

APPENDIX F: Meeting Summaries

Meeting Minutes

TO: Jared Jeffers
Project Manager
KYTC Central Office
200 Mero Street
Frankfort, KY 40622

Ben Hunt
Project Manager
KYTC District Office 3
900 Morgantown Road
Bowling Green, KY 42101

FROM: Len Harper
Project Manager
Stantec Consulting Services Inc.

DATE: October 27, 2022

SUBJECT: Smiths Grove Traffic Operations Study
KY 101 (MP 7.6 – MP 8.2)
Warren County
KYTC Item No. N/A
Project Team Meeting No. 1

The first Project Team Meeting for the subject project was held at the District 3 office in Bowling Green, KY and virtually via Microsoft Teams on October 12, 2022 at 1:00 p.m. CDT. The following individuals were in attendance:

Jay Balaji*	KYTC – Central Office Planning
Stephen De Witte*	KYTC – Central Office Planning
Dave Heil*	KYTC – Central Office Planning
Matthew Holder*	KYTC – District 3
Ben Hunt	KYTC – District 3
Jared Jeffers*	KYTC – Central Office Planning
Karissa Lemon	Bowling Green-Warren County MPO
Mikael Pelfrey*	KYTC – Central Office Planning
Joe Plunk*	KYTC – District 3
Austin Sims*	KYTC – District 3
Wes Watt*	KYTC – District 3

Brian Aldridge	Stantec Consulting Services Inc.
Mark Butler*	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

*Attended via Microsoft Teams

Graham Winchester welcomed everyone and led introductions. The purpose of the meeting was to discuss the progress-to-date for the Smiths Grove Traffic Operations Study. Graham then delivered a presentation. The following enumerated items were discussed.

1. The purpose of the meeting is to present the results from the existing conditions analysis and to get feedback from the project team on the existing and future year simulation model scenarios and next steps.
2. There is one project in the study area listed in *Kentucky's FY 2022 – 2028 Highway Plan*.
 - KYTC Item No. 03-80214: Construct a two-lane roundabout at the intersection of KY 101 and the I-65 southbound ramps in Smiths Grove. D = \$750,000 (2024), R = \$1 million (2026), U = \$1 million (2026), C = 7.5 million (20207).

There are two projects in the vicinity of the study area listed in previous versions of the Highway Plan:

- KYTC Item No. 03-109.00: Reconstruct KY 101 from Smiths Grove north to US 31W
 - Question: Should this project be considered in the future year analyses of this study.
 - Answer: No
 - KYTC Item No. 03-281: Scoping Study between Smiths Grove and US 31W
3. The objective of the study is to take a comprehensive look at the South Main Street commercial corridor in Smiths Grove – approx. 1/4-mile each side of the interchange with I-65 (as shown in **Figure 1**) – and propose and evaluate improvement concepts to be considered in future Highway Plans.
 4. A brief history of the study was discussed. The first project team meeting was delayed several months in anticipation of the final version of the Buc-ee's Traffic Impact Study (TIS), which was approved by KYTC in September 2022.
 - July 20, 2020 – Original Buc-ee's TIS was submitted to KYTC
 - November 29, 2021 – Notice to Proceed
 - December 16, 2021 – Scoping Meeting for Smiths Grove Traffic Operations Study
 - January 11, 2022 – Modeling Scoping Meeting
 - January 25, 2022 – Turning movement counts were collected
 - March 17, 2022 - Draft Environmental Overview was submitted to KYTC
 - April 7, 2022 – Revised Buc-ee's TIS
 - April 7, 2022 – Simulation Model Calibration Tech Memo submitted to KYTC
 - May 26, 2022 – Traffic Forecasting Meeting with KYTC
 - June 7, 2022 – Traffic Forecasting Technical Memo approved by KYTC

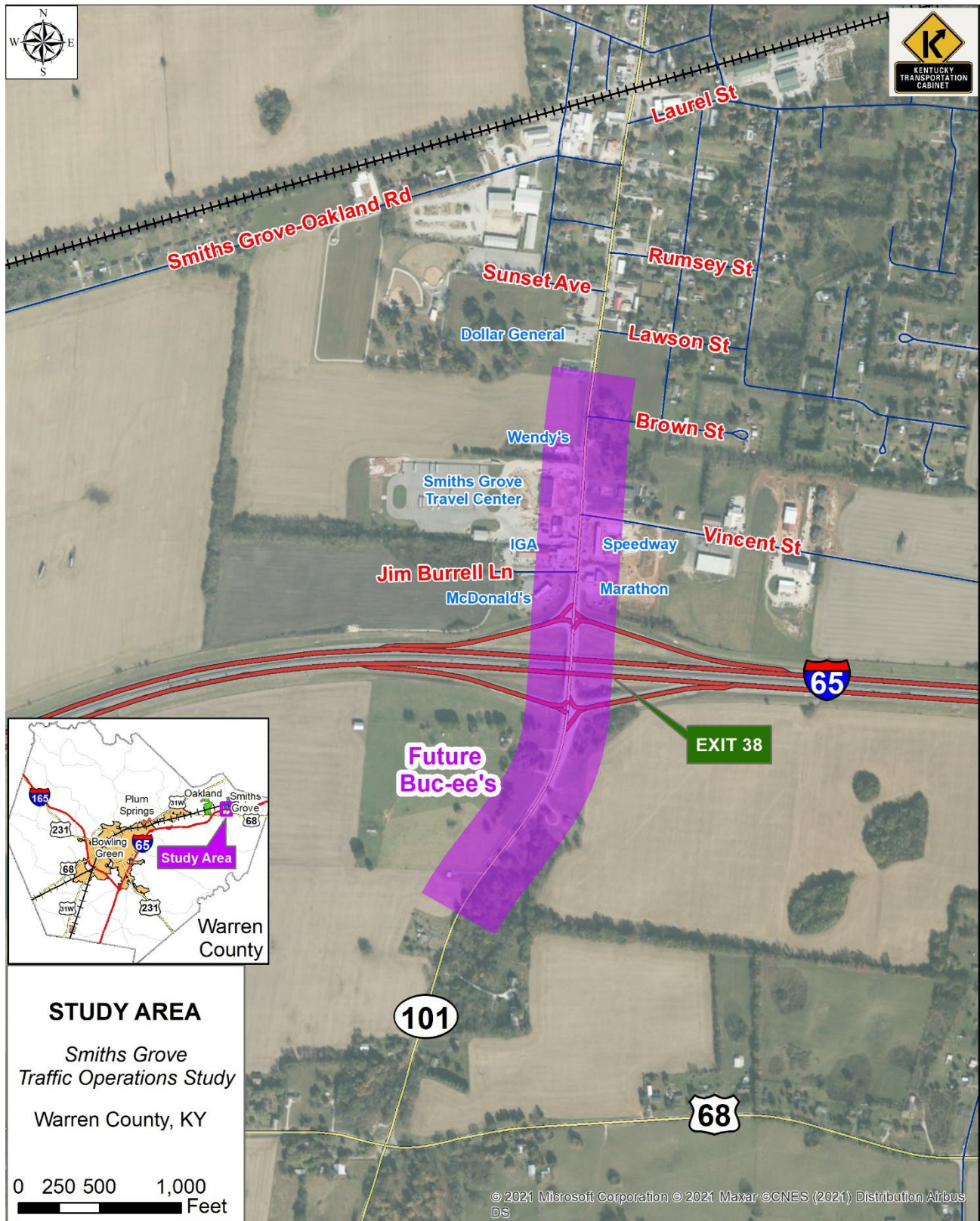


Figure 1: Smiths Grove Study Area

- July 12, 2022 – Revised Buc-ee’s TIS
 - August 2, 2022 – Stantec receives updated TIS
 - September 19, 2022 – Progress Meeting with KYTC
 - September 23, 2022 - KYTC approved Buc-ee’s TIS
 - October 12, 2022 – Project Team Meeting No. 1
5. Highlights from the existing conditions analysis were discussed. The study portion of KY 101 is 0.6 miles in length with posted speed limits ranging from 35 miles per hour (MPH) north of the I-65 interchange to 45 MPH to the south. This two-lane rural major collector has 11- to 12-foot lanes and 10-foot shoulders through the study area with a two-way left-turn lane (TWLTL) north of the interchange. There are currently no traffic signals on the study portion of KY 101.
6. Crash data from the Kentucky State Police database indicates that in the five years between January 1, 2017 and December 31, 2021, a total of 57 non-parking lot crashes were reported on the study portion of KY 101. Of the 57 crashes, there was one fatal collision (2 percent), 10 injury collisions (17 percent), and property damage only collisions (81 percent) during this five-year period. Angle (37 percent) and single vehicle crashes (23 percent) were the most prominent types of collisions.

The Crash Data Analysis Tool (CDAT) was used to perform an Excess Expected Crashes (EEC) analysis. EEC is a measure of the crash frequency at a given site compared to what is expected based on current conditions (geometrics, traffic, etc.). A positive EEC indicates more crashes are occurring than should be expected. Results from this analysis showed the study portion of KY 101 has an EEC of 0.5 crashes per year and a level of service of safety (LOSS) of 3, indicating that the route has experienced slightly more crashes than anticipated and has a moderate potential for crash reduction. Additionally, four of the study area intersections have positive EECs as shown in **Table 1**.

Table 1: KY 101 Intersection EEC

Intersection	Ann. EEC
KY 101 at I-65 NB Ramps	0.2
KY 101 at I-65 SB Ramps	0.6
KY 101 at Jim Burrell Ln	1.4
KY 101 at Vincent St.	0.1

7. Historical KYTC traffic volumes show Average Daily Traffic (ADT) ranging on KY 101 from 4,900 vehicles per day (VPD) south of the I-65 interchange to 5,600 VPD to the north. I-65 carries around 53,000 VPD west of the interchange.

Turning movement counts were collected in January 2022 at the following intersections:

- KY 101 at I-65 NB ramps
- KY 101 at I-65 SB ramps

- KY 101 at Jim Burrell Lane
- KY 101 at Vincent Lane

Additional videos were collected and peak hour spot counts taken at three entrances north of the interchange. These spot counts, along with the turning movement counts, were used to develop the existing (2022) traffic simulation model in TransModeler. A simulation model calibration technical memorandum was submitted and approved by KYTC in April 2022. Results from the existing simulation analysis were similar to results shown in the Buc-ee’s TIS, as shown in **Table 2** and **Table 3**. All intersections operate with acceptable levels of service (LOS) during the AM and PM peak hours in 2022.

Table 2: Existing Traffic Operations Summary (Buc-ee’s TIS)

Intersection	Approach	AM Peak			PM Peak		
		LOS	Delay	Queue	LOS	Delay	Queue
KY 101 at I-65 SB Ramps	I-65 Off Ramp	B	12.8	69 (L) 76 (R)	B	12.9	59 (L) 79 (R)
	NB KY 101	A	0.4	28 (L) 0 (T)	A	0.3	19 (L) 0 (R)
	SB KY 101	A	0.0	3	A	0.0	21
KY 101 at I-65 NB Ramps	I-65 Off Ramp	C	17.6	80 (L) 15 (R)	D	32.9	95 (L) 5 (R)
	NB KY 101	A	0.0	7	A	0.0	22
	SB KY 101	A	3.6	46 (L) 0 (T)	A	3.7	51 (L) 72 (T)

Table 3: Existing Traffic Operations Summary (TransModeler)

Intersection	Approach	AM Peak			PM Peak		
		LOS	Delay	Queue	LOS	Delay	Queue
KY 101 at I-65 SB Ramps	I-65 Off Ramp	A	8.8	18 (L) 28 (R)	B	10.1	20 (L) 33 (R)
	NB KY 101	A	0.0	0	A	0.0	0
	SB KY 101	A	0.0	0	A	0.0	0
KY 101 at I-65 NB Ramps	I-65 Off Ramp	C	18.6	73 (L) 5 (R)	C	23.2	126 (L) 3 (R)
	NB KY 101	A	0.0	0	A	0.0	0
	SB KY 101	A	0.8	0	A	0.8	0

- Graham then led a discussion of future growth in the Smiths Grove area. Population projections from the Kentucky State Data Center (KSDC) reveal that Warren County is expected to grow at a rate of 1.6 percent per year between 2020 and 2040. KYTC traffic count station data were also reviewed to determine historical traffic growth. South of the interchange, KY 101 has grown around 2.4 percent per year since 2009, as shown in **Table 4**. North of the interchange, KY 101 has grown 2.0 percent per year. I-65 has grown 0.6 percent per year south of the interchange and 1.8 percent per year to the north.

Table 4: Historical KYTC Traffic Counts

Year	KY 101 S	KY 101 N	I-65 North	I-65 South
	Sta. 114073 (KY 101 S)	Sta. 114003 (KY 101 N)	Sta. 114061	Sta. 114106
2008			45,300	
2009	3,990			43,300
2010		4,740		
2011				
2012	4,725			43,450
2013		4,859		46,367
2014				41,830
2015	6,047			42,978
2016		4,894		
2017				49,552
2018	4,942			
2019		5,638	53,405	
2020				
Annual Growth Rate	2.41%	1.95%	1.51%	1.70%

The Bowling Green/Warren County Travel Demand Model was updated and used as an additional tool to develop growth rates. Socioeconomic data was updated to include anticipated developments in the Smiths Grove area, including Buc-ee’s. Results from the updated model runs showed growth rates on KY 101 ranging from 0.9 to 1.5 percent per year.

