

**DRAFT**

# **Environmental Overview**

**Improvements to US 68 from the Louie B. Nunn Cumberland Parkway at Edmonton in Metcalfe County to KY 3535 Northeast of Greensburg in Green County**

**Green and Metcalfe Counties, Kentucky**

**Item Number: 3-203.00**

prepared for:

**Kentucky Transportation Cabinet**



**August 2014**

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## 1.0 EXECUTIVE SUMMARY

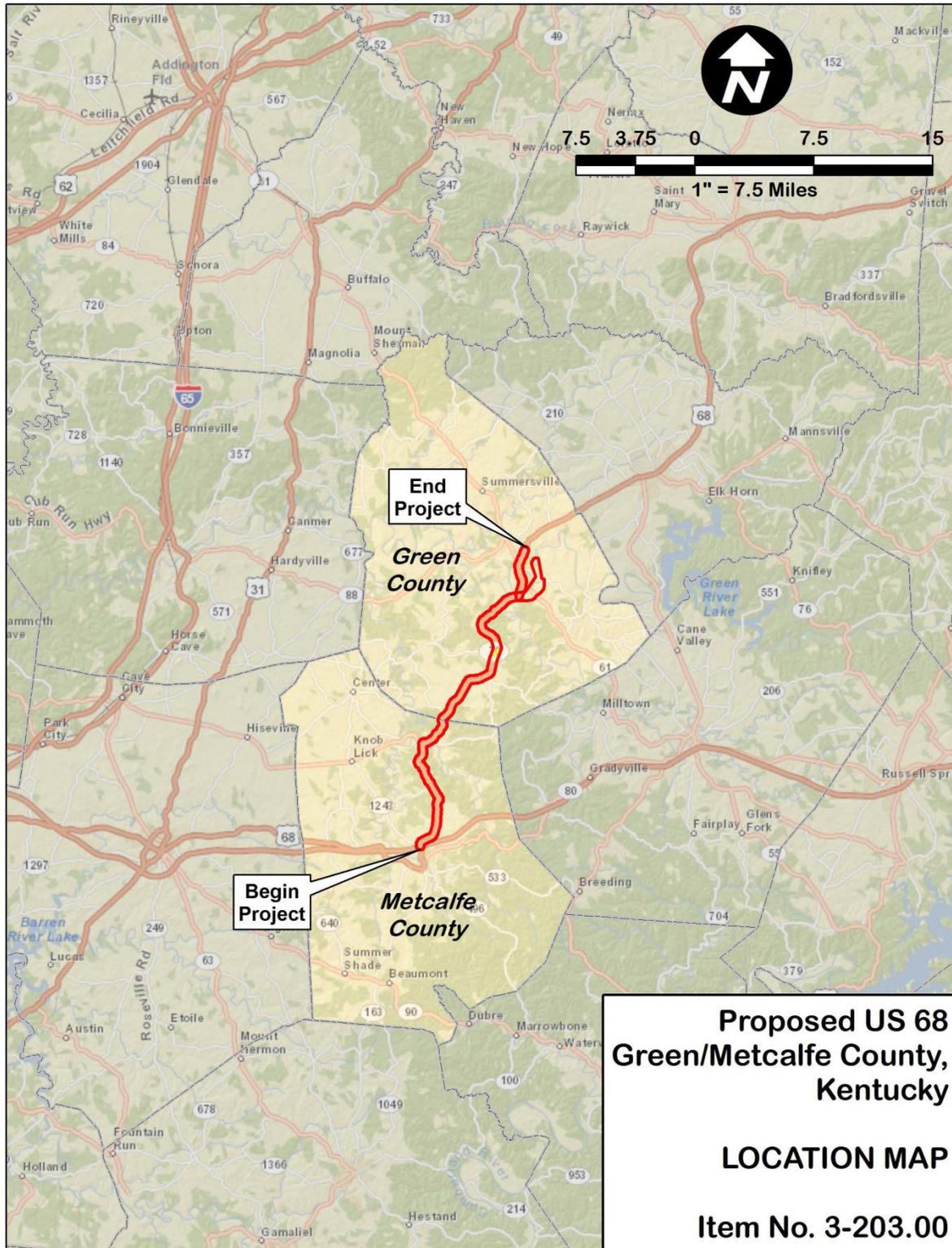
In support of the Kentucky Transportation Cabinet's (KYTC) US 68 Scoping Study, this Environmental Overview examines approximately 24 miles of the existing US 68 Corridor between the Louie B. Nunn Cumberland Parkway at Edmonton in Metcalfe County to KY 3535 (Industrial Park Road), northeast of Greensburg in Green County (Item No. 3-203.00). The scoping study encompasses the project limits of three Six Year Plan (SYP) Item Numbers: 3-8706 (Metcalfe), 8-8710 (Green), and 8-8711 (Green), described as a "new connector from Vaughn Curve on US 68 Bypass east of Greensburg, crossing KY 61 and KY 417 and connecting with KY 3535 north of Greensburg" (see Exhibit 1).

Environmental studies were performed to identify potential impacts and areas of concern within the 24-mile corridor. US 68 in the study area carries between 900 and 2,000 vehicles per day along the rural sections and approximately 5,000 to 8,000 vehicles per day through the city of Greensburg; the majority of the study corridor is currently two lanes.

The scoping study examines two distinct projects: the US 68 corridor (Item Nos. 3-8706 and 8-8710) and the US 68 connector (Item No. 8-8711). The purpose of the US 68 Corridor Project is to provide a safer, more efficient connection between Greensburg and the Cumberland Parkway by improving substandard geometrics along the corridor. The study area is one mile wide and centered along existing US 68. The proposed improvements to the US 68 corridor would connect a new interchange on the Cumberland Parkway (KYTC Item Number 3-8505) with the intersection of KY 61 and US 68 in Greensburg. The new interchange on the Cumberland Parkway will have some effect on regional travel patterns. The results of the Corridor Study will aid in the planning for the proposed developments, which will provide a safer, more efficient connection between Greensburg and the Cumberland Parkway by improving substandard geometrics along the corridor.

The purpose of the US 68 Connector Project is to improve safety, connectivity, and mobility, and to provide system redundancy by creating an alternate crossing over the Green River. Three connector alternatives are currently under consideration; one alternative follows existing US 68 through downtown Greensburg, while the other two alternatives are new route options that travel east of the city. The new alignment options avoid impacts to the historic district of downtown Greensburg, as well as the large number of properties individually listed on the National Register of Historic Places (NRHP).

**Exhibit 1: Project Location Map**



## 2.0 INTRODUCTION

### 2.1 Project Description

This report presents an overview of significant environmental features within the study area of the proposed improvements to US 68 (Item Number 3-203.00) in Green and Metcalfe counties in south-central Kentucky. This overview is based on correspondence with state and federal resource agencies, research, and field assessments of the study area. By identifying features in the study area, this document is intended to assist the Kentucky Transportation Cabinet (KYTC) in evaluating the environmental effects of the proposed roadway alignment alternatives.

US 68 in the study area, approximately 24 miles between the interchange under construction with the Louie B. Nunn Cumberland Parkway north of Edmonton in Metcalfe County and US 68/KY 61 intersection in Greensburg in Green County, carries between 900 and 2,000 vehicles per day along the rural sections and approximately 5,000 to 8,000 vehicles per day through the city of Greensburg.

As described in the Executive Summary, this Environmental Overview encompasses two separate projects: the US 68 corridor (Item Nos. 3-8706 and 8-8710) and the US 68 connector (Item No. 8-8711). The projects are described in more detail below. Environmental project mapping is located in Exhibit 3 at the end of this document.

#### 2.1.1 Corridor Project

The current corridor roadway consists of a two-lane facility with narrow to nonexistent shoulders. In Metcalfe County from mile point 9.002 to mile point 20.026 (at the Green County line), the roadway is classified as a rural major collector; from mile point 0 (at the Green County line) to mile point 11.954, it is classified as a rural major collector; and from mile point 11.954 to mile point 14.287, it is classified as a rural minor arterial. There is a high percentage of truck traffic in the project corridor, ranging from 5.1% to 14.2% trucks. The majority of the corridor has at least 9% trucks.

North of the Cumberland Parkway, US 68 is a rural major collector that extends northeastwardly to the city of Greensburg. This is just a portion of the entire US 68 Corridor, which stretches approximately 400 miles from Paducah to Maysville. Past improvements have been made to the US 68 Corridor from Greensburg via Campbellsville to Lebanon, which have provided a more reliable and safer connection up to the Martha Layne Collins Bluegrass Parkway north of Lebanon and Springfield via KY 555.

The proposed corridor roadway would have two 11-foot lanes with full-width shoulders, four feet of which would be paved. The facility may include truck climbing lanes at areas with heavy truck traffic and steep grades. Spot improvements are also being considered for this project, with priority given to sections with a history of safety problems. The Greasy Creek Bridge is located within the corridor and has a low sufficiency rating of 53.1.

#### 2.1.2 Connector Project

Beginning east of Russell Creek Bridge, US 68 consists of two 10-foot lanes, which then widen to 11 feet. The shoulders begin as 3-foot combination, and then range from 0- to 8-foot curbed. Beginning at East Hodgenville Street, the roadway consists of four 13-foot lanes; they narrow just east of East Hodgenville Street to 12 feet, with 10-foot paved shoulders.

Two connector options are currently being considered in addition to improvements along the existing route through Greensburg, as well as an alignment to the west, following existing Depot Street. The connector alternatives would consist of two 12-foot lanes with 10-foot paved shoulders.

The Green River Bridge, with a low sufficiency rating of 53, is located within the connector project area. The Green River Bridge does not meet current design standards and ultimately must be replaced. The nearest alternate state-maintained crossings of the Green River require a 19-mile detour to the west (at KY 88) or a 20-mile detour to the east (at KY 55 in Taylor County).

## **2.2 Project Purpose**

The purpose of the US 68 Corridor project is to provide a safer, more efficient connection between Greensburg and the Cumberland Parkway by improving substandard geometrics along the corridor.

The purpose of the US 68 Connector is to improve safety, connectivity, and mobility, and to provide system redundancy by creating an alternate crossing over the Green River.

