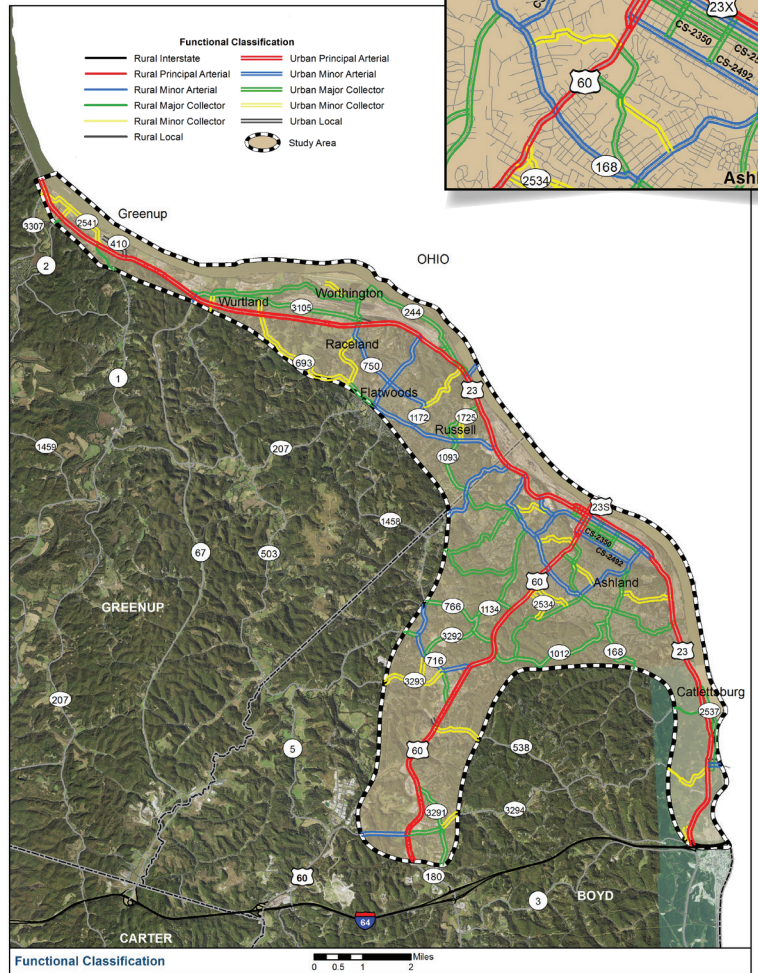
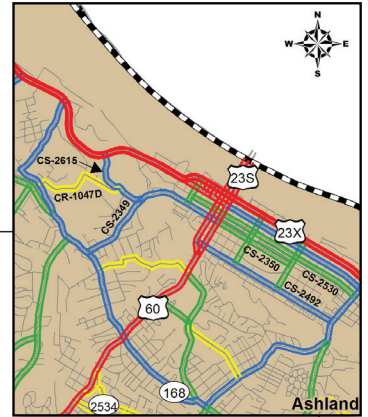


Boyd-Greenup Small Urban Area Study

BOYD AND GREENUP COUNTIES, KY

FINAL REPORT
AUGUST 2020



PREPARED FOR

IN PARTNERSHIP WITH



Executive Summary

The Kentucky Transportation Cabinet (KYTC) and the Kentucky-Ohio-West Virginia Interstate Planning Commission (KYOVA) initiated a Small Urban Area (SUA) study in Spring 2019 for urbanized areas of Boyd and Greenup counties, Kentucky. The SUA study identified and examined transportation issues related to safety and congestion in the corresponding cities and surrounding developed areas. The study boundary shown on **Figure ES- 1** begins at I-64 in Boyd County, passes through the city of Ashland including the US 60 corridor, and extends past the Industrial Parkway (KY 67) to the city of Greenup in Greenup County, covering roughly 50 square miles. SUA study efforts were focused on approximately 90 miles of state-maintained routes and nearly 11 miles of local routes integral to traffic operations within the boundary.

The study focused on both short- and long-term improvements. Specific project activities included completing an inventory of existing conditions, examining future conditions, proposing and analyzing practical solution improvement options, developing cost estimates, obtaining input from local officials and stakeholders, prioritizing improvements, and documenting the study.

In December 2019 and January 2020, local officials/stakeholders and the public identified numerous locations throughout the study area where transportation improvements could be considered. Suggestions ranged from improved signal timings and turn lane extensions to widening projects and intersection reconstructions. These suggestions were considered alongside a review of existing conditions, anticipated development trends, field reconnaissance, and input from the KYTC to develop a series of improvement concepts. These concepts focused primarily on areas with existing safety concerns identified by documented crash records and community input. Each concept can be categorized as one of three groups:

- **Long-term** projects are relatively high cost projects, often requiring additional right-of-way that will entail substantial investment to acquire. Most require additional project development activities and would need to be funded through traditional sources in the KYTC's biennial highway plan.
- **Short-term** projects are relatively lower cost projects that can be implemented in the near future. Many require little-to-no new right-of-way; some may be completed as maintenance actions.
- **Local** projects are improvements located beyond the state-maintained highway system. These would need to be funded by the City, the County, KYOVA, or a private developer.

Initial improvement concepts were developed and shared with the project team and local officials and stakeholders in March 2020, and then refined as needed based on their input. Cost estimates were developed based on planning-level pavement, earthwork, and traffic-related item quantities.

Each updated improvement concept was presented to local officials/stakeholders in May 2020 to gather their input on potential projects and prioritization. By nature, the short-term spot improvements represent low cost, quick implementation solutions that can be addressed as soon as funding becomes available. Rather than prioritize these, the project team agreed that all 11 short-term spots represent priorities for implementation as soon as funding becomes available. Many represent maintenance actions independent of more competitive funding streams. Short-term spot improvement locations are presented in **Figure ES-2** and summarized in **Table ES-1**.

Final recommendations for long-term and local projects are categorized as high, medium, or low priorities, as shown in **Figures ES-3 through ES-5** and **Tables ES-2 through ES-4**.

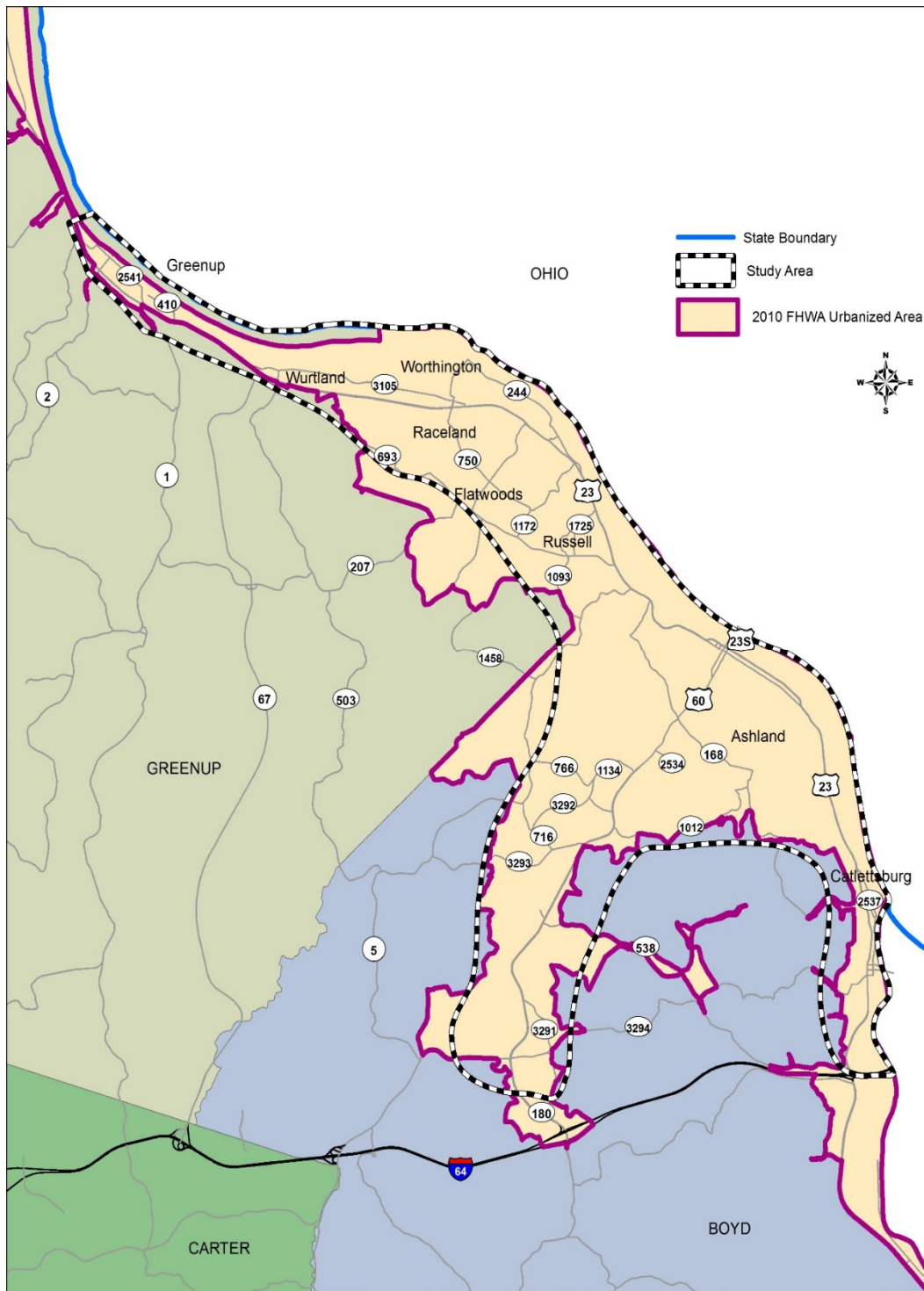


Figure ES- 1: Study Area

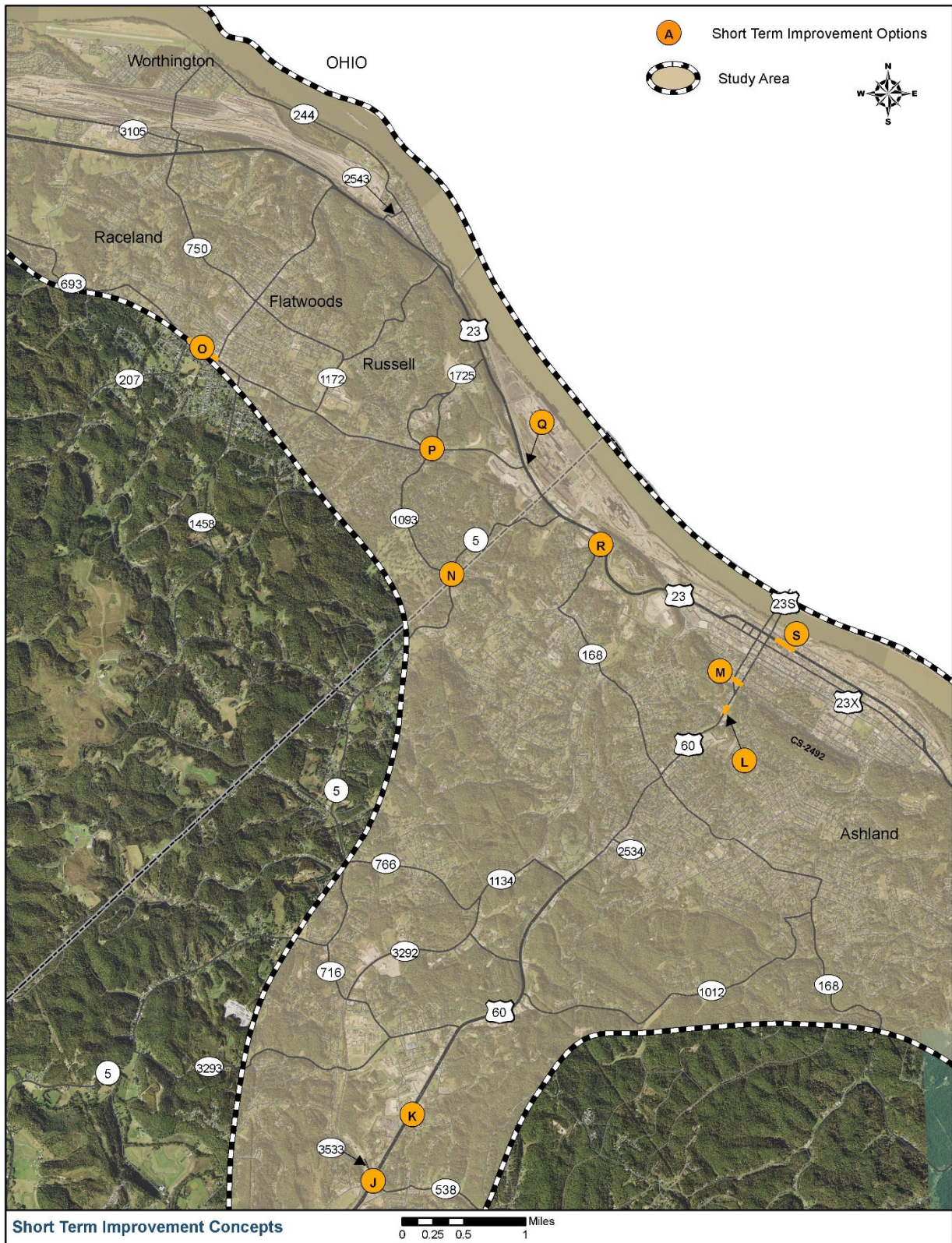


Figure ES-2: Short-Term Priority Improvement Locations

Table ES-1: Short-Term Priority Improvement Descriptions

ID	Route 1	Route 2	Description	Total Cost
J	US 60 (MP 6.5-6.6)	KY 538 Shopes Creek Rd.	Install solar LED "signal ahead" signs on US 60, replace signals with double reds, add reflective backplates, close Marathon's entrance closest to intersection	\$50,000
K	US 60 (MP 7.1-7.2)	Summit Rd. (by BCMS)	Install solar LED "signal ahead" signs on US 60, install auxiliary signal on SE and NW quadrant poles, replace signals with double reds and reflective backplates	\$40,000
L	US 60 (MP 11.5-11.6)	Oakview Rd. (by Tennis Center)	Install solar LED "signal ahead" signs on US 60, install auxiliary signal on SE and NW quadrant poles, replace signals with double reds and reflective backplates	\$40,000
M	Lexington Ave. (MP 0.0-0.1)	US 60 12 th & 13 th Sts. (Approx. MP 11.8)	Install painted cat-tracks, ¹ check warrants for protected left turns at 12 th and 13 th streets, replace signals with double reds and reflective backplates, install Qwik Kurb for access control into businesses, remove shrubs to improve sight distance.	\$95,000
N	KY 5 Bellefonte Princess Rd. (MP 0.07-0.10)	KY 1093 Country Club Dr. (MP 0.0-0.1)	Check warrants to convert intersection to all-way stop, trim trees lining KY 5 above eye-level, coordinate with local government to add roadside lighting	\$20,000
O1	KY 693 Bellefonte Rd. (MP 3.0-3.1)	KY 207 Greenbo Blvd. (MP 15.55-15.65)	Check warrants to convert intersection to all-way stop	\$20,000
O2	KY 693 Bellefonte Rd. (MP 3.1-3.2)	KY 207 Argillite Rd. (MP 15.8-15.9)	Replace signals with double reds and reflective backplates, adjust signal timing	\$30,000
P	KY 693 Diederich Blvd. (MP 5.0-5.1)	KY 1725 St. Christopher Dr. (MP 0.0)	Install solar LED "signal ahead" signs on KY 693, replace signals with double reds and reflective backplates	\$40,000
Q	KY 693 Diederich Blvd. (MP 5.7-5.8)	US 23 (MP 0.3)	Install striping and reflector delineation on median for left turning traffic	\$35,000
R	KY 168 Hoods Creek Pk. (MP 8.1-8.18)	US 23 (MP 20.3)	Install solar LED "signal ahead" signs on US 23 and KY 168, replace signals with double reds and reflective backplates	\$60,000
S	US 23 Greenup Ave. (MP 18.35-18.45)	15 th - 16 th Sts.	Install bulb-outs and/or crosswalk to shorten distance and reduce pedestrian exposure to traffic	\$500,000

¹ "Cat-tracks" are dashed lines delineating turn lanes through an intersection

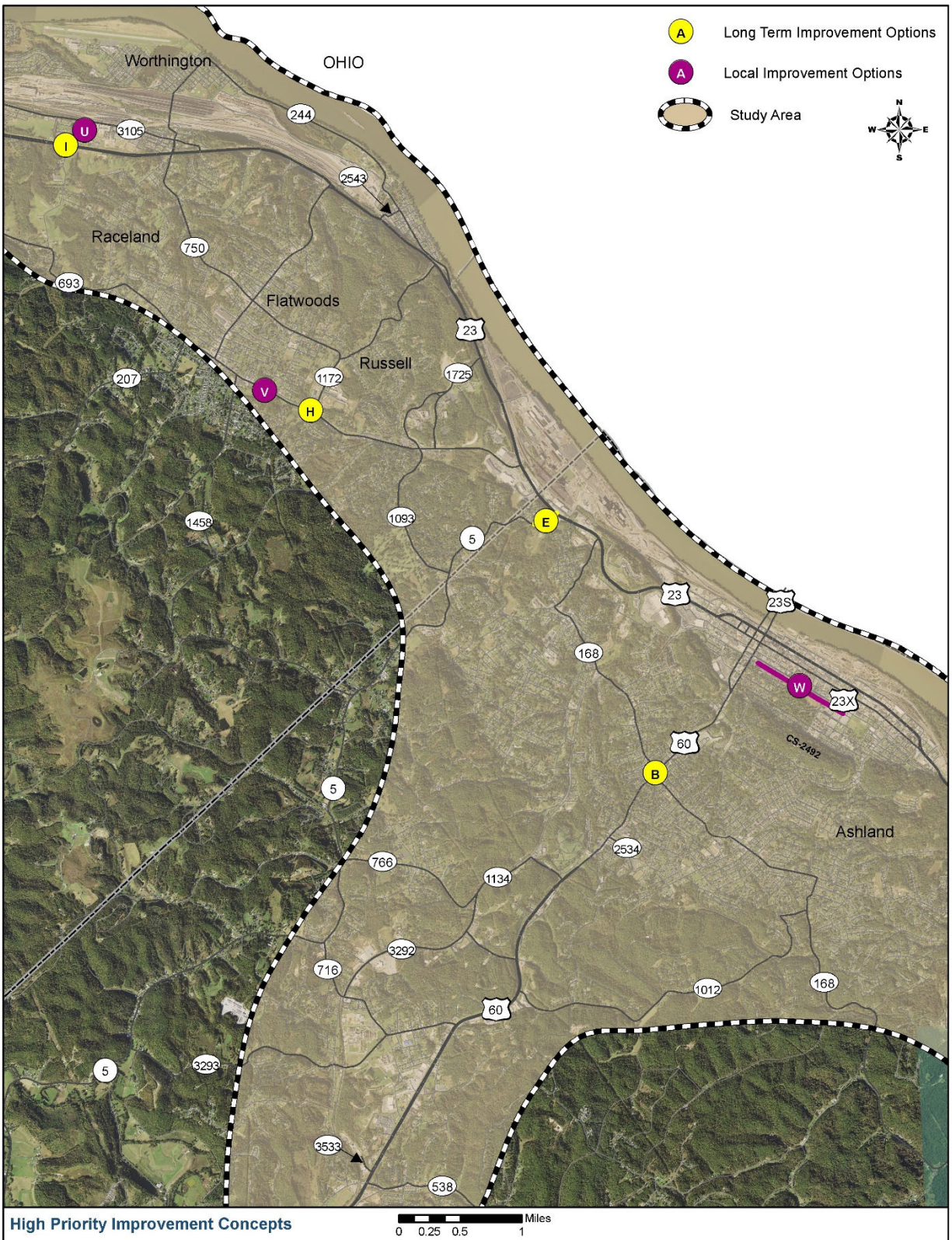


Figure ES-3: High Priority Improvement Locations

Table ES-2: High Priority Improvement Descriptions

ID	Route 1	Route 2	Description	Total Cost
B	US 60 (MP 10.750-10.850)	KY 168 Blackburn Ave. (MP 5.750-5.850)	Intersection improvements, ranging from closing Algonquin Ave. approach to a variety of reconstruction configurations	\$75,000 - \$4,150,000
E	KY 5 Bellefonte Princess Rd. (MP 10.531-10.781)	US 23 (MP 20.7-20.8)	Construct right-turn lane on KY 5 approaching US 23, add TWLTL, replace existing signal pole and controller box to improve sight distance	\$1,300,000
H	KY 693 Diederich Blvd. (MP 3.9-4.0)	KY 1172 Red Devil Ln./Thompson Rd.	Install double reds, reflective backplates and solar LED "signal ahead" signs on KY 693, construct NB right-turn lane on Thompson Road	\$650,000
I	US 23 (MP 5.3-5.4)	Caroline Rd.	Assess signal warrants, construct right-turn lanes on US 23 for Caroline Dr.; if unsignalized, construct acceleration lanes on US 23 for turning buses	\$75,000 - \$4,150,000
U	Caroline Rd.		Widen Caroline Rd. for bus traffic with left- and right-turn lanes	\$880,000
V	KY 693 Bellefonte Rd. (MP 3.6-3.7)	Espy Lane	Add striping to separate traffic into right/left turning lanes on Espy Ln.	\$12,000
W	Central Ave. Corridor	15th - 24th Sts.	Improve signage, striping, crosswalk, and intersection visibility	\$115,000
	Long-term projects			
	Local projects			

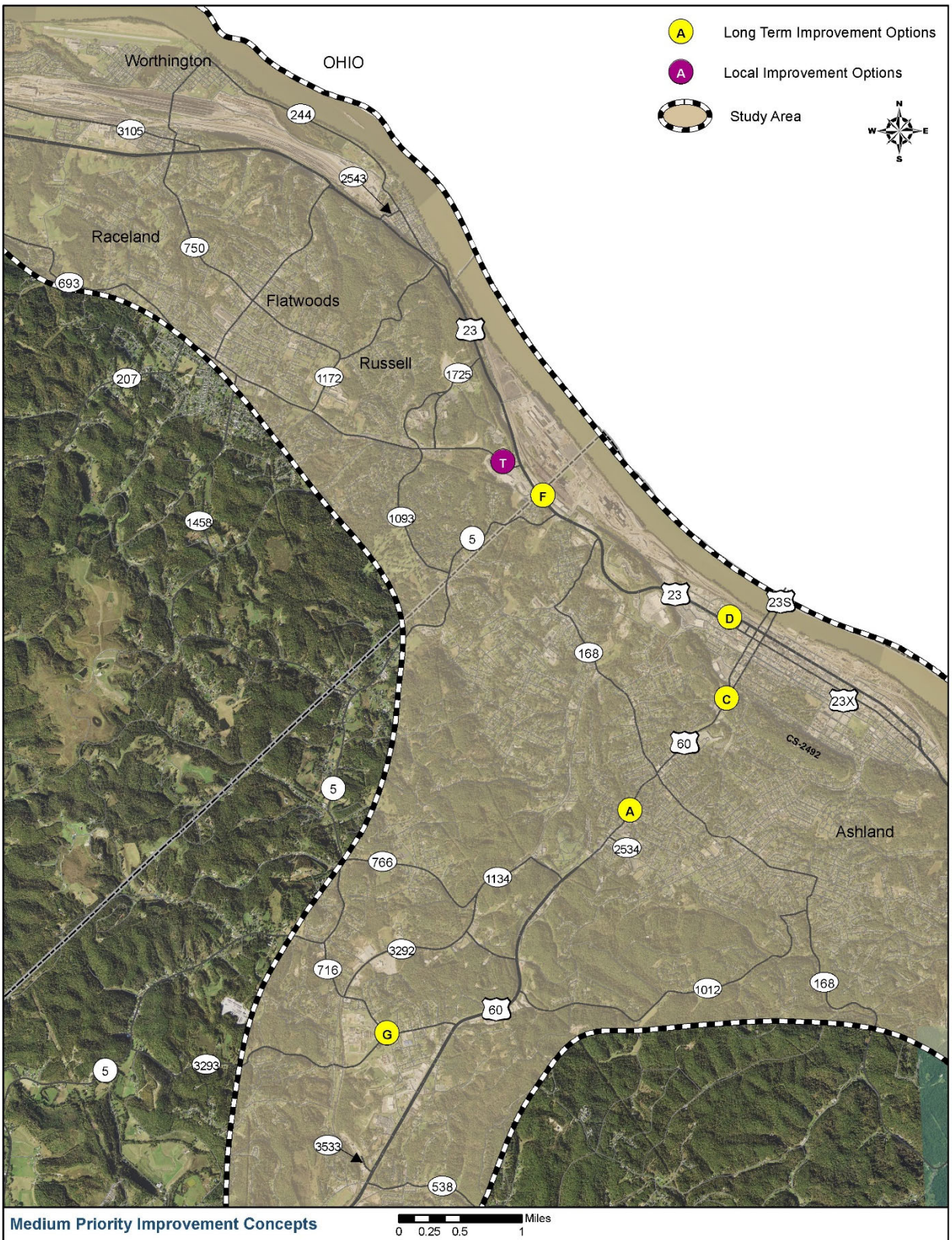
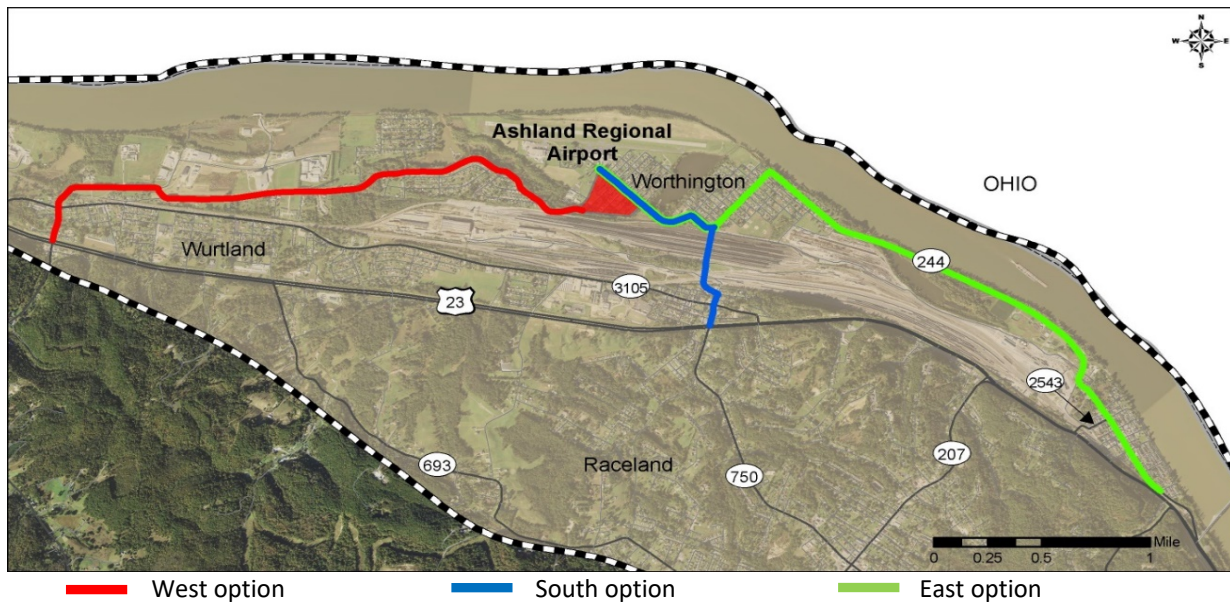


Figure ES-4: Medium Priority Improvement Locations

Table ES-3: Medium Priority Improvement Descriptions

ID	Route 1	Route 2	Description	Total Cost
A	US 60 (MP 10.4-10.5)	Old 13th Street	Construct TWLTL on US 60	\$2,850,000
C	US 60 (MP 11.6-11.7)	McKinley St. Bryan St. Palmer St.	Remove concrete median and construct TWLTL beginning at Palmer St. to McKinley St. at US 60 divergence point	\$1,950,000
D	US 23 Greenup Ave. (MP 18.9-19.0)	US 23X Winchester Ave. (MP 1.796)	Realign US 23/US 23X intersection for better sight distance, shifting 8 th St./Greenup Ave. as needed	\$3,850,000 - \$7,100,000
F	US 23 (MP 20.750- 20.940)	North from KY 5	Construct 5-foot-wide paved path with curb and gutter for improved pedestrian mobility and safety from KFC to Golden Corral	\$600,000
G	KY 716	KY 3293	Construct a mini roundabout at the intersection	\$1,550,000
T	KY 693 Diederich Blvd. (MP 5.6-5.7)	Near US 23 (by Hobby Lobby/Lowes)	Add traffic signal to Lowes/Hobby Lobby intersection, widen and align entrances at intersections of Lowe's/Hobby Lobby to accept higher traffic volumes	\$25,000
	Long-term projects			
	Local projects			

**Figure ES-5: Low Priority Improvement Location****Table ES-4: Low Priority Improvement Description**

ID	Route	Description	Total Cost
X	Unidentified	Conduct study to identify access improvements to the Ashland Regional Airport	\$300,000 (Planning)
	Local project		

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- B. Crash Records
- C. Section 6(f) List by County
- D. Meeting Summaries
- E. Socioeconomic Study

Acronym list

ABS	Ashland Bus System
ADT	Average Daily Traffic
CCRF	Critical Crash Rate Factor
CHAF	Continuous Highway Analysis Framework
DHV	Design Hourly Volume
FHWA	Federal Highway Administration
FIVCO	Five County Area Development District
HCM	Highway Capacity Manual
HDM	Highway Design Manual
HIS	Highway Information System
HSIP	Highway Safety Improvement Program
KYOVA	Kentucky-Ohio-West Virginia Interstate Planning Commission
KYTC	Kentucky Transportation Cabinet
LO/S	Local officials/stakeholders
LOS	Level of Service
LWCFA	Land and Water Conservation Fund Act
MAP-21	Moving Ahead for Progress in the 21 st Century
MP	Milepoint
mph	miles per hour
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan
NBIS	National Bridge Inventory System
NHS	National Highway System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
PDO	property damage only
STAA	Surface Transportation Assistance Act
STIP	Statewide Transportation Improvement Program
SUA	Small Urban Area
TED	Transportation Enterprise Database
TIP	Transportation Improvement Program
TWLTL	two-way left-turn lane
USEPA	US Environmental Protection Agency
v/c	volume-to-capacity ratio

1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) and the Kentucky-Ohio-West Virginia Interstate Planning Commission (KYOVA) initiated a Small Urban Area (SUA) study in Spring 2019 for urbanized areas of Boyd and Greenup counties, Kentucky. The SUA study identified and examined transportation issues related to safety and congestion in the corresponding cities and surrounding developed areas.

Small urban area studies provide thorough examinations of transportation networks, including analyses of existing and future traffic conditions, intended to identify transportation network needs and potential solutions to efficiently move goods and travelers. SUA study products include prioritized short-term projects able to be quickly and effectively implemented and long-term projects for future programming to address identified safety and capacity needs.

Boyd and Greenup counties are part of the Kentucky, Ohio, and West Virginia Interstate Planning Commission (KYOVA), the Metropolitan Planning Organization (MPO) for the West Virginia, Kentucky, and Ohio tri-state area. Both counties lie within the Five County Area Development District (FIVCO) boundary as well. This SUA was funded through KYOVA's Surface Transportation Block Grant Program.

1.1 Study Area

Illustrated in **Figure 1**, the study area encompasses urbanized areas in Boyd and Greenup counties. The study boundary begins at I-64 in Boyd County, passes through the city of Ashland including the US 60 corridor, and extends past the Industrial Parkway (KY 67) to the city of Greenup in Greenup County, covering roughly 50 square miles. SUA study efforts were focused on approximately 90 miles of state-maintained routes and nearly 11 miles of local routes integral to traffic operations within the boundary. Study area routes with milepoint (MP) limits and local streets names are listed in **Table 1** and **Table 2**.

1.2 Study Goals

The Boyd-Greenup SUA study documents existing and future transportation conditions within the study area. Current year (2020) and future year (2050) traffic operations, current safety conditions, and existing geometric characteristics were evaluated. Potential short- and long-term improvements to address safety and capacity needs were developed to examine priorities for further project development and implementation by the KYTC, local governments, KYOVA, or other entities. Study tasks completed for the SUA include the following:

- Prepared an inventory of existing conditions, geometric characteristics, and environmental overview.
- Evaluated existing transportation system and developed traffic forecasts.
- Developed improvement concepts and planning-level cost estimates.
- Conducted stakeholder and public involvement activities.
- Documented process with individual project sheets for easy reference.

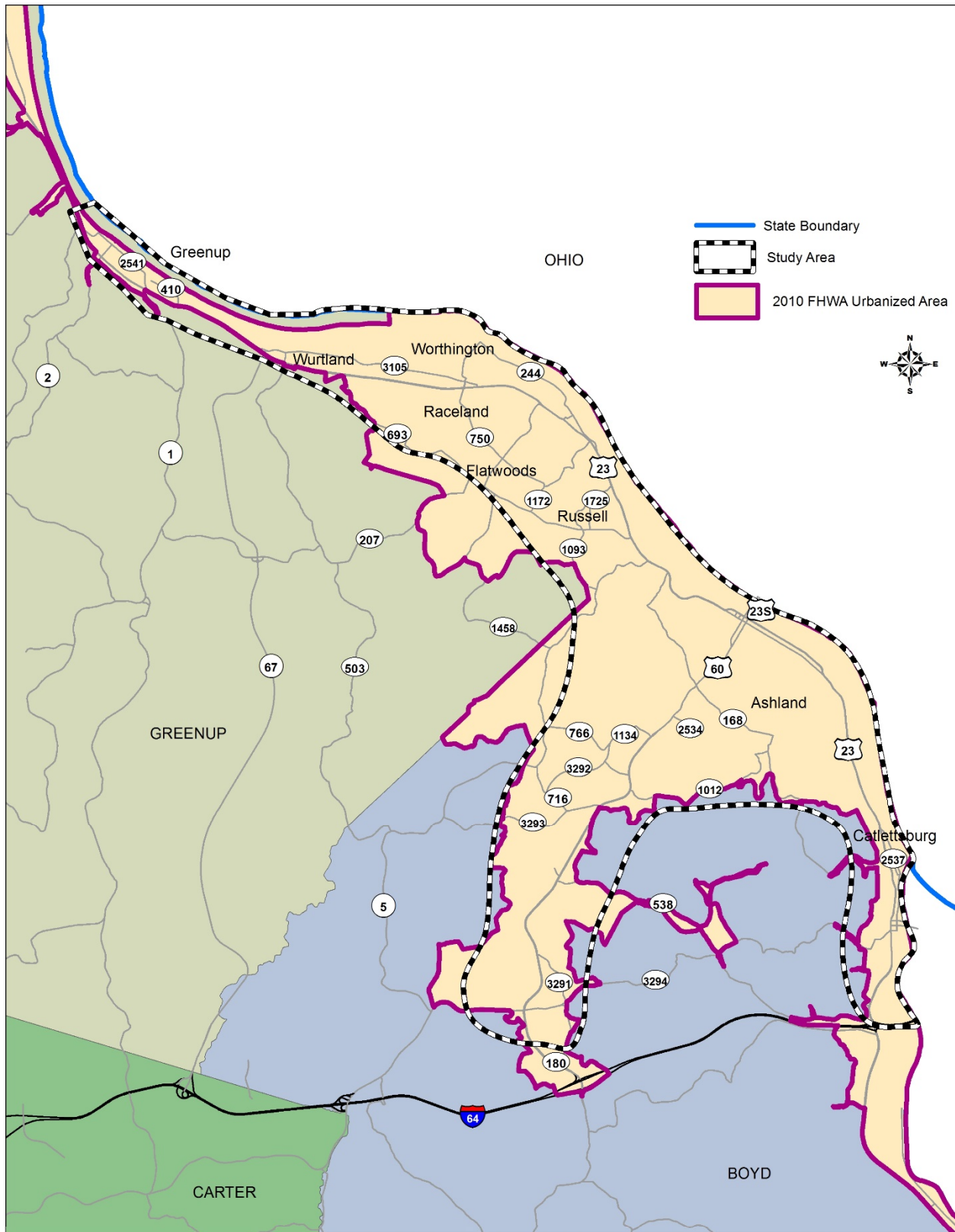


Figure 1: Study Area

Table 1: Boyd County Study Routes

Boyd	Road Name	BMP	EMP
US 23	WINCHESTER AVE	10.600	20.938
US 23S	13 TH ST.	0.000	0.483
US 23S-1	MARTIN LUTHER KING BLVD.	0.483	0.000
US 23X	WINCHESTER AVE.	0.000	1.796
US 60	US ROUTE 60	3.100	12.409
US 60	US ROUTE 60	12.409	12.880
US 60	MARTIN LUTHER KING BLVD.	11.752	12.128
US 60	10 TH ST.	12.329	12.409
KY 5	KY 5	6.647	7.578
KY 5	BELLEFONTE PRINCESS RD.	9.700	10.781
KY 168	KY 168	0.000	0.670
KY 168	KY 168	2.574	8.179
KY 180	KY 180	1.900	2.514
KY 538	SHOPES CREEK RD.	0.000	1.000
KY 538	LAKE BONITA RD.	6.200	6.617
KY 716	KY 716	0.000	1.565
KY 766	BOB MCCULLOUGH DR.	0.000	2.044
KY 1012	BOY SCOUT RD.	0.000	3.036
KY 1134	ROBERTS DR.	0.000	0.897
KY 2534	BERRY ST.	0.000	0.178
KY 2535	23 RD ST. UNDERPASS	0.000	0.065
KY 2536	23 RD ST.	0.000	0.043
KY 2537	BROADWAY ST.	0.000	0.404
KY 3291	MIDLAND TRL.	0.300	2.135
KY 3292	ROBERTS DR.	0.000	1.174
KY 3293	LITTLE GARNER RD.	1.000	2.407
KY 3294	CANNONSBURG RD.	0.000	1.200
KY 3295	KY 3294	6.500	9.445
KY 3533	HALEE LN.	0.000	0.166
CR-1047	W CENTRAL AVE.	0.000	0.797
CS-2349	6 TH ST.	0.000	0.752
CS-2350	CENTRAL AVE.	0.000	2.441
CS-2492	LEXINGTON AVE.	0.000	1.281
CS-2530	CARTER AVE.	0.000	2.282
CS-2615	RIVER HILL DR.	0.000	0.368

Table 2: Greenup County Study Routes

Greenup	Road Name	BMP	EMP
US 23	US 23	0.000	12.100
KY 1	E. KENTUCKY RD.	16.500	17.126
KY 2	KY HWY. 2	17.000	17.463
KY 5	BELLEFONTE PRINCESS RD.	0.000	0.792
KY 67	INDUSTRIAL PKWY.	12.900	13.039
KY 207	BELLEFONTE PRINCESS RD.	15.590	17.645
KY 244	STEWART AVE.	0.000	3.654
KY 410	E. MAIN ST.	0.000	0.681
KY 503	KY HWY. 503	9.000	9.287
KY 693	DIEDERICH BLVD.	0.000	5.812
KY 750	LEXINGTON AVE.	0.000	3.713
KY 1093	COUNTRY CLUB DR.	0.000	1.954
KY 1172	RED DEVIL LN.	0.000	0.482
KY 1725	ASHLAND DR.	0.000	0.905
KY 2541	MAIN ST.	0.000	1.619
KY 2543	FERRY ST.	0.000	0.153
KY 3105	GREENUP AVE.	0.000	3.823
CR-1948	RIVERSIDE BLVD.	0.000	1.543
CS-5009	RIVERSIDE DR.	0.000	1.318
CS-7006	INDUSTRIAL RD.	0.000	0.107

1.3 Previous Studies, Identified and Committed Projects

Previously completed studies and several planned and committed transportation improvements were identified in Boyd and Greenup counties.