- The BG-WC Metropolitan Planning Organization has requested a meeting to see what is happening with this study to know when to get going on updating the Smiths Grove land use and plan. Stantec will work with KYTC to schedule this meeting.

As a final data point, the Kentucky Statewide Model (KYSTM) was reviewed (2018 – 2045). Growth rates on KY 101 range from 0.5 to 2.9 percent per year while growth.

Based on these data points, a growth rate of 1.5 percent per year was used for this study. **Figure 2** presents the 2045 daily traffic forecasts using this growth rate. A full discussion of the growth rate development process can be found in the Traffic Forecasting Technical Memorandum, which was submitted to the KYTC Modal Branch in June 2022.

- There was discussion on if a lower growth rate should be used to grow I-65 and Buc-ee’s traffic between 2032 and 2045. Stantec will work with the KYTC Modal Branch to determine the most reasonable growth based on the available data sources.

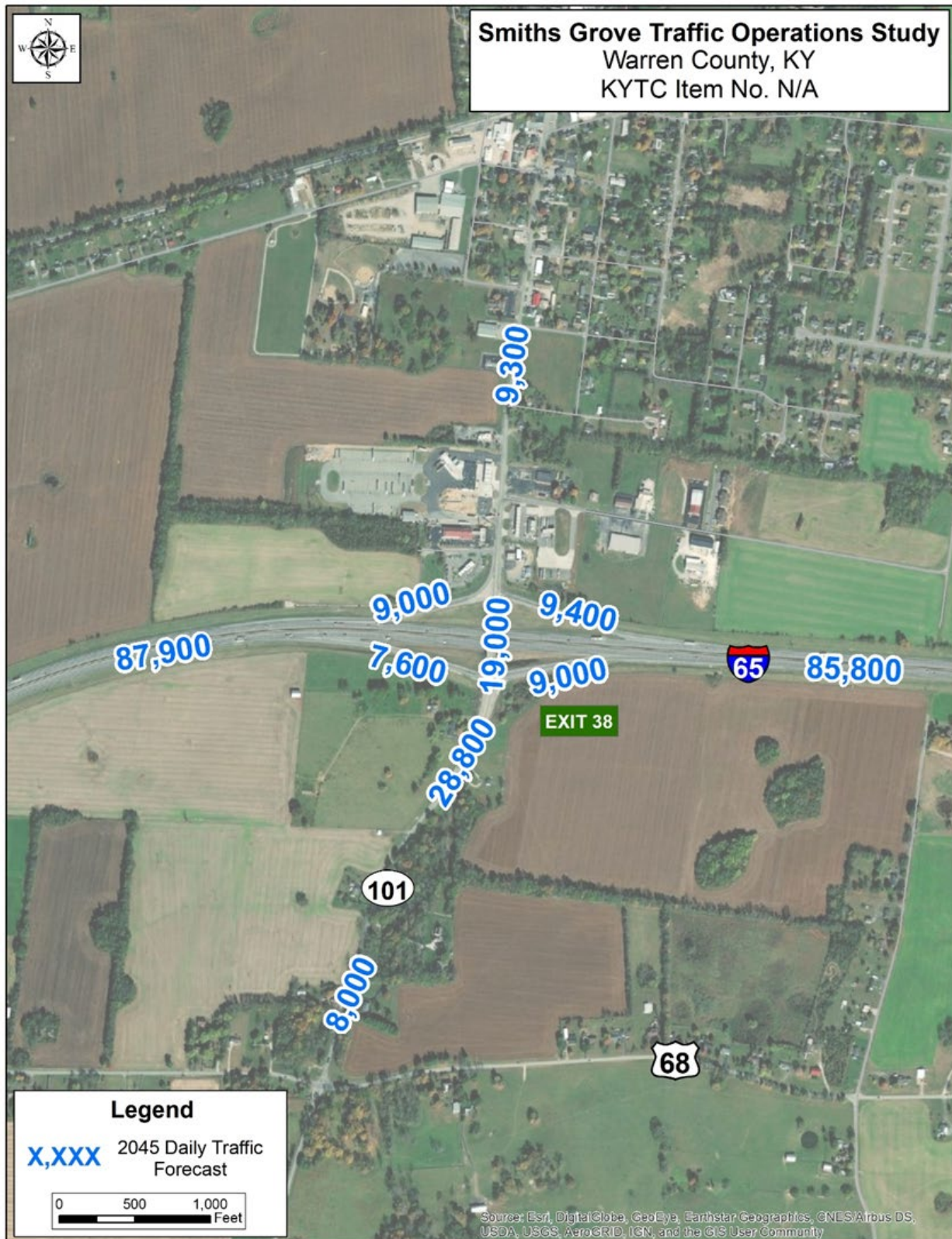


Figure 2: 2045 Daily Traffic Forecasts

9. The approved TIS was developed for the Buc-ee's Travel Center that will be located on KY 101 in the southwest corner of the I-65 interchange. It is expected to be 53,000 sq. feet, have 200 employees, and 120 fueling stations. The TIS included traffic operations analyses for weekday morning, weekday midday, weekday afternoon, and Saturday midday peak hours. **Table 5** presents the peak hour trip generation estimates from the TIS.

Table 5: Buc-ee's Trip Generation Estimates

Peak Hour	Total Trips		Intercept Rates	Intercept Trips		New Trips	
	In	Out		In	Out	In	Out
Weekday Morning Peak Hour	427	403	69%	295	278	132	125
Weekday Midday Peak Hour	535	549	61%	326	335	209	214
Weekday Afternoon Peak Hour	584	594	66%	385	392	199	202
Saturday Midday Peak Hour	788	835	49%	386	409	402	426

10. A 2032 No-Build simulation model was developed by applying the 1.5 percent per year growth rate to the Existing 2022 trip matrices (including Buc-ee's traffic). Results from the model are shown in **Table 6**. Traffic is unable to reach KY 101 from the unsignalized ramps and queues onto mainline I-65 during both the AM and PM peak hours. The ramp approaches are expected to operate at LOS F during both peak hours if no improvements are made.

Table 6: 2032 No-Build Traffic Operations Summary (TransModeler)

Intersection	Approach	AM Peak			PM Peak		
		LOS	Delay	Queue	LOS	Delay	Queue
KY 101 at I-65 SB Ramps	I-65 Off Ramp	C	15.7	61 (L) 44 (R)	F	106.0	708 (L) 62 (R)
	NB KY 101	A	0.0	0	A	0.0	0
	SB KY 101	A	0.0	0	A	0.0	0
	Overall	A	6.5		E	46.5	
KY 101 at I-65 NB Ramps	I-65 Off Ramp	F	**	1,150 (L) 367 (R)	F	**	1,250 (L) 108 (R)
	NB KY 101	A	0.0	0	A	0.0	0
	SB KY 101	A	1.4	16	A	1.3	11
	Overall	F	58.6		F	82.8	
KY 101 at Buc-ees North Entrance	EB Driveway	F	**	487	F	**	138
	NB KY 101	A	0.3	0	A	1.9	0
	SB KY 101	A	0.0	0	A	0.0	0
	Overall	E	37.4		E	42.2	
KY 101 at Buc-ee's Boulevard	EB Driveway	A	8.1	25	B	10.2	62
	NB KY 101	A	0.4	0	A	0.4	0
	SB KY 101	A	0.0	0	A	0.0	0
	Overall	A	1.6		A	3.5	

11. A 2032 Existing plus Committed (E+C) model scenario was then developed based on

recommendations from the Buc-ee's TIS. These improvements, as shown in **Figure 3**, include the following:

- Traffic signals at both ramp terminal intersections
- Two southbound KY 101 lanes at the SB ramp intersection, with the inside lane terminating as a left-turn lane at the NB ramp intersection

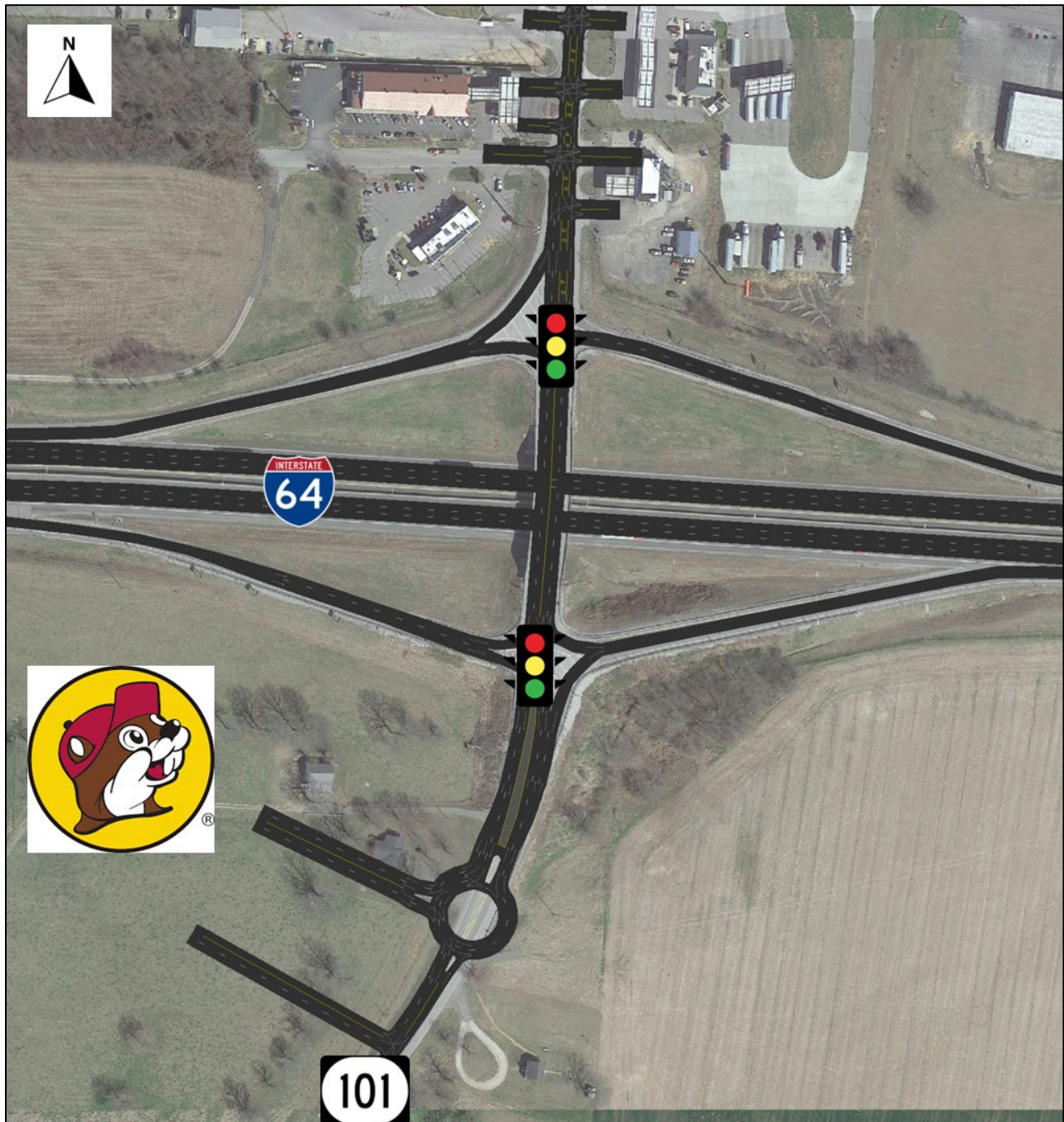


Figure 3: Existing plus Committed Roadway Network

- Two northbound KY 101 lanes at the NB ramp intersection, with the inside lane terminating as a left-turn lane at the SB ramp intersection
- Two southbound KY 101 lanes south of the NB ramp intersection
- Dual lane roundabout at the northern Buc-ee's intersection with a third lane acting as a right-turn bypass
- An additional Buc-ee's entrance south of the roundabout with eastbound left-turn and right-turn lanes from Buc-ee's

Results from the traffic analysis revealed that all intersections and ramp approaches are expected to operate at LOS C or better during the AM and PM peak hours, as shown in **Table 7**. In comparison, the traffic analysis from the Buc-ee's TIS showed the ramp approaches operating at LOS E during both weekday peak hours, as shown in **Table 8**.

