KY 251 Scoping Study - KYTC Item No. 4-153.00

KY Transportation Cabinet

Final Report
May 2012

Stantec Inc.

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EXECUTIVE SUMMARY

The Kentucky Transportation Cabinet (KYTC) initiated the KY 251 Scoping Study to seek improvement strategies for current and anticipated future transportation deficiencies within a portion of Hardin County. The project study area includes the section of KY 251 from KY 3005 (Ring Road) to KY 313 (Joe Prather Highway). KY 251 is a north-south route paralleling US 31W to the west and I-65 to the east. The purpose of the KY 251 Scoping Study is to determine the extent of and justification for improvements necessary along KY 251 as the roadway has experienced additional traffic as a result of growth at Fort Knox. Improvements to KY 251 would provide a safer, more efficient corridor between KY 3005 and KY 313, connecting Elizabethtown to Fort Knox and areas north.

Hardin County and the surrounding region have experienced increased population growth in the recent past, due in large part to the 2005 Base Realignment and Closure Plan (BRAC) and its effects on Fort Knox. Transportation improvements have been recommended to assist the area during this period of growth, including enhancements to KY 251. Several studies related to BRAC have recommended opening a southern access point into Fort Knox along KY 313, with a proposed new route to connect to either the existing North Wilson Road access control gate or possibly a new gate located on the south side of the post. With a potential new connection between KY 313 and the south side of the post, traffic along KY 251 and the surrounding routes would be expected to increase.

The final study recommendation, shown on **Figure ES-1**, is a combination of alternatives considered over the course of the study. It includes improvements at the KY 251 intersections with KY 434 and Wooldridge Ferry Road. KY 251 is proposed to be widened from north of Ring Road to KY 434 (Battle Training Road) using a minor widening template with two 11-foot wide lanes and full outside shoulders, four feet of which would be paved. Traffic forecasts developed for the study indicate two lanes will accommodate future year (2035) travel demand. The shoulders along KY 434 would be improved between KY 251 and KY 434 to the west approximately two miles to an intersection with a new connector road. This new road would connect KY 434 to KY 313 near the proposed connector road into Fort Knox. As this recommendation is based on the assumption the conceptual connector road into Fort Knox will be pursued in the future, other alternatives may be considered by the KYTC if the connector road concept does not move forward.

Table ES-1 includes a cost estimate for the recommended alternative. Cost estimates were developed based on 2011 average KYTC unit bid costs and estimated right-of-way costs at $25,000 per acre and $150,000 per relocation. This cost does not include construction of a new connector road north of KY 434.

Table ES-1: Cost Estimate for Recommended Alternative

PHASE	KY 251 / KY 434 IMPROVEMENTS COST	INTERSECTION "SPOT" IMPROVEMENTS COST
DESIGN	$855,000	$100,000
RIGHT-OF-WAY	$1,145,000	$200,000
UTILITIES	$1,195,000	$200,000
CONSTRUCTION	$7,755,000	$1,000,000
SUBTOTAL	**$10,950,000**	**$1,500,000**
TOTAL	**$12,450,000**	

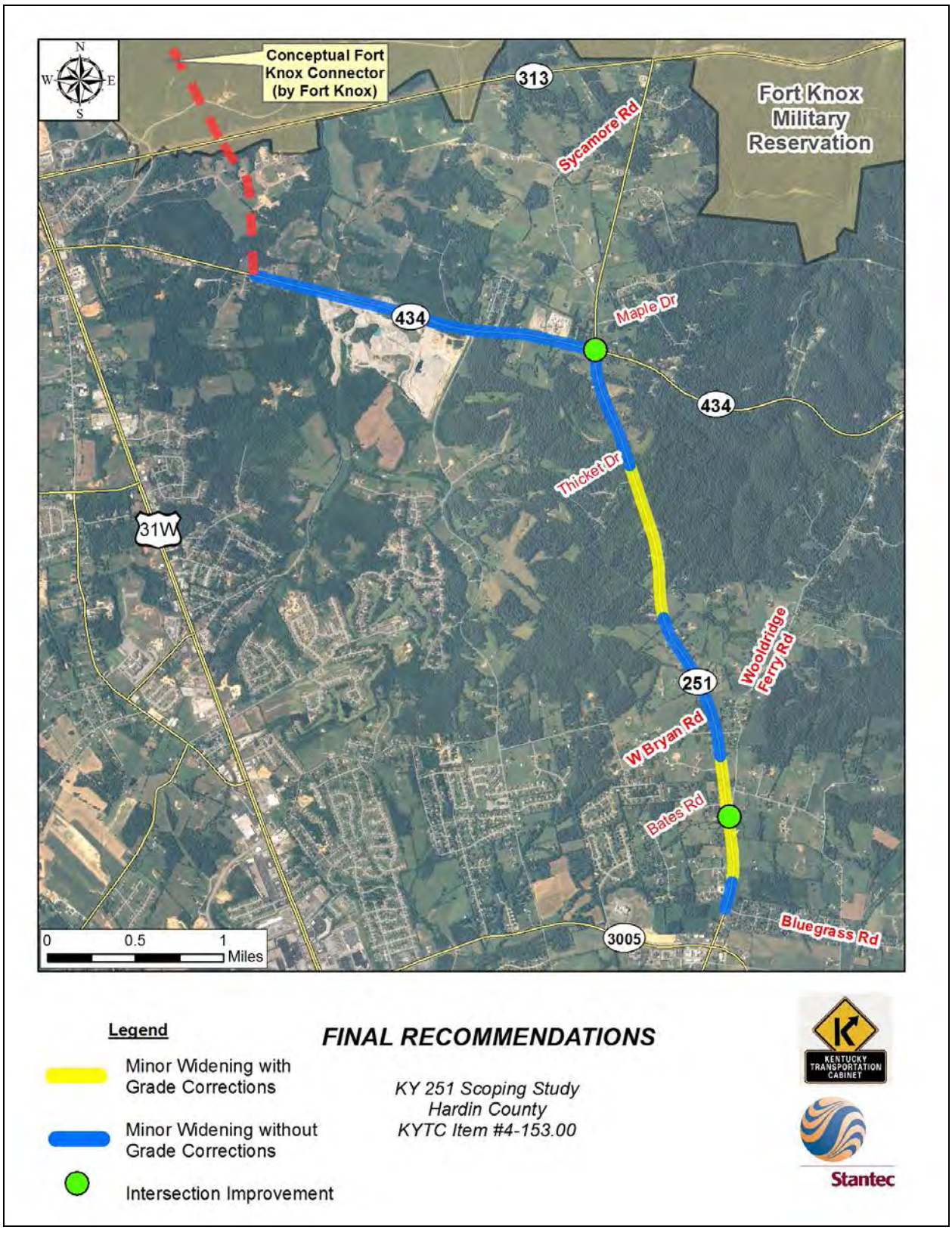


Figure ES-1: Study Recommendations

TABLE OF CONTENTS

List of Figures and Tables

Figures

Tables

1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) initiated the KY 251 Scoping Study to seek improvement strategies for current and anticipated future transportation deficiencies within a portion of Hardin County. The project study area, shown in **Figure 1**, is north of the city of Elizabethtown and includes the section of KY 251 from Ring Road (KY 3005) to the Joe Prather Highway (KY 313). KY 251 is a north-south route paralleling US 31W to the west and I-65 to the east. The purpose of the KY 251 Scoping Study was to determine the extent of and justification for needed improvements necessary along KY 251 as the roadway has experienced additional traffic due to growth at Fort Knox.

1.1 Draft Purpose and Need Statement

The Purpose and Need Statement for the study, and for project recommendations which may result from the study, is as follows:

> *The purpose of the KY 251 Improvement Project is to provide a safer, more efficient corridor between KY 3005 (Ring Road) and KY 313 (Joe Prather Highway), connecting Elizabethtown to Fort Knox and areas north. Ultimately, the project will serve a number of existing needs.*
>
> *The U.S. Department of Defense 2005 Base Realignment and Closure (BRAC) plan included a number of changes that will affect the Fort Knox Military Reservation and surrounding region. Fort Knox has three controlled access points to enter post. Because each of these gates relies on access from US 31W, an already congested corridor, travel alternatives that minimize the need to utilize US 31W have been sought. KY 251 currently provides an eastern north-south travel alternative that indirectly connects Elizabethtown to Fort Knox. Should a new southern access point to Fort Knox be provided in the future, travel demand on KY 251 is likely to increase significantly.*
>
> *The existing alignment for KY 251 is on rolling terrain with some segments on grades of up to seven percent that limit sight distance. While the horizontal alignment is relatively good, of the 45 vertical curves in the study section, 37 do not have adequate sight distance for a 55-mile per hour (mph) design speed. The nine-foot travel lanes with little to no shoulder are not adequate to accommodate the current truck traffic (10 percent) and anticipated future travel demand. Although KY 251 does not currently have a high crash rate, there is a disproportionately high percentage of single vehicle crashes. Nearly 38 percent of all crashes that occurred between 2006 and 2010 involved a single vehicle, and in 60 percent of those cases, vehicles ran off the roadway. A project is under design to improve KY 251 south of Ring Road (KYTC Item 4-7030), and these improvements will extend north of Ring Road to just north of Bluegrass Road providing needed congestion relief at the Ring Road intersection by providing additional lanes and shoulder. The KY 251 Improvement Project will extend these currently proposed improvements north to KY 313.*

Hardin County and the surrounding region have experienced increased population growth in the recent past, in large part due to the BRAC plan. It is estimated that the BRAC plan has resulted in as many as 13,700 persons relocating to the region and over 10,000 new vehicle trips entering post each day. Transportation improvements have been recommended to assist the area after this period of growth, including enhancements to a section of KY 251. Several studies related to BRAC recommended opening a southern access point onto KY 313, partly due to the newly constructed Human Resource Command which to date has added about 3,000 staff with the potential to add another 2,000-2,500. The Human Resource Command is located in the southern part of Fort Knox and the North Wilson Road gate is the closest access control point. With a potential new connection between KY 313 and the south side of the post, traffic along KY 251 and the surrounding routes is expected to increase. The three existing gates are accessed directly from US 31W along the west side of post, as shown in **Figure 2**.

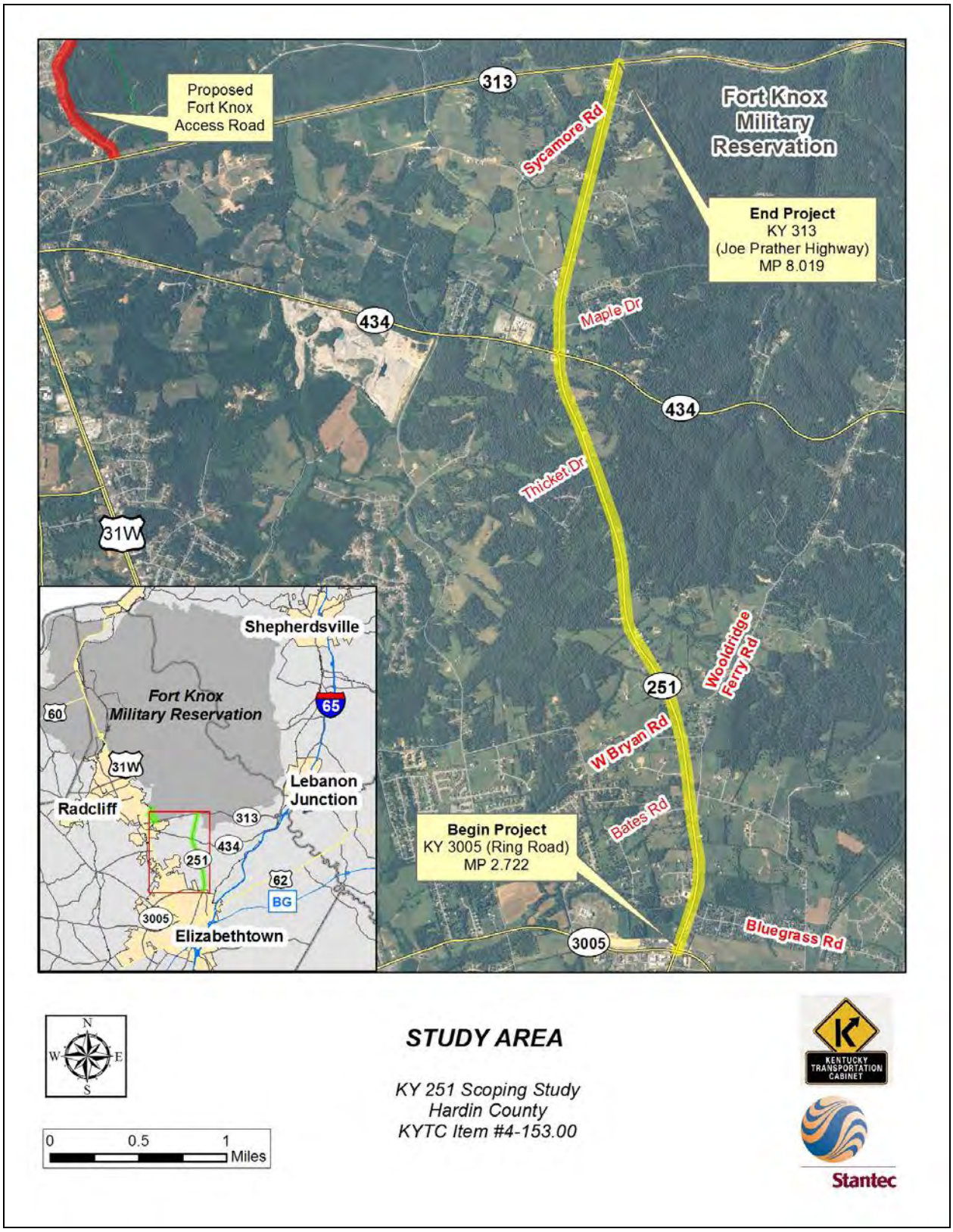


Figure 1: Study Area for the KY 251 Scoping Study

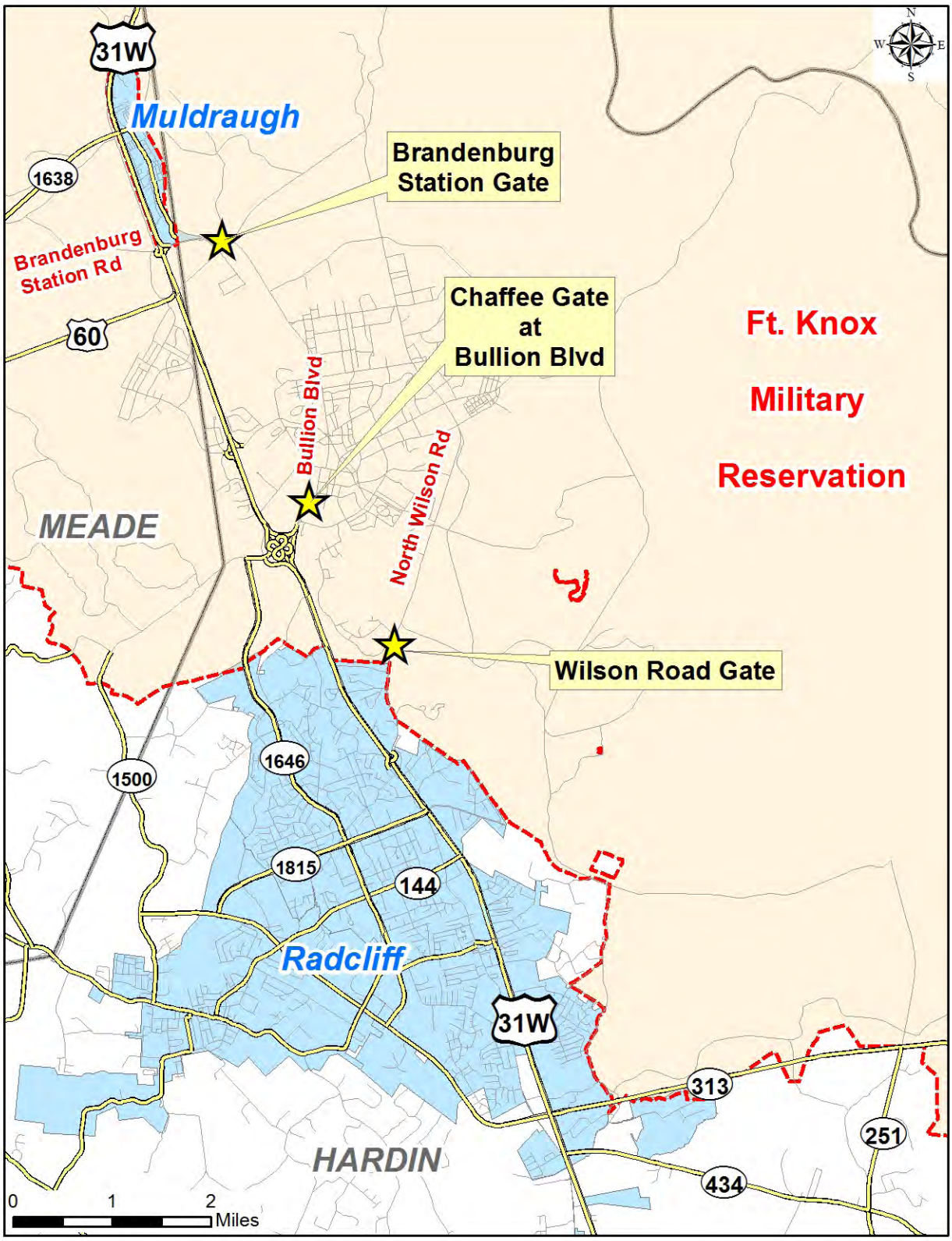


Figure 2: Access to Fort Knox from US 31W

Items involved with the study include the following:

- Discuss the project needs with public officials, resource agencies, the general public and other groups which have an interest in the project
- Define project goals, needs, and issues
- Identify any known environmental issues
- Identify and evaluate long term improvement alternatives, including access management, spot improvements, alternate corridors and design criteria

Project Issues

Major issues and concerns initially identified within the study area that will be addressed include:

- Mobility and Connectivity
  - Lack of adequate routes that access the Fort Knox Military Reservation
  - A need to improve connectivity between Radcliff and Elizabethtown
  - Traffic congestion and safety along US 31W
- Determination of Community Desire and Expectations
  - Project Costs and Schedule
  - Project phasing
  - Right-of-Way
- Environmental Issues
  - Community and Residential Impacts
  - Environmental Justice
  - Historical Properties
  - Natural Environment

1.2 Study Evolution

There have been several recent studies recommending improvements to KY 251. The 2005 Radcliff-Elizabethtown Urbanized Area Transportation Plan recommended the reconstruction of KY 251 from KY 3005 to KY 313 to Rural Major Collector standards. The 2008 BRAC Task Force Priority Transportation projects had the reconstruction of KY 251 from KY 3005 to KY 434 as #6 on the ranking list and the reconstruction from KY 434 to KY 313 as #6a. It has since been moved up to #2a and #2b by the Task Force. The 2009 Fort Knox Regional Highway Capacity Study recommended reconstruction of KY 251, with the prioritization of such a reconstruction depending on whether new southern access was to be provided from KY 313 to Fort Knox. Assuming new access was to be provided, the project would be a high priority. If new access was not provided, it was a medium priority. The 2010 First Look Scoping Study prepared by KYTC District 4 identified four alternatives: No-Build, spot improvements, minor widening and a major widening with four lanes proposed.