## **2.3 Project Need**

### **2.3.1 Roadway Deficiencies**

From mile point 9.0 in Metcalfe County to the Green County line, and from the Green County line to mile point 11.95, US 68 is classified as a rural major collector. From mile point 11.95 to the end of the project, it is classified as a rural minor arterial. The majority of US 68 in the project corridor has some grades without sight distance or frequent grades without sight distance. Shoulder widths through the corridor range from one to four feet, with two small sections in Greensburg that have curb and gutters. From the Metcalfe County line to mile point 4.58, US 68 has two nine-foot lanes. The majority of the route has lanes widths of ten feet or less. The US 68 corridor has geometric deficiencies, with a large number of horizontal curves that do not meet current standards for a 45 MPH design speed.

### **2.3.2 Safety**

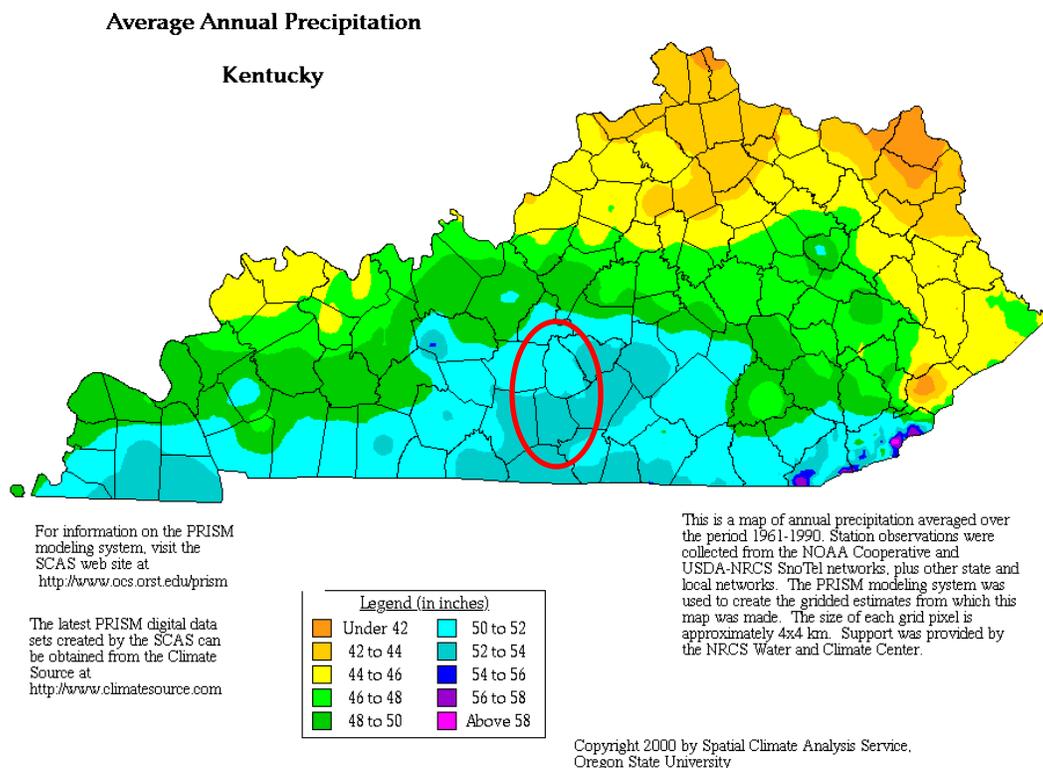
Between 2010 - 2012, there were 128 crashes between the Cumberland Parkway overpass and the KY 61/KY 3535 intersection. A number of single-vehicles crashes have occurred at the locations of substandard horizontal; in addition, there are occurrences of rear-end and sideswipe crashes throughout the corridor.

Within Greensburg, there are a large number of angle crashes, as well as single-vehicle and rear-end crashes. These crashes are typically attributed to congestion and slow-moving traffic. At the local officials meetings held in Metcalfe and Green counties in December 2013, attendees noted safety, narrow shoulders, narrow lanes, curves, and few passing opportunities as problems within the corridor. Attendees at the Public Meeting in Green County in February 2014 listed safety, sharp curves, and few passing opportunities as the issues that should be addressed along US 68. Attendees at the Public Meeting in Metcalfe County in February 2014 listed sharp curves, safety, passing, narrow lanes, and narrow shoulders as the issues along US 68 that should be addressed.

### 3.0 PHYSICAL CHARACTERISTICS OF THE PROJECT AREA

#### 3.1 Climate

Green and Metcalfe counties are considered to have a mild, mid-latitude climate that is well-suited for supporting diverse flora and fauna (Ulack et. al. 1998). According to United States Geological Survey (USGS) soil publications, the average daily maximum temperature during the summer is 88° F, while the average daily minimum temperature during the winter is 25° F. As illustrated in **Figure 1**, total annual precipitation is 50 inches and of this, 54% usually falls from April through September. The average seasonal snowfall is 13 inches, with an average of 7 days of at least one inch snow on the ground. The number of such days varies greatly from year to year.



**Figure 1: Kentucky Annual Average Precipitation**

#### 3.2 Physiographic Conditions

Metcalfe and Green counties are in the Eastern Pennyroyal physiographic region, which is part of the Mississippian Plateau, in south-central Kentucky (see **Figure 2**).<sup>1</sup> The typical terrain of the counties near the study area is a well-dissected, rolling to hilly, upland plateau with areas of karst topography

<sup>1</sup> Latham, E. E. and A. J. Barton, 1967. Soil Survey of Metcalfe County, Kentucky. U.S. Department of Agriculture, Soil Conservation Service.

characterized by sinkholes, sinking streams, streamless valleys, springs, caverns, and caves.<sup>2</sup> Geologically, the two counties are underlain by Mississippian rocks, mostly limestones deposited 350 million years ago in the bottom of a warm, shallow sea.<sup>3</sup>

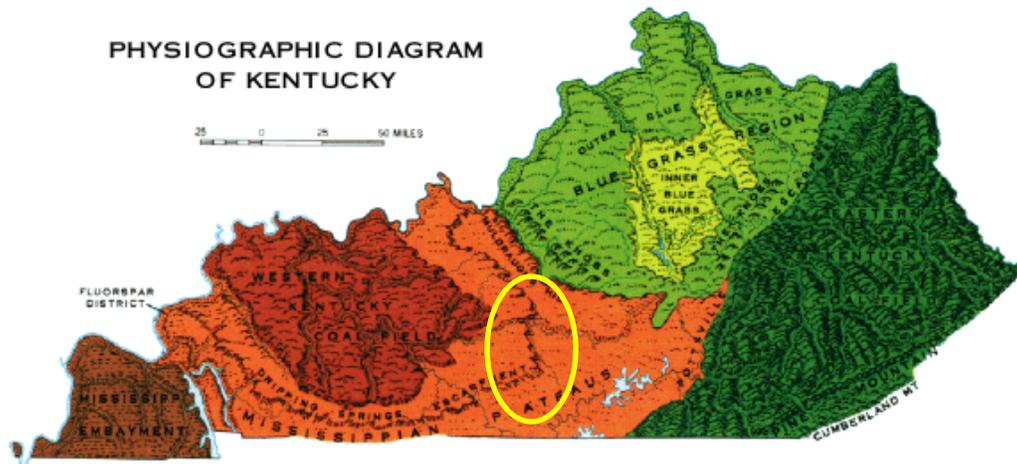


Figure 2: Physiographic Regions of Kentucky (Kentucky Geological Survey)

### 3.3 Topography

Topography within the study corridor consists of gently to moderately steep and very steeply sloping hillsides, broad uplands, irregular ridges, and narrow drainage valleys. The majority of level alluvial landforms within the study corridor are found in Green County. These include terraces and floodplains along Greasy Creek and similar landforms near Greensburg along the Green River, Russell Creek, and Clover Lick Creek. Other streams crossed or near the study corridor include Sulphur Creek, Cave Branch, Long Creek, Dry Fork Branch, Caney Fork Creek, Caney Branch, Dry Branch, and Clover Lick Creek. Elevations ranged between 165 m (540 ft) above mean sea level (AMSL) and 299 m (980 ft) AMSL. The lowest elevation was at the Green River in Greensburg, and the highest elevation was located on a ridgetop in the southern end of the study area near the Cumberland Parkway.

### 3.4 Geology

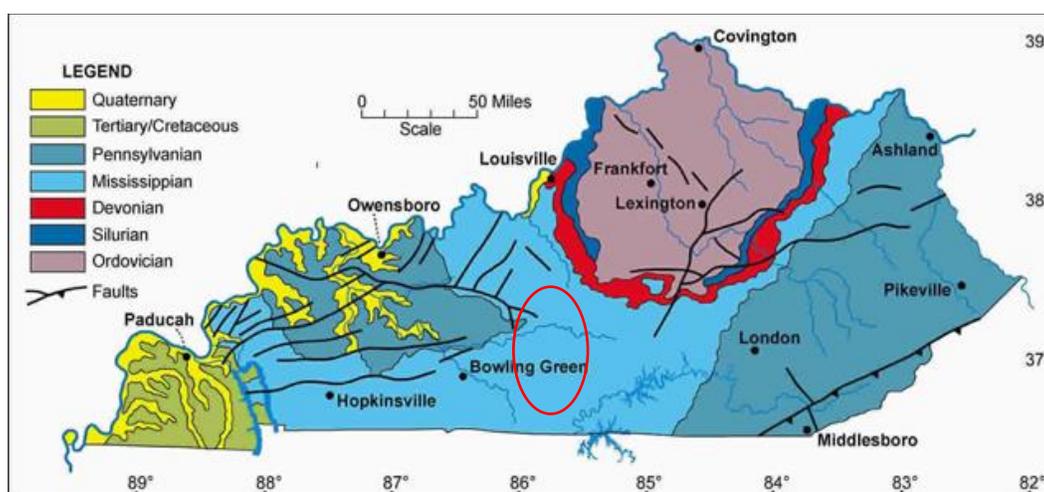
The project is within the Greensburg, Summersville, Exie, and East Fork, Kentucky Geologic Quadrangle (see **Figure 3**). The Mississippian Plateaus Region (Pennyroyal) extends from the Mississippi Embayment in the west to the Bluegrass and Eastern Kentucky Coal Field regions and surrounds much of the Western Kentucky Coal Field. It is a physiographically diverse region described as “a karst landscape [that] has sinkholes, sinking streams, caves and springs.”<sup>4</sup> Karst terrain of the Mississippian Plateau (Eastern Pennyroyal) occurs because bedrock in the eastern and southern parts of the region is

<sup>2</sup> McGrain, P. and J. C. Currens. 1978. Topography of Kentucky. Kentucky Geological Survey, University of Kentucky, Lexington, KY. Special Publication 25, Series X.