Table 7: 2032 E+C Traffic Operations Summary (TransModeler)

Intersection	Approach	AM Peak			PM Peak		
		LOS	Delay	Queue	LOS	Delay	Queue
KY 101 at I-65 SB Ramps	I-65 Off Ramp	C	30.7	109 (L) 17 (R)	C	28.6	136 (L) 22 (R)
	NB KY 101	B	10.2	67 (L) 35 (T)	A	8.9	89 (L) 78 (T)
	SB KY 101	A	9.8	75	B	11.3	79
	Overall	B	12.2		B	15.2	
KY 101 at I-65 NB Ramps	I-65 Off Ramp	C	33.4	90 (L)	C	30.2	142 (L) 18 (R)
	NB KY 101	B	10.1	101	B	19.4	110
	SB KY 101	A	4.2	32 (L) 18 (T)	B	10.5	52 (L) 42 (T)
	Overall	A	8.7		B	11.3	
KY 101 at Buc-ees North Entrance	EB Driveway	A	5.1	26 (L) 22 (T)	A	6.2	29 (L) 28 (T)
	NB KY 101	A	5.5	21 (L) 19 (T)	A	7.2	30 (L) 29 (T)
	SB KY 101	A	3.5	10 (T) 0 (R)	A	4.2	25 (T) 0 (R)
	Overall	A	6.3		A	6.9	
KY 101 at Buc-ee's Boulevard	EB Driveway	A	7.5	24 (L) 0 (R)	B	10.1	33 (L) 0 (R)
	NB KY 101	A	0.4	0	A	0.0	0
	SB KY 101	A	0.0	0	A	0.3	0

Table 8: 2032 E+C Traffic Operations Summary (Buc-ee's TIS)

Intersection	Approach	AM Peak			PM Peak			Saturday Peak		
		LOS	Delay	Queue	LOS	Delay	Queue	LOS	Delay	Queue
KY 101 at I-65 SB Ramps	I-65 Off Ramp	E	57.8	261 (L) 53 (R)	E	56.0	309 (L) 102 (R)	C	21.8	224 (L) 39 (R)
	NB KY 101	B	17.3	108 (L) 215 (T)	B	19.5	136 (L) 254 (T)	B	13.4	226 (L) 137 (T)
	SB KY 101	B	10.4	79 (T) 99(R)	B	14.6	106 (T) 150 (R)	C	24.4	129 (T) 99 (R)
	Overall	C	24.2		C	26.6		B	18.0	
KY 101 at I-65 NB Ramps	I-65 Off Ramp	E	61.2	170 (L) 78 (R)	E	57.8	211 (L) 144 (R)	C	20.3	118 (L) 84 (R)
	NB KY 101	A	6.8	111	A	9.7	143	B	13.3	155
	SB KY 101	A	1.4	90 (L) 126 (T)	A	2.3	116 (L) 171 (T)	A	7.1	147 (L) 159 (T)
	Overall	B	10.8		B	12.6		B	11.1	
KY 101 at Buc-ees North Entrance	EB Driveway	A	6.0	13 (L) 12 (R)	A	7.6	22 (L) 21 (R)	A	9.2	39 (L) 37 (R)
	WB Access	A	5.7		A	6.5		A	7.2	
	NB KY 101	B	11.4	90	C	15.0	133	C	18.4	136
	SB KY 101	A	2.5	12 (T) 11 (R)	A	2.6	16(T) 14 (R)	A	2.2	15 (L) 14 (T)
	Overall	A	6.2		A	7.4		A	8.0	
KY 101 at Buc-ee's Boulevard	EB Driveway	B	14.3	72 (L) 31 (R)	C	16.4	89 (L) 34 (R)	C	15.6	100 (L) 45 (L)
	NB KY 101	A	0.2	17	A	0.4	22	A	0.8	20
	SB KY 101									

12. There was then a discussion of traffic counts collected at the Buc-ee’s in Richmond, Kentucky. The counts were collected between Thursday (9/22/2022) and Tuesday (9/27/2022), shown in **Figure 4**. A review of the counts revealed that Buc-ee’s traffic on Sunday was significantly higher than the other days. The peak hour for each day was found to be around noon (entering and exiting):

- Thursday: 1,210 VPH
- Friday: 1,520 VPH
- Saturday: 1,410 VPH
- Sunday: 2,000 VPH
- Monday: 1,260 VPH

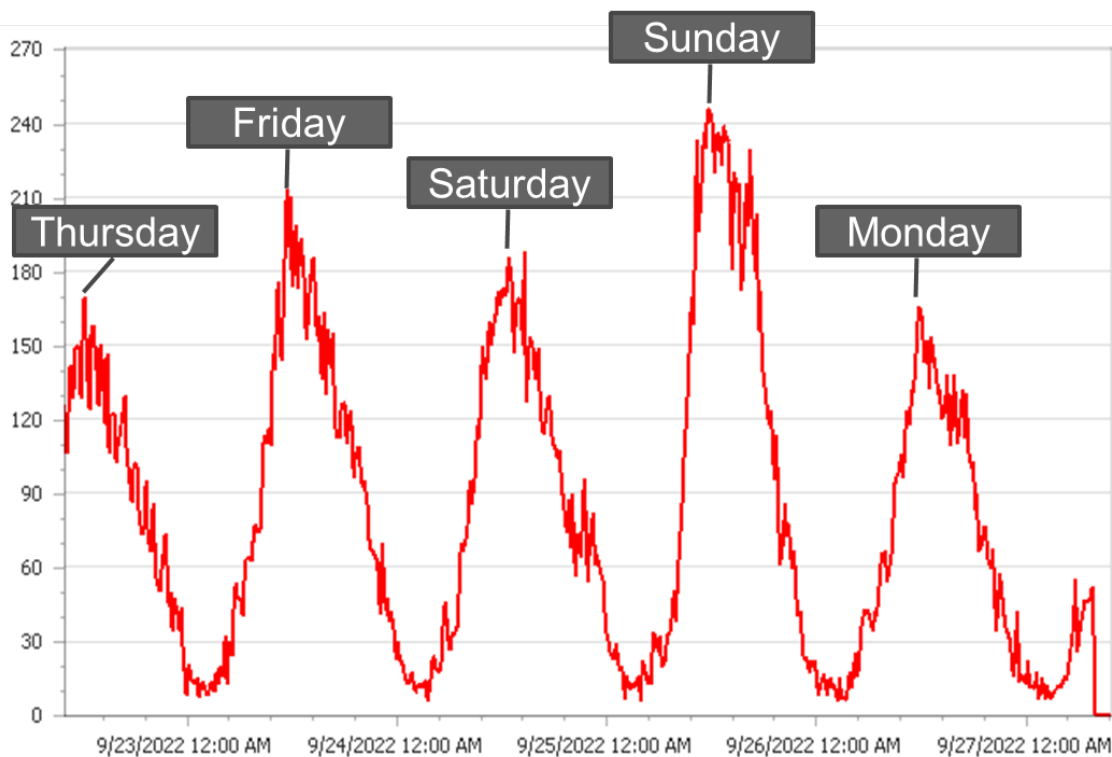


Figure 4: Buc-ee’s Peak Entering Traffic Summary (Richmond, KY)

The weekday traffic counts in Richmond were similar to the trip generation numbers in Smiths Grove based on the TIS, shown in Table 5. But, Sunday traffic was shown to be 20 percent higher in Richmond than Saturday traffic.

- The Buc-ee’s in Richmond is similar in size and number of fueling stations to the proposed Buc-ee’s in Smiths Grove
- Daily traffic on I-75 is 53,000 VPD (2019) south of the Duncannon Lane interchange in Richmond and 66,000 VPD (2021) to the north. Daily traffic is similar on I-65 near Smiths Grove with 58,000 VPD (2021) to the south and 61,000 VPD (2021) to the north.

The Buc-ee's TIS projects 303 left-turns during the PM peak and 397 left-turns during the Saturday midday peak from the I-65 SB off ramp. This increase in left-turns could necessitate an additional left-turn lane and an additional receiving lane on KY 101. To properly quantify the higher levels of weekend traffic, Stantec will develop a Weekend peak hour simulation model scenario.

13. KYTC Item No. 3-80214 to construct a roundabout at the KY 101 intersection with the I-65 SB ramps has \$750,000 in design funds for 2024. Stantec performed a Highway Capacity Software (HCS) analysis for the dual-lane roundabout for the PM peak for future years 2032 and 2045. Using a growth rate of 1.5 percent, the roundabout is expected to operate at LOS C in 2032 and LOS E in 2045.
14. To quantify the higher traffic volumes projected on the weekends, the next steps are for Stantec to develop 2022, 2032, and 2045 Saturday mid-day simulation models in TransModeler. This will include collecting existing Saturday turning movement counts along the commercial area north of the Interchange, revising the calibration technical memorandum, and revising the traffic forecast technical memorandum. As this additional analysis was not included in the original scope of work, Stantec will submit a contract modification to KYTC.

The meeting ended at approximately 2:15 p.m. CDT.

Meeting Minutes

TO: Jared Jeffers
Project Manager
KYTC Central Office
200 Mero Street
Frankfort, KY 40622

Ben Hunt
Project Manager
KYTC District Office 3
900 Morgantown Road
Bowling Green, KY 42101

FROM: Len Harper
Project Manager
Stantec Consulting Services Inc.

DATE: May 22, 2023

SUBJECT: Smiths Grove Traffic Operations Study
KY 101 (MP 7.6 – MP 8.2)
Warren County
KYTC Item No. N/A
Project Team Meeting No. 2

The second Project Team Meeting for the subject project was held at the District 3 office in Bowling Green, KY and virtually via Microsoft Teams on May 4, 2023 at 1:45 p.m. CDT. The following individuals were in attendance:

Magon Anderson*	KYTC – District 3
Kenny Carrico*	KYTC – Central Office Design
Stephen De Witte*	KYTC – Central Office Planning
Matthew Holder*	KYTC – District 3
Ben Hunt	KYTC – District 3
Jared Jeffers	KYTC – Central Office Planning
Stuart Lich*	KYTC – District 3
Stuart Payton	KYTC – District 3
Mikael Pelfrey*	KYTC – Central Office Planning
Joe Plunk	KYTC – District 3
Travis Spidel*	KYTC – District 3
Jeremy Stauffer	KYTC – District 3
Andrew Stewart*	KYTC – District 3
Wes Watt*	KYTC – District 3
Justin Young*	KYTC – District 3
Brian Aldridge	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Mark Kranz*	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

*Attended via Microsoft Teams

Len Harper welcomed everyone and led introductions. The purpose of the meeting is to get feedback from the Project Team on preliminary improvement concepts before presenting refined improvement concepts and cost estimates to the local officials and the public. The following enumerated items were discussed.

1. The objective of the study is to take a comprehensive look at the KY 101 (South Main Street) commercial corridor in Smiths Grove – approx. 1/4-mile each side of the interchange with I-65 – and propose and evaluate improvement concepts to be considered in the upcoming KY 101 design project, KYTC Item No. 3-80214.
2. Highlights from the existing conditions analysis were discussed. The Crash Data Analysis Tool (CDAT) was used to perform an Excess Expected Crashes (EEC) analysis. EEC is a measure of the crash frequency at a given site compared to what is expected based on current conditions (geometrics, traffic, etc.). A positive EEC indicates more crashes are occurring than should be expected. Results from this analysis showed the study portion of KY 101 has an EEC of 0.5 crashes per year and a level of service of safety (LOSS) of 3, indicating that the route has experienced slightly more crashes than anticipated and has a moderate to high potential for crash reduction. North of the interchange, the intersections are closely spaced together. Most of the crashes in this area are intersection related, and four of the study area intersections have positive EECs.
3. Weekday peak hour turning movement counts were collected in January 2022 and Saturday midday turning movement counts were collected in November 2022 at the KY 101 intersections with I-65 NB Ramps, I-65 SB Ramps, Jim Burrell Lane, and Vincent Lane. These counts were utilized to develop weekday AM, weekday PM, and Saturday midday traffic simulation model scenarios. All study area intersections currently operate at LOS A.
4. Based on the approved traffic impact study (TIS), Buc-ee's is expected to be 53,000 sq. feet, have 200 employees, and is expected to produce between 800 – 1,600 trips per hour during the morning, midday, and afternoon peak hours. A background growth rate of 1.5 percent per year was used along with the expected Buc-ee's traffic to develop traffic forecasts. KY 101 is expected to carry up to 26,500 vehicles per day (VPD) south of the I-65 interchange in 2045 and up to 9,300 VPD north of the I-65 interchange, as shown in **Figure 1**.
5. A 2032 traffic simulation model was developed using the approved 1.5 percent growth rate and expected Buc-ee's traffic. Based on results from the model, both ramp terminal intersections are expected to operate at LOS F during the Saturday midday peak hour if no roadway improvements are constructed.

