



# US 127 Russell Springs Improvement Study

Russell County, KYTC Item No. N/A



Final Report  
March 2022





# Russell Springs Improvement Study

Russell County

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March 2022

Kentucky Transportation Cabinet

**In partnership with:**  
Stantec Consulting Services Inc.





## Executive Summary

The US 127 Russell Springs Improvement Study examined the need for and possible types of transportation improvements along the US 127 corridor in Russell Springs, Kentucky. The study included inventorying traffic and safety data, soliciting input from local officials, evaluating preliminary improvement concepts, and establishing the purpose and need of future projects.

### Existing and Future Conditions

The goal of the US 127 Russell Springs Improvement Study was to improve safety, mobility, and congestion on US 127 between the Jamestown Bypass (US 127X) and Lakeway Drive (KY 379) in Russell County. The study focused on issues, needs, and candidate concepts along this section of US 127, as highlighted in green on **Figure ES-1**. The area of influence, shown in purple, represents the entire area in which improvement options were considered to improve connectivity.

US 127 is the only north-south arterial in Russell County and the best option for drivers traveling between Russell Springs, Jamestown, Lake Cumberland, and the Cumberland Expressway. Consequently, US 127 is an important connection supporting local, regional, and statewide travel. Existing traffic volumes along the study portion of US 127 range between 6,900 and 15,600 vehicles per day (VPD). The concentration of high traffic from the afternoon dismissal of the Russell County High School and Middle School along with shift changes from local manufacturers and businesses cause congestion during the p.m. peak hour (2:30 to 3:30 p.m.). This not only increases travel times, but also results in traffic flow with minimal gaps, making it difficult to turn onto US 127 from unsignalized intersecting roadways.

By 2045, traffic volumes are expected to grow to up to 18,800 VPD on US 127. The 2045 traffic simulation model showed that without improvements, the US 127 intersection with Maple Street (KY 619) will operate at Level of Service (LOS) E and the US 127 intersection with French Valley Road (KY 3280) will operate at LOS F. Additionally, both unsignalized Cumberland Expressway exit ramp approaches are expected to operate at LOS F. LOS is a qualitative measure describing operational conditions within a traffic stream. In urban areas, LOS D or better is generally considered desirable.



**Afternoon Congestion from School Dismissal and Business Shift Changes on US 127**

### Improvement Concepts

Community outreach helped guide the study, particularly in identifying potential issues and developing improvement concepts. Due to the COVID-19 pandemic, the study team used virtual methods to engage with the public. A number of different tools were employed including

## Executive Summary

### US 127 Russell Springs Improvement Study

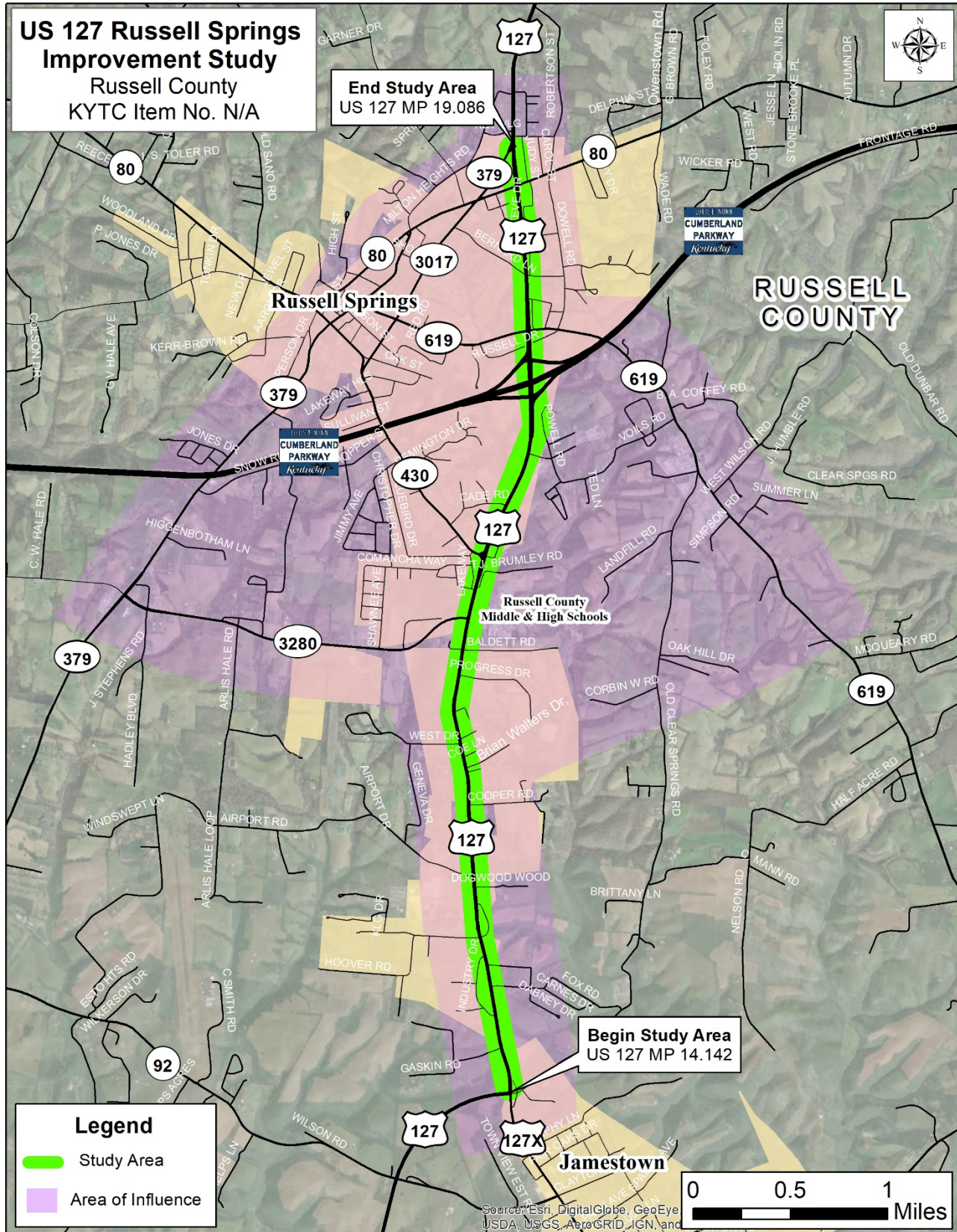


Figure ES-1: Study Area



## Executive Summary

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two virtual local officials/stakeholder meetings, the development of a project webpage, and the development of two online StoryMaps<sup>1,2</sup> to provide study information and solicit feedback through an online mapping exercise and surveys. Of the 152 participants in the first online survey, the top three concerns were traffic congestion from schools, traffic congestion from local businesses, and too many crashes.

Utilizing technical data, comments from stakeholders, and results of the survey, the project team identified short-term, “quick-win” improvements that can be implemented more quickly and independently in the event funding becomes available as well as long-term improvements that can be further developed and funded through Kentucky’s Highway Plan.

## Conclusions

Improvement concepts were prioritized based on results from the traffic analysis, safety analysis, benefit-cost analysis, and public outreach. This information is summarized in **Table ES-1**. Another factor affecting implementation of any proposed improvement concepts include the availability of existing funding. Outside of potential Highway Safety Improvement Program (HSIP) funds, KYTC District 8 does not have the funding to implement the Short-Term Improvement Concepts at this time. As a result, it is recommended that they be further developed and funded through Kentucky’s Highway Plan as part of the US 127 Safety and Mobility Plan (KYTC Item Nos. 8-156 and 8-166) shown in **Figure ES-2**. The one exception is working with Russell County Schools and local businesses to stagger dismissal and shift changes prior to the 2022-2023 school year (Improvement Concept #6 in Table ES-1). Given the immediate congestion relief that this improvement provides at no cost, this is the top overall recommendation of the study.

### Top Two Study Priorities

1. Stagger Afternoon School Dismissal and Business Shift Changes
2. US 127 Safety & Mobility Improvement Plan (Item Nos. 8-156 and 8-166)

## Prioritization of Long-Term Improvement Concepts:

### High Priority

- US 127 Safety and Mobility Plan (KYTC Item Nos. 8-156 and 8-166): The collection of projects included in the US 127 Safety and Mobility Improvement Plan, shown in **Figure ES-2**, would improve traffic operations so that all intersections in the study area operate at a desirable LOS D or better.

### Medium Priority

- KY 80 Access Management and Center Two-Way Left-Turn Lane from US 127 to Owenstown School Road

### Low Priority

- Realign Skewed Intersections on KY 80 at KY 430 and High Street

### Not Recommended at this Time

- New Cumberland Expressway Interchange at KY 379
- Connect Progress Drive and Brian Walters Drive
- New Connector Road between US 127 and KY 619

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<sup>1</sup> <https://storymaps.arcgis.com/stories/8587b5f7cc424920b2247c6f90f921a2>

<sup>2</sup> <https://storymaps.arcgis.com/stories/16464b55171943bdbbc7cd354dd6d5de>

## Executive Summary

### US 127 Russell Springs Improvement Study

**Table ES-1: Evaluation Matrix**

US 127 Russell Springs Improvement Study Evaluation Matrix													
Improvement Concepts		Traffic			Safety		Cost Estimates (Year 2021 Dollars)					Benefit-Cost Ratio	Public Ranking
		Existing Build PM Level of Service	2045 Build PM Level of Service	10-Year Congestion Relief Savings	Crash Modification Factor	10-Year Crash Reduction Savings	Design	ROW	Utility	Construction	Total		
Short-Term (No Right-of-Way Acquisition Anticipated)	1. Left-Turn Lanes on US 127 between Stephens Pipe & Steel and Bernard Lane	Not Able to Model	Not Able to Model	Not Able to Model	0.73	\$ 600,000	\$ 50,000	\$ -	\$ -	\$ 300,000	\$ 350,000	1.71	2
	2. Left-Turn Lanes on KY 619 at US 127 Intersection	C	D	\$1,500,000	No CMF	No CMF	\$ 10,000	\$ -	\$ -	\$ 50,000	\$ 60,000	25.00	3
	3. Traffic Signals at the Cumberland Expressway Ramp Intersections & Extend Right-Turn Lane	B / C	C / D	\$2,100,000	0.95	\$ 600,000	\$100,000	\$ -	\$ -	\$ 400,000	\$ 500,000	5.40	1
	4. Remove "Cut-Through" Traffic on Cade Avenue	Not Able to Model	Not Able to Model	Not Able to Model	0.93	\$ 400,000	\$ -	\$ -	\$ -	\$ 20,000	\$ 20,000	20.00	7
	5. Realign Right-Turn Lane on KY 430 at US 127 Intersection	N/A	N/A	N/A	0.56	\$2,200,000	\$ -	\$ -	\$ -	\$ 60,000	\$ 60,000	36.67	5
	6. Stagger Afternoon School Dismissal and Employee Shift Changes	D	E	\$3,800,000	No CMF	No CMF	\$ -	\$ -	\$ -	\$ -	\$ -	3800000.00	4
	7. Remove Traffic Signal at Fruit of the Loom Drive	A	A	\$ 300,000	No CMF	No CMF	\$ -	\$ -	\$ -	\$ 50,000	\$ 50,000	6.00	6
Long-Term	1. US 127 Safety & Mobility Improvement Plan (KYTC Item Nos. 8-156 and 8-166)*	C	D	\$9,900,000	0.90 (Average)	\$3,800,000	\$600,000	\$ 900,000	\$1,900,000	\$ 3,800,000	\$7,200,000	1.90	1
	2. KY 80 Access Management and TWTL from US 127 to Owenstown School Road	Not Able to Model	Not Able to Model	Not Able to Model	0.78	\$7,800,000	\$300,000	\$3,000,000	\$2,500,000	\$ 1,700,000	\$7,500,000	1.04	2

\* Includes Short-Term Improvement Concepts 1-4, Additional Through-Lanes on US 127 North and South of KY 619, Align Entrance for Crossroads Development and Add Left-Turn Lanes on US 127, Green-T Intersection at KY 430, and Intersection Improvements at French Valley Road (assumes roundabout for estimating purposes).



## Executive Summary

### US 127 Russell Springs Improvement Study

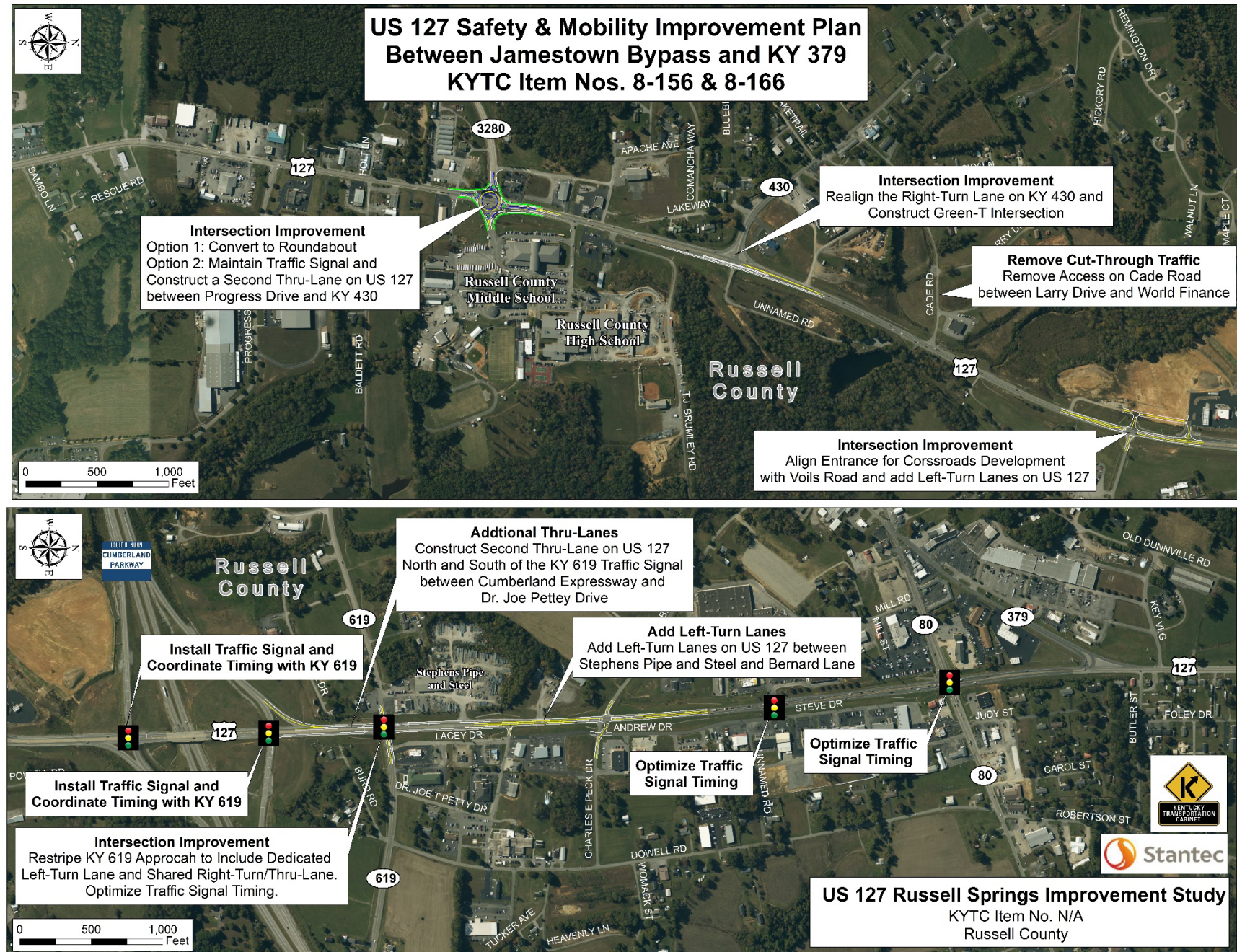


Figure ES-2: US 127 Safety and Mobility Improvement Plan (KYTC Item Nos. 8-156 and 8-166)



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### US 127 Russell Springs Improvement Study

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**Prioritization for Short-Term Improvement Concepts:** The short-term improvement concepts address existing concerns on US 127 and are not anticipated to require right-of-way acquisition. Because the long-term US 127 Safety and Mobility Plan (KYTC Item Nos. 8-156 and 8-166) builds on the short-term improvement concepts, resources would not be wasted if any or all of the short-term improvement concepts were built first. In the event funding is not available for the short-term improvement concepts, those improvement concepts are included under the US 127 Safety and Mobility Plan (KYTC Item Nos. 8-156 and 8-166) in **Figure ES-2**.

#### High Priority

- Work with Russell County Schools and local businesses to stagger dismissal and shift changes prior to the 2022 – 2023 school year. This project had the highest benefit to cost ratio (BCR). Given the immediate congestion relief that this improvement provides at no cost, it is the top overall recommendation of the study.

#### Medium Priority (in no particular order)

- Construct left-turn lanes on US 127 between Stephens Pipe & Steel and Bernard Lane. This concept was ranked as the second highest concept by the public.
- Construct left-turn lanes on KY 619 at the US 127 intersection. This concept was ranked as the third highest concept by the public and had the third highest BCR.
- Install traffic signals at the Cumberland Expressway Interchange ramps and extend the right turn lane at KY 619 to the westbound off-ramp of the Cumberland Expressway. This concept was ranked as the highest concept by the public.
- Remove “cut-through” traffic on Cade Avenue. This concept had the fourth highest BCR.
- Realign the right-turn lane on KY 430 at US 127. This concept had the second highest BCR.

#### Low Priority

- Remove the traffic signal at Fruit of the Loom Drive. The intersection operates at a LOS A and has a negative excess expected crash rate, meaning there are less crashes than would be expected compared to roadways with similar characteristics. The public and local officials noted the gas station at this intersection generates significant traffic and therefore suggested the signal is still needed. Before moving forward with this concept, a signal warrant analysis will need to be completed with a new turning movement count.

## Next Steps

The next step following this study for any potential improvements would be prioritization within the next round of Strategic Highway Investment Formula for Tomorrow (SHIFT) to program funding for Phase 1 Design (Preliminary Engineering and Environmental Analysis). Because of the COVID-19 Pandemic and the resulting school closures, turning movement counts could not be collected as part of this study. As a result, additional traffic analysis should be included as part of future project development phases. Future phases will also need to update the milepoints shown in this report due to the on-going realignment of US 127 south the study area (KYTC Item Nos. 8-108 and 8-8601). Further funding will be necessary to advance an improvement to the design phase as additional phases of this project are not funded in *Kentucky's FY 2020 – FY 2026 Highway Plan*.



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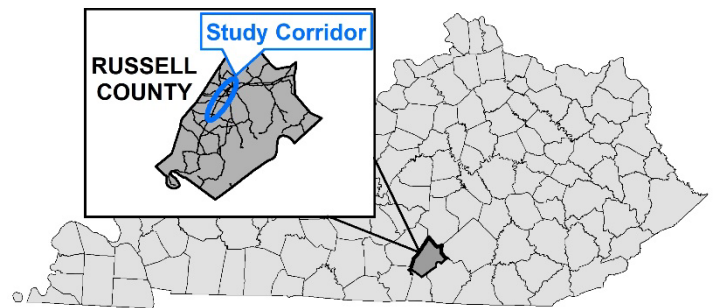
## 1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) initiated the *US 127 Russell Springs Improvement Study* in Russell County to evaluate potential options to improve safety, congestion, and mobility along approximately five miles of US 127 in Russell Springs, Kentucky.

This study was funded utilizing federal Statewide Planning and Research (SPR) funds. Future phases for this project are not listed in *Kentucky's FY 2020 – 2026 Highway Plan*.

### 1.1 STUDY AREA

The study focused on issues, needs, and candidate improvement concepts along US 127 between the Jamestown Bypass and KY 379, as highlighted in green in **Figure 1**. While US 127 was the focus of the study, improvements to adjacent routes were also considered that could provide congestion relief to US 127. The area of influence, shown in purple in Figure 1, represents the entire area in which improvement concepts were considered to improve connectivity.



US 127 is the main north-south connector in Russell County. Although the study portion of US 127 is classified as rural, it's location between Russell Springs and Jamestown introduces a mix of commercial, residential, recreational, and industrial traffic. North of the Cumberland Expressway interchange, US 127 provides access to the commercial section of Russell Springs that includes restaurants, businesses, and grocery stores. South of the interchange, Russell County High School and Russell County Middle School, located at the French Valley Road (KY 3280) intersection, introduce buses and other school traffic to the morning and afternoon "rush hours". US 127 is also utilized by recreational boaters traveling to Lake Cumberland. Additionally, there are several factories in the area, including Stephens Pipe and Steel, Dr. Schneider Automotive Systems and Bruss North America, among others, that generate peak hour traffic.

With a 2019 population of 17,800<sup>1</sup>, Russell County is the 65<sup>th</sup> largest county in Kentucky and home to Russell Springs, Jamestown, and portions of Lake Cumberland, one of the largest lakes in the state and a major source of tourism for the area. Population projections from the Kentucky State Data Center indicate that Russell County is expected to continue growing at a rate of 0.16 percent per year to the year 2040.