Previous Studies. KYOVA completed key planning studies on transit, and pedestrian and bicycle facilities in Boyd and Greenup counties. Recent studies are described below.

- The 2017 *Boyd and Greenup County Transit Study*² examines existing fixed-route transit accommodations within the KY portion of the MPO, and provides a summary of existing conditions, high-level analysis of existing transit gaps, and local and regional policy and service recommendations.
- The 2016 *Non-Motorized Transportation Plan*³ examines existing pedestrian and bicycle facilities in Boyd and Greenup counties, and identifies potential walking and biking improvements.
- The 2014 *Congestion Management Process*⁴ sets forth plans for the KYOVA tri-state urbanized area.

The findings of each planning study were reviewed and incorporated as appropriate into the planning process for this SUA effort.

Committed Projects. Several committed projects and planned concepts for future improvements have been identified within the study area. **Figure 2** summarizes color-coded transportation projects found in recent KYTC Highway Plans, the Continuous Highway Analysis Framework (CHAF) database, KYOVA's *Metropolitan Transportation Plan* (MTP) and Transportation Improvement Program (TIP), and other ongoing efforts promoted by local governments. **Table 3** and **Table 4** contain project identification letters and corresponding descriptions. Projects funded in Kentucky's *FY 2020–FY 2026 Highway Plan*⁵ or through other funding streams are assumed to be advancing independent of this SUA planning effort.

² http://www.kyovaipc.org/KYOVA_KYTransit_FINAL_060617.pdf

³ http://www.kyovaipc.org/KYOVA_NM_Transportation_Plan_FINAL_June_16.pdf

⁴ http://www.kyovaipc.org/CMP_Final_Report.pdf

⁵ [KY FY 2020 - FY 2026 Highway Plan](#)

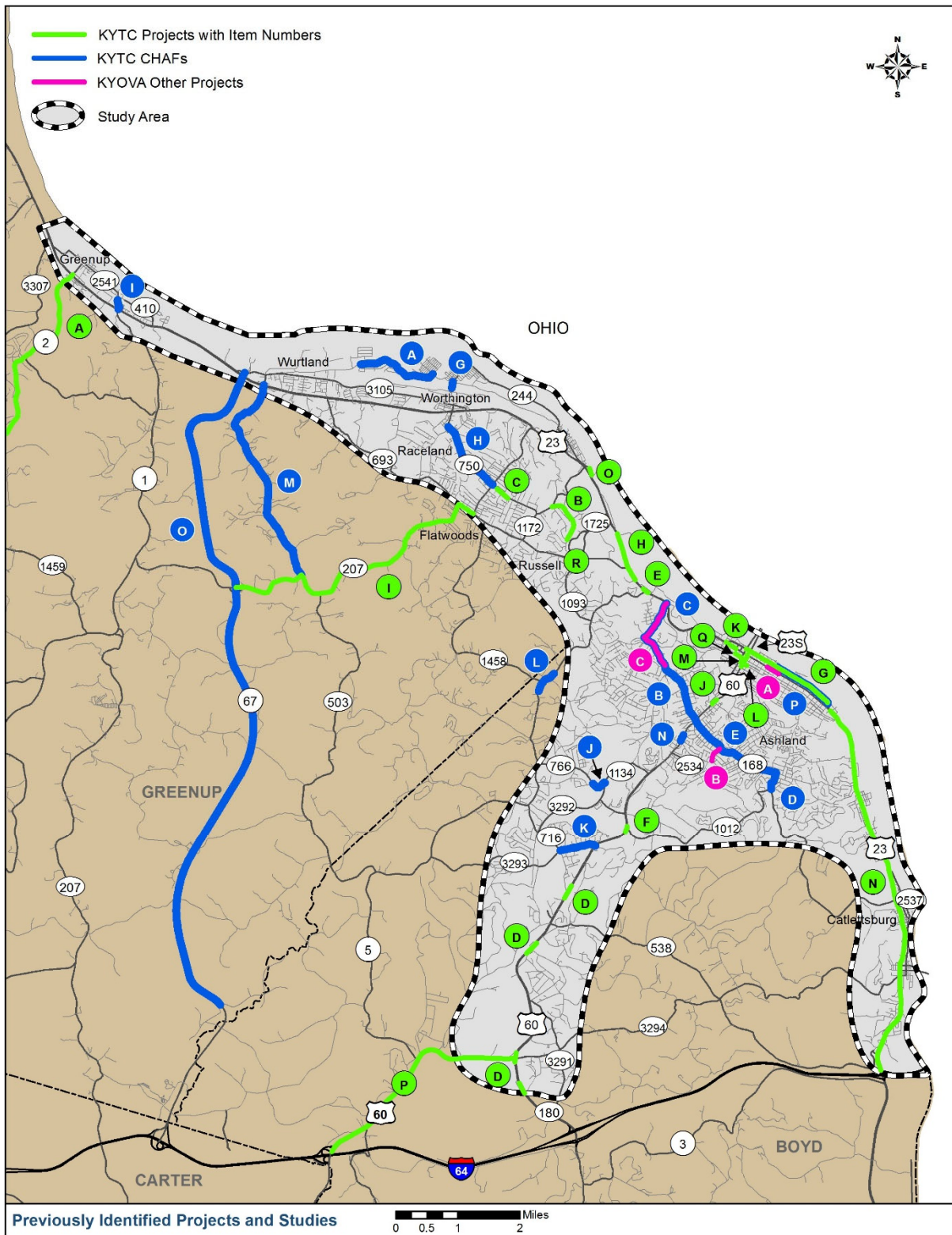


Figure 2: Previously Identified Projects

Table 3: Previously Identified KYTC and KYOVA Projects

ID	County	Item#	Route	BMP	EMP	Description	Authorized Phases	Remaining Costs (\$MILLION)
A	GREENUP	9-132.00	KY 2	13.2	17.2	RECONSTRUCT KY 2 FROM MP 13.2 TO US 23 (MP 17.2). (08CCN)(14CCR)(16CCR)(18CCN)	D	\$56.00
B	GREENUP	9-401.00	CS-3060 CS-3054	0 0.276	0.225 0.845	CONSTRUCT SIDEWALKS-PHASE B ALONG GESLING RD (CS-3060) FROM INTERSECTION OF CARDINAL RD (CS-3061) & SEATON DR (KY 750) TO KENWOOD DR (CS-3054/KY 1093) & PHASE C ALONG KENWOOD DR BEGINNING AT GESLING RD & ENDING AT DESIGN & CONSTRUCTION OF SIDEWALKS ALONG POWELL LANE (KY 750) IN FLATWOODS, KY BEGINNING AT END OF THE EXISTING SIDEWALK AT MP 1.74 & EXTENDING APPROXIMATELY 0.7 MILE EAST TO THE INTERSECTION OF KY 750 WITH KY 1172 (RED DEVIL LANE). (2014BOP)	D,R,U,C	Awarded 2020
C	GREENUP	9-402.00	KY 750	1.74	1.81	IMPROVE SAFETY & CONGESTION BY TURN LANE INSTALLATION &/OR EXTENSION AT THE FOLLOWING 4 LOCATIONS: 1. KY 180 @ MP 2.01-CONSTRUCT SB TURN LANE. 2. US 60//KY 180 @ MP 6.05-CONSTRUCT NB LEFT TURN LANE & EXTEND EXISTING SB LEFT TURN LANE; 3. US 60/KY 180: EXTEND NB LEFT TURN LANE & WIDEN EXISTING CROSS-OVER; & 5. SUMMIT RD (CR-1344A) @JUNCTION OF US 60.	D	\$0.40
D	BOYD	09-403.00	US 60/ KY 180	VARIOUS LOCATIONS		INSTALL CONTINUOUS GREEN LIGHT FOR THE RIGHT LANES ON NB US 23 AT THE INTERSECTION OF KY 5 WITH CONCRETE ISLAND NEAR THE CENTER OF THE INTERSECTION TO SEPARATE THE FLOW OF TRAFFIC. MATCH TO BE PROVIDED BY TOLL CREDITS.	C	
E	BOYD	09-409.00	US 23	20.69	20.79	INSTALL CONTINUOUS GREEN LIGHT FOR THE RIGHT LANES ON WB US 60 AT THE INTERSECTION OF KY 1012 (BOY SCOUT RD) MP 8.617 WITH CONCRETE ISLAND NEAR THE CENTER OF THE INTERSECTION TO SEPARATE THE FLOW OF TRAFFIC. MATCH TO BE PROVIDED BY TOLL CREDITS.	D	\$0.28
F	BOYD	09-410.00	US 60	8.567	8.667	REMOVE RAISED MEDIAN SECTIONS ON GREENUP AVE (US 23) IN BOYD COUNTY FROM MP 17.078 TO 18.640 & ADD A CONTINUOUS TWO-WAY TURN LANE (TWTL) FROM 20TH ST TO 31ST ST. MATCH TO BE PROVIDED BY TOLL CREDITS.	D	\$0.16
G	BOYD	09-411.00	US 23	17.078	18.640	REPLACE GRASS MEDIAN ALONG US 23 BETWEEN MP 0.03 TO 0.07 & MP 0.51 TO 0.85 WITH CONCRETE MOUNTABLE MEDIAN. MATCH TO BE PROVIDED BY TOLL CREDITS.	D	\$0.46
H	GREENUP	09-412.00	US 23	0.03 0.07	0.51 0.85	IMPROVE KY 207 FROM THE INDUSTRIAL PARKWAY TO THE KY 693 INTERSECTION IN FLATWOODS. (08CCN)(16CCR)	D,R,U,C	\$0.50
I	GREENUP	9-8509.00	KY 207	10.932	15.88	INSTALL SUPPLEMENTAL SIGNALS & UPDATE THE SIGNAL HEADS TO INCLUDE DOUBLE RED HEADS WITH REFLECTIVE BACKPLATES AT THE INTERSECTION OF US 60 (13TH ST) & RAMEY ST.	D	\$52.00
J	BOYD	9-9007.01	US 60	11.195	11.295	CONSTRUCT ON-ST PARKING BAY ALONG NB WINCHESTER AVE BETWEEN 9TH & 10TH ST, MILL, RESURFACE & RESTRIPE WINCHESTER AVE TO INCLUDE A TWO-WAY LEFT TURN LANE, UPDATE STRIPING ON 10TH ST & UPDATE SIGNAL TO INCLUDE FLASHING YELLOW ARROWS AT THE INTERSECTION OF US23X & 10TH ST. (2018BOP)	C	
K	BOYD	9-9007.50	US 23X/US 60/CS-2400	VARIOUS LOCATIONS		RESTRIPE CENTRAL AVE TO ALIGN THE THROUGH MOVEMENT ACROSS THE INTERSECTION, INSTALL A SUPPLEMENTAL SIGNAL HEAD & UPDATE THE THROUGH SIGNAL HEADS TO INCLUDE THE DOUBLE RED HEADS AT THE INTERSECTION OF CENTRAL AVE & 13TH ST. (2018BOP)	C	
L	BOYD	9-9007.60	CS-2350	0.83	0.95	INSTALL OVERHEAD LANE ASSIGNMENT SIGNS ON THE SIGNAL SPAN WIRE & UPDATE THE STRIPING ALONG MARTIN LUTHER KING BLVD BETWEEN WINCHESTER AVE & CENTRAL AVE. (2018BOP)	C	
M	BOYD	9-9007.70	US 60	11.976	12.202	ADDRESS PAVEMENT CONDITION ON US 23 FROM MP 10.67 TO MP 16.95	C	\$2.40
N	BOYD	9-20015.00	US 23	10.67	16.95	ADDRESS DEFICIENCIES OF BRIDGE ON KY 244 (MP 0.103) OVER CSX RAILROAD; .05 MI NE OF JCT US 23; 045B00039N. (16CCR)	C	Awarded 2020
O	GREENUP	9-1073.00	KY 244			IMPROVE US 60 FROM I-64 AT INTERCHANGE 181 TO THE KY 180 INTERSECTION AT CANNONSBURG.	D,R,U	\$22.60
P	BOYD	9-8400.00	US 60	0.2	4.02	PRELIM DESIGN & STUDY FOR LOW COST IMPROVEMENTS AT CENTRAL AVE & 23RD ST.	D	
Q	BOYD	9-9010.30	Central Ave			PRELIM DESIGN & STUDY FOR LOW COST IMPROVEMENTS AT KY 693 & KY 1093.	D	
R	GREENUP	9-9010.00	KY 693					
A	BOYD	TBD	US 23/ US 23X	18.63/ 0.962	18.63/1 .18	DESIGN FOR DOWNTOWN ST SCAPE (WINCHESTER AVE) US 23 FROM 7TH (MP 19.33) THROUGH 12TH ST (MP 18.63) STS & WINCHESTER AVE (US 23X) 28TH (MP 1.18) THROUGH 21ST ST(MP.962) IN ASHLAND, KY.		\$0.25
B	BOYD	TBD	CS-2269	0	0.244	DESIGN FOR DAWES ST RESTORATION & REHABILITATION FROM BEECH ST TO BLACKBURN AVE TO SAFELY ACCOMMODATE PEDESTRIAN & BICYCLE TRAFFIC FOR SAFE ROUTES TO SCHOOL (SRTS) IN ASHLAND, KY.		\$0.25
C	BOYD	TBD	KY 168	6.875	8.179	PLANNING STUDY/PRELIMINARY ENGINEERING: WESTWOOD SIDEWALK REHAB PROJECT-KY 168 MP 6.875 TO 8.179 (HOODS CREEK PIKE & WHEATLY RD).		\$0.03

— KYTC projects — KYOVA projects

Table 4: Projects in KYTC CHAF database

ID	CHAF	County	Route	BMP	EMP	Purpose	Total Cost (\$Million)
A	IP20040035	Greenup	CS- 5009	0.000	1.318	The purpose of this project is to improve Riverside Drive (CS-5009) to provide access to airport and to prevent flooding between the cities of Wurtland and Worthington.	44.0
B	IP20080512	Boyd	KY 168	5.804	7.458	Improve operational efficiency on Segment 2 of KY 168 from US 60 (MP 5.8) to Hood Creek Road (MP 7.4) in Ashland to decrease congestion, conflict points with turning vehicles, rear-end collisions and allow for freer traffic flow.	43.9
C	IP20080513	Boyd	KY 168	7.458	8.179	Improve operational efficiency on Segment 3 of KY 168 from Hoods Creek Road (MP 7.458) to US 23 (MP 8.179) to decrease congestion, conflict points with turning vehicles, rear-end collisions and allow for a freer flow of traffic.	16.6
D	IP20080514	Boyd	KY 168	3.871	3.971	Improve intersection sight distance at South Belmont Street (KY 1012) MP 3.871 near Ashland.	1.5
E	IP20080515	Boyd	KY 168	3.871	5.804	Improve operational efficiency on Segment 1 of KY 168 from KY 1012 (S. Belmont Street, MP 3.871) to US 60 (MP 5.804) to decrease congestion, conflict points with turning vehicles, rear-end collisions and allow for a freer flow of traffic.	20.4
F	IP20080542	Greenup	KY 2	13.165	17.188	Safety improvements on KY 2 from Little Sandy Bridge to US 23 (MP 13.2 MP 17.2). (Item No. 9-132.00: RUC remain unfunded)	64.6
G	IP20080544	Greenup	KY 244	3.238	3.338	Improve KY 244 between the cities of Raceland and Worthington to allow for 2-way traffic to improve emergency vehicle access and to provide a second egress/ingress for the city of Worthington during times of flooding.	45.7
H	IP20080545	Greenup	KY 750	0.370	1.595	Correct horizontal, vertical and width deficiencies on KY 750 from Pond Run (MP 0.37) to KY 207 (MP 1.595) to improve safety and operational efficiency of roadway.	24.9
I	IP20080546	Greenup	KY 2541	0.000	0.164	Improve operational efficiency on KY 2541 at the junction with US 23 in Greenup to relieve traffic congestion and aid traffic turning onto US 23.	1.4
J	IP20110167	Boyd	KY 766	1.004	1.261	Improve geometrics and safety by reconstruction of alignment for KY 766 to intersection with KY 1134.	5.0
K	IP20130096	Boyd	KY 716	0.000	0.560	Reconstruct KY 716 from MP 0.0 (US 60) to MP 0.560 (KY 3293) to improve safety and decrease congestion.	14.3
L	IP20130098	Boyd	KY 5	8.900	9.300	Reconstruct intersection at KY 5 and KY 1458 to improve safety and mobility and to address geometrics.	8.2
M	IP20130105	Greenup	KY 503	5.481	9.104	Rehabilitate KY 503 (between MP 5.481 to MP 9.104) by improving pavement, drainage, guardrail, clear zones, etc., to increase safety and improve pavement conditions.	16.3
N	IP20150131	Boyd	US 60	10.400	10.500	Reconstruct the intersection of US 60 & "Old 13th Street" (CS- 2232).	1.7
O	IP20150377	Greenup	KY 67	1.400	13.039	Construction on KY 67 from junction with Technology Drive (MP 1.4) to US 23 in Wurtland (MP 13.039), a total of 11.639 miles.	76.4
P	IP20160007	Boyd	US 23	17.065	18.055	Remove the existing raised median to create a center-turn lane on Greenup Avenue from the southern split with Winchester Avenue to the intersection of 20th Street.	1.0

2.0 EXISTING CONDITIONS

Existing transportation network conditions, described in the following sections, include information on roadway facilities and geometrics, crash history, and traffic volumes. Data for this section were collected from KYTC's Highway Information System (HIS) database, KYTC's Transportation Enterprise Database (TED), bridge inspection reports, National Bridge Inventory forms, traffic counts, and field reviews.

2.1 Functional Class and Roadway Systems

Functional Class. Functional classification is the process of grouping streets and highways according to the character of travel service and access to adjacent land uses that they provide. This classification system recognizes that travel involves movement through a hierarchical system of facilities that progress from lower classifications handling short, locally oriented trips to higher classifications serving longer distance travel at higher mobility levels. This SUA study focused on state-maintained routes functionally classified as collectors and arterials, and local routes integral to traffic operations within study area boundaries.

The following are definitions of major functional classes for this SUA:

- Principal Arterials serve major centers of metropolitan areas, provide a high degree of mobility, and can also provide mobility through rural areas.
- Minor Arterials provide service for trips of moderate length, serve geographic areas smaller than their higher arterial counterparts, and offer connectivity to the principal arterial system. The primary difference is usually multiple minor arterial routes serve an urban area, radiating from the urban center to serve the surrounding region. In contrast, an expanse of a rural area of equal size would often be served by a single principal arterial.
- Collectors gather traffic from Local Roads and funnel them to the arterial network. Within the context of functional classification, collectors are categorized as either Major Collectors or Minor Collectors. In the rural environment, collectors generally serve primarily intra-county travel and shorter trips.
- Local Roads are not intended for use in long distance travel, except at the origin or destination end of the trip, due to their direct access to abutting land. They are often designed to discourage through traffic.

Figure 3 shows functional classification of study area routes. Highways providing the highest levels of mobility (principal arterials) are US 23, US 60, and KY 180 between US 60 and I-64.

National Highway System. The National Highway System (NHS) consists of roadways important to the nation's economy, defense, and mobility. Area NHS roadways include the same principal arterial highway segments discussed above: US 23, US 60, and KY 180.

Truck Routes. In compliance with the Surface Transportation Assistance Act of 1982 (STAA), Kentucky established a network of highways on which commercial vehicles with increased dimensions may operate. These "STAA" vehicles include semi-trailers with 53-foot-long trailers and single-unit trucks with a total length of 45 feet. Designated truck routes in the study area are shown in **Figure 4** (p. 10). Federally designated truck routes include US 23, most of US 60, and KY 180. A portion of US 60, US 23X (Winchester Avenue), KY 67 (Industrial Parkway), KY 716, and KY 750 are on the Kentucky Highway Freight Network.

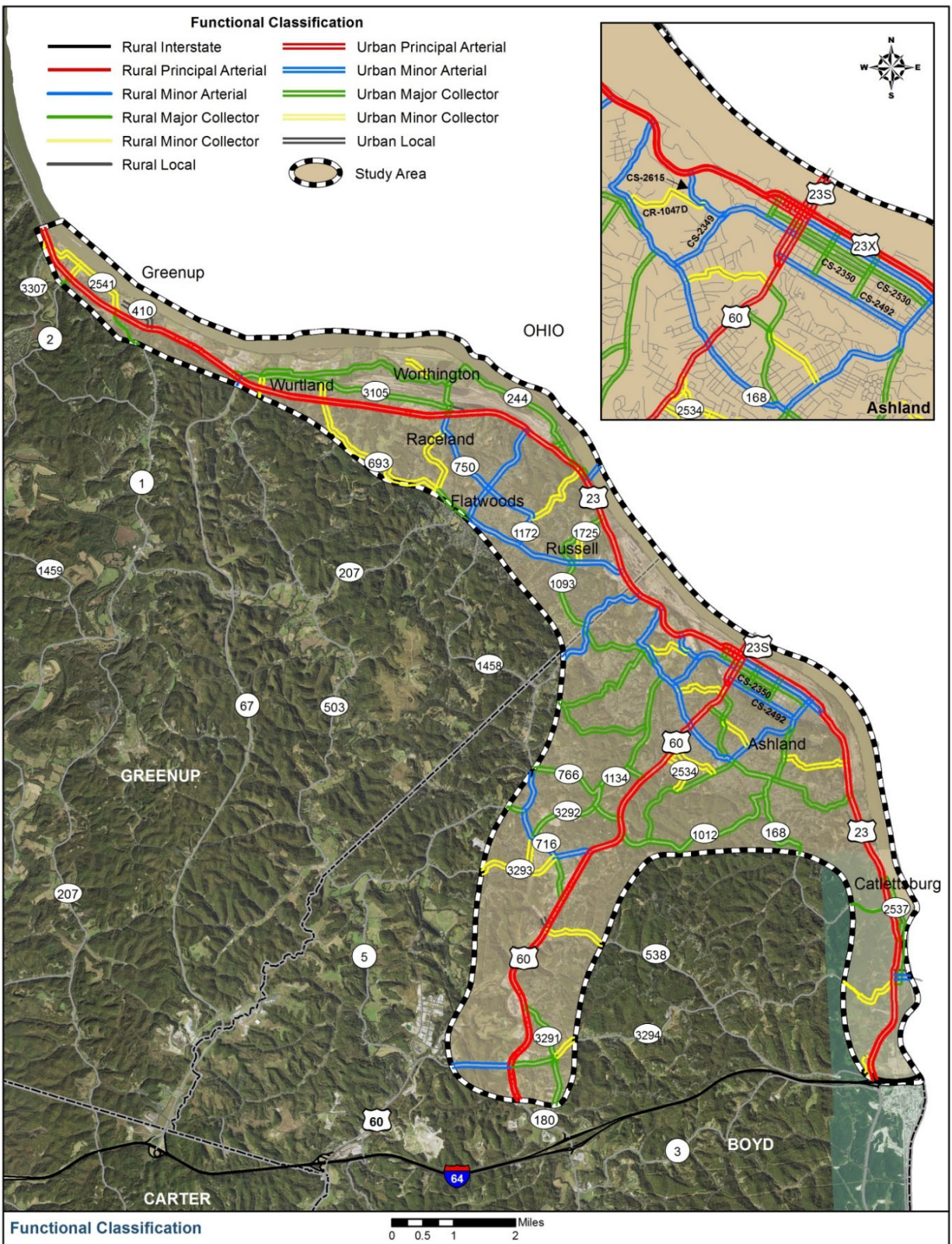


Figure 3: Functional Classification of Study Area Routes



2.2 Roadway Geometric Characteristics

KYTC's HIS database was queried during August 2019 to obtain study route geometric characteristics. Data were compared to KYTC's 2017 Highway Design Manual (HDM) minimum design recommendations for urban roadways shown in Exhibit 700-04⁶. Highway data assembled from HIS for analyses included:

- Speed limits
- Number of lanes with lane widths
- Shoulder types and widths
- Horizontal and vertical curve data

Speed Limits. As shown on **Figure 5** (p. 13), state maintained study routes have speed limits ranging from 25 to 55 miles per hour (mph), with the highest speeds on portions of US 23, US 60, KY 67, KY 180, KY 538, KY 766, KY 3293, KY 3294, and KY 3533. Local routes have speed limits ranging from 25 to 35 mph.

Number of Lanes and Lane Widths. **Figure 6** (p. 14) illustrates the current number of lanes and lane widths of study routes. Guidelines in the 2017 HDM recommend minimum 10-foot-wide lanes for residential and commercial urban local and collector routes, and arterial routes with speeds of 35 mph or less. Study area routes with lanes less than 10 feet wide are listed in **Table 5** and **Table 6**.

Table 5: Boyd County Study Routes with Lane Widths Less than 10 Feet

Boyd	Width	From	To
KY 1012 (Boy Scout Rd.)	9 FT	US 60	KY 168 (Valley View Dr.)
KY 2537 (Broadway St.)	8 FT	KY 2536/23 rd St.	End of State Maintenance
KY 3293 (Little Garner Rd.)	9 FT	Gregory Dr.	Summit Rd./KY 716
CR-1047D (W. Central Ave.)	9 FT	KY 168 (Wheatley Rd.)	CS-2615 (River Hill Dr.)

Table 6: Greenup County Study Routes with Lane Widths less than 10 feet

Greenup	Width	From	To
KY 1 (EK Rd.)	9 FT	Tanyard Hollow Rd.	Hillside Dr.
KY 2	9 FT	Townhill Plaza	KY 2541 (Main St.)
KY 410 (East Main St.)	9 FT	US 23	7 th St.
KY 503	9 FT	Carolina Ave.	KY 3105
KY 750 (Raceland/Lexington Ave.)	9 FT	CS-4001 (Pond Run Rd.)	Hamer St.
KY 1172 (Red Devil Ln.)	9 FT	KY 693 (Diederich Blvd.)	KY 750 (Seaton Dr.)
KY 2543 (Ferry St.)	7 FT	US 23	High Alley
CS-5009 (Riverside Dr.)	9 FT	Franz Dr.	Scott St.

⁶ [2017 Highway Design Manual](#)

Shoulder Types and Widths. Study route shoulder types and widths are shown on **Figure 7** (p. 15). Most of the study routes have curb and gutter or shoulders less than eight feet wide. Ten-foot wide shoulders exist along portions of US 60, US 23, and KY 180. No minimum shoulder widths for urban roadways are presented in the 2017 HDM, Exhibit 700-04.

Vertical and Horizontal Curves. KYTC HIS vertical and horizontal curve data were collected and compared to the 2017 HDM design recommendations for maximum vertical grades and minimum horizontal curve degrees.

HIS assigns grade levels for vertical curves based on grade steepness: rated from A (flattest) to F (steepest, 8.5% or greater). The 2017 HDM recommends maximum vertical grades ranging from 8% to 15% for local routes; 8% to 11% for collectors; and 6% to 9% for arterials.

HIS also assigns grade levels for horizontal curves based on degree of curvature: ranked from A (most sweeping) to F (sharpest, 28 degrees or greater). The 2017 HDM calculates maximum degree of curvature based on geometric factors. **Figure 8** (p. 16) shows curve deficiencies in the study area.

Sixteen vertical and 32 horizontal curves were identified as deficient in HIS data. Study routes and correlating number of deficient vertical and horizontal curves are listed in **Table 7**.

Table 7: Study Routes with Grade F Curves

Boyd	No. Vertical	No. Horizontal	Greenup	No. Vertical	No. Horizontal
	Grade F	Curve F		Grade F	Curve F
	(8.5% +)	(28° +)		(8.5% +)	(28° +)
KY 766		1	KY 750	2	
KY 716		2	KY 693	3	2
KY 538		1	KY 2543		2
KY 3294	1	6	KY 2541		2
KY 2537		1	KY 244		2
KY 2535		1	KY 1093	2	1
KY 2534		1	CS-5009		2
KY 168	4	4	CR-1948		1
KY 1134	1	1			
KY 1012	3	1			
CS-2615		1			

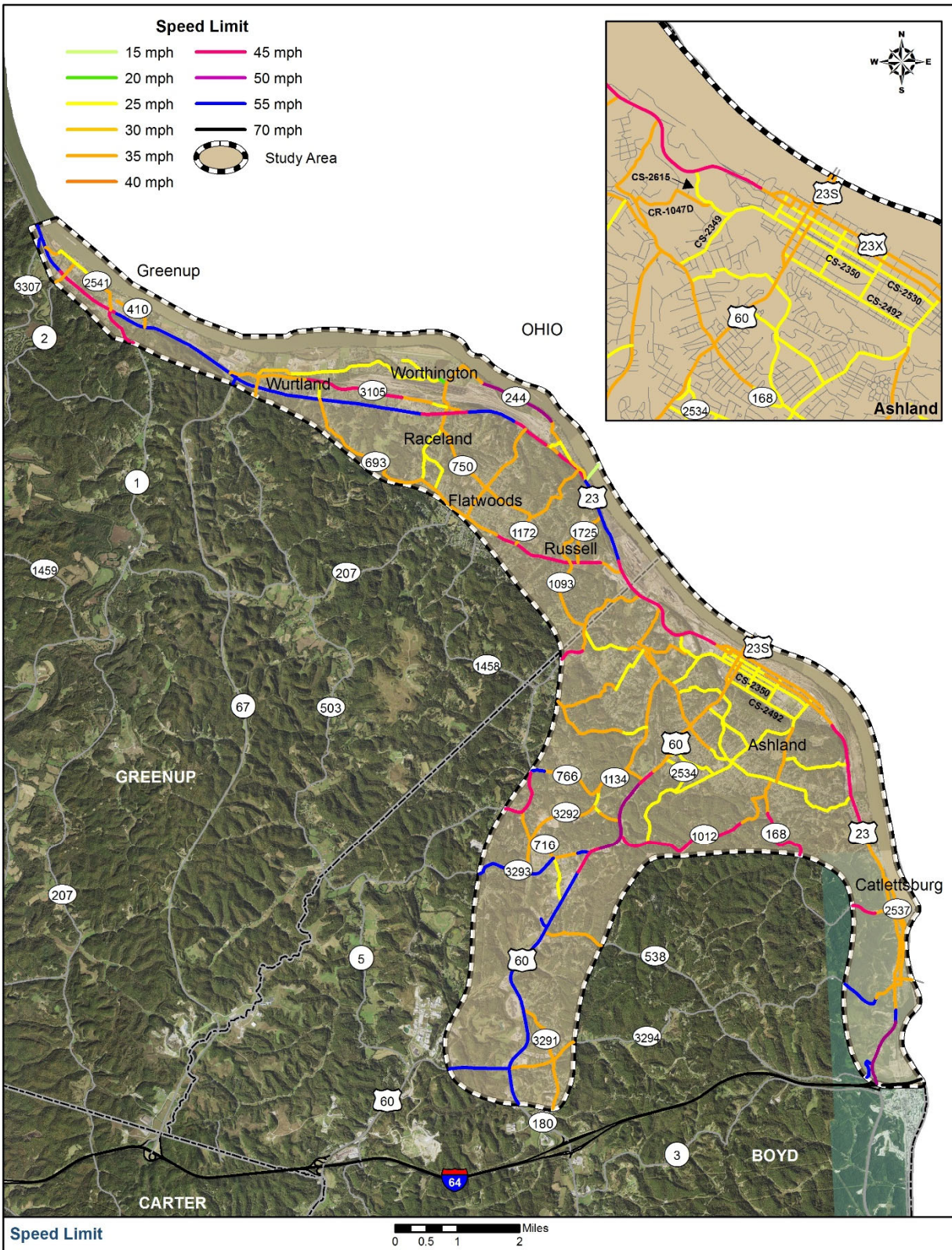


Figure 5: Speed Limits on Study Area Routes

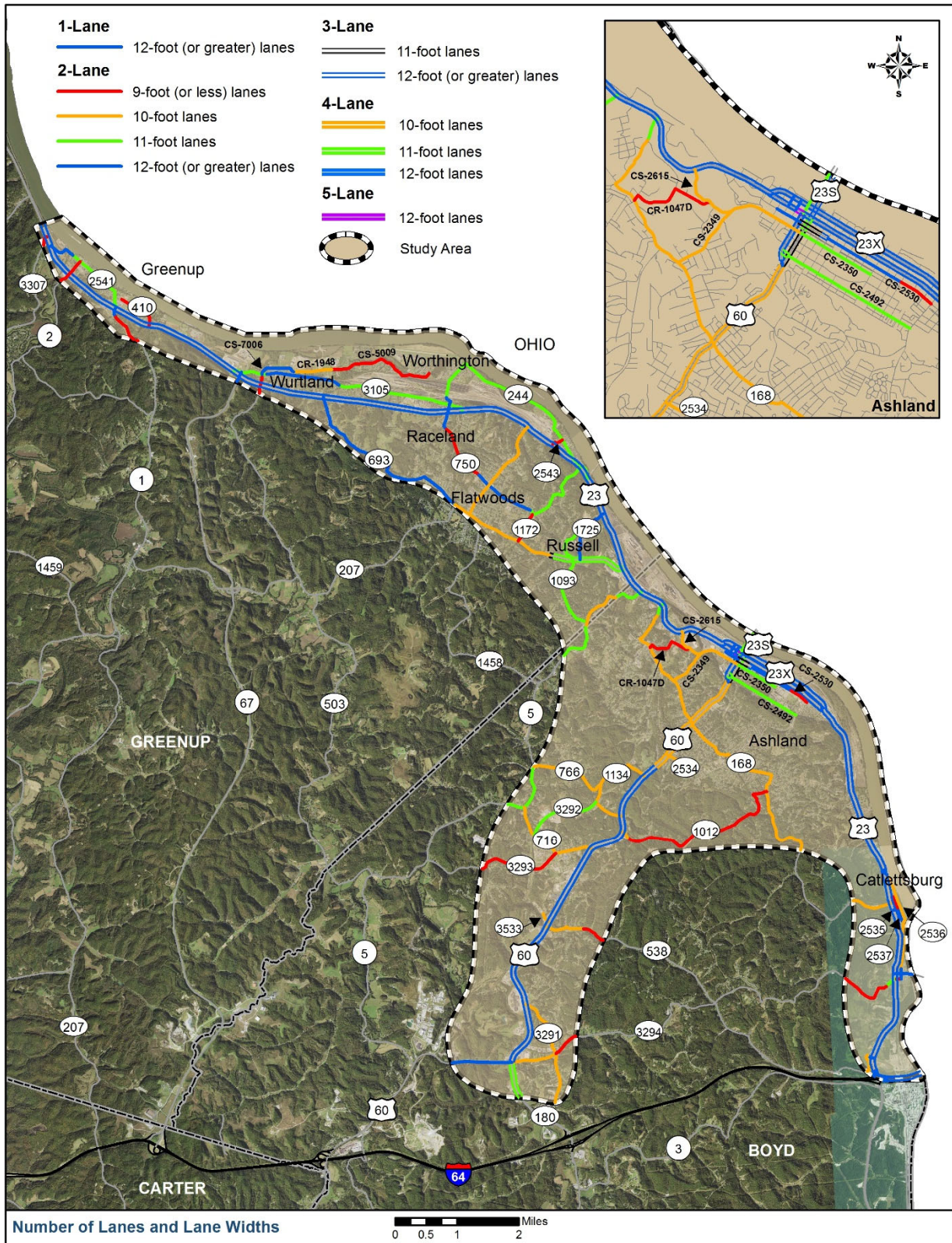
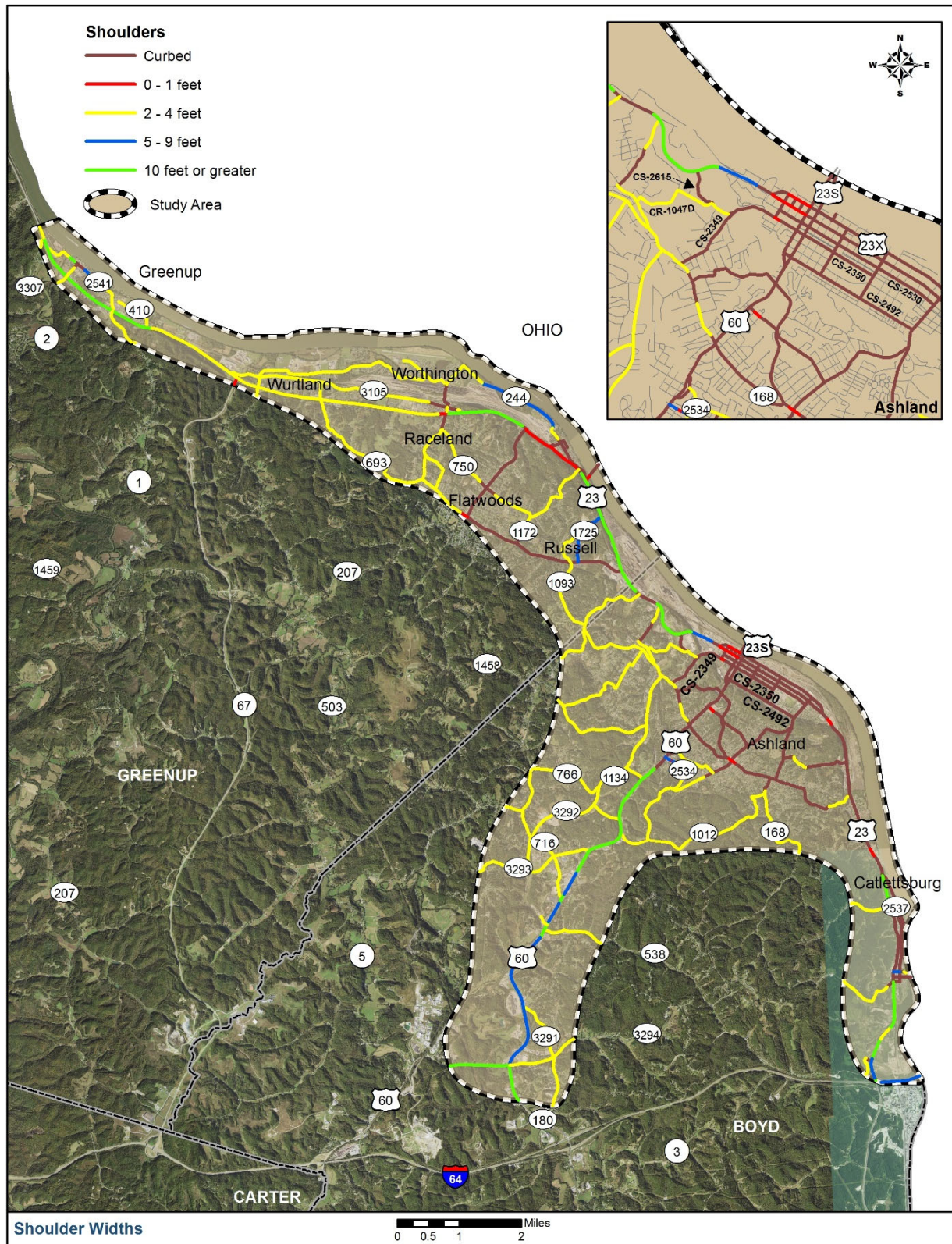


Figure 6: Number of Lanes and Lane Widths on Study Area Routes





2.3 Bridges

Figure 11 (p. 20) shows 41 bridges identified within the study area. Of these bridges, 2 were listed in poor condition, 25 in fair condition, and 14 in good condition as described in HIS, *Moving Ahead for Progress in the 21st Century Act* (MAP-21) data, and the National Bridge Inventory System (NBIS).