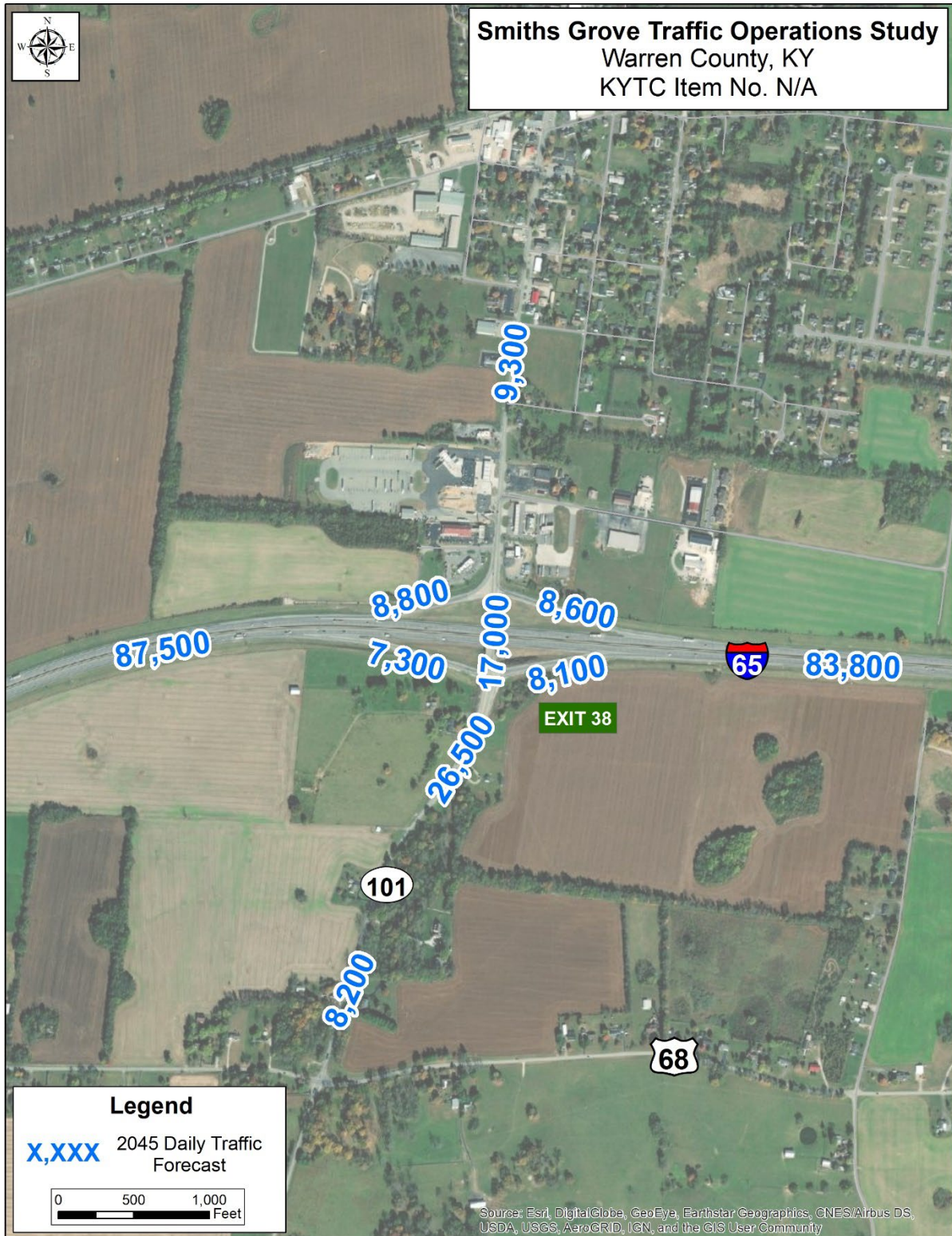


Figure 1: 2045 Daily Traffic Forecasts

6. A 2032 Existing plus Committed (E+C) model scenario was then developed based on recommendations from the Buc-ee's TIS. These improvements include the following:
 - Traffic signals at both ramp terminal intersections.
 - Two southbound KY 101 lanes at the SB ramp intersection, with the inside lane terminating as a left-turn lane at the NB ramp intersection.
 - Two northbound KY 101 lanes at the NB ramp intersection, with the inside lane terminating as a left-turn lane at the SB ramp intersection.
 - Two southbound KY 101 lanes south of the NB ramp intersection.
 - Dual lane roundabout at the northern Buc-ee's intersection with a third lane acting as a right-turn bypass.
 - An additional Buc-ee's entrance south of the roundabout with eastbound left-turn and right-turn lanes from Buc-ee's.

Results from the traffic analysis revealed that all intersections are expected to operate at LOS C or better during the AM, PM, and Saturday Midday peak hours.

7. Len then led a discussion of preliminary improvement concepts. Along with the Buc-ee's, there are several potential developments in the study area based on conversations with the Barren River Area Development District (BRADD). These developments could add traffic to the commercial area on KY 101 north of the interchange. There is currently less than 250 feet between Jim Burrell Lane and the I-65 Southbound Ramp intersection. The *Kentucky Access Management Implementation Report*¹ recommends a minimum of 300 feet spacing for urban major collectors as shown in **Figure 2**. Access management improvements were considered for all concepts, as outlined below.

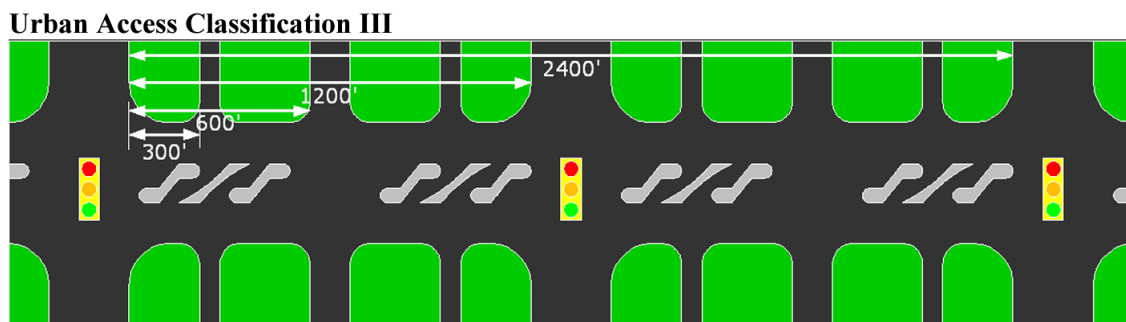


Figure 2: Spacing Recommendations for Access on Urban Major Collectors

¹ https://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1068&context=ktc_researchreports

Concept A

Concept A includes maintaining the Buc-ee's improvements at the I-65 interchange along with access management improvements on the commercial section to the north. The improvements are listed below and shown in **Attachment A**.

KY 101 at I-65 NB and SB Ramps

- Maintain Buc-ee's improvements.

KY 101 at Jim Burrell Lane

- Make Right-In / Right-Out.
- Construct backage road for left turn access to KY 101.

KY 101 North of Jim Burrell Lane

- Access management at driveways to better define entrances.
- Construct sidewalk on west side of KY 101.

Concept B

Concept B extends the access management improvements from Concept A north to Brown Street and includes a single-lane roundabout and extended backage road to allow for traffic circulation to and from the businesses. It includes the improvements listed below and shown in **Attachment A**.

KY 101 at I-65 NB and SB Ramps

- Maintain Buc-ee's improvements.

KY 101 between I-65 and Brown Street

- Construct a raised median on KY 101.
- Allow lefts in at larger intersections.
- Construct backage roads west of KY 101.
- Construct a sidewalk along west side of KY 101.
- Construct a single-lane roundabout at Brown Street.

Concept C

Concept C includes the access management improvements from Concept B along with a single-lane roundabout at the I-65 SB ramp terminal intersection. Results from the 2032 Saturday midday simulation model indicate significant queues on Jim Burrell Lane, southbound KY 101, and the I-65 SB off ramp. For that reason, this improvement concept was dismissed from further consideration

Concept D

Concept D includes the access management improvements from Concept B along with a dual-lane roundabout at the I-65 SB ramp terminal intersection. The improvements are listed below.

KY 101 at I-65 NB Ramps

- Maintain Buc-ee's improvements.

KY 101 at I-65 SB Ramps

- Construct a dual-lane roundabout.
- Construct a dual-lane off ramp.

KY 101 North of the Interchange

- Construct a raised median on KY 101.
- Allow lefts in at larger intersections.
- Construct a single-lane roundabout at Brown Street.

Results from the 2032 weekday PM and Saturday midday simulation model scenarios are shown in **Figure 3**. During the 2032 weekday PM peak hour, traffic flows smoothly and only minor queues are expected on the off ramp. During the 2032 Saturday midday peak hour, traffic is expected to queue on southbound KY 101 and on the SB off ramp, but the queues are not expected to reach mainline I-65.



Figure 3: Concept D – 2032 PM Simulation Model

Concept E

Concept E includes the access management improvements on KY 101 along with a dogbone roundabout at the I-65 interchange. The improvements are listed below.

KY 101 at I-65 Interchange

- Construct a dogbone roundabout.
- Construct dual-lane off ramps.

KY 101 North of the Interchange

- Construct a raised median on KY 101.
- Allow lefts in at larger intersections.
- Construct a single-lane roundabout at Brown Street.

Results from the 2032 Saturday midday peak hour simulation model are shown in **Figure 4**. Traffic on the SB off ramp queues on the ramp but does not reach the mainline.

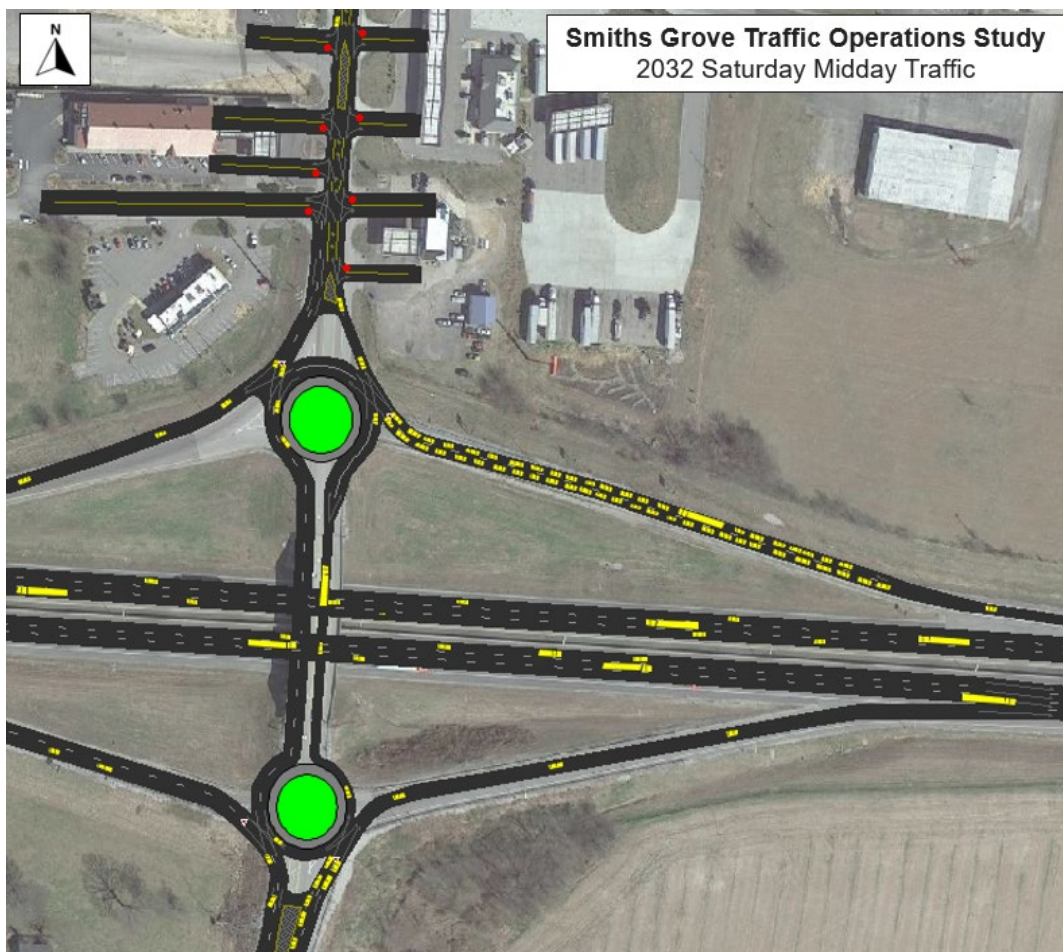


Figure 4: Concept E – 2032 Saturday Midday Simulation Model

Concept F

Concept F includes the improvements from Concept E along with an additional circulating lane at the northern roundabout and a three-lane southbound off ramp, as shown in **Attachment A**. The additional lanes allow the roundabouts to flow smoothly with minimal queues for all 2032 simulation scenarios. North of the interchange, this concept includes a raised median and allows lefts into the major intersections, including Jim Burrell Lane.

KY 101 at I-65 Interchange

- Construct a dogbone roundabout.
- Construct three circulating lanes at northern interchange.
- Construct three lanes on SB off ramp.

KY 101 North of the Interchange

- Construct a raised median on KY 101.
- Allow lefts in at larger intersections including Jim Burrell Lane.
- Construct a single-lane roundabout at Brown Street.

Concept G

Concept G includes the improvements from Concept F but does not allow left turn access into Jim Burrell Lane, as shown in **Attachment A**. Access will instead be moved north to a new access road to avoid queues backing up into the roundabout.

KY 101 at I-65 Interchange

- Construct a dogbone roundabout.
- Construct three circulating lanes at northern interchange.
- Construct three lanes on SB off ramp.