<sup>3</sup> Sauer, C.O., 1927, Geography of the Pennyroyal: Kentucky Geological Survey, ser. 6, v. 25, 303 p.

<sup>4</sup> Ulack, R., K. Raitz, and G. Pauer, eds. 1998. *Atlas of Kentucky*. The University of Kentucky Press, Lexington, KY. 316 pp.

dominated by thick deposits of Mississippian-age limestones.<sup>5</sup> These limestones are considered soluble (i.e. will dissolve) under the right conditions, which means they are easily eroded by waters moving through the ground. This project is within the boundaries of an area known as the Green River Bioreserve, a system of surface and subterranean aquatic habitats comprising the recharge area of the Green River and associated Mammoth Cave systems.



*Figure 3: Geologic Map of Kentucky*

### 3.5 Soils

According to the Metcalfe County and Green and Taylor Counties Soil Surveys,<sup>6</sup> the study area contains 68 soil types in Metcalfe County and 26 in Green County, of which three are common between the two counties (see Table 1 for Green County and Table 2 for Metcalfe County). According to the Natural Resources Conservation Services (NRCS), soil classifications for hydric, farmland, and erosion, only two soils are considered hydric, Melvin silt loam and Robertsville silt loam; 58 are considered prime farmland and of those, 20 are of state importance.

The erosion rating (K-factor) indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69, with lower values indicating lower susceptibility to erosion or detachment. Within the project area, K-factors range from 0.24 to 0.43. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water (NRCS web soil survey).

Hydric soils are defined by the National Technical Committee as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation (NRCS web soil survey).

<sup>5</sup> Kentucky Geological Society (KGS). <http://www.uky.edu/KGS/geoky/physiographic.htm>. Accessed 12 December 2013.

<sup>6</sup> Natural Resource Conservation Service. <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. Accessed 12 December 2013.

**Table 1: Soils That Occur within the Project Area – Green County, Kentucky**

Map Unit Symbol	Map Unit Name	Hydric (Yes/No)	Erosion Rating (K-value)	Farmland Classification
CaC	Caneyville silt loam, very rocky, 6 - 20% slopes	No	0.43	Not prime farmland
CaE	Caneyville silt loam, very rocky, 20 - 30% slopes	No	0.43	Not prime farmland
DcB	Dickson silt loam, 2 - 6% slopes	No	0.43	Prime farmland
EIB	Elk silt loam, 2 - 6% slopes	No	0.37	Prime farmland
EIC	Elk silt loam, 6 - 12% slopes	No	0.37	Farmland of state importance
FkB	Frankstown silt loam, 2 - 6% slopes	No	0.37	Prime farmland
FkC	Frankstown silt loam, 6 - 12% slopes	No	0.37	Farmland of state importance
FkD	Frankstown silt loam, 12 - 20% slopes	No	0.37	Not prime farmland
FkE	Frankstown silt loam, 20 - 30% slopes	No	0.37	Not prime farmland
FrB	Frederick silt loam, 2 - 6% slopes	No	0.32	Prime farmland
FrC	Frederick silt loam, 6 - 12% slopes	No	0.32	Farmland of state importance
FrD	Frederick silt loam, 12 - 20% slopes	No	0.32	Not prime farmland
FrE	Frederick silt loam, 20 - 30% slopes	No	0.32	Not prime farmland
FsD3	Frederick silty clay loam, 12 - 20% slopes, severely eroded	No	0.32	Not prime farmland
GaF	Garmon-Shelocta complex, 25 - 60% slopes	No	0.32	Not prime farmland
LoF	Lowell-Caneyville silt loam, very rocky, 30 - 60% slopes	No	0.37	Not prime farmland
Me	Melvin silt loam	Yes	0.43	Prime farmland if drained
Mh	Morehead silt loam	No	0.37	Prime farmland if drained
MoB	Mountview silt loam, 2 - 6% slopes	No	0.43	Prime farmland
MoC	Mountview silt loam, 6 - 12% slopes	No	0.43	Farmland of state importance
NdC	Needmore silty clay, 6 - 12% slopes, severely eroded	No	0.32	Not prime farmland
Ne	Newark silt loam	No	0.37	Prime farmland if drained
No	Nolin silt loam	No	0.32	Prime farmland if drained
OtA	Otwell silt loam, 0 - 2% slopes	No	0.43	Prime farmland
OtB	Otwell silt loam, 2 - 6% slopes	No	0.43	Prime farmland
Pt	Pits			
Ta	Taft silt loam	No	0.43	Prime farmland if drained

**Table 2: Soils That Occur within the Project Area – Metcalfe County, Kentucky**

Map Unit Symbol	Map Unit Name	Hydric	Erosion Rating (K-value)	Farmland Classification
BaB	Baxter cherty silt loam, 2 - 6% slopes	No	0.28	Prime farmland
BaB2	Baxter cherty silt loam, 2 - 6% slopes, eroded	No	0.28	Prime farmland
BaC	Baxter cherty silt loam, 6 - 12% slopes	No	0.28	Farmland of state importance
BaC2	Baxter cherty silt loam, 6 - 12% slopes, eroded	No	0.28	Farmland of state importance
BaD	Baxter cherty silt loam, 12 - 20% slopes	No	0.28	Not prime farmland
BaD2	Baxter cherty silt loam, 12 - 20% slopes, eroded	No	0.28	Not prime farmland
BaE	Baxter cherty silt loam, 20 - 30% slopes	No	0.28	Not prime farmland
BaE2	Baxter cherty silt loam, 6 - 12% slopes, eroded	No	0.28	Not prime farmland
BcC3	Baxter cherty silt clay loam, 6 - 12% slopes, severely eroded	No	0.24	Not prime farmland
BcD3	Baxter cherty silt clay loam, 12 - 20% slopes, severely eroded	No	0.24	Not prime farmland
BcE3	Baxter cherty silt clay loam, 20 - 30% slopes, severely eroded	No	0.24	Not prime farmland
BeC2	Baxter-Talbott rocky silt loams, 6 - 12% slopes, eroded	No	0.28	Not prime farmland
BeD2	Baxter-Talbott rocky silt loams, 12 - 20% slopes, eroded	No	0.28	Not prime farmland
BeE2	Baxter-Talbott rocky silt loams, 20 - 30% slopes, eroded	No	0.28	Not prime farmland
BfD3	Baxter-Talbott rocky silt loams, 12 - 20% slopes, severely eroded	No	0.28	Not prime farmland
BoD	Bodine cherty silt loam, 12 - 20% slopes	No	0.28	Not prime farmland
BoE	Bodine cherty silt loam, 20 - 35% slopes	No	0.28	Not prime farmland
CaE	Caneyville rocky complex, 20 - 30% slopes	No	0.43	Not prime farmland
CaE3	Caneyville rocky complex, 20 - 30% slopes, severely eroded	No	0.43	Not prime farmland
CaF	Caneyville rocky complex, 30 - 50% slopes	No	0.43	Not prime farmland
CbA	Captina silt loam, 0 - 2% slopes	No	0.43	Prime farmland
CbB	Captina silt loam, 2 - 6% slopes	No	0.43	Prime farmland
CcD3	Captina silt loam, 6 - 20% slopes, severely eroded	No	0.43	Not prime farmland
CdB	Christian loam, 2 - 6% slopes	No	0.37	Prime farmland
CdC	Christian loam, 6 - 12% slopes	No	0.37	Farmland of state importance
CdC2	Christian loam, 6 - 12% slopes, eroded	No	0.37	Farmland of state importance
CdD2	Christian loam, 12 - 20% slopes, eroded	No	0.37	Not prime farmland
CeD	Christian rocky soils, 12 - 20% slopes	No	0.43	Not prime farmland
CkB	Clarksville cherty silt loam, 2 - 6% slopes	No	0.28	Prime farmland
CkC	Clarksville cherty silt loam, 6 - 12% slopes	No	0.28	Farmland of state importance
CkC2	Clarksville cherty silt loam, 6 - 12% slopes, eroded	No	0.28	Farmland of state importance