Only one structure in poor condition is located on a study route, the Russell viaduct bridge (No. 045B00039N, KY 244). Construction activities for the Russell viaduct replacement began in 2020.

Bridge No. 010C00025N (Midland Trail, CR-1335A) is the other structure listed in poor condition. It is not located on a study route but will be addressed within the Bridging Kentucky program.

2.4 Pedestrian and Bicycle Accommodations

Improving safety and infrastructure for walking and bicycling creates an integrated, intermodal transportation system providing travelers with a real choice of transportation modes. Pedestrians and bicyclists have the same origins and destinations as other transportation system users. It is important for all users to have safe and convenient access to all types of facilities, transit stations and stops, employment opportunities, education, health care, and other essential services. Federal Highway Administration's (FHWA) 2019 *Bicycle and Pedestrian Planning, Program, and Project Development*⁷ guidance identifies Federal legislation and reference material, related to bicycling and walking safety and accommodation. This guidance states that pedestrian and bicycle needs must be given "due consideration" under Federal surface transportation law.

Pedestrian Facilities. The cities of Ashland and Catlettsburg have an extensive interconnected sidewalk system for pedestrians as illustrated in **Figure 12** (p. 21). Portions of existing sidewalks are in poor condition, particularly along US 23 between Ashland and Catlettsburg (**Figure 9**). The sidewalk system in Greenup County shown in **Figure 13** (p. 22) is sparse; however, local efforts to broaden the system and improve connectivity are ongoing.



Figure 9: Sidewalk along US 23

Bicycle Facilities. Members of the regional bicycle club, Ashland Cyclist Enthusiasts (ACE), routinely share the road with motorists when traveling locally known bicycle routes in the area. Several bike routes with official or unofficial signage exist in Boyd and Greenup counties. These routes do not include pavement markings or separated bike lanes.

KYOVA's 2016 *Non-Motorized Transportation Plan for Boyd and Greenup Counties*⁸, KY identifies existing needs and potential walking and biking improvements in the two counties, complementing the broader SUA transportation study. Improvement concepts resulting from this SUA study—such as curb extensions (bulb-outs) adding a layer of pedestrian protection by shortening cross walk lengths and improving visibility to

⁷ https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/guidance_2019.cfm

⁸ [2016 Non-Motorized Transportation Plan for Boyd and Greenup Counties](#)

motorists, installing continental crosswalks (i.e., pavement markings using wide vertical striping) along the Central Avenue corridor, and constructing a paved pedestrian path along US 23—dovetail effectively with plan recommendations.

In accordance with Federal requirements, KYTC's 2002 *Pedestrian & Bicycle Travel Policy*⁹ states the KYTC will consider incorporation of pedestrian and bicycle facilities on all new or reconstructed state-maintained roadways. Furthermore, the KYTC will consider accommodating bicycle transportation when planning the resurfacing of roadways, including shoulders. This policy further identifies parties responsible for maintaining pedestrian and bicycle facilities as described below:

- Maintenance of sidewalks within city limits is the responsibility of the city. Maintenance of sidewalks outside city limits is the responsibility of the KYTC if the KYTC constructed the facility. Maintenance of facilities constructed by the fiscal court or city is the responsibility of that entity. Maintenance by the KYTC is limited to repairing the surface, mowing, and clearing vegetation. This maintenance is on the same schedule as normal roadway maintenance.
- Maintenance of bicycle lanes is considered incidental to normal KYTC roadway maintenance. Maintenance by the KYTC is limited to repairing the surface, resurfacing, removing snow, striping, signing, and sweeping if the KYTC normally sweeps the roadway. This maintenance is on the same schedule as normal roadway maintenance.
- Maintenance of shared-use paths is the responsibility of the local government.

2.5 Transit

The Ashland Transportation Center is an intermodal transit station in Ashland, Kentucky. Jointly operated by the city of Ashland and CSX Transportation, it currently serves Amtrak's Cardinal train as well as the Ashland Bus System and Greyhound Lines buses. It is located at 99 15th Street near downtown Ashland.

Ashland Bus Service (ABS) and Lawrence County Transit operate fixed route transit services in Boyd and Greenup counties. ABS operates routes throughout Ashland and adjacent communities. ABS fixed routes include:



Figure 10: Ashland Transportation Center

- 13th Street (Kroger, Save-a-lot, Library)
- Crosstown (Kroger, Blackburn, Scope Towers)
- 29th Street (YMCA, Community College, Kroger)
- Catlettsburg (Courthouse, Foodland, Scope Towers)
- Downtown (Walmart, Aldi, Kroger, Mall)

Lawrence County Transit provides fixed route services to and from Ironton, Ohio. The looped route begins at Ironton Transit Center, proceeds to the former Our Lady of Bellefonte Hospital¹⁰, to Walmart in Ashland, to Kings Daughters Medical

⁹ [KYTC's 2002 Pedestrian & Bicycle Travel Policy](#)

¹⁰ Our Lady of Bellefonte Hospital closed its doors in 2020; however, physician practices are still active in and near the building.

Center, to Ashland Transportation Center, crossing the river to St. Mary's in Ohio, completing the loop at the Ironton Transit Center.

KYOVA's 2017 *Boyd and Greenup County Transit Study*¹¹ includes a transit services gap analysis highlighting areas in the two-county region with high propensity for transit, but no fixed route services. These gap areas are concentrated in Greenup County and follow US 23 along the cities of Wurtland, Flatwoods, and Raceland. The 2017 study recommended new transit routes for the following areas:

- Raceland, Flatwoods, and Russell
- South Shore, Greenup, and Ashland
- North-south connections along KY 5, KY 67 (Industrial Parkway), and KY 1.

Due to high usage potential, expansion of existing transit services warrants consideration along the following routes:

- US 23: North of Ashland to the city of Greenup
- Industrial Parkway (KY 67): North of KY 207 (Argillite Road) to US 23
- East Kentucky Road (KY 1): North of KY 207 (Argillite Road) to US 23
- Caroline Road/Bellefonte Road (KY 693): US 23 to US 23 (loop)
- Bellefonte Princess Road (KY 5): US 23 to US 60

Amtrak operates a passenger train (*The Cardinal*) three times weekly with pickup and drop-off service at the Ashland Transportation Center. The Cardinal runs between New York Penn Station and Chicago Union Station, with major intermediate stops at Philadelphia, Washington, D.C., Charlottesville, Charleston, Huntington, Cincinnati, Indianapolis, and several minor stops including the Ashland Transportation Center.

Greyhound Lines is the sole provider for intercity bus transportation in the area.

¹¹ http://www.kyovaipec.org/KYOVA_KYTransit_FINAL_060617.pdf



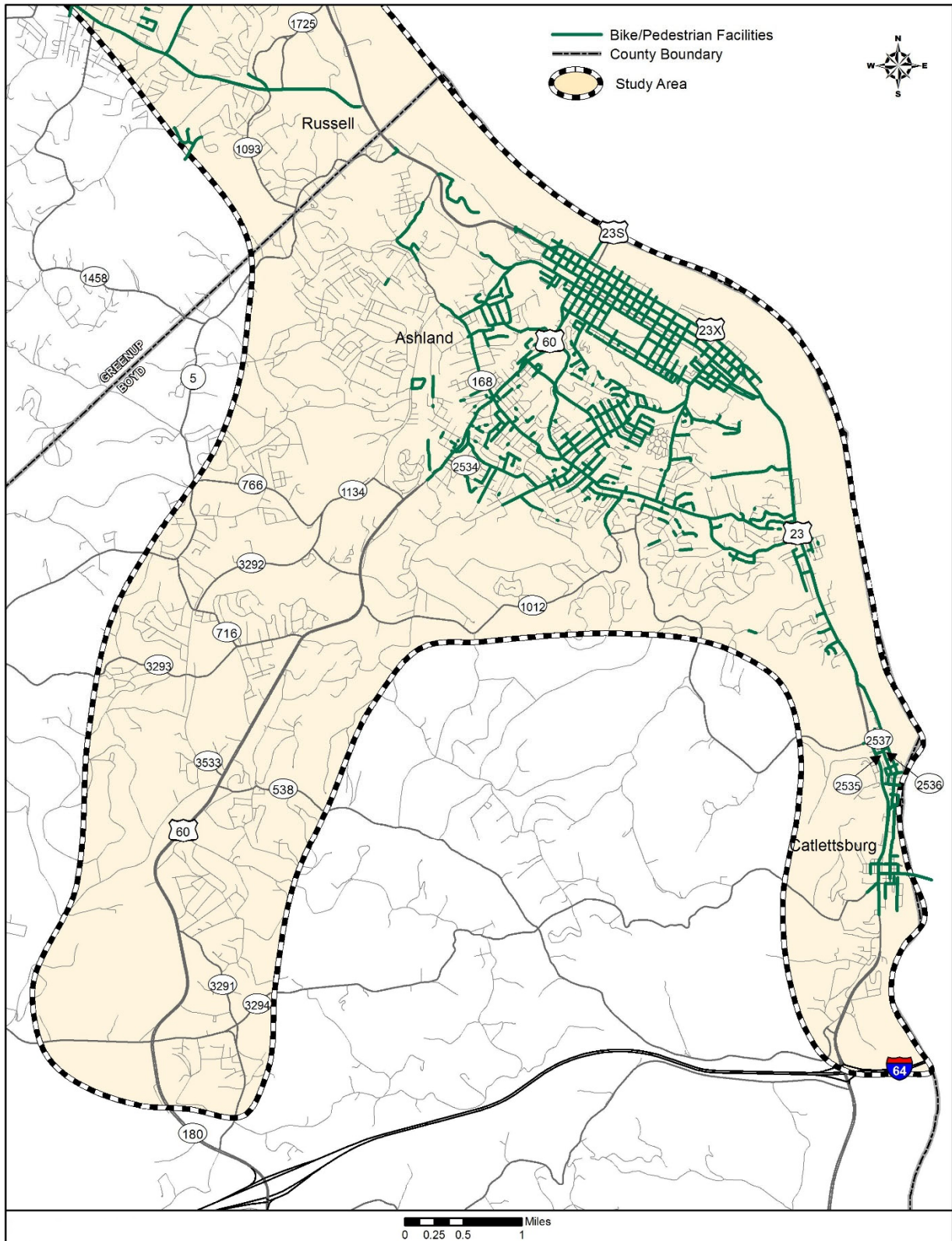


Figure 12: Study Area Bike and Pedestrian Facilities, Boyd County

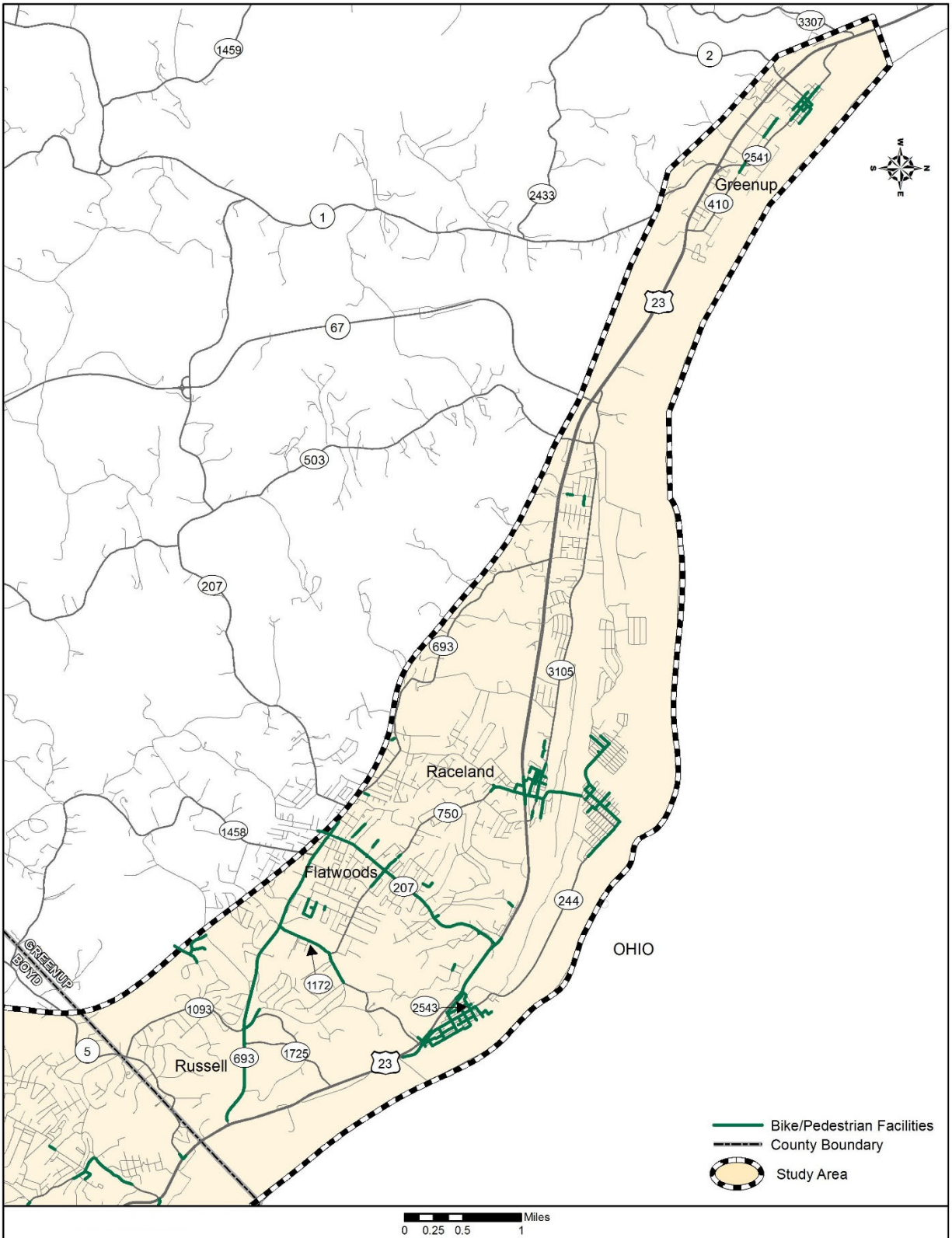


Figure 13: Study Area Bike and Pedestrian Facilities, Greenup County

2.6 Freight Mobility

According to the KYTC and FHWA's July 2019 *Kentucky Freight Modes*¹² report, Boyd and Greenup counties are rich in multi-modal freight distribution networks. Freight modes cover the gamut from airports and river ports, to railroads, highways, and pipelines. Growth of these economic generators depends in part on the region's ability to improve and maintain efficient transportation connections within the region as well as links to other regions and statewide corridors. Improving access to freight centers is important to attract new industry and associated jobs to help stimulate the local economy. Freight network links within the study area are listed below.

Highways. Federally designated truck routes include US 23, US 60, and KY 180 connecting US 60 to I-64. US 60, US 23X (Winchester Avenue), KY 67 (Industrial Parkway), KY 716, and KY 750 are on the Kentucky Highway Freight Network.

Airports. Ashland Regional Airport (DWU) is a public use airport in Worthington, Greenup County, Kentucky, owned by the Ashland Regional Airport Board. It is located six nautical miles northwest of the central business district of Ashland in Boyd County. Currently, the airport serves local charter and private aircraft. Community events, such as car and air shows, also take place at the airport.

Waterways. The Boyd Greenup Riverport Authority oversees a general cargo port, located in Wurtland, 16 miles north of I-64 via KY 67 (Industrial Parkway). Industrial sites are available within and adjacent to the port boundaries with sites suitable for heavy industrial uses, metalworking, chemicals, and warehousing.

Railways. CSX Transportation railroad runs along the banks of the Ohio River in Boyd and Greenup counties. Freight railroads in the United States are categorized into three classes based on earnings. CSX Transportation is a Class I railway with annual revenue exceeding \$463 million.

2.7 2020 Traffic Volumes and Operations

The KYTC provided historic traffic volumes for study area roadways, including truck percentages, K-factors¹³, and peak-hour directional distributions as available. Most traffic volumes were collected from 2014 to 2018. Year 2020 segment volumes were calculated based on appropriate historical trends, adjusting pre-2020 volumes to create a consistent 2020 dataset.

Traffic operations analyses include computing two commonly applied highway performance indicators used to describe quality of facility performance: level of service (LOS) and volume to capacity (v/c) ratios. Computations were performed in concurrence with the 2017 Highway Capacity Manual (HCM) procedures for study route segments.

LOS is a qualitative measure that describes traffic conditions based on measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. LOS typically represents a driver's perspective of traffic conditions based on perceived congestion. As illustrated in **Figure 14**, LOS A is associated

¹² https://transportation.ky.gov/MultimodalFreight/Documents/2019_Modes_Book.pdf

¹³ K-factor is defined as the proportion of annual average daily traffic occurring in an hour.

with free flow conditions, high freedom to maneuver, and little or no delay. Conditions at or near capacity typically are associated with LOS E. At LOS F, traffic conditions are oversaturated and beyond capacity, with low travel speeds, little or no freedom to maneuver, and lengthy delays. Although LOS C or better is desirable in urban areas, LOS D is generally acceptable. Year 2020 LOS was determined for the worst traffic hour based on design hourly volume (DHV) calculations.

Another measure, v/c , compares the traffic volume using a facility to its theoretical capacity over a specific duration, one hour in this instance. A v/c ratio greater than 1.0 indicates a route has exceeded its theoretical capacity and additional lanes may be justified. As v/c is measured over an hour period by segment, a roadway or intersection could be congested during peak commuter periods but show a relatively low v/c averaged over a longer duration.





LEVEL OF SERVICE		DESCRIPTION
A		<ul style="list-style-type: none"> Average Travel Speed. Free traffic flow with few restrictions on maneuverability or speed. NO DELAYS
B		<ul style="list-style-type: none"> Stable traffic flow. Speed becoming slightly restricted. Low restriction on maneuverability. NO DELAYS
C		<ul style="list-style-type: none"> Stable traffic flow, but less freedom to select speed, change lanes or pass. MINIMAL DELAYS
D		<ul style="list-style-type: none"> Traffic flow becoming unstable. Speeds subject to sudden change. Passing is difficult. MODERATE DELAYS
E		<ul style="list-style-type: none"> Unstable traffic flow. Speeds change quickly and maneuverability is low. MAJOR DELAYS
F		<ul style="list-style-type: none"> Heavily congested traffic. Demand exceeds capacity and speeds vary greatly. MAJOR DELAYS

Figure 14: Level of Service (LOS)

Analyses for the Boyd-Greenup SUA study concluded most roadways within the study area operate at acceptable LOS based on average daily traffic (ADT) segment-level analysis. Exceptions are portions of KY 5 in Boyd County and KY 693 in Greenup County, both of which operate at LOS E. All v/c ratios for study routes are 0.63 or less, indicating no major segment capacity issues based on HCM segment-level analyses. However, capacity at intersections may be further constrained due to intersection operations. The 2020 ADT, LOS, and v/c are summarized in **Table 8** and **Table 9** and mapped in **Figure 15** and **Figure 16**.

Table 8: 2020 Boyd County Study Routes—Traffic Operations

Route	County	BMP	EMP	DHV	% Trucks	2020 ADT Rounded	2020 LOS	2020 v/c
US 23	Boyd	9.161	20.938	834-2570	8-13	9470-30970	A-C	0.16-0.47
US 23S	Boyd	0.000	0.483	924	14	10750	A	0.22
US 23S1	Boyd	0.000	0.483	1241	9	14270	C	0.45
US 23X	Boyd	0.000	1.796	610-1442	9-17	7810-16030	A-B	0.12-0.28
US 60	Boyd	3.150	12.880	303-2185	2-17	2890-19550	A-D	0.06-0.33
KY 5	Boyd	6.647	10.781	465-1639	4-8	2380-6920	B-E	0.08-0.63
KY 168	Boyd	0.000	8.179	177-684	2-4	4460-6640	A-D	0.18-0.24
KY 180	Boyd	0.200	2.514	902	11	10360	A	0.14
KY 538	Boyd	0.000	6.631	177-194	4	1560-1890	B-D	0.07-0.09
KY 716	Boyd	0.000	1.565	519	6-14	4680-5510	C-D	0.18-0.19
KY 766	Boyd	0.000	2.044	215-252	6-8	1910-2580	B-C	0.08-0.09
KY 1012	Boyd	0.000	3.036	193-226	5	1670-2340	C	0.07-0.09
KY 1134	Boyd	0.000	0.897	272	7	2570	C	0.10
KY 2534	Boyd	0.000	0.178	440		3290	B	0.10
KY 2535	Boyd	0.000	0.065	88		930	A	0.03
KY 2536	Boyd	0.000	0.043	36		160	A	0.01
KY 2537	Boyd	0.000	0.404	16-90		110-680	A	0.01-0.04
KY 3291	Boyd	0.000	2.135	306		2110	C	0.11
KY 3292	Boyd	0.000	1.223	300		2790	C	0.11
KY 3293	Boyd	0.986	2.407	73-221	6	720-1830	A-B	0.03-0.09
KY 3294	Boyd	0.000	9.445	125-287	4-5	1310-2430	A-B	0.05-0.11
KY 3533	Boyd	0.000	0.166	16		90	C	0.01
CR-1047D	Boyd	0.000	0.797	0		No Volumes		
CS-2349	Boyd	0.000	0.651	469-676		5380-7120	C	0.20
CS-2350	Boyd	0.000	1.571	266-977		2720-9490	A-D	0.08-0.37
CS-2492	Boyd	0.000	1.281	518-935	8	5950-9170	C	0.23-0.30
CS-2530	Boyd	0.255	1.808	0		No Volumes		
CS-2615	Boyd	0.000	0.368	1229		12300	D	0.43

Table 9: 2020 Greenup County Study Routes—Traffic Operations

Route	County	BMP	EMP	DHV	% Trucks	2020 ADT Rounded	2020 LOS	2020 v/c
US 23	Greenup	0.000	12.100	1049-2570		13690-30970	A-C	0.16-0.47
KY 1	Greenup	16.573	17.134	265	6	2270	C	0.1
KY 2	Greenup	17.112	17.463	98-204	8	940-2070	A-B	0.04-0.08
KY 5	Greenup	0.000	0.792	364	8	3710	C	0.14
KY 67	Greenup	12.900	13.039	378	25	4780	C	0.16
KY 207	Greenup	15.590	17.645	468-1162	6	5630-10660	C-D	0.19-0.44
KY 244	Greenup	0.000	3.654	192-407	5	1810-3370	B-C	0.08-0.15
KY 410	Greenup	0.000	0.681	58		430	A	0.02
KY 503	Greenup	9.052	9.287	104		1080	B	0.04
KY 693	Greenup	0.000	5.812	93-1338	5-9	940-15560	B-E	0.04-0.51
KY 750	Greenup	0.000	3.713	131-666	4-5	1290-4470	B-D	0.05-0.25
KY 1093	Greenup	0.000	1.954	516-556		4880-5730	C	0.19-0.20
KY 1172	Greenup	0.000	0.482	477	12	3760	C	0.21
KY 1725	Greenup	0.000	0.905	319-346	3	3290-4230	C	0.12-0.18
KY 2541	Greenup	0.000	1.619	87-228		740-2350	A-B	0.03-0.09
KY 2543	Greenup	0.000	0.183	347		3620	C	0.13
KY 3105	Greenup	0.000	3.568	107-168	8	740-1230	A-B	0.04-0.05
CR-1948	Greenup	0.000	1.543	168		1440	A	0.06
CS-5009	Greenup	0.000	1.318	152		1510	B	0.05
CS-7006	Greenup	0.000	0.107	168		1440	B	0.06

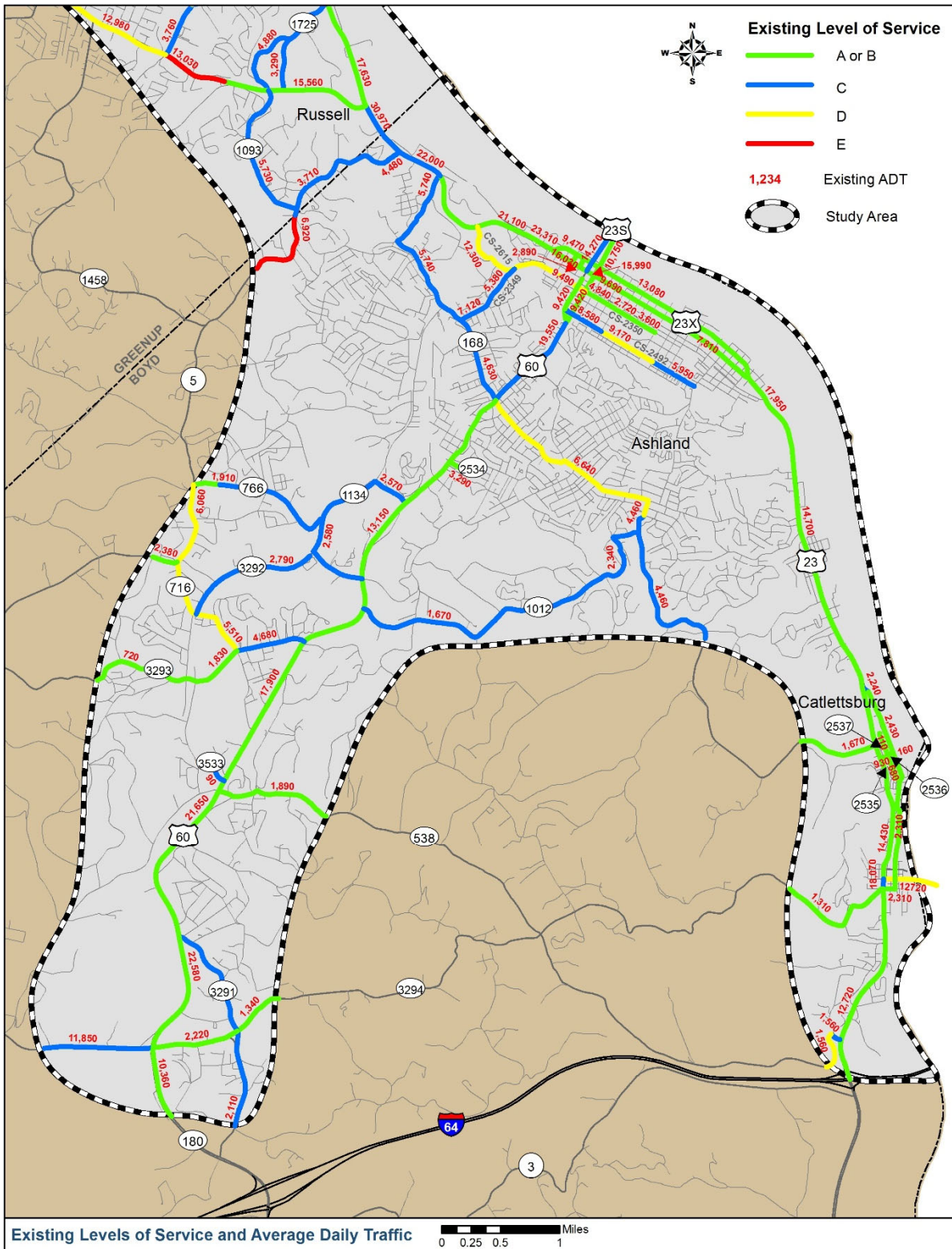


Figure 15: Boyd County Existing 2020 Traffic Volumes and LOS



2.8 Crash History

Historical crash data retrieved from the Transportation Enterprise Database (TED) warehouse were evaluated for study area roadways for a three-year period from January 2016 through December 2018. During the analysis period 3,564 total crashes were reported and sorted into three categories by severity: fatality, injury, or property damage only (PDO). Crashes were separated and mapped by manner of collision in **Figure 18**. Due to the large number, PDO crashes were not mapped. Complete crash records are included in **Appendix B**.

Severity. Of 3,564 reported crashes, 6 (<1%) were fatalities, 559 (16%) involved injuries, and 2,999 (83%) were PDOs. All fatal crashes identified occurred in Boyd County: 4 on US 60, 1 on KY 5, and 1 on US 23X (Winchester Avenue). Fatality details are listed in **Table 10**.

Table 10: Boyd County Fatal Crash Locations

Date	Time	Route	MP	Location	Crash	Human Factors
06/08/2018	5:33PM	KY 5	6.705	Summit near KY5/KY716	Motorcycle vs Jeep	Speed
08/11/2018	3:57PM	US 60	4.004	US 60/KY 180	Ambulance vs Motorcycle	
09/25/2018	5:37PM	US 60	4.318	US 60/Walmart Entrance	Vehicle vs Vehicle	Ran red light
04/17/2018	9:14PM	US 60	5.346	KYOVA Mall Intersection	Pedestrian vs Vehicle	
09/09/2017	8:02PM	US 60	9.345	Near Pitino Court on 13th	Motorcycle vs Motorcycle	Alcohol
11/29/2017	5:36PM	US 23X	1.396	Near Fat Patty's	Vehicle vs Pedestrian	Distracted

Manner of Collision. **Figure 17** summarizes crash type trends within the full study area showing the majority of crashes as rear end collisions (36%), followed by angle (23%), sideswipe (17%), and single vehicle (16%) collisions.

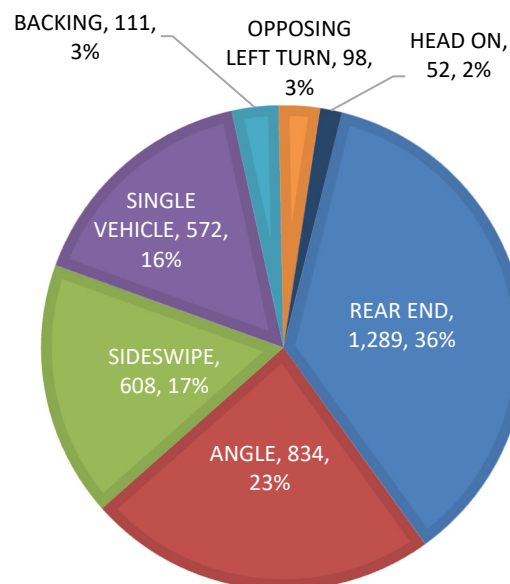


Figure 17: Study Area Crashes by Manner of Collision

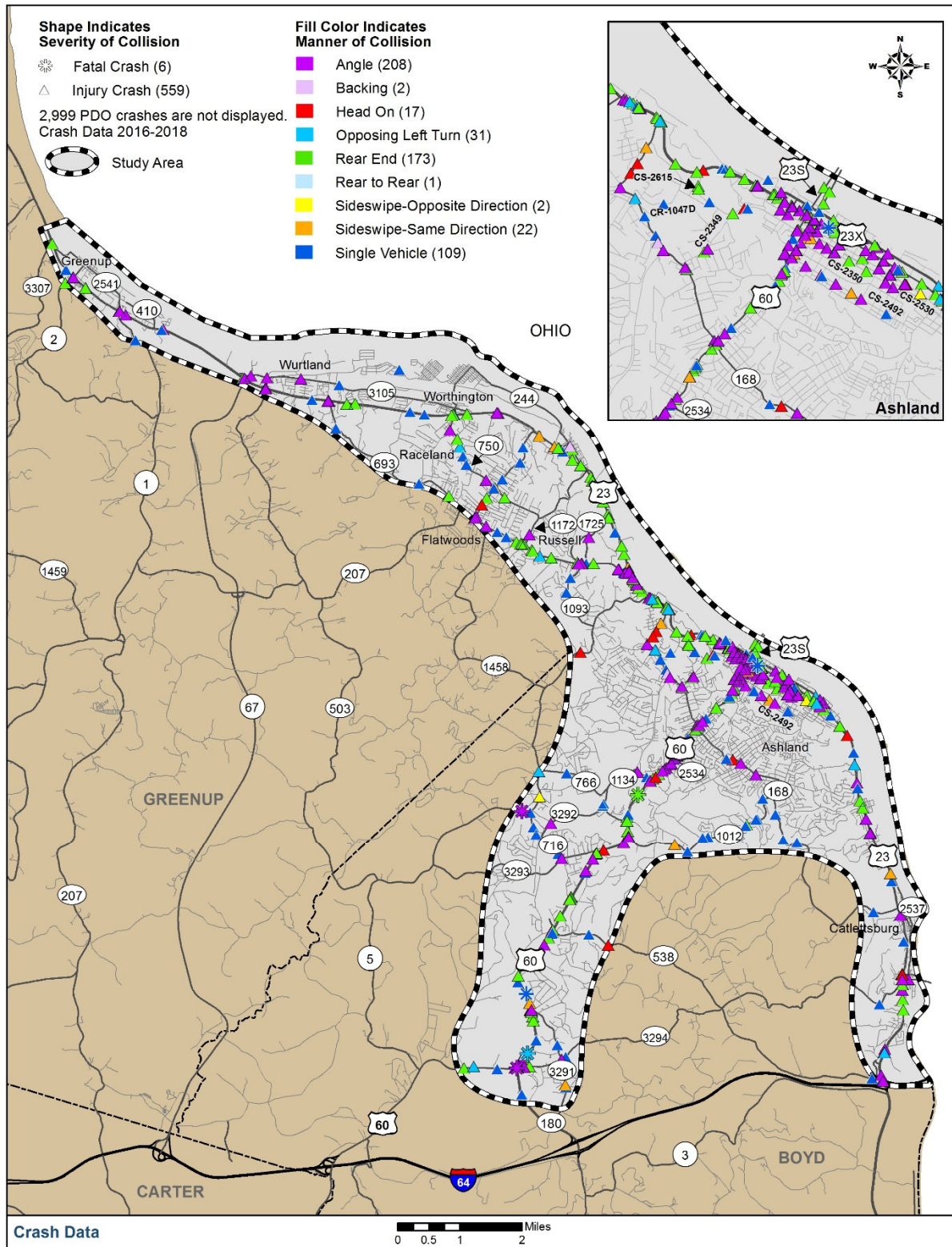


Figure 18: Study Area Fatal and Injury Crashes

Pedestrians. Twenty of 3,564 reported crashes involved pedestrian strikes, 2 of which were fatal. Eighteen of 20 pedestrian strikes occurred in Boyd County: 1 on US 23, 5 on US 23X (Winchester Avenue), 7 on US 60, 3 on CS-2492 (Lexington Avenue), and 1 each on KY 168 and CS-2350 (Central Avenue). Two occurred on KY 207 in Greenup County.

Bicycles. Nine of 3,564 reported crashes involved bicycle strikes, 8 of which were in Boyd County: 1 on US 23, 1 on US 23S, 4 on US 23X (Winchester Avenue), and 2 on US 60. The remaining bicycle strike occurred on KY 693 in Greenup County.