KY 101 North of the Interchange

- Construct a raised median on KY 101.
- Allow lefts in at larger intersections and Jim Burrell Lane access.
- Construct a sidewalk along west side of KY 101.
- Construct a single-lane roundabout at Brown Street.

8. Following the presentation of the improvement concepts there were several discussion points from the project team:
 - Make sure the storage lengths are long enough to accommodate trucks.
 - The western backage road could be placed behind the truck parking lot at the Smiths Grove Travel Center.
 - Consider an improvement concept that removes all left turns.
 - As part of the upcoming KY 101 design project (KYTC Item No. 3-80214), new traffic counts could be collected after Buc-ee's is open to confirm which type of roundabouts are needed at the I-65 ramps. Current traffic analysis is based on the trip generation traffic numbers from the Buc-ee's Traffic Impact Study (TIS).

9. The next steps are for Stantec to refine the improvement concepts and develop cost estimates based on feedback from the project team. The refined concepts will then be presented at a Local Officials Meeting and a Public Meeting.

The meeting ended at approximately 2:45 p.m. CDT.

Meeting Minutes

TO: Jared Jeffers
Project Manager
KYTC Central Office
200 Mero Street
Frankfort, KY 40622

Ben Hunt
Project Manager
KYTC District Office 3
900 Morgantown Road
Bowling Green, KY 42101

FROM: Len Harper
Project Manager
Stantec Consulting Services Inc.

DATE: August 3, 2023

SUBJECT: Smiths Grove Traffic Operations Study
Warren County
KYTC Item No. N/A
Local Officials / Stakeholder Meeting No. 1

The first Local Officials / Stakeholder Meeting for the subject project was held at the Smiths Grove Fire Department on July 27, 2023, at 3:00 p.m. CDT. The following individuals were in attendance:

Devonna Driver	Warren County Schools
Nancy Howard	City of Smiths Grove
Chip Jenkins	Warren County Schools
Debbie Jackson	Office of Keith Jackson
Kevin Jackson	State Representative
Eddie Lowe	Warren County Schools
Buddy Marr	City of Smiths Grove
Kenneth Marr	Smiths Grove Fire Department
Michael Meredith	State Representative
Sherry Murphy	Bowling Green Tourism
David Stiffey	City of Smiths Grove
Matthew Holder	KYTC – District 3
Ben Hunt	KYTC – District 3
Jared Jeffers	KYTC – Central Office
Stuart Payton	KYTC – District 3
Joe Plunk	KYTC – District 3
Brian Aldridge	Stantec Consulting Services Inc.
Jason Bricker	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Tad Taylor	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

Ben Hunt welcomed everyone and led introductions. The purpose of the meeting was to share information about the Smiths Grove Traffic Operations Study and to solicit feedback regarding improvement concepts under consideration. Len Harper then delivered a presentation. The following enumerated items were discussed.

1. The objective of the study is to take a comprehensive look at the South Main Street commercial corridor in Smiths Grove – approx. 1/4-mile each side of the interchange with I-65 – and propose and evaluate improvement concepts to be considered in future Highway Plans.
2. A safety analysis was conducted on three sections of KY 101: north of the I-65 interchange, the SB I-65 ramp intersection, and the NB I-65 ramp intersection. North of the I-65 interchange, there were 27 reported crashes on KY 101 between 2017 and 2021, as shown in **Figure 1**. Of the 27 crashes, 14 were angle collisions (52 percent) and four were backing collisions (15 percent). Three of the collisions resulted in an injury (11 percent), including two angle and one head on collision.

Over the five-year period, there were three reported collisions at the SB I-65 ramp terminal intersection, all of which resulted in property damage only. Over this same period, 13 collisions were reported at the NB I-65 ramp terminal intersection, one of which resulted in a fatality (opposing left-turn at night) and four of which resulted in an injury (two angle, one head on, and one rear end), as shown in **Figure 2**.

3. The Crash Data Analysis Tool (CDAT) was used to perform an Excess Expected Crashes (EEC) analysis. EEC is a measure of the crash frequency at a given site compared to what is expected based on current conditions (geometrics, traffic, etc.). A positive EEC indicates more crashes are occurring than should be expected. Results from this analysis showed the study portion of KY 101 has an EEC of 0.5 crashes per year and a level of service of safety (LOSS) of 3, indicating that the route has experienced slightly more crashes than anticipated and has a moderate potential for crash reduction. Additionally, four of the study area intersections have positive EECs, including Jim Burrell Lane which has an EEC of 1.4 crashes per year.
4. Level of service (LOS), a qualitative measure describing operational conditions, was used to evaluate the adequacy of the existing roadway. In rural areas, LOS C or better is desirable and in urban areas, LOS D or better is desirable. The existing analysis shows all intersections operating at LOS C or better.

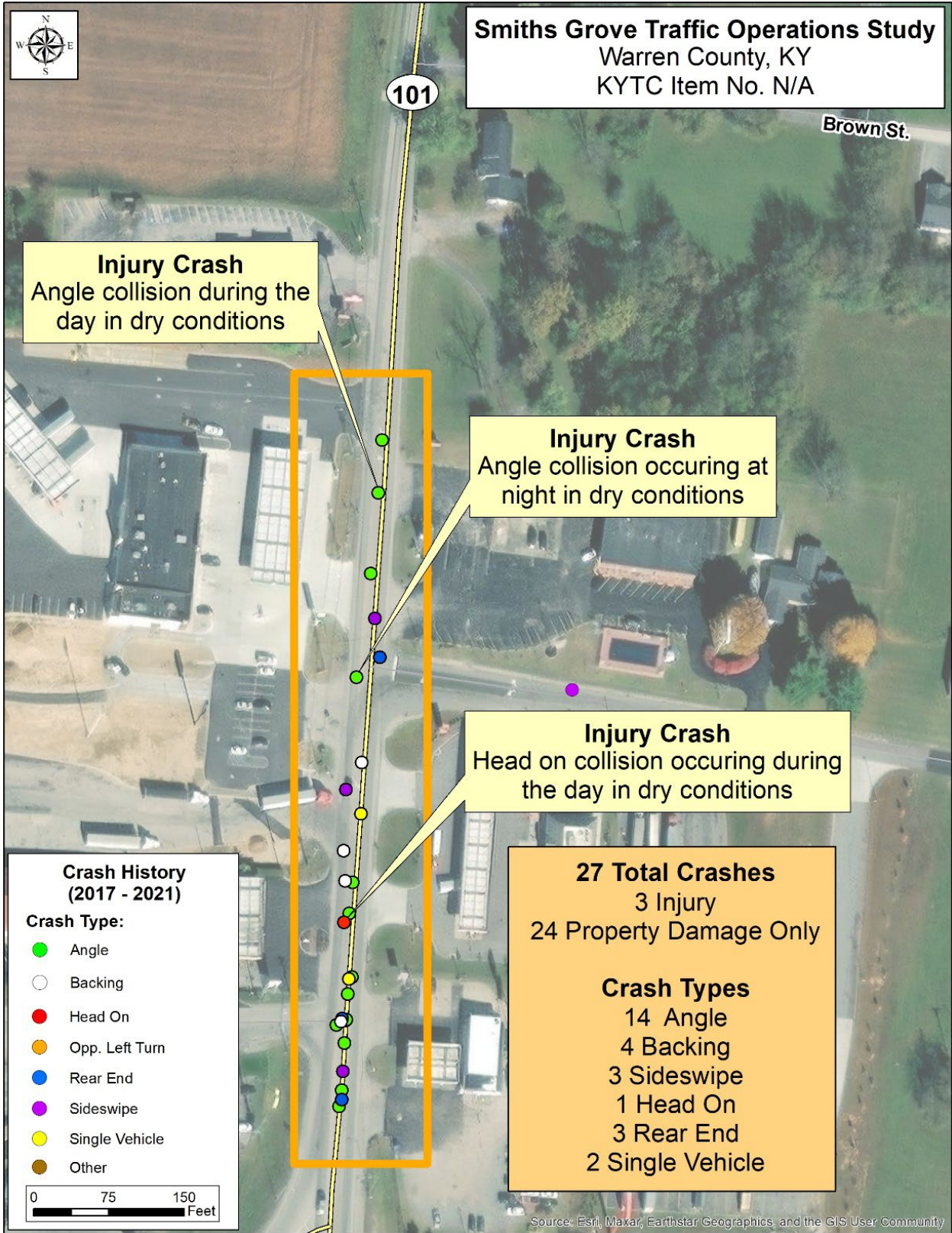


Figure 1: Safety Analysis KY 101 North of I-65

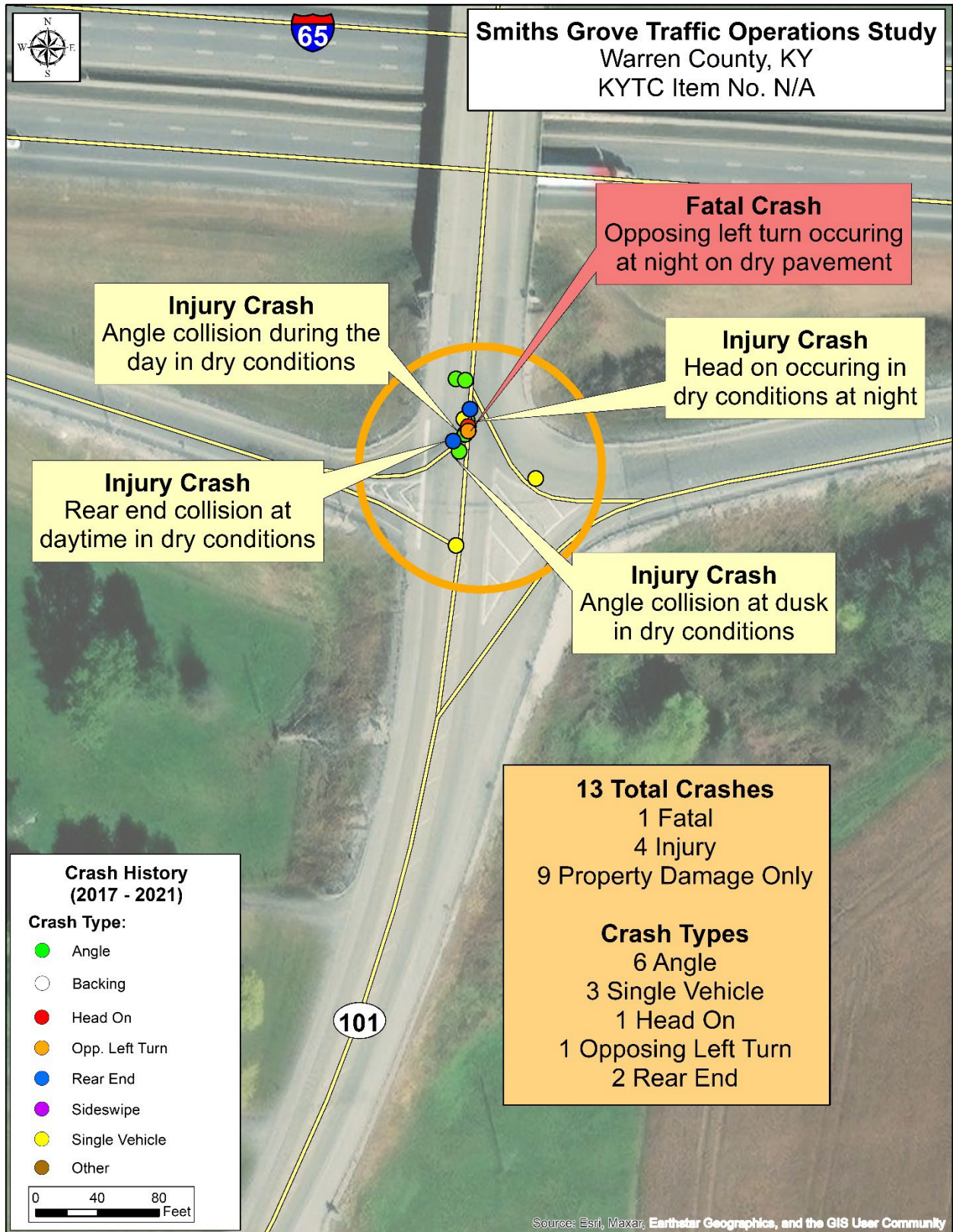


Figure 2: Safety Analysis Northbound I-65 Ramps

5. Potential future developments were discussed. Twenty-three acres in the northwestern corner of the I-65 intersection is currently zoned as highway business. The northeastern corner contains seventeen acres of currently zoned as highway business. The southeast corner is currently zoned agricultural, while in the southwest corner construction has begun on Buc-ee's.
6. 2045 daily traffic forecasts were developed by adding Buc-ee's expected traffic and utilizing a 1.5 percent background annual growth rate. Traffic on KY 101 south of I-65 is forecasted to increase to 26,500 vehicles per day (VPD).
7. Proposed Buc-ee's interchange improvements were presented. Based on the approved TIS, traffic signals and dedicated left and right turn lanes will be constructed at both ramp terminal intersections, with additional through lanes on KY 101. A roundabout will be constructed on KY 101 at the main entrance to Buc-ee's, while a stop-controlled intersection with dedicated left and right turn lanes at the intersection of Buc-ee's Boulevard and KY 101.
 - It was noted that these roadway improvements will be made before Buc-ee's opens.
 - Question: Are the Buc-ee's improvements similar to the improvements in Richmond?
Answer: The improvements are similar but not exactly the same. The Richmond interchange does not have traffic signals at the ramp terminal intersections and the roundabouts are internal to the Buc-ee's site.
 - Question: Will the roundabout be the main entrance?
Answer: Yes.
 - Question: Is the roundabout large enough for trucks and farm equipment?
Answer: Yes, the roundabout will accommodate trucks and other large vehicles.
 - Question: Will there be any improvements to the poor sight distance turning left from the NB I-65 off ramp?
Answer: The traffic signal will provide left-turning vehicles with a protected turn movement.
8. The Kentucky Access Management Implementation report states that full access intersections should be spaced at least six hundred feet apart. Jim Burrell Lane is currently 250 feet from the I-65 SB off ramp.
9. Large boards displaying the four improvement concepts were made available for the local officials. Attendees were asked to examine each improvement concept and provide feedback on which improvement concept they preferred through a survey.