*Table 2 continued on next page*

Map Unit Symbol	Map Unit Name	Hydric	Erosion Rating (K-value)	Farmland Classification
CkD2	Clarksville cherty silt loam, 12 - 20% slopes, eroded	No	0.28	Not prime farmland
CkE2	Clarksville cherty silt loam, 20 - 30% slopes, eroded	No	0.28	Not prime farmland
CrB	Crider silt loam, 2 - 6% slopes	No	0.32	Prime farmland
CrB2	Crider silt loam, 2 - 6% slopes, eroded	No	0.32	Prime farmland
CrC2	Crider silt loam, 6 - 12% slopes, eroded	No	0.32	Farmland of state importance
CuC2	Cumberland cherty silt loam, 6 - 12% slopes	No	0.28	Farmland of state importance
DaD	Dandridge-Westmoreland shaly silt loams, 12 - 20% slopes	No	0.28	Not prime farmland
DaF	Dandridge-Westmoreland shaly silt loams, 20 - 50% slopes	No	0.28	Not prime farmland
DbF3	Dandridge-Westmoreland shaly silt loams, 20 - 50% slopes, severely eroded	No	0.28	Not prime farmland
DcB	Dandridge-Westmoreland silt loams, 2 - 6% slopes	No	0.32	Not prime farmland
DcC	Dandridge-Westmoreland silt loams, 6 - 12% slopes	No	0.32	Not prime farmland
DeB	Dewey silt loam, 2 - 6% slopes	No	0.32	Prime farmland
DeC2	Dewey silt loam, 6 - 12% slopes, eroded	No	0.32	Farmland of state importance
DkA	Dickson silt loam, 0 - 2% slopes	No	0.43	Prime farmland
DkB	Dickson silt loam, 2 - 6% slopes	No	0.43	Prime farmland
DkB2	Dickson silt loam, 2 - 6% slopes, eroded	No	0.43	Prime farmland
DkC2	Dickson silt loam, 6 - 12% slopes, eroded	No	0.43	Farmland of state importance
EkB	Elk silt loam, 2 - 6% slopes	No	0.37	Prime farmland
Gu	Gullied land			
HcB	Humphreys cherty slit loam, 2 - 6% slopes	No	0.28	Prime farmland
HcC	Humphreys cherty slit loam, 6 - 12% slopes	No	0.28	Farmland of state importance
HcC2	Humphreys cherty slit loam, 6 - 12% slopes eroded	No	0.28	Farmland of state importance
Hg	Huntington gravelly silt loam	No	0.20	Prime farmland
Hu	Huntington silt loam	No	0.28	Prime farmland
LdB	Landisburg silt loam, 2 - 6% slopes	No	0.43	Prime farmland
Ls	Lindside silt loam	No	0.37	Prime farmland
Me	Melvin silt loam	Yes	0.43	Prime farmland if drained
MoB	Mountview silt loam, 2 - 6% slopes	No	0.43	Prime farmland
MoC2	Mountview silt loam, 6 - 12% slopes, eroded	No	0.43	Farmland of state importance
Nk	Newark silt loam	No	0.37	Prime farmland if drained
PmB	Pembroke silt loam, 2 - 6% slopes	No	0.32	Prime farmland
PmC2	Pembroke silt loam, 6 - 12% slopes, eroded	No	0.32	Farmland of state importance

Table 2 continued on next page

Map Unit Symbol	Map Unit Name	Hydric	Erosion Rating (K-value)	Farmland Classification
Rb	Robertsville silt loam	Yes	0.43	Prime farmland if drained
Rf	Robinsonville fine sandy loam	No	0.28	Prime farmland
Rk	Rock outcrop			
SaB	Sango silt loam, 2 - 6% slopes	No	0.43	Prime farmland
Ta	Taft silt loam	No	0.43	Prime farmland if drained
TbC	Talbott silt loam, rocky, 6 - 12% slopes	No	0.37	Farmland of state importance
TcC2	Talbott silty clay loam, rocky, 6 - 12% slopes, eroded	No	0.32	Farmland of state importance

### 3.6 Watershed

The project falls within the Upper Green River watershed USGS Hydrologic Unit Code (HUC8) 05110001, as identified by the Kentucky Division of Water (KDOW). The project crosses three subbasins, Big Brush Creek-Green River, Russell Creek, and Little Barren River. The 24-mile study area consists mostly of rural communities surrounded by farmland and scattered forested habitat.

The Green River is 384-mile-long tributary of the Ohio River wholly within the state. It starts in Lincoln County in south-central Kentucky and flows westerly towards the Ohio River. The Upper Green River Watershed, which includes the headwaters downstream to the Butler County line, is rated by the Nature Conservancy and the Natural Heritage Program as the fourth most important watershed in the United States and the most important watershed in Kentucky for protecting fish and mussel species. It is the most biologically diverse river in the entire Ohio River ecosystem and hosts 71 mussel species and over 150 fish species. This watershed contains Mammoth Cave National Park, Kentucky's largest spring, Lost River Cave, Hidden River Cave, Cub Run Cave, and the only segments of the Green River deemed Wild River (26 miles) and Exceptional Waters (66 miles).

### 3.7 Land Use

The proposed project begins in low-density residential land uses and passes through low-density residential, commercial, and industrial land uses, as well as rural wooded areas. It terminates in an area of high-density commercial land uses within the city limits of Greensburg. The commercial land uses include gas stations, a funeral home, car dealerships, and multiple historic buildings. Industrial land use is scattered throughout the project corridor and includes solid waste, trucking, and tire facilities.

## 4.0 ENVIRONMENTAL CHARACTERISTICS OF THE PROJECT AREA

### 4.1 Air Quality

Green and Metcalfe counties are currently in attainment for all criteria pollutants: Carbon Monoxide (CO), Eight-Hour Ozone (O<sub>3</sub>), Particulate Matter (PM) 2.5, PM10, Lead (Pb), Nitrogen Dioxide (NO<sub>2</sub>), and Sulfur Dioxide (SO<sub>2</sub>). Based on available traffic data, the US 68 project is not expected to meet criteria to require a CO project-level analysis and will not produce a projected violation of the CO standards (35 parts per million over a one-hour period, or 9 parts per million over an eight-hour period). Therefore, negative impacts to the ambient air quality of Green or Metcalfe counties are not expected.

With respect to Mobile Source Air Toxics (MSATs), available traffic data indicates that the US 68 project is one with low potential MSAT effects. Therefore, a qualitative MSAT analysis, rather than a quantitative analysis, will likely be required at a later date for the connector project. An air quality analysis may not be required for spot improvements on the corridor project.

### 4.2 Noise

A preliminary noise study will provide data to consider noise impacts associated with each of the alternatives. A full noise analysis will be performed for the connector project once a Preferred Alternative is selected; a noise analysis is not likely to be required if spot improvements are conducted for the corridor project.

To determine potential noise impacts from construction and operation of the proposed project, noise-sensitive land uses will need to be identified for each alternative, and existing ambient noise levels must be measured for each. The procedure for conduction field monitoring will be based on FHWA requirements and the KYTC Noise Abatement Policy. Noise levels will be measured in terms of L<sub>eq</sub>, which reflects the average equivalent steady state sound level; in a given time period (usually one hour), it would contain the same acoustic energy as the time-varying sound level during the same time period. The FHWA Traffic Noise Model (TNM) 2.5 will be used to produce future noise impact calculations for the noise impact analysis.

With respect to construction noise, the contractor will be required to provide equipment such as sound deadening devices, shields, and physical barriers, and to take such noise abatement measures that may be necessary to restrict the transmission of noise in the immediate vicinity of schools, hospitals, rest homes, churches, libraries, museums, parks, and other noise-sensitive sites. It will be the responsibility of KYTC to monitor construction noise and advise the contractor of violations of the maximum allowable noise levels.

### 4.3 Ecological Resources

The following sections discuss the sensitive ecological resources present within the study area.

### **4.3.1 Aquatic Resources**

#### **4.3.1.1 Floodplains**

Floodplain information was obtained from the Federal Emergency Management Agency's (FEMA) FIRMette digital flood data, as appended by the state of Kentucky. This project is located on the following Flood Insurance Rate Maps (FIRM): City of Greensburg 21087C0140C, 21087C205C, 21087C0185C, 21087C120C, Green County 21087C0200C, 21087C0300C, Metcalfe County 21169C0125C, and 21169C0115C. The project crosses seven different Zone A floodplains. The largest floodplains are the Green River, Russell Creek, and East Fork Little Barren River.

#### **4.3.1.2 Waters and Wetlands**

Based on USGS topographic maps, the project crosses 17 blue-line streams (nine named and eight unnamed tributaries). The most important waters in the project area are Green River and Russell Creek, both of which are Outstanding State Resource Waters (OSRW). The Green River is an OSRW because it contains many federally endangered and threatened species and Russell Creek is an exceptional waters reference reach. The remaining named streams are Sulfur Creek, East Fork Little Barren River, Caney Fork, Greasy Creek, Clover Lick Creek, and Goose Creek.

Correspondence with the Kentucky State Nature Preserve Commission (KSNPC) stated that the "project area is within the boundaries of an area known as the Green River Bioreserve, a system of surface and subterranean aquatic habitats comprising the recharge area of the Green River and associated Mammoth Cave systems. This is the fourth-most important site nationally for the conservation of rare aquatic organisms and biodiversity. It includes the largest number of imperiled aquatic organisms in Kentucky" (KSNPC letter dated December 16, 2013). Ecological correspondence is located in Appendix A.

In a letter response dated December 2, 2013, from the Kentucky Division of Water (KDOW) Division of Ground Water, underground water tracer data is primarily in the area west of the project. There are also many domestic wells in use within the overview project corridor.

Potential wetlands were mapped using National Wetland Inventory (NWI) maps and site reconnaissance. See Exhibit 3 at the end of this overview for environmental features. The entire project is scattered with potential wetlands ranging from small palustrine emergent wetlands under a tenth of an acre to larger forested wetlands located in various woodlots and along the major streams. Actual wetland determinations will be completed during the Aquatic Terrestrial Reporting phase of the project.

#### **4.3.1.3 Permits**

Permit requirements will be determined during the project's design phase. Seventeen blue-line streams and numerous smaller streams not labeled on USGS topographic maps are present in the overview study area. There are also numerous potential wetlands throughout the project area.

The KDOW will require a non-point source pollution control plan and an erosion control plan. Application of the KYTC's *Standard Specifications for Road and Bridge Construction* and the Federal Highway Administration's (FHWA) *Best Management Practices for Erosion and Sediment Control* can be used to alleviate most sedimentation problems. Because of the amount of karst area surrounding the project, and

the project area being part of the Green River Bioreserve, a Ground Water Protection Plan would most likely be required.

Jurisdictional waters, as defined by the United States Army Corps of Engineers (USACE), are located within the study area. Ephemeral streams may also be considered jurisdictional waters; therefore potential ephemeral stream impacts will require assessment prior to submission of a permit packet to the USACE. USACE Section 404 and KYDOW Section 401 permits may be required. On-site stream impact mitigation may require consideration for this project. Potential restoration, mitigation, and/or in-lieu fees may be required. Work in a stream, such as bank stabilization, road culverts, utility line crossings, or stream alterations, will require a Floodplain Construction Permit and a Water Quality Certification from the KDOW.

No spring or wellhead protection areas are located within, or adjacent to, the study area.

#### **4.3.1.4 Wild and Scenic Rivers**

No nationally listed wild and scenic rivers are located within the study area. While portions of the Green River downstream are listed on the Kentucky Wild River System, no stream reaches within the project area are listed.

#### **4.3.2 Terrestrial Resources**

The most notable terrestrial resource in the project corridor is the Wyatt Jeffries Woods. Wyatt Jeffries Woods is 57.1 acres of virgin timber and is the largest tract of mature forest in Green County. The land was purchased by Green County Fiscal Court with money from the Kentucky Heritage Land Fund. NWI mapping also indicates that part of the woodlot is a forested wetland.