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<sup>1</sup> Kentucky State Data Center



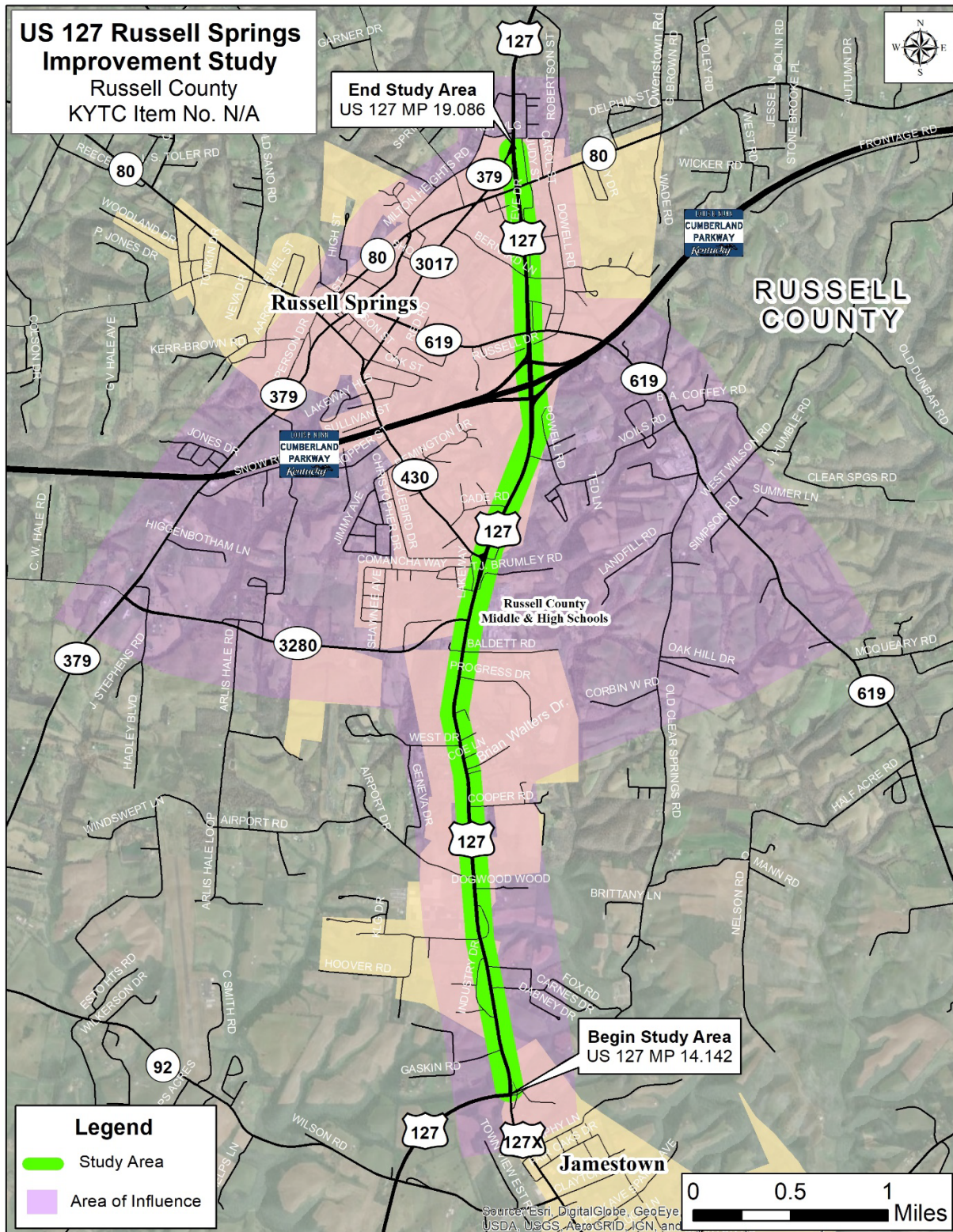


Figure 1: Study Area



## 1.2 PLANNED AND COMMITTED PROJECTS

This study was previously logged in KYTC's Continuous Highway Analysis Framework (CHAF):

- **IP20190162:** Preliminary Engineering Study for Improving Safety, Increase Mobility and Capacity from US 127X/Clear Springs Rd to KY 80. (MP 14.412 – 18.902).

There is one project in the immediate vicinity listed in *Kentucky's FY 2020 – 2026 Highway Plan*:

- **Item No. 8-20009.00:** Address pavement condition on US 127 from milepoint 19.03 to milepoint 26.21 (2024 Construction = \$1,549,000). This project was completed in 2021.

There are seven additional CHAF projects in the area of influence. They are identified in **Figure 2** and include:

- **IP20190165** – Improve the existing route, CS-2098 (Erik Ln) to connect to KY 1381 (Voils Road). (MP 14.96-18.9). SHIFT Statewide Rank #90, 43.0; 2020 SHIFT South Region Rank #42, 42.0.
- **IP20190161** – Improve the existing route, CS-2078 (Progress Drive) and CS-2067 (Brian Walters Drive) to join. (MP 14.96-18.9). SHIFT Statewide Rank #117, 35.2; 2020 SHIFT South Region Rank #45, 41.9.
- **IP20180093** – Improve the existing route, CS-2098 (Erik Ln) to connect to CR-1091 (Old Clear Springs Road) near Landfill Road. (MP 14.96-18.88). 2020 SHIFT Statewide Rank #96, 41.6; SHIFT South Region Rank #43, 42.0.
- **IP20180036 (8-80007)** – Add a right turning lane on US 127 Southbound beginning at the Eastbound exit of the Cumberland Expressway for 0.2 miles (18CCN). (MP 17.5-17.8). 2020 SHIFT Statewide Rank #101, 41.2; SHIFT South Region Rank #52, 40.8.
- **IP20060252** – Reduce congestion and improve capacity, safety, and mobility on US 127 between the intersection of Bernard Lane/Charles Peck Drive and the Northridge Shopping Center traffic light in Russell Springs. (MP 18.32-18.8). 2020 SHIFT South Region Rank #32, 43.9.
- **IP20060251** – Reduce congestion and improve safety, capacity, and mobility along US 127 from the Cumberland Expressway to Lakeway Drive KY 379 in Russell Springs. (MP 17.87-19.09). SHIFT Statewide Rank #45, 52.2; 2020 SHIFT South Region Rank #10, 52.0.
- **IP20060250** – Reduce congestion and improve capacity, safety, and mobility on US 127 between the west bypass of Jamestown to the Cumberland Expressway. See segment 12 in June 1998 Advance Planning Study (MP 14.14-18.12). 2020 SHIFT Statewide Rank #53, 51.3; SHIFT South Region Rank #12, 51.4.



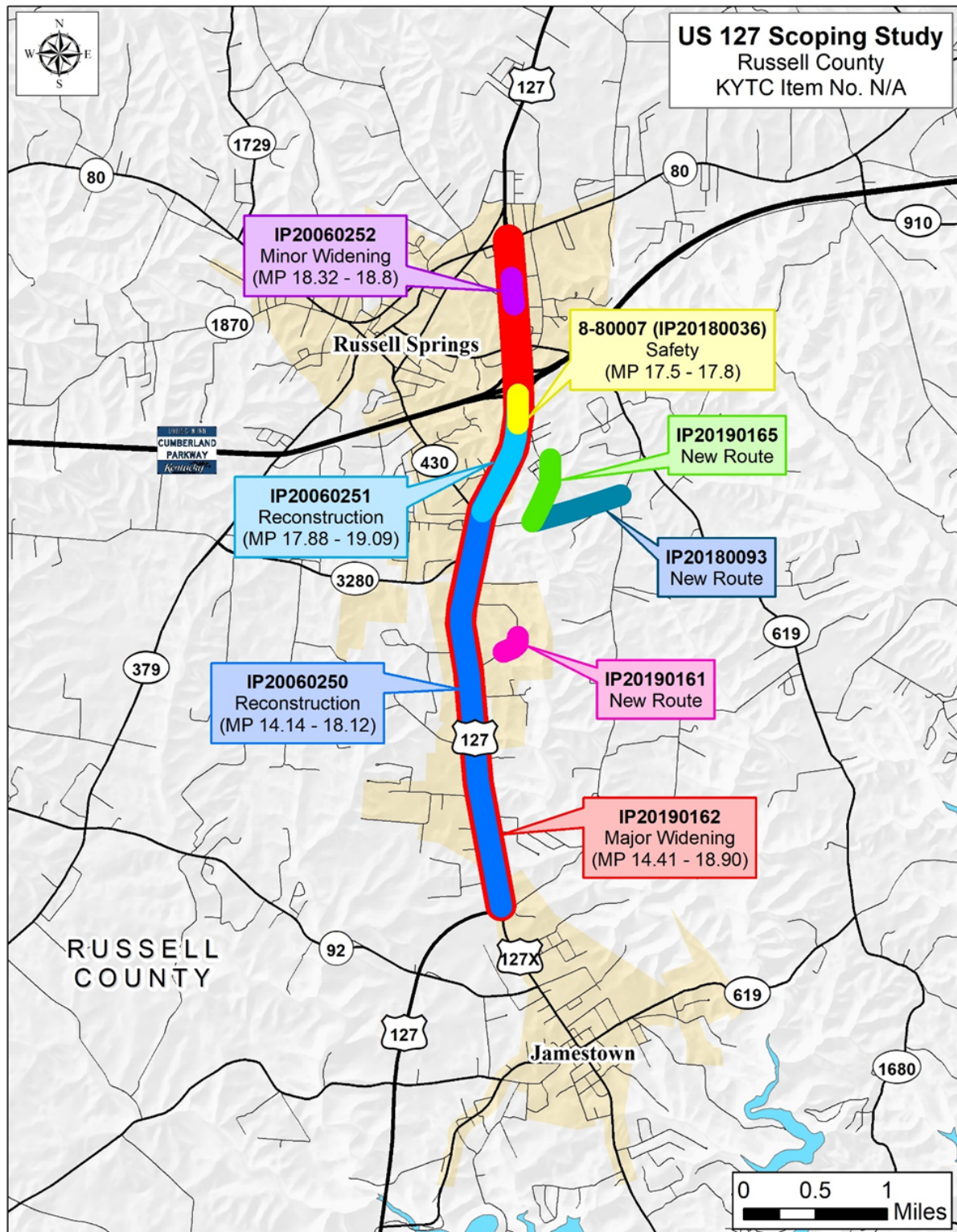
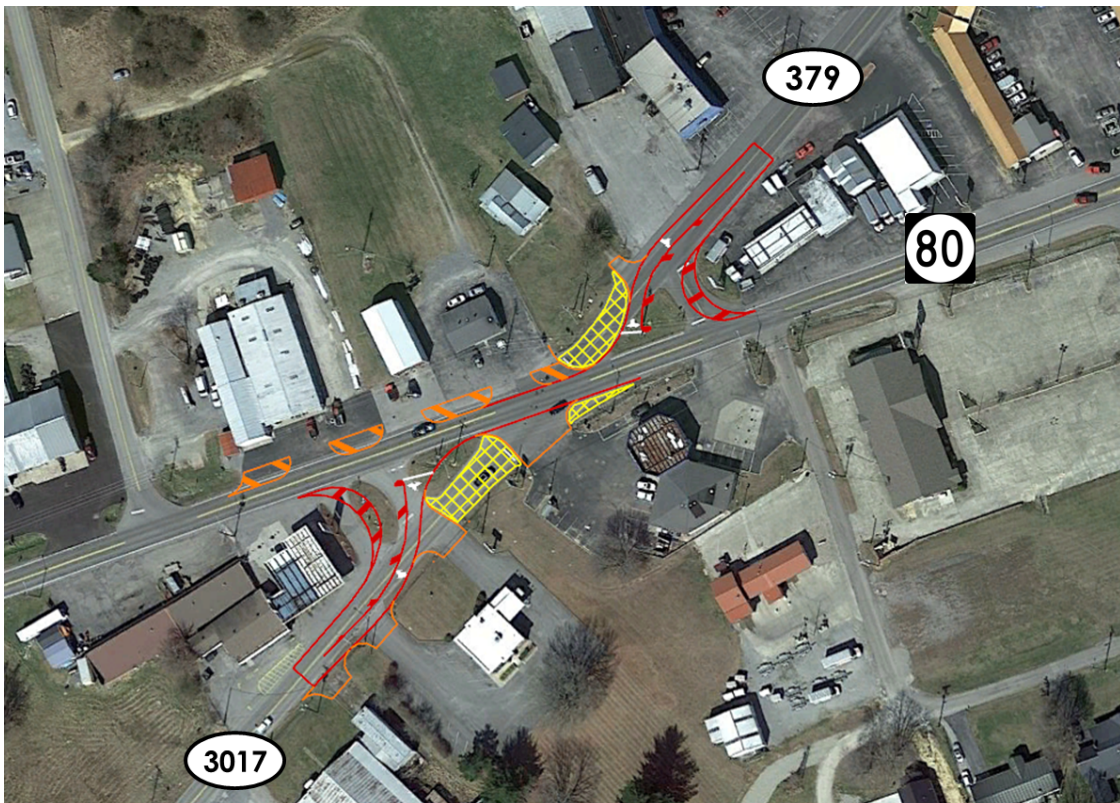


Figure 2: CHAF Projects

Additionally, a Highway Safety Improvement Program (HSIP) project, KYTC Item No. 8-9012, to improve the KY 80 intersection with KY 379/KY 3017 was recently completed. The purpose of the project was to realign the intersection to consolidate access and improve safety, as shown in **Figure 3**. This project was constructed in July 2021.



**Figure 3: KY 80 HSIP Project (Item No. 8-9012)**

Conditions of the existing transportation network were examined and are shown in the following sections. The information compiled includes roadway facilities and geometrics, crash history, and traffic volumes within the study area. Data for this section were collected from KYTC's Highway Information System (HIS) database, KYTC's Traffic Count Reporting System, aerial photography, and field inspection.

## **2.1 FUNCTIONAL CLASSIFICATION**

**Figure 4** shows the functional classification of roadways within the study area. Principal arterials, shown in red, serve major centers of metropolitan areas and provide a high level of mobility for substantial statewide travel.



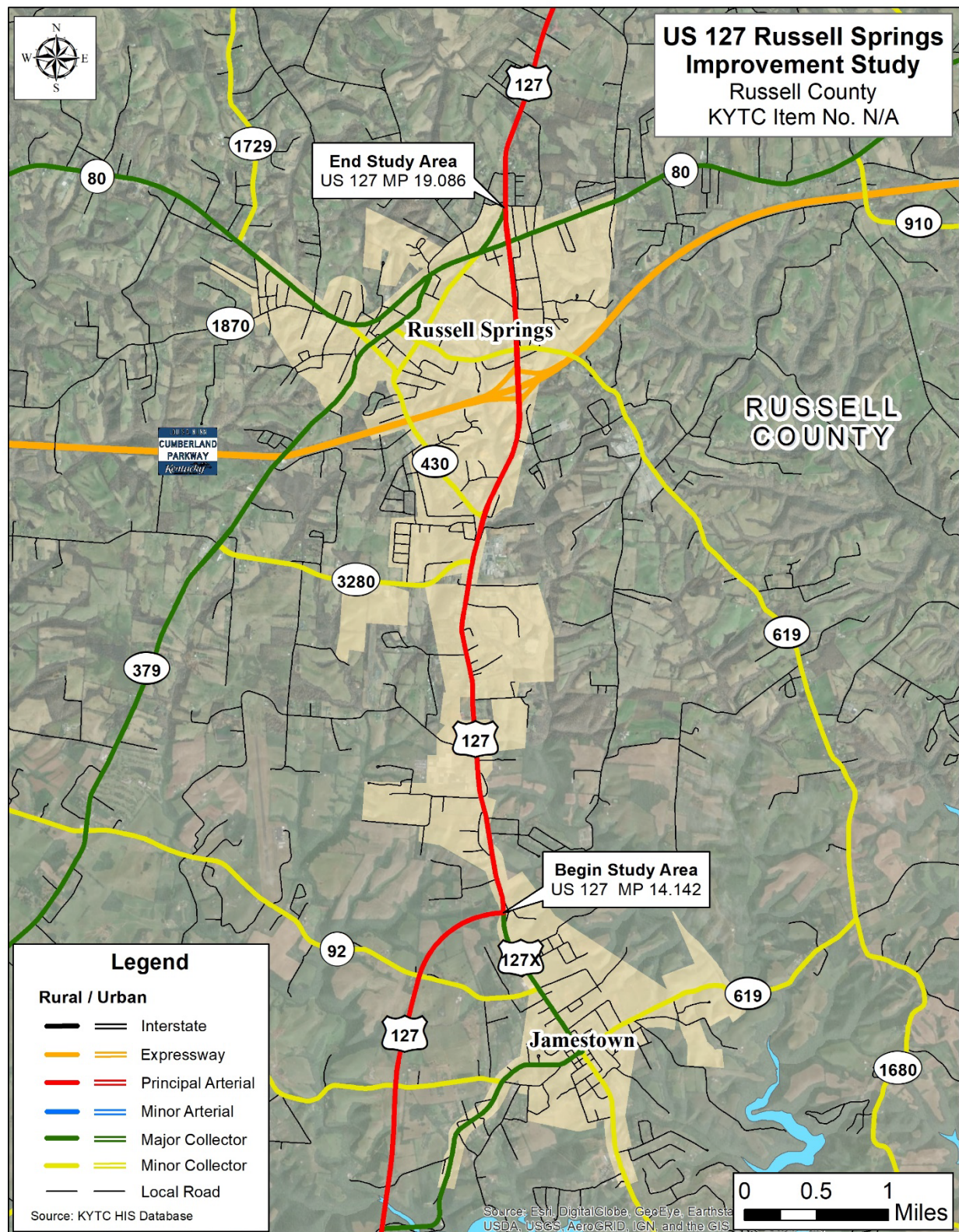


Figure 4: Functional Classification



Collectors, shown in green and gold, facilitate trips between local roads and the arterial network<sup>2</sup>.

US 127 is the only principal arterial in the area with KY 379 and KY 80 classified as major collectors. Several other routes are classified as minor collectors, including KY 92, KY 430, and KY 619.

## 2.2 ROADWAY GEOMETRY

KYTC's HIS database was used to identify roadway geometry. The current number of lanes and estimated lane widths along study area roadways are shown on **Figure 5**. The study portion of US 127 has 11- to 12-foot lanes while the other north-south corridors, KY 379 and KY 619, both have sections with 10-foot lanes.

US 127 has varying typical sections within the study area. South of Lake Way Drive (KY 430), US 127 has one lane in each direction and a two-way left-turn lane (TWLTL) with curb & gutter and sidewalk(s). North of KY 430, it becomes an undivided two-lane road with 10-foot paved shoulders and no sidewalks. US 127 has a 20-foot raised median to the north and south of the Cumberland Expressway interchange with a flush median and left-turn lanes between the ramps. North of the interchange, the roadway is once again an undivided two-lane road with 10-foot paved shoulders and left-turn lanes at KY 619, Stephens Pipe & Steel, Northridge Shopping Center, and KY 80.

## 2.3 EXISTING TRAFFIC ANALYSIS

The most current average daily traffic (ADT) volumes from KYTC's traffic count stations are shown on **Figure 6**. US 127 has the highest traffic volumes in the study area with up to 15,600 vehicles per day (VPD) near the Russell County schools. Other roadways with significant traffic volumes include KY 80 with 9,600 VPD and the Cumberland Expressway with 7,700 VPD.

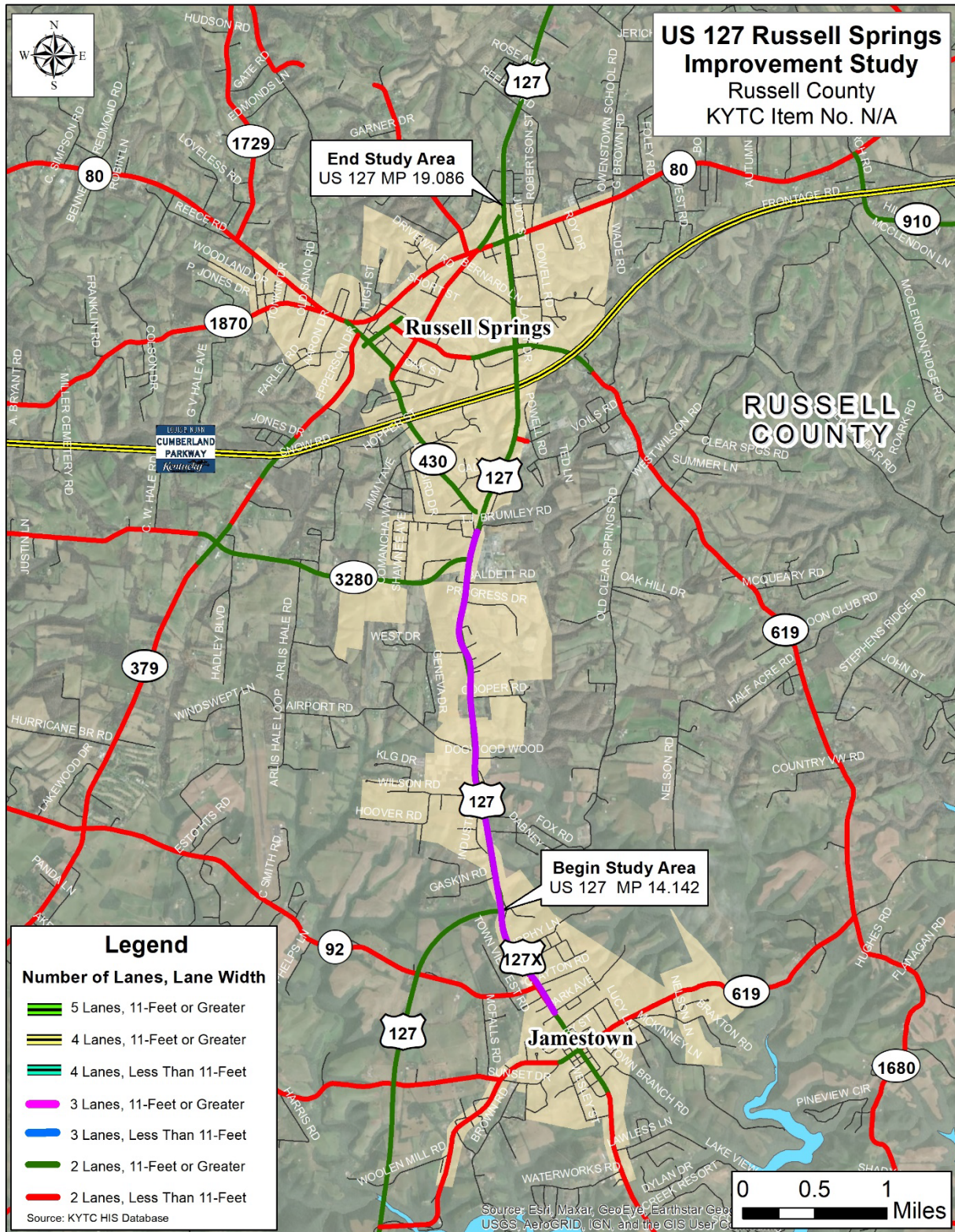
### 2.3.1 Turning Movement Estimates

In March 2020, COVID-19 caused the shutdown of businesses and schools across the state, including in Russell County. As a result, traffic patterns were significantly changed and collecting turning movement counts in the field was not a viable option. Instead, turning movement estimates were developed using available data including the Kentucky Statewide Model (KYSTM), KYTC station traffic counts, Streetlight origin-destination data, turning movement counts from previous projects, and drone footage of the afternoon release of students at the Russell County Middle and High Schools. A full discussion of the development of the turning movement estimates can be found in **Appendix A**.