Figure 19 shows pedestrian and bicycle crash locations on study routes.

2.8.1 Critical Crash Rate Factors

Crashes were geospatially referenced and compared to statewide data to identify locations experiencing above-average crash rates. The Critical Crash Rate methodology used by the KYTC is defined in the Kentucky Transportation Center research report *Analysis of Traffic Crash Data in Kentucky (2014–2018)*¹⁴. As defined in the report, two analysis types were completed: “segments” and “spots.”

- Segments vary in length and are divided along roadways as geometry or traffic volumes change.
- Spots are defined by analyzing 0.1-mile-long sections where crashes are concentrated.

For each segment and spot, analysts examined crash numbers, traffic volume, roadway type, lane numbers, and segment length to determine critical crash rate factors (CCRF). CCRF is one measure of roadway safety, expressed as a ratio of the crash rate at a given location compared to statewide crash rates for similar roadways. A CCRF greater than 1.0 indicates crashes may be occurring more often than can be attributed to random occurrence. This procedure is a screening technique identifying locations where further analysis may be needed. It is neither a definitive statement nor measurement of a crash problem.

Analysis revealed 25 high crash segments and 80 high crash spots on study routes, illustrated on **Figure 20** (p. 33).

¹⁴ [Analysis of Traffic Crash Data in Kentucky \(2014-2018\)](#)

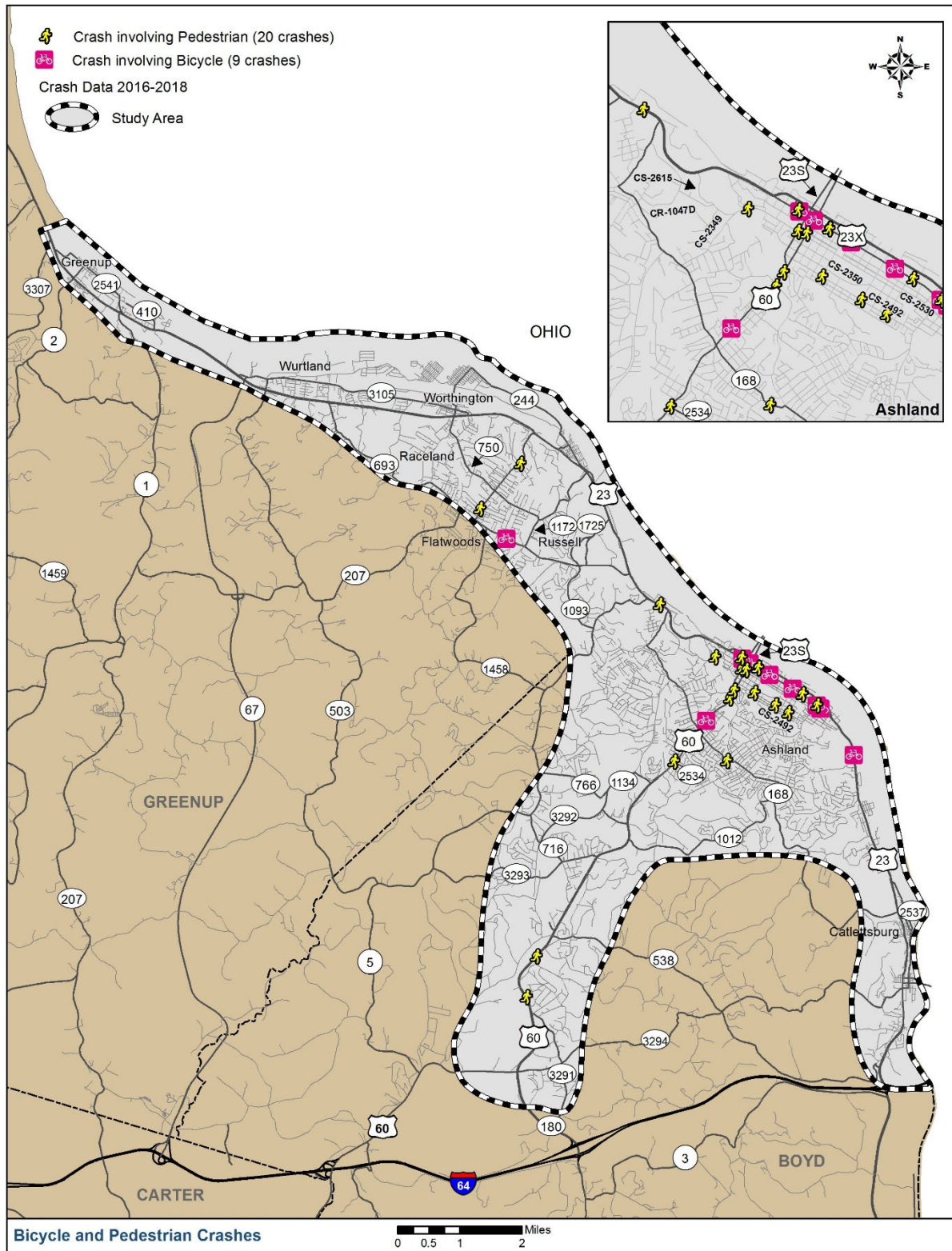


Figure 19: Bicycle and Pedestrian Crash Locations



High Crash Segments. Of 25 high crash segments identified on study routes (**Table 11** and **Table 12**), 21 are in Boyd County: 7 on US 60; 4 on CS-2530 (Carter Avenue); 3 on CS-2350 (Central Avenue); 3 on US 23X (Winchester Avenue); and 1 each on US 23, KY 716, KY 168 and CS-2492 (Lexington Avenue). Four high crash segments are in Greenup County, 1 each on KY 207, KY 693, KY 750, and KY 2541.

Table 11: Boyd County Study Routes—High Crash Segments

Boyd	Name	BMP	EMP	ADT	Crashes			CCRF
					Total	Fatal	Injury	
CS-2350	Central Ave.	0.880	1.098	4835	40		4	3.30
CS-2350	Central Ave.	1.098	1.39	2715	15		3	1.51
CS-2350	Central Ave.	1.571	2.441	3596	51		8	1.86
CS-2492	Lexington Ave.	0.000	0.363	8576	43	1	7	1.57
CS-2530	Carter Ave.	0.829	1.303	4800	27		3	1.26
CS-2530	Carter Ave.	1.303	1.375	2700	6			1.45
CS-2530	Carter Ave.	1.375	1.519	2700	12		3	1.46
CS-2530	Carter Ave.	1.593	1.808	2700	14		2	1.73
KY 168		7.968	8.179	5737	14			1.04
KY 716		0.000	0.565	4675	26			1.08
US 23		18.984	19.157	23301	44		3	1.37
US 23X	Winchester Ave.	0.000	1.25	7808	109		21	1.28
US 23X	Winchester Ave.	1.250	1.551	9686	72	2	12	2.32
US 23X	Winchester Ave.	1.551	1.796	16022	67		10	2.13
US 60		9.880	10.818	13142	126		22	1.20
US 60		11.711	12.058	9415	55		11	1.36
US 60		12.058	12.182	9415	44		8	3.51
US 60		12.182	12.254	15983	56		4	4.51
US 60		12.254	12.329	16022	37		2	2.89
US 60		12.329	12.409	2886	7		1	1.53
US 60		11.835	12.128	9415	53		7	2.22

Table 12: Greenup County Study Routes—High Crash Segments

Greenup	Name	BMP	EMP	ADT	Crashes			CCRF
					Total	Fatal	Injury	
KY 207	Argillite Rd.	15.880	16.452	10654	56		4	1.18
KY 693	Diederich Blvd.	5.165	5.812	15557	94		9	1.07
KY 750	Lexington Ave.	1.371	1.595	4465	12		3	1.03
KY 2541	Main St.	0.927	1.017	1496	6			1.77

High Crash Spots. Eighty 0.1-mile spots with CCRF values greater than 1.0 are summarized in **Table 13** and **Table 14**. Fifty-eight percent of total study area high crash spots are concentrated on five routes: four routes in Boyd County—CS-2530 (Central Avenue), US 60, US 23X (Winchester Avenue), and US 23 (Greenup Avenue)—plus one on KY 693 in Greenup County.

Table 13: Boyd County Study Routes—60 High Crash Spots

Boyd	Name	BMP	EMP	ADT	Crashes			CCRF
					Total	Fatal	Injury	
CS-2350	Central Ave.	0.800	0.900	5300	25		4	3.30
CS-2350	Central Ave.	0.900	1.000	4835	16		1	2.24
CS-2350	Central Ave.	1.000	1.100	2927	19		2	3.63
CS-2350	Central Ave.	1.100	1.200	2715	9		2	1.80
CS-2350	Central Ave.	1.600	1.700	3596	45		7	7.59
CS-2492	Lexington Ave.	0.000	0.100	8565	25		4	2.39
CS-2530	Carter Ave.	0.700	0.800	9400	12		5	1.07
CS-2530	Carter Ave.	0.800	0.900	4800	8		1	1.12
CS-2530	Carter Ave.	1.000	1.100	4800	8			1.12
CS-2530	Carter Ave.	1.100	1.200	4800	8			1.12
CS-2530	Carter Ave.	1.300	1.400	2700	6			1.20
CS-2530	Carter Ave.	1.400	1.500	2700	7		2	1.40
CS-2530	Carter Ave.	1.500	1.600	2700	9		2	1.39
CS-2530	Carter Ave.	1.800	1.900	2700	6		1	1.20
CS-2615	River Hill Dr.	0.100	0.200	11381	13		2	1.02
KY 168		0.200	0.300	1669	3			1.09
KY 168		5.700	5.800	6638	15	1		1.70
KY 168		5.800	5.900	4825	14		2	1.96
KY 168		6.700	6.800	5737	8		1	1.00
KY 168		6.800	6.900	5737	10		1	1.25
KY 168		8.100	8.200	5737	11			1.38
KY 538	Shopes Creek	0.000	0.100	1882	7		2	1.73
KY 716		0.000	0.100	4675	11			1.57
KY 716		0.600	0.700	5506	9		2	1.16
KY 766	Bob McCullough	1.500	1.600	2571	6		1	1.24
KY 3293	Little Garner Rd.	1.800	1.900	1823	5			1.26
KY 3294	Cannonsburg Rd.	7.700	7.800	2301	5		1	1.10
KY 3294	Cannonsburg Rd.	8.500	8.600	2301	6			1.32
US 23		10.600	10.700	12717	14		6	1.04
US 23		11.100	11.200	12717	14		7	1.04
US 23		12.400	12.500	14430	19		7	1.06
US 23		18.900	19.000	23301	26		4	1.23
US 23		19.100	19.200	22196	31		4	1.53
US 23		19.700	19.800	21091	22		0	1.13
US 23		20.300	20.400	21544	20		6	1.01
US 23		20.500	20.600	21997	25		5	1.24
US 23S	MLK Blvd.	0.000	0.100	10746	20		3	1.19
US 23X	Winchester Ave.	0.100	0.200	7808	15		3	1.31
US 23X	Winchester Ave.	0.200	0.300	7808	28		6	2.44
US 23X	Winchester Ave.	0.700	0.800	7808	13		4	1.13
US 23X	Winchester Ave.	0.800	0.900	7808	12		3	1.05
US 23X	Winchester Ave.	1.300	1.400	9686	17	1	4	1.27
US 23X	Winchester Ave.	1.400	1.500	9686	14	1	1	1.05
US 23X	Winchester Ave.	1.500	1.600	15705	50		9	2.62

Table 13: Boyd County Study Routes—60 High Crash Spots (Continued)

Boyd	Name	BMP	EMP	ADT	Crashes			CCRF
					Total	Fatal	Injury	
US 23X	Winchester Ave.	1.600	1.700	16022	36		7	2.27
US 23X	Winchester Ave.	1.700	1.800	16022	20		1	1.26
US 60		4.000	4.100	21506	24	1	4	1.21
US 60		5.000	5.100	22579	23	1	10	1.12
US 60		6.500	6.600	16020	27		4	1.70
US 60		7.100	7.200	17893	22		6	1.28
US 60		10.400	10.500	13142	21		4	1.26
US 60		10.800	10.900	18905	31		3	1.41
US 60		11.500	11.600	19545	35		3	1.55
US 60		11.600	11.700	19545	31		8	1.37
US 60		12.000	12.100	12717	33		6	1.73
US 60		12.100	12.200	14430	20		4	1.36
US 60		12.200	12.300	16020	84		4	5.29
US 60		11.800	11.900	9415	23		2	2.12
US 60		11.900	12.000	9415	16		2	1.47
US 60		12.000	12.100	9415	14		4	1.29

Table 14: Greenup County Study Routes—20 High Crash Spots

Greenup	Name	BMP	EMP	ADT	Crashes			CCRF
					Total	Fatal	Injury	
KY 2		17.100	17.200	1046	5			1.69
KY 207	Argillite Rd.	15.800	15.900	9654	27		1	2.37
KY 207	Argillite Rd.	16.400	16.500	6128	18		1	2.16
KY 244	Stewart Ave.	0.700	0.800	1804	4		1	1.01
KY 503		9.000	9.100	1080	4			1.33
KY 693	Diederich Blvd.	3.000	3.100	3875	12		1	1.93
KY 693	Diederich Blvd.	3.100	3.200	12972	25		1	1.78
KY 693	Diederich Blvd	3.900	4.000	12972	22		4	1.57
KY 693	Diederich Blvd	4.900	5.000	15557	32		6	2.94
KY 693	Diederich Blvd	5.000	5.100	15557	19		1	1.74
KY 693	Diederich Blvd	5.600	5.700	15557	24		3	1.54
KY 693	Diederich Blvd	5.700	5.800	15557	41		4	2.64
KY 750	Lexington Ave.	1.500	1.600	4491	8		2	1.17
KY 1093	Country Club Dr.	1.200	1.300	5643	16		2	2.02
KY 2541	Main St.	0.900	1.000	1581	6			1.63
KY 3105	Greenup Ave.	3.000	3.100	738	3			1.20
KY 3105	Greenup Ave.	3.500	3.600	738	3			1.20
US 23		0.300	0.400	17621	22		4	1.29
US 23		1.800	1.900	18450	33		1	1.87
US 23		2.600	2.700	18203	18		2	1.03

3.0 ENVIRONMENTAL

An environmental overview was conducted to identify resources and potential issues for consideration during the development of transportation improvement concepts. As a high-level planning overview for a large study area, the environmental overview looked at general, county-wide issues rather than site-specific issues. Natural and human environmental resources were identified from readily available databases. Study area environmental resources are shown in **Figure 22** and **Figure 23** on the following pages and summarized in the following sections. The intent is to identify potential environmental issues that merit investigation during any future project development activities rather than to quantify impacts.

The study area includes a series of small communities along the Ohio River in northeastern Kentucky: Catlettsburg, Ashland, Russell, Flatwoods, Raceland, Worthington, Wurtland, and Greenup. Ashland is the county seat for Boyd County; the city of Greenup is the county seat for Greenup County. Nearby Ironton, Ohio, and Huntington, West Virginia, complete the metropolitan area.

3.1 Natural Environment

“Natural environment” typically refers to all living and non-living things found to occur in nature, and includes aquatic ecology such as rivers, streams, and wetlands; threatened and endangered species; farmlands; and geotechnical resources.

Streams and Wetlands. The most notable water resources are the Ohio River and the Big Sandy River, which form the northeastern boundary of the study area and the state. Moving south to north, other named streams in the area include Chadwick Creek, Shope Creek, Ice Dam Creek, Catletts Creek, Horse Creek, Keys Creek, Hood Creek, White Oak Creek, Pond Run, Uhlens Run, the Little Sandy River. There are numerous unnamed streams.

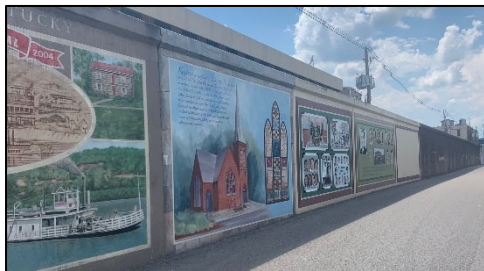


Figure 21: Floodwall along Ohio River

Sizable floodplains are associated with the larger streams, covering most land area east of US 23 excluding Ashland and the CSX yard. A series of floodwalls protect the cities (**Figure 21**).

No federally designated Wild or Scenic Rivers or Outstanding State Resource Waters exist in the study area. One wellhead protection area exists, associated with Worthington Public Works. Small, scattered wetlands exist within the study area, primarily associated with rivers and streams.

Impacts to streams and wetlands require permit coordination with the US Army Corps of Engineers, US Coast Guard, and/or Kentucky Division of Water, depending on the scale of the water resource and potential disturbance.

Protected Species. Three bat and eleven mussel species within Boyd and Greenup counties are on the federal list of Threatened or Endangered Species, summarized in **Table 15** (p. 40). The larger region—including all of Greenup, Carter, and Lewis counties—is designated as critical habitat for Indiana bats (*Myotis sodalis*).

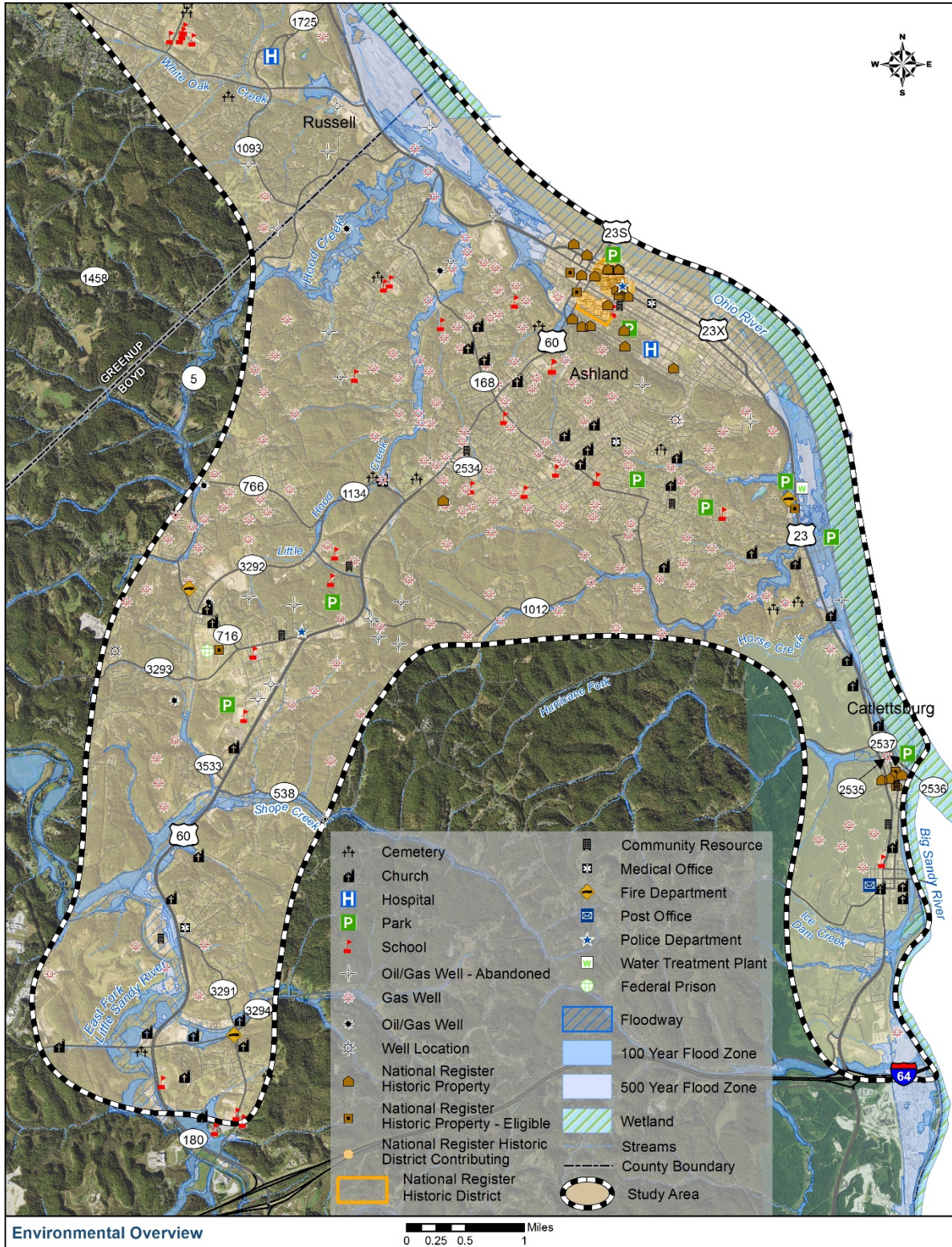


Figure 22: Study Area Environmental Resources, Boyd County

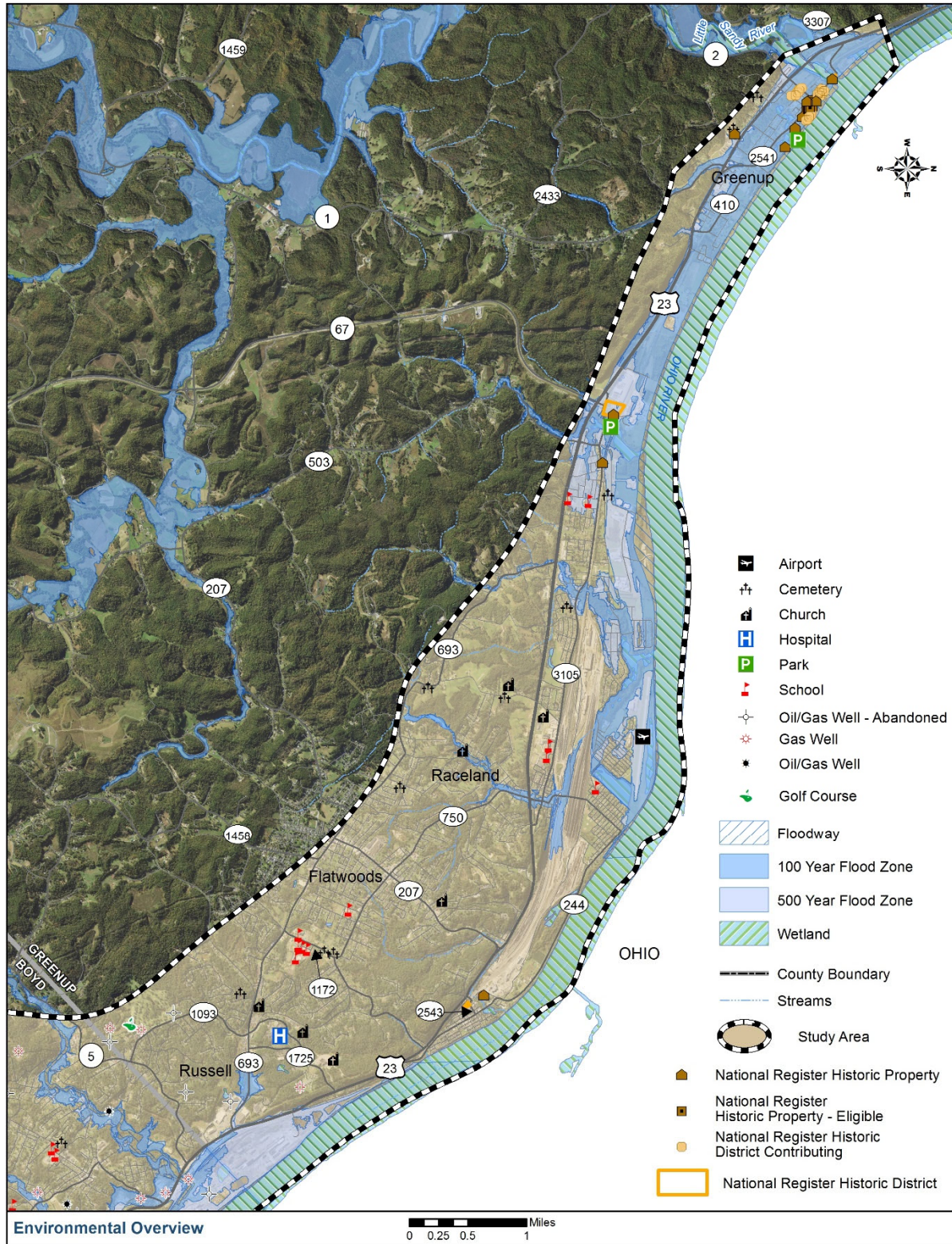


Figure 23: Study Area Environmental Resources, Greenup County

Table 15: Threatened/Endangered Species in Boyd and Greenup Counties

Group	Name	Scientific Name	Status
Mammals	Gray bat	<i>Myotis grisescens</i>	Endangered
Mammals	Indiana bat	<i>Myotis sodalis</i>	Endangered
Mammals	Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened, with 4D Rule
Mussels	Northern riffleshell	<i>Epioblasma rangiana</i>	Endangered
Mussels	Sheepnose	<i>Plethobasus cyphus</i>	Endangered
Mussels	Clubshell	<i>Pleurobema clava</i>	Endangered
Mussels	Fanshell	<i>Cyprogenia stegaria</i>	Endangered
Mussels	Orangefoot pimpleback	<i>Plethobasus cooperianus</i>	Endangered
Mussels	Purple cat's paw	<i>Epiblasma obliquata</i>	Endangered
Mussels	Rabbitsfoot	<i>Quadrula cylindrica</i>	Threatened
Mussels	Ring pink	<i>Obovaria retusa</i>	Endangered
Mussels	Rough pigtoe	<i>Pleurobema plenum</i>	Endangered
Mussels	Snuffbox	<i>Epioblasma triquetra</i>	Endangered
Mussels	Spectaclecase	<i>Cumberlandia mododonta</i>	Endangered

Projects that occur within an area of known bat habitat will require project-specific evaluation to assess appropriate minimization/mitigation measures. For other federally listed species, specific ecological surveys may be required for projects that have the potential to impact habitat. Coordination with the US Fish and Wildlife Service Kentucky Field Office will be necessary to determine the need for future project-specific surveys.

Farmland Classifications. The Natural Resource Conservation Service (NRCS) soil survey shows 18% of soils in the study area represent prime farmlands. If drained or otherwise protected from flooding, an additional 12% of soils meet the criteria for prime farmland. Additionally, 10% of the soils represent farmlands of statewide importance. The remaining 60% are not prime farmland soils. The geographic distribution of these designations is shown in **Figure 24**.

No agricultural districts or other protected easements were identified in the vicinity of the study area.

Geotechnical. The study area lies within the Eastern Coal Fields Physiographic Region of the state, characterized by an outcrop of Pennsylvanian bedrock known for its shale, sandstone, and coal. Kentucky Geological Survey records note several landslides along the ridge generally paralleling US 23.

Oil and gas wells are common, particularly near Ashland and Catlettsburg. Numerous water wells serve the area, concentrated in more rural areas west of the study area.

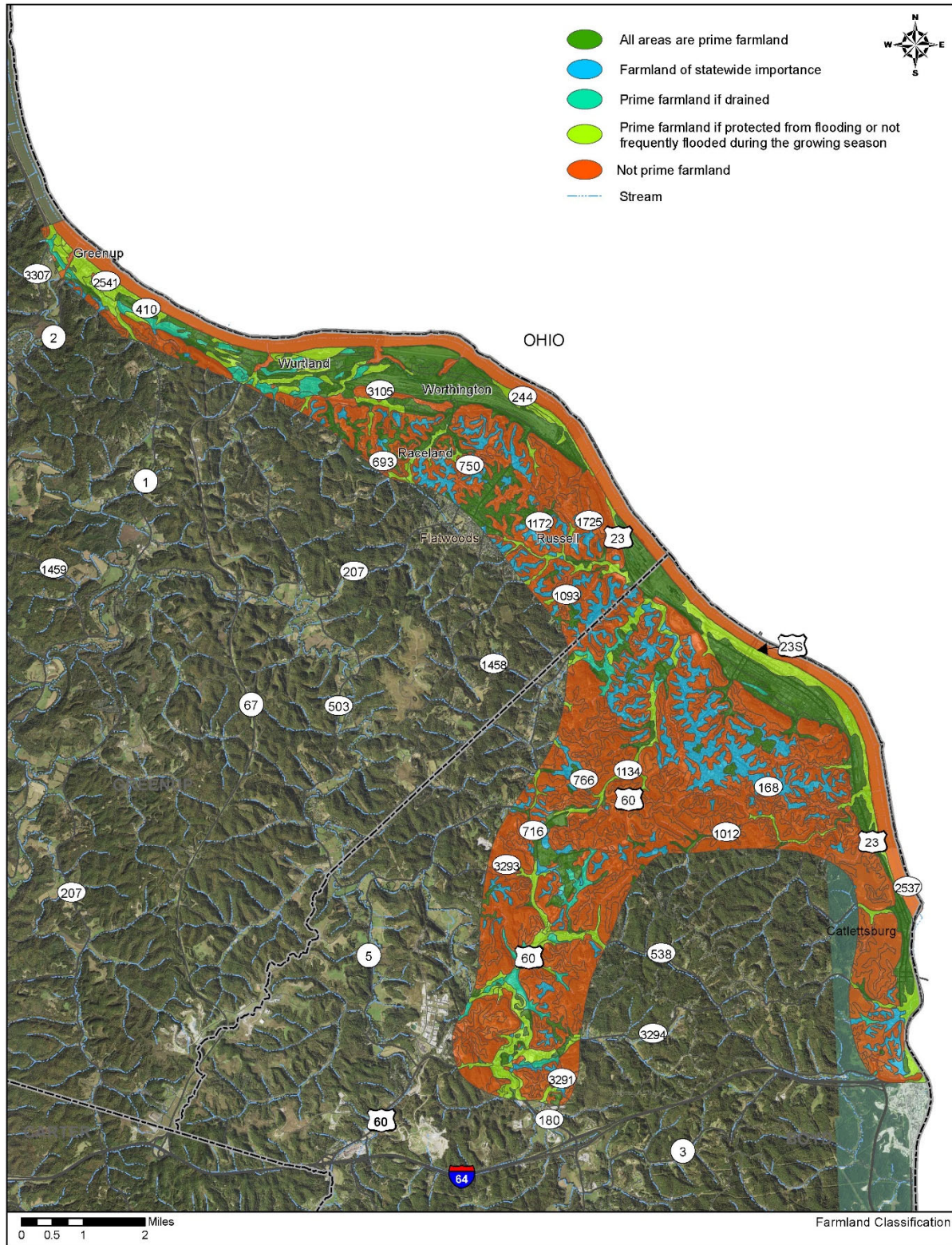


Figure 24: NRCS Farmland Soil Classifications

3.2 Human Environment

The “human environment” is often defined as the built environment or as the communities where we live. Such resources that could be impacted by roadway projects are discussed in the following sections.

Land Use. The region’s present character is closely connected to its historic mining ties for oil, coal, and iron. Ashland developed as a busy trade center with a robust transportation system—rail, river, and highway ties supporting its industries.

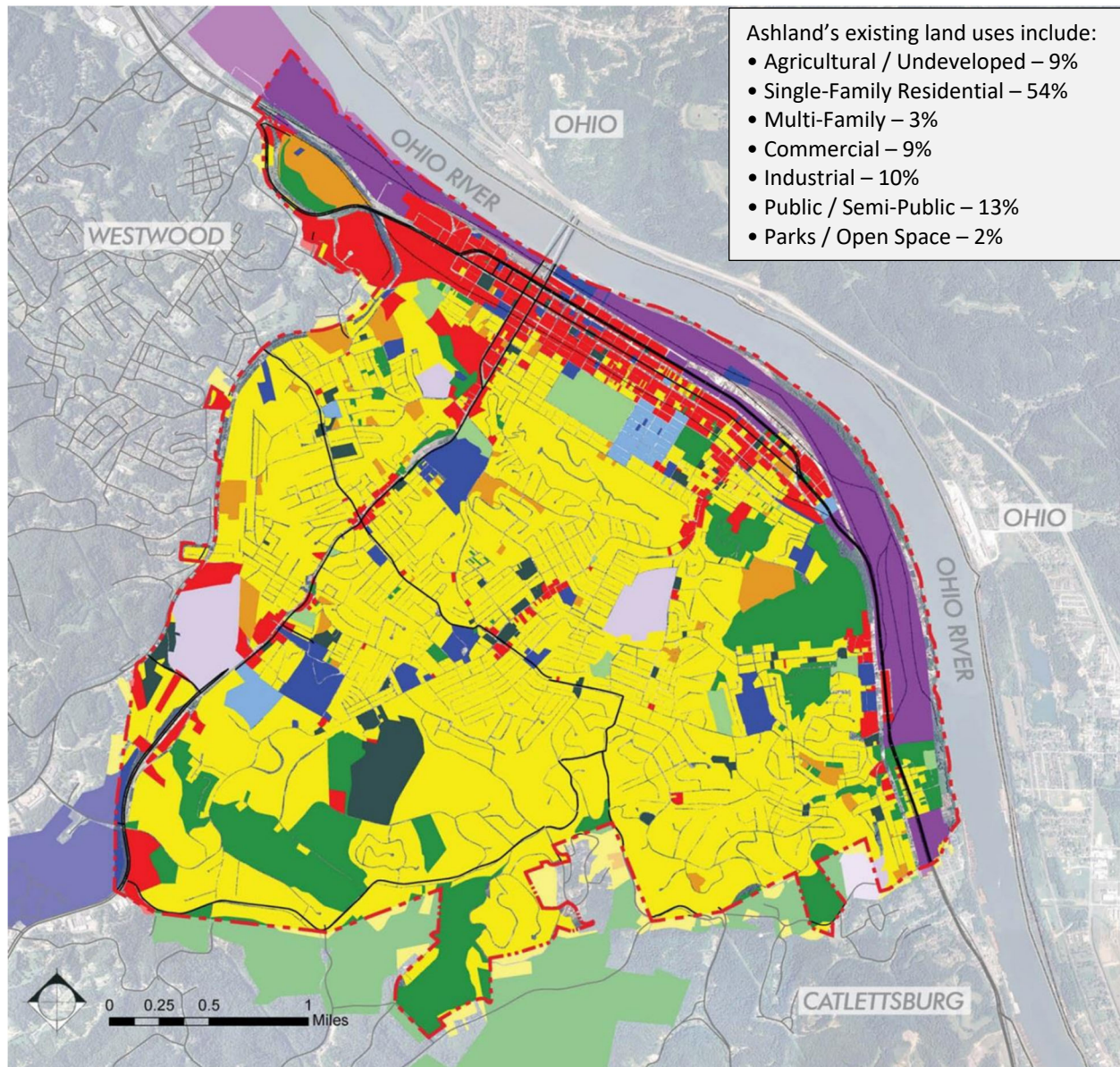
Land use is primarily residential, with pockets of commercial development along major highways, and a swath of industrial developments along the riverfront. Each incorporated area generally has its own municipal center and commercial area(s). CSX maintains a large yard along the riverfront from West Russell to Wurtland. The City of Ashland published its latest draft Comprehensive Plan in 2020; its land use map is shown in **Figure 25**.

Employment. Census Bureau estimates of civilian employment by industry (2014–2018) show the most common industries in the two-county study region are Education/Health Care/Social Assistance, followed by Retail Trade and Manufacturing. Major employers¹⁵ include:

- King’s Daughters Medical Center, Ashland: 3,700 employees
- Marathon Petroleum, Catlettsburg: 1,550 employees
- Our Lady of Bellefonte Hospital, Russell: 1,260 employees, *CLOSED 2020*
- Catlettsburg Refining LLC, Catlettsburg: 740 employees
- Boyd County Schools: 570 employees
- Ashland Independent Schools: 510 employees
- Greenup Public Schools: 480 employees
- Pathways, Inc., Ashland: 290 employees
- Russell Independent Schools: 290 employees
- Cintas, Ashland: 280 employees
- Ashland Community and Technical College: 220 employees
- Calgon Carbon Corp, Catlettsburg: 200 employees
- Special Metals Corp, Catlettsburg: 200 employees

Braidy Industries planned construction of a \$1.7 billion aluminum rolling mill along KY 67, is projected to add 600+ new jobs and currently has a 2021 build year. While these assumptions were reflected in the future traffic model assumptions, the company is currently facing funding and legal challenges making implementation timeframes difficult to predict.

¹⁵ Employment estimates provided by Ashland Alliance (ashlandalliance.com) and KY Cabinet for Economic Development (thinkkentucky.com)



Source: 2020 Draft Ashland Comprehensive Plan

Figure 25: Land Use within the City of Ashland

Census Bureau estimates of commuting flows (2011–2015) show 75% of over 31,000 workers living in Boyd and Greenup counties work in the same two-county area. Other residents opt to commute outward to Cabell County, WV (1,371 employees); Scioto County, OH (1,308 employees); Lawrence County, OH (721 employees); and others. Similarly, Boyd and Greenup counties attract commuters in to work: from Lawrence County, OH (3,092 employees); Carter County, KY (1,615 employees); Cabell County, WV (1,063 employees); Scioto County, OH (897 employees); and others.

Community Features. Numerous community resources are located within the study area, shown on **Figure 22** and **Figure 23** (pp. 38-39).

Parks and Recreation: Each county maintains a network of parks and public greenspaces: the Ashland/Boyd County Dog Park, Armco Park, Port of Ashland, Central Park, Wendal Banks South Side Park, AK Steel Sports Park, Clyffeside Park, Akers Park, Greenup City Park, and Wolfpen Music Park lie within the study area.

Public parks are protected by Section 4(f) of the US Department of Transportation Act, which protects public parks, recreation areas, wildlife refuges, and historic sites from conversion to a transportation use. Parks/recreation areas that received grants through the Land and Water Conservation Fund Act (LWCFA) are also protected by Section 6(f) regulations. Overall, 18 LWCFA grants have been awarded in Boyd and Greenup counties, several falling within the limits of the study area (**Appendix C**). If any proposed improvements involve additional right-of-way from within a park or recreation area, Section 4(f) and Section 6(f) requirements shall be considered during future project development phases.