Site reconnaissance indicated that the area is gently sloping to moderately steep upland. Pastures and agriculture activities dominated the landscape. The woodlots in the area were generally small in size. Tracts of bottomland forest were observed along the larger streams such as Green River, Russell Creek, and East Fork Little Barren River.

#### **4.3.3 Threatened and Endangered Species**

A search of the U.S. Fish and Wildlife Service (USFWS) database revealed 14 species listed for the project study corridor (see Table 3). The Kentucky Department of Fish and Wildlife Resources (KDFWR) information system indicates that the snuffbox, rabbitsfoot, fanshell, clubshell, and gray bat are all known to occur within the half-mile buffer surrounding the project corridor. The remaining species, except for diamond darter, have the potential to occur in the project area based on habitat requirements for each species. The diamond darter was historically found in the Green River; although not currently occupied, a reach of Green River within the project corridor is designated as critical habitat for the species, which identifies the reach as essential for the conservation of the species. Each species is addressed below.

**Table 3: Federally Threatened and Endangered Species with Potential to Occur**

Species	Common Name	Status	Habitat Present
<b>Mammals</b>			
<i>Myotis sodalist</i>	Indiana bat	E	Potential
<i>Myotis grisescens</i>	Gray bat	E	Yes
<i>Myotis septentrionalis</i>	Northern long-eared bat	P	Potential
<b>Mussels</b>			
<i>Pleurobema clava</i>	Clubshell	E	Yes
<i>Cyprogenia stegaria</i>	Fanshell	E	Yes
<i>Pleurobema plenum</i>	Rough pigtoe	E	Potential
<i>Plethobasus cyphus</i>	Sheepnose	E	Potential
<i>Cumberlandia monodonta</i>	Spectaclecase	E	Potential
<i>Lampsilis abrupta</i>	Pink mucket	E	Potential
<i>Obovaria retusa</i>	Ring pink	E	Potential
<i>Plethobasus cooperianus</i>	Orangefoot pimpleback	E	Potential
<i>Quadrula cylindrica cylindrica</i>	Rabbitsfoot	T, CH	Yes
<i>Epioblasma triquetra</i>	Snuffbox	E	Yes
<b>Fish</b>			
<i>Crystallaria cincotta</i>	Diamond darter	E, CH	Yes

E = Endangered; T = Threatened; C = Candidate Species; CH = Critical Habitat; P = Proposed

The federally-endangered Indiana bat is listed as potentially occurring within the project corridor based on its historic range, proximity to known occurrence records, or biological and physiographic characteristics. The project corridor contains forested areas and stream corridors which the Indiana bat could potentially use during the summer months as roosting sites, foraging habitat, and travel corridors. Potential winter habitat in the form of rockshelters, caves, and abandoned underground mines also occur in close proximity and within the project corridor. The USFWS recommended that KYTC should address the impacts to the Indiana bat through adherence to the September 6, 2012 Indiana bat Programmatic Agreement between KYTC, FHWA, and the USFWS.

Gray bats roost, breed, rear young, and hibernate in caves year-round. They migrate between summer and winter caves and will use transient or stopover caves along the way. Gray bats eat a variety of flying aquatic and terrestrial insects present along streams, rivers, and lakes. Low-flow streams produce an abundance of insects and are especially valuable to the gray bats as foraging habitat. For hibernation, the roost site must have an average temperature of 42 to 52 degrees F. Most of the caves used by gray bats for hibernation have deep vertical passages with large rooms that function as cold air traps. Summer caves must be warm, between 57 and 77 degrees F, or have small rooms or domes that can trap the body heat of roosting bats. Summer caves are normally located close to rivers and lakes where the bats feed. This species is known to occur within the study corridor.

The northern long-eared bat is currently proposed for federal listing under the Endangered Species Act. The entire state of Kentucky is considered potential habitat. During the summer, northern long-eared bats typically roost singly or in colonies in a wide-variety of forested habitats, where they seek shelter during daylight hours underneath bark or in crevices/cavities of both live trees and snags. Northern long-eared

bats have also been documented roosting in man-made structures such as barns during the summer. According to current winter occurrence data, northern long-eared bats predominately winter in hibernacula that include caves, tunnels, and underground mine passages. The USFWS Kentucky Field Office suggests contacting their office to identify and resolve any potential conflicts to prevent significant project delays.

The clubshell mussel is an elongate triangle, compressed, and thick shell that is smooth, brown or yellowish brown with broken green rays near the umbo. Its overall length is two to three inches. It can be found in flowing water, usually in sand and/or gravel without heavy silt deposits in small to large rivers where it often remains deeply buried in the substrate. Presently it is sporadic in the upper Green River system. This species is known to occur within the study corridor.

The fanshell mussel is round, moderately inflated, with a thick shell that is greenish to yellow or tan, with numerous fine green dots or dashes sometimes bundled into broken dark rays. Its overall length is three to four inches. It occurs in riverine habitat of medium to large rivers at depths of less than three feet to more than 18 feet. Its preferred substrates are stable, coarse sand and gravel swept free of silt by current. It is generally distributed in the upper Green River. This species is known to occur within the study corridor.

The rough pigtoe mussel is triangular, inflated, with a thick shell that is smooth with a shallow depression extending from the umbo to the ventral margin. The shell is light to dark brown, sometimes with faint rays and an overall length of three to four inches. Rough pigtoes occur in medium to large rivers, usually in flowing water with clean sand and gravel substrate. It is sporadic in the upper Green River.

The sheepsnose mussel is an elongate oval, moderately inflated, and thick. The posterior ridge is rounded and bordered anteriorly by a shallow depression and then by a row of low knobs that extend from the umbo to the ventral margin. It is yellow to brown with an overall length of four to five inches. Sheepsnose occur in flowing water of medium to large rivers. Its preferred substrate is a mixture of sand and gravel. It is sporadic nearly statewide.

The spectaclecase mussel is an elongate oval, compressed and thin. The shell is smooth and is light to dark brown in color with an overall length of six to seven inches. Spectaclecases are found in medium to large rivers. Its preferred substrate is mud, sand, and gravel amongst boulders.

The pink mucket mussel is oval, inflated, and thick and sexually dimorphic. The posterior margin in males is bluntly pointed, whereas in females it is rounded or squared. The shell is smooth, shiny, and yellow, yellowish green or tan, sometimes with faint rays. It is four to five inches with pink to salmon-colored nacre. Pink muckets typically occur in free-flowing reaches of large rivers, though it is occasionally reported from large creeks and small rivers. Its preferred substrates appear to be gravel with interstitial sand, kept free of silt by current. It is sporadic from the lower Ohio River to the Licking River, which includes the Green River.

The ring pink mussel is round, compressed to moderately inflated, and thick. The shell is two to three inches, smooth, and tan or brown with distinct purple and white nacre. It is found in medium to large river reaches with sand and gravel substrate in flowing water. It is sporadic in the upper Green River.

The orangefoot pimpleback mussel is round to slightly oval, compressed, and thick. The shell is three to four inches, has knobs present on the posterior two-thirds of the shell, and is yellowish brown to reddish

brown. It is found in flowing water of medium to large rivers where the substrate is composed of a mixture of sand and gravel. It is sporadic in the Ohio and Tennessee Rivers. The Green River has suitable habitat for this species.

The rabbitsfoot mussel is elongate rectangle, compressed to cylindrical, and thick. The shell is four to five inches, can have scattered folds, ribs and/or knobs on the posterior ridge, and is tan, brown, or green with green and black triangular markings. The rabbitsfoot occurs in large creeks to large rivers where it can often be found along margins of shoals in gravel substrate in slow to moderate current. It can also be found in muddy sand substrate on the submerged shelf along the river margin. It is sporadic nearly statewide. This species is known to occur within the study corridor.

The snuffbox mussel is triangular, inflated, and moderately thick and sexually dimorphic. In males the posterior ridge is sharp with the posterior slope flattened and ribbed. In females the posterior slope is inflated laterally and serrated. The shell is two to three inches, smooth, yellow or yellowish green, and covered in dark green rays and v-shaped markings. It occurs in shoal habitat of small to large rivers and is usually found buried in gravel or sand substrate with the apertures exposed. It is sporadic in the upper Green River and eastward. This species is known to occur within the study corridor.

The diamond darter was historically distributed throughout the Ohio River Basin, including the Green River. The species has been extirpated from all known habitat except the Elk River in West Virginia. A reach of the Green River is designated critical habitat because this reach contains good water quality and supports fish species that have similar habitat requirements. The diamond darter needs clean sand and gravel substrates, low levels of siltation, and healthy benthic macroinvertebrate populations as prey items. There is critical habitat for this species within the study corridor.

## 4.4 Cultural Historic Resources

### 4.4.1 Historic Resources

A Cultural Historic Resources Overview was completed in December 2013 for this corridor and is included in Appendix B. The area of potential effect (APE) for the overview was a corridor of ½ mile on either side of the existing US 68 route. The overview included a records search and review of all historic maps, Section 106 Cultural Historic Resource Reports, Kentucky Historic Inventory files, National Register of Historic Places (NRHP) files, and databases pertinent to the area. A Geographical Information System (GIS) report on previously recorded sites was requested from the Kentucky Heritage Council (KHC), the State Historic Preservation Office (SHPO) under whose jurisdiction these files exist. A field review of the project APE provided current documentation on the existence of these previously documented resources.

In Metcalfe County, there are no listed NRHP properties within the APE; however, there are two previously recorded historic properties that have been determined potentially eligible for listing in the National Register by the SHPO, Mc-26 and Mc-305 (see Table 1 in Historic Overview).

In Green County, there are multiple individual National Register listings in both the county and within Greensburg. A large portion of the town's center is also listed as an historic district. Greensburg's Downtown Historic District contains 56 properties; eleven of the contributing buildings within the district were previously individually listed in the National Register (see Table 2 in Historic Overview).