<sup>2</sup> Highway Functional Classification Concepts, Criteria and Procedures. U.S. Department of Transportation/Federal Highway Administration.

[https://www.fhwa.dot.gov/planning/processes/statewide/related/highway\\_functional\\_classifications/section03.cfm#ToC336872985](https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/section03.cfm#ToC336872985)



**Figure 5: Number of Lanes and Lane Width**

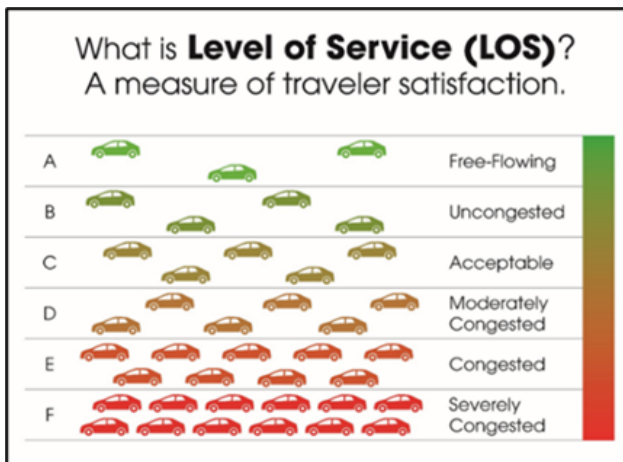






### 2.3.2 Existing (2020) Simulation Model

While traffic on US 127 flows smoothly for most of the day, there is significant congestion at the signalized intersections during the peak periods. Traffic at these intersections operates considerably worse around the morning start (7:30 a.m.) and afternoon dismissal (2:30 p.m.) of



Russell County Middle School and Russell County High School, which coincide with shift change times of several local businesses. Although Stantec had a 2017 Synchro model covering the northern portion of the study area, it was decided that a more robust software was necessary for this study. A traffic simulation model depicting a.m. (6:45 – 7:45) and p.m. (2:30 – 3:30) peak hour conditions was developed using Caliper's TransModeler (version 5) simulation package. TransModeler allows for a more detailed analysis with multiple matrices of varying time domains within the peak hour, which was necessary to evaluate the short-term impacts related

to buses and students traveling to and from the schools. A more detailed discussion of simulation model development including parameter adjustments and calibration statistics can be found in **Appendix B**.

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. Results from the 2020 Existing/No-Build a.m. scenario show all study area intersections operating at a LOS C or better, as shown in **Figure 7**. While the intersections operate with desirable LOS during the a.m. peak hour, there is an individual approach operating at an undesirable LOS – the westbound KY 619 approach that operates at LOS E.

Results from the 2020 Existing model analysis indicate that during the p.m. peak hour, the French Valley Road (KY 3280) intersection operates at LOS E and the KY 619 intersection operates at LOS D, as shown in **Figure 8**. Similar to the am peak analysis, there are individual approaches operating at undesirable LOS, including the westbound and eastbound Cumberland Expressway off ramps, which operate at LOS E and F, respectively.



**Afternoon Congestion from School Dismissal and Business Shift Changes on US 127**





Figure 7: Existing (2020) A.M. Level of Service



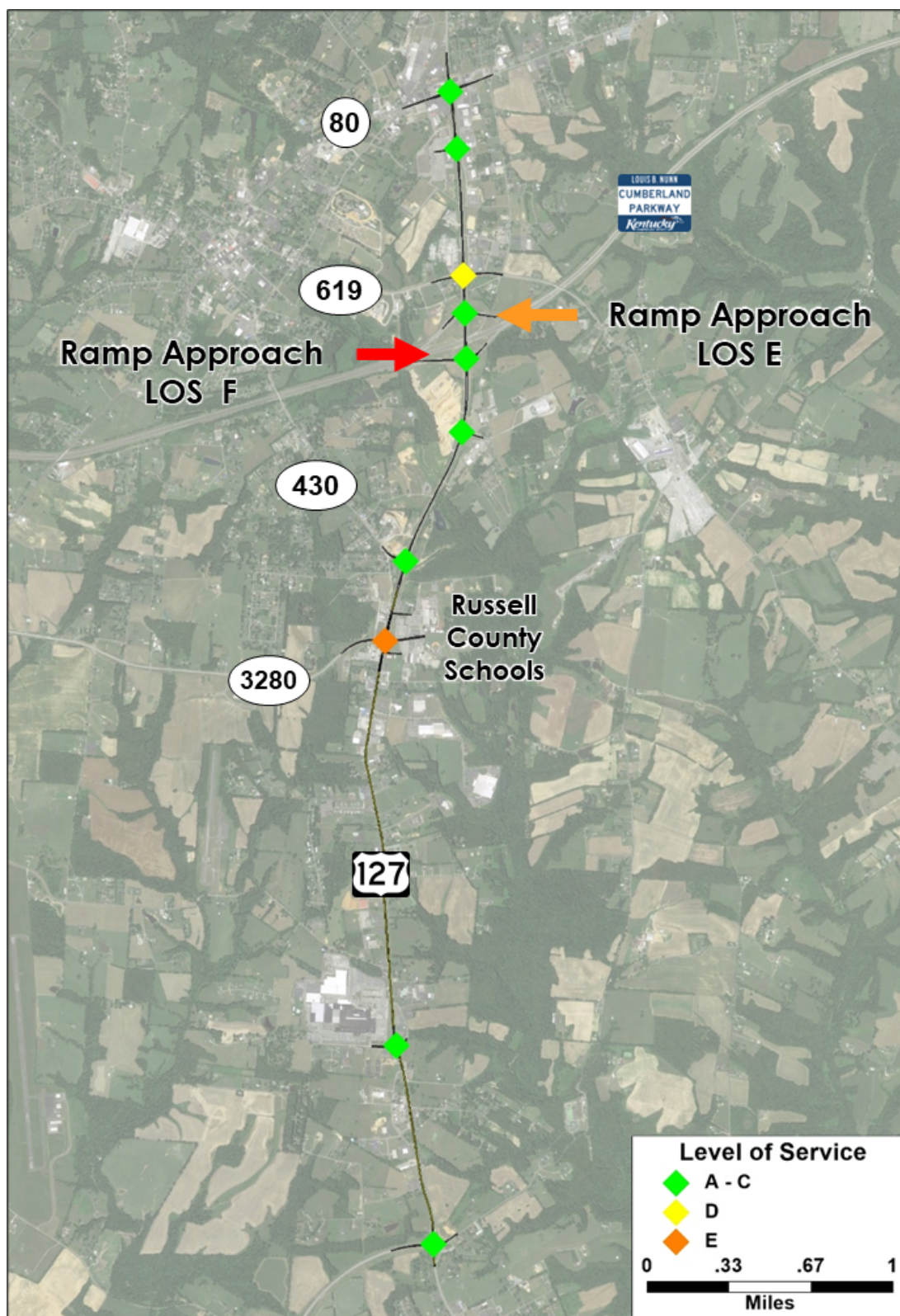


Figure 8: Existing (2020) P.M. Level of Service

Based on results from the simulation model, French Valley Road (KY 3280) is the only intersection on the study portion of US 127 that currently operates at an undesirable LOS. During the p.m. peak hour, which includes afternoon dismissal of Russell County Middle School and Russell County High School, this intersection has an average delay of 78 seconds, with an average delay of 100 seconds for the northbound US 127 approach and an average delay of 203 seconds for the approach for the schools, as shown in **Table 1**.

**Table 1: US 127 at French Valley Road (KY 3280) Existing Traffic Operations**

Scenario	LOS	Delay	Approach	LOS	Delay
2020 No-Build	E	78	NB US 127	F	100.4
			SB US 127	D	44.0
			Schools	F	203.1
			French Valley	C	31.7

## 2.4 CRASH HISTORY

Crash data were collected along the study portion of US 127 for a five-year period between January 1, 2015 and December 31, 2019. Over the course of the five-year period, there were 455 collisions, as shown in **Figure 9**. The crash records and locations are included in **Appendix C**.

Of the 455 crashes, 61 (13 percent) were injury and 394 (87 percent) were property damage only collisions. The most common crash types over the five-year period were rear end (42 percent) and angle collisions (26 percent).

KYTC and the Kentucky Transportation Center (KTC) developed a more refined statistical methodology based on the Highway Safety Manual (HSM) to rank safety needs of projects included in the 2020 SHIFT process. One data point used in this process is excess expected crashes (EEC). EEC is based on a crash prediction model estimating the number of crashes expected on an average roadway segment of a given type and length. It represents the number of excess crashes a segment is experiencing compared to other roadways of its type, adjusting for traffic volumes and a statistical correction. EEC is positive when more crashes are occurring than expected and negative when fewer crashes are occurring than expected.

EECs were calculated for the US 127 roadway segments using the Crash Data Access Tool (CDAT), an online safety analysis tool developed by the KTC, and intersection EECs were provided separately by KTC.

There are several US 127 study area intersections with positive EECs, including French Valley Road, KY 430, Voils Road, the eastbound Cumberland Expressway ramps, and Kroger, as shown in **Table 2**. Additionally, most of the study portion of US 127 has a positive segment EEC, as shown in **Table 3** and **Figure 10**.



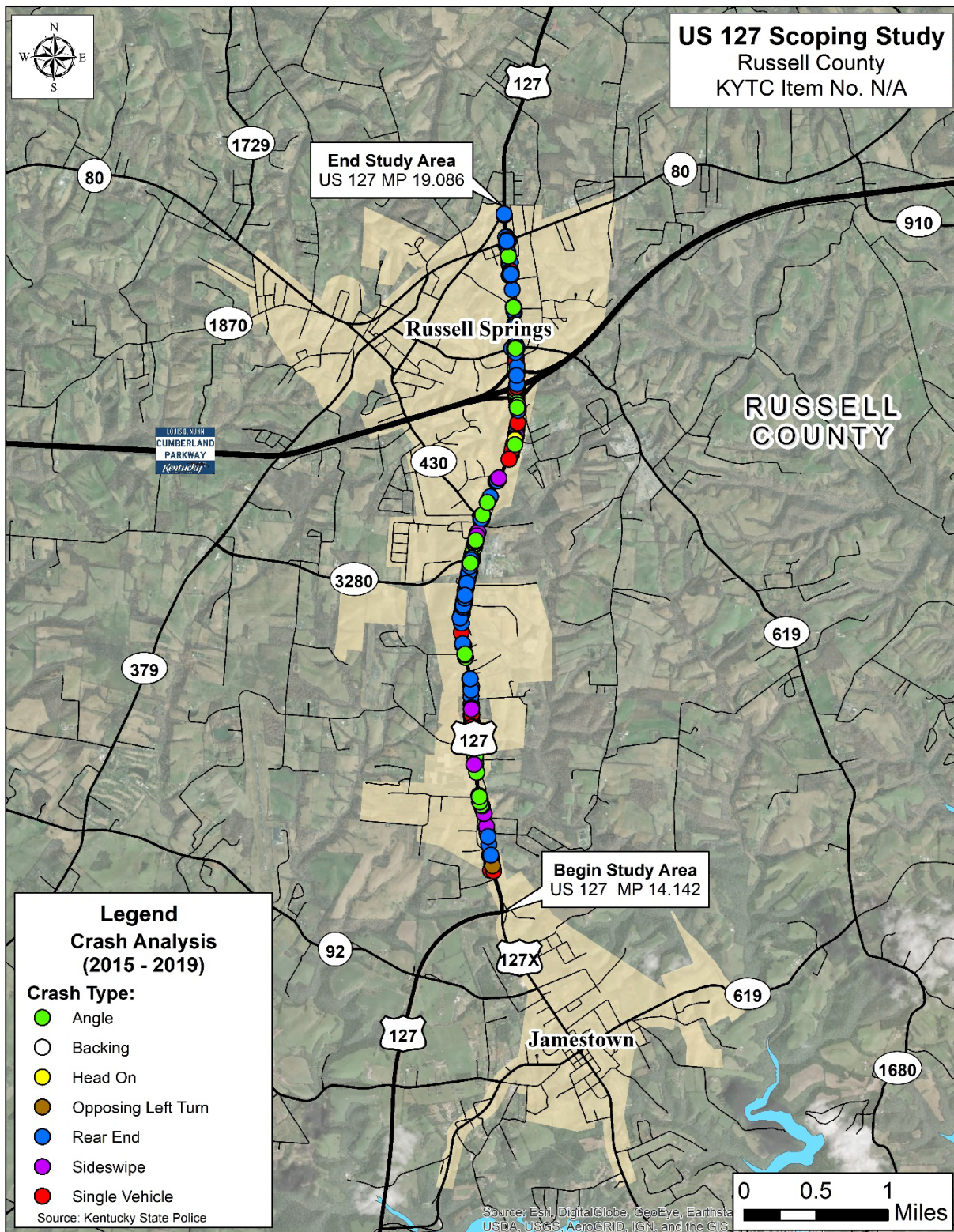


Figure 9: Crash Type (2015 – 2019)

**Table 2: US 127 Intersection Excess Expected Crashes (EEC)**

Intersection	Annual Intersection EEC
US 127 at KY 80	-0.19
US 127 at Kroger	2.65
US 127 at KY 619	-1.1
US 127 at WB Cumberland Expressway	-0.74
US 127 at EB Cumberland Expressway	0.66
US 127 at Voils Rd.	0.11
US 127 at KY 430	2.34
US 127 at French Valley Rd.	1.92
US 127 at Fruit of the Loom	-0.63
US 127 at US 127X	-1.78

**Table 3: US 127 Segment Excess Expected Crashes (EEC)**

Route	Beginning	End	Annual Segment EEC
US 127	KY 80	KY 619	4.7
	KY 619	Cumberland Expressway	2.93
	Cumberland Expressway	Voils Rd.	-0.86
	Voils Rd.	KY 430	4.3
	KY 430	French Valley Rd.	4.18
	French Valley Rd.	Brian Walters Dr.	21.93
	Brian Walters Dr.	Gaskin Rd.	3.59
	Gaskin Rd.	US 127X	-3.19



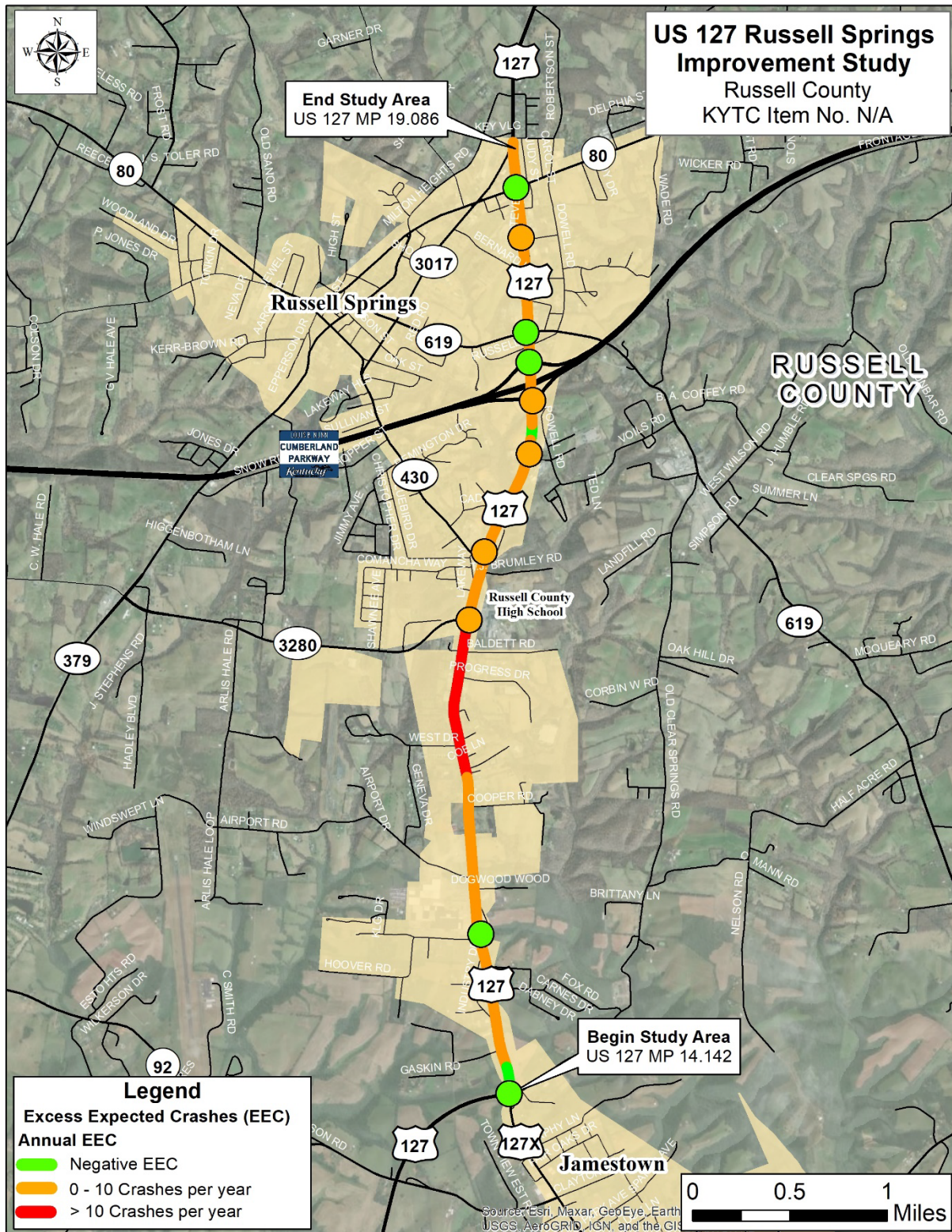


Figure 10: Study Area Excess Expected Crashes (EEC)



### 3.0 STUDY GOALS

US 127 is the only north-south arterial in Russell County and the best option for drivers traveling between the Cumberland Expressway and Russell Springs to the north, and Jamestown and Lake Cumberland to the south. Consequently, US 127 is an important regional connection, and is consistently used for through trips.

However, it is also used locally by the people who live and work along the corridor. The mixture of traffic from local businesses, schools, and factories causes significant afternoon peak hour congestion on the study portion of US 127. The congestion is compounded by the proximity of the afternoon dismissal of the Russell County High School, Russell County Middle School, and the shift changes of nearby factories. Not only does this increase travel times, but it also creates a constant stream of vehicles which makes it difficult for drivers to turn onto US 127 from unsignalized intersecting roadways. The lack of turning opportunities also creates safety concerns, with study area intersections experiencing a higher number of crashes than would be expected.



***The goal of the US 127 Russell Springs Improvement Study is to improve safety, mobility, and congestion on US 127 between the Jamestown Bypass (US 127X) and Lakeway Drive (KY 379) in Russell County.***

### 4.0 FUTURE CONDITIONS

To determine the need for and type of potential transportation improvement concepts, it is necessary to estimate future conditions. This chapter summarizes the anticipated future conditions within the study area.

Over the past 20 years, Russell County has experienced slight population growth of 0.4 percent per year. Based on projections from the Kentucky State Data Center, growth in Russell County is expected to remain modest, with an annual growth rate of 0.16 percent per year projected between 2010 and 2040. In addition to population growth, the US 127 corridor in Russell County is also expected to experience employment growth, with several developments expected in the study area. Traffic forecasts were developed to estimate the impact of this growth on the roadway system in Russell County.

## 4.1 TRAFFIC FORECASTS

To develop the 2045 traffic forecasts, annual growth rates were first developed for study area roadways. The Kentucky Statewide Travel Demand Model (KYSTM) was updated and used along with historical KYTC traffic counts to develop the growth rates. Based on these sources, an annual growth rate of 0.75 percent per year is projected for US 127 and surrounding roadways, except for the Cumberland Expressway, which is expected to grow 1.5 percent per year. The Russell County projected population growth rate of 0.16 percent<sup>3</sup> per year was used to account for enrollment growth of Russell County Middle School and Russell County High School.

The annual growth rates were then used to forecast the 2020 daily traffic estimates to the future year 2045, as shown in **Table 4** and **Figure 11**. Peak hour turning movement forecasts were also developed using the annual growth rates and can be found along with a more detailed discussion of the traffic forecasts in **Appendix A**.

**Table 4: 2045 Daily Traffic Forecasts**

Route	Location	Beg MP	End MP	Annual GR	2020 ADT	2045 ADT
US 127	US 127X to KY 3280	14.142	16.618	0.75%	11,900	14,400
	KY 3280 to KY 430	16.618	16.921		15,600	18,800
	KY 430 to Cumberland Pkwy.	16.921	17.891		14,000	16,900
	Cumberland Pkwy. to KY 619	17.891	18.154		14,800	17,900
	KY 619 to KY 80	18.154	18.902		11,700	14,100
	KY 80 to KY 379	18.902	19.09		6,900	8,300

## 4.2 2045 NO-BUILD SIMULATION MODEL

A 2045 No-Build simulation model was developed using the existing simulation network and the expected annual growth rates. Results from the 2045 No-Build a.m. scenario show all study area intersections operating at a level of service D or better, as shown in **Figure 12**. While the intersections operate at a desirable LOS, the eastbound and westbound Cumberland Expressway off ramp approaches operate at LOS E and F, respectively, and the westbound KY 80 approach operates at LOS E.

Results from the model analysis indicate that during the p.m. peak hour, the French Valley Road (KY 3280) intersection operates at LOS F and the KY 619 intersection operates at LOS E, as shown in **Figure 13**. Additionally, the Cumberland Expressway off ramps both operate at LOS F.