Kentucky's FY 2012 – FY 2018 Recommended Highway Plan (Six Year Plan) includes two separate projects for KY 251, with the first between Ring Road and KY 434 (KYTC Item No. 4-153.05) and the second between KY 434 and KY 313 (KYTC Item No. 4-153.01). The plan includes a combined $2.86 million for design (fiscal year 2012), $4.0 million for right-of-way (2014-2015), and $2.5 million for utility relocations (2015-2016) for improvements to KY 251. The funding source is listed as "State Project" (SP). The recently enacted Biennial Highway Construction Plan includes SP funding of $2.86 million for Phase I (preliminary) design in fiscal year 2012 and $2.5 million for right-of-way acquisition in the southern section in 2014.

The Kickoff Meeting for the KY 251 Scoping Study was held on February 11, 2011. Copies of all Study Team meetings are included in **Appendix A**. Initially, the study was to be an investigation of improving only the existing alignment for KY 251. There was some discussion at the kickoff meeting concerning the northern end

of the study corridor, between KY 434 and KY 313. The team decided to look at a new western connector between KY 434 and KY 313 to the west of KY 251. Improvements to KY 251 from north of KY 434 to KY 313 were still to be investigated. The team ultimately decided to also explore improvements along KY 434 near the KY 251 intersection and west to US 31W. Any recommended improvements to KY 251 will begin at the north end of KYTC Project, Item # 4-7030.00 near Bluegrass Road.

The preliminary design criteria consisted of a two-lane or four-lane roadway section using 11-foot lane widths, an eight-foot shoulder with four feet paved, and a 10-foot ditch. It was decided one option would be to follow the existing horizontal alignment while making corrections to the vertical curves in order to meet current design standards for a 55-mph design speed, if possible.

There has been recent interest from Fort Knox to investigate the feasibility of new southern access from KY 313 to the access control gate on North Wilson Road. This potential new connector would be located east of the existing South Boundary Road. With forecasts suggesting traffic would travel more heavily in a westward direction and the possibility of a new connector road from Fort Knox, new route alternatives west of KY 251 should be considered in the study. A final effort to reduce right of way impact and projected costs yielded another considered design option. An alternative utilizing a minor roadway widening to a two-lane section, a four-foot wide shoulder, and a ditch slope width of six feet was used. This alternative also considered only making spot improvements to the vertical curves that would meet current design standards for a 45-mph design speed. A separate new western connector road between KY 434 and KY 313 was also included in the study to address the anticipated heavier westward traffic flow.

2.0 EXISTING CONDITIONS

Conditions of the study area's existing transportation network are examined in the following section. The information compiled includes roadway facilities and geometrics, crash history, and traffic volumes within the study area. Data for this section was collected from the KYTC's Highway Information System (HIS) database, aerial photography, as-built plans, and field review.

2.1 Roadway Characteristics

The portion of KY 251 in the study area was originally constructed in the 1930's. There have been no major upgrades to the roadway since its construction. **Figure 3** shows the typical section from the as-built plans. The resulting construction did not provide adequate shoulder or recovery area beyond the traveled way. **Figure 4** and **Figure 5** are representative photographs taken along the roadway.

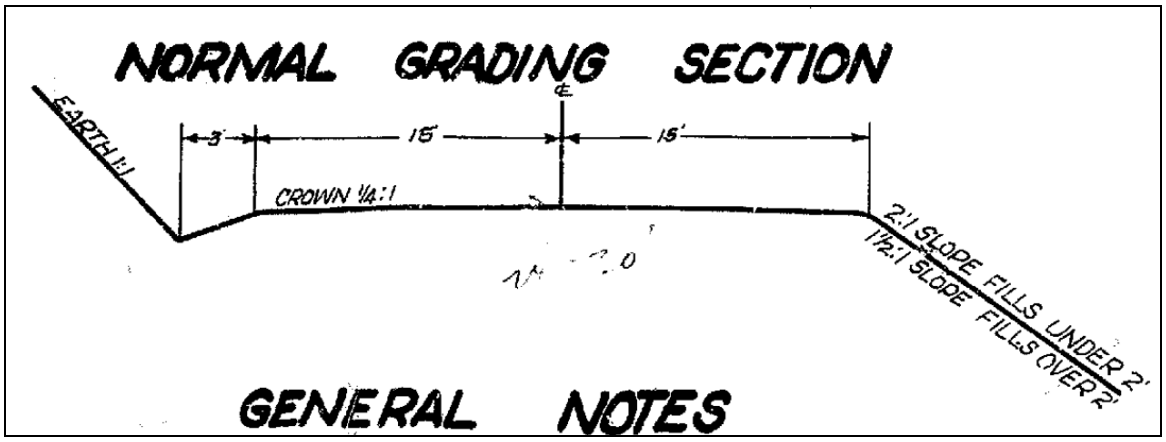


Figure 3: Typical Section from the As-Built Plans

Figure 4: KY 251 North of KY 434 (looking south)

Figure 5: KY 251 at Bates Road (looking north)

Figure 6 shows the functional classification of all roadways within the study area. Functional classification is the grouping of roads, streets and highways into integrated systems ranked by the level of mobility for through movements and access to adjoining land. This grouping acknowledges that roads serve multiple functions and it provides a basis for comparing roads fairly. Functional classification can be used for, but is not limited to, the following purposes:

- Provide a framework for highways serving mobility and connecting regions and cities within a state.
- Provide a basis for assigning jurisdictional responsibility according to the roadway's importance.
- Provide a basis for development of minimum design standards according to function.
- Provide a basis for evaluating present and future needs.
- Provide a basis for allocation of limited financial resources

All of KY 251 within the study area is classified as a collector roadway. KY 434 is also classified as a collector. At the north and south ends of the study area, KY 3005 (Ring Road) and KY 313 (Joe Prather Highway) are both arterials.

Figure 7 shows the existing lane widths for all roadways within the study area. KY 251 is a two-lane roadway with nine to 9.5-foot wide driving lanes and little or no shoulder for most of its length. Current KYTC design guidelines call for a minimum of 11-foot wide lanes on arterials and collector roadways. KY 434 consists of two 10-foot wide lanes. As shown in **Figure 8**, shoulder widths along KY 251 typically vary from no shoulder to about one foot. The shoulder along KY 434 is primarily earth and widths are between four and 10 feet.

The existing horizontal alignment meets current sight distance requirements for a 55-mph design speed, as suggested in **Figure 9**. **Figure 10** presents a summary of the HIS data concerning the vertical curve adequacy. The HIS data suggest the majority of KY 251 north of Bluegrass Road meets current design guidelines for rolling terrain. However, a more in-depth analysis of the existing alignment based on the as-built plans suggests the vertical alignment does not satisfy current guidelines for a 55-mph design speed. There are 45 vertical curves along KY 251, and many of them are quite short. A majority of these vertical curves (37 of the 45) do not meet current sight distance requirements, as shown in **Figure 11**. Improving the corridor on its existing alignment will be difficult because correcting the vertical deficiencies will require significant changes to existing grades, as many of the existing vertical curves are back to back. This will also make it particularly difficult to maintain traffic flow during construction.

