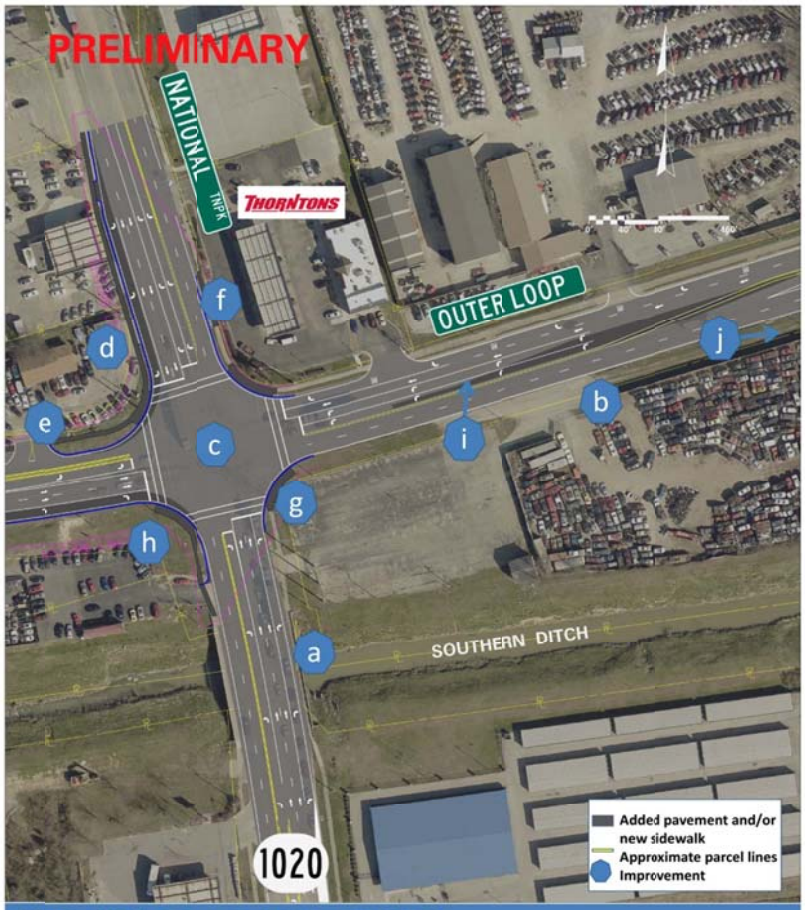


Figure ES 7: National Turnpike Intersection Improvements

Table ES 6: National Turnpike High Priority Improvement Costs

ID	Survey Score	Design	Right of Way	Utilities	Construction	Total
a	6.87	$3,000	-	$50,000	$30,000	$83,000
b	7.41	$34,000	-	$125,000	$340,000	$499,000
c	4.88	-	-	-	$2,000	$2,000
f	4.16	-	$25,000	-	$2,000	$27,000
g	3.76	$14,000	$15,000	-	$140,000	$169,000
i	4.22	$10,000	-	-	$100,000	$110,000
j	N/A	-	-	-	$2,000	$2,000

Conclusions and Recommendations

The project team considered the No Build option, as well as each long- and short-term improvement alternative. Recommendations were made for the Outer Loop Corridor Study based on existing conditions, crash history, projected traffic operations, public input, project costs, and ability to meet the project's purpose and need.

The project team recommended Long-term Alternative 2 over Alternative 1. Alternative 2 is anticipated to operate three times better than Alternative 1 in terms of corridor travel times, improves LOS to B from just west of Candleworth Drive to National Turnpike, and has a benefit-cost ratio (BCR)[4] greater than 1.0.

The four spot improvements and the 34 Outer Loop short-term intersection improvements for 3rd Street Road, New Cut Road, and National Turnpike were prioritized as high, medium, or low. Two of the four spot improvements were prioritized as high along with sidewalks along the corridor. Additionally, of the 34 short-term improvements, five on 3rd Street Road, three on New Cut Road, and seven on National Turnpike were assigned high priority. Cost estimates were prepared for each improvement concept given a high priority based on average KYTC District 5 unit costs and costs for bridges and contingencies. KYTC District 5 provided high-level cost estimates for right-of-way and utility phases.

Next Steps

Currently no funding for the projects suggested in this corridor study exist in the enacted *Kentucky's FY 2018 - FY 2024 Highway Plan* beyond those allocated to complete this study. The recommended long-term corridor improvement(s) should be reflected in KIPDA's long range plan and evaluated against other projects for inclusion in KYTC's next Six Year Highway Plan. Likewise, the suitable high priority short-term improvements should also be evaluated against other projects for inclusion in KYTC's next Six Year Highway Plan. Lastly, implementation of the appropriate high priority short-term improvements should be pursued through other funding sources such as pavement rehabilitation projects, highway safety improvement projects, etc.

[4] **Benefit cost ratio**: (BCR) is an indicator used in cost-benefit analysis, to show the relationship between the costs and benefits of a proposed project, in monetary or qualitative terms. A BCR greater than 1.0 suggests the project's benefits outweigh its cost.