There are twelve additional historic properties located in Greensburg that are individually listed in the National Register (see Table 2 and Figure 7 in Historic Overview). These twelve properties are outside the Greensburg Downtown Historic District boundaries. In rural Green County, there are two properties listed in the National Register within the APE: Gn-27 and Gn-37. Both properties have National Register boundaries that are adjacent to the right-of-way for US 68 (see Figures 11 and 13 in Historic Overview).

Gn-79 is an historic tunnel north of Greensburg that has been determined potentially eligible for the National Register by the SHPO (see Figure 7 in Historic Overview). There are also two previously recorded historic properties in the survey files of the SHPO that were unevaluated: Gn-36 and Gn-38. The field review indicated that these may be considered potentially eligible after further research.

The last historic resources survey of Green County took place in 1986. Since nearly 30 years have elapsed, there are likely to be changes to the listed or potentially eligible properties. Some properties that were eligible or potentially in the past may have deteriorated and would no longer be considered eligible for the NRHP; however, many properties that were not previously eligible may have reached the age criterion and would now need to be reevaluated.

### 4.4.2 Archaeological Resources

An Archaeological Overview Study was performed by Cultural Resource Analysts, Inc., to identify potential archaeological resources in the project area. The APE for archaeological resources was defined as the study area, which consists of right-of-way (access limits) along approximately 24 miles of US 68 between Greensburg and the soon-to-be constructed interchange on the Cumberland Parkway, as well as a 0.8 km (0.5 mi) buffer on each side of the centerline. Also included in the study area were two amorphous areas south and east of Greensburg within which new route alternatives are under investigation intended to provide a more efficient connection between US 68 and Greensburg. The entire

study area covers 6,851 ha (16,930 acres). The study included a review of records from the Office of State Archaeology (OSA), the NRHP, and GIS files, and provided a summary of relevant information and analysis of the probability for archaeological sites based on existing data.

Thirteen archaeological sites have been previously recorded within the study area; all of the surveys and sites are located in Green County in the northern extent of the study area near Greensburg. Very little of the study area has been covered by the previously conducted archaeological surveys. Of the 13 surveys, only 4 were conducted within the past 10 years. Therefore, it is recommended that any areas that may be disturbed in future proposed construction have not been covered by any survey, or surveyed according to the current field methods required by current SHPO specifications, be subjected to a new survey. It should be noted that the prevalence of recorded sites in Green County is likely more reflective of the lack of surveys within the study area in Metcalfe County rather than the absence of archaeological sites.

The records search revealed that two (2) of the 13 sites are historic farm/residences, three (3) sites are multi-component prehistoric open habitations and historic farm/residences, and the remaining eight (8) sites are prehistoric open habitations without mounds. The two historic sites are both historic residences located in the city of Greensburg.

If future plans are proposed that impact known sites that have not yet been assessed, the sites would likely need to be revisited and reassessed, and potentially subjected to NRHP testing. Given that field methods used when they were documented are different than those required by the SHPO specifications today, the other sites that were not recommended for further work would also likely need to be revisited and reassessed. Some sites might have been disturbed after they were recorded, and they may only need to be revisited to check their current condition.

The records review of the known sites located in Green and Metcalfe counties suggests that the majority of archaeological sites that could be found within the study area are prehistoric open habitation without mounds. However, a wide variety of site types have been documented in the counties. The analysis of landform data suggests that most archaeological sites in the area have been found on upland landforms. As the majority of the project is located on uplands, it is likely that some of these landforms may contain archaeological sites. However, taking into account the known sites within the study area, many of the prehistoric upland sites are found in relative proximity to river and creek valleys and their confluence.

Historic maps suggest the presence of a high number of possible historic archaeological sites. The mid-twentieth-century topographic maps identified over 500 isolated historic residences, farm complexes, or outbuildings within the study area but outside of the Greensburg city limits. Many of the possible historic sites likely date to the twentieth century, although some could date as early as the early to mid-nineteenth century based on NRHP-listed structures, known archaeological sites, and the overall history of the area. It is possible that all of these map structures could produce archaeological remains, and the potential for historic archaeological sites within the study area is considered high. However, many of these historic sites may be disturbed due to modern developments or occupations.

Due to the lack of available maps dating prior to the mid-twentieth century, it is uncertain how many of these potential historic sites may have earlier nineteenth-century historic components. If further predictions of nineteenth- or early-twentieth-century historic sites are necessary, it is recommended that a windshield survey be conducted to determine their presence and level of disturbance. The same mid-twentieth-century maps identified 13 historic cemeteries. It is recommended that these cemeteries be

avoided or documented according to *Specifications for Conducting Fieldwork and Preparing Cultural Resource Assessment Reports* (Sanders 2006).

The cultural historic records review revealed 18 previously recorded cultural historic sites, one (1) historic bridge, and one (1) cultural historic district. The majority of these cultural historic resources are located within the city of Greensburg, and the potential construction disturbance to these structures from the current project may be considered low. However, cultural historic resources may be affected by any future construction, dependent on the type and location of that construction. Therefore, it is recommended that once the type and location of construction are established, an appropriate area of potential effect be determined and a survey be conducted if necessary. In addition, the three known cultural historic sites (Whitlock Log Cabin, Mud Brick House in Greensburg, and Brents-Lisle House) outside of the city of Greensburg also likely contain previously unrecorded nineteenth-century archaeological deposits. These areas should be considered high potential when using predictive modeling.

The current study area is located on elevations ranging between 165 m (540 ft) and 299 m (980 ft) AMSL, although the majority of the study area is located at elevations above 183 m (600 ft) AMSL. Therefore, most of the landforms were formed during the Late Pleistocene or before; approximately 88 percent of the landforms within the study area were formed during the Late Pleistocene or before. However, there are sections of Mollisol and Inceptisol series soils that were potentially formed during the Holocene and may contain deeply buried cultural deposits. It is recommended that these areas undergo deep testing, including but not limited to bucket auger probes, if they are going to be affected by any potential future construction. Any sites found within buried deposits on these landforms are more likely to be considered eligible for the NRHP than sites found on upland landforms. Some minor drainages also exhibit these same alluvial soils, although they are less likely to have stable landforms capable of deeply buried cultural deposits.

The low occurrence of documented archaeological resources within the study area and the counties as a whole makes it difficult to define specific red flag areas. Overall, the study area has a high potential to produce both prehistoric and historic archaeological sites. Furthermore, some of these sites have the potential to be significant and thus eligible for inclusion in the NRHP. The NRHP data indicates that most of the significant standing structures will be located in Greensburg, although the three NRHP-listed structures located outside of Greensburg may be significant historical archaeological sites as well.

#### **4.5 Section 4(f) / Section 6(f) Resources**

Section 4(f) properties include publicly-owned public parks, recreation areas, and wildlife or waterfowl refuges, or any publicly or privately owned historic site listed or eligible for listing on the National Register of Historic Places. Section 4(f) properties must be considered in the development of transportation projects and avoided whenever feasible. American Legion Park is a public park located on KY 417 (Legion Park Road). This park consists of approximately 30 acres and is Green County's only recreational park. It includes a large pavilion for gatherings, six baseball diamonds, one basketball court, two playgrounds, and a concession stand for spectators. Green River forms the back boundary of the park. Also on the grounds are horse stables and multiple indoor buildings for various uses.

The Wyatt Jeffries Woods, located at 6079 Edmonton Road and described in Section 4.3.2 as a notable terrestrial resource, is 57.1 acres of virgin timber and is the largest tract of mature forest in Green County. The land was purchased by Green County Fiscal Court with money from the Kentucky Heritage Land

Fund and provides outdoor recreation opportunities through camping, 1.3 miles of walking trails, and a pavilion with restrooms. This property will be subject to the protections and provisions of Section 4(f).

Section 6(f)(3) of the Land and Water Conservation Fund Act of 1965 requires all property acquired or developed with Land and Water Conservation Fund (LWCF) assistance be maintained in perpetuity for public outdoor recreation use. Property for the American Legion Park (listed as the Green County Park) was purchased with LWCF monies; the swimming pool and Little League field within the park were also developed using LWCF assistance. The Greensburg swimming pool is no longer operational, though the facility still stands. In addition, the Green River Paddle Trail begins at the spillway below the Green River Lake Dam in Taylor County and extends to the Hart County Line. An access point to the Green River Paddle Trail was constructed with LWCF monies in the American Legion Park. Both the park itself and the aforementioned facilities within it will be subject to Section 6(f).

Exhibit 3 shows the location of Section 4(f) and Section 6(f) properties.

#### 4.6 Hazardous Material/Underground Storage Tanks

In January 2014, Palmer Engineering (Palmer) completed a Hazardous Materials Scoping Study for the KYTC. Palmer Engineering obtained the latest database report provided by Environmental Data Resources, Inc. (EDR) of Milford, Connecticut (see Appendix C). In addition, Palmer performed coordination with state, local, and federal environmental agencies; reviewed aerial photography; conducted on-site field investigations; and interviewed local government officials and property owners during a February 2014 Public Meeting.

Approximately 39 sites of potential interest were identified throughout the study corridor (see Table 4 and Exhibit 3). Thirteen sites of these appeared in the EDR report, which included the city of Greensburg.