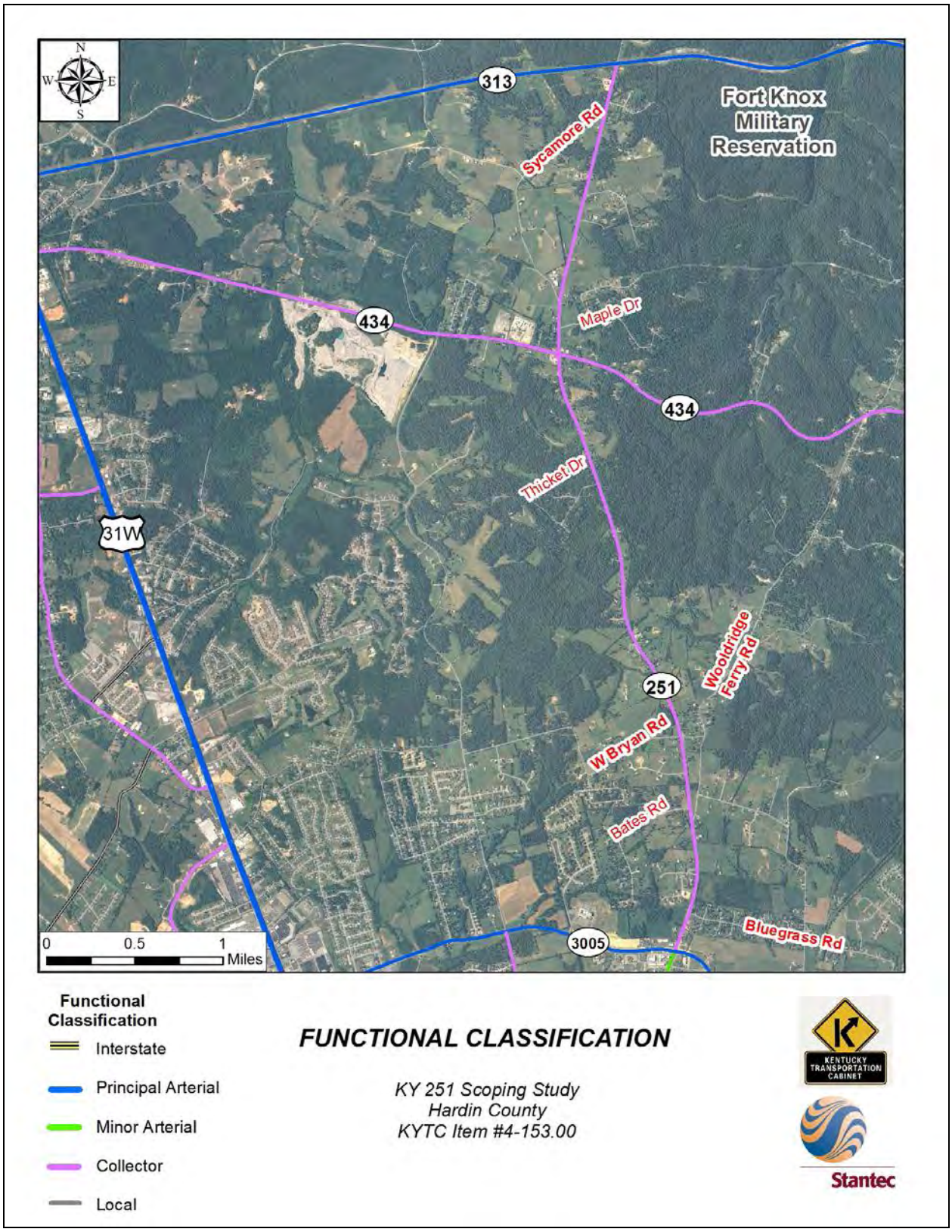


Figure 6: Functional Classification for Study Area Roadways

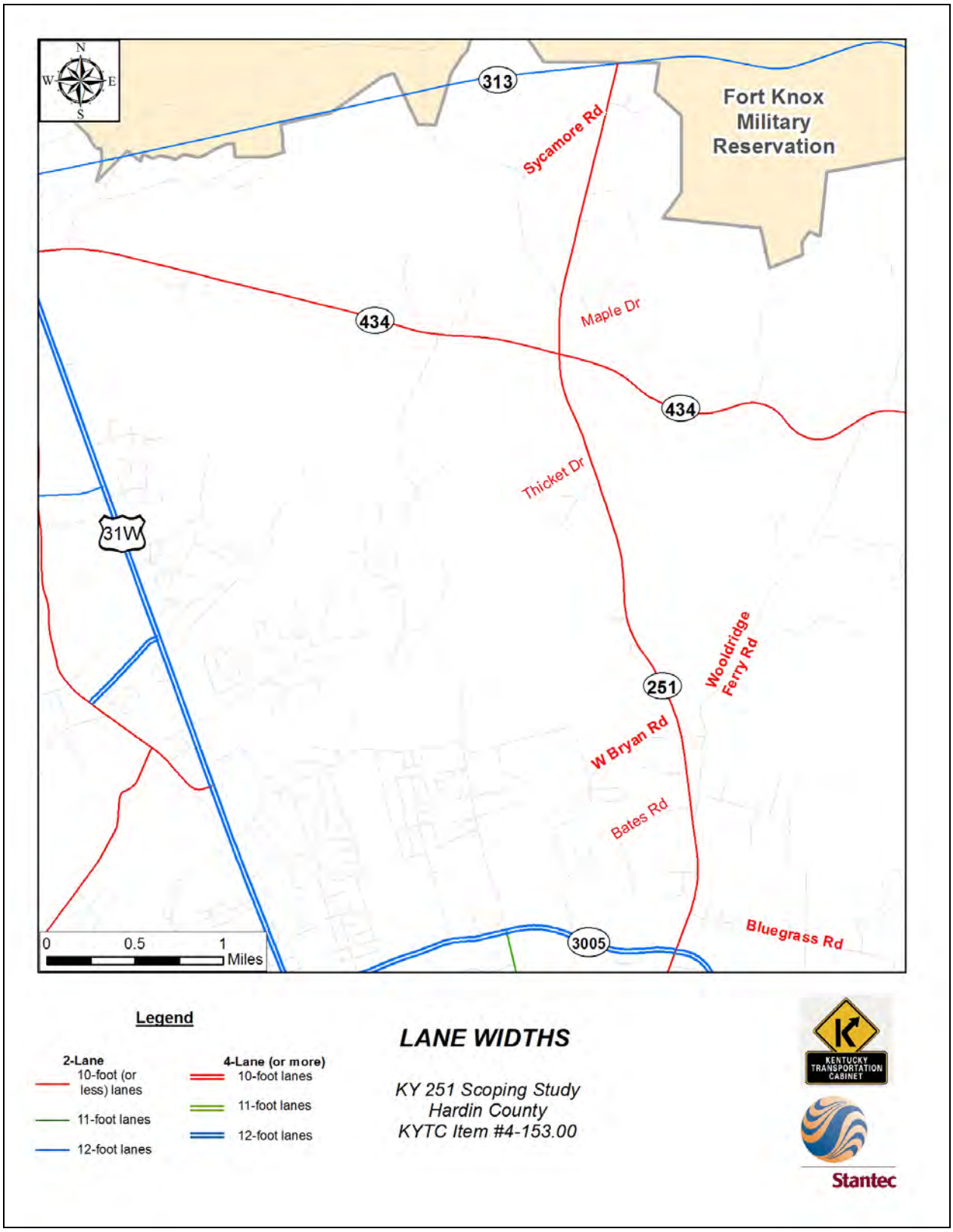


Figure 7: Lane Widths

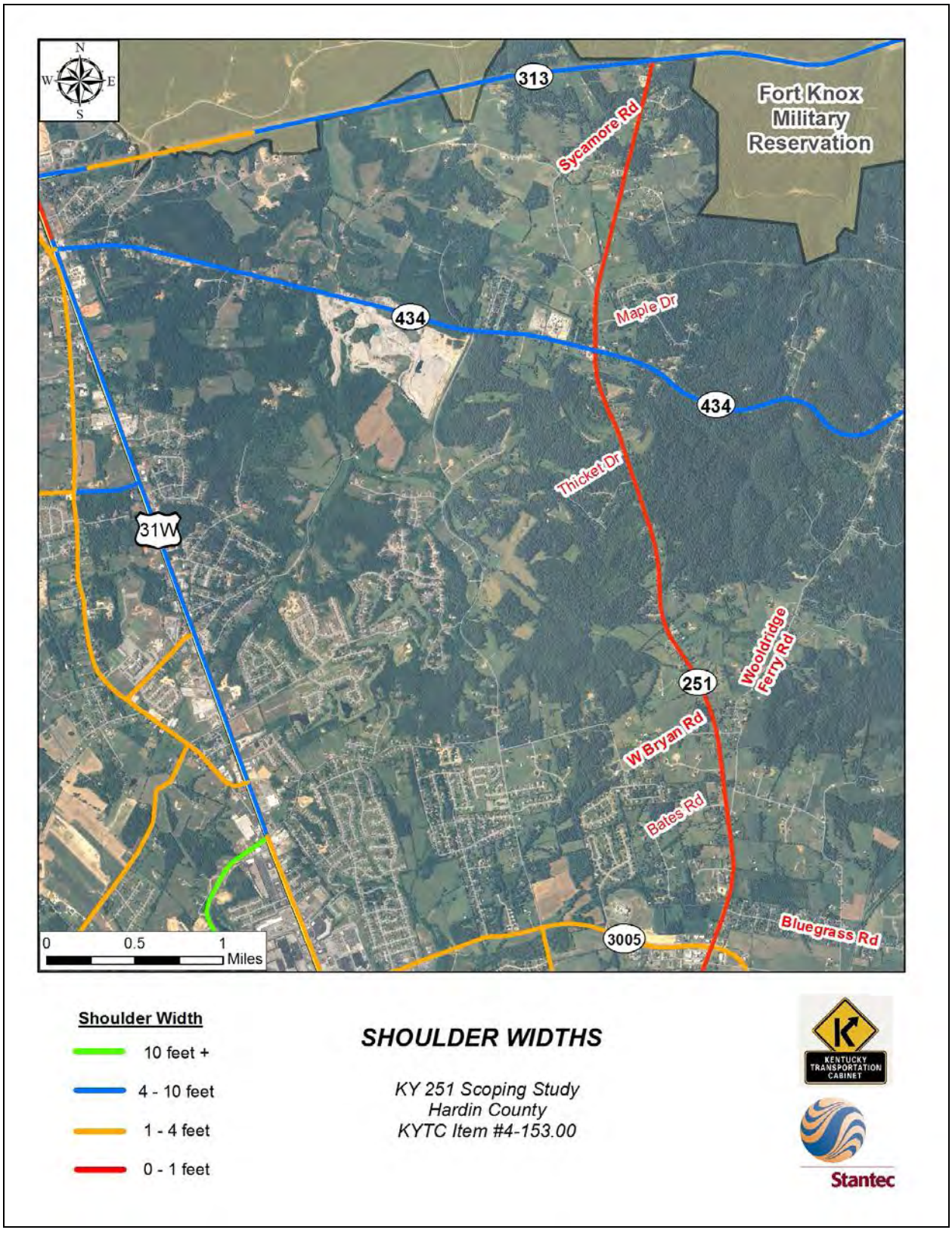


Figure 8: Shoulder Widths

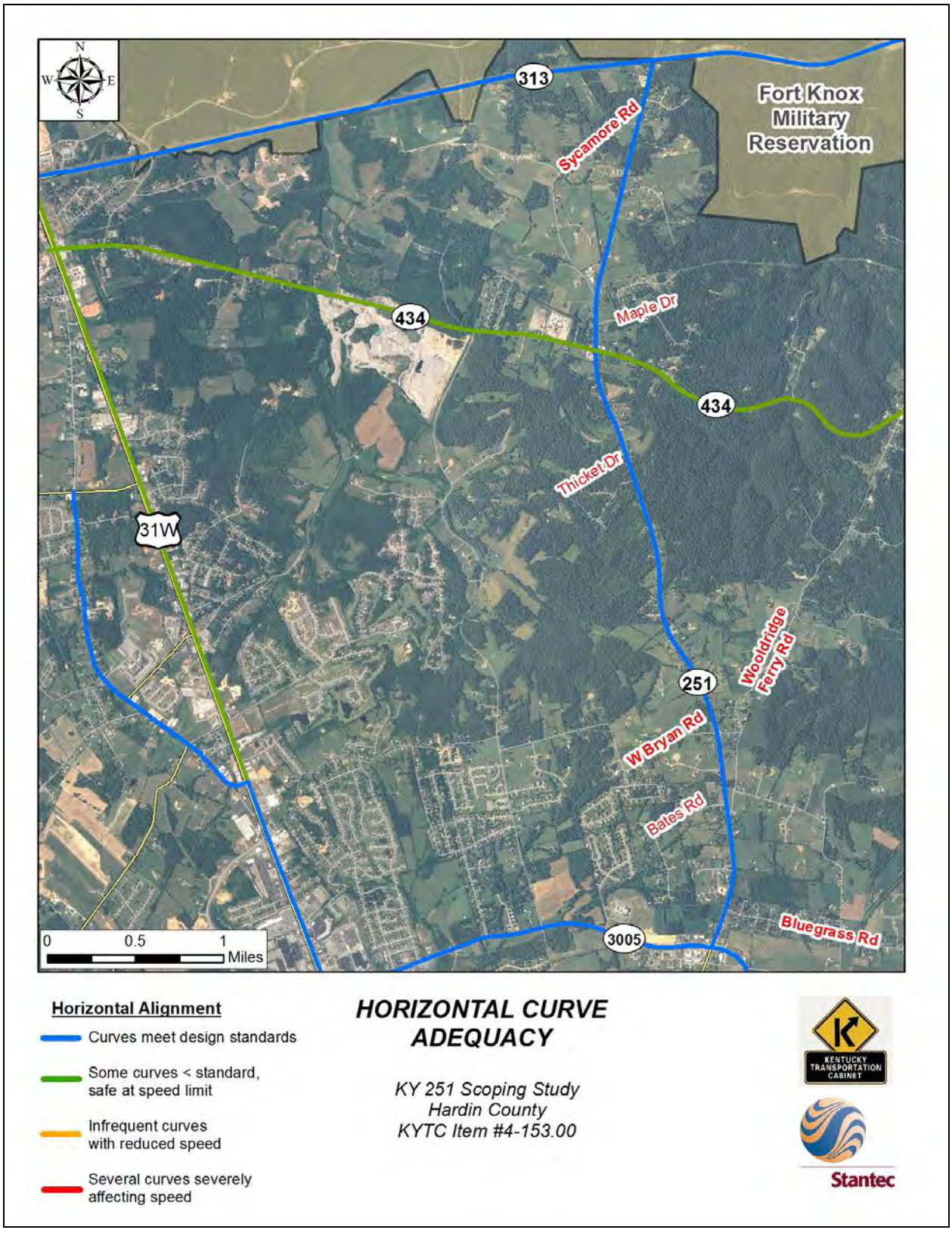


Figure 9: Adequacy of Horizontal Curvature

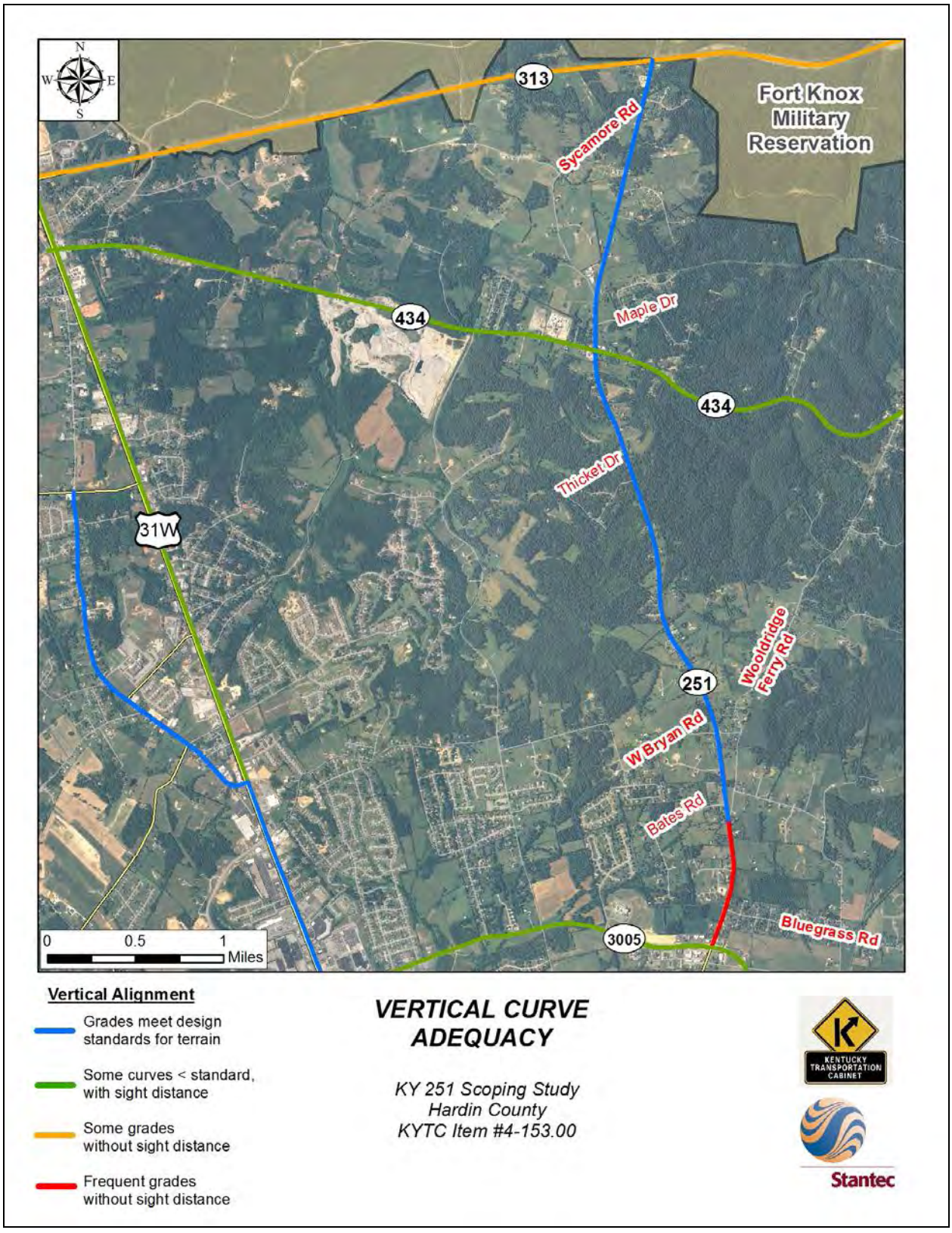


Figure 10: Adequacy of Vertical Curvature

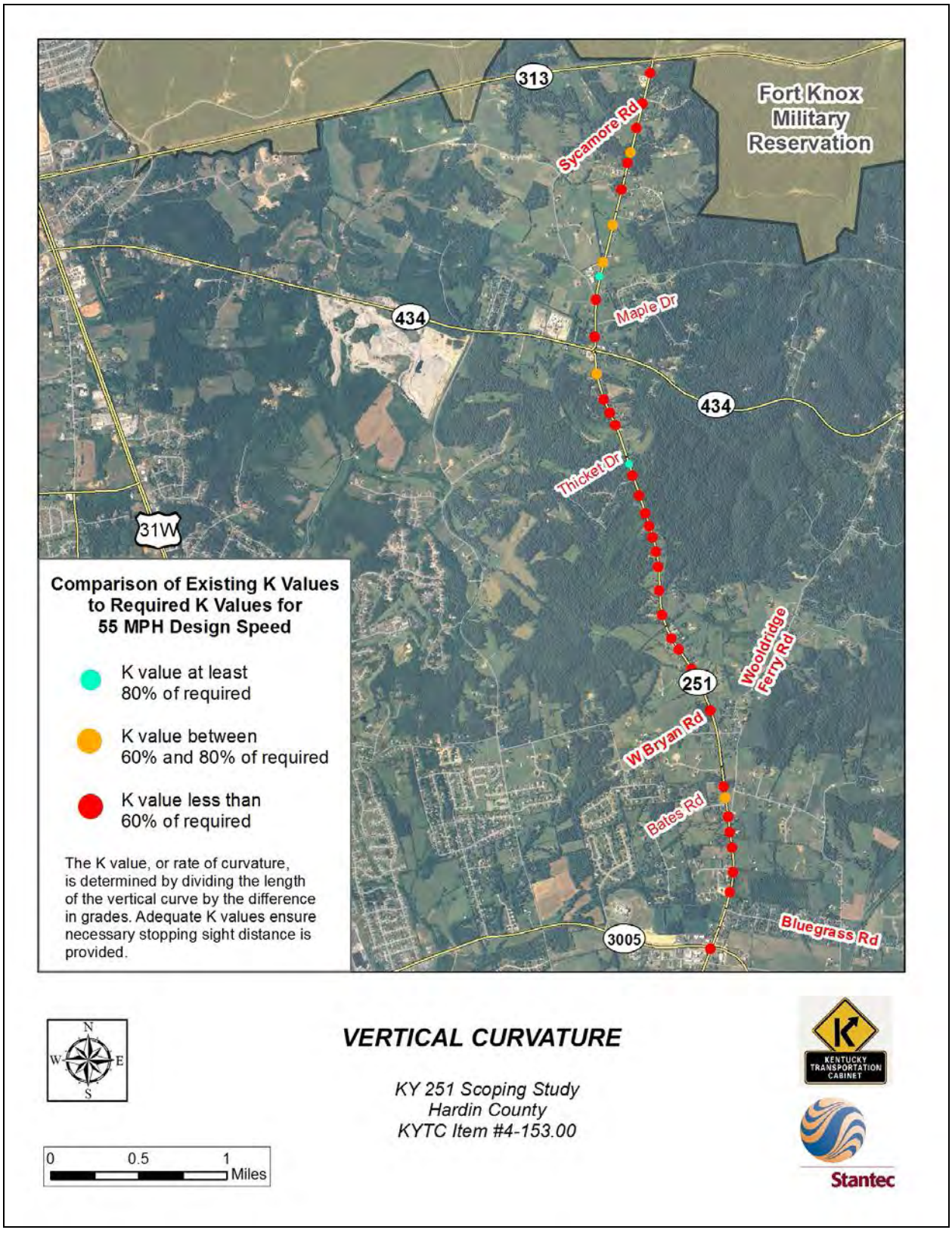


Figure 11: Vertical Curves along KY 251

2.2 Existing Traffic Volumes

Existing average daily traffic (ADT) volumes were obtained for roadway segments within the study area using the KYTC HIS database. **Figure 12** shows the current ADTs as provided in the KYTC HIS database along each of the state-maintained roadways within the study area. Traffic volumes along KY 251 range from a low of about 1,600 vehicles per day at the north end to 5,400 vehicles per day north of KY 3005. Single unit trucks comprise 2.7 percent of the daily traffic and combination trucks comprise 1.2 percent.

The volume-to-service flow (VSF) ratio is a basic measure of congestion, comparing the traffic demand to the roadway's capability. The VSF is calculated by dividing the peak hour traffic flow by the calculated or theoretical capacity of the roadway segment. Areas of concern are where the VSF values approach or exceed 1.0, in which limited capacity leads to congestion. As illustrated on **Figure 12**, all roadways are performing adequately, with VSF value of 0.8 or below. There are no roadway segments within the study area with a VSF greater than 1.0.

2.3 Crash Analysis

Crash data were collected along existing roadways within the study area for a five-year period between January 1, 2006 and December 31, 2010. During that period, there were 78 reported crashes on KY 251 with 18 (23 percent) injury crashes. The locations of these crashes and the crash types are shown on **Figure 13**. The predominant crash type has been single vehicle crashes (29 crashes, 37 percent) followed by rear end crashes (24 crashes, 31 percent).

Critical Rate Factors (CRFs) were also determined as part of this analysis. The CRF value is calculated by dividing the actual crash rate along a particular roadway segment by the critical rate, which is the maximum accident rate for which it can be said that crashes are occurring randomly based on roadway characteristics and traffic. A CRF less than 1.0 indicates that crashes occur at random, and greater than 1.0 suggests that conditions or causative factors may exist that contribute to non-random occurrences.

Both roadway segments (in this case, stretch between significant intersections) and spots (0.2 mile segments centered on intersections) were analyzed. **Table 1** summarizes the segments on both KY 251 and KY 434 and **Table 2** summarizes the spots along both roadways.