Schools and Universities: Several school districts serve the project area: Boyd County Public Schools, Ashland Independent, Greenup County School District, Russell Independent Schools, and Raceland Worthington Schools. Ashland Community and Technical College provides post-secondary education for the region. In addition to the existing schools in the area, the Raceland Worthington District is constructing middle school facilities adjacent to the existing high school along US 23, with a December 2020 completion anticipated.

Historic Districts and Properties: Numerous historic districts and properties are located within the study area. The greatest concentration of historic sites and districts are within downtown Ashland, Catlettsburg, and Greenup. A windshield survey to identify additional properties that could satisfy National Register of Historic Places (NRHP) criteria was conducted in the vicinity of proposed spot improvements (see **Chapter 6**). Two additional resources were noted which may require further consideration as part of any future project development activities. These are noted below.

- The 1940s Tudor-style commercial building (**Figure 26**) southwest of the US 60/KY 168/Algonquin Avenue intersection. The adjoining neighborhood, which continues westward along Algonquin Avenue and US 60, also merits consideration as a NRHP district.
- Large swaths of the community of Worthington may satisfy criteria to be considered a NRHP district as well.

If any proposed improvements involve additional right-of-way from within a listed historic site or an additional site meeting the criteria to qualify for NRHP eligibility, Section 4(f) requirements must be considered during future project development phases. Consultation with the Kentucky Heritage Council would also be required in accordance with Section 106 of the *National Historic Preservation Act*.



Figure 26: Potentially Historic Tudor-style Building, Boyd County

Churches and Cemeteries: Dozens of churches and other places of worship are located throughout the study area, as shown on **Figure 22** and **Figure 23** (pp. 38-39). Four large cemeteries serve the region: Golden Oaks off 55th Street, Ashland Cemetery off Belmont Street, Rose Hill near the Winslow community, and Bellefonte Memorial Gardens off Red Devil Lane. Numerous other smaller cemeteries are noted throughout the area; additional unmarked burial grounds may exist, particularly as small family plots are common in more rural areas.

Other Services: Most civic services are concentrated in downtown Ashland. A variety of local fire departments serve the study area: England Hill, Catlettsburg, Ashland, Summitt-Ironville, Russell, Flatwoods, Raceland, Worthington, Wurtland, Greenup, and Little Sandy. Law enforcement is provided by sheriff's offices in both counties and local police departments in Greenup, Wurtland, Flatwoods, Raceland, Worthington, Russell, Bellefonte, Ashland, and Catlettsburg. The Kentucky State Police have a post along US 60 off KY 716 in the study area. Emergency medical services are provided at Kings Daughters Hospital in Ashland. A smaller hospital in Russell also served the region but was closed in Spring 2020.

Demographic Trends. Included as **Appendix E**, an assessment of demographic trends was completed by FIVCO to identify potential sensitive population concentrations. This socioeconomic study reviewed 2018 Census estimates to identify potential environmental justice concentrations of low-income, minority, elderly, disabled, or limited English proficiency persons. Summarized in **Table 16**, **Table 17**, and **Figure 27**, the analysis concluded that potential environmental justice (EJ) populations exceed county averages in 49 of 52 block groups within the study area. Additional analysis may be required as part of future project development phases, especially if improvements in any of the 49 block groups with higher than average EJ populations require additional right-of-way or residential relocations.

Table 16: Summary of Demographic Trends, Boyd County

Geography	2010 Population	% Minority	% Below Poverty	% Elderly	% Disabled	% LEP
United States	312,916,765	23.5%	13.4%	14.9%	12.6%	8.5%
Kentucky	4,293,245	12.4%	16.9%	15.2%	17.3%	2.2%
Boyd & Greenup	84,498	5.0%	18.3%	20.0%	26.5%	0.4%
Boyd T302 BG1	1,381	15.6%	53.9%	14.7%	35.0%	1.2%
Boyd T303 BG1	1,010	5.1%	36.8%	28.9%	26.8%	0.6%
Boyd T303 BG2	487	0.0%	24.1%	28.3%	49.7%	0.0%
Boyd T303 BG2	549	10.7%	29.0%	11.0%	27.6%	0.0%
Boyd T304 BG1	2,268	9.5%	30.0%	10.7%	26.7%	0.9%
Boyd T305 BG1	1,693	9.2%	17.4%	20.0%	29.1%	0.0%
Boyd T305 BG2	1,668	8.8%	4.9%	20.9%	25.7%	0.0%
Boyd T305 BG3	1,123	13.1%	16.9%	21.3%	26.0%	0.0%
Boyd T306 BG1	1,140	6.5%	11.6%	26.2%	22.8%	0.0%
Boyd T306 BG1	1,029	2.7%	12.0%	21.0%	22.1%	0.0%
Boyd T306 BG3	1,237	0.0%	1.6%	24.2%	17.8%	0.0%
Boyd T306 BG4	807	6.3%	10.0%	15.2%	26.5%	0.0%
Boyd T307 BG1	1,144	6.9%	22.8%	18.5%	19.6%	0.0%
Boyd T307 BG2	1,456	5.4%	10.1%	24.6%	22.8%	0.6%
Boyd T307 BG3	797	12.2%	20.4%	17.9%	26.8%	0.0%
Boyd T308 BG1	2,040	6.9%	50.0%	9.3%	35.8%	0.0%
Boyd T308 BG2	1,876	7.4%	33.4%	15.5%	28.2%	0.0%
Boyd T309 BG1	1,372	0.0%	9.3%	26.3%	23.8%	0.0%
Boyd T309 BG2	1,210	11.5%	41.9%	13.7%	41.0%	0.0%
Boyd T309 BG3	1,590	7.2%	26.1%	13.2%	17.3%	2.5%
Boyd T309 BG4	1,352	2.0%	11.0%	35.4%	28.2%	0.0%
Boyd T310.01 BG1	1,463	3.5%	15.2%	20.5%	27.4%	0.6%
Boyd T310.02 BG1	1,063	5.1%	12.1%	9.5%	16.2%	1.1%
Boyd T310.02 BG2	999	3.0%	22.2%	25.2%	40.3%	0.0%
Boyd T310.02 BG3	2,003	*41.9%	6.3%	6.7%	11.2%	3.1%
Boyd T310.02 BG4	1,715	1.2%	3.9%	35.7%	31.2%	0.0%
Boyd T310.02 BG5	1,162	7.9%	21.0%	14.7%	32.6%	0.0%
Boyd T311 BG1	2,385	0.0%	15.6%	15.6%	22.0%	0.0%
Boyd T311 BG2	1,416	0.0%	6.2%	12.4%	24.4%	0.0%
Boyd T311 BG4	1,169	0.0%	28.3%	12.9%	41.7%	0.0%
Boyd T312 BG1	1,853	0.0%	7.5%	25.8%	22.2%	0.0%
Boyd T313 BG1	892	3.4%	37.3%	19.9%	33.2%	0.0%
Boyd T313 BG2	740	13.3%	36.0%	21.5%	34.3%	1.8%
Boyd T313 BG3	904	3.6%	13.6%	18.9%	18.2%	0.0%

*Site of Federal Prison as noted in Appendix E

Table 17: Summary of Demographic Trends, Greenup County

Geography	2010 Population	% Minority	% Below Poverty	% Elderly	% Disabled	% LEP
United States	312,916,765	23.5%	13.4%	14.9%	12.6%	8.5%
Kentucky	4,293,245	12.4%	16.9%	15.2%	17.3%	2.2%
Boyd & Greenup	84,498	5.0%	18.3%	20.0%	26.5%	0.4%
Greenup T401 BG1	731	9.3%	24.0%	12.3%	20.0%	0.0%
Greenup T401 BG2	1,141	3.6%	11.4%	19.4%	26.7%	0.0%
Greenup T401 BG3	802	2.7%	3.5%	32.9%	16.2%	0.6%
Greenup T401 BG4	1,100	10.8%	1.4%	23.8%	20.5%	4.4%
Greenup T401 BG5	729	4.6%	9.9%	34.9%	26.9%	0.0%
Greenup T402.01 BG1	1,384	0.3%	9.0%	32.3%	26.9%	0.0%
Greenup T402.01 BG2	1,545	5.9%	18.7%	13.7%	23.6%	0.0%
Greenup T402.02 BG1	1,223	2.4%	13.9%	16.1%	26.5%	0.0%
Greenup T402.02 BG2	1,824	6.6%	11.7%	21.1%	25.5%	0.0%
Greenup T402.02 BG3	1,342	2.8%	19.6%	5.5%	23.7%	0.0%
Greenup T403 BG1	1,755	0.3%	14.3%	22.8%	26.2%	0.3%
Greenup T403 BG2	1,731	1.7%	23.9%	17.2%	25.5%	0.0%
Greenup T403 BG3	9,17	3.6%	4.5%	22.8%	24.1%	0.0%
Greenup T404 BG1	1,159	3.8%	15.2%	32.5%	32.6%	0.0%
Greenup T404 BG2	2,583	3.9%	11.7%	19.4%	27.2%	0.0%
Greenup T405.02 BG1	1,054	2.5%	25.8%	18.8%	23.6%	0.0%
Greenup T405.02 BG2	1,080	14.3%	20.2%	23.5%	23.4%	0.3%
Greenup T405.02 BG3	1,327	1.6%	14.3%	21.6%	22.7%	0.0%

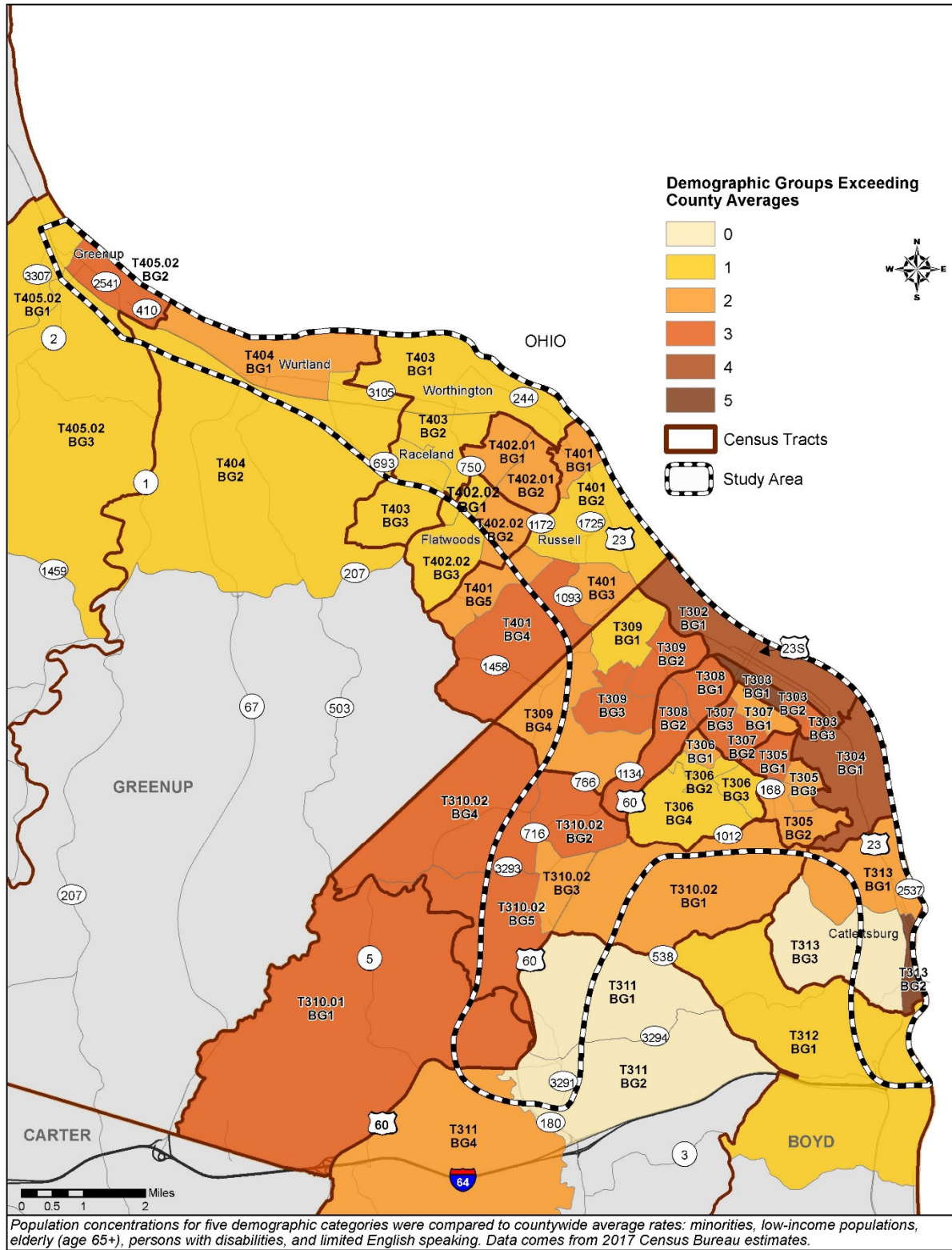


Figure 27: Potential Environmental Justice Population Concentrations

Hazardous Materials Considerations. Due to the large size of the study area, a detailed government database search was not conducted. Instead, readily available records from the US Environmental Protection Agency (USEPA) were compiled to illustrate the range of monitored sites within the study area. Records range from short-term construction permits to large-scale industrial pollutant handlers/generators. **Figure 22** and **Figure 23** (pp. 38–39) also show numerous gas wells concentrated in the Boyd County portion of the study area, and the few in Greenup County located near the Boyd County line.

Air Quality Considerations. The region is currently in attainment for all criteria pollutants monitored by the USEPA. However, compliance is complicated by the multi-state jurisdiction and changing USEPA standards. A 2018 court ruling requires continuing conformity demonstrations for ozone emissions based on 1997 standards; KYOVA's transportation improvement program (TIP) development processes continue to incorporate performance measures and air quality conformity requirements. Maintenance plans for particulate matter (PM_{2.5}) went into effect during 2011-2012 for each of the states comprising the MPO region.

To demonstrate air quality conformity, any federally funded transportation projects recommended for further development should be modeled and included in the MPO's TIP and the KYTC's statewide transportation improvement program (STIP) to ensure conformity requirements are satisfied.

Noise Considerations. Federally funded transportation projects typically require consideration of noise impacts. Noise sensitive receptors in the vicinity of improvements include residential areas, parks, cemeteries, hospitals, churches, schools, etc. Some commercial properties with exterior uses are also considered noise sensitive. Specific traffic noise impact analyses may be required as part of future project development activities if projects are identified that add capacity or shift traffic closer to sensitive receptors.

4.0 INITIAL COORDINATION EFFORTS

Collaborative project team, local official/stakeholder (LO/S), and public meetings were held throughout the study. The project team was composed of KYTC District 9 and Central Office staff from various disciplines, along with KYOVA, FIVCO, and consultant personnel. LO/S involvement, public input, and online engagement activities played important roles in gathering information from a variety of local perspectives, identifying areas of concern, and developing potential improvements. Summaries of all meetings are in **Appendix D**.

4.1 Project Team Meeting No.1

The project team reviewed existing conditions data including high crash locations, 2020 traffic, and environmental features during the first meeting held at KYTC District 9 November 19, 2019. Existing LOS on roadway segments in the study area are acceptable, with a few exceptions discussed in **Section 2.7**. All current v/c calculations were 0.63 or less, signifying no major congestion issues based on daily volumes. Minimal population growth in the area resulted in similarly acceptable traffic operations projections for design year 2050. Safety was determined to be the primary need throughout the study area, substantiated by numerous high crash areas discussed in **Section 2.8**.

4.2 Local Officials and Stakeholders Meeting No. 1

Basic study area characteristics presented to the LO/S at the first meeting held at the Ashland Train Depot December 12, 2019 included existing conditions data previously shared with the project team. The group provided input on potential problem areas and possible improvements. Attendees included representatives of state, city, and county governments, emergency services, and the project team.

Background information on completed studies and previously identified projects, roadway characteristics, traffic operations, safety analyses, and environmental setting were presented. Attendees were provided oversized maps of the study area and asked to identify locations with safety, congestion, or other transportation concerns to be considered for possible improvements. The areas of concern are discussed in the full meeting summary in **Appendix D**.

4.3 Public Meetings

The project team held two open house public meetings in January 2020: one in Greenup County January 21, 2020, and a second in Boyd County January 28, 2020. Primary meeting objectives were to gather information and verify current congested areas, crash locations, roadway deficiencies, drainage problems, bike and pedestrian needs, and environmental concerns in the study area. A total of 65 members of the public attended the meetings and provided 73 comments on study route issues.



Figure 28: Public Meeting Attendees

4.4 Online Public Engagement

Online public engagement by means of an interactive map complemented the information gathering process and increased opportunities for local roadway users to comment on issues and concerns in the study area. In addition to the 73 comments received at public meetings, 218 were captured online. By category, most transportation issues cited by local users were safety related (49%), followed by congestion (23%), and roadway geometry (7%). **Figure 30** on the following page shows the distribution of public comments throughout the study area, highlighting the densest concentration of comments: along US 23 and KY 693. **Figure 29** provides a similar figure, zoomed in on the tighter street network within Ashland.



Figure 29: Distribution of Community Input on Transportation Needs—Downtown Ashland

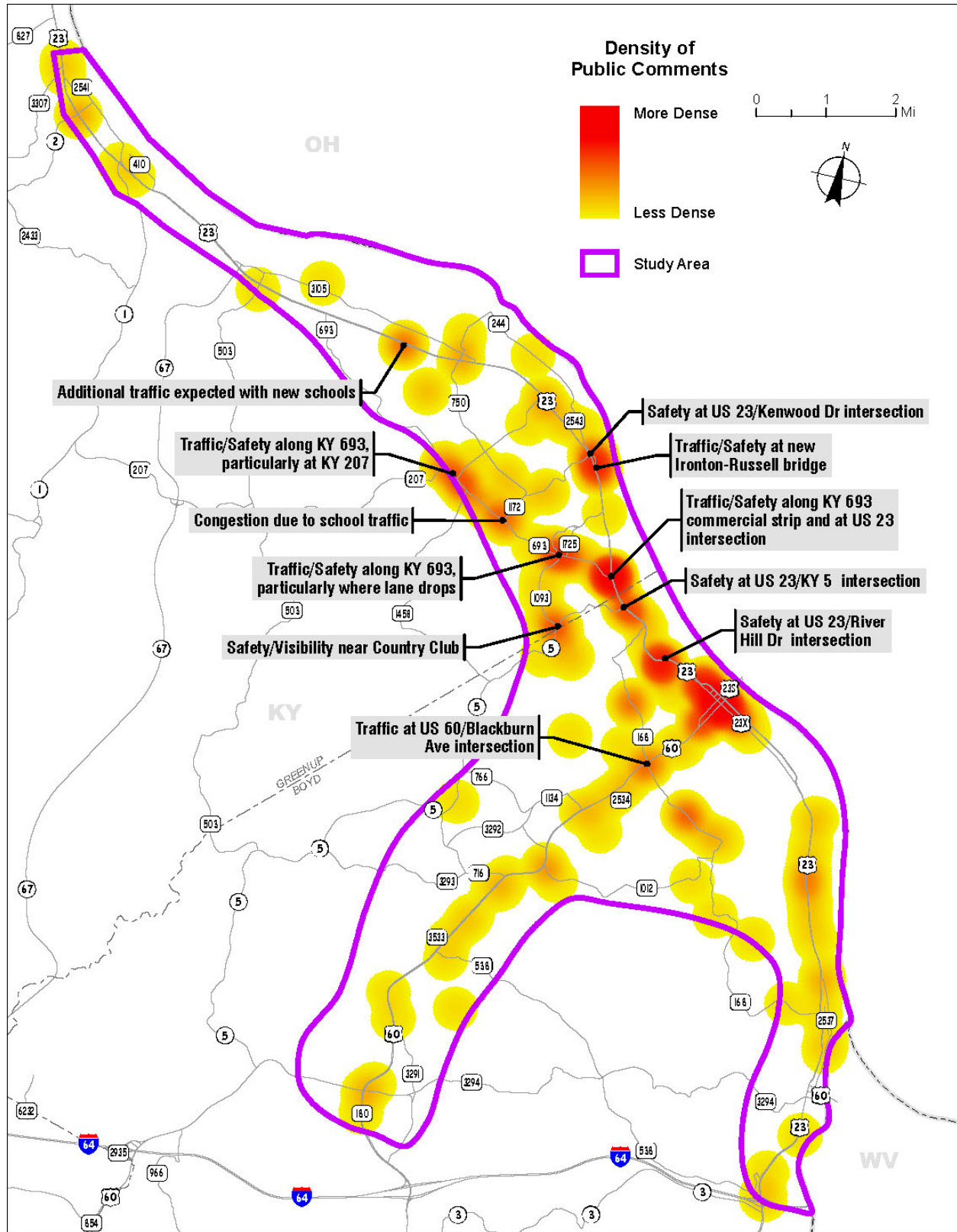


Figure 30: Distribution of Community Input on Transportation Needs—Entire Study Area

5.0 2050 TRAFFIC FORECAST AND NO-BUILD OPERATIONS

Year 2050 forecasts were generated using KYOVA's Travel Demand Model with a 2050 horizon year. KYOVA's 2018 Travel Demand Model was built using a 2015 base year, having no significant build changes since. Year 2020 served as the "existing" baseline scenario and future year No-Build and Build forecasts were determined. The KYOVA model is a 24-hour model, with no time-of-day components.

5.1 Future Year Traffic Assumptions

The KYOVA Travel Demand Model determined future year growth for all study area roadway segments. Regional growth has been static, even trending downward based on some estimates. The background model assumptions were modified to reflect 650 new jobs assumed to represent Braidy Industries by 2021, in addition to 3,000 new jobs attributed to supporting satellite industry job creation. Braidy Industries proposed plant is located outside the study boundary but is expected to impact regional traffic volumes and patterns.

Since the modeling effort, Braidy Industries' future has become less certain. However, 2050 traffic volumes based on predicted job creation included in the KYOVA model were conservative and used in calculations.

5.2 2050 No-Build Traffic

A 2050 No-Build scenario was run to project future traffic volumes, which were adjusted appropriately to reflect existing count data and eliminate negative growth projections. For roadways showing positive growth, future year model assignments were adjusted and averaged to determine future year ADT and DHV. Detailed information about this effort is contained in the *Traffic Forecast Report*, located in **Appendix A**.

On individual highway segments, growth rates ranged from 0% to 4%. Most analysis segments exhibited no growth, corresponding to the static and downward county population projections anticipated by the Kentucky State Data Center through 2040. Six study routes exhibited LOS becoming undesirable (LOS E or F) on one or more segments in 2050: US 60, KY 716, CS-2350 (Central Avenue), CS-2492 (Lexington Avenue), CS-2615 (River Hill Drive), located in Boyd County, and KY 207 in Greenup County.

Study area 2020 and 2050 traffic operations are summarized in **Table 18** and **Table 19**. 2050 traffic operations are illustrated on **Figure 31** and **Figure 32**.

Table 18: Boyd County 2020 and 2050 Traffic Operations

Route	BMP	EMP	% Trucks	2020 AADT	2020 LOS	2020 v/c	% Trucks	2050 AADT	2050 LOS	2050 v/c
US 23	9.161	20.938	8-13	9470-30970	A-C	0.16-0.47	8-13	12200-34600	A-C	0.20-0.52
US 23S	0.000	0.483	14	10750	A	0.22	14	11600	A	0.24
US 23S1	0.000	0.483	9	14270	C	0.45	14	15400	C	0.48
US 23X	0.000	1.796	9-17	7810-16030	A-B	0.12-0.28	9-17	9000-18100	A-B	0.14-0.32
US 60	3.150	12.880	2-17	2890-19550	A-D	0.06-0.33	2-17	1700-29500	A-E	0.06-0.47
KY 5	6.647	10.781	4-8	2380-6920	B-E	0.08-0.63	4-8	3800-9900	B-E	0.13-0.90
KY 168	0.000	8.179	2-4	4460-6640	A-D	0.18-0.24	2-4	1800-7400	A-D	0.09-0.24
KY 180	0.200	2.514	11	10360	A	0.14	11	14800	A	0.20
KY 538	0.000	6.631	4	1560-1890	B-D	0.07-0.09	4	2100-2400	C-D	0.10
KY 716	0.000	1.565	6-14	4680-5510	C-D	0.18-0.19	6-14	10300-27200	D-F	0.36-1.11
KY 766	0.000	2.044	6-8	1910-2580	B-C	0.08-0.09	6-8	2400-2700	B-C	0.10
KY 1012	0.000	3.036	5	1670-2340	C	0.07-0.09	5	3100-3700	C	0.11-0.15
KY 1134	0.000	0.897	7	2570	C	0.10	7	4200	C	0.17
KY 2534	0.000	0.178		3290	B	0.10		3300	B	0.17
KY 2535	0.000	0.065		930	A	0.03		1500	A	0.05
KY 2536	0.000	0.043		160	A	0.01		200	A	0.01
KY 2537	0.000	0.404		110-680	A	0.01-0.04		100-1000	A	0.01-0.05
KY 3291	0.000	2.135		2110	C	0.11		5400	D	0.3
KY 3292	0.000	1.223		2790	C	0.11		5700	C	0.23
KY 3293	0.986	2.407	6	720-1830	A-B	0.03-0.09	6	1400-8000	B-D	0.06-0.38
KY 3294	0.000	9.445	4-5	1310-2430	A-B	0.05-0.11	4-5	1300-4200	A-C	0.06-0.16
KY 3533	0.000	0.166		90	C	0.01		100	C	0.01
CS-2349	0.000	0.651		5380-7120	C	0.20		7600-8300	C	0.28-0.30
CS-2350	0.000	1.571		2720-9490	A-D	0.08-0.37		4400-12200	A-E	0.13-0.48
CS-2492	0.000	1.281	8	5950-9170	C	0.23-0.30	8	6000-14900	C-E	0.20-0.53
CS-2615	0.000	0.368		12300	D	0.43		15400	E	0.55

Table 19: Greenup County 2020 and 2050 Traffic Operations

Route	BMP	EMP	% Trucks	2020 AADT	2020 LOS	2020 v/c	% Trucks	2050 AADT	2050 LOS	2050 v/c
US 23	0.000	12.100		13690-30970	A-C	0.16-0.47		13300-34800	A-C	0.21-0.52
KY 1	16.573	17.134	6	2270	C	0.1	6	2900	C	0.13
KY 2	17.112	17.463	8	940-2070	A-B	0.04-0.08	8	900-2100	A-B	0.04-0.08
KY 5	0.000	0.792	8	3710	C	0.14	8	4100	C	0.15
KY 67	12.900	13.039	25	4780	C	0.16	25	6600	C	0.22
KY 207	15.590	17.645	6	5630-10660	C-D	0.19-0.44	6	5800-12400	C-E	0.21-0.51
KY 244	0.000	3.654	5	1810-3370	B-C	0.08-0.15	5	1800-4900	C-D	0.08-0.22
KY 410	0.000	0.681		430	A	0.02		400	A	0.02
KY 503	9.052	9.287		1080	B	0.04		1700	B	0.06
KY 693	0.000	5.812	5-9	940-15560	B-E	0.04-0.51	5-9	1600-20900	B-E	0.06-0.63
KY 750	0.000	3.713	4-5	1290-4470	B-D	0.05-0.25	4-5	1800-7000	B-D	0.07-0.32
KY 1093	0.000	1.954		4880-5730	C	0.19-0.20		7400-9000	D	0.30-0.36
KY 1172	0.000	0.482	12	3760	C	0.21	12	5500	C	0.31
KY 1725	0.000	0.905	3	3290-4230	C	0.12-0.18	3	3300-6400	C-D	0.12-0.27
KY 2541	0.000	1.619		740-2350	A-B	0.03-0.09		700-2400	A-B	0.03-0.09
KY 2543	0.000	0.183		3620	C	0.13		3900	C	0.15
KY 3105	0.000	3.568	8	740-1230	A-B	0.04-0.05	8	1400-2800	B-C	0.08-0.10
CR-1948	0.000	1.543		1440	A	0.06		500-1400	A	0.06
CS-5009	0.000	1.318		1510	B	0.05		3900	C	0.13
CS-7006	0.000	0.107		1440	B	0.06		1400	B	0.06
US 23	0.000	12.100		13690-30970	A-C	0.16-0.47		13300-34800	A-C	0.21-0.52
KY 1	16.573	17.134	6	2270	C	0.1	6	2900	C	0.13
KY 2	17.112	17.463	8	940-2070	A-B	0.04-0.08	8	900-2100	A-B	0.04-0.08
KY 5	0.000	0.792	8	3710	C	0.14	8	4100	C	0.15
KY 67	12.900	13.039	25	4780	C	0.16	25	6600	C	0.22
KY 207	15.590	17.645	6	5630-10660	C-D	0.19-0.44	6	5800-12400	C-E	0.21-0.51
KY 244	0.000	3.654	5	1810-3370	B-C	0.08-0.15	5	1800-4900	C-D	0.08-0.22
KY 410	0.000	0.681		430	A	0.02		400	A	0.02

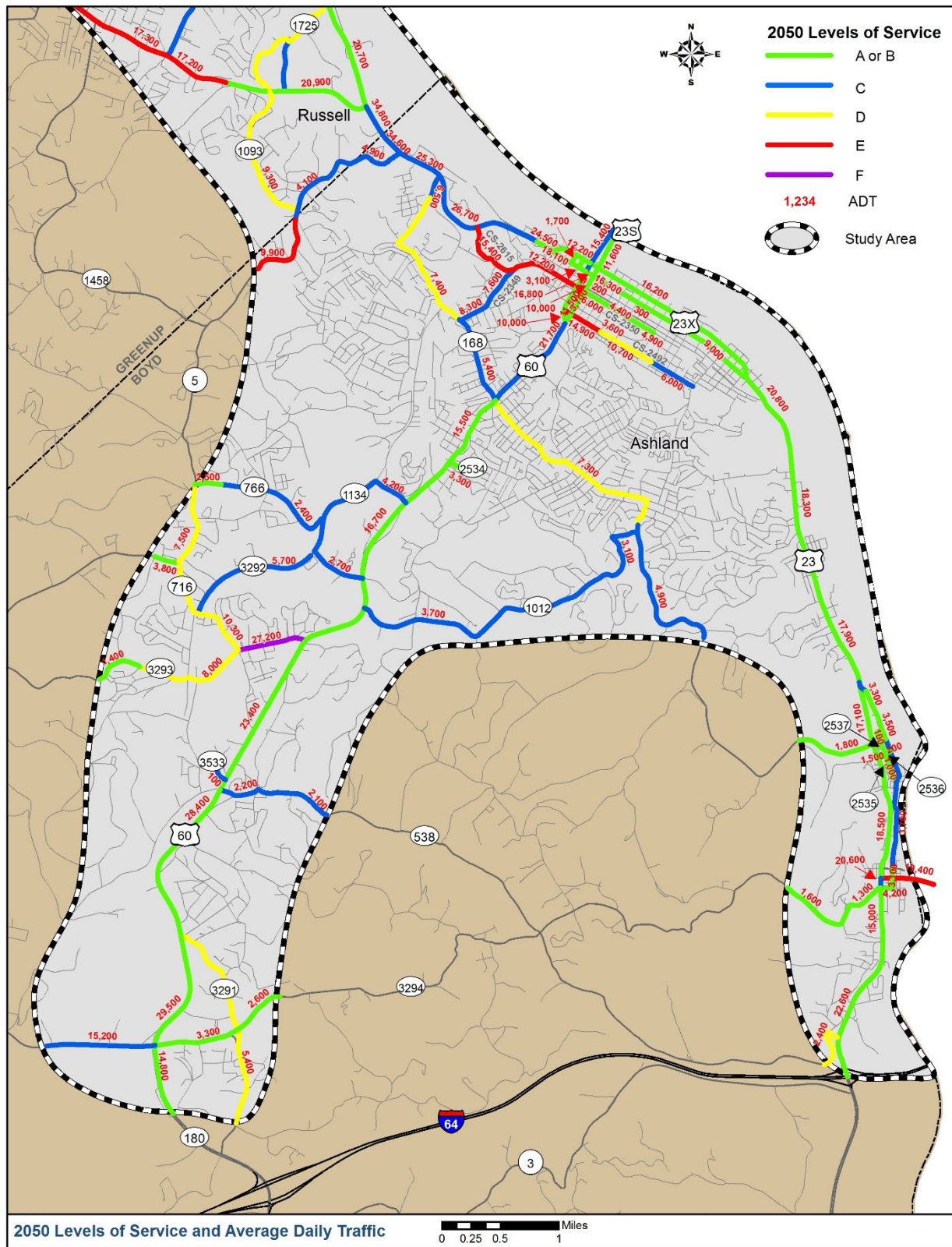


Figure 31: 2050 Boyd County Traffic Operations

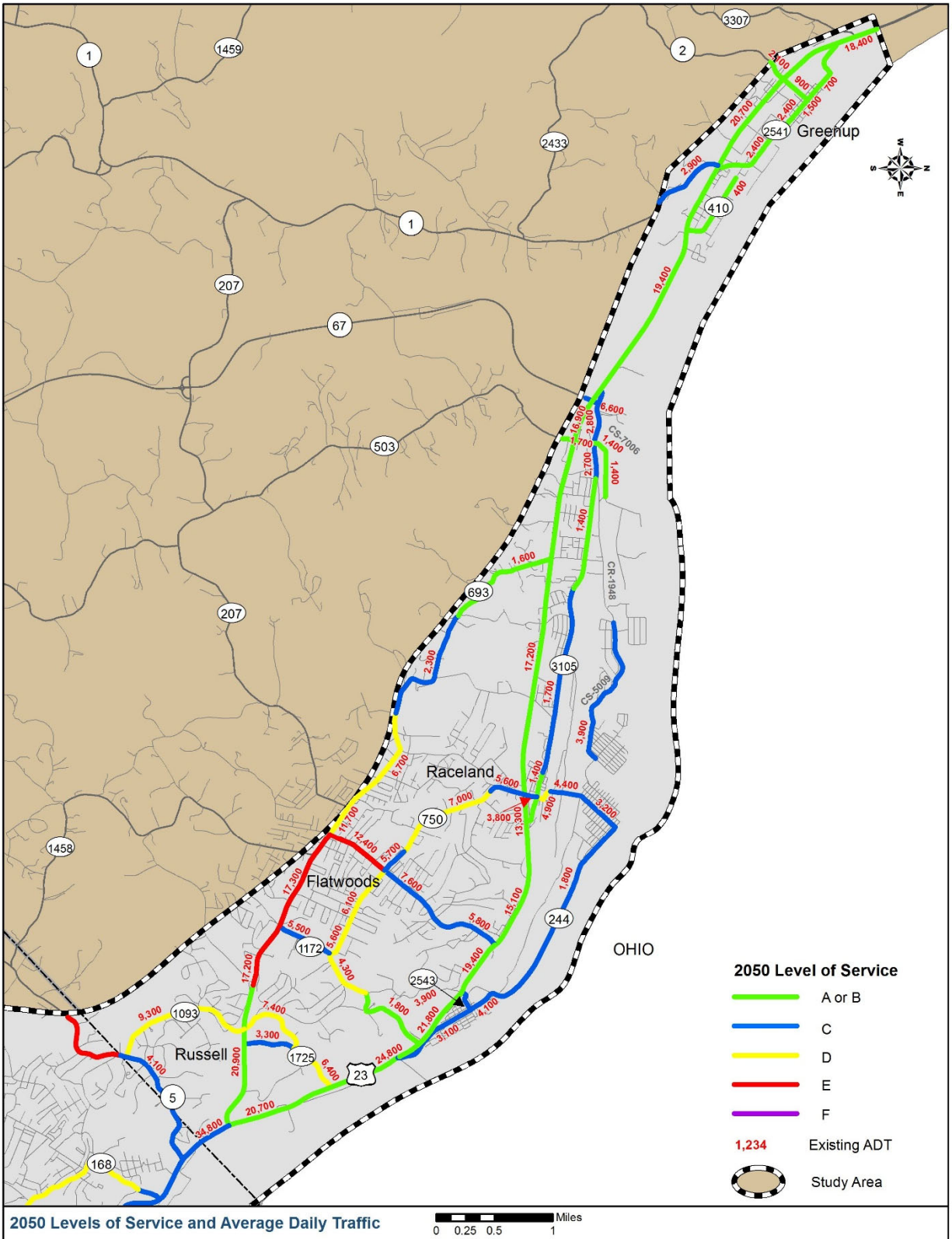


Figure 32: 2050 Greenup County Traffic Operations

5.3 Intersection Turning Movement Counts

ADT and DVH volumes were calculated for two Boyd County intersections: US 60/KY168 (Blackburn Avenue) and northern US 23 (Greenup Avenue)/US 23X (Winchester Avenue). Without turning movement counts to provide existing traffic flows, forecasts were limited to approach ADT and DHV volumes. Results are shown in **Figure 33** and **Figure 34**.



Figure 33: ADT/DHV at US 60/KY 168 Intersection

6.0 CONCEPT DEVELOPMENT

Concepts to improve safety and congestion were developed based on review of existing geometric deficiencies, existing and future traffic operations, crash concentrations, field reconnaissance, and input from the project team and community leaders. Terms “spot improvement” and “concept” are used interchangeably throughout the text. Each concept was categorized into one of three groups:

- **Long-term** projects are relatively high cost projects, often requiring additional right-of-way, additional project development activities, and funding through traditional sources in Kentucky’s biennial highway plan.
- **Short-term** projects are relatively lower cost projects that may be implemented in the near future, requiring little to no additional right-of-way, and possibly completed as maintenance actions.
- **Local** projects are located outside of the state-maintained highway system, likely funded by local governments or private developers.

Summarized in **Figure 36**, improvement projects being advanced by a current, funded project or more detailed study were omitted from consideration.