Concept 1 –This concept includes installing a raised median on the commercial portion north of the I-65 interchange to limit left turns out of driveways that increase congestion and cause safety issues. Additionally, sidewalks are proposed on the west side of KY 101.

Concept 2 – The second improvement concept includes installing a raised median from the SB I-65 off ramp to Brown Street with left-turns allowed in at larger intersections. A roundabout will also be constructed at the KY 101 intersection with Brown Street. Longer backage roads are proposed as part of this concept to reconnect the roundabout to Jim Burrell Lane but will only be considered as part of future developments.

Concept 3 – Concept three includes a dual-lane dogbone roundabout at the I-65 interchange that will maintain the existing bridge. Both off ramps will have dual right turn lanes and there will be sidewalks along the west side of KY 101. This concept would include a raised median through the northern portion of the study area with a single-lane roundabout at Brown Street.

Concept 4 – Improvement concept includes the improvements from Concept 3 along but does not allow left-turn access to Jim Burrell Lane. Access will instead be moved north to a new access road to avoid queues backing up into the roundabout.

- An evaluation matrix was developed to compare the improvement concepts, as shown in **Table 1**.

Table 1: Evaluation Matrix

Issues / Project Goals	Existing (No Build)	Concept 1	Concept 2	Concept 3	Concept 4
Estimated Construction Cost	\$0	\$1,400,000	\$2,700,000	\$4,900,000	\$4,700,000
Benefit-to-Cost Ratio (Crash Reduction)	N/A	0.3	0.2	1.0	0.9
Improves Safety by Reducing Conflict Points	✘	●	●	✓	✓
Improves Congestion by Decreasing Access Density	✘	●	●	✓	✓
Provides Truck Access	●	●	●	✓	✓
Accommodates Future Development	✘	●	✓	✓	✓
Provides Sidewalk	✘	✓	✓	✓	✓
Reduces Right-of-Way Impacts	✓	✓	●	●	●
Reduces Utility Impacts	✓	✓	✓	✓	✓
<p style="text-align: right;">✘ Not Addressed</p> <p>Key: ● Somewhat Addressed</p> <p style="text-align: right;">✓ Addressed</p>					

- Surveys were distributed to attendees to solicit feedback on the need for improvements, transportation issues in the study area, and improvement concepts.

Of the five surveys returned by local officials, it was found that three respondents drive the KY 101 corridor daily. Additionally, three respondents own property in the study area while the one rents.

All respondents ranked congestion as the highest transportation issue, followed by safety and too many trucks. The respondents all agreed that improvements along KY 101 were needed.

Two respondents preferred Concept 4, preferred Concept 3, and one respondent said concept one was preferred. Three respondents believed that sidewalks are needed on KY 101, one does not think sidewalks are needed, and one respondent was unsure.

12. The project team then outlined the next steps. Stantec will refine improvement concepts based on local official and public feedback. The project team will then prioritize the improvement concepts and begin writing a draft report summarizing the study.

The meeting ended at approximately 4:00 PM CDT

MEETING MINUTES

Project: Smiths Grove Traffic Operations Study
Warren County

Purpose: Public Meeting

Place: Smiths Grove Fire Department
120 South Main Street, Smiths Grove

Meeting Date: July 27, 2023
5:00-7:00 PM CDT

A public meeting for the Smiths Grove Traffic Operations Study was held on Thursday, Jul 27, 2023, at the Smiths Grove Fire Department. Ben Hunt and Len Harper gave a presentation and study information was laid out in station format. The study webpage (<https://transportation.ky.gov/DistrictThree/Pages/SmithsGrove.aspx>) contains the same information and survey that was presented at the in-person meeting. The public meeting and accompanying survey were promoted via District 3 social media accounts, media releases, the study webpage, and a variable message sign placed on KY 101. A member of the project team was at each station to discuss the study with members of the public and answer any questions. In total, 121 individuals attended the meeting.

- The sign in table provided attendees with a study overview handout and paper copies of the survey, giving the public the opportunity to provide feedback on the improvement concepts presented.
- Boards presented traffic and safety analyses and the four improvement concepts.

End Of Minutes







Summary of Public Input

Project: Smiths Grove Traffic Operations Study
Warren County

Purpose: Summary of Public Survey Responses July and August 2023

A survey was handed out at the public meeting on July 27, 2023 to get feedback on the improvement concepts for the Smiths Grove Traffic Operations Study. The public meeting and accompanying survey were promoted via KYTC's District 3 social media accounts, press release, local media articles and stories, and the study webpage.

A total of 71 survey responses were collected during the comment period. This memo summarizes the public input received.

Question 1: How often do you drive the study area portion of KY 101?

Figure 1 summarizes the input received on Question 1.

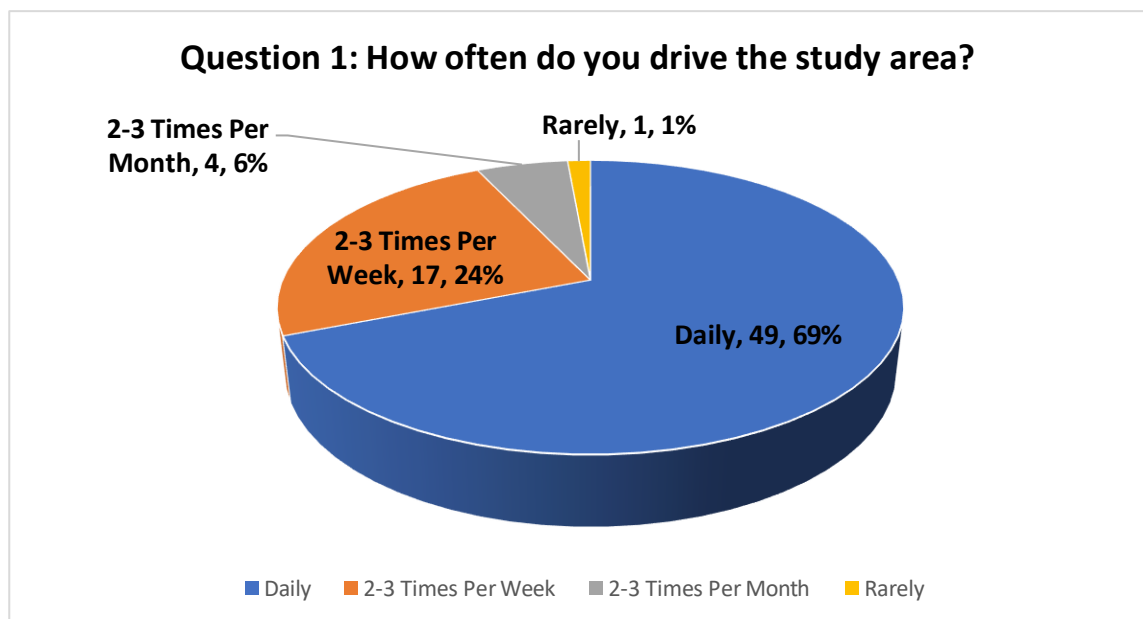


Figure 1: Question 1 Response

Question 2: Do you own or rent / lease property within the study area?

Figure 2 summarizes the input received on Question 2.

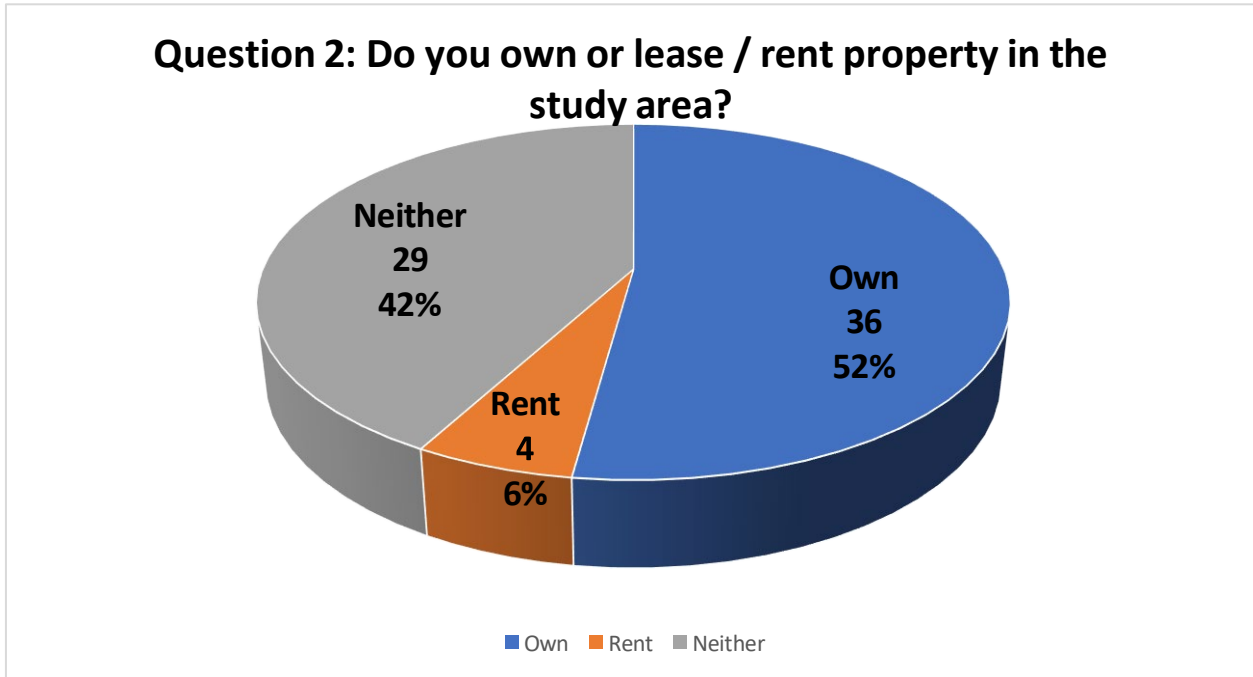
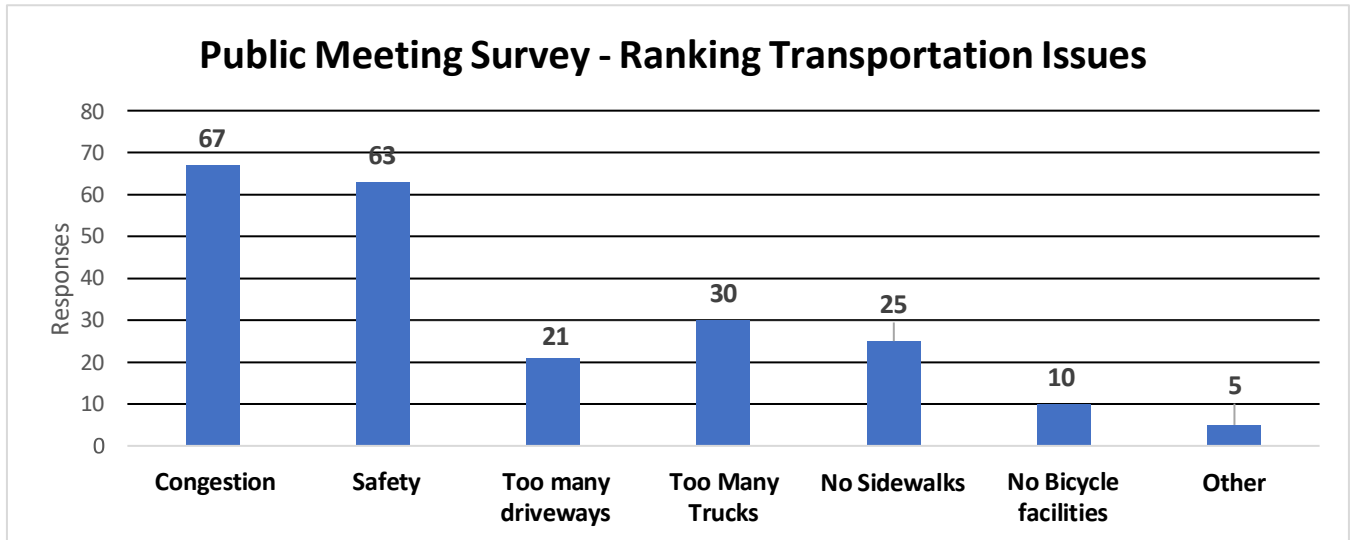


Figure 2: Question 2 Response

Question 3: What do you see as the top three transportation issues in the study area? Rank the options as 1-3 in order of importance where 1 is the highest priority and 3 is the lowest. If there are additional issues that should be included, please list them below.