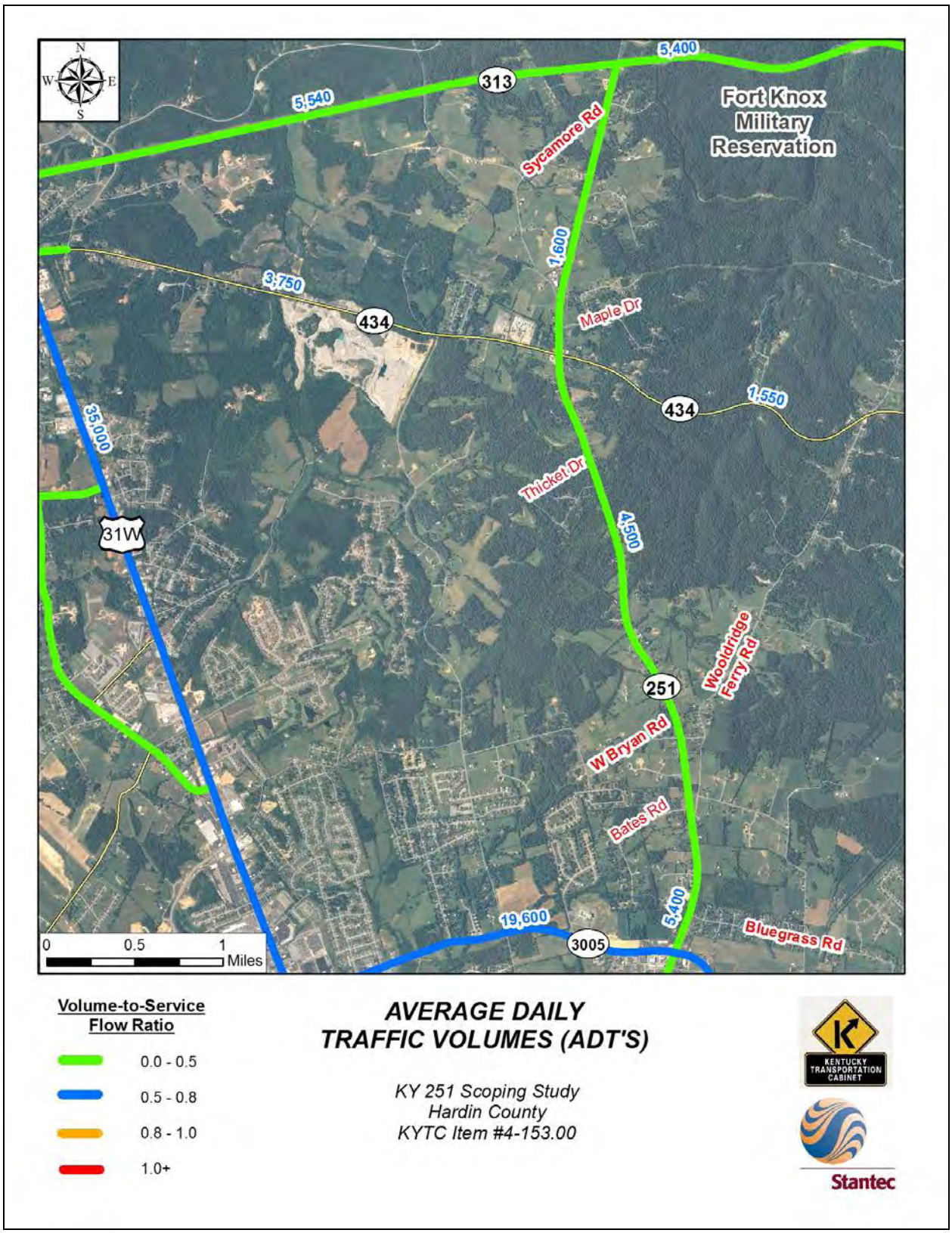


Figure 12: Average Daily Traffic (ADT) Volumes

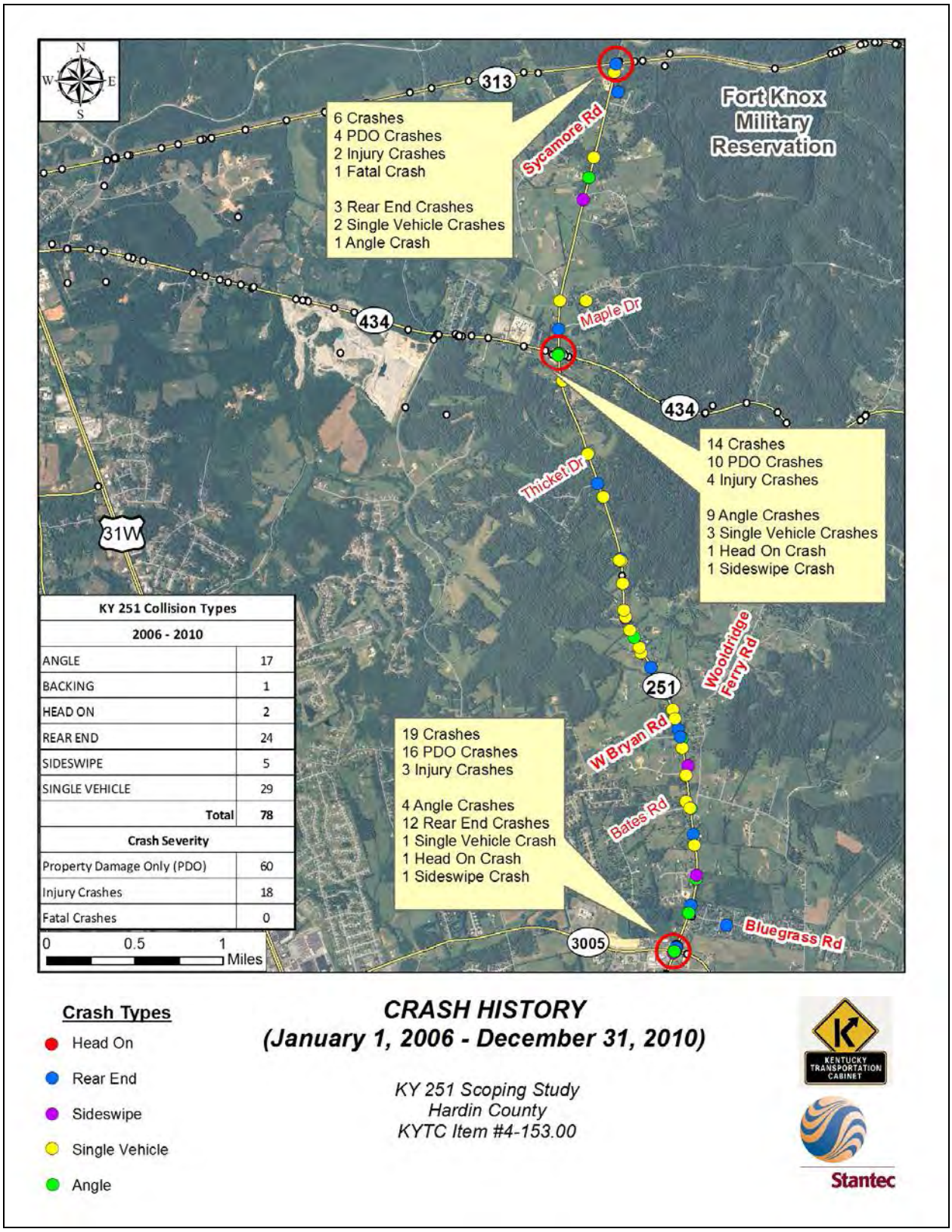


Figure 13: Crash History

Table 1: Segment Crash Analysis Results

Route	Begin Segment	Begin Milepoint	End Segment	End Milepoint	Avg. ADT	Number of Crashes	Actual Crash Rate	Road Type	Average Crash Rate	Calculated Critical Crash Rate	CRF
KY 251	KY 3005	2.722	Wooldridge Ferry Rd.	3.473	5,800	19	398.4	Urban 2-lane	287.0	497.3	0.80
KY 251	Wooldridge Ferry Rd.	3.473	E/W Bryan Rd.	3.967	5,300	6	209.3	Rural 2-lane	209.2	446.7	0.47
KY 251	E/W Bryan Rd.	3.967	KY 434	6.326	4,500	22	189.3	Rural 2-lane	209.2	322.8	0.59
KY 251	KY 434	6.326	KY 313	8.019	3,300	4	65.4	Rural 2-lane	209.2	368.1	0.18
KY 434	US 31W	0.025	Bewley Hollow Rd.	2.455	7,040	29	154.8	Rural 2-lane	209.2	298.0	0.52
KY 434	Bewley Hollow Rd.	2.455	KY 251	3.158	5,310	11	269.1	Rural 2-lane	209.2	405.8	0.66

Table 2: Spot Crash Analysis Results

Route	Intersection	Begin Milepoint	End Milepoint	Avg. ADT	Number of Crashes	Actual Crash Rate	Road Type	Average Crash Rate	Calculated Critical Crash Rate	CRF
KY 251	KY 3005	2.622	2.822	5,800	15	2.4	Urban 2-lane	0.6	1.4	1.65
KY 251	Wooldridge Ferry Rd.	3.373	3.573	5,300	2	0.3	Rural 2-lane	0.4	1.2	0.29
KY 251	E/W Bryan Rd.	3.867	4.067	5,300	4	0.7	Rural 2-lane	0.4	1.2	0.57
KY 251	KY 434	6.226	6.426	3,050	3	0.9	Rural 2-lane	0.4	1.5	0.61
KY 251	KY 313	7.819	8.019	1,600	1	0.6	Rural 2-lane	0.4	2.0	0.29
KY 434	Bewley Hollow Rd.	2.355	2.555	2,065	3	1.3	Rural 2-lane	0.4	1.8	0.76
KY 434	KY 251	3.058	3.258	2,565	8	2.8	Rural 2-lane	0.4	1.6	1.79

There are no roadway segments with a CRF greater than 1.0, suggesting that crashes occur randomly. The KY 251 intersection with KY 3005 and the KY 434 intersection with KY 251 both have CRF's greater than 1.0. The KY 3005 intersection will be improved with the KYTC Item #4-7030.00 project. Improvements to the KY 434 intersection with KY 251 are discussed later in this report.

3.0 ENVIRONMENTAL OVERVIEW

The environmental overview provides a general summary of the social, economic, and environmental composition of the project area. These findings were used to evaluate the impact that improvement options might have on the environmental resources in the study area. The environmental review area is generally 300 feet each side of the existing centerline of KY 251 (600 feet total width), beginning at the intersection of KY 3005 (Ring Road) and extending northward to KY 313 (Joe Prather Highway), for a distance of approximately 5.3 miles. A detailed Environmental Overview Report dated March 2011, which includes resource agency letters and contacts, has been prepared and submitted to the KYTC under separate cover. A copy, which includes a detailed Environmental Footprint map, is included in **Appendix B**. Due to changes to the limits of the original study area for alternative development, the environmental overview is limited to the KY 251 corridor.

3.1 Socioeconomics and Environmental Justice

Information regarding socioeconomic data and the presence or absence of environmental justice populations is included in the Environmental Justice Overview in **Appendix C**. During on-site reconnaissance of the study area, one small mobile home neighborhood (consisting of about five mobile homes) was identified along KY 251 southbound, south of Five Oaks Drive.

3.2 Air Quality

Review of available U.S. Environmental Protection Agency (USEPA) Envirofacts data for Hardin and adjoining counties (USEPA, 2010a) did not indicate any air quality issues for the reporting year through September 2010. Review of available USEPA Green Book data (USEPA, 2010b) indicates adjoining Bullitt and Jefferson Counties (Louisville, KY-IN area) are in "non-attainment" status for particulate matter PM-2.5 1997 pollutant criteria, while Hardin County is not listed for any criteria pollutants. The KYTC Division of Planning's Air Quality Modal Program does not list Hardin County as an Air Quality Non-Attainment Area (8-Hour Ozone or PM2.5) as of July 2007 (KYTC, 2010b).

3.3 Noise

Noise-sensitive receptors observed within or adjacent to the study area included the following:

- Low density residential neighborhood developments (e.g. maximum of five dwelling units per acre) such as Bluegrass Road, Amber Wood and Grand Hill Villas in the south of the study area, a small mobile home park, Five Oaks Drive and The Woods between West Bryan Road and Battle Training Road.
- Camp Nikao, youth and adult camp and retreat facility in the north of the study area.
- Two churches, one in the south and one in the center of the study area.

Aside from the specified residential areas, the majority of the study area exhibited very low density (i.e. two or fewer dwelling units per acre) rural residential and agricultural development patterns with widely separated single family residential structures along KY 251. A project-specific traffic noise impact study may be needed to identify and mitigate noise impacts as this project further develops.

3.4 Aquatic and Terrestrial Ecology

No high quality stream corridors or 100-year floodplains are located in the study area. There are some small ponds in the area which serve mostly local agricultural and recreational purposes. A number of minor streams exist within the project area. Most of the streams are ephemeral with two potentially recognized as USGS features. Initial reconnaissance identified some areas that show characteristics of wetlands. Further evaluation would be required to determine if these areas would be subject to any permitting and mitigation requirements. There are several wells located within the study area. These are primarily domestic, single home use sources. The southern portion of the study area falls within a Source Water Assessment and Protection area for a public water supply. Additional coordination with local watershed management programs and protection measures during construction may need to be taken.

Although there are no known records of any federal-listed endangered species within the project area, there have been instances of some occurring or have the potential to occur within Hardin County. There are a few species of mussel that have the potential to occur in Hardin County, however no suitable habitats were observed in the area. Potential summer habitats for the Indiana bat and the gray bat were observed during

initial inspections. Review of information provided in the Indiana Bat Mitigation Guidance for the Commonwealth of Kentucky indicates portions of Indiana Bat Recovery and Mitigation Focus Areas (RMFA's) are located within a couple of miles of the study area. Due to the approximation of the study area to these RMFA's, additional habitat assessment and coordination with resource agencies may be required as the project progresses. No known caves are located along the KY 251 corridor for this study which would serve as a potential habitat for the bats.

No known records of any state-listed species exist within the project area. There are about 46 species that are known or have the potential to occur in Hardin County. Of these, the rough rattlesnake-root, a state-endangered plant species, has been recorded near, yet outside, of the study area. Due to the occurrence of potential habitats for state-listed species, assessment and coordination with resource agencies may be required as the project progresses.

3.5 Cultural Historic Resources Evaluation

Review of information from the Kentucky Heritage Council indicated no previously recorded historic resources occur in or adjacent to the study area. An initial project review indicated the possibility of structures 50 years of age or older present within the study area, and recommended further study. A KYTC pre-qualified consultant will be required to determine the presence (and National Register of Historic Places (NRHP) eligibility) or absence of cultural historic resources in the study area as there appears to be several residences and associated structures which may be over 50 years of age. One cemetery is indicated on USGS mapping (Colesburg Quad) within the project study area, namely the McMillen Cemetery located southeast of the south intersection of KY 251 and Sycamore Road, approximately 250 feet east of KY 251 centerline. This site is possibly a private family cemetery as it is mapped within the same property parcel as the residential home. The presence of this cemetery will need to be verified and further evaluated for NRHP eligibility.

3.6 Archaeological Resources Evaluation

Review of information from the Kentucky Office of State Archaeology indicates one prior archaeological survey has been performed which partially overlaps a small portion of the project study area at the north project terminus (KOSA, 2011; Attachments A3 and B15). The prior archaeological survey identified one previously recorded archaeological site (National Register eligibility undetermined). Specific information regarding the location, context and content of this site was not provided.

Since most of the project area has not been previously surveyed, a Phase I archaeological site investigation will be required to determine the presence or absence of archaeological resources.

3.7 UST/Hazmat Considerations

An initial review of the area identified potential UST/Hazmat considerations. One site with confirmed UST and AST present is a gas station located at the southwest corner of KY 251 and KY 434 intersection. A vacant site located on KY 251 and East Bryan Road exhibits characteristics of a former service/gas station. Further survey work would be required to determine the presence of any UST or other environmental concerns. A few other businesses in the area may contain materials that would warrant consideration of a Phase I survey for hazardous materials.

4.0 GEOTECHNICAL OVERVIEW

Bedrock in the study area is underlain by plane bedded sedimentary rocks of the Mississippian and Devonian Periods, overlain by shale and limestone of the Borden Formation, and capped by additional layers of Salem, St. Louis and St. Genevieve Limestones (Arms, et. al., 1979; Kepferle, 1966 and 1967).

The majority of Hardin County, including all of the study area, is considered to be in an intense karst and very high karst potential area (KGS, 2001b and 2010a). Intense and very high karst indicates an area "underlain by bedrock with high potential for karst development…thick-bedded, typically fine-grained and pure limestone units with little or no insoluble content. May [Will] exhibit mature karst, including caves, sinkholes and springs where they crop out" (KGS, 2010b). Several sinkholes are mapped within the study area (KGS, 2003), and were observed during on-site reconnaissance activities. The Kentucky Speleological Society reported there are no known caves listed along or near the project study area (KSS, 2011).

The presence of mines or quarries in the study area was investigated through review of information from the Kentucky Department for Natural Resources (Division of Mine Permits, Division of Mine Reclamation and Enforcement, and Division of Abandoned Mine Lands; KDNR, 2010), Kentucky Mine Mapping Information (2010), and on-site reconnaissance. Review of secondary source information indicated several active mines and/or quarries occur in Hardin County. The Fort Knox Quarry, a limestone quarry operated by Vulcan Construction Materials, is the nearest operating mine or quarry and is located along KY 434 approximately 0.75 mile west of the KY 251 and KY 434 intersection. There are no mined out areas mapped within the county, and the county is not covered by any of the Division of Abandoned Mine Lands' three field offices.

5.0 TRAFFIC FORECASTS

In order to determine the need for and purpose of potential transportation improvement projects, it is necessary to estimate future conditions within the study area. A starting point in this effort was to first consider historical travel trends along KY 251. **Figure 14** shows KYTC's average daily traffic counts along KY 251 between 1994 and 2011. The southernmost section, north of KY 3005, has historically carried the highest volume of traffic which exceeded 6,000 vehicles per day in 2007. The volume on that section has since decreased to about 5,400 vehicles per day. The section north of KY 434 carries the lowest volume of traffic and has not exceeded 2,000 vehicles per day.

The KYTC provided a copy of the Elizabethtown-Radcliff Travel Demand Model to incorporate the proposed alternatives into future year forecasts. The model would demonstrate how the individual alternatives would affect the distribution and volume of traffic on KY 251 and surrounding highways.

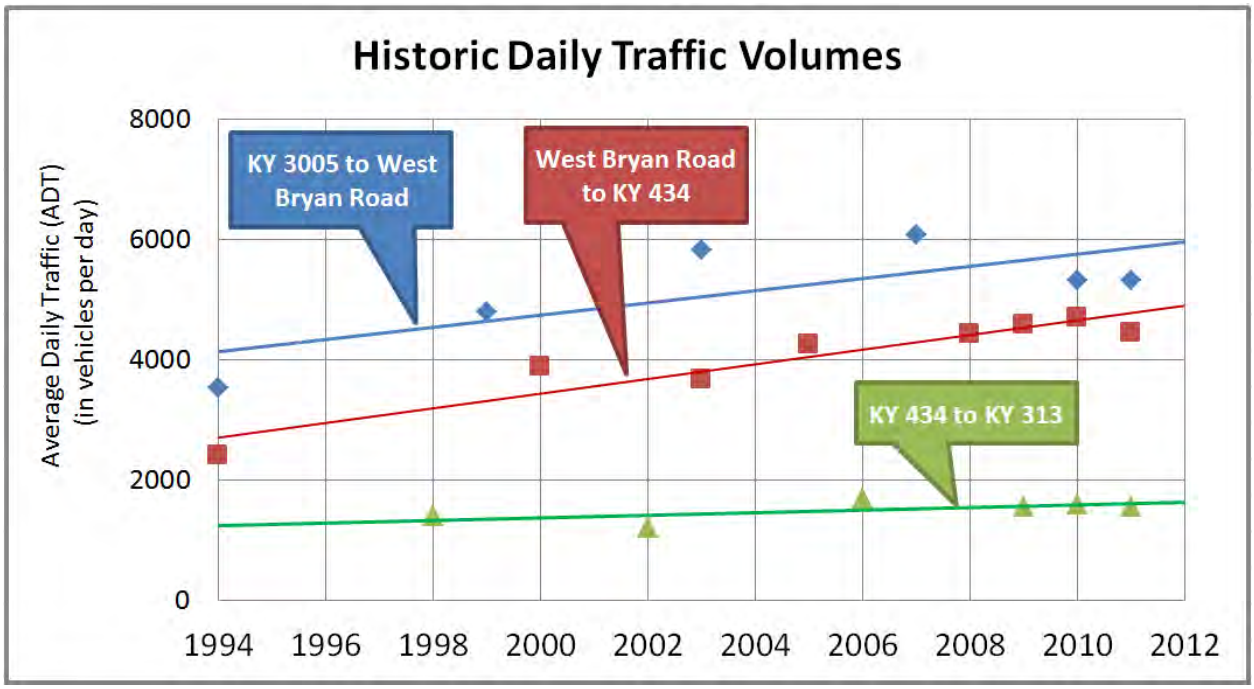


Figure 14: Historic Traffic Counts along KY 251

The Elizabethtown model had been developed for the Cabinet in 2009 with a 2008 base year and 2035 horizon year. Minor code and operational adjustments were made to make the model compatible with the current version of Caliper's TransCAD operating software. Model network and zonal data files were then revised to reconcile base year network and zonal files with future year files. New Traffic Analysis Zones (TAZs) were created in the base year to reflect future committed projects that would distinctly affect traffic distribution. These projects, shown in **Figure 15** (Hardin County), **Figure 16** (Elizabethtown), and **Figure 17** (Meade County), included the KY 313 extension from Vine Grove to US 60 in Meade County (KYTC Item No. 4-297) and the Elizabethtown to Radcliff connector (KYTC Item No. 4-8103) which roughly parallels US 31W to the west. The adjustments resulted in the addition of nine TAZs, although no new TAZs were added directly to the study area.