Figure 34: ADT/DHV at Northern US 23/US 23X Intersection

Each high crash spot and location identified by the community as a concern was examined to understand underlying needs. For example, analysis determined US 60 near its intersection with Old 13th Street (MP 10.4-10.5) had a 1.26 CCRF with over 50% of the reported crashes involving a rear-end collision when a motorist stopped in the thru lane to make a left turn. Analysts then developed a proposed conceptual solution: creating a two-way left turn lane (TWLTL) to separate turning vehicles from thru movements. In some cases, the identified concept was cost prohibitive or determined infeasible from an engineering perspective. Otherwise, these solutions were presented to the project team for consideration.

Initial spot improvements presented to the project team are listed on the following page.

- Add a TWLTL along US 60 at Old 13th Street and from McKinley to Palmer Streets to address high crash trends.
- Improve five-leg intersection at US 60, KY 168 (Blackburn Avenue), and Algonquin Avenue to reduce delay and improve safety.
- Realign US 23 (Greenup Avenue) intersection with US 23X (Winchester Avenue) north of Ashland to improve visibility and address community concerns about safety.
- Add turn lanes on KY 5 (Bellefonte Princess Road) approaching US 23 to reduce delay.
- Reconstruct KY 5 intersection with Jane Hill Road to improve visibility.
- Add sidewalk along US 23 north of KY 5 (**Figure 35**) to safely accommodate pedestrians.
- Add turn lane and high visibility signage at intersection of KY 693 (Diederich Boulevard), Red Devil Lane, and Thompson Road to reduce delay and crashes associated with Russell school traffic.
- Reconstruct Caroline Road and improve its intersection with US 23 to accommodate new Raceland school traffic.
- Add high visibility signage at a series of US 60 intersections to reduce high crash trends: Summit Road, Oakview Road, Lexington Avenue, and US 23X (Winchester Avenue).
- Improve visibility and delineate movements at the US 23 intersection with the new Ironton-Russell Bridge.
- Create an all-way stop condition at the KY 5 (Bellefonte Princess Road)/Country Club Drive) intersection to address community concerns.
- Improve intersection traffic controls and add high visibility signage along KY 693 from KY 207 (Greenbo Road) through US 23 to address community concerns with safety and delay.
- Add high visibility signage at the US 23 intersection with KY 168 to address high crash trends.
- Improve pedestrian crossings along US 23 (Greenup Avenue) and US 23X (Winchester Avenue) to improve pedestrian safety, particularly near the transportation center.
- Widen River Hill Drive to efficiently accommodate high traffic volumes accessing commercial properties.
- Add high visibility signage along the Central Avenue corridor to address high crash trends.



Figure 35: Worn Bike/Ped Path along US 23

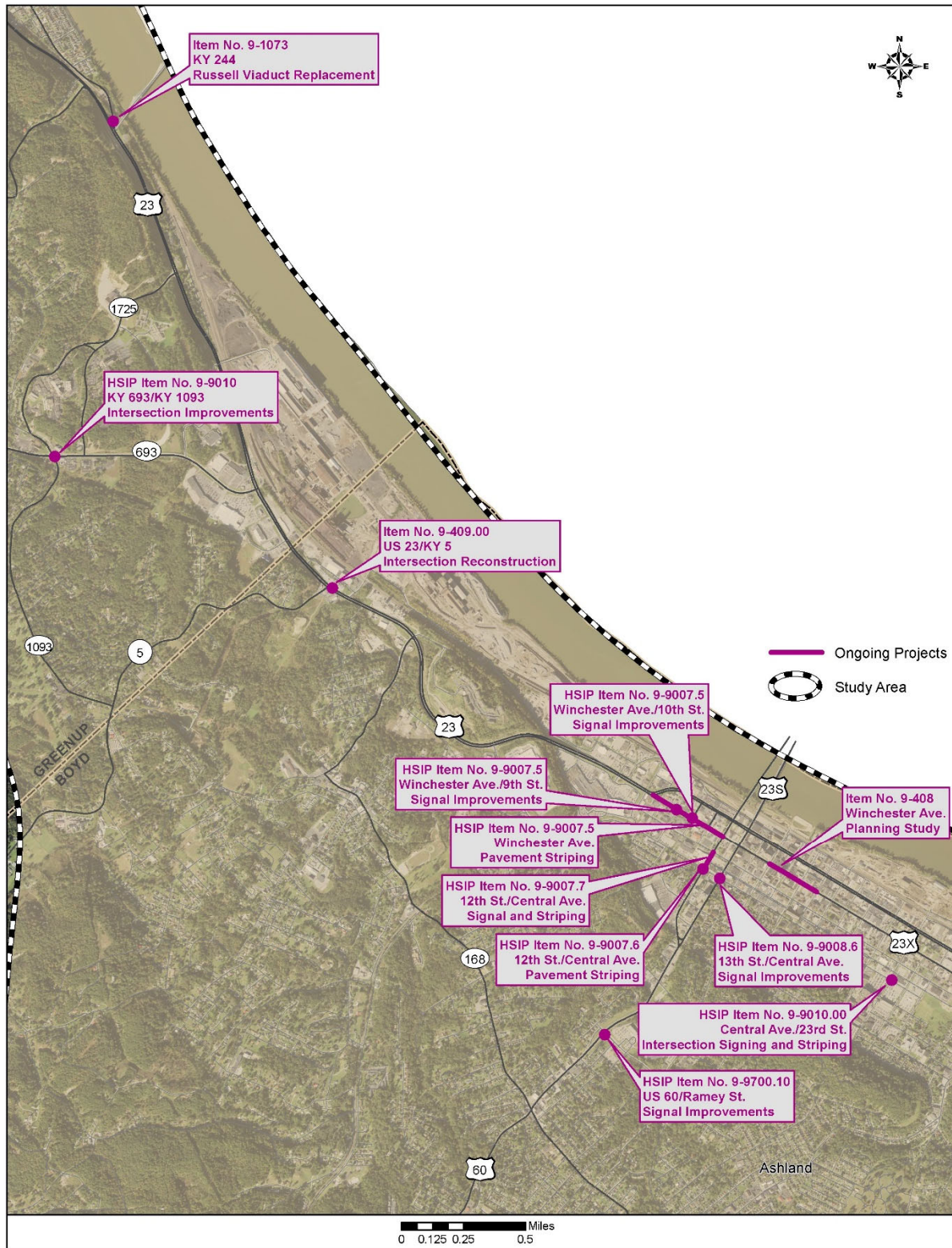


Figure 36: Ongoing Projects in the Study Area & Vicinity

6.1 Project Team Meeting No. 2

The initial set of improvement concepts was presented for discussion at Project Team Meeting No. 2 held March 13, 2020, at the KYTC D9 office in Flemingsburg, Kentucky. Some of the initial concepts above were eliminated due to feasibility concerns—high costs, topography, utility impacts, earlier project development activities, etc. Two additional project concepts were added from the CHAF database to be prioritized alongside other concepts. Detailed discussion items from the meeting are in the summary, found in **Appendix D**.

6.2 Spot Improvements Advanced for Prioritization

Following the second Project Team meeting, team members produced a refined list of improvement concepts which included 9 long-term, 10 short-term and 5 local projects for further evaluation and prioritization. **Figure 37** (p. 64) displays improvement locations.

Long-term improvements include:

- A. Add TWLTL along US 60 at Old 13th Street
- B. Improve intersection at US 60, KY 168 (Blackburn Avenue), and Algonquin Avenue
- C. Add TWLTL along US 60 from McKinley to Palmer streets
- D. Realign US 23 (Greenup Avenue) intersection with US 23X (Winchester Avenue) north of Ashland
- E. Add turn lanes on KY 5 (Bellefonte Princess Road) approaching US 23
- F. Add sidewalk along US 23 from KFC to Golden Corral, north of KY 5
- G. Reconstruct intersection of Little Garner Road and Summit Road as mini roundabout
- H. Add turn lane and high visibility signage at intersection of KY 693 (Diederich Boulevard), Red Devil Lane, and Thompson Road
- I. Improve intersection at US 23 and Caroline Road for new Raceland school traffic

Short-term projects include:

- J. Improve visibility and access control for US 60 intersection with Shopes Creek Road
- K. Improve visibility for US 60 intersection with Summit Road
- L. Improve visibility for US 60 intersection with Oakview Road
- M. Improve striping, signage, signal phasing, and access control along Lexington Avenue between 12th and 13th streets
- N. Add stop-control and clear branches at KY 5 (Bellefonte Princess Road) intersection with KY 1093
- O. Add stop-control at KY 693 (Bellefonte Road) intersection with Greenbo Boulevard AND improve visibility and signal timing at KY 693 intersection with Argillite Road
- P. Improve visibility for KY 693 (Diederich Boulevard) intersection with St. Christopher Drive
- Q. Improve visibility and striping at KY 693 (Diederich Boulevard) intersection with US 23
- R. Improve visibility at US 23 intersection with Hoods Creek Pike
- S. Add pedestrian bulb-outs for US 23 (Greenup Avenue) at 15th and 16th streets

Local projects include:

- T. Signalize commercial entrance along KY 693 (Diederich Boulevard)—by Lowes
- U. Widen Caroline Road lanes and add turn lanes

- V. Stripe Espy Lane for defined right-turn bay
- W. Improve intersection visibility along Central Avenue from 14th to 24th streets
- X. Conduct study to improve access to Ashland Regional Airport

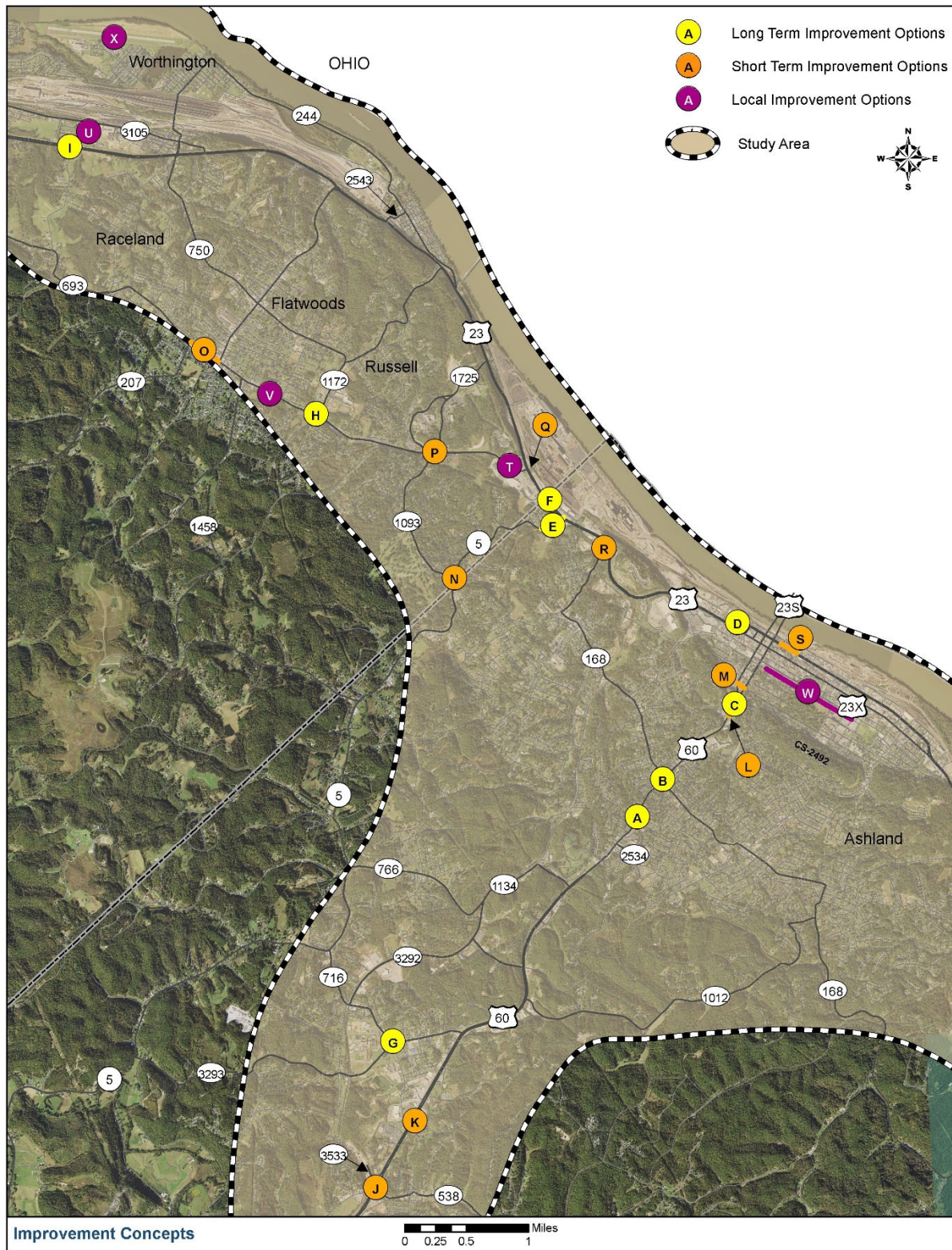


Figure 37: Potential Improvement Locations

6.3 2050 Build Scenario Traffic

Most recommended improvement concepts were smaller in scale or focused on improving safety. Many concepts are expected to have minimal impacts on routine traffic operations. A planning effort to examine potential effects of a US 23X (Winchester Avenue) lane reduction is expected to begin later in 2020 that may affect traffic operations at one of the long-term improvement options (Spot D)—realignment of the northern Greenup Avenue/Winchester Avenue intersection. As a part of this study, the KYOVA travel demand model was run, assuming the existing four-lane section from 13th to 18th streets drops to two lanes. Changes created by lane reductions in ADT and DHV versus the 2050 No-Build scenario are shown in **Figure 38**.

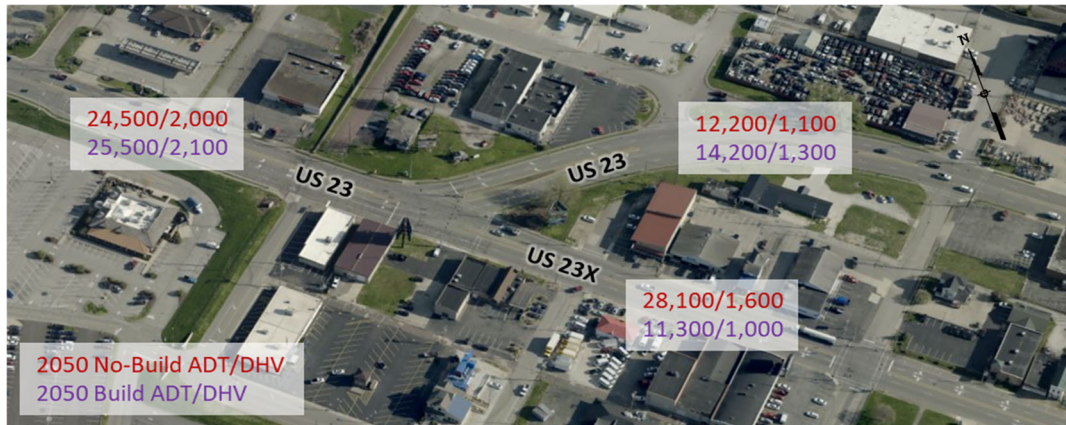


Figure 38: 2050 No-Build/Build Traffic at northern US 23/US 23X Intersection

7.0 Final Coordination Meetings

After improvement concepts were further developed, a final round of meetings was held to gather input and prioritize potential improvements. Summaries of the final LO/S and project team meetings are in **Appendix D**.

7.1 Local Officials and Stakeholders Meeting No. 2

On May 21, 2020, an informational webinar and online survey were used to capture LO/S input and priorities for identified improvement concepts. Project team members presented information on 24 improvement concepts and fielded related questions. LO/S were provided a survey and instructions to give input on prioritization. Overall, eight surveys were completed.

As shown in **Figure 39**, respondents ranked long-term spots B (five-leg US 60/KY 168 intersection) and I (US 23 at Caroline Road by the high/new middle schools' campus) as their highest priorities. The top short-term priorities (**Figure 40**) were Spots M and L, closely followed by Q, P, and S:

- Spot M: Lexington Avenue between 12th and 13th streets
- Spot L: US 60 intersection with Oakview Road
- Spot Q: KY 693 (Diederich Boulevard) intersection with US 23
- Spot P: KY 693 (Diederich Boulevard) intersection with St. Christopher Drive
- Spot S: US 23 (Greenup Avenue) pedestrian bulb-outs at 15th and 16th streets

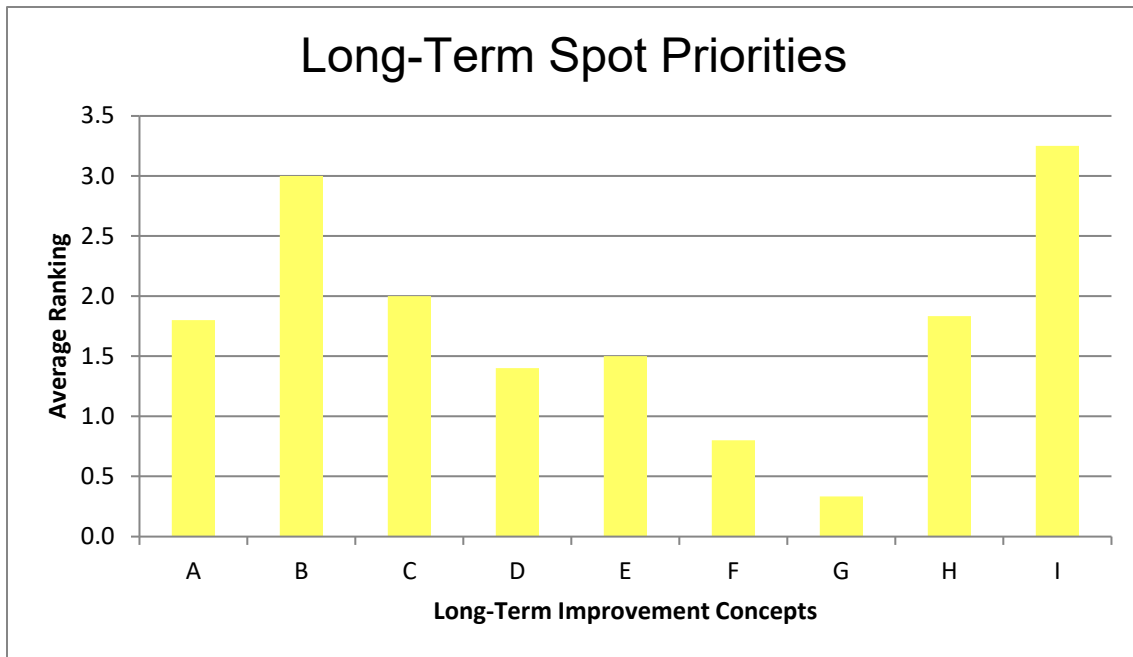


Figure 39: Long-Term Spot Priorities from LO/S Surveys

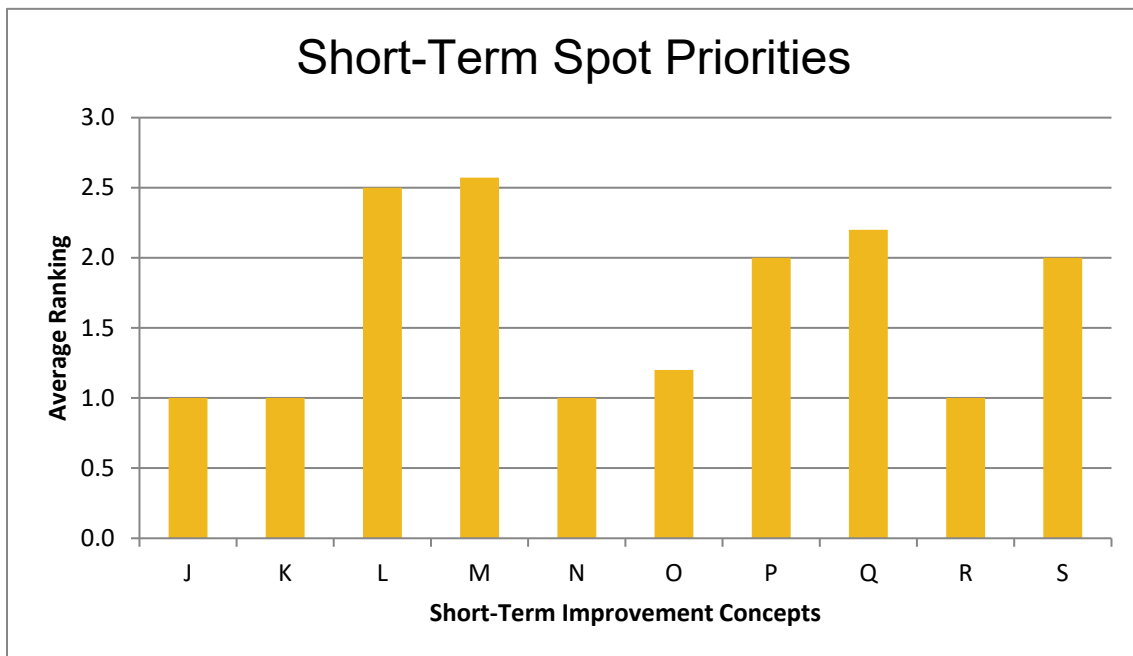


Figure 40: Short-Term Spot Priorities from LO/S Surveys

Local priorities favored Spot W (Central Avenue intersections) as shown in **Figure 41**.

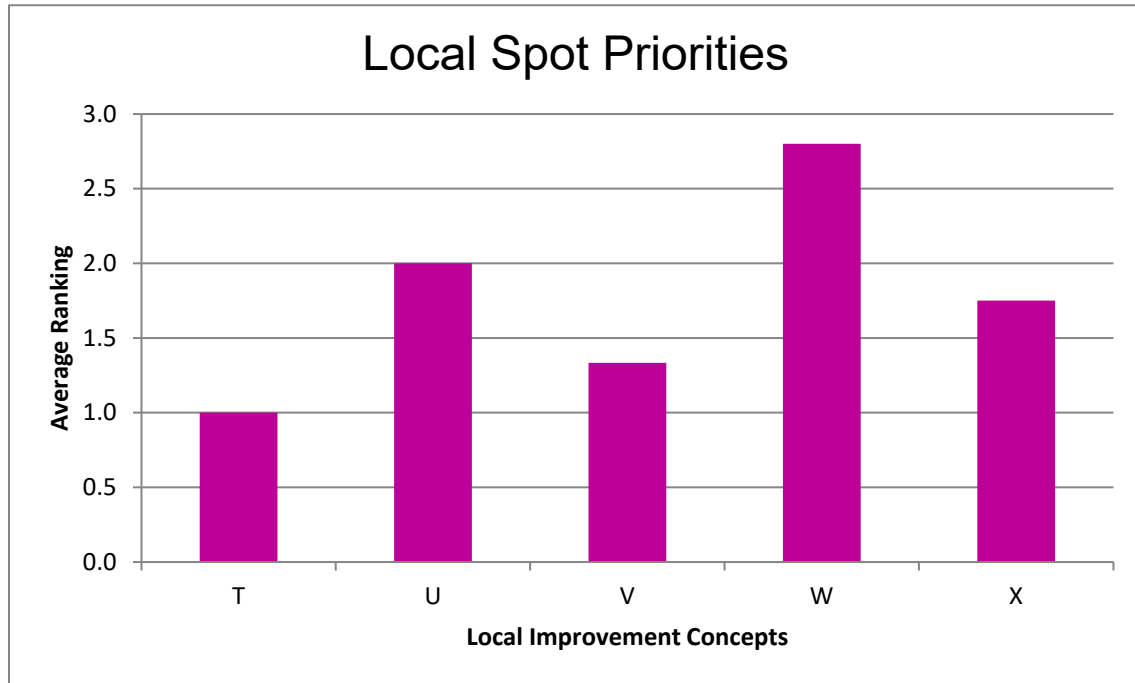


Figure 41: Local Spot Priorities from LO/S Surveys

7.2 Project Team Meeting No. 3

The final project team meeting was held virtually June 5, 2020. Project team members reviewed LO/S input and finalized improvement prioritization. Detailed project sheets for each recommended concept are presented in the next chapter; key discussion items from the meeting are summarized below.

- Benefit-cost ratios were calculated for long-term spots, based on a 20-year horizon for anticipated safety improvements. Two project benefit-cost ratio calculations resulted in a ratio over 1.0: the lower cost option at D and the turn lane at H. The team concurred that the BCAs represent good insights for project team discussions but were not necessary to include on individual project sheets.
- Spot D may become more important if the Winchester Avenue lane reduction advances.
- Spot B may be challenging to implement: the adjacent Tudor-style building to the west and adjacent neighborhood are likely historic resources.
- Spot I is a priority for the local government.
- Spot F was not highly rated in surveys, but the utility cost estimate was decreased after the initial project sheets were mailed. With the worn path visible along the shoulders, a sidewalk connection would serve an observed safety need.
- While the Spot G mini roundabout could fit within the existing footprint, there were few crashes to elevate its priority.

- Spot E is a good project at a busy intersection; quantifying travel time savings with more detailed traffic data likely would have increased the benefit-cost ratio. The short turn bay to McDonalds nearby is also a concern but not included in Spot E or the upcoming Highway Safety Improvement Program (HSIP) project at the US 23/KY 5 intersection.
- By nature, the short-term spot improvements represent low-cost, quick implementation solutions that can be addressed as soon as funding becomes available. Rather than prioritize these, the team agreed all 11 short-term spots represent short-term priorities for implementation.
- Spot W, along Central Avenue, was rated highest priority by local officials. Crash trends show nine PDO crashes occurred on Central Ave between 14th Street and 24th Street from 2016–2018 in the months of November and December. This represents 9% of 99 total crashes along this stretch in three years. Seven of nine occurred during daylight hours and two at nighttime.

8.0 RECOMMENDATIONS

The Boyd-Greenup SUA Study resulted in a range of conceptual improvements recommended for future implementation. Improvement concepts focused primarily on areas with existing safety concerns identified by documented crash records and community input. The following subsections summarize prioritization results, incorporating traffic operations, safety considerations, project team input, and other factors beyond LO/S rankings. Cost estimates were based on planning-level quantities for traffic items, pavement, structures, earthwork, etc. KYTC District 9 staff provided right-of-way and utility estimates. Cost estimates are shown in **Table 20**.

8.1 Short-Term Priorities

By nature, the short-term spot improvements represent low cost, quick implementation solutions that can be addressed as soon as funding becomes available. Rather than prioritize these, the project team agreed that all 11 short-term spots represent short-term priorities for implementation as soon as funding becomes available. Many represent maintenance actions independent of more competitive funding streams. Short-term spot improvement locations are presented in **Figure 42** (p. 72).

8.2 High Priority Spots

Seven spot improvements were rated as high priorities for implementation, as summarized in **Figure 43** (p. 73). These include four long-term spots and three local spots.

8.3 Medium Priority Spots

Six spot improvements were rated medium priorities for implementation, as summarized in **Figure 44** (p. 74). These include five long-term spots and one local spot.

8.4 Low Priority Spot

One concept was rated a low priority for implementation: a planning study to examine improved mobility from the Ashland Airport to US 23, corresponding to CHAF IP20040035.

Table 20: Recommended Improvement Concepts with Phase Cost Estimates

Map ID	Main Route (MP - MP)	Intersecting Route (MP - MP)	Description	Priority	Rounded Estimates (2020 Dollars)				
					Design	ROW	Utilities	Const	Total Cost
A	US 60 (MP 10.4-10.5)	Old 13th Street	Construct TWLTL on US 60	Med	\$150,000	\$1,000,000	\$1,000,000	\$700,000	\$2,850,000
B	US 60 (MP 10.750-10.850)	KY 168 Blackburn Ave. (MP 5.750-5.850)	Intersection improvements, from closing Algonquin Ave. approach to a variety of reconstruction configurations	High	\$25,000 - \$500,000	\$0 - \$1,000,000	\$0 - \$1,000,000	\$0 - \$1,650,000	\$75,000 - \$4,150,000
C	US 60 (MP 11.6-11.7)	McKinley St. Bryan St. Palmer St.	Remove concrete median and construct TWLTL beginning at Palmer St. to McKinley St. at US 60 divergence point	Med	\$125,000	\$250,000	\$1,000,000	\$575,000	\$1,950,000
D	US 23 Greenup Ave. (MP 18.9-19.0)	US 23X Winchester Ave. (MP 1.796)	Realign US 23/US 23X intersection for better sight distance, shifting 8 th St./Greenup Ave. as needed	Med	\$400,000 - \$500,000	\$600,000 - \$3,000,000	\$650,000 - \$1,000,000	\$2,200,000 - \$2,600,000	\$3,850,000 - \$7,100,000
E	KY 5 Bellefonte Princess Rd. (MP 10.531-10.781)	US 23 (MP 20.7-20.8)	Construct right-turn lane on KY 5 approaching US 23, add TWLTL, replace existing signal pole and controller box to improve sight distance	High	\$100,000	\$250,000	\$500,000	\$450,000	\$1,300,000
F	US 23 (MP 20.750-20.940)	North from KY 5	Construct 5-foot-wide paved path with curb and gutter for improved pedestrian mobility and safety from KFC to Golden Corral	Med	\$50,000	\$50,000	\$100,000	\$400,000	\$600,000
G	KY 716 (MP 0.565)	KY 3293 (MP 2.407)	Construct a mini roundabout at the intersection	Med	\$75,000	\$150,000	\$1,000,000	\$325,000	\$1,550,000
H	KY 693 Diederich Blvd. (MP 3.9-4.0)	KY 1172 Red Devil Ln./ Thompson Rd.	Install double reds, reflective backplates and solar LED "signal ahead" signs on KY 693, construct NB right-turn lane on Thompson Road	High	\$100,000	\$25,000	\$25,000	\$500,000	\$650,000
I	US 23 (MP 5.3-5.4)	Caroline Rd.	Assess signal warrants, construct right-turn lanes on US 23 for Caroline Dr.; if unsignalized, construct acceleration lanes on US 23 for turning buses	High	\$50,000 - \$75,000	\$0	\$25,000	\$550,000 - \$850,000	\$75,000 - \$4,150,000

Table 20: Recommended Improvement Concepts with Phase Cost Estimates (Continued)

Map ID	Main Route (MP - MP)	Intersecting Route (MP - MP)	Description	Priority	Rounded Estimates (2020 Dollars)				
					Design	ROW	Utilities	Const	Total Cost
J	US 60 (MP 6.5-6.6)	KY 538 Shopes Creek Rd.	Install solar LED "signal ahead" signs on US 60, replace signals with double reds, add reflective backplates, close Marathon's entrance closest to intersection	N/A	\$0	\$0	\$0	\$50,000	\$50,000
K	US 60 (MP 7.1-7.2)	Summit Rd. (by BCMS)	Install solar LED "signal ahead" signs on US 60, install auxiliary signal on SE and NW quadrant poles, replace signals with double reds and reflective backplates	N/A	\$0	\$0	\$0	\$40,000	\$40,000
L	US 60 (MP 11.5-11.6)	Oakview Rd. (by Tennis Center)	Install solar LED "signal ahead" signs on US 60, install auxiliary signal on SE and NW quadrant poles, replace signals with double reds and reflective backplates	N/A	\$0	\$0	\$0	\$40,000	\$40,000
M	Lexington Ave. (MP 0.0-0.1)	US 60 12 th & 13 th Sts. (Approx. MP 11.8)	Install painted cat-tracks, check warrants for protected left turns at 12 th and 13 th streets, replace signals with double reds and reflective backplates, install Qwik Kurb for access control into businesses, remove shrubs to improve sight distance.	N/A	\$0	\$0	\$0	\$95,000	\$95,000
N	KY 5 Bellefonte Princess Rd. (MP 0.07-0.10)	KY 1093 Country Club Dr. (MP 0.00-0.1)	Check warrant to convert intersection to all-way stop, trim trees lining KY 5 above eye-level, coordinate with local government to add roadside lighting	N/A	\$0	\$0	\$0	\$20,000	\$20,000
O1	KY 693 Bellefonte Rd. (MP 3.0-3.1)	KY 207 Greenbo Blvd. (MP 15.55-15.65)	Check warrant to convert intersection to all-way stop	N/A	\$0	\$0	\$0	\$20,000	\$20,000
O2	KY 693 Bellefonte Rd. (MP 3.1-3.2)	KY 207 Argillite Rd. (MP 15.8-15.9) / Reed St.	Replace signals with double reds and reflective backplates, adjust signal timing	N/A	\$0	\$0	\$0	\$30,000	\$30,000
P	KY 693 Diederich Blvd. (MP 5.0-5.1)	KY 1725 St. Christopher Dr. (MP 0.0)	Install solar LED "signal ahead" signs on KY 693, replace signals with double reds and reflective backplates	N/A	\$0	\$0	\$0	\$40,000	\$40,000

Table 20: Recommended Improvement Concepts with Phase Cost Estimates (Continued)

Map ID	Main Route (MP - MP)	Intersecting Route (MP - MP)	Description	Priority	Rounded Estimates (2020 Dollars)				
					Design	ROW	Utilities	Const	Total Cost
Q	KY 693 Diederich Blvd. (MP 5.7-5.8)	US 23 (MP 0.3)	Install striping and reflector delineation on median for left turning traffic	N/A	\$0	\$0	\$0	\$35,000	\$35,000
R	KY 168 Hoods Creek Pk. (MP 8.1-8.18)	US 23 (20.3)	Install solar LED "signal ahead" signs on US 23 and KY 168, replace signals with double reds and reflective backplates	N/A	\$0	\$0	\$0	\$60,000	\$60,000
S	US 23 Greenup Ave. (MP 18.35-18.45)	15 th - 16 th Sts.	Install bulb-outs and/or crosswalk to shorten distance and reduce pedestrian exposure to traffic	N/A	\$80,000	\$0	\$0	\$420,000	\$500,000
T	KY 693 Diederich Blvd. (MP 5.6-5.7)	Approaching US 23 (by Hobby Lobby/Lowes)	Add traffic signal to Lowes/Hobby Lobby intersection, widen and align entrances at intersections of Lowe's/Hobby Lobby to accept higher traffic volumes	Med	\$0	\$0	\$0	\$25,000	\$25,000
U	Caroline Rd.		Widen Caroline Rd. for bus traffic with left- and right-turn lanes	High	\$80,000	\$100,000	\$300,000	\$400,000	\$880,000
V	KY 693 Bellefonte Rd. (MP 3.6-3.7)	Espy Lane	Add striping to separate traffic into right/left turning lanes on Espy Ln.	High	\$0	\$0	\$0	\$12,000	\$12,000
W	Central Ave. Corridor	14 th St. (MP 0.95) 15 th St. (MP 1.02) 16 th St. (MP 1.10) 17 th St. (MP 1.17) 22 nd St. (MP 1.57) 24 th St. (MP 1.73)	Improve signage, striping, crosswalk, and intersection visibility	High	\$10,000	\$0	\$0	\$105,000	\$115,000
X	Unidentified		Conduct study to identify access improvements to the Ashland Regional Airport	Low	\$300,000				\$300,000 (Planning)

Note: Concepts categorized by Long-Term (yellow), Short-Term (orange), and Local (purple) as shown in left column.