<sup>3</sup> Kentucky State Data Center



## Final Report

### US 127 Russell Springs Improvement Study

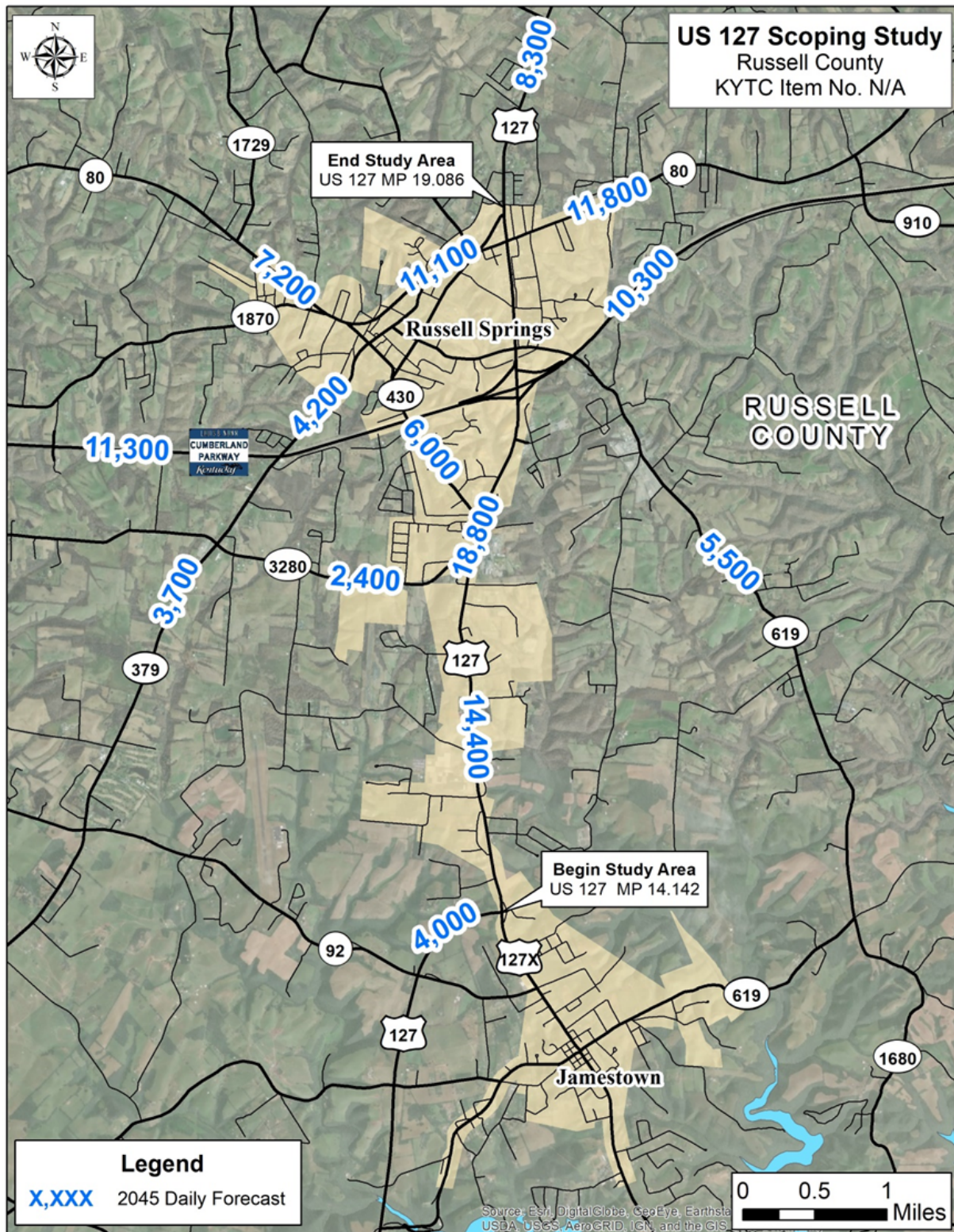


Figure 11: 2045 Daily Traffic Forecasts



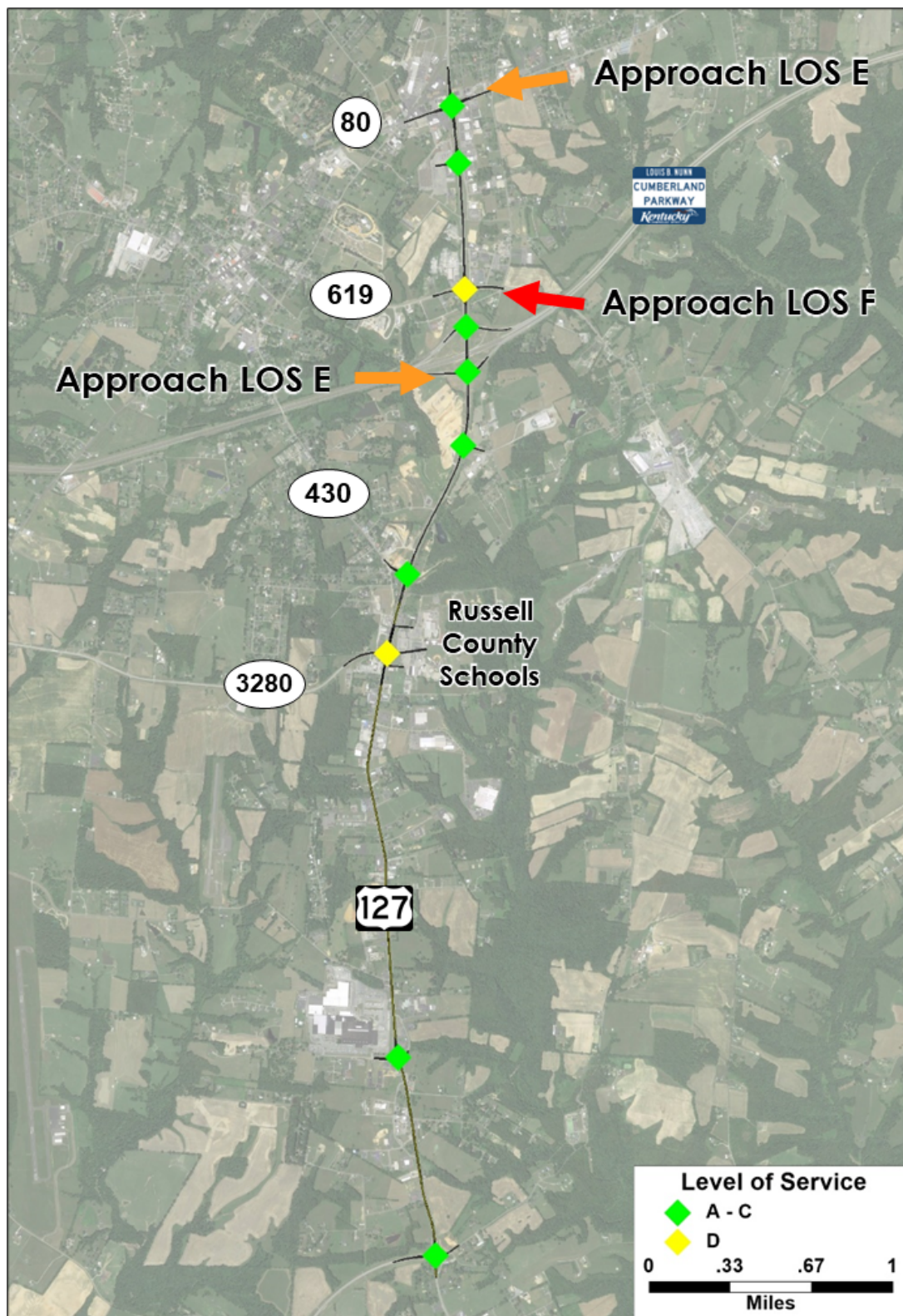


Figure 12: 2045 No-Build A.M. Level of Service



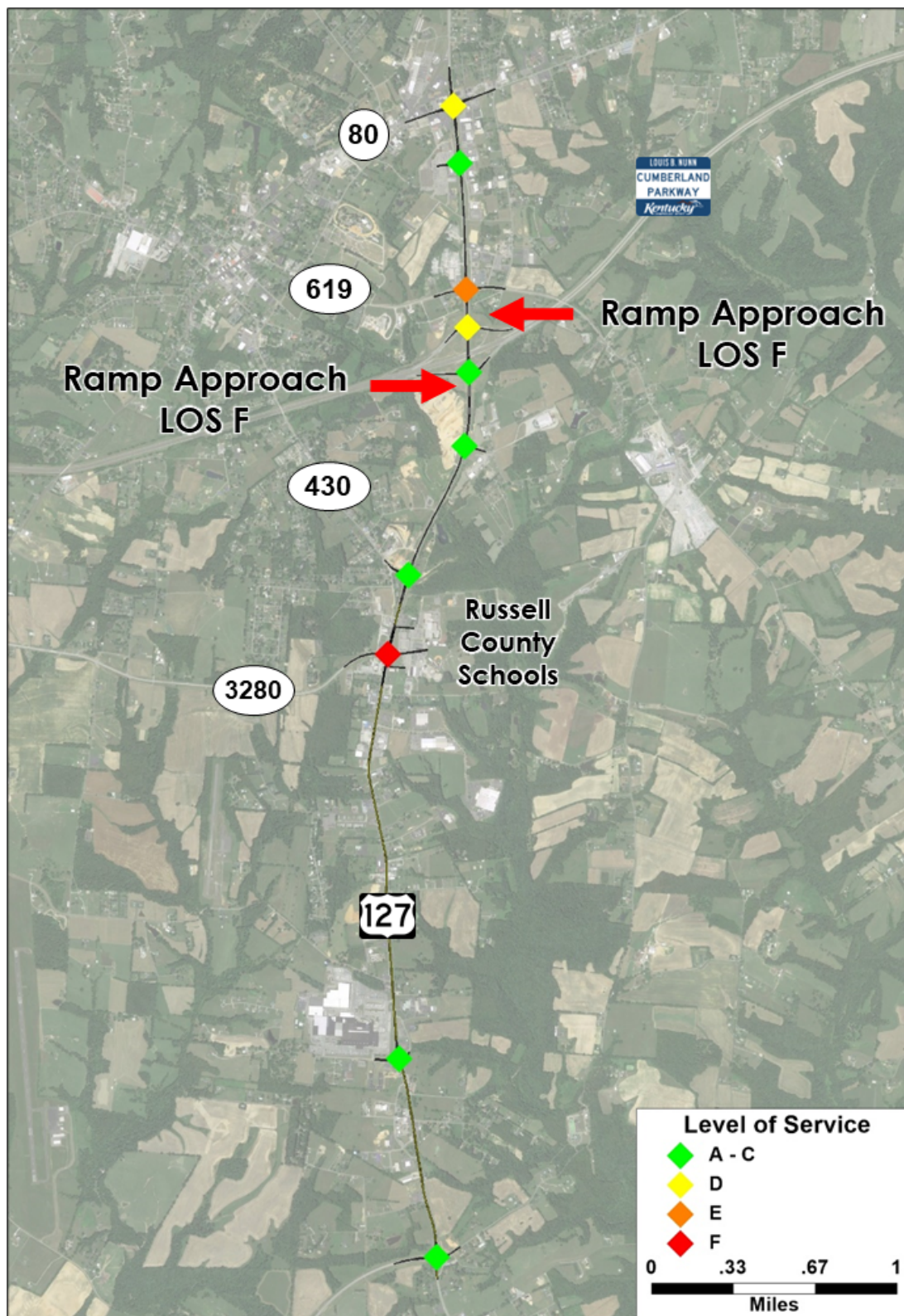


Figure 13: 2045 No-Build P.M. Level of Service

## 5.0 ENVIRONMENTAL OVERVIEW

An Environmental Overview was completed to identify environmental resources of significance, potential jurisdictional features, and other environmental areas of concern that should be considered during project development. Natural and human environmental resources within the study area were identified from a literature/database review, as well as a windshield survey. More detailed environmental studies may be required as individual projects are further developed. If a future project is federally funded, the National Environmental Policy Act (NEPA) requires that potential environmental impacts regarding jurisdictional wetlands, archaeological sites, cultural historic sites, and federally endangered species must be avoided if possible. If not, then impact minimization efforts are required. Mitigation for unavoidable impacts may also be necessary. The following provides a summary of the findings. The complete document is included in **Appendix E**.

### 5.1 NATURAL ENVIRONMENT

Natural environment resources include threatened, endangered, and special concern species and habitat, woodland and terrestrial areas, and parks. Through a literature/database review and field reconnaissance, potentially sensitive resources that affect the natural environment were identified in the study area. **Figure 14** presents the water resources in the study area.

There are 77 National Wetland Inventory (NWI) features mapped within the study area, comprising a total of approximately 138.9 acres. Several water wells and streams are located near US 127 and site-specific conditions will need to be considered during any future design phase.

Approximately 30 percent of the study area is urbanized, two thirds of which includes moderate density residential housing (single-family home developments). Noise-sensitive land use areas include residential neighborhoods, cemeteries, places of worship, schools, hotels, and restaurants with exterior uses.

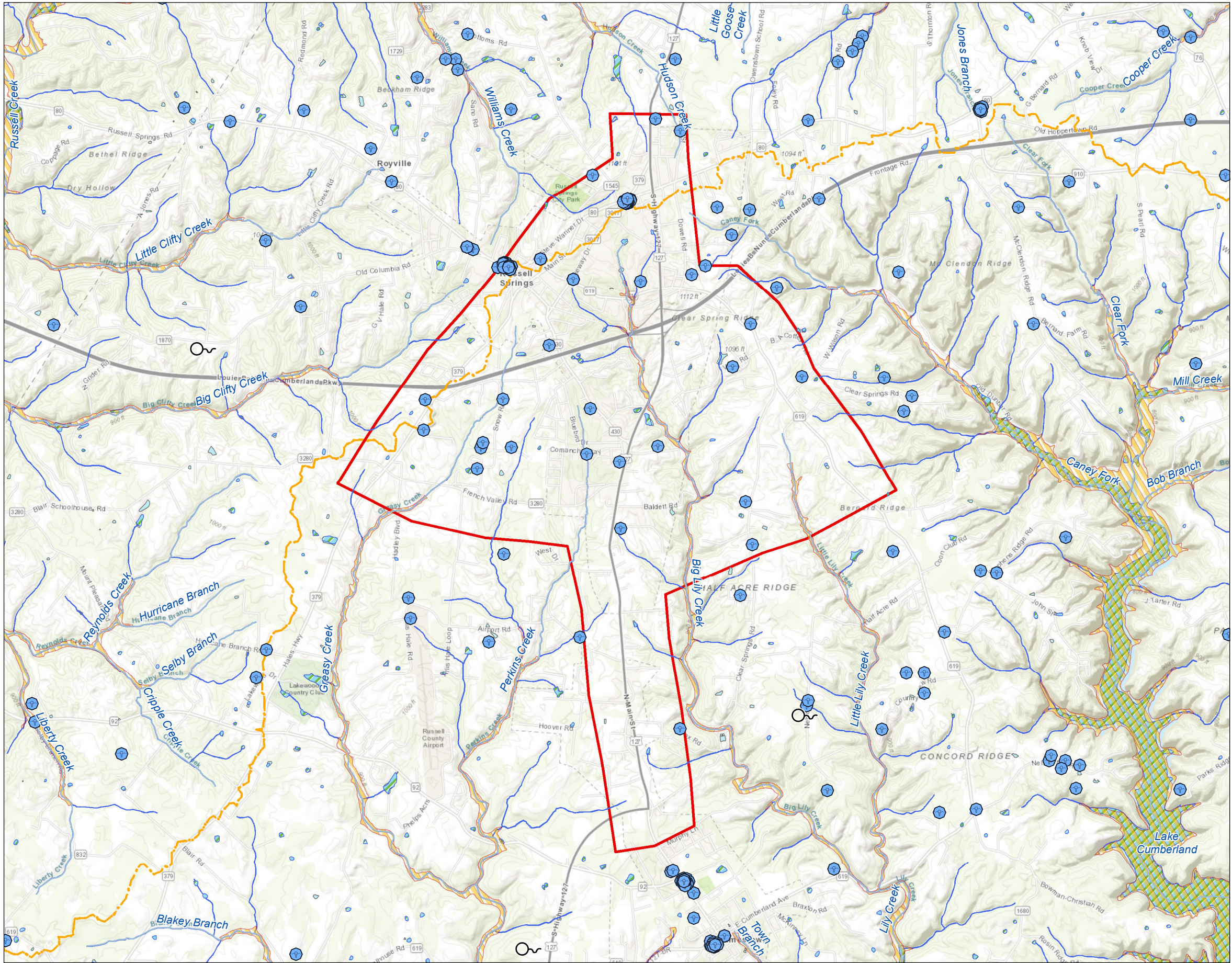
There are approximately 5,375 acres of farmland located within the study area. Approximately 90 percent of the soils in the study area are identified as farmland. Of the soil categorized as farmland, 44 percent is Prime Farmland, 40 percent is Farmland of Statewide Importance, and 6 percent is Prime Farmland if drained. Additionally, there are three areas of concern within one mile of the study area: Lake Cumberland Wildlife Management State WMA (managed area), Green River Bioreserve Mega site (area of significant biodiversity), and a bat habitat. The Office of Kentucky Nature Preserves (KNP) indicated two species in the study area, including Loggerhead Shrike and Elusive Clubtail.

A hazardous materials database search revealed three State Hazardous waste sites and 25 oil/gas wells within the area of influence, two of which are located along US 127. Additionally, there are three historic landfills in the study area, including Russell County Feed, Inc. (inactive), Hudson & Sons Sanitation Transfer Station (inactive), and Russell County Transfer Station (active). Potential hazardous materials concerns are associated throughout the study area, concentrated around the western study area border, and along main roadways.

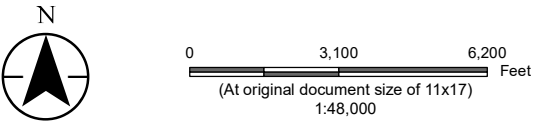




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- Legend
- Study Area
  - 100-Year Floodplain
  - Floodway
  - Ponds
  - NWI Wetlands
  - Streams
  - Watershed Boundary
  - Springs
  - Waterwell



**Notes**  
1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet  
2. Data Sources: ESRI Topo, USGS Streams (2020), FEMA National Flood Hazard (2010), National Wetlands Inventory (2012), and KY Geologic Survey (2020).  
3. Background: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community



<b>Project Location</b> Russell County, Kentucky	Prepared by SMH on 4/22/2020 TR by LA on 4/22/2020 IR Review by LA on 4/22/2020
<b>Client/Project</b> Kentucky Transportation Cabinet Environmental Overview Russell Springs Improvements Study	178558003

**Figure No.**  
**14**

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**Title**  
**Water Resources**



## 5.2 HUMAN ENVIRONMENT

Human environment is defined as what we live in and around and what we have built. Through review of secondary source information and field reconnaissance, potentially sensitive resources that affect the human environment were identified in the study area, are discussed in the following sections, and shown on **Figure 15**.

Residential land use comprises approximately 20 percent of the study area, predominately as single-family residential dwellings with adjoining forested and pasture or farmland and some single-family residential developments. Commercial and industrial land use comprises approximately 10 percent of the study area and includes portions of Russell Springs, primarily in the northwest of the study area and along US 127.

At least three school facilities were identified in the study area, including Russell County High School, Russell County Middle School, and the Lake Cumberland Technology Center. The schools are all situated along US 127. Multiple public service facilities are also located within the study area, including a US Post office, the Russell Springs Detention Center, the Russell County Health Department, and the Russell Springs Police Department.

At least six cemeteries were identified in the study area. There may be additional private, or family cemeteries present in the study area that have not been previously mapped or located.



**Russell County Schools Auditorium**

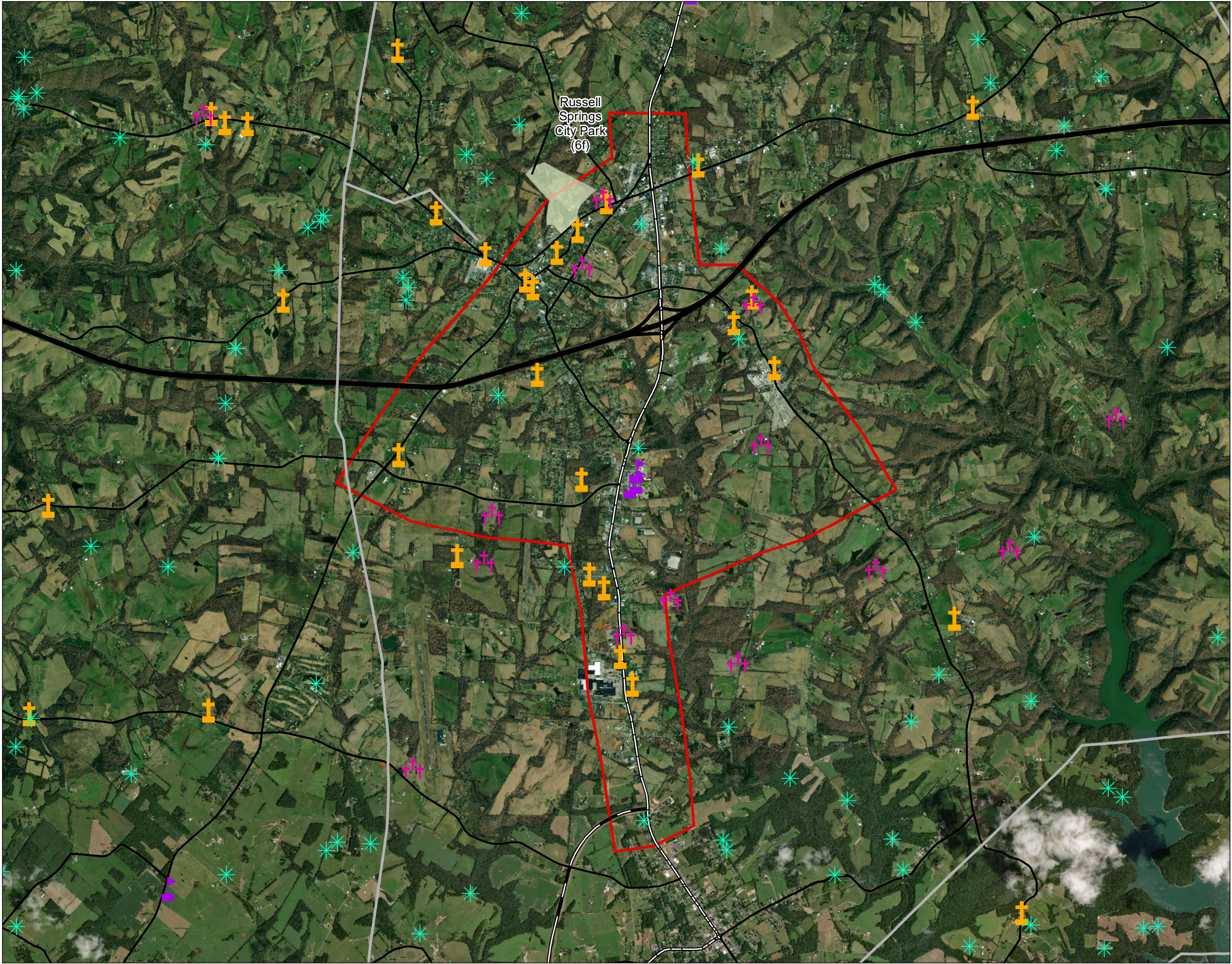
There is one electric transmission line that intersects the far west corner of the study area.