The new connector from Veteran's Parkway to KY 313 (KYTC Item No. 4-8103.50) and proposed Fort Knox Access Road running parallel east of US 31W were also included in the future network. The new connector is included in all future year scenarios. The Fort Knox Access Road is not a committed project, but is a conceptual proposal intended to redirect post-related traffic arriving from KY 313 on the east away from US 31W. It was included in some alternative model runs, but is not presumed to be part of the analytical purview of this study.

The base year model was updated and re-validated to 2010 using new traffic counts collected by KYTC as well as the most recently available counts at Fort Knox's three active entry gates. While the model generally conforms to KYTC's standard protocols for file structure and user interface, it is unique in its use of special generators to balance and match traffic at the entry gates. Given the general capacity and fluidity of on-post traffic generating activities, this approach allows the model to set traffic volumes entering and exiting the post to counts either observed or estimated at each gate. Observational travel speeds and travel times along KY 251 and KY 434 were provided by KYTC staff and included in the validation process.

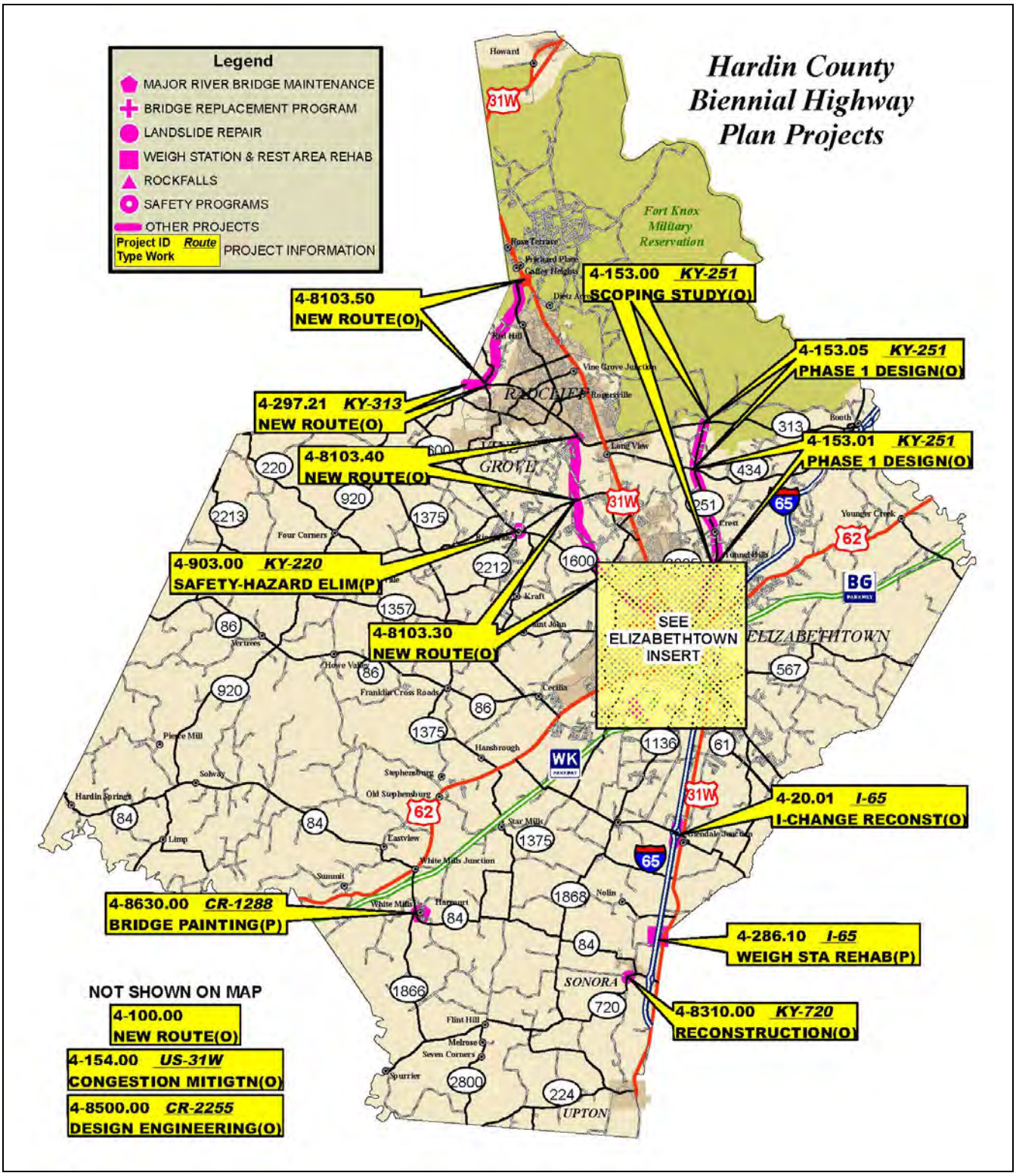


Figure 15: Committed Projects in Hardin County

Source: Kentucky's FY 2010-FY 2012 Enacted Biennial Highway Plan

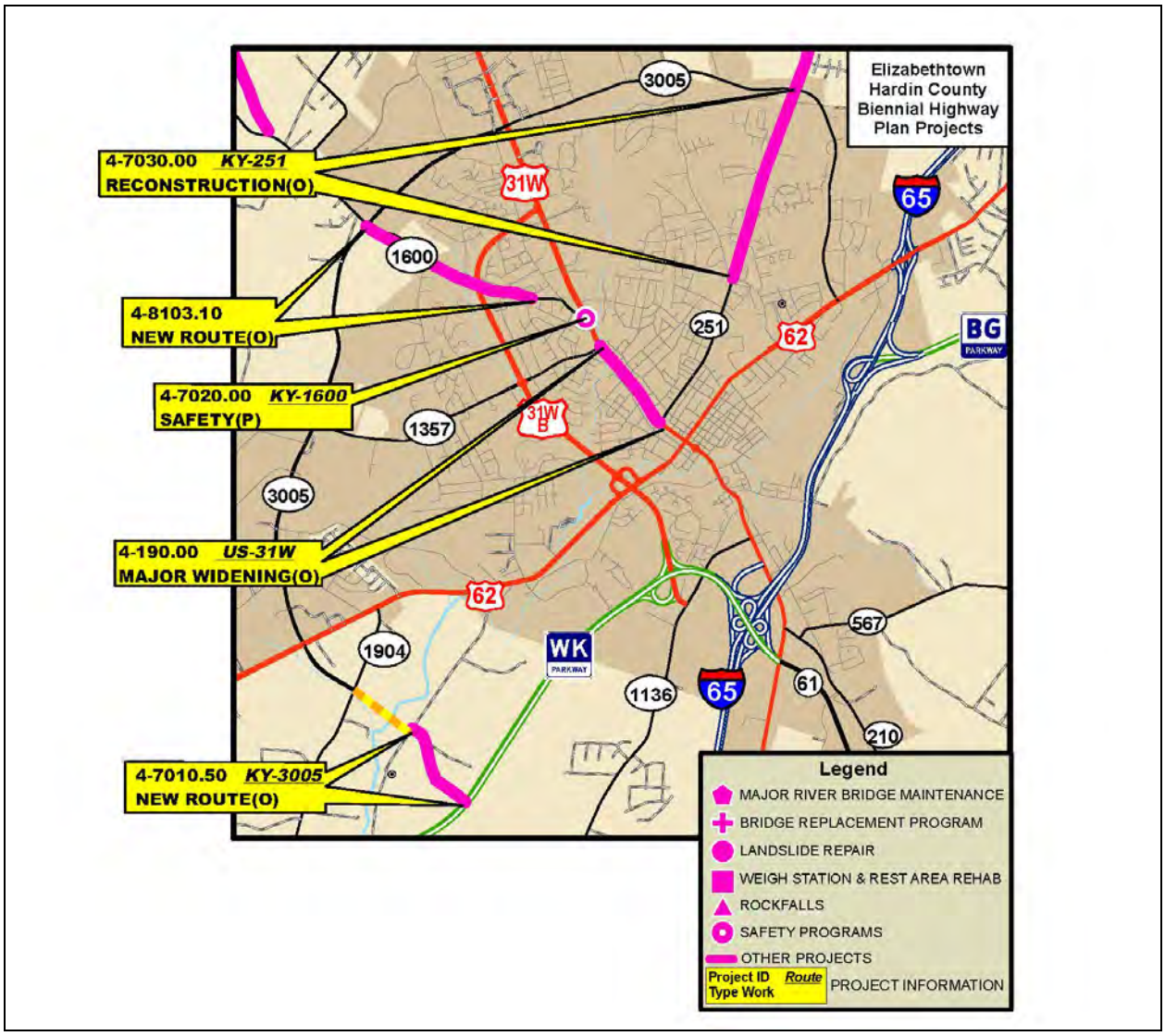


Figure 16: Committed Projects in Elizabethtown

Source: Kentucky's FY 2010-FY 2012 Enacted Biennial Highway Plan

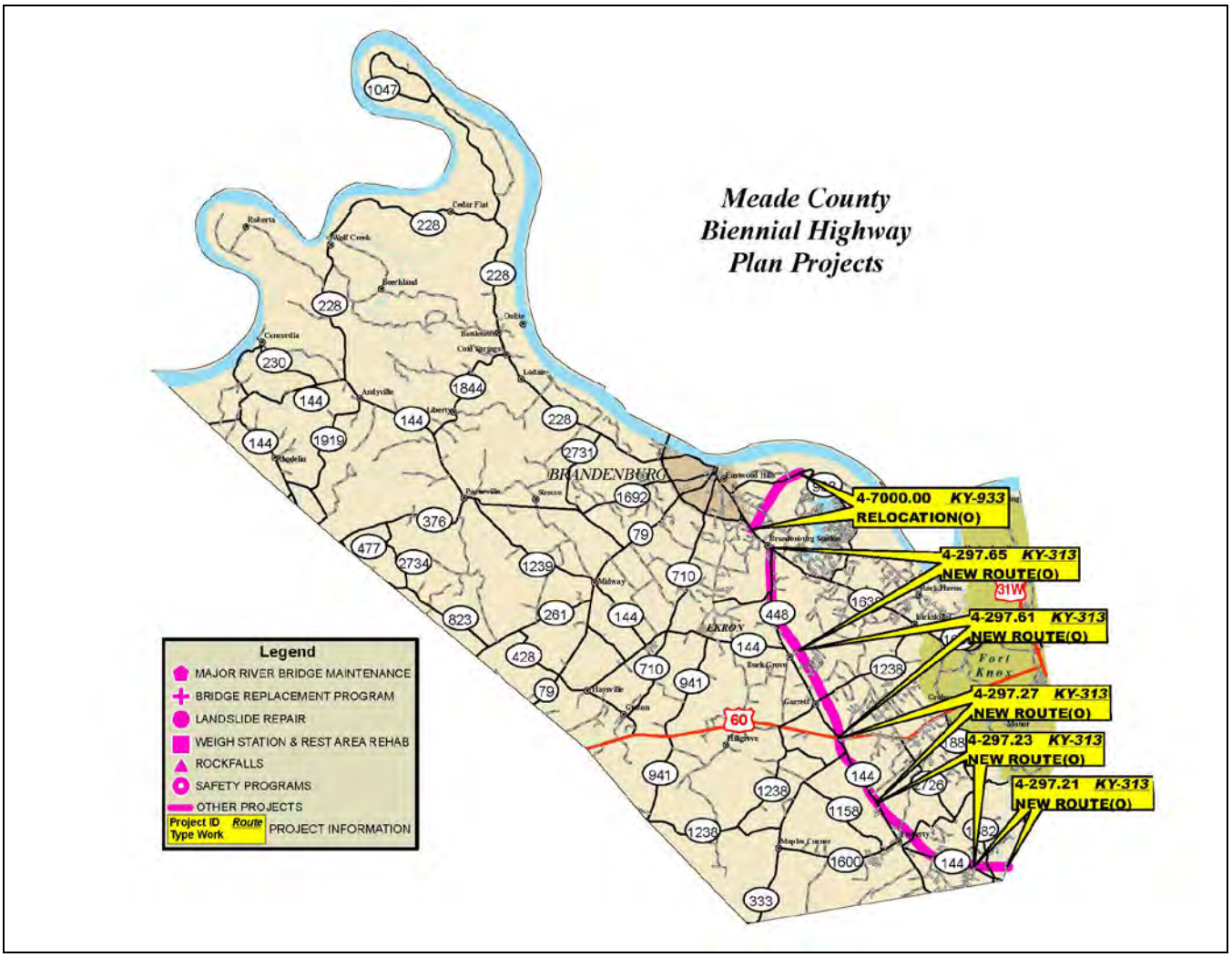


Figure 17: Committed Projects in Meade County

Source: Kentucky's FY 2010-FY 2012 Enacted Biennial Highway Plan

Final validation statistics for the 2010 base year model include the percent Root Mean Square Error (%RMSE) and assigned-to-observed ratio of Vehicle Miles Traveled (VMT). The %RMSE is the standard statistic used to indicate how well a model assigns traffic to the network as compared to observed counts. The %RMSE for the 2010 base model is 33.1%, which falls below the acceptable 35% threshold for models incorporating a higher percentage of low-volume roads as typically found in rural and small urban areas. The overall ratio of assigned-to-observed VMT was 1.0002, indicating a very good overall fit, although the model's VMT ratio for collector roads was high at 1.20.

There were only eleven count stations within the study area, but for those counts, the %RMSE was 23.7% and the VMT ratio was 1.09. **Figure 18** shows the location of these count stations.

The resulting traffic forecasts for the No-Build Scenario as well as the base year 2010 ADT volumes are included on **Figure 19**. Compared to the 2010 traffic counts, future volumes are expected to increase along KY 251. The highest volume is south of Bluegrass Road where the forecast is 15,000 vehicles per day and annual growth is about 4.6 percent per year. The remainder of KY 251 is not expected to exceed 9,000 vehicles per day with growth rates ranging from 2.3 to 3.5 percent per year through 2030.

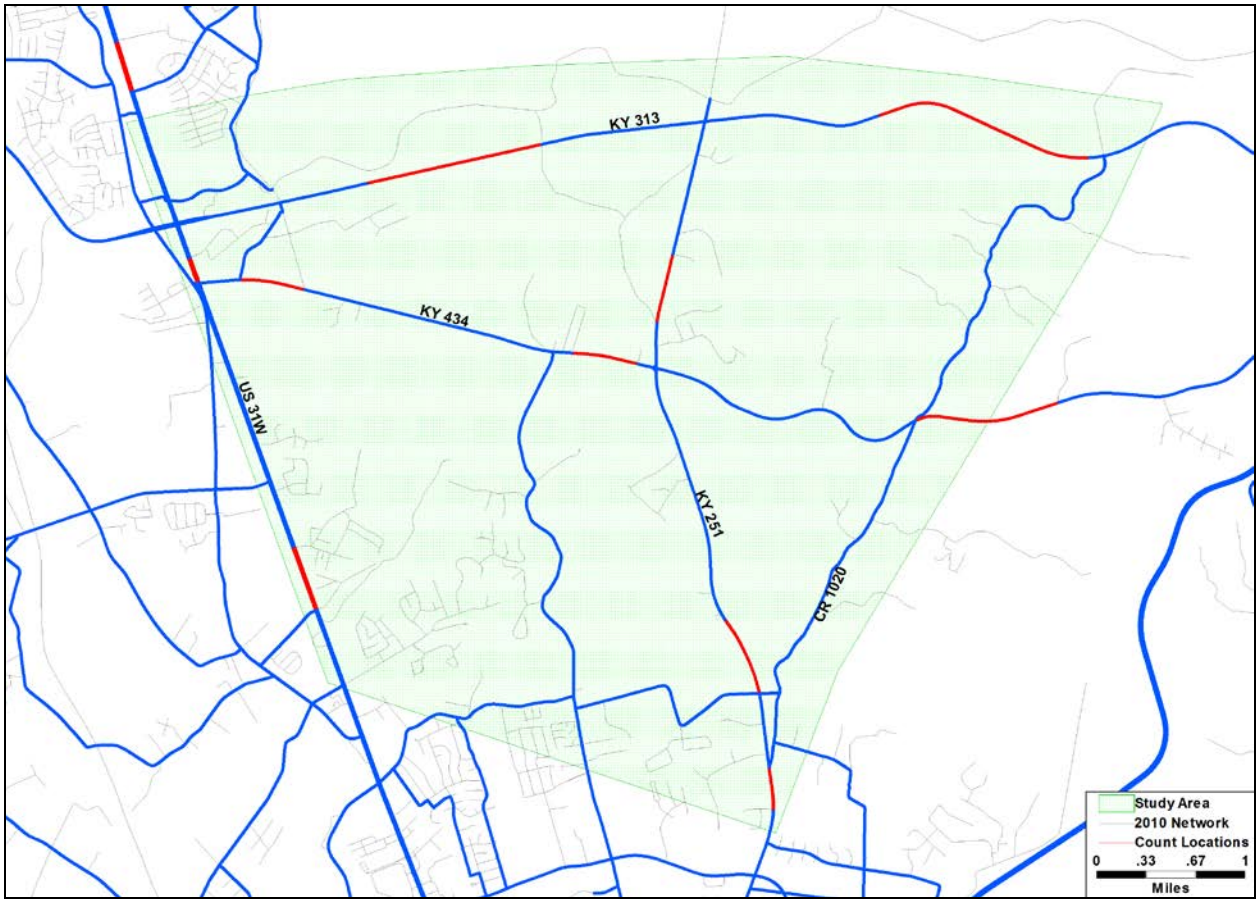


Figure 18: KYTC Count Stations in Proximity to the Study Area
Source: Radcliff-Elizabethtown Regional Travel Demand Model
(Segments with count stations shown in red)