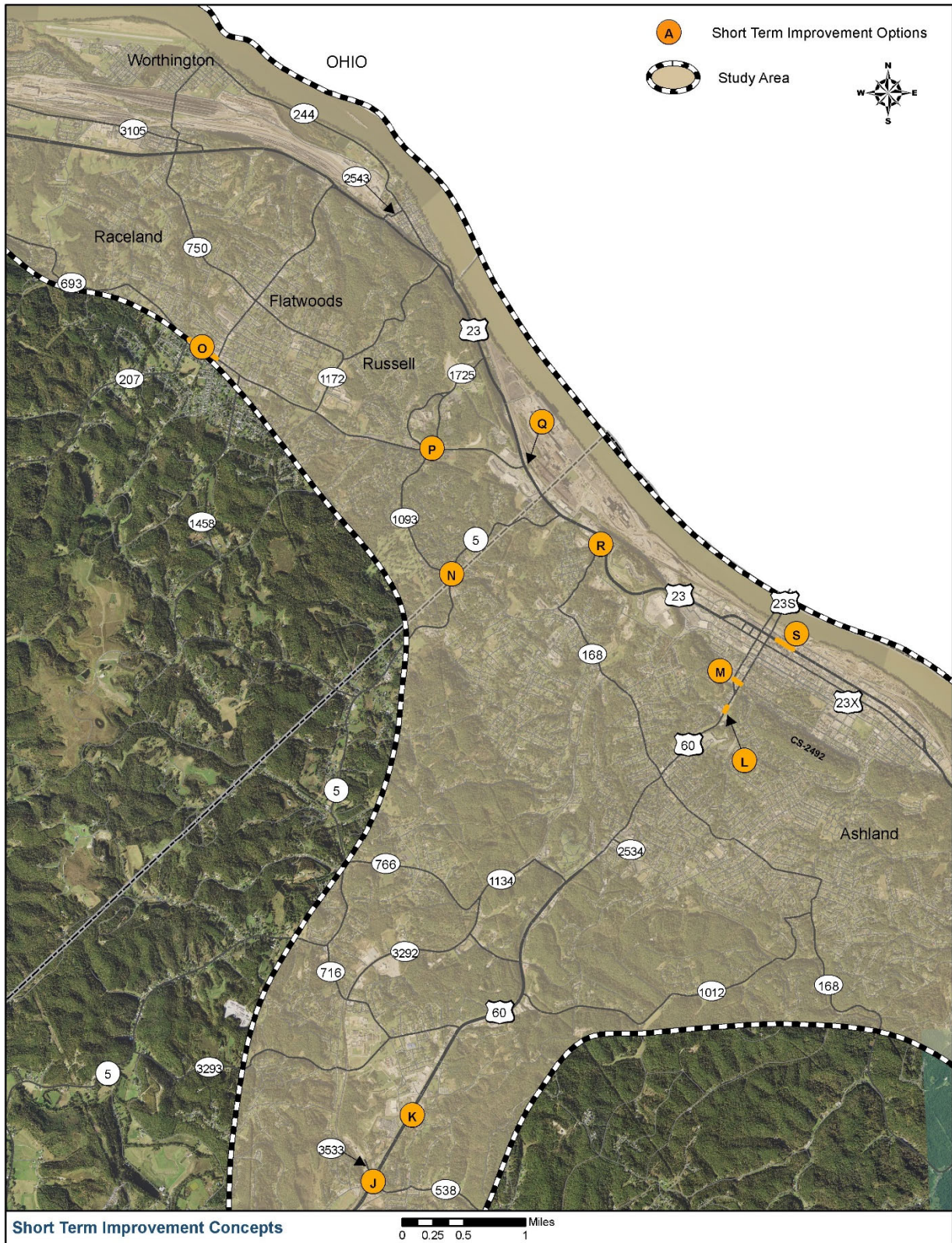


Figure 42: Short-Term Spot Improvement Priorities

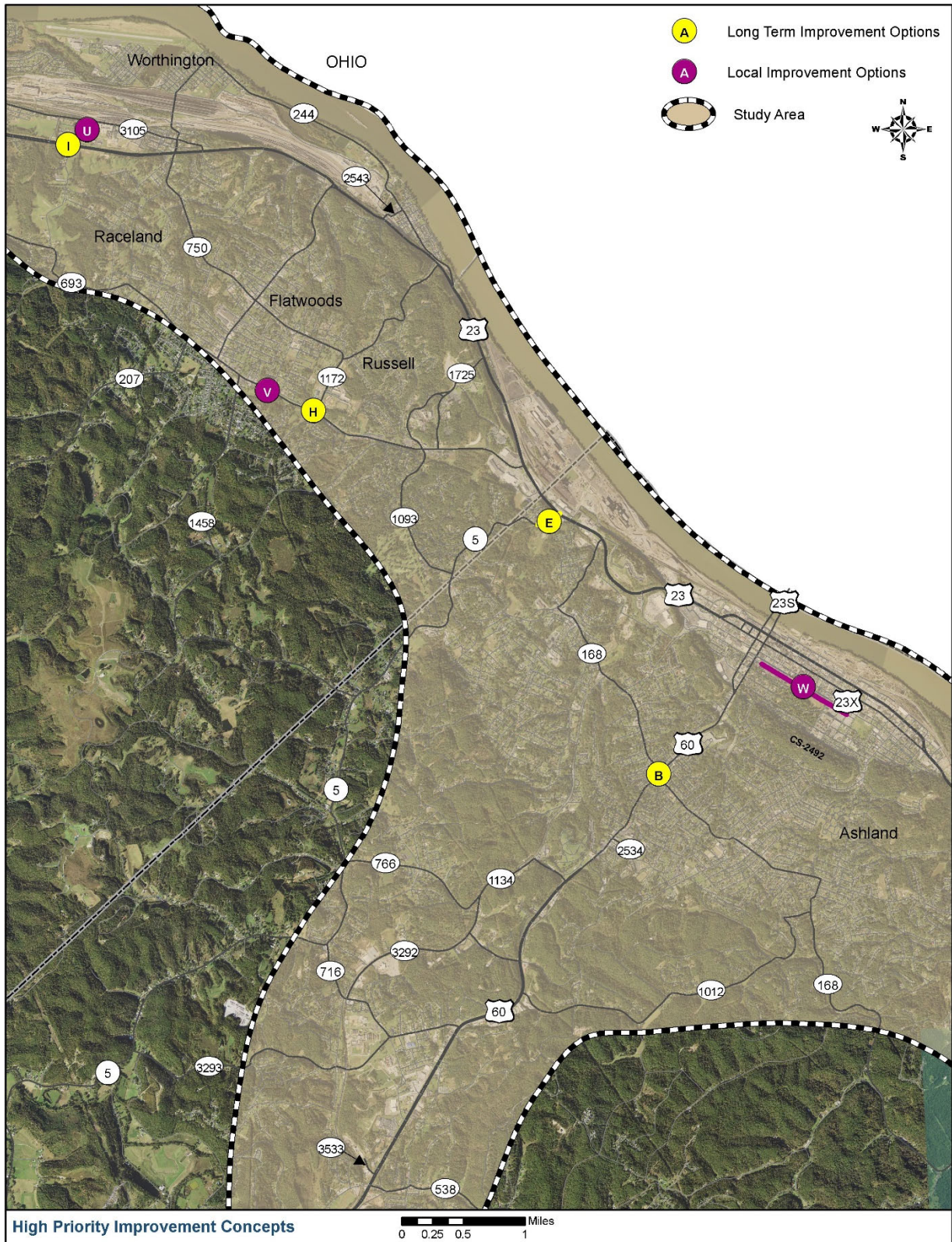


Figure 43: High Priority Spot Improvements

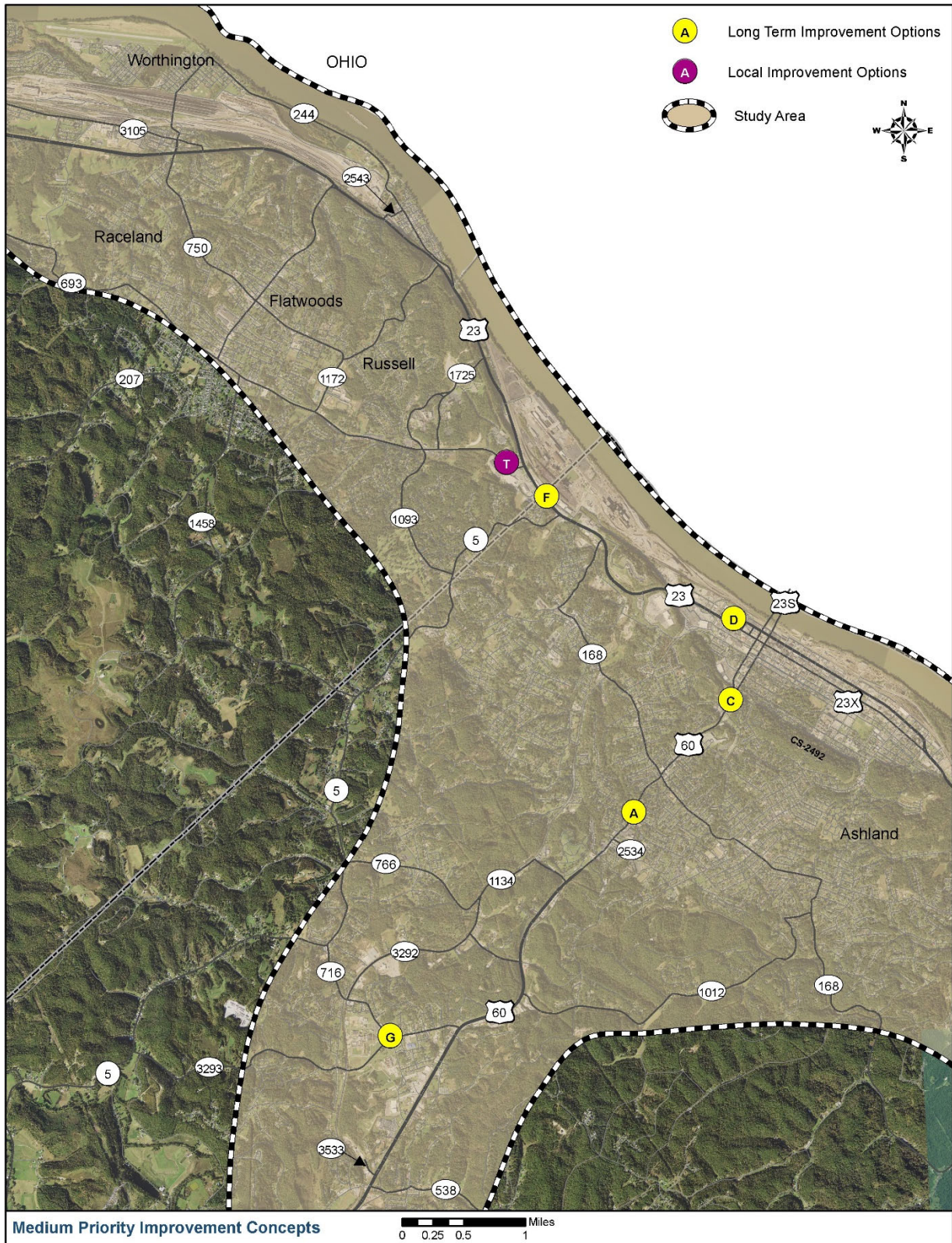
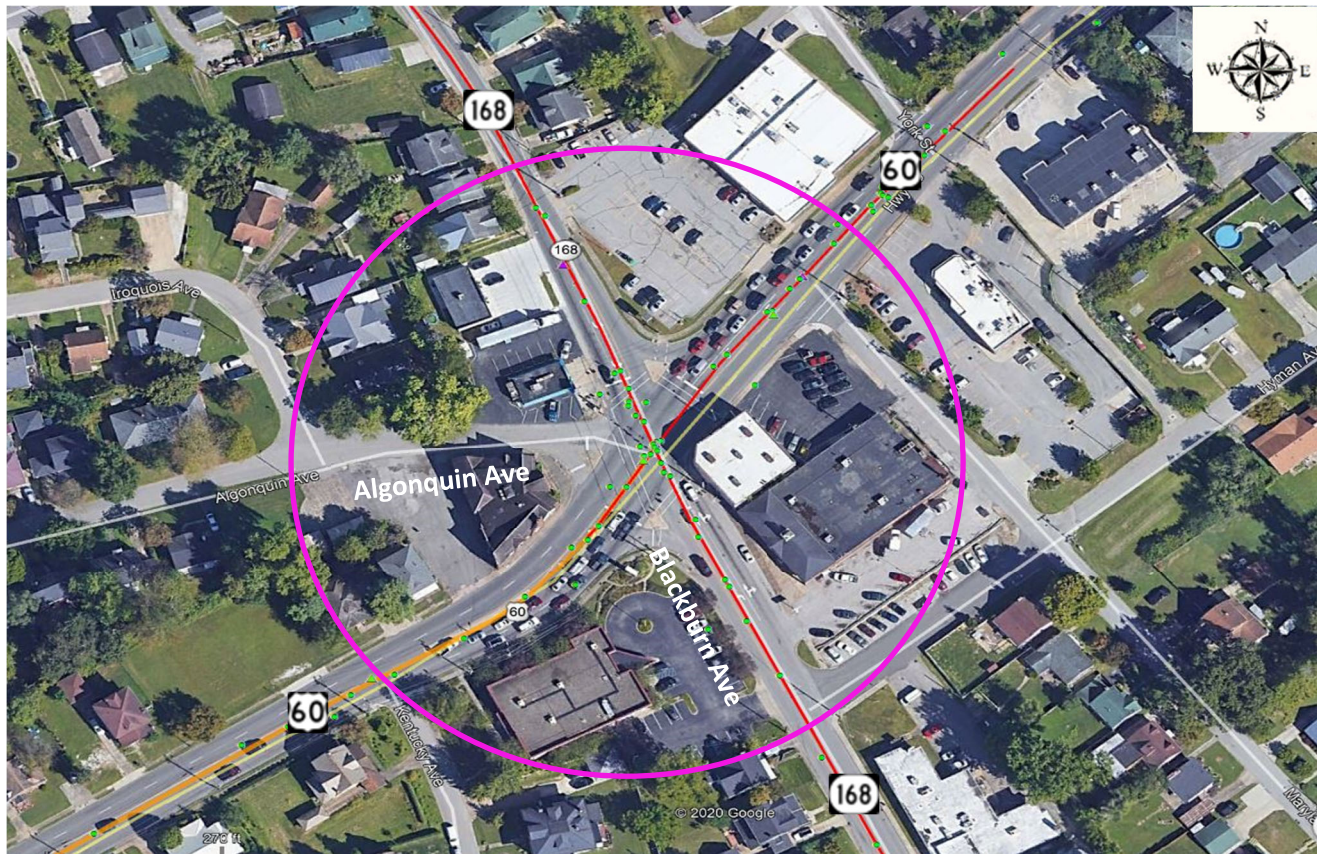



Figure 44: Medium Priority Spot Improvements



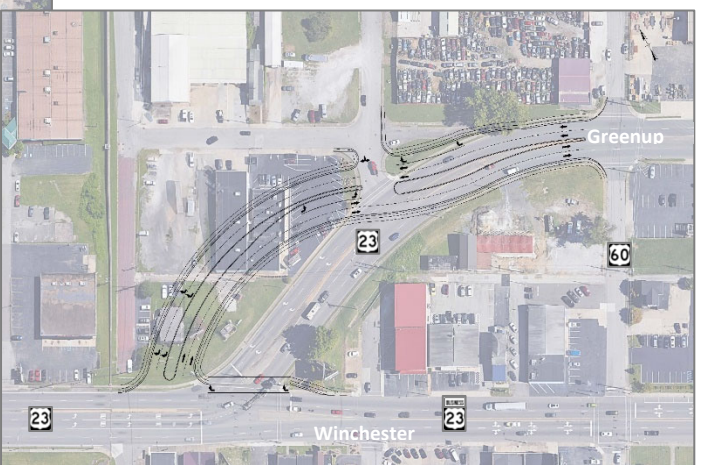
8.5 Project Sheets

Individual information sheets for improvement concepts A through X are presented in this section.


A	Boyd County	US 60 at Old 13 th Street North		
Long-Term	Medium Priority	MP 10.400 – 10.500		
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">Construct two-way left-turn lane (TWLTL) on US 60 from just south of Old 13th Street to Cumberland Avenue. <p>Note: This project sheet covers US 60 milepoint (MP) 10.4-10.5; however, adjacent segments exhibit similar crash patterns.</p>		Phase Estimate	(2020 Dollars)	
		Design:	\$150,000	
		Right-of-Way:	\$1,000,000	
		Utilities:	\$1,000,000	
		Construction:	\$700,000	
		Total Cost:	\$2,850,000	
IDENTIFIED NEEDS:				
• 2020 Traffic:	13,150 vehicles per day (vpd) on US 60, operating at Level of Service (LOS) B or 0.19 volume-to-capacity (v/c), with 9% truck traffic (%T).			
• 2050 Traffic:	15,500 vpd on US 60, operating at LOS B or 0.22 v/c; 9%T.			
• 2016-2018 Crashes:	21 crashes on US 60 including 0 fatal, 4 injury, 17 property damage only (PDO). Critical crash rate factor (CCRF) is 1.26. 52% of crashes are US 60 traffic turning left getting rear-ended when stopping in the thru lane. Traffic switching lanes sideswipe others, generally when avoiding stopped left-turning vehicles in their lane.			
• Existing Geometry:	Four 10-ft-wide lanes and 2-ft-wide curb/gutter			
• Other:	Speed limit is 35 MPH.			
ENVIRONMENTAL RED FLAGS:		No environmental red flags.		
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)		
<div><div>— High Crash Segments</div><div>— High Crash Spots</div><div> Fatal</div><div> Injury</div><div> PDO</div><div> Angle Rear End</div><div> Left Turn Single Vehicle</div><div> Sideswipe Head On</div></div>				


B	Boyd County	US 60 at KY 168 and Algonquin Avenue (5-way intersection)		
Long-Term	High Priority	US 60 MP 10.750 – 10.850 KY 168 MP 5.750-5.850		
IMPROVEMENT DESCRIPTION: • Intersection improvements, including closing the Algonquin Avenue approach to optimize signal phasing. A variety of configurations will be studied during the future design process.		Phase Estimate	(2020 Dollars)	
		Design:	\$25,000 – \$500,000	
		Right-of-Way:	\$0 – \$1,000,000	
		Utilities:	\$0 – \$1,650,000	
		Construction:	\$50,000 – \$1,000,000	
		Total Cost:	\$75,000 – \$4,150,000	
IDENTIFIED NEEDS:				
• 2020 Traffic:	US 60: 19,550 vpd at LOS C or 0.33 v/c; 9%T KY 168 at 6,640 vpd at LOS D or 0.24 v/c; 4%T.			
• 2050 Traffic:	US 60: 21,700 vpd at LOS C or 0.36 v/c; 9%T KY 168: 7,300 vpd at LOS D or 0.26 v/c; 4%T			
• 2016-2018 Crashes:	US 60 had 0 fatal, 3 injury, 28 PDO crashes with CCRF 1.41. KY 168 had 0 fatal, 2 injury, 27 PDO with CCRF 1.96. 52% of US 60 and 62% of KY 168 crashes are rear-ends.			
• Existing Geometry:	US 60 has four 10-ft-wide lanes with 2-ft-wide curb/gutter and left-turn bays at signal. KY 168 has two 10-ft-wide lanes with 2-ft-wide curb/gutter and left-turn bays at signal.			
• Other:	Speed Limit is 35 MPH. Community input notes long queues, high speeds, and poor signal timing at the intersection.			
ENVIRONMENTAL RED FLAGS: Businesses, Utilities, potential Historic				
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)				
<div></div>				
— High Crash Segments		— High Crash Spots		★ Fatal △ Injury ○ PDO ■ Angle ■ Rear End ■ Left Turn ■ Single Vehicle ■ Sideswipe ■ Head On

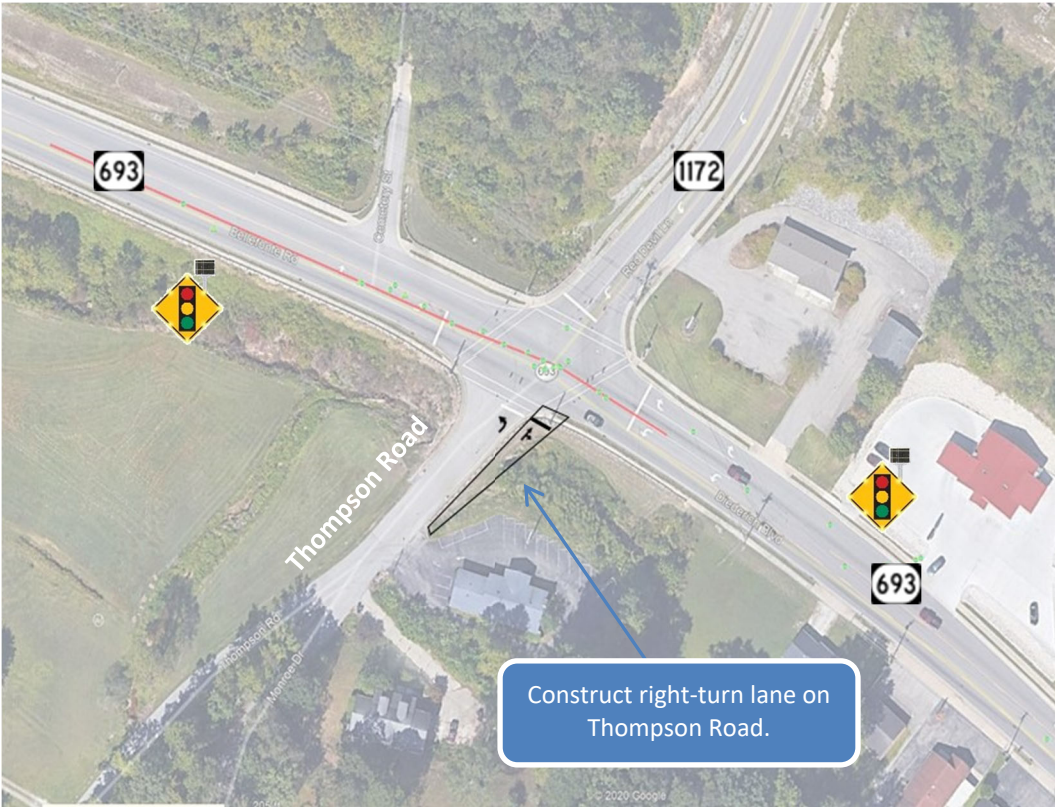
C	Boyd County	US 60 at McKinley/Bryan/Palmer Streets (by Gibbs Hardware and Hibachi Steakhouse)		
Long-Term	Medium Priority	MP 11.600 – 11.700		
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">Remove concrete median and construct TWLTL on US 60 from Palmer Street to US 60 divergence point.		Phase Estimate	(2020 Dollars)	
		Design:	\$125,000	
		Right-of-Way:	\$250,000	
		Utilities:	\$1,000,000	
		Construction:	\$575,000	
		Total Cost:	\$1,950,000	
IDENTIFIED NEEDS:				
• 2020 Traffic:		19,550 vpd on US 60, operating at LOS C or 0.33 v/c; 4%T.		
• 2050 Traffic:		21,700 vpd on US 60, operating at LOS C or 0.36 v/c; 4%T.		
• 2016-2018 Crashes:		31 crashes on US 60 including 0 fatal, 8 injury, 23 PDO with a CCRF 1.37. 68% of crashes are drivers rear-ending NB and SB vehicles stopping in through lanes to turn left to businesses.		
• Existing Geometry:		Four 10-ft-wide lanes with 2-ft-wide curb/gutter.		
• Other:		Speed limit is 35 MPH.		
ENVIRONMENTAL RED FLAGS:		No environmental red flags		
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)		
<div></div>				
<div><div><div>— High Crash Segments</div><div>— High Crash Spots</div><div>✱ Fatal</div><div>△ Injury</div><div>○ PDO</div></div><div><div>■ Angle</div><div>■ Rear End</div><div>■ Left Turn</div><div>■ Single Vehicle</div></div><div><div>■ Sideswipe</div><div>■ Head On</div></div></div>				

D	Boyd County	US 23 (Greenup Ave.) at US 23X (Winchester Ave.)	
Long-Term	Medium Priority	US 23 MP 18.900 – 19.000 US 23X MP 1.796	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">• Realign US 23/US 23X intersection for better sight distance, shifting 8th Street/Greenup Ave as needed with alignment shift. A variety of configurations will be studied during future design phases.		Phase Estimate	(2020 Dollars)
		Design:	\$400,000-\$500,000
		Right-of-Way:	\$600,000-\$3,000,000
		Utilities:	\$650,000-\$1,000,000
		Construction:	\$2,200,000-\$2,600,000
		Total Cost:	\$3,850,000-\$7,100,000
IDENTIFIED NEEDS:			
• 2020 Traffic:	US 23: 9,470-23,310 vpd at LOS A-B or 0.16-0.34 v/c; 11%T US 23X: 16,030 vpd at, LOS B or 0.28 v/c; 17%T		
• 2050 Traffic:	US 23: 12,200-24,500 vpd at LOS A-B or 0.20-0.36 v/c; 11%T US 23X: 18,100 vpd at LOS B or 0.31 v/c; 17%T. Build Traffic: US 23: 14,000-25,500 vpd US 23X: 11,300 vpd		
• 2016-2018 Crashes:	56 crashes at intersection, including 0 fatal, 5 injury, 51 PDO with CCRF of 1.23-1.26. 55% of crashes are rear-ends. Greenup Ave drivers rear-end vehicles while looking left to turn onto Winchester Ave. SB drivers on Winchester Ave sideswipe vehicles due to drifting from the outside left turn lane into the inner left turn lane.		
• Existing Geometry:	Both have four 12-ft-wide lanes, 2-ft-wide t curb/gutter, and turn lanes at intersection.		
• Other:	Speed limit is 35 MPH		
ENVIRONMENTAL RED FLAGS:		Businesses	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
		 <div>Realign US 23/US 23X intersection and reconstruct 8th Street approach for improved sight distance</div>	
Concept 1			
		Concept 2	

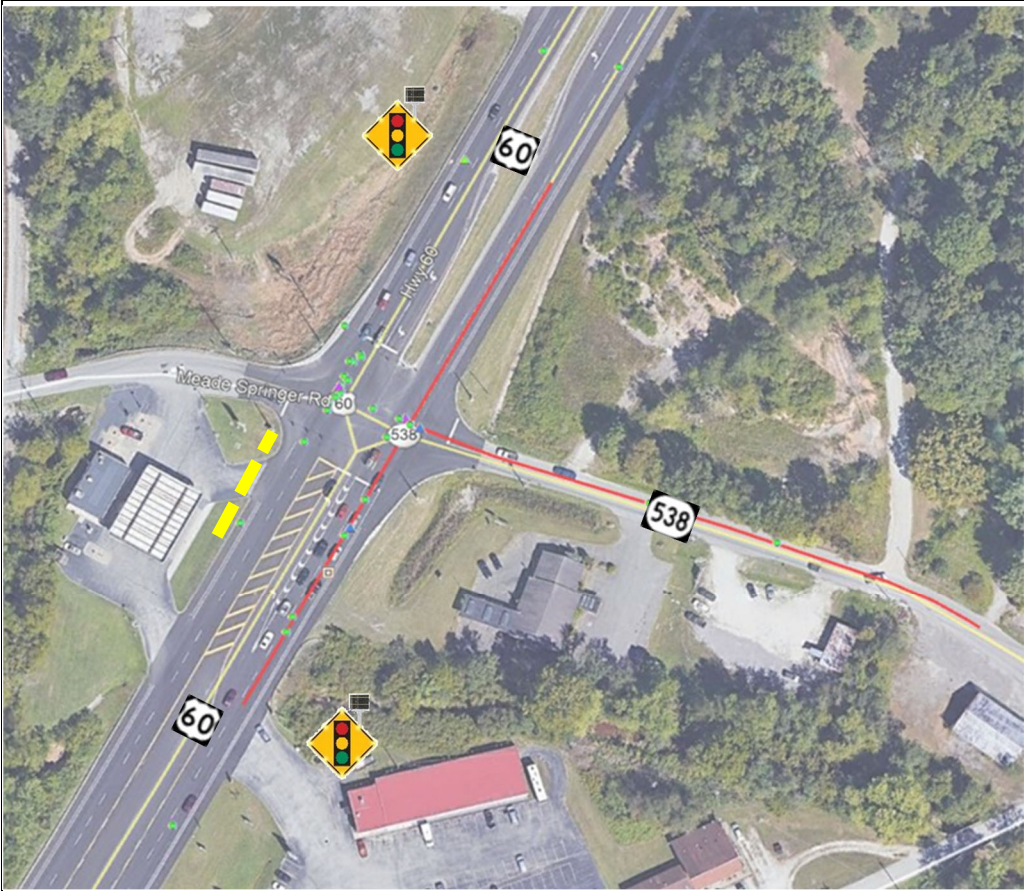


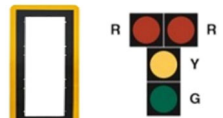

E	Boyd County	KY 5 (Bellefonte Road) at US 23	
Long-Term	High Priority	KY 5 MP 10.531–10.781 US 23 MP 20.700–20.800	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">Construct right-turn lane on KY 5 approaching the US 23.Construct TWLTL for turns to adjacent businesses.Remove and replace existing signal pole and controller box in NW quadrant (by KFC) for improved sight distance for KY 5 traffic.		Phase Estimate	(2020 Dollars)
		Design:	\$100,000
		Right-of-Way:	\$250,000
		Utilities:	\$500,000
		Construction:	\$450,000
		Total Cost:	\$1,300,000
IDENTIFIED NEEDS:			
• 2020 Traffic:		KY 5: 4,480 vpd at LOS C or 0.18 v/c; 8%T US 23: 30,970 vpd at LOS C or 0.47 v/c; 8%T.	
• 2050 Traffic:		KY 5: 4,900 vpd at LOS C or 0.19 v/c; 8%T US 23: 34,600 vpd at LOS C or 0.52 v/c; 8%T.	
• 2016-2018 Crashes:		KY 5 has 0 fatal, 0 injury, 4 PDO US 23 has 0 fatal, 1 injury, 16 PDO. No high CCRF spots. 75% of KY 5 crashes and 76% of US 23 crashes are rear-ends.	
• Existing Geometry:		KY 5 has two 11-ft-wide lanes with 1- ft-wide paved shoulder. US 23 has four 12-ft-wide lanes, curb/gutter, NB left-turn lane and median.	
• Other:		Speed Limit is 35 MPH on KY 5 and 45 MPH on US 23. Signal pole/controller box may impede sight distance for KY 5 drivers turning right on red. Community input notes congestion on KY 5 at the signal.	
ENVIRONMENTAL RED FLAGS:		No environmental red flags	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	






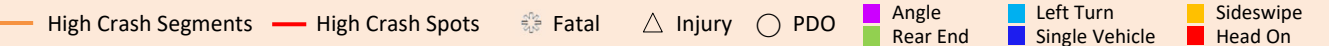
F	Boyd/Greenup Counties	US 23 Pedestrian Path From KY 5 in Boyd to Russell Plaza Drive in Greenup	
Long-Term	Medium Priority	US 23 Boyd MP 20.750 – 20.940 Greenup MP 0.000 – 0.040	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">Construct 5-foot-wide paved path with curb and gutter for improved pedestrian mobility and safety from KFC in Boyd County to Golden Corral in Greenup.Replace existing asphalt shoulders with the same sidewalk/curb & gutter template.		Phase Estimate	(2020 Dollars)
		Design:	\$50,000
		Right-of-Way:	\$50,000
		Utilities:	\$100,000
		Construction:	\$400,000
		Total Cost:	\$600,000
IDENTIFIED NEEDS: <ul style="list-style-type: none">2020 Traffic: 30,970 vpd on US 23, operating at LOS C or 0.47 v/c; 8%T.2050 Traffic: 34,600 vpd on US 23, operating at LOS C or 0.52 v/c; 8%T.2016-2018 Crashes: N/AExisting Geometry: Four 12 ft-wide lanes, 2-ft-wide curb/gutter transitioning to 10-ft-wide paved shoulders; 14-ft-wide median.Other: Speed limit is 45 MPH. Pedestrians and bicyclists have created a well-worn path between KY 5 and the widened asphalt shoulder near Golden Corral.			
ENVIRONMENTAL RED FLAGS:		No environmental red flags	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
			

G	Boyd County	KY 716/KY 3293/Summitt Road Intersection	
Long-Term	Medium Priority	KY 716 MP 0.565 KY 3293 MP 2.407	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> Construct a mini roundabout at the intersection. This improvement is a component of CHAF IP20130096. 		Phase Estimate	(2020 Dollars)
		Design:	\$75,000
		Right-of-Way:	\$150,000
		Utilities:	\$1,000,000
		Construction:	\$325,000
		Total Cost:	\$1,550,000
IDENTIFIED NEEDS: <ul style="list-style-type: none"> 2020 Traffic: KY 716: 5,510 vpd at LOS D or 0.19 v/c; 6-14%T KY 3293: 1,830 vpd at LOS B or 0.09 v/c; 6%T. 2050 Traffic: KY 716: 10,300 vpd at LOS D or 0.36 v/c; 6-14%T KY 3293: 8,000 vpd at LOS D or 0.38 v/c; 6%T. 2016-2018 Crashes: KY 716 has 0 fatal, 0 injury, 5 PDO KY 3293 has 0 fatal, 0 injury, 1 PDO. No high CCRF spots. Existing Geometry: KY 716 has two 10 ft lanes and 3 ft shoulder. KY 3293 has two 9 ft lanes and 3 ft shoulder. Other: Speed Limit is 35 MPH on KY 716 and 55 MPH on KY 3293. 			
ENVIRONMENTAL RED FLAGS: No environmental red flags			
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)			
			

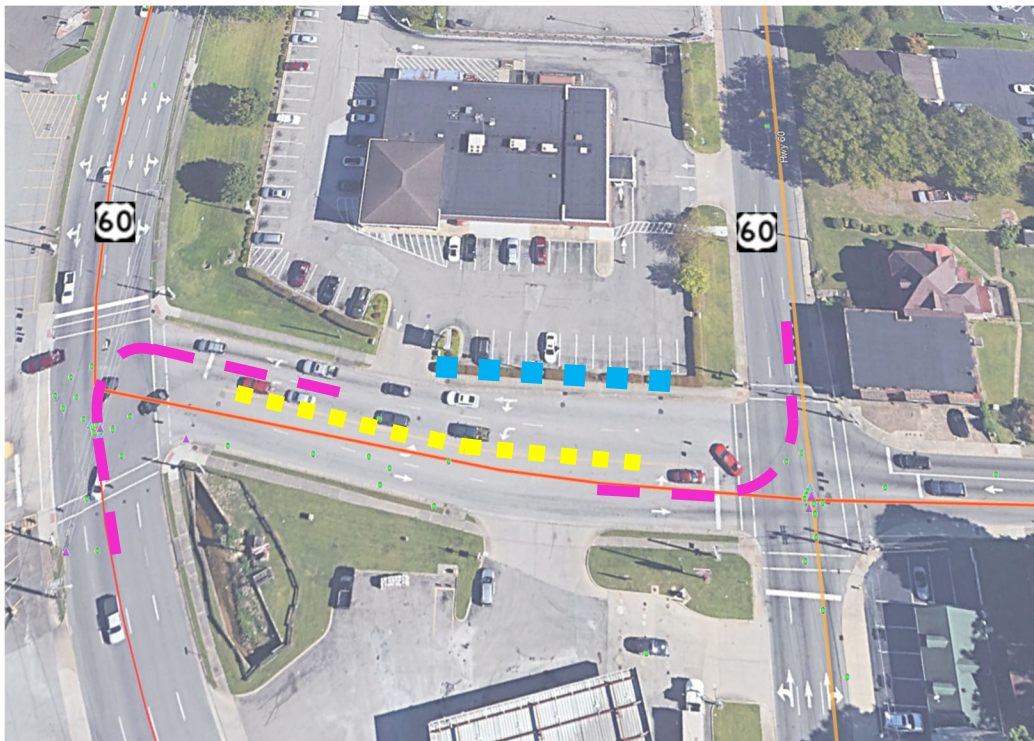


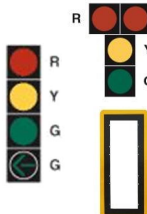


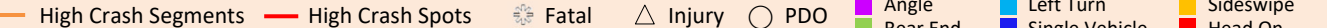
H	Greenup County	KY 693 (Diederick Boulevard) at KY 1172 (Red Devil Lane)/Thompson Road	
Long-Term	High Priority	KY 693 MP 3.900 – 4.000 KY 1172 MP 0.000	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">• Install double red signal heads, reflective backplates, and solar LED enhanced “signal ahead” signs on KY 693.• Construct NB right-turn lane on Thompson Road at KY 693.		Phase Estimate	(2020 Dollars)
		Design:	\$100,000
		Right-of-Way:	\$25,000
		Utilities:	\$25,000
		Construction:	\$500,000
		Total Cost:	\$650,000
IDENTIFIED NEEDS:			
• 2020 Traffic:		KY 693: 13,030 vpd at LOS E or 0.47 v/c; 9%T KY 1172: 3,760 vpd at LOS C or 0.21 v/c; 12%T.	
• 2050 Traffic:		KY 693: 17,200 vpd at LOS E or 0.63 v/c; 9%T KY 1172: 5,500 vpd at LOS C or 0.31 v/c; 12%T.	
• 2016-2018 Crashes:		KY 693 has 0 fatal, 4 injury, 18 PDO with CCRF of 1.57 KY 1172 has 0 fatal, 1 injury, 2 PDO. 91% of KY 693 crashes are rear-ends.	
• Existing Geometry:		KY 693 has two 10-ft-wide lanes, curb/gutter, turn lanes. KY 1172 has two 9-ft-wide lanes, curb/gutter, left-turn lane.	
• Other:		Speed Limit is 45 MPH on KY 693 and 35 MPH on KY 1172. Community input notes congestion on KY 693 and on Thompson Road.	
ENVIRONMENTAL RED FLAGS: Stream/wetland			
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)			
<div></div>			
<div><div><div>— High Crash Segments</div><div>— High Crash Spots</div><div>Fatal</div><div>△ Injury</div><div>○ PDO</div><div>Angle</div><div>Rear End</div><div>Left Turn</div><div>Single Vehicle</div><div>Sideswipe</div><div>Head On</div></div></div>			
















I	Greenup County	US 23 at Caroline Road	
Long-Term	High Priority	US 23 MP 5.300 – 5.400	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">Continue to monitor traffic, assessing signal warrants.Construct right turn lanes onto Caroline Drive.If unsignalized, construct acceleration lanes for turning buses. Coordinate with Local Project U: Widen Caroline Road.		Phase Estimate	(2020 Dollars)
		Design:	\$50,000-\$75,000
		Right-of-Way:	\$0
		Utilities:	\$25,000
		Construction:	\$550,000-\$850,000
		Total Cost:	\$625,000-\$950,000
IDENTIFIED NEEDS:			
• 2020 Traffic:	12,630 vpd on US 23, operating at LOS A or 0.16 v/c; 7%T.		
• 2050 Traffic:	17,200 vpd on US 23, operating at LOS A or 0.22 v/c; 7%T.		
• 2016-2018 Crashes:	No crashes on US 23 within MP limits.		
• Existing Geometry:	Four 12 ft-wide lanes and 10 ft-wide paved shoulders, left-turn lanes, 35- 50-ft-wide grass median.		
• Other:	Speed limit is 55 MPH. With elementary, middle, high schools and sports facilities located on same campus, community input identified congestion issues from school traffic.		
ENVIRONMENTAL RED FLAGS:		No environmental red flags	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
<div><div><div>Construct NB and SB acceleration lanes, if no signal is installed.</div><div>Caroline Road (Local Project U)</div><div>23</div><div><div>Install new traffic signal if warrants are met.</div></div><div>Construct NB and SB right turn onto Caroline Road.</div><div>23</div></div><div><div>Raceland-Worthington School</div><div></div></div></div>			
<div><div>High Crash Segments</div><div>High Crash Spots</div><div>Fatal</div><div>Injury</div><div>PDO</div><div>Angle</div><div>Rear End</div><div>Left Turn</div><div>Single Vehicle</div><div>Sideswipe</div><div>Head On</div></div>			