*Table 4: Sites of Environmental Interest*

Site	Address	County/City	Notes	Latitude	Longitude
Greenwave Recycling	3750 Greensburg Road	Metcalfe	Maybe far enough off US 68	37.02457	85.5972
MLT Trucking	US 68	Metcalfe	AST's; potential trucking repair service	37.05265	85.60062
Eldarado and Tony's Tire	6511 & 6515 Greensburg Road	Metcalfe	The two sites are next to each other	37.05953	85.6065
Old Gas Station	7525 US 68	Metcalfe	Not in service	37.07225	85.61402
Cell Tower	US 68	Metcalfe		37.09145	85.61458
Oil / Gas Well	US 68	Metcalfe		37.10228	85.59819
Oil / Gas Well	US 68	Metcalfe		37.10433	85.59692
Oil / Gas Well	US 68	Metcalfe		37.10418	85.59432
Crude Oil AST	US 68	Green	Sludge pond; leaking equipment; ground staining	37.12479	85.58124
Crude Oil AST (Multiple)	US 68	Green	Strong odor; ground staining	37.12683	85.58076
Former Garage	US 68	Green	Not in service	37.15473	85.54530
Farm Garage	US 68	Green		37.16029	85.53588
Arco Gas Station	US 68	Green	Not in service	37.16064	85.53576
Transfer Station	US 68	Green	Gas Pipeline	37.16384	85.53496

Site	Address	County/City	Notes	Latitude	Longitude
Former Service Station	US 68	Green	Not in service	37.16953	85.53305
Former Machine Shop	US 68	Green	Not in service	37.18084	85.52877
McKinney's Corner Substation	US 68	Green	EKPC	37.18568	85.52911
Wilco Energy Corp	3993 Edmonton Road	Green	BC Oil Company Inc.	37.20120	85.54481
Farm Garage	US 68	Green	Privately owned	37.21295	85.53388
Aluminum Fabricators Inc.	1720 Edmonton Road	Green	AI 74825 (no files)	37.22410	85.52009
Central Farmers Supply Co.	901 Columbia Hwy / South Main Street	Greensburg	Possible fertilizers; AST's	37.24055	85.50015
IMI-Irving Materials Inc.	801 Columbia Hwy / South Main Street	Greensburg	AST's; concrete mixing station	37.24138	85.49903
Old Gas Station	642 Columbia Hwy / S Main Street	Greensburg	Not in Service; 11 monitoring wells intact; attached care wash	37.24205	85.49894
Materials / Equipment Storage Lot	South Main Street	Greensburg	Former Tobacco Warehouse	37.24415	85.49961
Old Gas Station	South Main Street	Greensburg	Not in Service	37.24437	85.49878
Skaggs Barber Shop	638 Columbia Hwy	Greensburg	Possible former gas station	37.24506	85.49908
Blue Springs Trading Post	South Main Street	Greensburg	Currently Thrift Shop	37.24594	85.50044
Former Citgo Station	Shady Lane & S Main Street	Greensburg	Monitoring Wells, tanks, auto service center	37.24981	85.50188
Greensburg Lumber Company	South Main Street	Greensburg	Not in Service as a lumber company	37.25016	85.50211
Former Gas Station	219 South Main Street	Greensburg	Former Cowboys – SB193	37.25722	85.50354
Carwash	Located between FiveStar and Cowboys	Greensburg	Self-serve	37.25750	85.50366
Five Star Foodmart / Marathon Station	215 South Main Street	Greensburg	In service – Ai 107734	37.25799	85.50343
Cowherd & Parrott Funeral Home	206 South Main Street	Greensburg	Crematorium	37.25841	85.50273
Car Dealer Service Garage	213 South Main Street	Greensburg	Former Greensburg Firestore - UST	37.25876	85.50220
Greensburg Bottling Company	North Depot Street	Greensburg	Not in service, listed mines	37.26602	85.49506
Gates Gas Station	792 Campbellsville Road	Greensburg	In service	37.27112	85.49546
Nally & Haydon Surfacing, LLC	HWY 487	Greensburg	Quarry	37.23555	85.48768

Site	Address	County/City	Notes	Latitude	Longitude
Possible Buried Drums Legions Park	1099 Legion Park Road	Greensburg	Listed & potential historic	37.24260	85.47987
Auto Body Shop	Legion Park Road	Greensburg	In service	37.24721	85.48326

In addition, there are seven bridges within the project area that would require asbestos sampling if they are to be demolished during construction (see Table 5).

*Table 5: Bridges for Asbestos Sampling*

Site	Address	County/City	Notes	Latitude	Longitude
Bridge #1	E.F. Little Barren River	Metcalfe	Potential Asbestos	37.10134	85.59936
Bridge #2	Caney Creek	Metcalfe	Potential Asbestos	37.11626	85.59097
Bridge #3	Greasy Creek	Green	Potential Asbestos	37.15158	85.56114
Bridge #4	Russell Creek	Green	Potential Asbestos	37.22800	85.51130
Bridge #5	Clover Lick Creek	Green	Potential Asbestos	37.23638	85.50032
Bridge #6	Green River	Green	Potential Asbestos	37.25391	85.50275
Bridge #7	Clover Lick Creek	Green	Potential Asbestos	37.23594	85.49263

## 4.7 Socioeconomic Characteristics

Socioeconomic data for Green and Metcalfe counties and the state of Kentucky were summarized and documented to determine potential Environmental Justice (EJ) issues.

### 4.7.1 Population

The 2020 population projection for Green County (11,112) reflects a decrease of 1.3% from 2010 (see Table 6). The population growth rate is significantly lower than both the state average rate of 7.7% and the national average rate of 9.71%. Population growth is projected to continue to decrease in Green County during the next 40 years ([www2.ca.uky.edu](http://www2.ca.uky.edu)).

The 2020 population projection for Metcalfe County (10,329) reflects an increase of 2.3%; however, from 2010 to 2050, the population is projected to decrease by 1.6% (see Table 6).

*Table 6: Population Figures and Projections for Green and Metcalfe Counties, Kentucky*

	2010 Census	2015 Projection	2020 Projection	2025 Projection	2030 Projection	2050 Projection
Green County	11,258	11,217	11,112	10,943	10,733	9,669
Metcalfe County	10,099	10,233	10,329	10,383	10,380	9,938

Source: Kentucky State Data Center ([www2.ca.uky.edu](http://www2.ca.uky.edu))

#### **4.7.2 Race and Hispanic or Latino Origin**

The project area consists of 12 Census Tract Block Groups (see Table 7 and Exhibit 2). The racial composition of the project area is predominantly White, and the percentage of minority populations in both Green and Metcalfe counties is typically lower than the State average. Green County has a larger percentage of its population that is classified as Native, compared to Kentucky. Several Census Tract Block Groups within both counties have higher percentages of minority populations than the State, as highlighted in orange in Table 7.

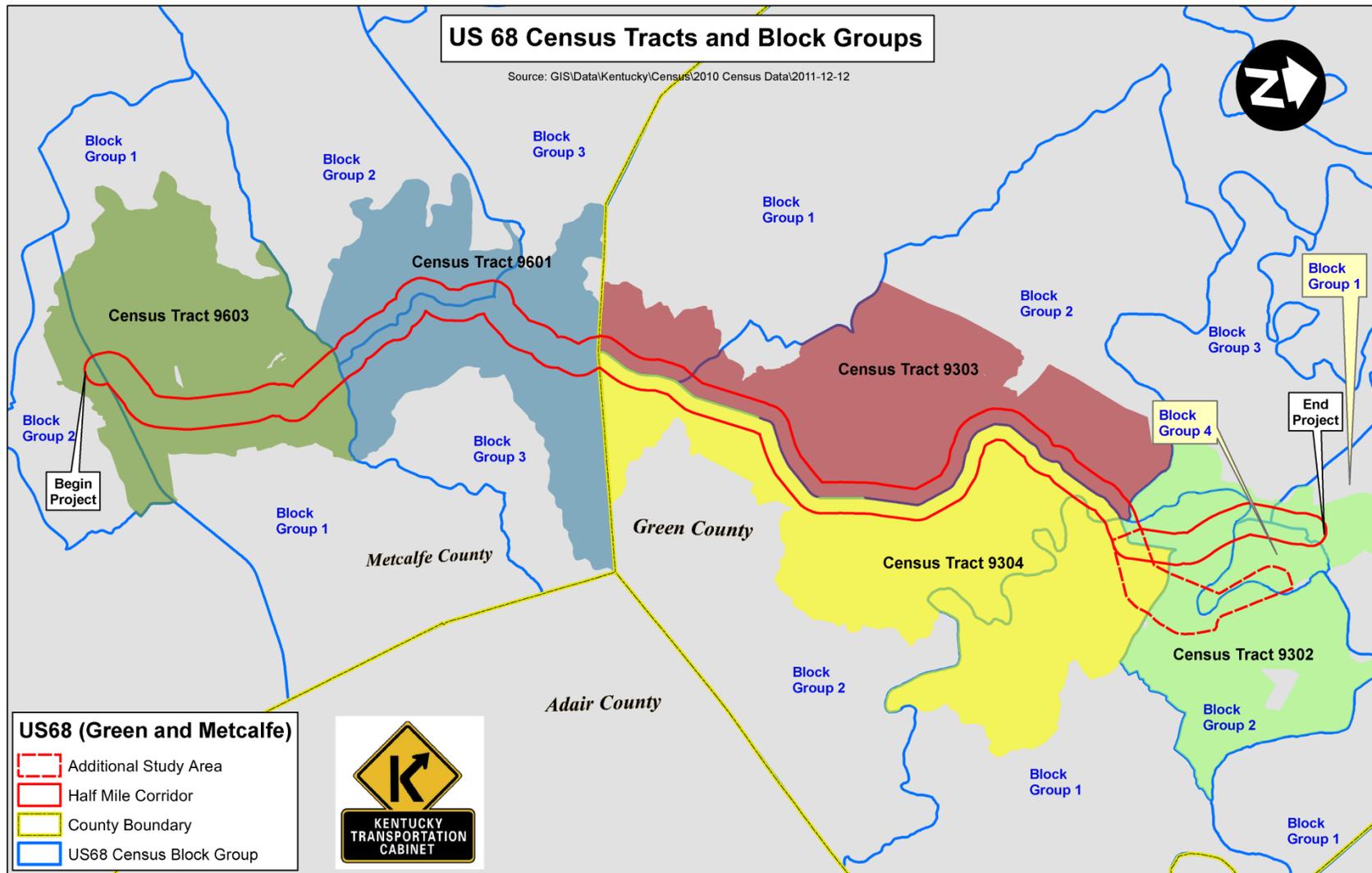
**Table 7: Race and Hispanic or Latino Origin Characteristics by Block Group**