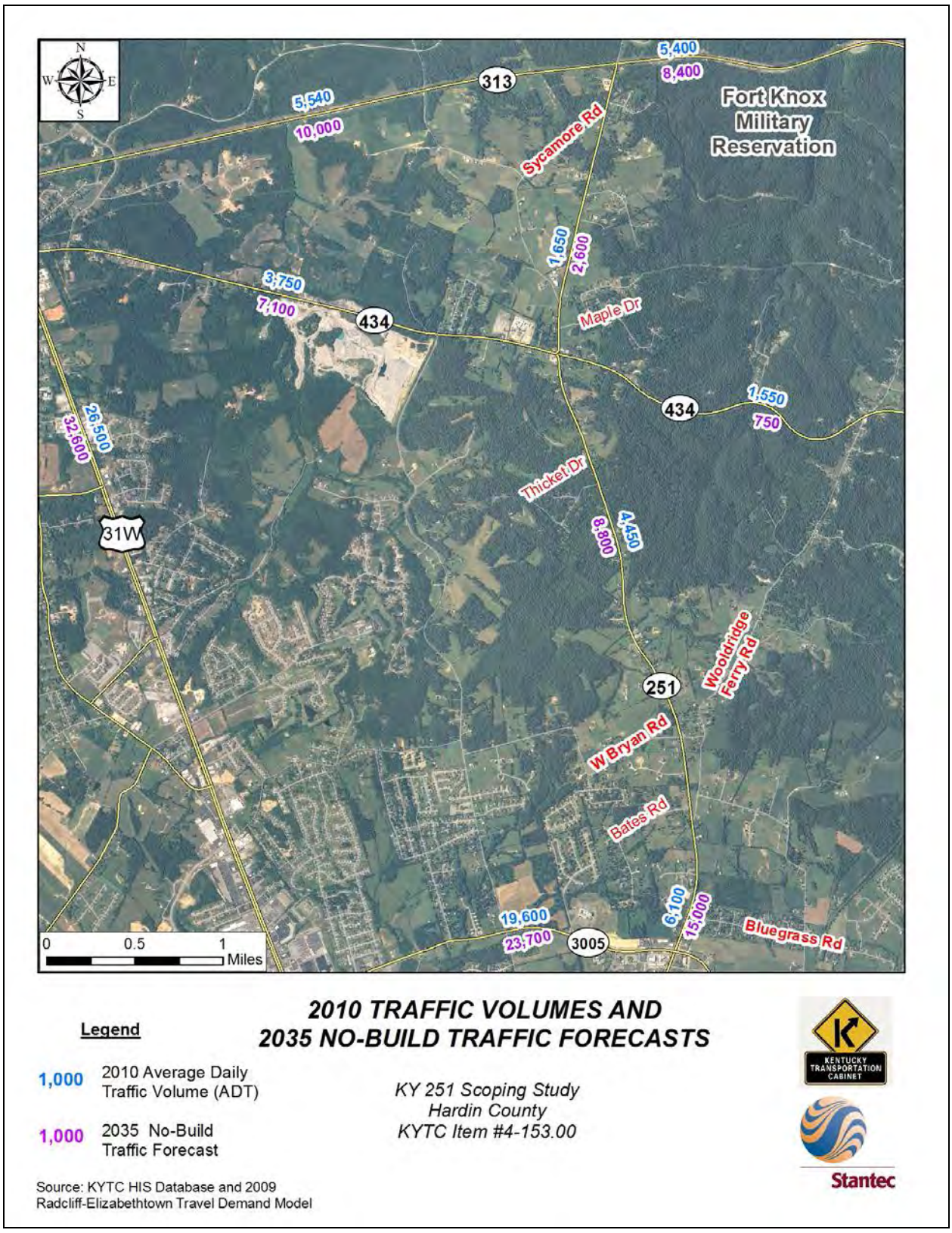


Figure 19: 2010 Traffic Counts and 2035 No-Build Traffic Forecasts

6.0 DEVELOPMENT OF ALTERNATIVES

A number of transportation alternatives were developed and evaluated in the KY 251 Scoping Study. This includes both short-term projects that could potentially be implemented in the near term with minimal cost and long-range corridor alternatives that would require more significant resources. This chapter discusses these conceptual improvement alternatives.

6.1 Spot Improvements

Two short-term improvements (also referred to as "spot improvements") were developed based on investigation of crash data and site reconnaissance. Descriptions of each of these two projects follow.

Wooldridge Ferry Road intersects KY 251 at a skew, resulting in a very wide approach, as shown in **Figure 20**. It also has less than desirable sight distance to the south, demonstrated in **Figure 21**. Although only two crashes have occurred at the Wooldridge Ferry intersection over the past five years, a realignment of Wooldridge Ferry to connect directly across from Bates Road would eliminate the skewed intersection and sight distance issue.

Figure 20: KY 251 at Wooldridge Ferry (looking north)

Figure 21: Looking South along KY 251 from Wooldridge Ferry

The second intersection discussed was KY 434 at KY 251, shown in **Figure 22**. There were 14 crashes reported at this two-way stop-controlled intersection over the past five years. The predominant turning movements at the intersection are from northbound KY 251 to westbound KY 434, and from eastbound KY 434 to southbound KY 251. The KY 251 approaches are stop-controlled, and travel speeds on KY 434 tend to be relatively high as the speed limit is 55 mph. Thus, there is the potential for serious crashes to occur. A high crash rate spot exists on KY 434 through the intersection. The study team discussed options to better facilitate traffic flow between the west and south approaches. A preliminary layout showing a single lane roundabout was presented as an alternative to accommodate turning traffic and to slow traffic through the intersection. The team agreed this option should be pursued further.

Figure 22: KY 251 at KY 434 (looking south)

6.2 Long-Term Improvements

The conceptual long-range corridor alternatives for the KY 251 Scoping Study were developed based on a comprehensive investigation of existing conditions. These alternatives, shown on **Figure 23**, involve both improvements to existing sections of KY 251 as well as new routes. The new routes are all west of existing KY 251 in an effort to provide a more efficient and more direct connection to the potential new connector road into Fort Knox east of South Boundary Road. The following concepts were presented and discussed at a public meeting in November 2011.

Do Nothing/ No-Build Alternative

A Do Nothing/ No-Build alternative was briefly discussed in the preliminary stages of the study. This alternative would not satisfy the Purpose and Need for the study.

Alternative #1A

Alternative #1A involves the improvement of KY 251 from KY 3005 to KY 313 utilizing a 55-mph design speed and an improved rural two-lane cross section, including 11-foot driving lanes and eight-foot shoulders with four feet being paved. This typical roadway section, shown in **Figure 24**, is being referred to as a minor widening. The existing roadway will be widened and improved along its current horizontal alignment. Utilizing a 55-mph design speed will require improvements in the vertical curves which will result in areas with large earthwork quantities and land disturbance. A number of relocations are anticipated in order to construct the roadway to meet current design standards. The constructed roadway should increase safety and maintain an acceptable level of service.

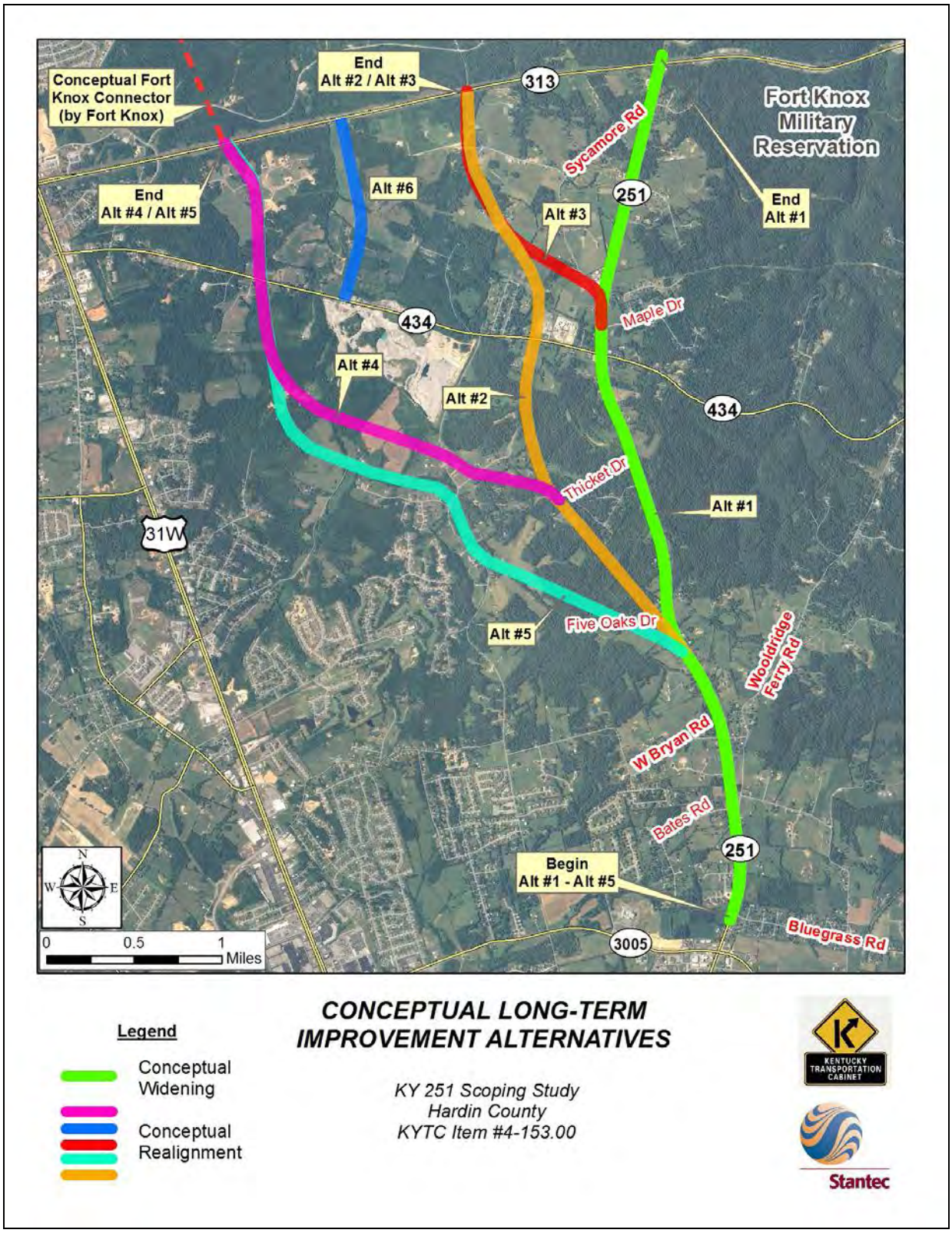


Figure 23: Conceptual Long-Term Improvement Alternatives

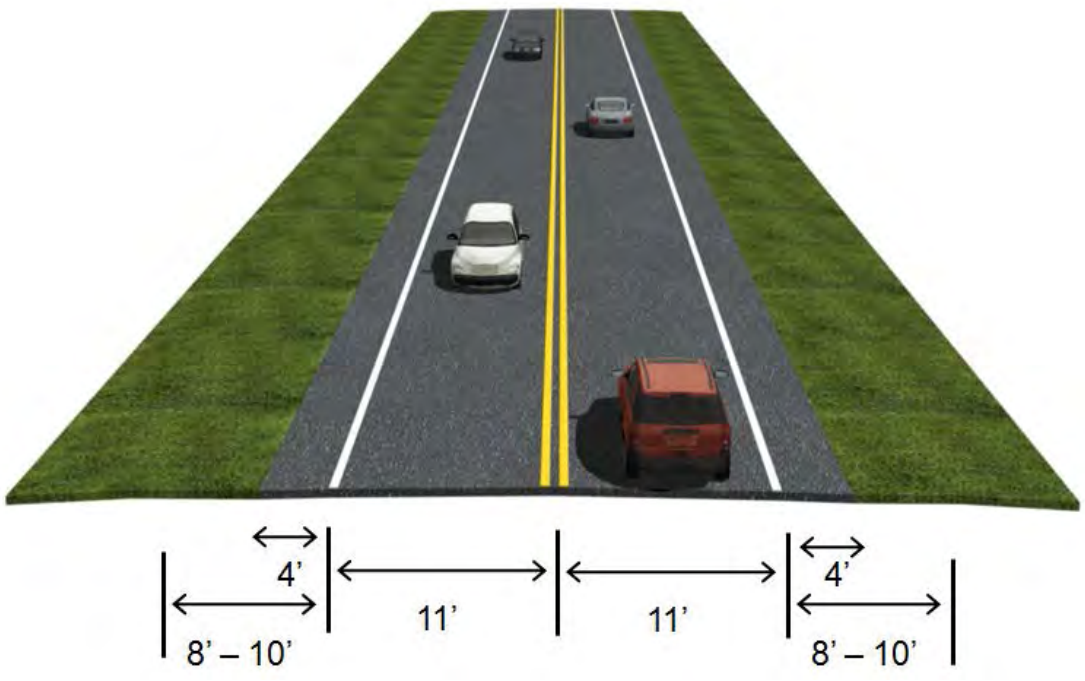


Figure 24: Assumed Typical Section for Minor Widening

Alternative #1B

Alternative #1B involves the reconstruction of KY 251 from KY 3005 to KY 313 utilizing a typical section with a four-lane roadway with paved shoulders, being referred to as a major widening and shown in **Figure 25**. The roadway would be reconstructed following the existing horizontal alignment while improving the vertical alignment to meet current design standards for a 55-mph roadway. The existing narrow lanes and minimal shoulders would be replaced with 11-foot travel lanes with eight-foot shoulders (four feet paved). This alternative would require a great deal of right of way to be purchased to accommodate the increase in roadway width. In addition, making the required vertical improvements would also result in large earthwork quantities and increased need for right of way. This will also result in increased impact to residences and business, leading to a larger number of relocations. Although the improved roadway would provide a safer and more functional route, with the increased capacity of a four-lane roadway with the projected traffic volumes, this alternative would function below the ideal volume to capacity ratio and would function far below efficiency.

Alternative #1C

Alternative #1C involves widening the existing KY 251 roadway to two 11-foot driving lanes while providing a smaller four-foot wide shoulder and narrower ditches. Spot improvements to the vertical curves would be made at identified locations to meet 45-mph design speed standards. This alternative reduces the impact of the roadway construction while making improvements to help alleviate some of the deficiencies of the current roadway. The purpose of this alternative is to provide a low cost alternative that, while not meeting 55-mph design standards as the other alternatives, still will improve the safety and functionality of the roadway without adversely impacting properties along the current route.

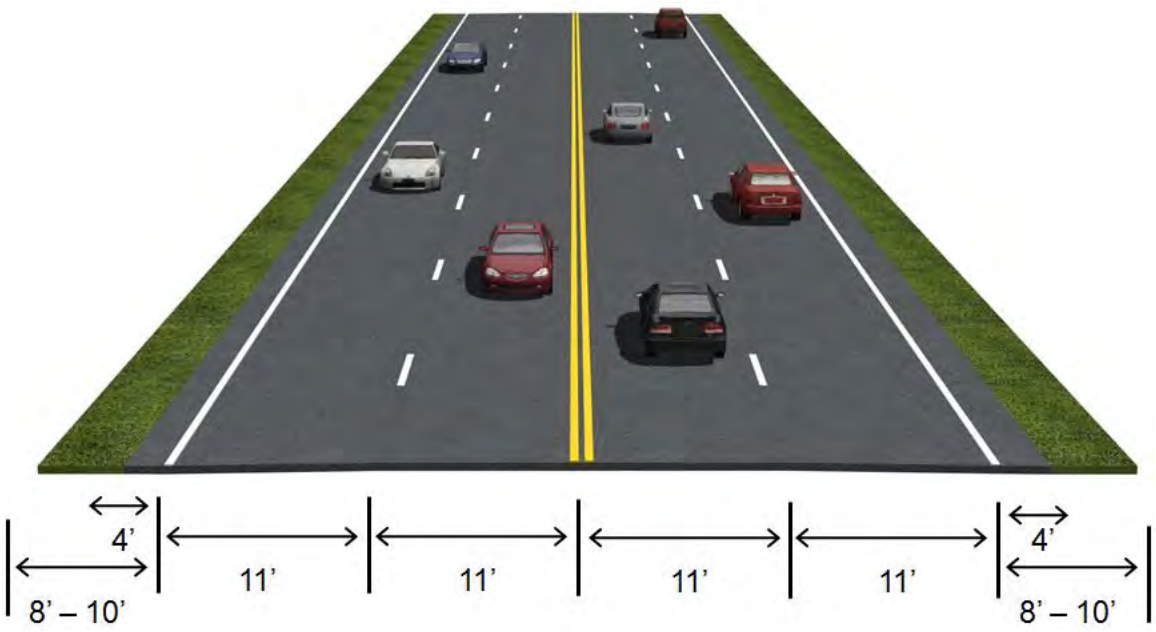


Figure 25: Assumed Typical Section for Major Widening

Alternative #2

Alternative #2 utilizes the minor widening roadway section and meets 55-mph design standards. This alternative starts along the existing KY 251 alignment until reaching a point near its intersection with Five Oaks Drive. In this area, the roadway will turn and follow a new horizontal alignment to the west of existing KY 251 and proceed northward to KY 313 near its current intersection with Master Lane. This alternative provides the ability to design the roadway for a 55-mph design speed while reducing the impact to property owners along the existing KY 251 roadway. Construction time would be reduced as the realignment portion would not require maintaining traffic. A new western route would remove a large amount of traffic from a portion of the existing KY 251 roadway in this area resulting in an increase of safety for local traffic along KY 251. The new portion would be safer since it would meet higher design standards and have a reduction in access points along the roadway.

Alternative #3

Alternative #3 also utilizes the minor widening roadway section and a new roadway portion to intersect KY 313 near Master Lane. This alternative differs in that the majority of the length of this option involves following the existing KY 251. The alternative would follow KY 251 past the intersection with KY 434 and then follow a new alignment from a point south of Sycamore Road. This alternative would reduce right of way impacts, although it would only slightly reduce the number of relocations potentially required along existing KY 251. Traffic impacts would remain high, and construction time would not be reduced as much as Alternative #2 due to the required level of maintenance of traffic involved while widening along the existing roadway. The end result would still be an improved and safer route.

Alternative #4

Alternative #4 utilizes the minor widening roadway section along KY 251 until close to Five Oaks Drive where a new horizontal alignment is followed similar to that of Alternative #2. However, Alternative #4 will continue on a more westward route initially before turning northward again. Alternative #4 will intersect KY 313 over two miles west of the current intersection of KY 251 and KY 313. Traffic modeling has indicated higher traffic demand for a more western route, and this alternative would connect directly to a candidate location for a new connector road onto post. This route would provide an alternative to using US 31W to reach the access

control checkpoint if Fort Knox constructs the new roadway. This alternative would have a large right of way acquisition and would have increased costs from the construction of additional length of new roadway. Impact to traffic during construction would be limited to the widening portion along existing KY 251 and at new intersections created along the route.