## 5.3 SOCIOECONOMIC STUDY

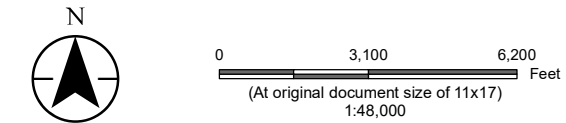
The Lake Cumberland Area Development District (LCADD) conducted a socioeconomic study for the study area. A complete copy of the report is found in **Appendix D**. The information in this report outlines 2014-2018 American Community Survey (ACS) statistics in and near the study area using tables, charts, and maps. The data presented in this document is intended to highlight areas of concern that will require additional consideration should any project be advanced to future phases. Statistics are provided for minority, elderly, poverty status, limited English proficiency (LEP), and disabled populations for the nation, state, region, county, and census block groups located within the study area. **Table 5** presents key findings related to the socioeconomic characteristics of the study area.



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- Legend
-  Study Area
  -  Approximate Electric Power Transmission Lines
  -  Cemeteries
  -  Place of Worship
  -  Schools
  -  Parks
  -  Oil and Gas Wells
  -  Secondary Road
  -  Primary Road
  -  US 127



**Notes**

1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet

2. Data Sources: ESRI Basemap (2020) and KY Department of Education (2019).

3. Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



<b>Project Location</b> Russell County, Kentucky	Prepared by SMH on 4/30/2020 TR by LA on 4/30/2020 IR Review by LA on 4/30/2020
<b>Client/Project</b> Kentucky Transportation Cabinet Environmental Overview Russell Springs Improvements Study	178558003

**Figure No.**  
**15**

**Title**  
**Human Environment**



**Table 5: Socioeconomic Summary**

Category	Kentucky	Russell County
Percent of Minority Population	15.2%	6.3%
Percent Below the Poverty Line	18.0%	24.6%
Percent of Adults over 65	15.6%	19.1%
Percent of Adults with a disability	20.9%	22.5%
Percent with Limited English Proficiency	2.3%	2.0%

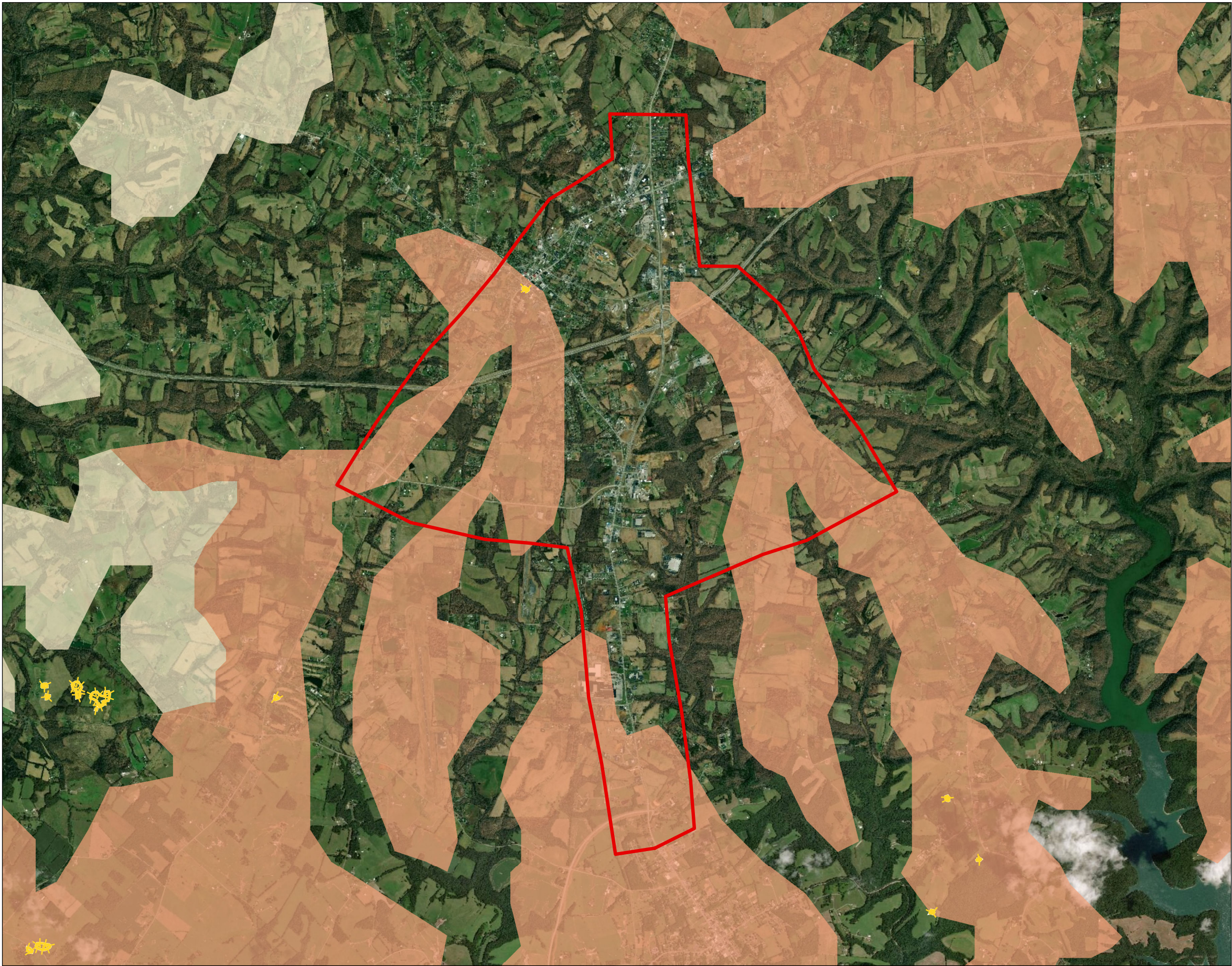
During future phases of project development, a more detailed and robust analysis would be required for the NEPA documentation when assessing the potential for adverse and disproportionate impacts to those with disabilities, poverty status, and minority populations.





## 5.4 GEOTECHNICAL OVERVIEW

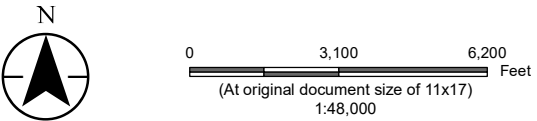
A geotechnical overview of the study area was completed based upon research of available published data and experience with highway design and construction projects within the region. Ten of the published reports came from Russell County and two from Adair and Russell Counties. The purpose of the overview was to provide a general summary of the bedrock, soil, and geomorphic features likely to be encountered in the study area and to identify geotechnical features that may have an impact on any future project's alignment. The following provides a summary of the findings, shown in **Figure 16**. The complete document is included in **Appendix F**.

The potential for karst conditions exists within the study area, however, the only portion of US 127 in a moderate karst area is to the south near the US 127X intersection. Because future projects may include widening, information on pavement structure should be obtained to assist the team with pavement design and California Bearing Ratio (CBR) information. It is anticipated that chemically or mechanically stabilized roadbed would be required because CBR values are expected to be six or less based on study area geological characteristics.





- Legend
-  Study Area
  -  Sinkholes (1)
  -  Major Karst Area
  -  Moderate Karst Area



**Notes**  
1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet  
2. Data Sources: Bing Imagery and Kentucky Geological Survey (2003).  
3. Background: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**Project Location**  
Russell County,  
Kentucky

Prepared by SMH on 4/23/2020  
TR by LA on 4/23/2020  
IR Review by LA on 4/23/2020

**Client/Project**  
Kentucky Transportation Cabinet  
Environmental Overview  
Russell Springs Improvements Study

178558003

Figure No.  
**16**

Title  
**Geologic Features**



## 6.0 INITIAL PROJECT TEAM AND STAKEHOLDER COORDINATION

Over the course of the study, the project team held three meetings to coordinate on key issues. The project team included representatives from KYTC Central Office, KYTC District 8, the Lake Cumberland Area Development District (LCADD), and the consultant, Stantec. Detailed summaries of each meeting are presented in **Appendix G**.

### 6.1 PROJECT TEAM MEETING NO. 1

The first project team meeting was held via Microsoft Teams on December 3, 2020. The purpose of the meeting was to discuss the existing conditions analysis and to discuss transportation issues in the study area. Key discussion items included the following:

- The Crash Data Analysis Tool (CDAT) tool is not currently able to analyze intersections, so the KTC provided intersection EECs along US 127. The intersections with French Valley Road, Lake Way Drive, Cumberland Expressway eastbound ramps, and the Kroger Entrance/Steve Drive Connector had positive EEC values.
- Queues from the traffic simulation model were compared to drone footage from the afternoon school dismissal.
- The following developments were included in the KYSTM update:
  - Dollar General on Apache Avenue
    - 9,100 sq. ft.
  - Davis Distributing Metal Fabrication Facility on Airport Road
    - 50 employees
    - 50,000 to 100,000 sq. ft.
  - Development in the NE quadrant of the Cumberland Expressway interchange
    - 5 acres
    - 4 small restaurants expected
  - Lake Cumberland Regional College and Workforce Center
    - 58,000 sq. ft.
    - No additional students or staff are anticipated on the school property during normal hours. There is a vocational school on the property already and staff and students will just be attending the new building, rather than the old one.
  - Java Springs Coffee Shop
- While a major widening from three to five lanes would reduce p.m. peak hour congestion, it would also likely increase speeds and the severity of crashes. It was

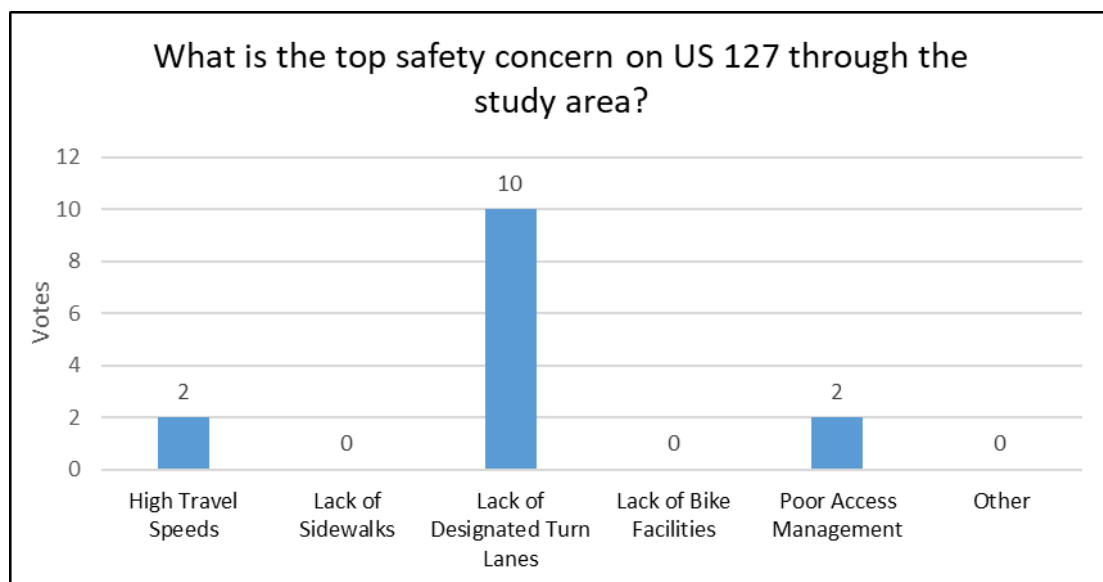


determined that the high cost outweighs the congestion relief benefit, so a major widening was not carried forward.

## 6.2 LOCAL OFFICIALS/STAKEHOLDERS MEETING NO. 1

The project team reached out to local government representatives and other community groups early in the planning process. The first Local Officials/Stakeholders Meeting was held via Microsoft Teams on January 13, 2021. In addition to the project team, representatives from the Russell County School System, the Russell Springs Police Department, the Kentucky State Police, DUO Broadband, the Russell County 911 System, the Kentucky legislature, and the City of Jamestown, among others, were in attendance. The purpose of the meeting was to present the existing conditions analysis and to get feedback from the local officials and stakeholders on transportation issues along the study portion of US 127. During the meeting, attendees were asked to fill out a survey. The results are as follows:

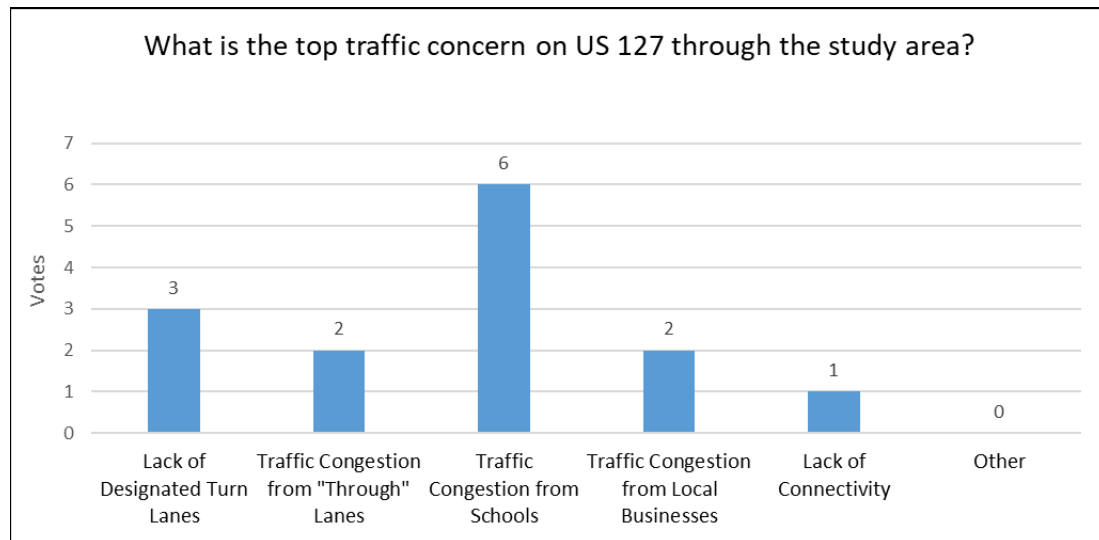
- When asked how often they travel US 127 in Russell Springs, 10 respondents indicated that they travel the corridor daily, one respondent travels it monthly, and one never travels the corridor.
- The second question asked which transportation goal is the most important for this planning study. Six respondents indicated that reducing congestion is most important and four respondents indicated that improving safety is most important.
- The third question asked respondents to choose the top safety concern on US 127 through the study area. Lack of designated turn lanes was the most common choice (10 responses), followed by high travel speeds and poor access management, as shown in **Figure 17**.



**Figure 17: Local Officials/Stakeholders Survey - Safety Concerns**



- Question four asked respondents to choose the top traffic concern on US 127 through the study area. Traffic congestion from schools was the most common answer (six responses), followed by lack of designated turn lanes, as shown in **Figure 18**.



**Figure 18: Local Officials/Stakeholders Survey - Traffic Concerns**

- The final question asked respondents to indicate the top trouble spot on US 127 that should be addressed as part of this planning study. The top choice was US 127 at the Cumberland Expressway (six responses) followed by US 127 at French Valley Road/Russell County Schools (three responses).

## 7.0 INITIAL PUBLIC INVOLVEMENT

Due to COVID-19 restrictions, the project team was unable to host an in-person public meeting. Instead, an online StoryMap with a survey and mapping exercise was made available between January 14, 2021 and February 15, 2021. The following is a summary of the results.

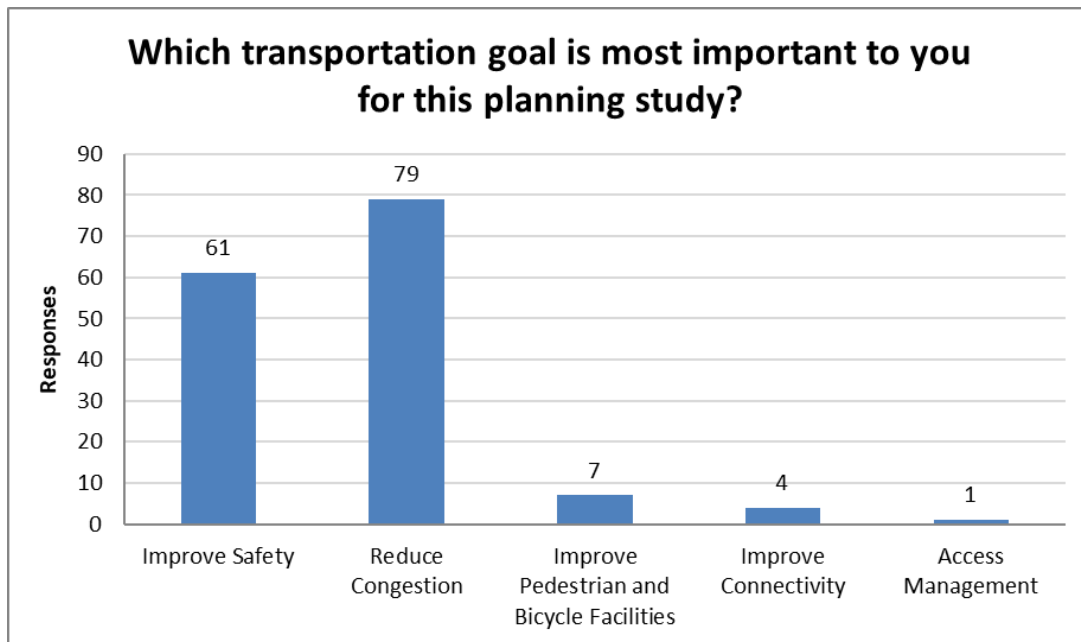
### 7.1 ONLINE SURVEY

Of the 152 participants in the survey, 56 (37 percent) indicated that they heard about the study from social media, 36 (24 percent) from a Russell County School email, and 22 (14 percent) from a friend or neighbor. The next question asked if participants live or work within the study area. 124 (82 percent) responded that they live and/or work within the study area. The highest reported zip codes were 42642 (Russell Springs) and 42629 (Jamestown), accounting for nearly 86 percent of the responses.

When asked how often they drive on the study corridor of US 127, the majority (91 percent) of respondents indicated that they drive through the area daily or several times per week.



Respondents were then asked which transportation goal is most important to them. Reducing congestion (52 percent) and improving safety (40 percent) were the most common responses, as shown in **Figure 19**.



**Figure 19: Public Survey - Transportation Goals**

Respondents were then asked to rank transportation concerns No. 1 (most preferred) through No. 10 (least preferred). The concern received 10 points for a first-place vote, nine points for a second-place vote, and so on. The top two concerns were traffic congestion from schools and local businesses, as shown in **Figure 20**.