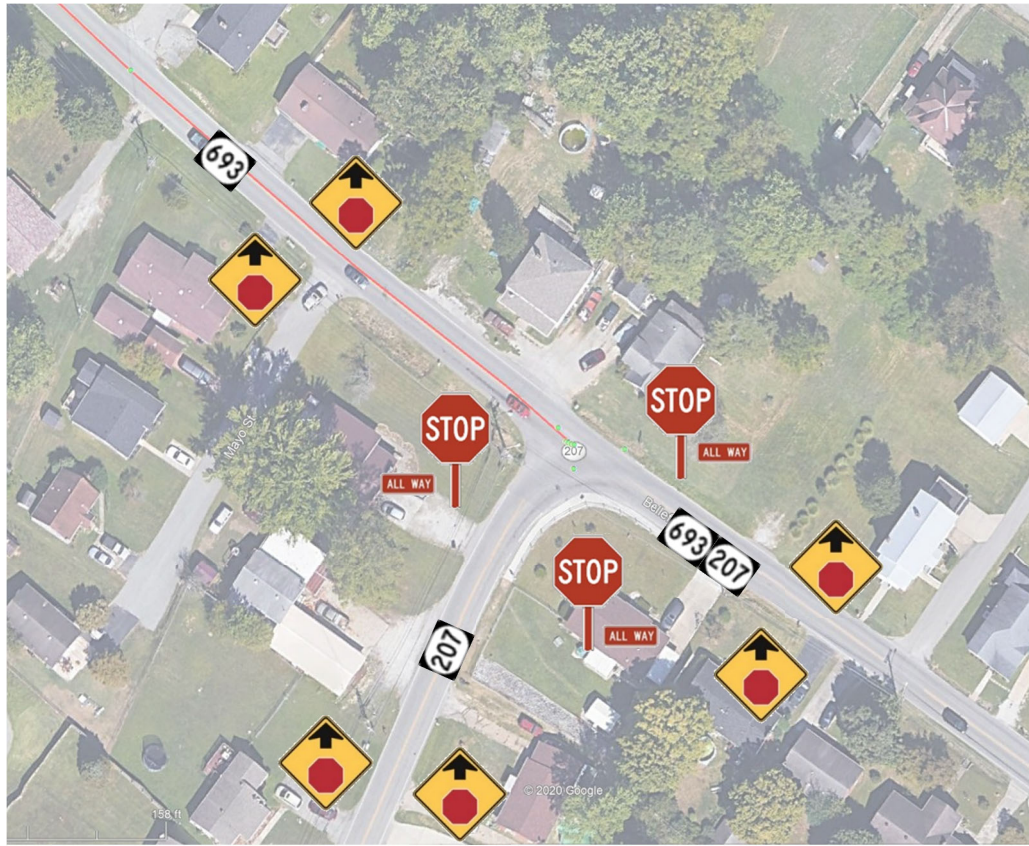




J	Boyd County	US 60 at KY 538 (Shopes Creek Road)	
Short-Term		US 60 MP 6.555 KY 538 MP 0.000	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">• Install LED enhanced solar “signal ahead” signs on US 60.• Replace signals with double reds and reflective backplates.• Close Marathon’s US 60 entrance closest to intersection.		Phase Estimate	(2020 Dollars)
		Design:	\$0
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$50,000
		Total Cost:	\$50,000
IDENTIFIED NEEDS:			
• 2020 Traffic:		17,900-21,700 vpd on US 60, operating at LOS A-B or 0.23-0.31 v/c; 2%T.	
• 2050 Traffic:		23,400-28,400 vpd on US 60, operating at LOS A-B or 0.30-0.32 v/c; 2%T.	
• 2016-2018 Crashes:		US 60 has 0 fatal, 4 injury, 23 PDO with a 1.70 CCRF. Crashes are 44% rear-ends.	
• Existing Geometry:		Four 12- ft-wide lanes and 10-ft-wide paved shoulders with left-turn bays at the signal.	
• Other:		Speed Limit is 55 MPH. Westbound US 60 is downgrade showing skid marks.	
ENVIRONMENTAL RED FLAGS:		N/A	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
		<div></div> <ul style="list-style-type: none">• Sign assemblies: • Install double reds with reflective backplates • Block or remove entrance 	
<div><div><div>High Crash Segments</div><div>High Crash Spots</div><div>Fatal</div><div>Injury</div><div>PDO</div><div>Angle</div><div>Rear End</div></div><div><div>Left Turn</div><div>Single Vehicle</div><div>Sideswipe</div><div>Head On</div></div></div>			

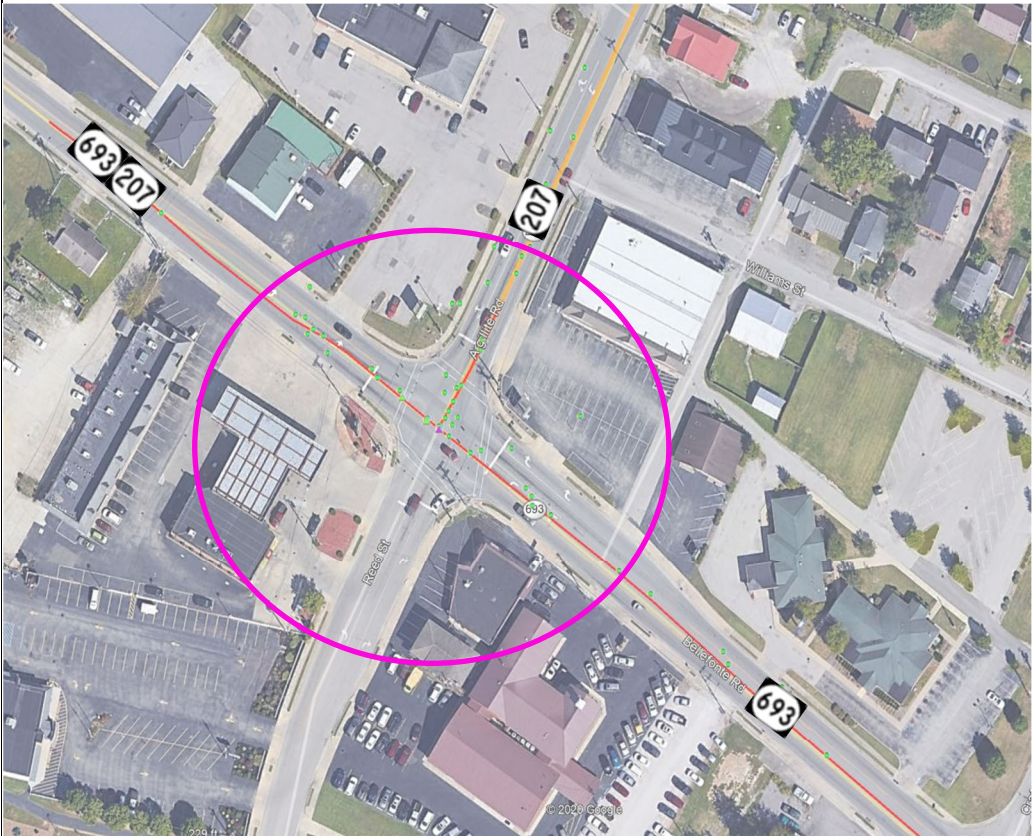

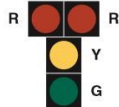












K	Boyd County	US 60 at Summitt Road	
Short-Term		US 60 MP 7.130 Summitt Rd MP 0.000	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">• Install LED enhanced solar “signal ahead” signs on US 60.• Install auxiliary signals on SE and NW quadrant poles.• Replace signals with double reds and reflective backplates for visibility.		Phase Estimate	(2020 Dollars)
		Design:	\$0
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$40,000
		Total Cost:	\$40,000
IDENTIFIED NEEDS: <ul style="list-style-type: none">• 2020 Traffic: 17,900 vpd on US 60, operating at LOS A or 0.23 v/c; 2%T.• 2050 Traffic: 23,400 vpd on US 60, operating at LOS B or 0.30 v/c; 2%T.• 2016-2018 Crashes: US 60 has 0 fatal, 6 injury, 16 PDO with 1.28 CCRF. 82% rear-ends.• Existing Geometry: Four 12-ft-wide lanes and 10-ft-wide paved shoulders with NB left-turn bay at the signal.• Other: Speed Limit is 55 MPH. Summitt Road leads to two schools and a federal prison. Community input noted heavy traffic and high speeds on US 60.			
ENVIRONMENTAL RED FLAGS:		N/A	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
		<div></div> <ul style="list-style-type: none">• Sign assemblies <div></div> <ul style="list-style-type: none">• Install auxiliary signals/double reds with backplates <div></div>	
			

L	Boyd County	US 60 at Oakview Road	
Short-Term		US 60 MP 11.550 Oakview Rd MP 0.000	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">• Install LED enhanced solar “signal ahead” signs on US 60.• Install auxiliary signals on SE and NW quadrant poles.• Replace signals with double reds with reflective backplates for visibility.		Phase Estimate	(2020 Dollars)
		Design:	\$0
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$40,000
		Total Cost:	\$40,000
IDENTIFIED NEEDS:			
• 2020 Traffic:	19,550 vpd on US 60, operating at LOS C or 0.33 v/c; 4%T.		
• 2050 Traffic:	21,700 vpd on US 60, operating at LOS C or 0.36 v/c; 4%T.		
• 2016-2018 Crashes:	US 60 has 0 fatal, 3 injury, 32 PDO. 66% rear-ends with CCRF of 1.55. Drivers are not stopping in time due to not seeing the signal/distracted driving. Most crashes are in the intersection.		
• Existing Geometry:	Four 10-ft-wide lanes and 2-ft-wide curb/gutter with left-turn bays at the signal.		
• Other:	Speed Limit is 35 MPH.		
ENVIRONMENTAL RED FLAGS:		N/A	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
		<div></div> <ul style="list-style-type: none">• Sign assemblies <div></div> <ul style="list-style-type: none">• Auxiliary signals, double reds, reflective backplates <div></div> <div></div>	
High Crash Segments High Crash Spots Fatal Injury PDO Angle Rear End Left Turn Single Vehicle Sideswipe Head On			

M	Boyd County	CS-2492 (Lexington Avenue) at US 60 (12 th & 13 th Streets)	
Short-Term		Lex Ave MP 0.000-0.100 US 60 MP 11.808 EB & 11.835 WB	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">• Install painted “cat-tracks” to define turn movements.• Check warrants for protected left-turn phase at 12th and 13th streets.• Replace signals with double reds and reflective backplates.• Install Qwik Kurb to block lefts from entrances onto Lexington Avenue.• Remove shrubs along CVS parking lot for increased sight distance.		Phase Estimate	(2020 Dollars)
		Design:	\$0
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$95,000
		Total Cost:	\$95,000
IDENTIFIED NEEDS: <ul style="list-style-type: none">• 2020 Traffic: Lex Ave: 8,580 vpd at LOS C or 0.30 v/c; 8%T US 60: 9420 vpd at LOS or 0.12-0.16 v/c; 8%T.• 2050 Traffic: Lex Ave: 14,900 vpd at LOS E or 0.53 v/c; 8%T US 60 11,500-14,600 vpd at LOS A-B or 0.15-0.25 v/c; 8%T.• 2016-2018 Crashes: Lexington Ave has 0 fatal, 4 injury, 21 PDO with 40% angle crashes and a CCRF of 2.39.• Existing Geometry: Four 11 ft-wide lanes, with curb/gutter, turn lanes between 12th and 13th streets.• Other: Speed Limit is 25 MPH. Conflicting movements in a short length contributes to the high number of crashes. Landscaping limits visibility. Public input noted this is a common concern.			
ENVIRONMENTAL RED FLAGS: N/A			
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)			
		<div></div> <ul style="list-style-type: none">• “Cat-tracks” • Signal and reflective backplates • Qwik Kurb • Shrub Removal 	
			

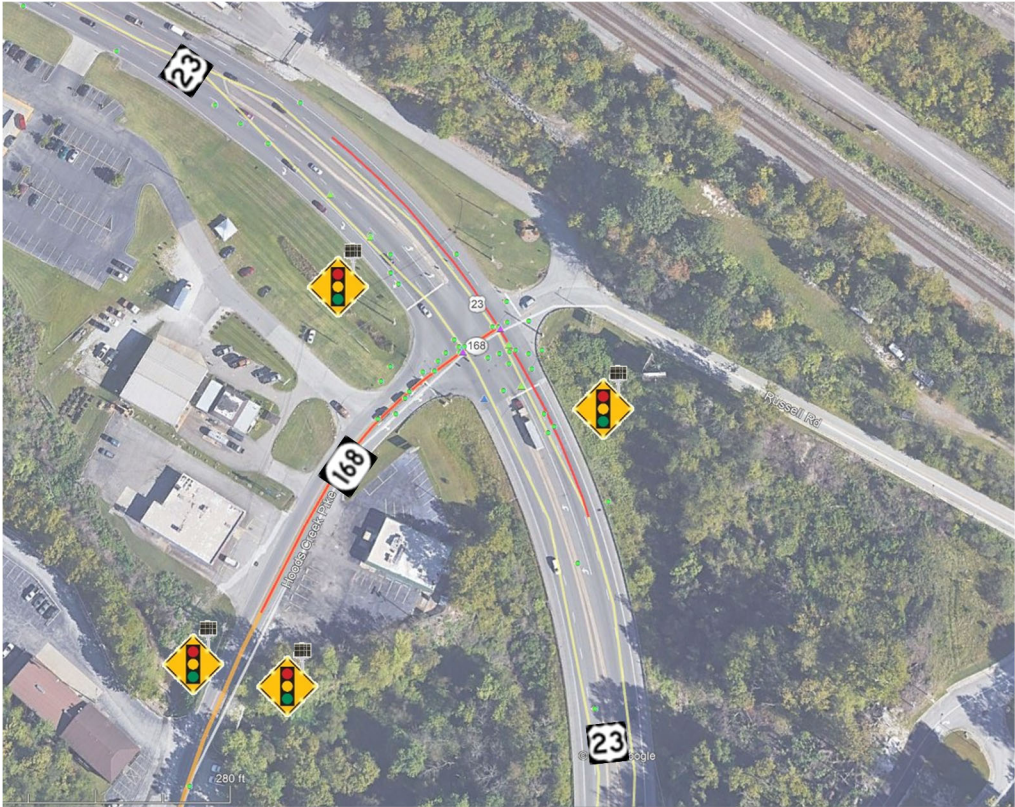


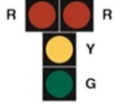

N	Greenup County	KY 5 (Bellefonte-Princess Road) at KY 1093 (Country Club Drive)	
Short-Term		KY 5 MP 0.071 KY 1093 MP 0.000	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">• Check warrant to convert intersection to all-way stop using retroreflective stop signposts and 36" signs.• Trim trees lining KY 5 above eye level for increased sight distance.• Coordinate with local government to add roadside lighting.		Phase Estimate	(2020 Dollars)
		Design:	\$0
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$20,000
		Total Cost:	\$20,000
IDENTIFIED NEEDS: <ul style="list-style-type: none">• 2020 Traffic: KY 5: 3,710 vpd at LOS C or 0.14 v/c; 8%T KY 1093: 5,730 vpd at LOS C or 0.19 v/c.• 2050 Traffic: KY 5: 4,100 vpd at LOS C or 0.15 v/c; 8%T KY 1093: 9,300 vpd at LOS D or 0.36 v/c.• 2016-2018 Crashes: KY 5 had 0 fatal, 0 injury, 3 PDO KY 1093 had 0 fatal, 0 injury, 2 PDO. No high CCRF spots.• Existing Geometry: KY 5 has two 10-ft-wide lanes with 1-ft-wide paved shoulders. KY 1093 has two 11-ft lanes with 1-ft-wide paved shoulders.• Other: Speed Limit is 35 MPH. Sight distance issue due to trees. Public input noted speeding concerns.			
ENVIRONMENTAL RED FLAGS:		N/A	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
		<div></div> <ul style="list-style-type: none">• Sign assemblies: (if warranted) • Tree trimming • Coordinate with local government to add roadside lighting	
 High Crash Segments  High Crash Spots  Fatal  Injury  PDO  Angle  Rear End  Left Turn  Single Vehicle  Sideswipe  Head On			



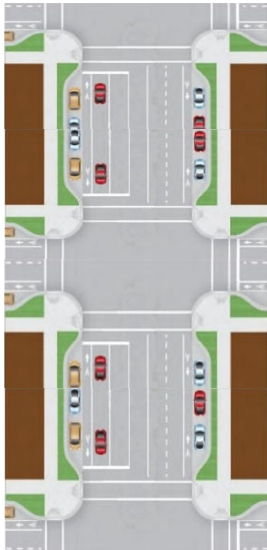
01		Greenup County		KY 693 (Bellefonte Road) at KY 207 (Greenbo Road)	
Short-Term		KY 693 MP 3.099 KY 207 MP 15.590			
IMPROVEMENT DESCRIPTION: • Check warrants to convert intersection to all-way stop controlled, using retroreflective stop signposts and doubled stop ahead signs.			Phase Estimate		(2020 Dollars)
			Design:		\$0
			Right-of-Way:		\$0
			Utilities:		\$0
			Construction:		\$20,000
			Total Cost:		\$20,000
IDENTIFIED NEEDS:					
• 2020 Traffic:		KY 693: 3,880 vpd at LOS C or 0.16 v/c; 5%T KY 207: 9,550 vpd at LOS D or 0.33 v/c; 6%T.			
• 2050 Traffic:		KY 693: 6,700 vpd at LOS D or 0.27 v/c; 5%T KY 207: 11,700 vpd at LOS D or 0.41 v/c; 6%T.			
• 2016-2018 Crashes:		KY 693 has 0 fatal, 1 injury, 11 PDO with 1.93 CCRF KY 207 has 0 fatal, 0 injury, 2 PDO. Most crashes are in the intersection, often due to right-of-way confusion.			
• Existing Geometry:		Both routes have two 10-ft-wide lanes with 1-ft-wide paved shoulders.			
• Other:		Speed Limit is 35 MPH. Public input noted this intersection as a concern. Item 9-8509, a project to reconstruct KY 207 from this intersection to the Industrial Parkway, is currently under design.			
ENVIRONMENTAL RED FLAGS:		N/A			
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)			
				<div></div> <div>• Sign assemblies (if warranted)</div> <div></div> <div></div> <div></div>	
<div><div>— High Crash Segments</div><div>— High Crash Spots</div><div>★ Fatal</div><div>△ Injury</div><div>○ PDO</div><div>■ Angle</div><div>■ Rear End</div><div>■ Left Turn</div><div>■ Single Vehicle</div><div>■ Sideswipe</div><div>■ Head On</div></div>					


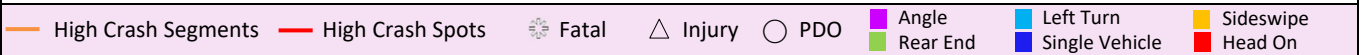
02		Greenup County		KY 693 (Bellefonte Road) at KY 207 (Argillite Road)			
Short-Term				KY 693 MP 3.099 KY 207 MP 15.880			
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">• Replace existing signals to double reds.• Install reflective backplates to all signals.• Adjust signal timing to maximize capacity at peak times.				Phase Estimate		(2020 Dollars)	
				Design:		\$0	
				Right-of-Way:		\$0	
				Utilities:		\$0	
				Construction:		\$30,000	
				Total Cost		\$30,000	
IDENTIFIED NEEDS:							
• 2020 Traffic:		KY 693: 12,980 vpd at LOS D or 0.43 v/c; 9%T KY 207: 9,550-10,660 vpd at LOS D or 0.33-0.44 v/c; 6%T.					
• 2050 Traffic:		KY 693: 17,300 vpd at LOS E or 0.57 v/c; 9%T KY 207: 11,700-12,400 vpd at LOS D-E or 0.41-0.51 v/c; 6%T.					
• 2016-2018 Crashes:		KY 693 has 0 fatal, 1 injury, 24 PDO with 1.78 CCRF KY 207 has 0 fatal, 1 injury, 26 PDO with 2.37 CCRF. Most crashes due to disregarding/not seeing signal.					
• Existing Geometry:		Both routes have two 10-ft-wide lanes with turn lanes and curb/gutter.					
• Other:		Speed Limit is 35 MPH. Public input noted a need to retime signals. Item 9-8509, a project to reconstruct KY 207 from this intersection to the Industrial Parkway, is currently under design.					
ENVIRONMENTAL RED FLAGS:				N/A			
PROJECT LOCATION MAP:				(Not to Scale; images are for illustrative purposes only.)			
						<div></div> <ul style="list-style-type: none">• Change signals to double reds, install reflective backplates and adjust signal timing as needed. <div></div> <div></div>	
 High Crash Segments		 High Crash Spots		 Fatal		 Injury	
				 PDO		 Angle	
				 Rear End		 Left Turn	
						 Single Vehicle	
						 Sideswipe	
						 Head On	


P	Greenup County	KY 693 (Bellefonte Road) at KY 1725 (St. Christopher Drive)	
Short-Term		KY 693 MP 5.059 KY 1725 MP 0.000	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">• Install LED enhanced solar “signal ahead” signs on KY 693.• Replace signals with double reds with reflective backplates for visibility.		Phase Estimate	(2020 Dollars)
		Design:	\$0
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$40,000
		Total Cost:	\$40,000
IDENTIFIED NEEDS:			
• 2020 Traffic:		15,560 vpd on KY 693, operating at LOS B or 0.24 v/c; 9%T.	
• 2050 Traffic:		20,900 vpd on KY 693, operating at LOS B or 0.33 v/c; 9%T.	
• 2016-2018 Crashes:		19 crashes on KY 693, including 0 fatal, 1 injury, 18 PDO. 53% are rear-ends with CCRF of 1.57. Most crashes caused by distracted driving and not seeing signals in time to stop.	
• Existing Geometry:		Four 11-ft-wide lanes and 2-ft-wide curb/gutter with left-turn bays at the signal.	
• Other:		Speed Limit is 45 MPH. Community input noted intersection as a concern.	
ENVIRONMENTAL RED FLAGS:		N/A	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
		<div></div> <ul style="list-style-type: none">• Sign assemblies <div></div> <ul style="list-style-type: none">• Install double reds with reflective backplates <div></div>	
<div><div>— High Crash Segments</div><div>— High Crash Spots</div><div> Fatal</div><div> Injury</div><div> PDO</div><div> Angle</div><div> Rear End</div><div> Left Turn</div><div> Single Vehicle</div><div> Sideswipe</div><div> Head On</div></div>			



Q	Greenup County	KY 693 (Diederick Boulevard) at US 23	
Short-Term		KY 693 MP 5.812 US 23 MP 0.295	
IMPROVEMENT DESCRIPTION: • Install “cat-tracks” and reflector delineation on median for traffic turning left onto NB US 23 from KY 693.		Phase Estimate	(2020 Dollars)
		Design:	\$0
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$35,000
		Total Cost:	\$35,000
IDENTIFIED NEEDS:			
• 2020 Traffic:		KY 693: 15,560 vpd at LOS B or 0.24 v/c; 9%T US 23: 30,970 vpd at LOS C or 0.47 v/c; 8%T.	
• 2050 Traffic:		KY 693: 20,900 vpd at LOS B or 0.33 v/c; 9%T US 23: 34,800 vpd at LOS C or 0.52 v/c; 8%T.	
• 2016-2018 Crashes:		KY 693 has 0 fatal, 4 injury, 37 PDO with 2.64 CCRF US 23 has 0 fatal, 4 injury, 18 PDO with 1.29 CCRF.	
• Existing Geometry:		KY 693 has four 11-ft-wide lanes with turn lanes, curb/gutter. US 23 has four 12-ft-wide lanes with turn lanes, median, and curb/gutter.	
• Other:		Speed Limit is 45 MPH on KY 693 and 55 MPH on US 23. Trends show motorists leaving assigned lanes, crossing median, and getting confused in left turn. Public input noted a need for improved island visibility and improved access to Rally’s; determined to be infeasible with current configuration.	
ENVIRONMENTAL RED FLAGS:		N/A	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
		• “Cat-tracks” 	
		• Retroreflective, low profile median delineation 	
 — High Crash Segments — High Crash Spots ★ Fatal △ Injury ○ PDO ■ Angle ■ Rear End ■ Left Turn ■ Single Vehicle ■ Sideswipe ■ Head On			

R	Boyd County	KY 168 (Hoods Creek Pike) at US 23
Short-Term		KY 168 MP 8.179 US 23 MP 20.345
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none"> • Install solar LED enhanced “signal ahead” signs on US 23 and KY 168. • Replace existing signals with double reds and reflective backplates. 		Phase Estimate (2020 Dollars)
		Design: \$0
		Right-of-Way: \$0
		Utilities: \$0
		Construction: \$60,000
		Total Cost: \$60,000
IDENTIFIED NEEDS: <ul style="list-style-type: none"> • 2020 Traffic: KY 168: 5,740 vpd at LOS C or 0.19 v/c; 4%T US 23: 22,000 vpd at LOS C or 0.42 v/c; 8%T. • 2050 Traffic: KY 168: 5,700 vpd at LOS C or 0.19 v/c; 4%T US 23: 25,300 vpd at LOS C or 0.48 v/c; 8%T. • 2016-2018 Crashes: KY 168 has 0 fatal, 0 injury, 11 PDO with 1.38 CCRF US 23 has 0 fatal, 11 injury, 46 PDO with 1.24 CCRF. 60% of US 23 crashes are rear-ends. Vehicles turn from KY 168 into oncoming traffic. • Existing Geometry: US 23 has four 12-ft-wide lanes with turn lanes, 10-ft-wide paved shoulders KY 168 has two 11-ft-wide lanes with 1-ft-wide paved shoulders. • Other: Speed Limit is 35 MPH on KY 168 and 45 MPH on US 23. 		
ENVIRONMENTAL RED FLAGS: N/A		
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)		
		 <ul style="list-style-type: none"> • Sign Assembly  <ul style="list-style-type: none"> • Install double reds and reflective backplates 
		

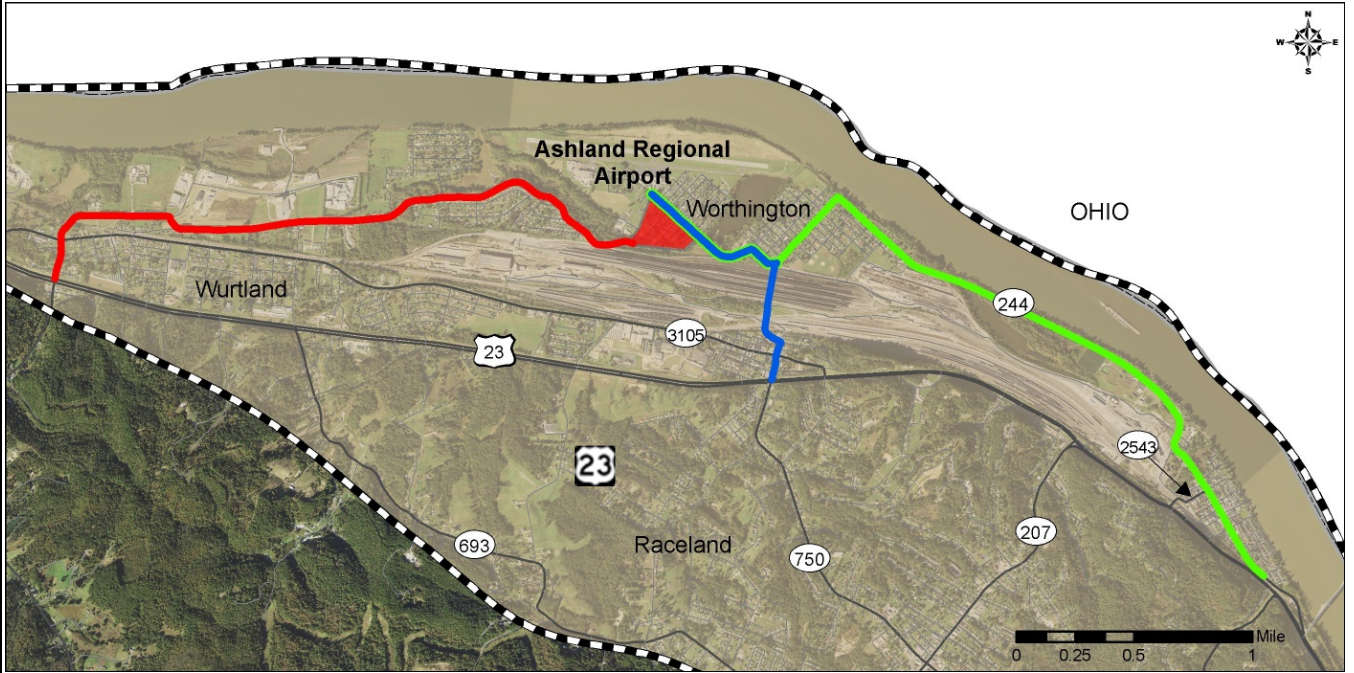
S	Boyd County	US 23 (Greenup Avenue) at 15 th -16 th Streets	
Short-Term		US 23 MP 18.350 – 18.450	
IMPROVEMENT DESCRIPTION: <ul style="list-style-type: none">Install pedestrian bulb-outs and crosswalks at 15th and 16th streets' intersections with Greenup Avenue to shorten walking distances and reduce pedestrian exposure to traffic.		Phase Estimate	(2020 Dollars)
		Design:	\$80,000
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$420,000
		Total Cost:	\$500,000
IDENTIFIED NEEDS:			
• 2020 Traffic:		13,080 vpd on US 23 (Greenup Ave), operating at LOS B or 0.28 v/c; 11%T.	
• 2050 Traffic:		16,200 vpd on US 23 (Greenup Ave), operating at LOS B or 0.29 v/c; 11%T.	
• 2016-2018 Crashes:		N/A	
• Existing Geometry:		Four 12-ft-wide lanes with TWLTL and on-street parking.	
• Other:		15 th and 16 th streets are pedestrian links to the transit center and riverfront. Greenup Avenue is approximately 90 feet wide at these intersections.	
ENVIRONMENTAL RED FLAGS:		N/A	
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)	
		<div></div> <ul style="list-style-type: none">Install bulb outs at intersections. 	
High Crash Segments		High Crash Spots	Fatal
Injury		PDO	Angle
Rear End		Left Turn	Single Vehicle
Sideswipe		Head On	

T	Greenup County	KY 693 (Diederick Boulevard) Approaching US 23 (by Hobby Lobby/Lowe's)	
Local	Medium Priority	MP 5.600 – 5.700	
IMPROVEMENT DESCRIPTION: 1. Add traffic signal to Lowe's/Hobby Lobby intersection. 2. Widen and align entrances at intersections of Lowe's/Hobby to accommodate high traffic volumes. 3. KYTC approved a permit to add a signal at this intersection but the developer is responsible for implementation.		Phase Estimate	(2020 Dollars)
		Design:	Completed
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$25,000 (Developer)
		Total Cost:	\$25,000 (Developer)
IDENTIFIED NEEDS: <ul style="list-style-type: none"> 2020 Traffic: 15,560 vpd on KY 693, operating at LOS B or 0.24 v/c; 9%T. 2050 Traffic: 20,900 vpd on KY 693, operating at LOS B or 0.33 v/c; 9%T. 2016-2018 Crashes: 24 crashes on KY 693 including 0 fatal, 3 injury, 21 PDO. 58% angle crashes with CCRF of 1.54. Existing Geometry: Four 11-ft-wide lanes and 2-ft-wide curb/gutter with left-turn lanes. Other: Speed Limit: 35 MPH. Traffic conflicts entering and exiting businesses. Public input noted this as one of the biggest concerns in the area, a congested area with high speeds. 			
ENVIRONMENTAL RED FLAGS: N/A			
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)			
			
			

U	Greenup County	Caroline Road approaching US 23	
Local	High Priority	US 23 MP 5.300 – 5.400	
IMPROVEMENT DESCRIPTION: Widen Caroline Road for bus traffic with left- and right-turn lanes. Coordinate with Long-Term Project I at the US 23 intersection.		Phase Estimate	(2020 Dollars)
		Design:	\$80,000
		Right-of-Way:	\$100,000
		Utilities:	\$300,000
		Construction:	\$400,000
		Total Cost:	\$880,000
IDENTIFIED NEEDS:			
• 2020 Traffic:		12,630 vpd on US 23, operating at LOS A or 0.16 v/c; 8%T.	
• 2050 Traffic:		17,200 vpd on US 23, operating at LOS A or 0.22 v/c; 8%T.	
• 2016-2018 Crashes:		No crashes on US 23 within MP limits.	
• Existing Geometry:		Caroline Road is 18 ft wide with no painted lane lines.	
• Other:		With elementary, middle, high schools and sports facilities located on same campus, community input identified congestion issues from school traffic.	
ENVIRONMENTAL RED FLAGS:		Homes, Businesses, Stream/wetland	
PROJECT LOCATION MAP: (Not to Scale) (Images are for illustrative purposes only.)			
			
<div><div>High Crash Segments</div><div>High Crash Spots</div><div>Fatal</div><div>Injury</div><div>PDO</div><div>Angle</div><div>Rear End</div><div>Left Turn</div><div>Single Vehicle</div><div>Sideswipe</div><div>Head On</div></div>			

V	Greenup County	KY 693 (Bellefonte Road) at Espy Lane	
Local	High Priority	KY 693 MP 3.60 – 3.70	
IMPROVEMENT DESCRIPTION: Add striping to separate traffic into right/left lanes on Espy Lane.		Phase Estimate	(2020 Dollars)
		Design:	\$0
		Right-of-Way:	\$0
		Utilities:	\$0
		Construction:	\$12,000
BCA: N/A		Total Cost:	\$12,000
IDENTIFIED NEEDS: <ul style="list-style-type: none"> • 2020 Traffic: 12,980 vpd on KY 693 operating at LOS D or 0.43 v/c; 9%T. • 2050 Traffic: 17,300 vpd on KY 693, operating at LOS E or 0.57 v/c; 9%T. • Crashes: 7 crashes on KY 693 including 0 fatal, 1 injury (involving bicyclist), 6 PDO. No high CCRF spots. • Existing Geometry: KY 693 has two 11-ft-wide lanes, curb/gutter, and 12-ft-wide center turn lane. • Other: Speed Limit is 35-45 MPH. Espy Lane is 36 ft wide at back of radius, with adequate pavement for proposed lanes. 			
ENVIRONMENTAL RED FLAGS: N/A			
PROJECT LOCATION MAP: (Not to Scale; images are for illustrative purposes only.)			
			
			

W	Boyd County	Central Avenue (CS-2350) Corridor At 14 th -17 th ; 22 nd ; 24 th Streets		
Local	High Priority	Central Avenue MP 0.95 – 1.73		
IMPROVEMENT DESCRIPTION: A series of 2-way stop-controlled, all-way stop-controlled, and signalized intersections along Central Avenue confuse drivers. Improved signage includes high visibility double stop signs, placards below stop signs, and reflective backplates for signals.		Phase Estimate	(2020 Dollars)	
		Design:	\$10,000	
		Right-of-Way:	\$0	
		Utilities:	\$0	
		Construction:	\$105,000	
		Total Cost:	\$115,000	
IDENTIFIED NEEDS:				
• 2020 Traffic:	2,270-4,840 vpd on Central Avenue operating at LOS A or 0.08-0.14 v/c.			
• 2050 Traffic:	4,400-6,000 vpd on Central Avenue, operating at LOS A or 0.13-0.17 v/c.			
• 2016-2018 Crashes:	14 th -17 th St had 0 fatal, 5 injury, 39 PDO. 22 nd & 24 th St had 0 fatal, 7 injury, 31 PDO. High CCRF spots ranged from 1.80 to 3.63. Central Avenue crashes occur mainly at intersections due to disregarding/not seeing stop signs, merging, and right-of-way confusion.			
• Existing Geometry:	Two 11-ft-wide lanes and 2-ft-wide curb/gutter.			
• Other:	Speed Limit is 25 MPH. Ongoing HSIP project (Item No. 9-9010) will address Central Ave/23 rd Street.			
ENVIRONMENTAL RED FLAGS:		N/A		
PROJECT LOCATION MAP:		(Not to Scale; images are for illustrative purposes only.)		
<div><div>— High Crash Segments</div><div>— High Crash Spots</div><div>Fatal</div><div>Injury</div><div>PDO</div><div>Angle</div><div>Rear End</div><div>Left Turn</div><div>Single Vehicle</div><div>Sideswipe</div><div>Head On</div></div>				

X	Greenup County	Airport Access	
Local	Low Priority	Scoping Study	
IMPROVEMENT DESCRIPTION: Conduct scoping study to identify improvements to provide direct, reliable access to/from Ashland Regional Airport and neighborhoods from US 23. This corresponds to CHAF 20040035, originally associated with CS-5009 (Riverside Drive).		Phase Estimate	(2020 Dollars)
		Design:	\$300,000
		Right-of-Way:	TBD
		Utilities:	TBD
		Construction:	TBD
		Total Cost:	\$300,000 (Planning only)
IDENTIFIED NEEDS: <ul style="list-style-type: none"> • 2020 Traffic: N/A • 2050 Traffic: N/A • 2016-2018 Crashes: N/A • Existing Geometry: N/A • Other: Shown below, numerous potential connections exist, making a more in-depth scoping study valuable to identify costs, benefits, and impacts associated with the proposed improvement. 			
ENVIRONMENTAL RED FLAGS: TBD			
PROJECT LOCATION MAP: (Images are for illustrative purposes only.)			
			

9.0 NEXT STEPS

The next phase in the project development process for long-term projects is Phase I Preliminary Engineering. If federal funds are used or permits will be required, additional environmental analyses will be required to satisfy the *National Environmental Policy Act* (NEPA). Short-term projects may be initiated through the district's routine maintenance and traffic programs or become part of systematic specialty programs such as the Highway Safety Improvement Program (HSIP). City and county governments should collaborate with state and KYOVA personnel on local project funding and implementation. Coordination with local officials, key stakeholders, and the public will be critical considering the potential for impacts to nearby community resources.

10.0 ADDITIONAL INFORMATION

Written requests for additional information should be sent to:

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Frankfort, KY 40622
Email: Mikael.Pelfrey@ky.gov

Additional study information can be obtained from:

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