		White	Black or African American	Hispanic	Asian	Native (American Indian, Alaska Native, Hawaiian Native, etc.)	One Race, Other (Not Hispanic)	Two or More Races (Not Hispanic)
<b>Kentucky</b>	Number	3,809,537	337,520	132,836	48,930	12,621	55,551	75,208
	Percent	87.79	7.78	3.06	1.13	0.29	1.28	1.73
<b>Green County</b>	Number	10,775	224	159	17	41	56	145
	Percent	95.71	1.99	1.41	0.15	0.36	0.50	1.29
<b>930200-1</b>	Number	1,103	21	14	0	0	3	12
	Percent	96.84	1.84	1.23	0	0	0.26	1.05
<b>930200-2</b>	Number	664	10	3	4	3	3	1
	Percent	96.93	1.46	0.44	0.58	0.44	0.44	0.15
<b>930200-3</b>	Number	759	45	19	3	4	7	16
	Percent	91.01	5.40	2.28	0.36	0.48	0.84	1.92
<b>930200-4</b>	Number	1,318	47	14	1	6	8	22
	Percent	94.01	3.35	1.00	0.07	0.43	0.57	1.57
<b>930300-1</b>	Number	1,151	8	27	0	1	2	20
	Percent	97.38	0.68	2.28	0	0.08	0.17	1.69
<b>930300-2</b>	Number	1,203	3	27	0	10	10	15
	Percent	96.94	0.24	2.18	0	0.81	0.81	1.21
<b>930400-1</b>	Number	820	30	7	0	7	3	11
	Percent	94.14	3.44	0.80	0	0.80	0.34	1.26
<b>930400-2</b>	Number	702	2	9	1	3	4	18
	Percent	96.16	0.27	1.23	0.14	0.41	0.55	2.47
<b>Metcalfe County</b>	Number	9,774	154	115	14	14	52	91
	Percent	96.78	1.52	1.14	0.14	0.14	0.51	0.90
<b>960100-2</b>	Number	679	27	15	1	0	11	5
	Percent	93.91	3.73	2.07	0.14	0	1.52	0.69
<b>960100-3</b>	Number	786	12	8	0	2	1	13

		White	Black or African American	Hispanic	Asian	Native (American Indian, Alaska Native, Hawaiian Native, etc.)	One Race, Other (Not Hispanic)	Two or More Races (Not Hispanic)
	Percent	96.56	1.47	0.98	0	0.25	0.12	1.60
<b>960300-1</b>	Number	870	5	17	0	4	13	12
	Percent	96.24	0.55	1.88	0	0.44	1.44	1.33
<b>960300-2</b>	Number	1,116	24	13	3	4	4	6
	Percent	96.46	2.07	1.12	0.26	0.35	0.35	0.52

Source: US Census Bureau

Exhibit 2: Project Area Census Tracts and Block Groups



### 4.7.3 Housing

2010 Census data indicates that 5,324 housing units were present in Green County, of which 13.58% are vacant. The owner occupancy rate is 65.63% with a median value (2008 – 2012) of \$72,000. During the same time period in Metcalfe County, there were 4,681 housing units, with a vacancy rate of 13.37%. Owners occupied 65.54% of the housing, with a median value of \$80,300. The need for housing is not expected to increase in Green County because the population has declined slightly since 2000; the population in Metcalfe County has only increased by 2.3%, which is not likely to create a large demand for new housing.

### 4.7.4 Industry and Employment

According to the US Census Bureau 2008-2012 American Community Survey 5-Year Estimates, the civilian labor force in Green County is 5,070, of which an estimated 10.4% is unemployed (see Table 8). The largest class of workers is the private wage and salary worker, which comprises 73.3% of the work force. The top industries in the county are educational services, and health care and social assistance (25.6%); manufacturing (17.7%); and retail trade (13.6%). The mean travel time to work is 29 minutes.<sup>7</sup>

The civilian labor force in Metcalfe County is 4,584, of which an estimate 7.5% is unemployed (see Table 8). The largest class of workers is the private wage and salary worker, comprising 75.3% of the workforce. The top industries in the county are manufacturing (29.1%); educational services, and health care and social assistance (18.4%); and retail trade (10.0%). The mean travel time to work is 23.7 minutes.

*Table 8: Green and Metcalfe Counties Labor Force*

	Green County	Metcalfe County
Civilian Labor Force	5,070	4,584
Employed	4,541	4,239
Unemployed	529	345

### 4.7.5 Income

The median household income for Green County is \$33,573 (2008-2012) and has grown by 31.85% since 2000. The income growth rate is higher than the state average rate of 26.54%, and higher than the national average rate of 26.32%. The median household income for Metcalfe County is \$34,100, with an income growth rate of 44.86% since 2000.<sup>8</sup>

Several Census Tract Block Groups within the project area have lower median household incomes and lower per capita incomes than those of their respective counties (highlighted in orange); income levels within both Green and Metcalfe counties are lower than those of the state.

<sup>7</sup> US Census Bureau. Selected Economic Characteristics, 2008-2012 American Community Survey 5-Year Estimates. <http://factfinder2.census.gov>, accessed 26 February 2014.

<sup>8</sup> US Census Bureau. Selected Economic Characteristics, 2008-2012 American Community Survey 5-Year Estimates. <http://factfinder2.census.gov>, accessed 26 February 2014.

As of 2010, approximately 15.3% of families living in Green County and 10.83% of families living in Metcalfe County were considered impoverished; 14.15% of families living in Kentucky were considered impoverished (see Table 9). The family poverty levels in several Census Block Groups are higher than the levels of their respective counties (highlighted in orange).

**Table 9: Median Household and Per Capita Incomes by Block Group**

	Median Household Income	Per Capita Income	Family Poverty Level
<b>Kentucky</b>	42,610	23,210	14.15%
<b>Green County Block Group</b>	33,573	19,981	15.32%
<b>930200-1</b>	51,107	44,241	10.78%
<b>930200-2</b>	41,250	27,043	***
<b>930200-3</b>	18,047	12,701	35.03%
<b>930200-4</b>	32,392	16,791	17.51%
<b>930300-1</b>	36,667	16,872	10.61%
<b>930300-2</b>	29,097	17,643	14.74%
<b>930400-1</b>	37,917	25,985	2.09%
<b>930400-2</b>	31,328	12,808	18.14%
<b>Metcalfe County Block Group</b>	34,100	17,347	10.83%
<b>960100-2</b>	34,886	18,758	5.14%
<b>960100-3</b>	30,093	20,862	13.02%
<b>960300-1</b>	34,297	15,370	***
<b>960300-2</b>	26,083	15,716	22.33%

\*\*\* Data not available

#### 4.7.6 Environmental Justice

The purpose of *Executive Order 12898*, “Federal Actions to Address Environmental Justice in Minority and Low-Income Populations,” is to focus federal attention on the environmental and human health condition of minority and low-income communities, to promote non-discrimination in federal programs affecting human health and the environment, and to provide minority and low-income communities access to public information and an opportunity to participate in matters relating to the environment and human health.

Two Environmental Justice reviews were conducted for this project; the review for Green County was provided by the Lake Cumberland Area Development District, and the review for Metcalfe County was provided by the Barren River Area Development District (see Appendix D). The reviews largely utilize data from the U.S. 2010 Census Tract data, except where unavailable, for the total number and percentages of minority, elderly, low-income, and disabled populations. While reviews of both counties found higher percentages of protected groups in several Census Tracts, they conclude that the proposed project should not have adverse effects on those groups. Further consideration of these populations is recommended during the planning process.

#### 4.7.7 Agriculture

The majority of the project area is rural, with rural residential and commercial land uses interspersed throughout a corridor that is predominantly agricultural and interspersed with woodlots. In the town of Greensburg, there are urban residential, commercial, and industrial land uses. If federal funding is utilized for this project, Farmland Conversion Impact Rating Forms for Corridor Type Projects (NRCS-CPA-106) will be completed for the alternatives to ensure that the provisions of the Farmland Protection Policy Act (7 CFR 658) are met. Due to the small percentage of prime and unique farmland the project would impact, in comparison to the remaining farmland within the counties, it is unlikely that farmland impacts will be problematic.

## 5.0 CONSTRUCTION PHASE ACTIVITIES

During construction, KYTC's *Standard Specifications for Road and Bridge Construction* will be utilized to ensure that this project will not cause significant detrimental social, environmental, or economic effects in the area. Any impact incurred during the construction of the proposed project will be short-term and will have no long-lasting effects upon the project area. No major detours will be needed; only short-term traffic delays will be expected. Construction activities, including maintenance of traffic and sequencing of construction, will be planned and scheduled to minimize traffic delays. Signing will be used as appropriate to provide notice of pertinent information to the traveling public. Access to all properties will be maintained to the maximum practical extent. The project is expected to produce construction-period economic benefits by stimulating local economies through construction-related jobs, sales, income, government revenue and expenditures, and off-site construction support.

Best Management Practices (BMPs) and erosion control procedures will be utilized in areas of potential sedimentation and erosion. Construction associated with or near streams will occur during low-flow periods to minimize disturbances. Replanting of disturbed areas, including stream banks and right-of-way, will be with native vegetation for aesthetics, soil stabilization, and fish and wildlife populations. Removal of stream canopy trees will be avoided wherever possible. Mitigation of in-stream habitat disturbance will be executed.

Noise levels due to heavy construction equipment may exceed acceptable noise standards during the construction period; however, every reasonable effort will be made to minimize construction noise, especially near noise-sensitive locations.

Any increase in particulate matter in the air due to construction activity will be temporary and will not be detrimental to the health and welfare of local residents. Dust pollution may be an unavoidable, yet minor, nuisance; every feasible effort will be made to minimize this problem. Exhaust from construction equipment will have an insignificant effect on the ambient air quality. Any open air burning will be done in compliance with state regulations and local ordinances.

Waste and borrow sites have not been determined for the project.

## **6.0 EARLY COORDINATION AND PUBLIC INVOLVEMENT**

Local officials meetings were held in each county on December 19, 2013. Local officials in each county expressed support for the US 69 Corridor and US 68 Connector projects, primarily based on safety concerns.

The first public meetings for this project took place in Edmonton on February 10, 2014, and in Greensburg on February 11, 2014. The public meeting summaries are included in Appendix E. No public controversy or obstacles to the project were identified during or as a result of the public meetings. The majority of the public meeting attendees expressed support for the projects in both counties; however, residents in Metcalfe County expressed less knowledge of the need for a connector in Greensburg. Attendees provided input in regard to environmental features to be considered during project development and made suggestions for possible realignment segments along the corridor.

Additional public involvement meetings will be held as the study progresses and during future project phases. Public involvement will be coordinated often to include concerned citizens and project stakeholders throughout the environmental process.

***Exhibit 3: Environmental Features***