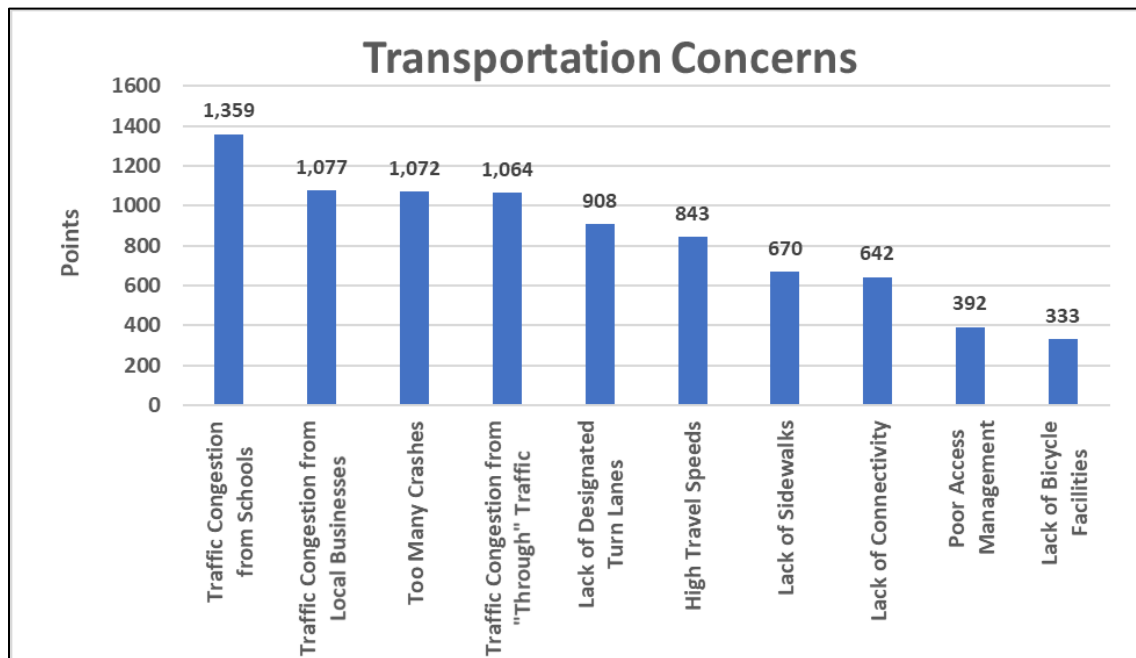


Figure 20: Public Survey - Transportation Concerns

## 7.2 ONLINE MAPPING EXERCISE

Along with the survey, an online mapping exercise was made available to the public to indicate specific locations of concern and potential improvement ideas on a map of the study area. There were 102 points identified through this exercise, categorized as "concerns" or "improvements," as shown in **Figure 21**. The locations on US 127 with the most input points included the following:

- US 127 at the Russell County High School and Middle School
  - Concerns: congestion
  - Suggested improvements: turn lanes, improved signal timing, roundabout
- US 127 Interchange with the Cumberland Expressway
  - Concerns: safety, difficulty turning onto US 127 during peak periods
  - Suggested improvements: turn lanes, traffic signal
- US 127 at Bernard Lane
  - Concerns: congestion, difficulty turning onto US 127 during peak periods
  - Suggested improvements: turn lanes, traffic signal
- US 127 at Progress Drive
  - Concerns: congestion
  - Suggested improvements: turn lanes, traffic signal
- US 127 at FiveStar/Voils Road

## Final Report

### US 127 Russell Springs Improvement Study

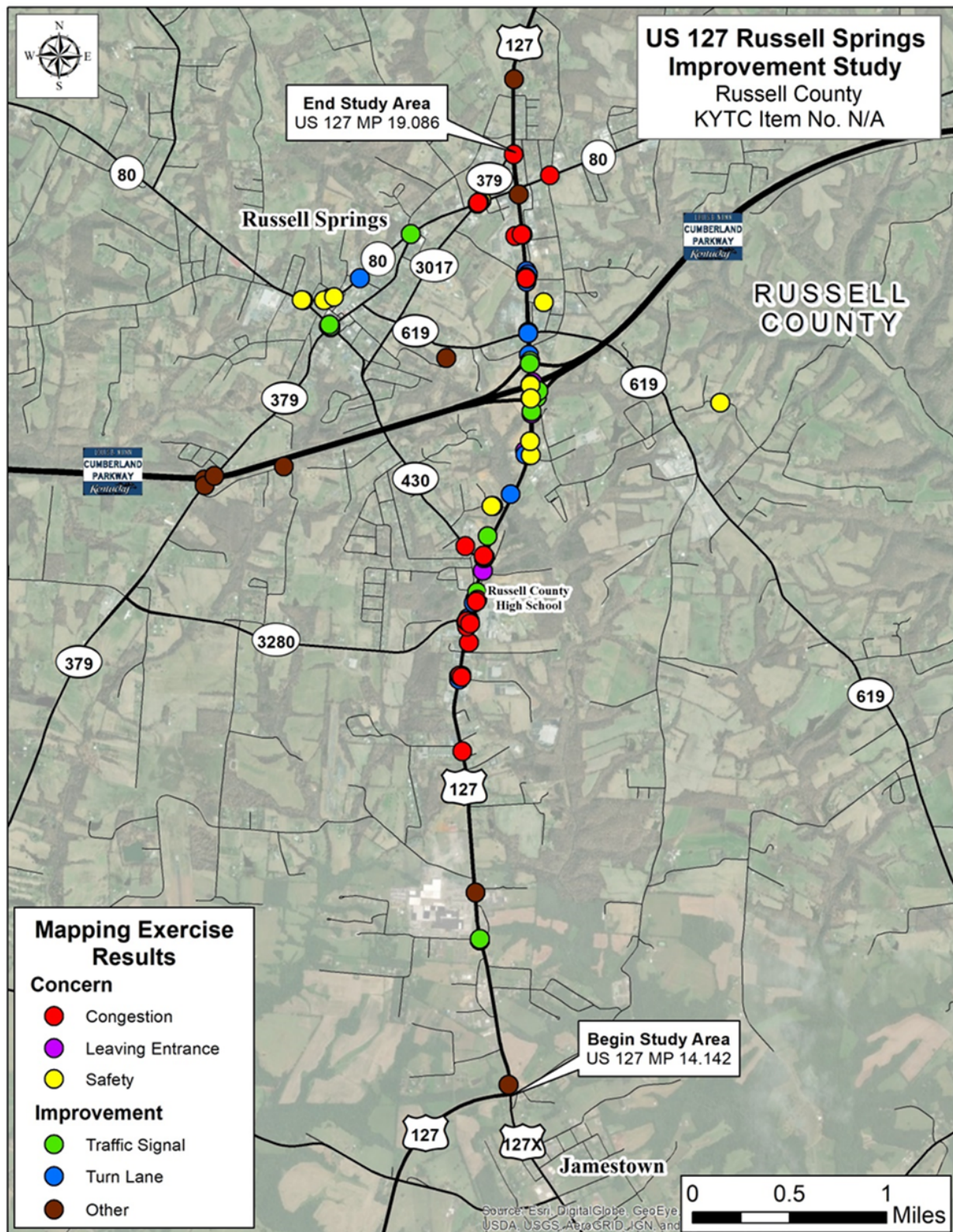


Figure 21: Online Mapping Exercise Results



- Concerns: safety, difficulty turning onto US 127 during peak periods
- Suggested improvements: turn lanes, traffic signal

The non-US 127 locations with the most input points included the following:

- KY 379 at KY 430
  - This intersection was recently converted to a four-way stop
  - Responses indicate that the four-way stop is preferred over a signal
- KY 80 at Lakeway Drive
  - Congestion, safety concerns due to the skewed intersection
  - Suggested improvements: traffic signal
- Curve on KY 80
  - Concerns: speeding around the curve, skewed intersections
  - Suggested improvements: widening
- New Cumberland Expressway interchange at KY 379

Overall, congestion seems to be the most important issue for US 127 travelers in Russell County. Drivers are particularly concerned with peak hour congestion due to the afternoon dismissal of the Russell County High School and Middle School. The school traffic, in combination with traffic from factories and local businesses, not only increases travel times, but also creates a constant flow of traffic and makes it difficult to turn onto US 127 from unsignalized intersecting roadways. This is especially true at the Cumberland Expressway interchange where traffic queues on the ramps due to the lack of turning opportunities during the peak hours. This creates safety concerns, which was the second most important issue for most survey participants, especially for vehicles turning left onto US 127.

## 8.0 INITIAL IMPROVEMENT CONCEPTS

Improvement concepts were developed based on a combination of input from the project team, a review of existing conditions, public input, traffic simulation model analyses, and field reconnaissance. Over the course of the study, the project team worked to determine which improvement concepts improved safety, mobility, and connectivity on US 127. Along with the No-Build concept, this study initially examined several other improvements discussed below and shown in **Figure 22**.



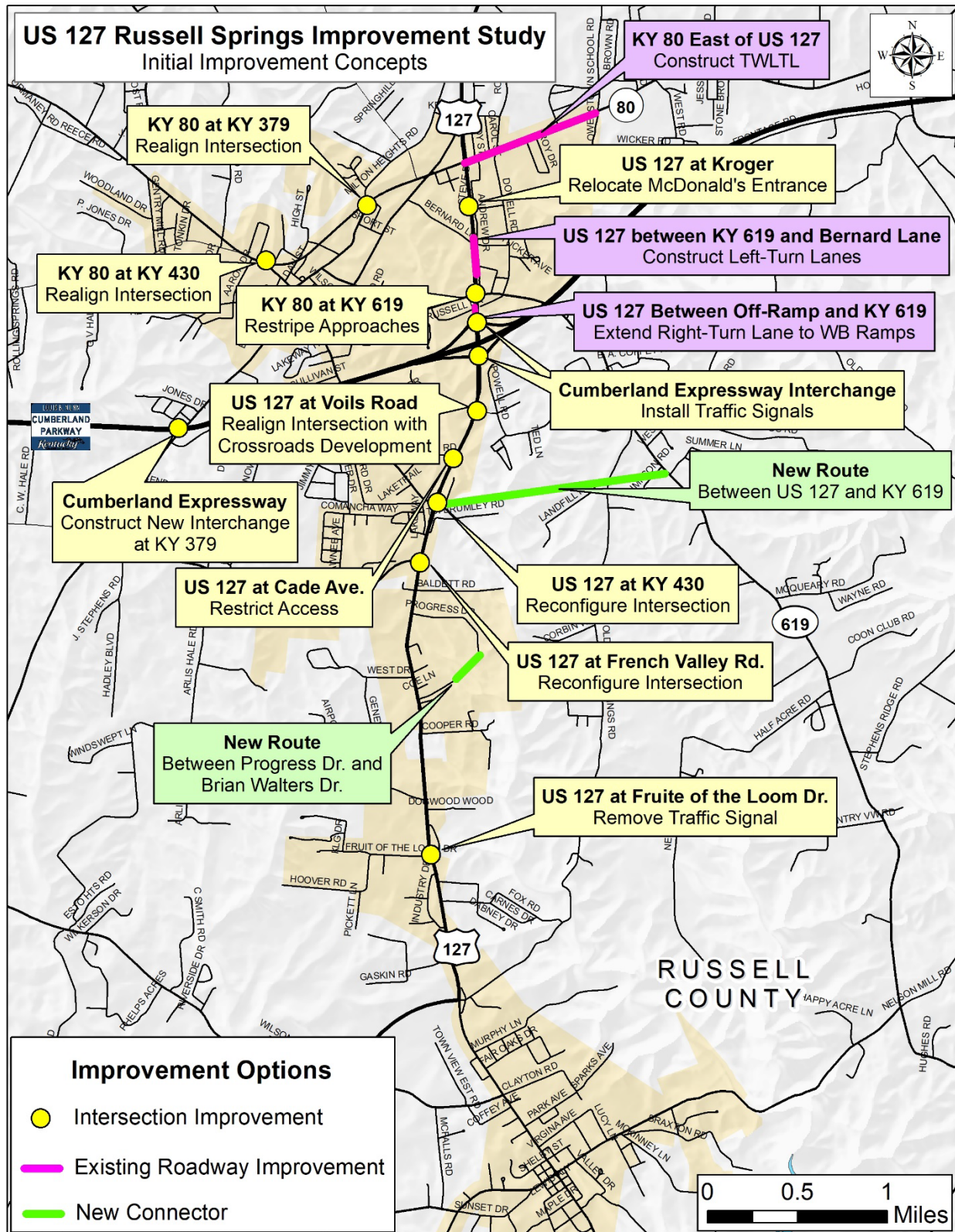


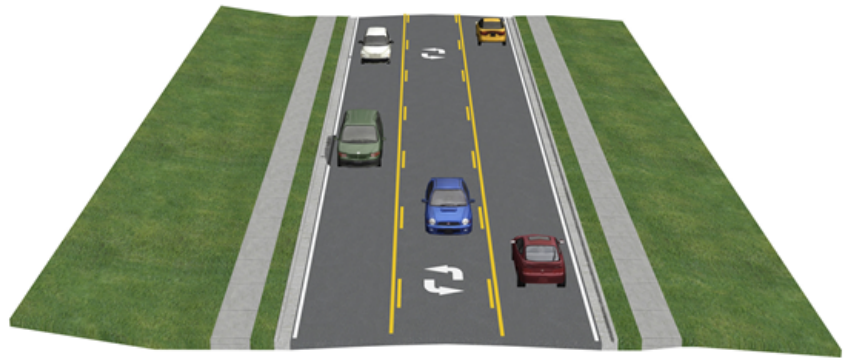
Figure 22: Initial Improvement Concepts

**KY 80 east of US 127**

The section of KY 80 east of the signalized intersection with US 127 serves a mix of commercial and residential traffic, with numerous access points and no turn lanes. Of the 51 reported crashes over the past five years, 23 were rear end and 12 were angle collisions. Based on results from the CDAT analysis, this section of KY 80 had an EEC of 12 crashes per year. An option to improve safety includes installing a TWLTL between US 127 and Owenstown Road, as shown in **Figure 23**. This would reduce the number of potential conflicts by removing left-turning vehicles from the KY 80 traffic stream. Additionally, an access management plan could be implemented to consolidate entrances.

Another possible improvement concept includes extending the westbound left-turn lane at the US 127 intersection. This would provide more storage for the left-turning vehicles and would lower the likelihood of turning vehicles blocking through traffic.

Based on feedback from the local officials and public, adding sidewalks along KY 80 should also be considered.



**Figure 23: Three-lane section with center two-way left-turn lane (TWLTL)**

**US 127 at Kroger**

Several respondents to the online mapping exercise indicated that the McDonald's drive-thru backs up onto Kroger Drive and even to the US 127 intersection, blocking the eastbound approach. An improvement option includes relocating the McDonald's entrance to the southwest corner of the parking lot to avoid queues spilling into the main intersection.

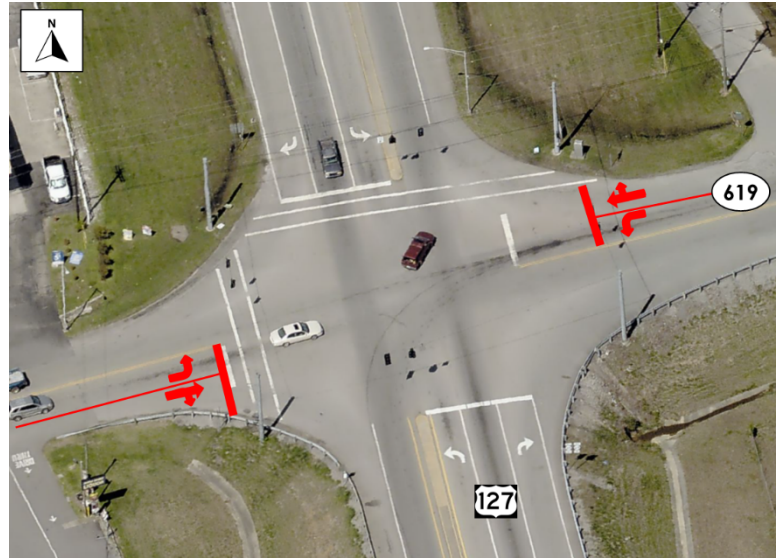
**US 127 between KY 619 and Bernard Lane**

The section of US 127 between KY 619 and Bernard Lane/Charles Peck Drive has recently experienced significant commercial growth with several businesses opening east of US 127. These businesses have increased the number of vehicles turning onto and off US 127 in the area, creating both safety and congestion concerns due to a lack of turn lanes. Over the past five years, there were 28 reported crashes on this portion of US 127, 20 of which were rear end and most of which occurred at the intersections. An improvement option includes constructing left-turn lanes from US 127 to Bernard Lane/Charles Peck Drive and to Joe Pettet Drive. This would improve safety by removing left-turning vehicles from the US 127 through traffic stream.



**US 127 at KY 619**

When traveling northbound on US 127, the KY 619 intersection is the first traffic signal north of French Valley Road (KY 3280) and acts to ‘meter’ traffic during the peak hours. This causes significant queues on US 127, especially during the PM peak. The westbound KY 619 approach currently operates at LOS F during the PM peak due to the high number of left-turning vehicles and long US 127 green times, which are necessary to accommodate the through traffic. A potential improvement option is to restripe both KY 619 approaches to include a left-turn lane and a shared right-turn/through lane, as shown in **Figure 24**. The analysis showed that this, along with modest signal timing adjustments, would improve the westbound approach from LOS F to LOS D.



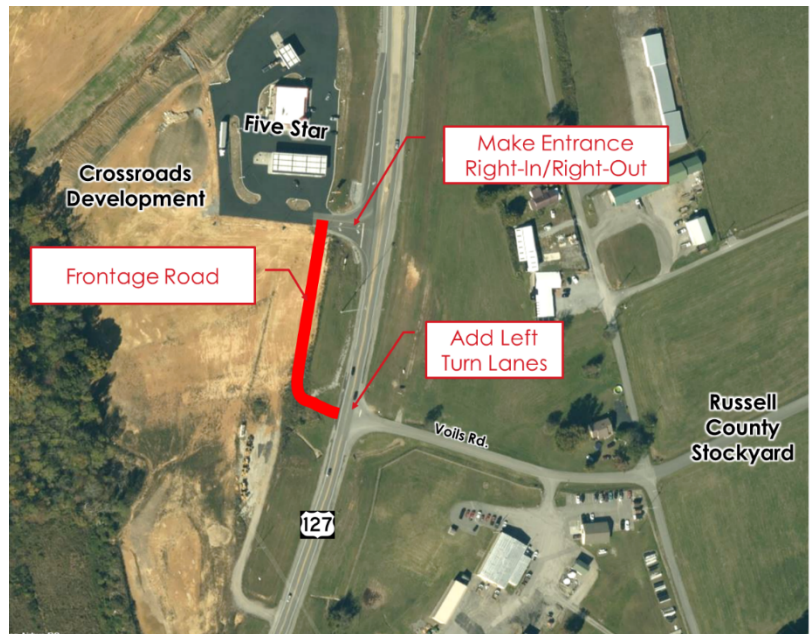
**Figure 24: Proposed restriping at US 127/KY 619 intersection**

**Cumberland Expressway Interchange**

Both the eastbound and westbound Cumberland Expressway ramp interchanges with US 127 are currently unsignalized. This allows the high traffic volumes on US 127 to flow freely through the interchange. However, vehicles on the off ramps have difficulty turning onto US 127, especially left turns, during peak traffic periods due to the constant stream of vehicles on US 127. With little opportunity to turn, drivers accept smaller gaps when turning onto US 127, resulting in an EEC of 2.9 crashes per year on this portion of US 127. An improvement option includes installing traffic signals at both ramp terminal intersections. This would reduce queues on the ramps and allow traffic to safely turn onto US 127. Based on an analysis of 2017 12-hour turning movement counts, both ramp terminal intersections satisfy signal warrants. Another potential improvement option is to install an auxiliary lane between the westbound off ramp and the KY 619 intersection. This would provide more storage for through traffic at the KY 619 intersection, reducing queues and providing more opportunities for vehicles to turn onto US 127 from the ramps during peak periods. Results from the simulation model showed that adding traffic signals and an auxiliary lane would improve the existing PM peak hour average delay of the eastbound ramp from 65 seconds to 31 seconds and the westbound ramp from 49 seconds to 22 seconds.

**US 127 at Voils Road/Crossroads Development**

South of the Cumberland Expressway interchange, the western side of US 127 has a new FiveStar gas station and is expected to see additional developments. The current FiveStar entrance is located north of the Voils Road intersection with US 127, both of which are unsignalized. Over the past five years, there were 12 reported crashes in this area, six of which were rear end collisions. With this area likely to be developed further, more vehicles will be turning off of US 127. One possible improvement option is to construct a frontage road connecting the gas station entrance with Voils Road, as shown in **Figure 25**. This new intersection could be signalized if warranted, or left unsignalized with the addition of turn lanes. The existing FiveStar entrance could be converted to a right-in/right-out. These improvement concepts would consolidate access and provide safer turning opportunities.



**Figure 25: Proposed improvements for the Crossroads development**

**New road between US 127 and KY 619**

Voils Road is currently the only east-west connection between US 127 and KY 619 in the area. However, Voils Road is a narrow, two-lane road not suitable for high traffic volumes. An option to improve connectivity and potentially alleviate traffic on US 127 is to realign Erik Lane to the KY 430 intersection and construct a connection to KY 619 including a connection to Russell County High School. This would provide better east-west access and reduce the number of vehicles traveling on US 127 through the Cumberland Expressway interchange. Based on a KYSTM analysis, this new route can expect daily traffic of less than 1,000 VPD.

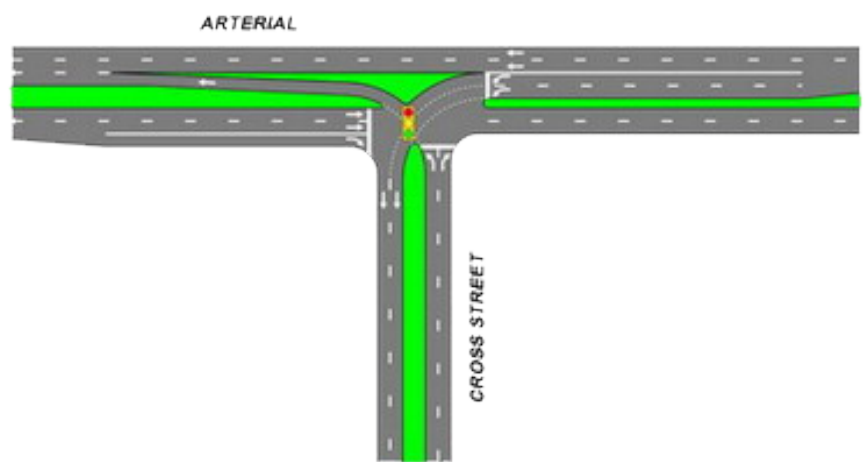
**US 127 at Cade Avenue**

To avoid the KY 430 intersection, some local drivers use Cade Avenue as a cut through street. It is a narrow, unstriped city street not meant for through traffic. There are also no turn lanes for Cade Avenue on US 127. Over the past five years, there have been 16 reported crashes near this intersection, 11 being rear end collisions. An improvement option is to remove access on Cade Avenue between Larry Drive and Caden Way, allowing only the commercial center direct access to US 127.



## US 127 at KY 430

The US 127 intersection with KY 430 is unsignalized and currently has a channelized right-turn to southbound US 127. This turn lane is intended to allow drivers the chance to speed up before entering the US 127 traffic stream. However, there is no receiving lane on US 127, so drivers must merge into traffic, resulting in an increased number of crashes. Over the past five years, there have been 30 rear end collisions at this channelized right-turn lane. A short-term improvement option is to remove the channelization and realign the KY 430 intersection so that all vehicles come to a complete stop. The intersection currently does not satisfy signal warrants but may be re-evaluated as traffic patterns change. A long-term improvement option is to construct a Green-T intersection at KY 430. This type of innovative intersection would provide continuous flow on northbound US 127 while providing either stop-controlled left-turns or a traffic signal for the other two approaches. With a traffic signal, as shown in **Figure 26**, this option would require southbound US 127 traffic to stop when the light is red. However, the signal would only have two phases and would be an efficient way to allow KY 430 traffic to turn safely onto US 127. Rock Quarry Road would be converted to a right-in right-out.



**Figure 26: Example Green-T intersection**

## US 127 at French Valley Road

The US 127 intersection with French Valley Road is the main access point for Russell County Middle School and High School. It is also the most congested area in Russell County during the morning and afternoon peak periods. Not only does bus and vehicular traffic from the schools overwhelm US 127, but workers from nearby factories are also using the route at the same time due to shift changes coinciding with student arrival and dismissal. This intersection currently operates at LOS E during the p.m. peak hour. The congestion also leads to an increased number of crashes, with 67 crashes reported in this area over the past five years, 40 of which were rear end collisions. This location is the highest concern for people who live and work in the area based on results from the public survey. One improvement option is to stagger the school dismissal times and the shift changes of nearby factories, which would disperse traffic and improve conditions to an acceptable LOS D at the French Valley Road intersection. **Table 6** shows the tremendous effect one scenario described below would have:

- Russell County High School and Middle School Dismissal: move 2:30 p.m. dismissal to 2:45 p.m. (approximately 300 vehicles)

**Table 6: French Valley Road at US 127 PM Peak Hour LOS**

US 127 at French Valley Rd	Approach	Approach LOS	Approach Delay (SEC)
2021 No-Build	NB US 127	F	100
2021 Shift/Dismissal Changes	NB US 127	D	44

- Dr. Schneider Automotive Systems: move 2:30 p.m. shift change to 2:15 p.m. (approximately 130 vehicles)
- Bruss North America: move 2:45 p.m. and 3:05 p.m. shift changes to 3:15 p.m. (approximately 170 vehicles)

Another improvement concept is to reconstruct the French Valley Road intersection. One option for reconstruction is a dual-lane roundabout, which would improve the efficiency of the intersection and relieve congestion. This option would improve the 2045 PM LOS from F to C. A second option is to construct a five-lane section on US 127 between Progress Drive and KY 430 to provide more capacity through the signalized intersection, which would improve the 2045 PM LOS from F to E.