Figure 3 summarizes the input received on Question 3.



Question 4: Do you think improvements are needed along KY 101?

Figure 4 summarizes the input received on Question 4.

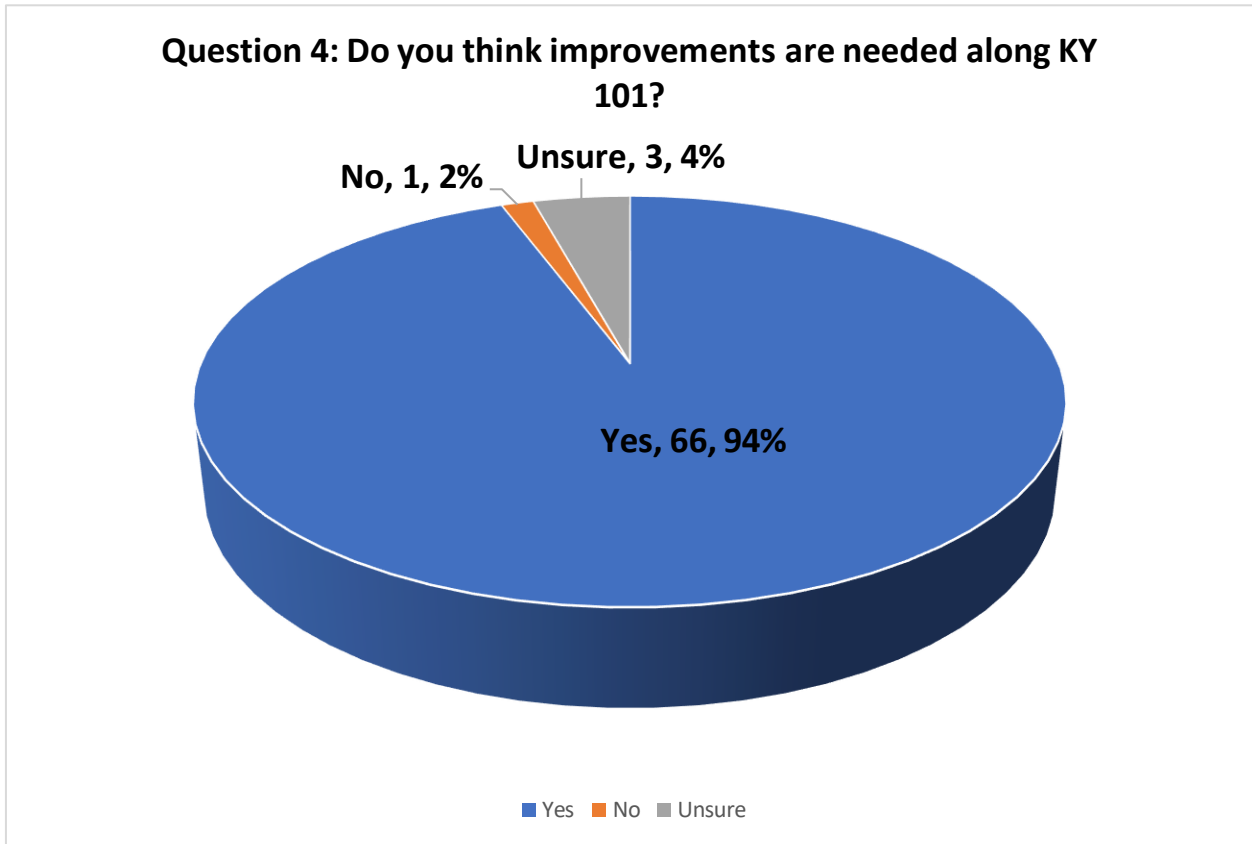


Figure 4: Question 4 Response

Question 5: Which improvement concept do you prefer?

Figure 5 summarizes the input received on Question 5.

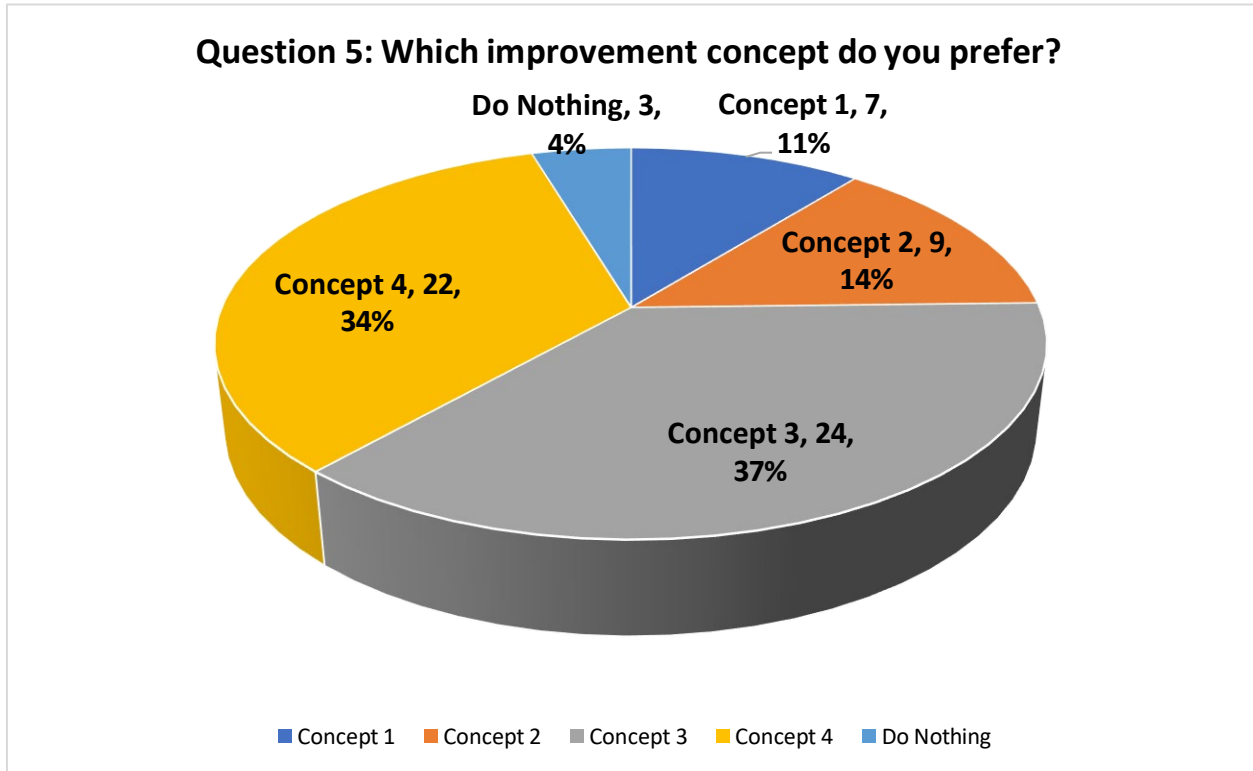


Figure 5: Question 5 Response

Question 6: Do you think sidewalks are needed throughout KY 101?

Figure 6 summarizes the input received on Question 6.

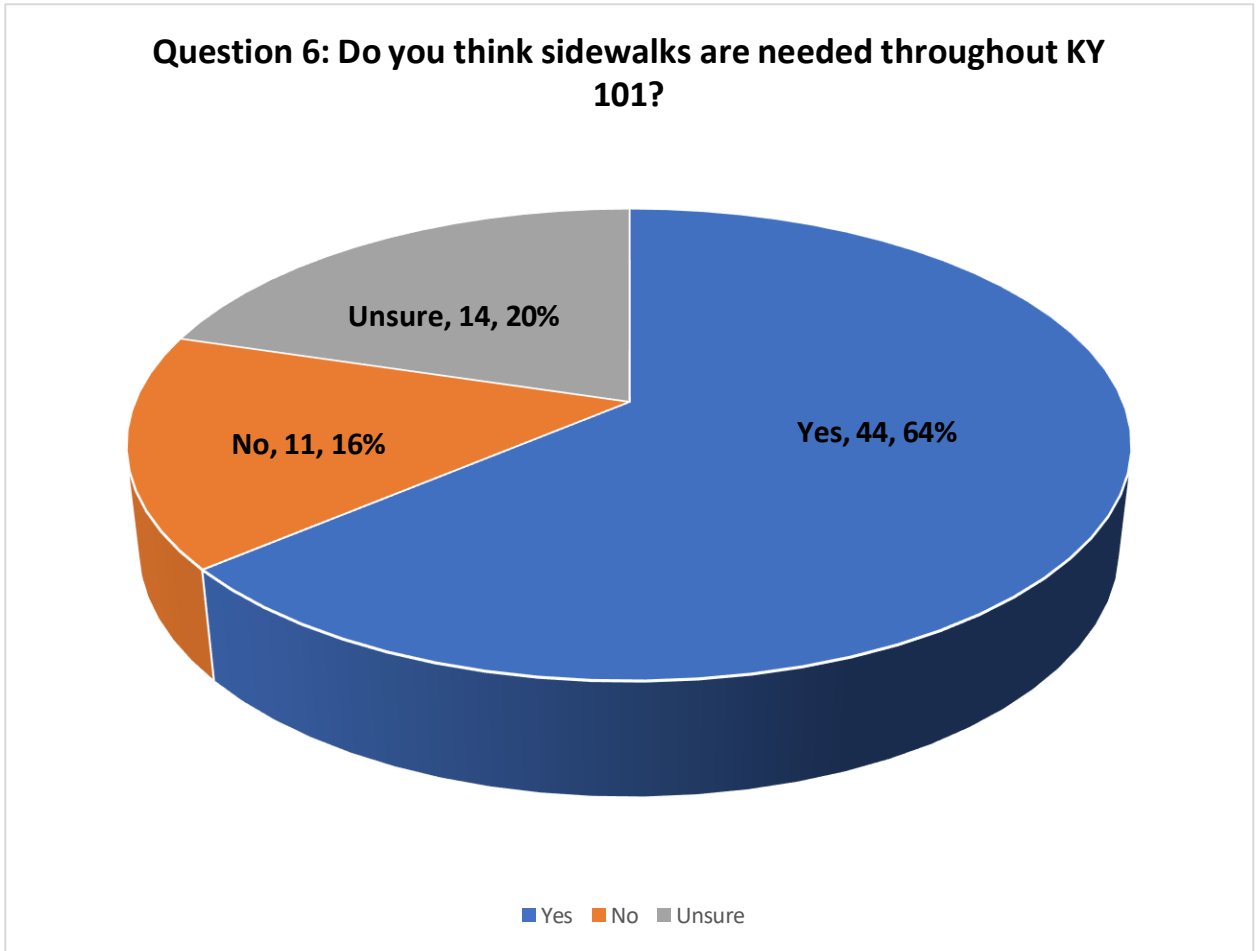


Figure 6: Question 6 Response

Question 7: Additional Comments

Overall, respondents liked improvement concepts three and four the most. Many of the respondents own or rent property in the study area, while other respondents live near the study area. Several respondents suggested other improvement concepts that could be considered.

- Extend sidewalks to Buc-ee's
- Do not need roundabouts.
- Can not get out of McDonalds.
- Traffic lights are needed.
- Improve sight lines over at the offramps.
- Install shields around roundabouts to protect houses from headlights.
- Option 3 needs a break at Vincent Street.
- Widen shoulders for semi-trucks on KY 101 past US 68-80 toward Scottsville.
- Too many big trucks
- Add missing ramps to exit 36.
- Build access road from highway 68 to Jim Burrell for future development.
- Widen Lawson.
- Need additional law enforcement.
- Trucks pulling livestock will have trouble making curves.
- No entrance into Shell, need access to shell with left turn lane.
- Need a turn lane to Lawson St. for future development.
- Need lighting improvement.
- Need roundabout at Vincent St.
- Too many driveways and trucks in intersections

- Highway 68 needs improvements due to increased traffic.
- Provide dedicated off ramp to Buc-ee's.
- Improvements are needed at the KY 101 and KY 68-80 intersection.
- Use map apps and dedicated radio station for transportation network explanation.
- Left turns through divided highway will only cause more congestion and accidents.
- Widen road into motel parking lot to get around trucks going into truck stop.
- Concerned with lights at ramp on interstate. Timing of these lights so they do not get backed up.
- Removal or cutback of bushes, etc.

Meeting Minutes

TO: Jared Jeffers
Project Manager
KYTC Central Office
200 Mero Street
Frankfort, KY 40622

Ben Hunt
Project Manager
KYTC District Office 3
900 Morgantown Road
Bowling Green, KY 42101

FROM: Len Harper
Project Manager
Stantec Consulting Services Inc.