Alternative #5
Alternative #5 takes a similar concept approach as Alternative #4 in providing a new, more westward route for KY 251. The roadway template would utilize the two 11-foot driving lanes with eight-foot shoulder on the minor widening sections. This alternate would begin slightly south of the Alternative #4 and proceed on a route that aims to minimize commercial and residential relocations. While this would potentially reduce the right of way costs, this route is anticipated to have an increased environmental impact. This route would result in increased impact to existing drainage crossings and streams.

Alternative #6
Alternative #6 utilizes the roadway template with the two 11-foot driving lanes and eight-foot (four feet paved) shoulders on the minor widening section as described previously. Alternative #6 would provide a north-south connection between KY 434 and KY 313 near the west edge of a quarry site located on KY 434. This alternative does little to address the current deficiencies and conditions located along the KY 251 corridor. The alternative would provide an option to the forecasted western traffic demand. It can be considered a supplement to the other alternatives considered for the KY 251 corridor or an independent option.

6.3 Evaluation of Long-Term Alternatives

A comprehensive approach was utilized to provide some insight as to which alternatives perform better than others. This evaluation process was not intended to necessarily determine which corridors should be pursued for further study, but rather provide a relative comparison between all alternatives in terms of traffic relief, adverse impacts, and public sentiment. Each alternative was evaluated based on nine criteria. These criteria and how they were applied are as follows:

1. **Satisfies Purpose and Need Statement** – Based on the Purpose and Need Statement, this criterion considers how much traffic relief would be likely for existing routes or how much traffic can be diverted from existing routes and how much traffic might be carried by the proposed alternative.
2. **Traffic volume on new corridor** – Based on the highest traffic volume carried by the segment of a proposed alternative corridor just south of KY 434.
3. **Traffic diversion from US 31W** – Based on the estimated amount of traffic that could be diverted from US 31W just south of KY 434. Traffic volumes were compared to the No-Build Alternative.
4. **Environmental impacts** – Includes a number of potential impacts to the natural environment (i.e. impacts to streams, encroachment on wetlands, etc.) and the manmade environment (i.e. proximity to historic sites, parks, etc.)
5. **Community impacts** – Considers the adverse effects that a new route may introduce, such as dividing an existing community, impacting community resources (i.e. churches, schools, etc.) or requiring a significant number of residential relocations within a densely populated area. Also considers the potential benefits that could be realized by a community, such as increased mobility from additional travel alternatives.
6. **Business relocations** – Based on estimates of the total number of businesses that would be taken by each alternative.
7. **Residential relocations** - Based on estimates of the total number of residences that would be taken by each alternative.
8. **Public input** – Based on the results of the questionnaire from the public meeting, where attendees were asked if they were in favor of or opposed each alternative.
9. **Cost** – Based on the total estimated cost, including design, right-of-way, utilities, and construction.

Actual values that could be quantified or estimated for each alternative, such as construction cost or relocations, were used where possible. Where actual measures were not possible to estimate, the potential level of impacts were rated as high (significant adverse impacts), medium (some impacts), or low (little or no impact). With respect to public input, the percentage of favorable responses from the public meeting were used. A summary of the values used in this process are presented in **Table 3**.

Table 3: Summary of Long-Term Improvement Alternatives

CRITERIA	Satisfies Purpose and Need	Traffic Volume on New Corridor	Traffic Diversion from US 31W	Environmental Impacts	Community Impacts	Business Relocations	Residential Relocations	Public Input	Cost
SCALE	H, M, L	Vehicles per Day (VPD)	Vehicles per Day (VPD)	H, M, L	H, M, L	Approx. number of businesses	Approx. number of homes	Based on favorable input from Public Mtg.	Total cost (construction, right-of-way, utilities)
No Build	L	7,400	0	L	L	0	0	0	$0
Alternative 1a	M	7,400	0	L	M	0	10	41.7%	$16,900,000
Alternative 1b	H	8,400	1,100	L	H	2	28	54.2%	$31,800,000
Alternative 1c	M	7,400	0	L	M	0	5	33.3%	$11,000,000
Alternative 2	M	9,000	700	H	M	0	5	4.2%	$16,900,000
Alternative 3	H	8,400	1,100	M	M	0	8	20.8%	$17,500,000
Alternative 4	H	11,200	1,800	H	M	0	3	20.8%	$19,800,000
Alternative 5	H	11,200	1,800	H	M	0	0	29.2%	$21,400,000
Alternative 6	M	2,500	0	L	L	0	0	8.3%	$3,000,000

Alternatives that provide a more direct connection to Fort Knox received a high rating under “Satisfies the Purpose and Need”. Traffic forecasts from the travel demand model suggest the westernmost alternatives that connect directly to the potential new Fort Knox connector road would carry the highest volume of traffic (up to 11,200 vehicles per day in 2035), but two lanes would still accommodate the future demand. There is little diversion of traffic away from US 31W because other committed projects- namely the Elizabethtown to Radcliff connector and the Veterans Memorial Parkway connector- are anticipated to divert a significant volume of traffic already. In general, the alternatives that require significant new construction result in more adverse effects in terms of environmental and community impacts and were rated high or medium in those categories.

One issue not included in this analysis is related to future maintenance. Construction of new transportation corridors results in more miles of roadway for the KYTC to maintain. Should a new alignment be pursued, the KYTC would either maintain the additional mileage (in addition to the existing KY 251) or try to work with Hardin County to take over the future maintenance of the existing route.

Cost estimates were developed based on 2011 average KYTC unit bid costs and estimated right-of way costs at $25,000 per acre and $150,000 per relocation.

7.0 FINAL RECOMMENDATION

The study alternatives were discussed at a final Project Team meeting held in December 2011. At the meeting, the alternatives were discussed, comments from the Public Meeting were summarized, and a recommended alternative was selected by the study team.

A hybrid alternative, shown on **Figure 25**, was chosen by the Project Team for final recommendation. A desire to limit right of way impacts, minimize costs, and provide a more western route to connect to a potential connector road into Fort Knox has led to the decision to apply a mix of components from the presented alternatives. KY 251 is proposed to be widened from KY 3005 to KY 434 using the minor widening template as proposed in Alternative #1C. The shoulders along KY 434 would be improved for the anticipated increase in traffic from the existing intersection between KY 251 and KY 434 to the west approximately 2 miles to an intersection with a new connector road. This new road would connect KY 434 to KY 313 similar to Alternative #6 but located further west to where Alternatives #4 and 5 are located to meet with the possible connector road into Fort Knox. As this recommendation is based on the assumption the conceptual connector road into Fort Knox will be pursued in the future, other alternatives may be considered by the KYTC if the connector road concept does not move forward.

This alternative will help eliminate some of the contributing factors of crashes along KY 251 by improving sight distance and providing more usable shoulder, thereby enhancing the overall safety of the roadway. It may be determined during the design process that some other intersection improvements and turn lanes may be added to further improve the quality and efficiency of the roadway for the projected increase of traffic if a new Fort Knox connector road is constructed. **Table 4** includes a cost estimate for the recommended alternative, by project phase. This cost does not include the cost to construct the new connector road north of KY 434.

Table 4: Cost Estimate for Recommended Alternative

PHASE	KY 251 / KY 434 IMPROVEMENTS COST	INTERSECTION "SPOT" IMPROVEMENTS COST
DESIGN	$855,000	$100,000
RIGHT-OF-WAY	$1,145,000	$200,000
UTILITIES	$1,195,000	$200,000
CONSTRUCTION	$7,755,000	$1,000,000
SUBTOTAL	**$10,950,000**	**$1,500,000**
TOTAL	**$12,450,000**	

Maintenance of traffic will provide some difficulties along existing KY 251. For the vertical grade improvement locations, the full extent of the impact on the grade changes required to meet the current standards for a 45-mph design speed cannot be fully determined under the current scope and resources of this study. The ability to provide a diversion compared to requiring a road closure would need to be determined during the design phase. Due to its current lane widths and lack of existing shoulders through most of the study area, it may prove difficult to maintain adequate travel lanes along KY 251 during construction. There could be a need for restrictions on size and types of vehicles that would be allowed during construction requiring a detour route for the trucks that currently use KY 251. It is anticipated to be easier to maintain traffic along KY 434 for its improvements as no new vertical alignment changes would be made and other existing conditions appear to be more favorable. However, with the late inclusion of this option in the study, there could be some obstacles that may arise from the lack of current, more in depth information on the KY 434 corridor.

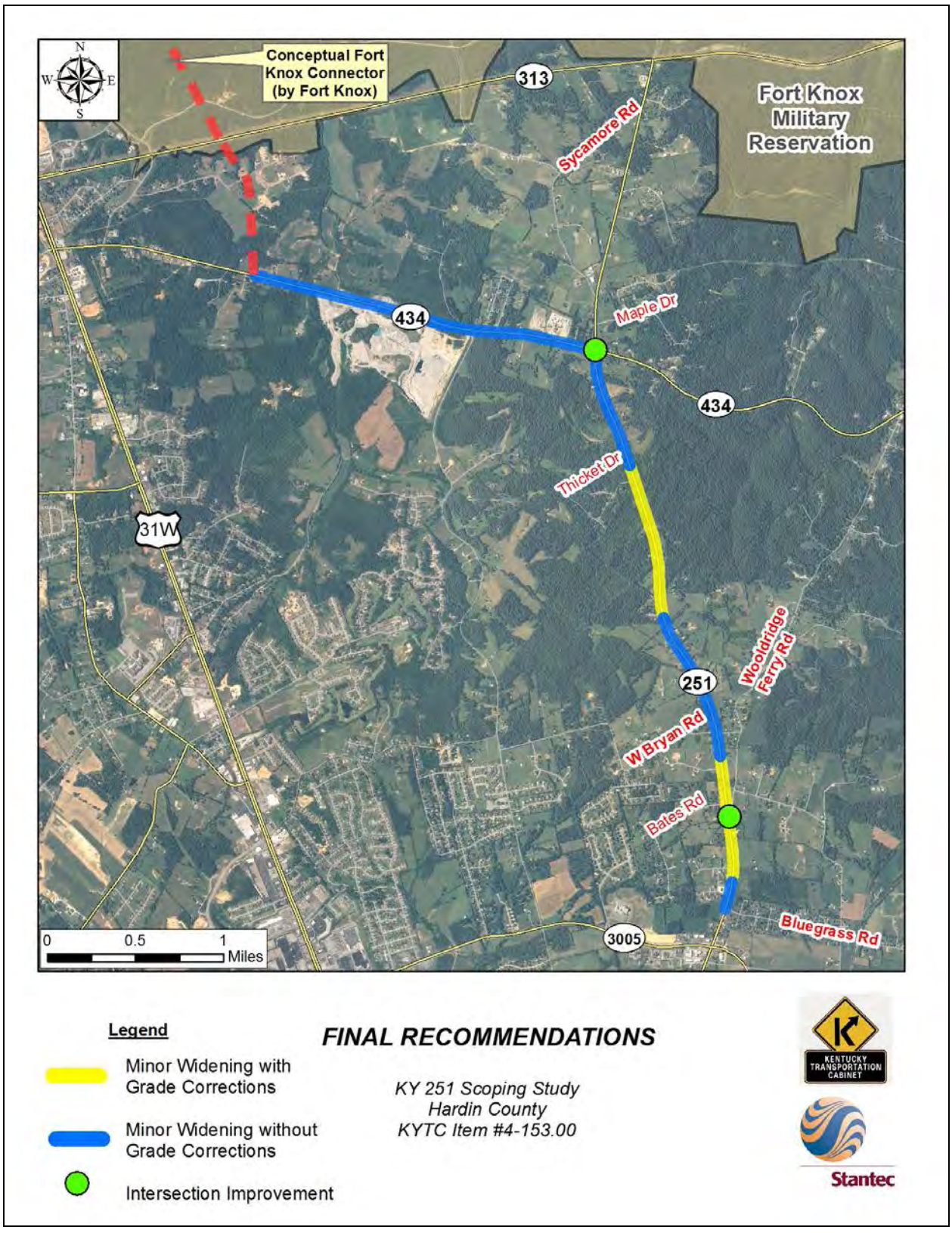


Figure 26: Study Recommendations

Appendix A – Meeting Summaries

MEETING SUMMARY

KY 251 Scoping Study – Kickoff Meeting

KYTC Item No. 4-153.00

February 18, 2011

A meeting was held with District 4 staff on Friday, February 18 to discuss the KY 251 Scoping Study. The meeting was held at 9:30 AM at the District 4 Conference Room in Elizabethtown. In attendance at the meeting were:

- Charles Allen – KYTC District 4 Planning
- Jill Asher – KYTC Planning
- Harry Berry – Hardin County Judge Executive
- Brandon Booth – LTADD
- Jared Clemons - KYTC District 4
- Patty Dunaway – KYTC District 4
- John Edwards - KYTC District 4 Environmental
- Joseph Ferguson – KYTC District 4 Environmental
- Chris Jessie – KYTC District 4
- John Moore - KYTC District 4 Project Development
- Paul Sanders – KYTC District 4
- Mike Skaggs - LTADD
- Scott Thomson – KYTC Planning
- Kevin Young – KYTC District 4 Planning

- Brian Aldridge – ENTRAN
- Mark Butler – ENTRAN
- Tom Creasey - ENTRAN
- Heather Lawler - ENTRAN

Jared Clemons welcomed everyone and said the purpose of this meeting was to present information for the study of KY 251 from KY 3005 (Ring Road) to KY 313 (Joe Prather Highway). Jared also mentioned Charles Allen will be taking over as Project Manager. He then introduced Brian Aldridge who delivered a brief presentation, a copy of which is attached.

Brian started out with a Draft Purpose and Need for the project. The purpose of the KY 251 Scoping Study is to investigate the need and justification for transportation improvements and to develop and evaluate improvement concepts between KY 3005 and KY 313. The study corridor is approximately 5.3 miles in length.

The U.S. Department of Defense 2005 Base Realignment and Closure (BRAC) plan included a number of changes that will affect the Fort Knox Military Reservation and surrounding region. Several studies related to BRAC have recommended opening a southern access point onto KY 313, partly due to the newly constructed Human Resource Command which to date has added about 3,000 staff with the potential to add another 2,000-2,500. The Human Resource Command is located in the southern part of Fort Knox and the North Wilson Road gate is the closest access control point. With a fourth potential gate at Fort Knox located on the south side of the post, traffic along KY 251 and the surrounding routes is expected to increase significantly. The three existing gates are accessed directly from US 31W along the west side of post.

There have been several recent studies recommending improvements to KY 251. The 2005 Radcliff-Elizabethtown Urbanized Area Transportation Plan recommended the reconstruction of KY 251 from KY 3005 to KY 313 to Rural Major Collector standards. The 2008 BRAC Task Force Priority Transportation projects had the reconstruction of KY 251 from KY 3005 to KY 434 as #6 on the ranking list and the reconstruction from KY 434 to KY 313 as #6a. It has now been moved up to #2a and #2b. Mike Skaggs with the Lincoln Trail Area Development District (LTADD) was to supply ENTRAN with the updated priority list. The 2009 Fort Knox Regional Highway Capacity Study recommended reconstruction of KY 251 with dependence on the new southern access to Fort Knox. The 2010 First Look Scoping Study prepared by KYTC District 4 identified 4 alternatives: No build, spot improvements, minor widening and a major widening with 4 lanes proposed.

Brian briefly discussed the existing characteristics of KY 251. Handouts were provided depicting data compiled from the KYTC Highway Information System (HIS) database, aerial photography, site reconnaissance, and crash records retrieved from the Kentucky State Police. KY 251 is functionally classified as:

- Rural Major Collector north of Bates Road
- Urban Minor Arterial south of Bates Road

The lane widths vary from 9’ to 9.5’ and there is anywhere from no shoulder to a 1’ wide shoulder. Between January 2006 and December 2010 there were 78 reported crashes with 18 (23%) injury crashes. Brian discussed in some detail the crashes that occurred at the three main intersections along the corridor (KY 3005, KY 434, and KY 313). The existing horizontal alignment meets current sight distance requirements for a 55 MPH design speed while a majority of the vertical curves (37 of the 45) do not meet current sight distance requirements. Improving the corridor on its existing alignment will be difficult as correcting the vertical deficiencies will require significant changes to existing grades. This will make it particularly difficult to maintain traffic.

Brian concluded the presentation by discussing the project schedule and next steps. The project will follow a 12-month schedule. He said ENTRAN will continue to work on traffic forecasting and the Environmental Overview and scheduling the first of three meetings with the Radcliff-Elizabethtown Metropolitan Planning Organization (MPO). ENTRAN will begin to develop alternatives, including both short-term “spot” improvements and long-term improvements.

There was some discussion concerning the northern end of the study corridor, between KY 434 (Battle Training Road) and KY 313. The team decided to look at a new western connector between KY 434 (Battle Training Road) and KY 313 to the west of KY 251 in the area of Lincoln Road. ENTRAN will still evaluate possible improvements to KY 251 north of KY 434 to KY 313. The team also decided ENTRAN would look at improvements on KY 434 near the KY 251 intersection and west to US 31W.

The meeting adjourned at 10:30.

MEETING SUMMARY

KY 251 Scoping Study – Project Team Meeting

KYTC Item No. 4-153.00

July 28, 2011

A meeting was held with District 4 staff on Thursday, July 28 to discuss the KY 251 Scoping Study. The meeting was held at 1:30 PM in the District 4 Design Conference Room in Elizabethtown. In attendance at the meeting were:

- Charlie Allen – KYTC District 4 Planning
- Kevin Blain – KYTC District 4 Traffic
- Patty Dunaway – KYTC District 4
- Joseph Ferguson – KYTC District 4 Environmental
- Barry House – KYTC Planning
- John Moore - KYTC District 4 Project Development
- Paul Sanders - KYTC District 4 Project Development
- Mike Skaggs - LTADD
- Kevin Young – KYTC District 4 Planning

- Brian Aldridge – ENTRAN
- Mark Butler – ENTRAN
- Glenn Hardin - ENTRAN
- Heather Lawler - ENTRAN

After introductions, Charlie Allen welcomed everyone to the second project team meeting for the study of KY 251 from KY 3005 (Ring Road) to KY 313 (Joe Prather Highway). The purpose of the KY 251 Scoping Study is to investigate the need and justification for transportation improvements and to develop and evaluate improvement concepts between KY 3005 and KY 313. The study corridor is approximately 5.3 miles in length. He then introduced Brian Aldridge who added that ENTRAN has developed some preliminary alternatives based on input from the kickoff meeting. Based on the project schedule, ENTRAN is about 50 percent through the development of alternatives and wanted to meet to ensure the appropriate options were being considered.