### **US 127 at Progress Drive**

Progress Drive is the main access point to US 127 for several factories and hundreds of employees. It was identified in the public mapping exercise as a location of concern for many people who live and work in the area. The intersection is currently unsignalized and had 22 reported crashes over the past five years, nine of which were rear end and seven of which were angle collisions. Since the Progress Drive intersection is currently the only access point for many of the businesses, an improvement option is to extend Brian Walters Drive to connect to Progress Drive near Bruss North America Inc. This would create a full loop and provide a second entrance on US 127, relieving congestion at the current Progress Drive intersection. Based on available turning movement counts, the Progress Drive intersection does not satisfy signal warrants. However, if traffic patterns change, an improvement option is to install a traffic signal.

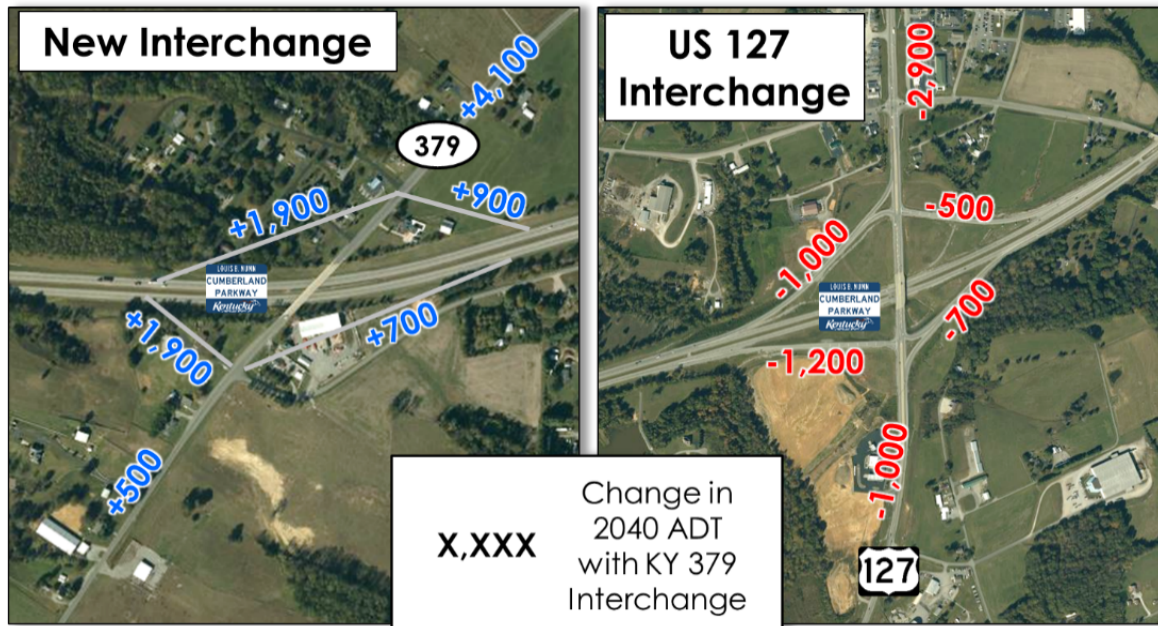
### **US 127 at Fruit of the Loom Drive**

The Fruit of the Loom Drive intersection is currently not the main intersection used by Stephens Pipe and Steel. The unsignalized intersection to the north is more heavily used by employee and truck traffic. An option to improve the flow of traffic on US 127 is to remove the traffic signal at Fruit of the Loom Drive.



## Cumberland Expressway

West of US 127, the Cumberland Expressway's nearest interchange is 14 miles away at KY 55 in Columbia. Several respondents to the online mapping exercise were in support of constructing a new interchange west of Russell Springs at KY 379. Based on results from a KYSTM analysis, new ramps at a KY 379 interchange are expected to have 700 – 1,900 VPD. This interchange would also reduce traffic on the US 127 ramps, up to 1,200 VPD, as shown in **Figure 27**.



**Figure 27: Cumberland Expressway Interchange with KY 379 Expected Daily Traffic (KYSTM)**

## KY 80 at Lakeway Drive (KY 379)

The skewed KY 80 intersection with KY 379 presents multiple opportunities to improve safety and was identified in the online public survey as a location of concern. An improvement option would be to realign the intersections.

## KY 80/KY 430/High Street intersections

In the western portion of the study area, KY 80 has a horizontal curve with skewed intersections at Jamestown Street and High Street. It was noted through the public survey that drivers commonly travel the curve with excessive speeds. Over the past five years, there were 16 reported crashes at the two intersections, four of which were angle and four were single vehicle collisions. Improvement concepts include realigning the skewed intersections and installing reduced speed warning signs.

## 9.0 SECOND PROJECT TEAM AND STAKEHOLDER MEETINGS

Following the development of the initial improvement concepts, the project team met for a second time. During the meeting, improvement concepts were presented, and attendees were asked to provide feedback regarding their concerns and priorities. Summaries for all meetings are found in **Appendix G**.

### 9.1 PROJECT TEAM MEETING NO. 2

The second project team meeting was held via Zoom on April 20, 2021. The purpose of the meeting was present the results from the first round of public involvement and to get feedback on preliminary improvement concepts. Key discussion items included the following:

- On February 4<sup>th</sup>, 2021, members of the Project Team met virtually with the Russell County Industrial Development Authority. The following summarizes the meeting:
  - The Lake Cumberland Regional Complex is expected to develop on French Valley Road. Since this new development will add truck traffic onto US 127, it was requested that this study consider a new Cumberland Expressway interchange at KY 379 as an alternate route for trucks. Additionally, the Industrial Development Authority requested that signs for the complex be installed on the Expressway.
  - Consider a new connection between Progress Drive and Brian Walters Drive.
  - The existing signal at Fruit of the Loom Drive is probably not needed.
    - It may be beneficial to move this signal to Progress Drive or Brian Walters Drive once the new connection is made.
  - When asked, they said the local businesses might be willing to stagger shift changes away from the Russel County School dismissal if that would help.
- After discussion, the project team decided to remove one of the preliminary improvement concepts from further discussion:
  - KY 80 and KY 379 Intersection Realignment: This project is already under design through the HSIP contract (KYTC Item No. 8-9012).
- At the end of the meeting, District 8 requested that several additional improvements be analyzed:
  - Single-lane and dual-lane roundabout options were analyzed for the KY 619 intersection. A single-lane roundabout did not improve traffic operations and was removed from consideration. Based on results from the 2045 simulation model, a dual-lane roundabout is expected to improve the intersection LOS from E to D. Due to cost and right-of-way impacts, this concept was not carried forward.
  - Roundabouts at the Cumberland Expressway ramp terminal intersections. Based on results from the 2045 simulation model, constructing roundabouts at these intersections would not improve traffic operations. This concept was not carried





forward.

- A reconfiguration of the Cumberland Expressway interchange to include loop ramps within the existing right-of-way. Due to the steep grades and sharp horizontal curves that would be required on the loop ramps, this concept was not carried forward.

## **9.2 LOCAL OFFICIALS/STAKEHOLDERS MEETING NO. 2**

The project team met with key stakeholders and local officials for a second time virtually using Zoom on June 16, 2021. The purpose of the meeting was to present the conceptual improvement strategies and solicit feedback from local officials and stakeholders. Improvement concepts were presented to the local officials and stakeholders in three geographical areas: US 127 improvements from the Cumberland Expressway interchange to KY 379, US 127 improvements south of the Cumberland Expressway interchange, and non-US 127 improvements. Stakeholders were also asked to answer survey questions to help the project team prioritize improvement concepts, and the results are summarized below.

- When asked to pick their top priority of US 127 improvement concepts at the northern end of the study corridor, five of the six respondents (83 percent) indicated that installing traffic signals at the Cumberland Expressway Interchange ramp terminals was the top priority while one respondent indicated that having dedicated left-turn lanes at the KY 619 intersection was the top priority.
- When asked to pick their top priority of US 127 improvement concepts south of the Cumberland Expressway, two of the five respondents (40 percent) indicated that realigning the right-turn lane at the KY 430 intersection was the highest priority, one voted for left-turn lanes at the Voils Road intersection, one voted for an additional northbound US 127 through lane, and one voted for a roundabout at French Valley Road.
- When asked to pick their top priority of non-US 127 projects, two of the five respondents (40 percent) indicated that staggering shift changes was the highest priority, one voted for the new connector to KY 619, one voted for the new connector on Progress Drive, and one voted for improving the KY 80 intersection with KY 430 and High Streets.

## **10.0 SECOND ROUND OF PUBLIC INVOLVMENT**

A second round of public outreach was held to solicit feedback on the initial improvement concepts. An online StoryMap and survey were made available between August 23, 2021 and October 4, 2021. The following is a summary of the results from the survey.

Of the 184 people who answered question one in the survey, 90 (48 percent) indicated that they heard about the study from social media, 36 (19.4 percent) from the radio or local newspaper, and 35 (18.8 percent) from a Russell County School email. Additionally, 128 (69 percent)

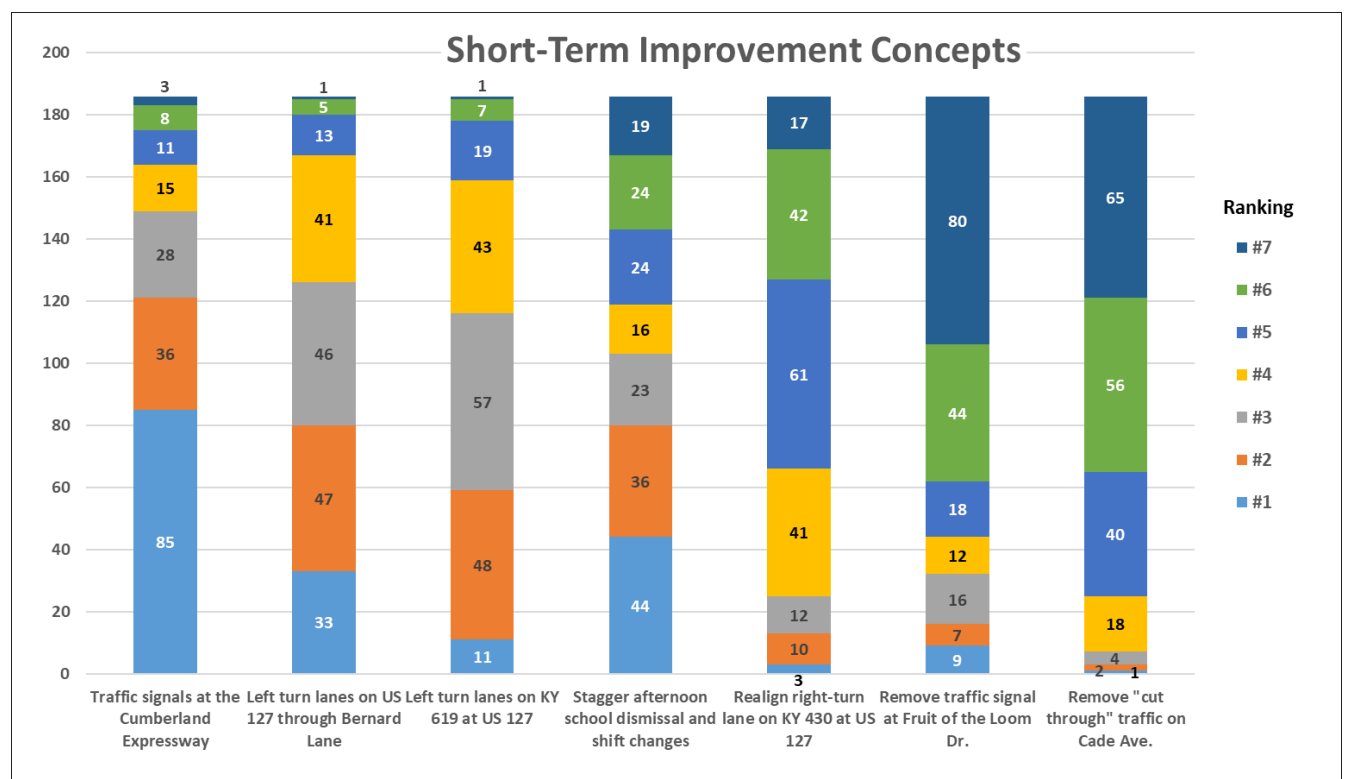


indicated that they drive the study portion of US 127 daily, 48 (26 percent) drive it weekly, and 10 (5 percent) drive it monthly.

The next question asked if participants live or work within the study area. 152 (82 percent) responded that they live and/or work within the study area. The highest reported zip codes were 42642 (Russell Springs) and 42629 (Jamestown), accounting for nearly 90 percent of the responses.

Respondents were then asked to rank the short-term improvement concepts No.1 (most preferred) through No. 7 (least preferred). The concepts received seven points for a first-place vote, six points for a second-place vote, and so on. Installing traffic signals at the Cumberland Expressway Interchange received the most points, followed by left turn lanes on US 127 through Bernard Lane and dedicated left turn lanes on KY 619. Staggering the afternoon school dismissal and shift changes received the second most first place votes but was ranked fourth overall.

**Figure 28** presents the improvement concept rankings from left to right with the higher ranked concepts on the left and **Table 7** summarizes the total points received by each concept.



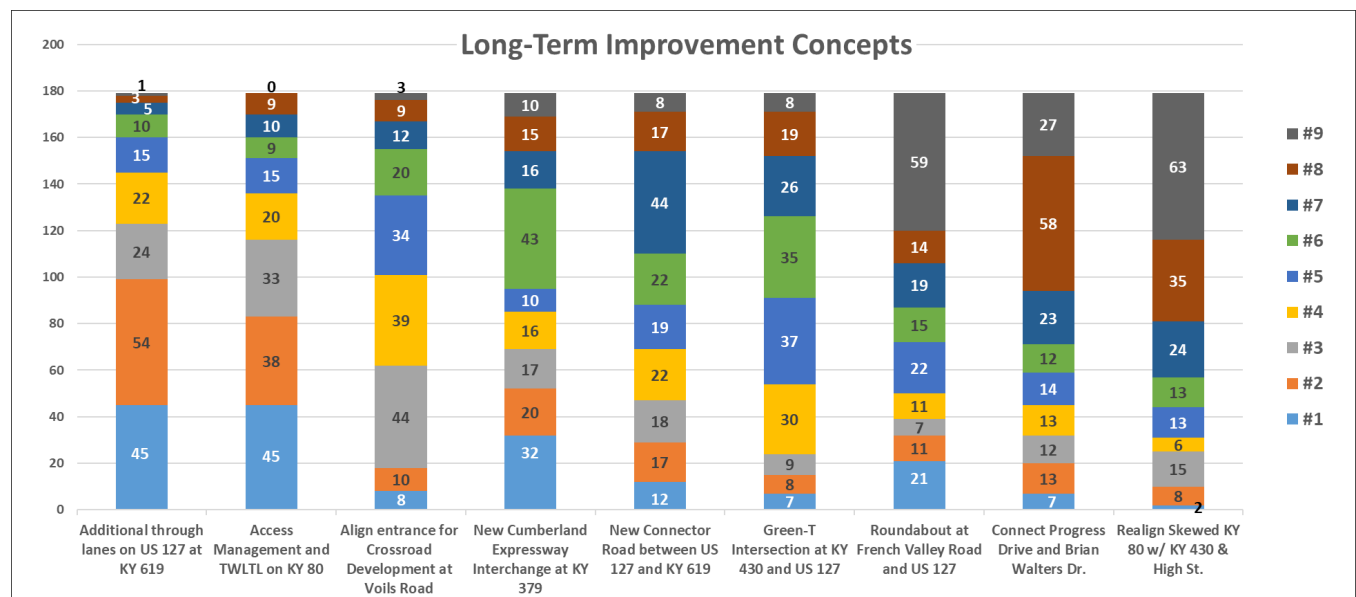
**Figure 28: Short-Term Improvement Concept Public Ranking**



**Table 7: Short-Term Improvement Concept Public Ranking**

Short-Term Concept	Points
Traffic signals at the Cumberland Expressway	1063
Left turn lanes on US 127 through Bernard Lane	957
Left turn lanes on KY 619 at US 127	894
Stagger afternoon school dismissal and shift changes	842
Realign right-turn lane on KY 430 at US 127	589
Remove traffic signal at Fruit of the Loom Dr.	455
Remove "cut through" traffic on Cade Ave.	408

Respondents were then asked to rank the long-term improvement concepts No. 1 (most preferred) through No. 9 (least preferred). The improvement concepts received nine points for a first-place vote, eight points for a second-place vote, and so on. Constructing additional through lanes on US 127 at KY 619 received the most points followed by access management and constructing a two-way left-turn lane (TWLTL) on KY 80. **Figure 29** presents the improvement concept rankings from left to right with the higher ranked concepts on the left and **Table 8** summarizes the total points received by each concept.



**Figure 29: Long-Term Improvement Concept Public Ranking**



**Table 8: Long-Term Improvement Concept Public Ranking**

Improvements	Points
Additional through lanes on US 127 at KY 619	1274
Access Management and TWLTL on KY 80	1219
Align entrance for Crossroad Development at Voils Road	1001
New Cumberland Expressway Interchange at KY 379	973
New Connector Road between US 127 and KY 619	859
Green-T Intersection at KY 430 and US 127	819
Roundabout at French Valley Road and US 127	706
Connect Progress Drive and Brian Walters Dr.	659
Realign Skewed Intersections on KY 80	545

When asked if any of the improvement concepts should be removed from consideration, the roundabout at French Valley Road received the most votes with 39, as shown in **Table 9**.

Removing the traffic signal at Fruit of the Loom Drive, removing cut through traffic on Cade Avenue and constructing a new Cumberland Expressway interchange at KY 379 received the next most with seven votes each.

- Concerns with the roundabout included: it would make traffic worse; the high speeds on US 127 would make it dangerous; trucks would have trouble navigating it, and it would cause pedestrian safety concerns near the schools.

**Table 9: Public Survey – Which Concepts Should be Removed?**

Which concepts should be removed?	Votes
Roundabout at French Valley Road and US 127	39
Remove traffic signal at Fruit of the Loom Dr.	7
Remove "cut through" traffic on Cade Ave.	7
New Cumberland Expressway Interchange at KY 379	7
Connect Progress Drive and Brian Walters Dr.	5
New Connector Road between US 127 and KY 619	4
Green-T Intersection at KY 430 and US 127	3
Realign Skewed Intersections on KY 80	3
Traffic signals at the Cumberland Expressway	1
Realign right-turn lane on KY 430 at US 127	1
Additional through lanes on US 127 at KY 619	1
Access Management and TWLTL on KY 80	1
Align entrance for Crossroad Development at Voils Road	1
Left turn lanes on US 127 through Bernard Lane	0
Left turn lanes on KY 619 at US 127	0
Stagger afternoon school dismissal and shift changes	0





- Several respondents indicated that the gas station at the Fruit of the Loom intersection generated significant traffic and that the signal is still needed. This concern was also mentioned at the second Local Officials/Stakeholders meeting.
- Rather than removing cut through traffic on Cade Avenue, several respondents suggested that Cade Avenue be widened to accommodate the traffic.
- Concerns with a possible new Cumberland Expressway interchange included concerns over right-of-way impacts and that an additional interchange is not needed.

When asked if there were any additional projects that should be considered, 18 respondents indicated that widening US 127 should be considered, as shown in **Table 10**. The concepts receiving the next most votes included installing new traffic signals (Voils Road, Progress Drive, Bernard Lane, and KY 430 were all mentioned as candidate locations) and installing turn lanes (US 127 at Dowell Road and a TWLTL on KY 80 were both specifically mentioned).

**Table 10: Public Survey - Concepts to be Considered**

Concepts to be Considered	Votes
Widen US 127	18
New signals	18
Turn lanes	7
Other	5
Speed enforcement/signage	3
French Valley intersection improvements	3
Restriping/repaving	2
Signal timing	2
Progress Dr. improvements	2
Bike lanes	1

Overall, the short-term improvement concepts were more popular than the long-term improvements. Although it wasn't presented as a concept, the most popular long-term option was major widening throughout the study area. While a major widening from three to five lanes would reduce p.m. peak hour congestion, it would also likely increase speeds and the severity of crashes. The project team determined that the high cost outweighs the congestion relief benefit, so a major widening was not carried forward after Project Team Meeting No. 1.

The roundabout concept was not popular with the public based on results from the survey. There are common misconceptions about the benefits of roundabouts in areas where none are in place and people have not experienced them. Russell County currently does not have an existing roundabout.



## 11.0 REVISED IMPROVEMENT CONCEPTS

After the second round of meetings, improvement concepts were revised based on feedback from the project team, local officials/stakeholders, and the public. The revised concepts fulfill the study goal by improving safety and mobility and reducing congestion on the US 127 corridor.