DATE: September 20, 2023

SUBJECT: Smiths Grove Traffic Operations Study
KY 101 (MP 7.6 – MP 8.2)
Warren County
KYTC Item No. N/A
Project Team Meeting No. 3

The third Project Team Meeting for the subject project was held virtually via Microsoft Teams on September 15, 2023 at 10:30 a.m. EDT. The following individuals were in attendance:

Matthew Holder	KYTC – District 3
Ben Hunt	KYTC – District 3
Jared Jeffers	KYTC – Central Office Planning
Stuart Payton	KYTC – District 3
Joe Plunk	KYTC – District 3
Andrew Stewart	KYTC – District 3
Wes Watt	KYTC – District 3
Jason Bricker	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

Len Harper welcomed everyone and led introductions. The purpose of the meeting was to present results from the Local Officials / Stakeholder and public surveys and to discuss improvement concept recommendations. The following enumerated items were discussed.

1. The objective of the study is to take a comprehensive look at the KY 101 (South Main Street) commercial corridor in Smiths Grove – approx. 1/4-mile each side of the interchange with I-65 – and propose and evaluate improvement concepts to be considered in the upcoming KY 101 design project, KYTC Item No. 3-80214.
2. Surveys were distributed at the Local Officials / Stakeholder Meeting to solicit feedback on the need for improvements, transportation issues in the study area, and proposed improvement concepts.

There were five participants who completed the survey, three of which indicated they travel on KY 32 daily, with three participants owning property in the study area and one leasing.

Participants were asked to rank transportation issues on KY 101 (#1 – #3) with #1 being the highest rating. A point system was used to summarize the results, with three points given to a first-place ranking, two points to a second place, and one point to a third place. Congestion was the highest ranked issue followed closely by safety, as shown in **Figure 1**.

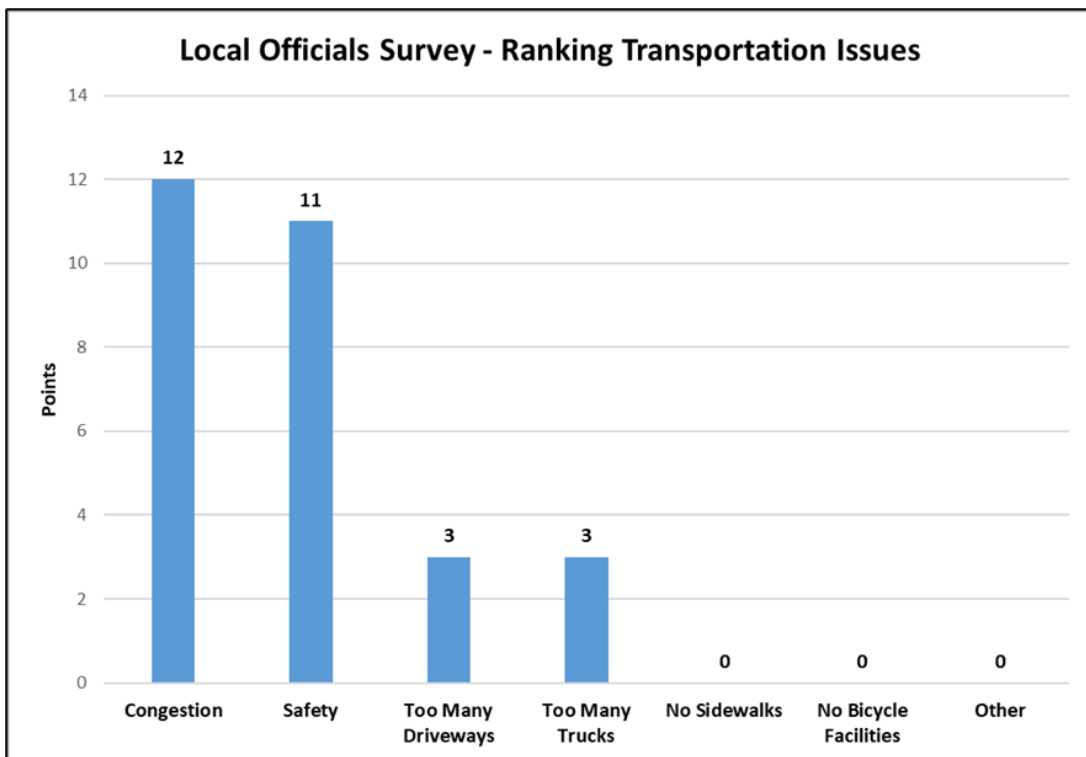


Figure 1: Local Officials Survey – Ranking Transportation Issues

All respondents agreed that improvements along KY 101 are needed, with two indicating Concept 3 is their preferred choice, two choosing Concept 4, and one respondent choosing Concept 1. Additionally, three of the respondents believe that sidewalks are needed along KY 101.

3. A similar survey was disseminated at the public meeting. The following summarizes the results of the survey:

Of the 71 respondents, 49 (69 percent) indicated that they drive KY 101 daily and 17 (24 percent) drive it two to three times per week and over half of the respondents own property in the study area.

Respondents were then asked to rank transportation issues on KY 101 (#1 – #3) with #1 being the highest rating. A point system was used to summarize the results, with three points given to a first-place ranking, two points to a second place, and one point to a third place. Similar to the local officials / stakeholder survey, congestion was the highest ranked issue followed closely by safety, as shown in **Figure 2**.

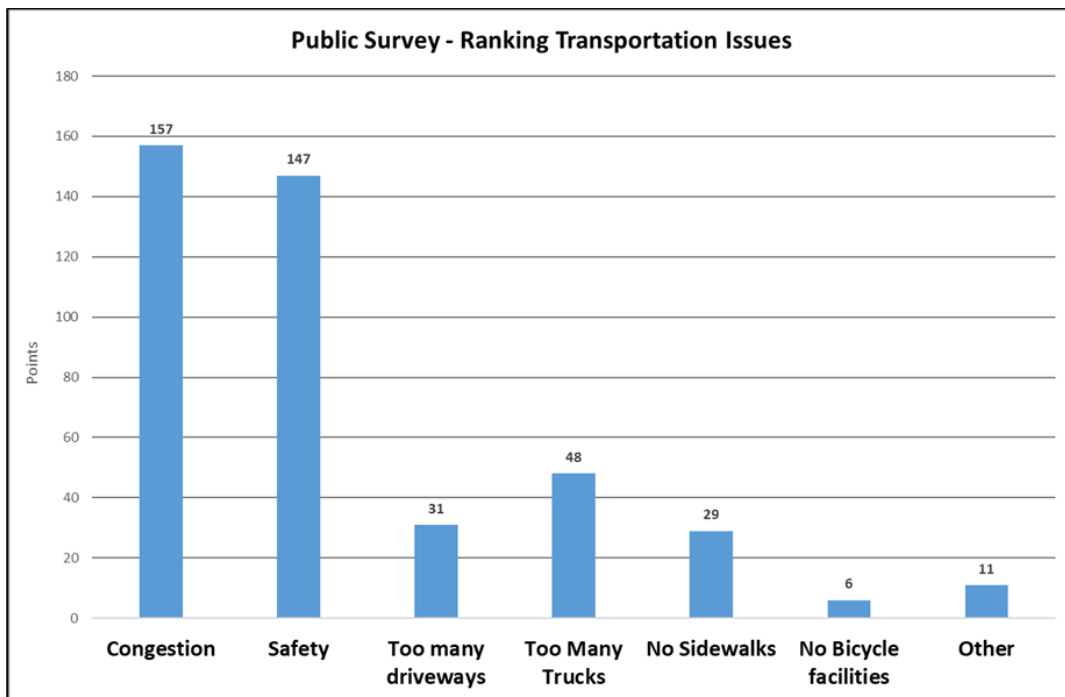


Figure 2: Public Survey – Ranking Transportation Issues

Ninety four percent of respondents indicated that improvements along KY 101 are needed, with three indicating they were unsure and one indicating that improvements are not needed. When asked which concept they prefer, the most common response was Concept 3 with 24 votes (37 percent) followed by Concept 4 with 22 votes (34 percent), as shown in **Figure 3**.

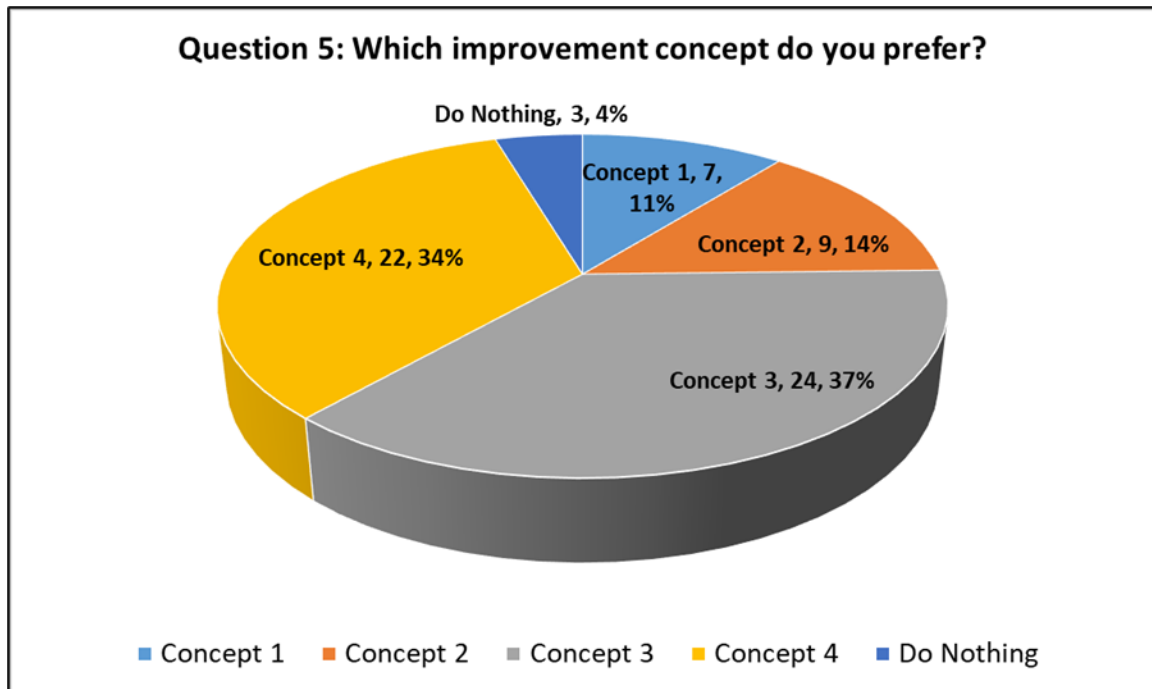


Figure 3: Public Survey – Improvement Concepts

Of the 69 respondents, 44 (64 percent) believe that sidewalks are needed along KY 101, 14 (20 percent) were unsure, and 11 (16 percent) do not think sidewalks are needed.

The final question asked if respondents had any additional suggestions for improvements along KY 101. Common responses included the need for lighting, extending the sidewalk to Buc-ee’s, and additional enforcement.

4. There was then a discussion on prioritization of improvement concepts. Concept 3 and Concept 4 were moved forward and will both be considered during the design phase. Additionally, the following sidewalk options will be considered:
 - **Concept 3A:** Sidewalk along the east side of KY 101 ending at McDonald’s.
 - **Concept 3B:** Sidewalk along east side of KY 101 ending at Buc-ee’s.
 - **Concept 3C:** Sidewalks along both sides of KY 101 ending at Buc-ee’s. The I-65 bridge will be widened to accommodate two KY 101 northbound lanes.
 - **Concept 4A:** Sidewalk along east side of KY 101 ending at McDonald’s.
 - **Concept 4B:** Sidewalk along east side of KY 101 ending at Buc-ee’s.
 - **Concept 4C:** Sidewalks along both sides of KY 101 ending at Buc-ee’s. The I-65 bridge will be widened to accommodate two KY 101 northbound lanes.

Table 1 presents the estimated costs for each of the six concepts.

Table 1: Updated Cost Estimates

Concept	Design	Right-of-Way	Utility	Construction	Total
Concept 3A	\$1,080,000	\$1,500,000	\$2,000,000	\$5,400,000	\$9,980,000
Concept 3B	\$1,220,000	\$1,750,000	\$2,250,000	\$6,100,000	\$11,320,000
Concept 3C	\$1,500,000	\$2,000,000	\$2,500,000	\$7,500,000	\$13,500,000
Concept 4A	\$1,020,000	\$2,250,000	\$2,000,000	\$5,100,000	\$10,370,000
Concept 4B	\$1,160,000	\$2,500,000	\$2,250,000	\$5,800,000	\$11,710,000
Concept 4C	\$1,440,000	\$2,750,000	\$2,500,000	\$7,200,000	\$13,890,000

5. The next steps are for Stantec to refine the improvement concepts and begin writing a draft report to summarize the study.

The meeting ended at approximately 11:30 a.m. EDT.