### 11.1 LONG-TERM IMPROVEMENT CONCEPTS

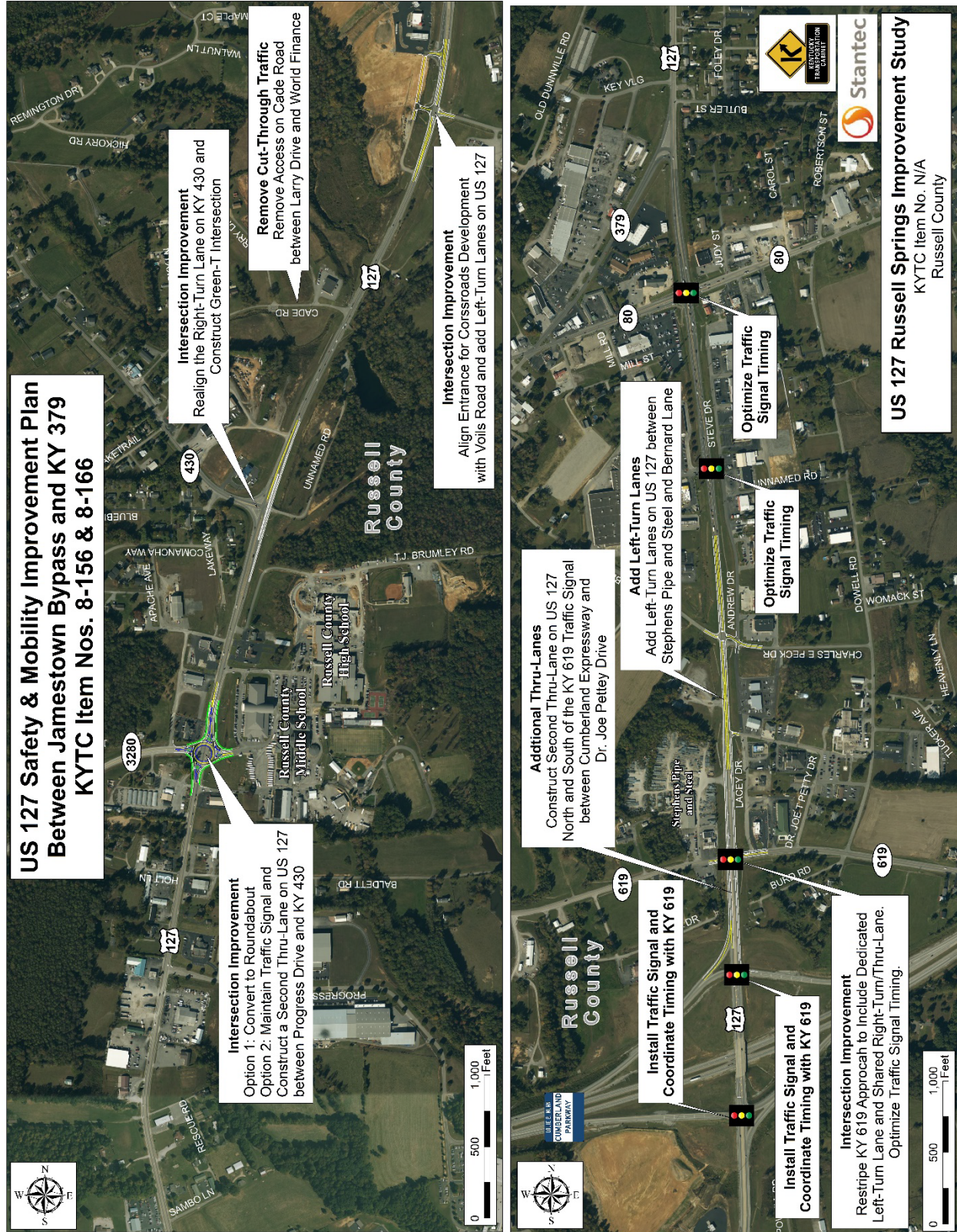
The long-term concepts are higher-cost improvements that will require more significant resources to implement. These types of improvements will generally require additional right-of-way and will need to be funded through Kentucky's Highway Plan.

#### 11.1.1 US 127 Safety and Mobility Improvement Plan (KYTC Item Nos. 8-156 and 8-166)

The US 127 Safety and Mobility Plan is intended to provide long-term safety and congestion relief along the entire study corridor and includes the following improvements (as shown in **Figure 30**):

- **US 127 between Stephens Pipe & Steel and Bernard Lane**
  - Construct left-turn lanes on US 127 at Bernard Lane/Charles Peck Drive and Joe Petty Drive.
- **US 127 at KY 619**
  - Minor widening and re-striping to provide dedicated left-turn lanes on both KY 619 approaches.
  - Construct additional through lanes in each direction on US 127 through the KY 619 intersection.
- **Cumberland Expressway Interchange**
  - Install traffic signals at the eastbound and westbound Cumberland Expressway ramp intersections with US 127.
- **US 127 at Voils Road**
  - Align the entrance for the Crossroads development with the existing US 127 intersection at Voils Road and provide turn lanes.
  - Convert the existing FiveStar entrance to a right-in/right-out.
- **Cade Avenue**
  - Remove access on Cade Avenue between Larry Drive and Caden Way.
- **US 127 at KY 430**
  - Realign the channelized right-turn lane on KY 430
  - Construct a Green-T intersection at the US 127 intersection with KY 430.
- **US 127 at French Valley Road**
  - Improve the US 127 intersection with French Valley Road.
    - Option 1 – convert to roundabout
    - Option 2 – construct additional northbound and southbound through lanes on US 127 between Progress Drive and KY 430.





**Figure 30: US 127 Safety and Mobility Improvement Plan**

If no improvements are made to the study portion of US 127, the French Valley Road and KY 619 intersections will operate at undesirable LOS F and E, respectively, during the 2045 PM peak. However, if the US 127 Safety and Mobility Plan is implemented, all study area intersections will operate at LOS D or better in the future, as shown in **Figure 31**.

In addition to the US 127 Safety and Mobility Plan, several other long-term improvement concepts were considered for advancement/further study, including:

- **KY 80 east of the US 127 intersection**
  - Conduct access management on KY 80 by consolidating access points and installing a TWLTL from US 127 to Owenstown Road.
- **KY 379 at the Cumberland Expressway**
  - Construct a new Interchange at KY 379.
- **New connector road between US 127 and KY 619**
  - Provide a new connection between the existing US 127 intersection with KY 430 to KY 619 south of Stephens Pipe and Steel.
- **New connection between Progress Drive and Brian Walters Drive**

### 11.1.2 Short-Term Improvement Concepts

The short-term improvement concepts address existing concerns on US 127 and are not anticipated to require right-of-way acquisition. Several of these concepts are listed as part of the US 127 Safety and Mobility Plan, however, they may be implemented as funding becomes available. Because the long-term plan builds on the short-term improvement concepts, resources would not be wasted if any or all of the spot improvement concepts were built first.

- **US 127 between Stephens Pipe & Steel and Bernard Lane**
  - Install a TWLTL or left-turn lanes on US 127 at Bernard Ln./Charles Peck Drive and Joe Petty Drive.
- **US 127 at KY 430**
  - Realign the channelized right-turn lane on KY 430
- **Stagger school dismissal**
  - Work with Russell County Schools and local businesses to stagger dismissal and shift changes prior to the 2022-2023 school year
- **US 127 at KY 619**
  - Minor widening and re-striping to provide dedicated left-turn lanes on both KY 619 approaches.
  - Construct an additional through lane in each direction on US 127 through the KY 619 intersection.



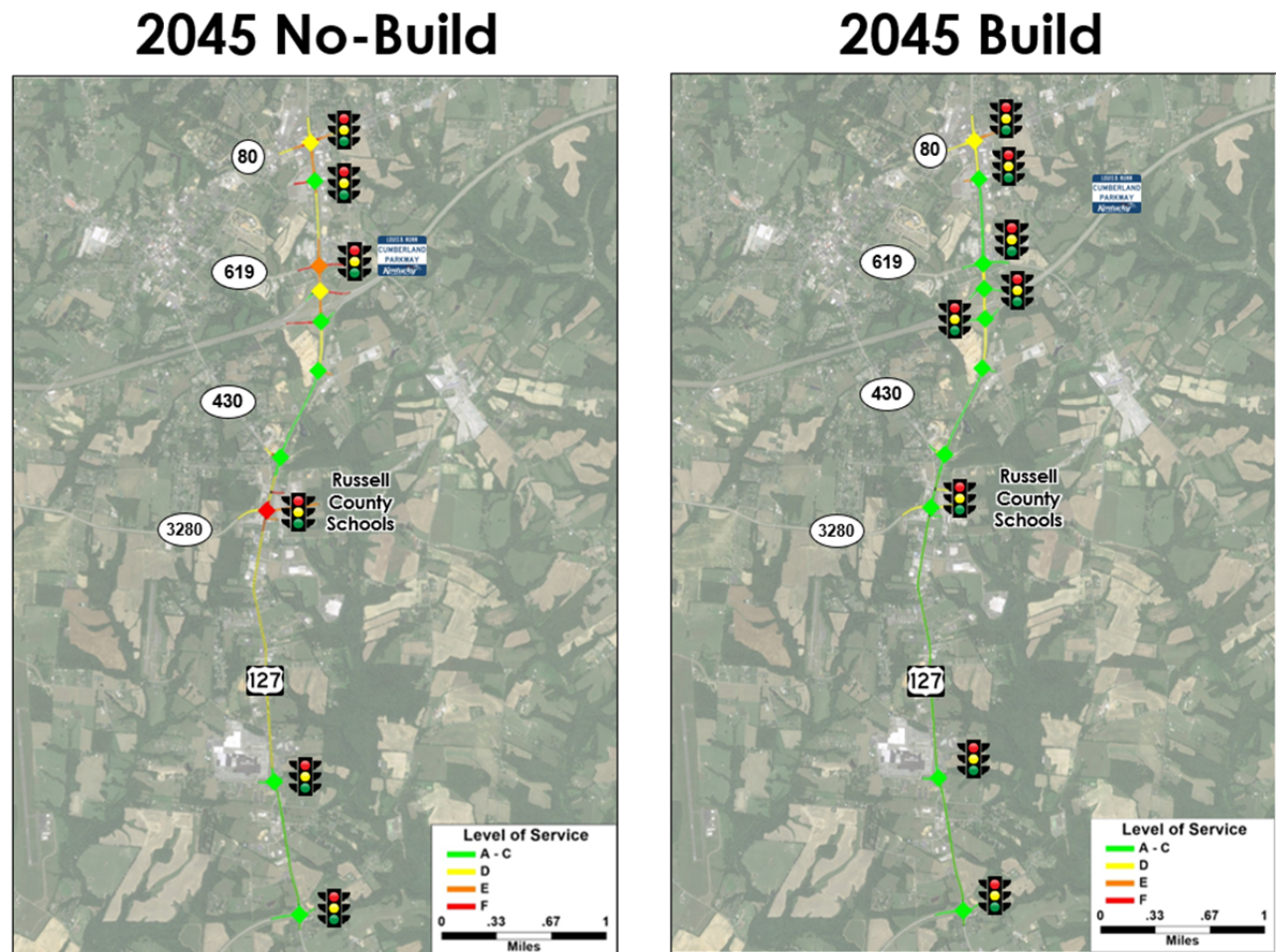


Figure 31: US 127 Safety and Mobility Plan Level of Service

- **Cumberland Expressway Interchange**
  - Install traffic signals at the eastbound and westbound Cumberland Expressway ramp intersections with US 127.
  - Provide a northbound US 127 auxiliary lane between the westbound off ramp and the KY 619 intersection.
- **Cade Avenue**
  - Remove access on Cade Avenue between Larry Drive and Caden Way.
- **US 127 at Fruit of the Loom Drive**
  - Remove the traffic Signal at the US 127 intersection with Fruit of the Loom Drive.

## 11.2 FINAL PROJECT TEAM MEETING

Following the development of the revised improvement concepts, the project team met for the final time via Microsoft Teams on October 14, 2021. The purpose of the meeting was to discuss results from the second round of public involvement and to get feedback from the project team

on the revised improvement concepts. A detailed summary of the final project team meeting is included in **Appendix G**. Key discussion items included the following:

- KYTC reached out to both the Russell County Schools and major employers on Progress Drive to inquire about staggering school dismissal and shift changes. While the factories were not interested in changing shift times at this time, the Russell County School Superintendent was open to shifting school dismissal 15 minutes. The change was tabled by the School Board for the 2021 – 2022 school year, but KYTC District 8 will work with the Russell County School Superintendent prior to the 2022 – 2023 school year.
- KYTC District 8 is pursuing Highway Safety Improvement Program (HSIP) funds for the left-turn lanes on US 127 between Stephens Pipe & Steel and Bernard Lane. Outside of HSIP funds, KYTC District 8 does not have the funding for the Short-Term Improvement Concepts. They will likely have to be developed and funded through Kentucky's Highway Plan under KYTC Item Nos. 8-156 and 8-166.
- Even though it wasn't shown as a concept to the public, the most popular long-term option seemed to be major widening throughout the study area. While a major widening from three to five lanes would reduce PM peak hour congestion, it would also likely increase speeds and the severity of crashes. The high cost far outweighs the congestion relief benefit, so a major widening was not carried forward after Project Team Meeting No. 1.
- There was a discussion about the Rock Quarry Road connection at KY 430. Currently it is a low volume road with no known future developments. As such, the Green-T improvement concept assumes Rock Quarry Road will become a right-in/right-out only. If conditions change, Rock Quarry Road could be connected to Erik Lane.

## 12.0 CONCLUSIONS

The goal of the *US 127 Russell Springs Improvement Study* is to improve safety, mobility, and congestion on US 127 in Russell Springs. US 127 is used for regional through trips and locally by the people who live and work along the corridor. There is significant congestion and notable safety concerns during the peak periods, especially during the afternoon dismissal of Russell County Middle School, Russell County High School, and business shift changes. Several improvement concepts were considered on US 127 as well as on surrounding roadways.

### 12.1 BENEFIT-TO-COST ANALYSIS

To assist in prioritizing improvement concepts, the project team conducted a benefit-to-cost analysis (BCA). This analysis provided a means for determining which improvements have the greatest benefit and are the most economical. The BCA was conducted based on crash savings and travel time savings where possible.





Improvement concepts that were able to be modeled with the peak hour simulation model were assigned a 10-year congestion relief savings based on the vehicle hours traveled (VHT) saved and the average hourly wage in Russell County. Crash modification factors (CMFs) were used to quantify crash reduction savings by estimating the number crashes that would be reduced by implementing the improvement concept. The total benefit was then divided by the total cost to produce a benefit-to-cost ratio (BCR).

An evaluation matrix was developed to compare improvement concepts, as shown in **Table 11**.

## 12.2 PRIORITIZATION

Concepts were categorized as short- or long-term then prioritized based on results from the traffic analysis, safety analysis, BCA, public outreach, stakeholder feedback, and project team feedback.

### 12.2.1 Long-Term Improvement Concepts

The long-term improvement concepts were categorized as high, medium, or low priority or “not recommended at this time”. In the event funding is not available for the short-term improvement concepts, those improvement concepts are included under the US 127 Safety and Mobility Plan (KYTC Item Nos. 8-156 and 8-166), as shown previously in **Figure 30**.

#### High Priority

- US 127 Safety and Mobility Plan (KYTC Item Nos. 8-156 and 8-166)
  - Construct left-turn lanes on US 127 at Bernard Ln./Charles Peck Drive and Joe Petty Drive. This is also a short-term improvement that may be constructed earlier if funding becomes available.
  - Minor widening and re-striping to provide dedicated left-turn lanes on both KY 619 approaches. This is also a short-term improvement that may be constructed earlier if funding becomes available.
  - Construct an additional through lane in each direction on US 127 through the KY 619 intersection.
  - Install traffic signals at the eastbound and westbound Cumberland Expressway intersections with US 127. This is also a short-term improvement that may be constructed earlier if funding becomes available.
  - Align the entrance for the Crossroads development with the existing US 127 intersection at Voils Road and provide turn lanes. Consider a traffic signal at this location.
  - Convert the existing FiveStar entrance to right-in/right-out.
  - Remove access on Cade Avenue between Larry Drive and Caden Way. This is also a short-term improvement that may be constructed earlier if funding becomes available.

Table 11: Evaluation Matrix

US 127 Russell Springs Improvement Study Evaluation Matrix												
Improvement Concepts	Traffic		Safety		Cost Estimates (Year 2021 Dollars)					Benefit-Cost Ratio	Public Ranking	
	Existing Build PM Level of Service	2045 Build PM Level of Service	10-Year Congestion Relief Savings	Crash Modification Factor	10-Year Crash Reduction Savings	Design	ROW	Utility	Construction	Total		
1. Left-Turn Lanes on US 127 between Stephens Pipe & Steel and Bernard Lane	Not Able to Model	Not Able to Model	Not Able to Model	0.73	\$ 600,000	\$ 50,000	\$ -	\$ -	\$ 300,000	\$ 350,000	1.71	2
2. Left-Turn Lanes on KY 619 at US 127 Intersection	C	D	\$ 1,500,000	No CMF	No CMF	\$ 10,000	\$ -	\$ -	\$ 50,000	\$ 60,000	25.00	3
3. Traffic Signals at the Cumberland Expressway Ramp Intersections & Extend Right-Turn Lane	B / C	C / D	\$ 2,100,000	0.95	\$ 600,000	\$ 100,000	\$ -	\$ -	\$ 400,000	\$ 500,000	5.40	1
4. Remove "Cut-Through" Traffic on Cade Avenue	Not Able to Model	Not Able to Model	Not Able to Model	0.93	\$ 400,000	\$ -	\$ -	\$ -	\$ 20,000	\$ 20,000	20.00	7
5. Realign Right-Turn Lane on KY 430 at US 127 Intersection	N/A	N/A	N/A	0.56	\$ 2,200,000	\$ -	\$ -	\$ -	\$ 60,000	\$ 60,000	36.67	5
6. Stagger Afternoon School Dismissal and Employee Shift Changes	D	E	\$ 3,800,000	No CMF	No CMF	\$ -	\$ -	\$ -	\$ -	\$ -	3800000.00	4
7. Remove Traffic Signal at Fruit of the Loom Drive	A	A	\$ 300,000	No CMF	No CMF	\$ -	\$ -	\$ -	\$ 50,000	\$ 50,000	6.00	6
1. US 127 Safety & Mobility Improvement Plan (KYTC Item Nos. 8-156 and 8-166)*	C	D	\$ 9,900,000	0.90 (Average)	\$ 3,800,000	\$ 600,000	\$ 900,000	\$ 1,900,000	\$ 3,800,000	\$ 7,200,000	1.90	1
2. KY 80 Access Management and TWTL from US 127 to Owenslown School Road	Not Able to Model	Not Able to Model	Not Able to Model	0.78	\$ 7,800,000	\$ 300,000	\$ 3,000,000	\$ 2,500,000	\$ 1,700,000	\$ 7,500,000	1.04	2
* Includes Short-Term Improvement Concepts 1-4; Additional Through-Lanes on US 127 North and South of KY 619; Align Entrance for Crossroads Development and Add Left-Turn Lanes on US 127; Green-T Intersection at KY 430; and Intersection Improvements at French Valley Road (assumes roundabout for estimating purposes).												

\* Includes Short-Term Improvement Concepts 1-4, Additional Through-Lanes on US 127 North and South of KY 619, Align Entrance for Crossroads Development and Add Left-Turn Lanes on US 127, Green-T Intersection at KY 430, and Intersection Improvements at French Valley Road (assumes roundabout for estimating purposes).



- Realign the channelized right-turn lane on KY 430 and construct a Green-T intersection at the US 127 intersection with KY 430.
- Improve the US 127 intersection with French Valley Road.
  - Option 1 – convert to roundabout
  - Option 2 – construct additional northbound and southbound through lanes on US 127 between Progress Drive and KY 430.

**Medium Priority**

- Conduct access management on KY 80 by consolidating access points and installing a TWLTL from US 127 to Owenstown Road.

**Low Priority**

- Realign the skewed intersections on KY 80 with Bottoms Road and Lakeway Drive.

**Not recommended at this time**

- Construct a new Cumberland Expressway interchange at KY 379
- Connect Progress Drive and Brian Walters Drive
- Construct a new connector road between US 127 and KY 619

**12.2.2 Short-Term Improvement Concepts**

The short-term improvement concepts address existing concerns on US 127 and are not anticipated to require right-of-way acquisition. They were prioritized into high, medium, and low priorities and can be implemented as funding becomes available prior to the implementation of the long-term US 127 Safety and Mobility Plan (KYTC Item Nos. 8-156 and 8-166). Because the long-term plan builds on the short-term improvement concepts, resources would not be wasted if any or all of the spot improvement concepts were built first.

**High Priority**

- Work with Russell County Schools and local businesses to stagger dismissal and shift changes prior to the 2022 – 2023 school year. This project had the highest BCR. Given the immediate congestion relief that this improvement provides at no cost, it is the top overall priority of the study.

**Medium Priority (in no particular order)**

- Construct left-turn lanes on US 127 between Stephens Pipe & Steel and Bernard Lane. This project was ranked as the second highest priority by the public.
- Construct left-turn lanes on KY 619 at the US 127 intersection. This project was ranked as the third highest priority by the public and had the third highest BCR.
- Install traffic signals at the Cumberland Expressway Interchange ramps & extension of the right turn lane at KY 619 to the westbound off-ramp of the Cumberland Expressway. This project was ranked as the highest priority by the public.



- Remove “cut-through” traffic on Cade Avenue. This project had the fourth highest BCR.
- Realign the right-turn lane on KY 430 at US 127. This project had the second highest BCR.

**Low Priority**

- Remove the traffic signal at Fruit of the Loom Drive. The intersection operates at a LOS A and has a negative excess expected crash rate, meaning there are less crashes than would be expected. The public and local officials noted the gas station at this intersection generates significant traffic and that the signal is still needed. Before moving forward with this concept, a signal warrant analysis will need to be completed with a new turning movement count.

## 12.3 NEXT STEPS

The next step following this study for any potential improvement concepts would be Phase 1 Design (Preliminary Engineering and Environmental Analysis). Because of the COVID-19 Pandemic and the resulting school closures, turning movement counts could not be collected as part of this study. As a result, additional traffic analysis should be included as part of future project development phases. Future phases will also need to update the milepoints shown in this report due to the on-going realignment of US 127 south the study area (KYTC Item Nos. 8-108 and 8-8601). Further funding will be necessary to advance an improvement concept to a future phase as additional phases of this project are not funded in *Kentucky's FY 2020 – FY 2026 Highway Plan*.

## CONTACTS/ADDITIONAL INFORMATION

Written requests for additional information should be sent to Mikael Pelfrey, Director, KYTC Division of Planning, 200 Mero Street, Frankfort, KY 40622. Additional information regarding this study can also be obtained from the KYTC District 8 Project Manager, Jeff Dick, at (502) 764-0331 (email at [JeffD.Dick@ky.gov](mailto:JeffD.Dick@ky.gov)).