Brian delivered a brief presentation, a copy of which is attached. A revised Draft Purpose and Need for the project was provided as a handout. Jill Asher had provided some feedback on the original draft asking that the Purpose and Need address the purpose of the project (or projects) and not the purpose of the study. The revised draft addresses those comments. The four primary needs for the project(s) include the following:

- Correct existing geometric deficiencies
- Provide improved, alternative access to Fort Knox

- Improve safety
- Extend planned improvements on KY 251 north of Bluegrass Road

Brian mentioned that he had presented the study to the Radcliff-Elizabethtown Metropolitan Planning Organization (MPO) Transportation and Technical Coordinating Committee (TTCC) on June 1. This presentation included a discussion of the existing conditions and issues, the study scope of work and schedule, and some of the preliminary concepts under consideration. There were four questions asked by committee members during the meeting, as follows:

- What sort of access control would be proposed with the potential realignment options?
- How do the impacts compare between a realignment option versus widening the existing route?
- Are bicycle and pedestrian accommodations proposed?
- Would it be possible to shift the proposed southern access to Fort Knox, currently proposed for the South Boundary Road corridor, to the east to better align with one of the potential realignment options for KY 251?

Brian responded to the questions at the meeting, noting that most of these items will be addressed during the study.

Brian mentioned the previous studies that have discussed improving KY 251. He noted that Mike Skaggs had mentioned during the kickoff meeting that the BRAC Task Force had reprioritized its list of recommended transportation improvements. The KY 251 projects have moved from #6/6A (from Ring Road to KY 434 was #6 and from KY 434 to KY 313 was #6A) to #2/2A respectively.

Brian briefly discussed the Environmental Overview for KY 251 that was submitted in the spring. Maps were shown depicting the resources noted in the overview.

As discussed at the kickoff meeting, the existing horizontal alignment meets current sight distance requirements for a 55 MPH design speed while a majority of the vertical curves (37 of the 45) do not meet current sight distance requirements. Brian showed the typical section from the as-built plans which shows 1:1 cut slopes and 2:1 fill slopes. Improving the corridor on its existing alignment will be difficult as correcting the vertical deficiencies will require significant changes to existing grades. This will make it particularly difficult to maintain traffic. Brian said a reconstructing the existing route to a 45 MPH design speed would be more feasible (yet still an issue in some areas) and asked the team if that would be acceptable. It was agreed that a reconstruction alternative would look at a 45 MPH design speed.

Potential spot improvements were discussed. Brian showed the study team the crash history (2006-2010) which was discussed in detail at the kickoff meeting. ENTRAN has examined the locations with the highest occurrence of crashes for potential improvements. A number of single vehicle crashes occurred between Bluegrass Road and Thicket Drive. There are two sections along this stretch that could be improved with relative ease to correct the vertical alignment. The first is about 3,700 feet from just north of Bluegrass Road to just south of West Bryan Road. The

second includes about 4,300 feet south of Thicket Drive. These two sections include about 17 of the 37 vertical curves that were found to have less than required sight distance for 55 mph. It was decided that these two sections should be advanced further with some typical section improvements (at minimum) between and north to KY 434.

There were two intersections discussed for spot improvements. Wooldridge Ferry Road intersects KY 251 at a skew, resulting in a very wide approach. It also has less than desirable sight distance to the south. A realignment of Wooldridge Ferry to connect directly across from West Bryan Road was discussed as an alternative. The team agreed this alternative was desirable. The second intersection discussed was KY 434 at KY 251. There were 14 crashes reported at this intersection over the past five years. Brian said the predominant turning movements at the intersection are from the south to KY 434 westbound, and from eastbound KY 434 to southbound KY 251. The KY 251 approaches are stop-controlled, and Brian expressed come concerns about the travel speeds on KY 434 and the potential for serious crashes to occur. A preliminary layout showing a single lane roundabout was presented as an alternative to accommodate turning traffic and to slow traffic through the intersection. The team agreed this option should be pursued further.

The traffic forecasts for the project were discussed. Brian began the discussion with some background information, including Census estimates regarding population growth in Hardin and Meade County between 2010 and 2035. Hardin County is anticipated to grow by about 1.3 percent per year over that time period, and Meade County is anticipated to grow by about 0.2 percent per year. Within Hardin County, Elizabethtown's population grew faster between 2000 and 2009 (0.9 percent per year) than the remainder of the county. Brian then showed some trendline estimates based on historical traffic along KY 251. Extrapolating the historical traffic counts to the year 2035 resulted in about 11,500 vehicles per day north of Ring Road and about 2,200 vehicles per day between KY 434 and KY 313 at the north end of the study area.

Using the Hardin-Meade County travel demand model (modified by ENTRAN as part of the study), traffic forecasts have been developed for four preliminary long-term improvement alternatives, as follows:

- 2035 No-Build
- Alternative 1: New northwest connector from north of KY 434 connecting to KY 313 near Masters Lane
- Alternative 2: New northwest connector from north of West Bryan Road connecting to KY 313 near Masters Lane
- Alternative 3: Major widening (four lanes) of existing KY 251 from Ring Road to KY 313

A handout was provided depicting the preliminary 2035 forecasts for each alternative. The forecasting performed to date suggests shifting a potential realignment farther west (closer to US 31W and access to Fort Knox) results in higher travel demand along KY 251. The future model indicates approximately 40,000 vehicle trips into and out of Fort Knox each day in 2035. Brian said that the model does not contain a lot of future (post-BRAC) growth within Fort Knox, so

another scenario was tested that included an additional 10,000 vehicular trips into/out of post each day. This scenario did not result in a significant increase in traffic along KY 251.

Cost estimates for the preliminary concepts were presented. ENTRAN has estimated the likely number of relocations and right-of-way needs for each option and has included these in the estimates. Brian said some modifications would be made to the cost estimates and they would be provided to the District for review.

There was some discussion on examining another alternative that would include a “cross-country” connection from KY 251 north of Ring Road to connect to the South Boundary Road corridor proposed for southern access into Fort Knox. ENTRAN agreed this option needs to be considered in the study to determine the likely impacts and to estimate future travel demand. The team also decided ENTRAN would identify any significant utility impacts associated with all options under consideration.

The meeting adjourned at approximately 2:30.

PUBLIC MEETING SUMMARY

KY 251 SCOPING STUDY
From KY 3005 (Ring Road) to KY 313 (Joe Prather Highway)
Item No. 4-153.00

Heartland Elementary School
2300 Nelson Drive
Elizabethtown, KY
Thursday, November 3, 2011, 5:00 – 7:00 pm

A public information meeting for the KY 251 planning study was held on Thursday, November 3, 2011 from 5:00 to 7:00 pm at Heartland Elementary School in Elizabethtown. The purpose of the meeting was to provide information about the project, discuss potential alternative improvements to be considered, and solicit input from the public. The following individuals from the Kentucky Transportation Cabinet and the consultant staff were in attendance:

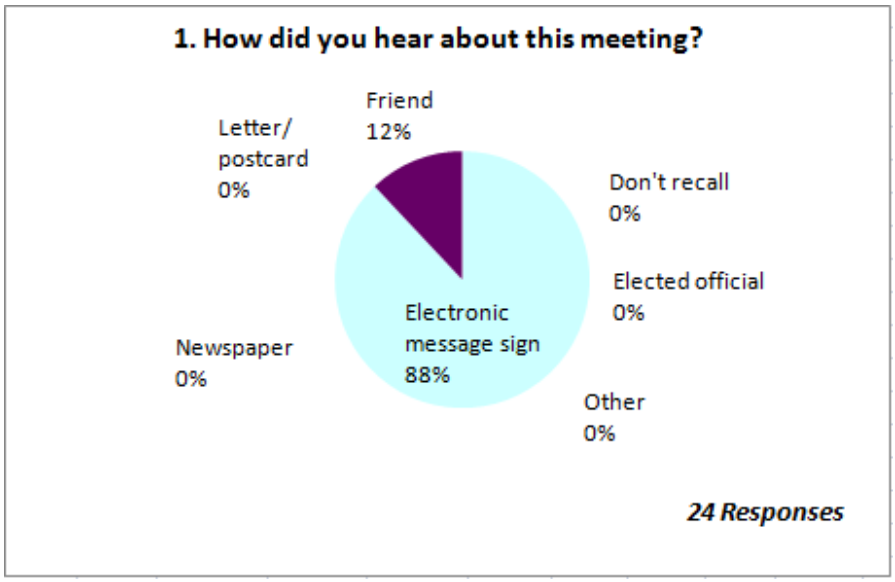
Jill Asher	KYTC – Central Office
Steve Ross	KYTC – Central Office
Patty Dunaway	KYTC - District 4
Kevin Young	KYTC - District 4
Charlie Allen	KYTC - District 4
Chris Jessie	KYTC - District 4
John Moore	KYTC - District 4
Dana King	KYTC - District 4
Brian Aldridge	Stantec Consulting
Heather Lawler	Stantec Consulting
Glenn Hardin	Stantec Consulting
Ashley Day	Stantec Consulting

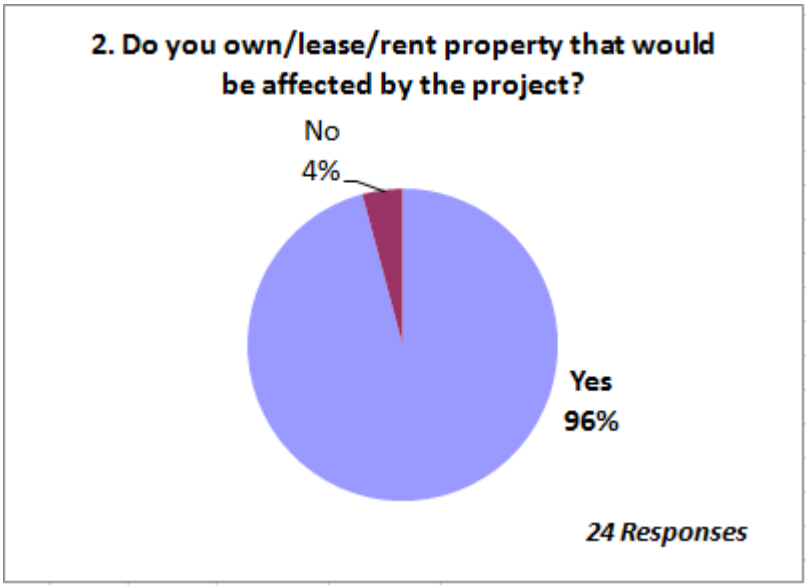
The public information meeting was held in an open house format, with formal presentations given at 5:15 pm and 6:15 pm. A sign in table was set up where attendees signed in and were given a project handout and questionnaire. KYTC and consultant staff were available to answer questions and discuss issues. Based on the sign-in sheets, 114 members of the public attended the meeting.

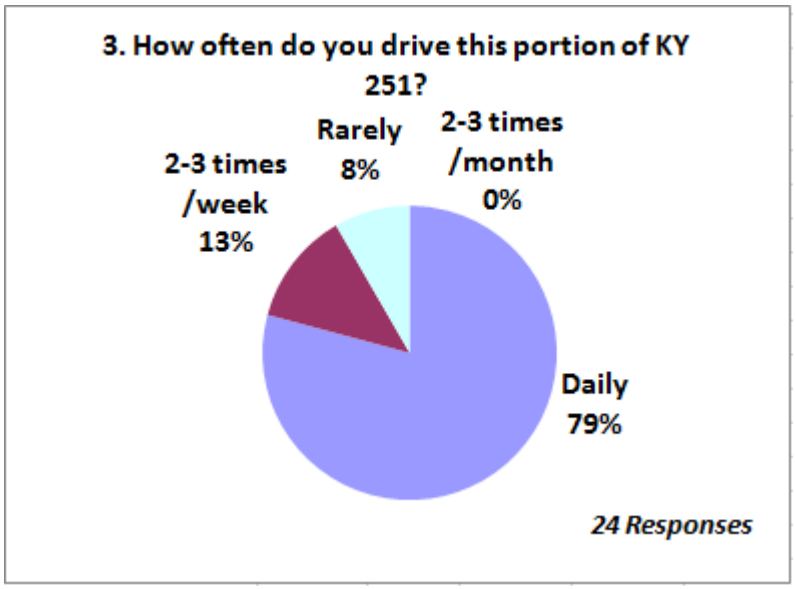
The following project exhibits were on display:

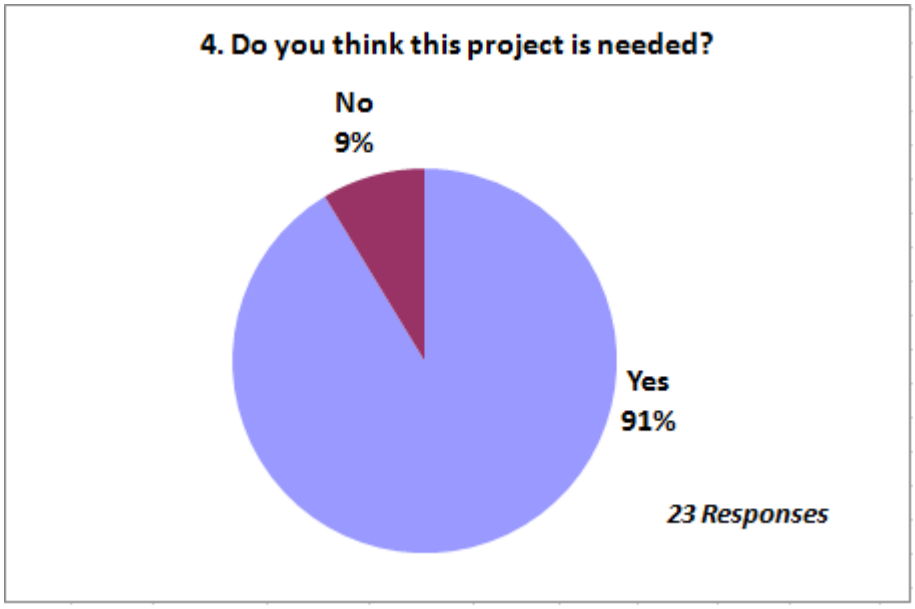
- Study Area Map with Conceptual Improvement Alternatives and Typical Sections
- Crash History
- Existing Traffic Volumes and 2035 Traffic Forecasts

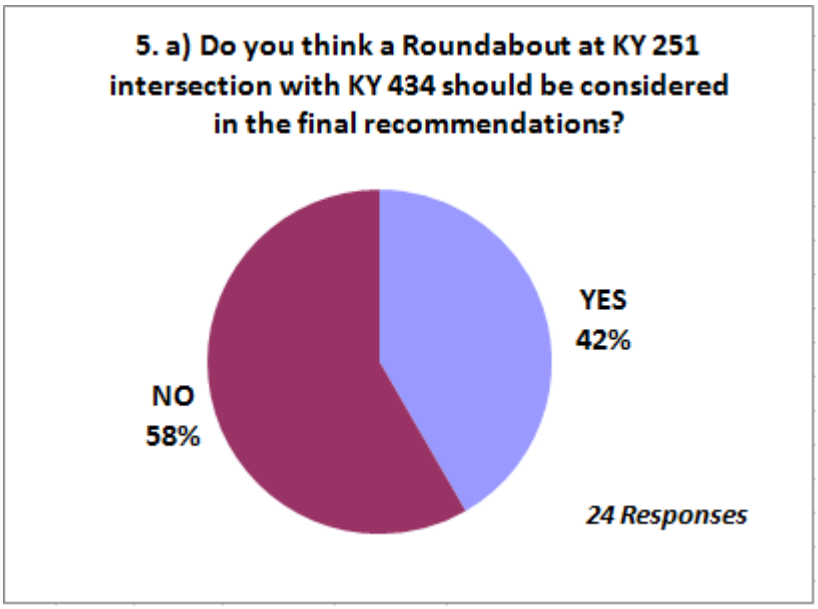
Public meeting attendees were given the option to either fill out their questionnaire at the meeting or return it by mail after the meeting. A total of 24 questionnaires were returned. The results of the questionnaire are summarized as follows:

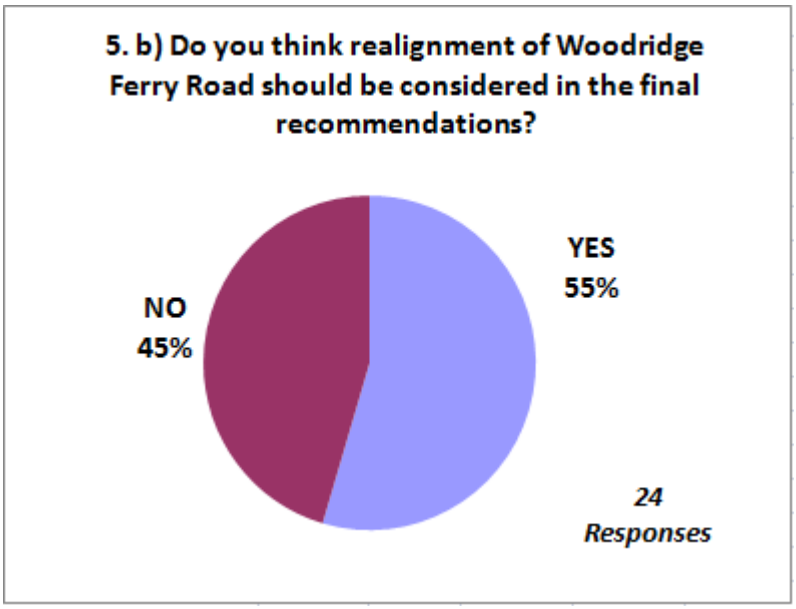

1. How did you hear about this meeting?
Friend
12%
Letter/
postcard
0%
Don't recall
0%
Elected official
0%
Electronic
message sign
88%
Newspaper
0%
Other
0%
24 Responses

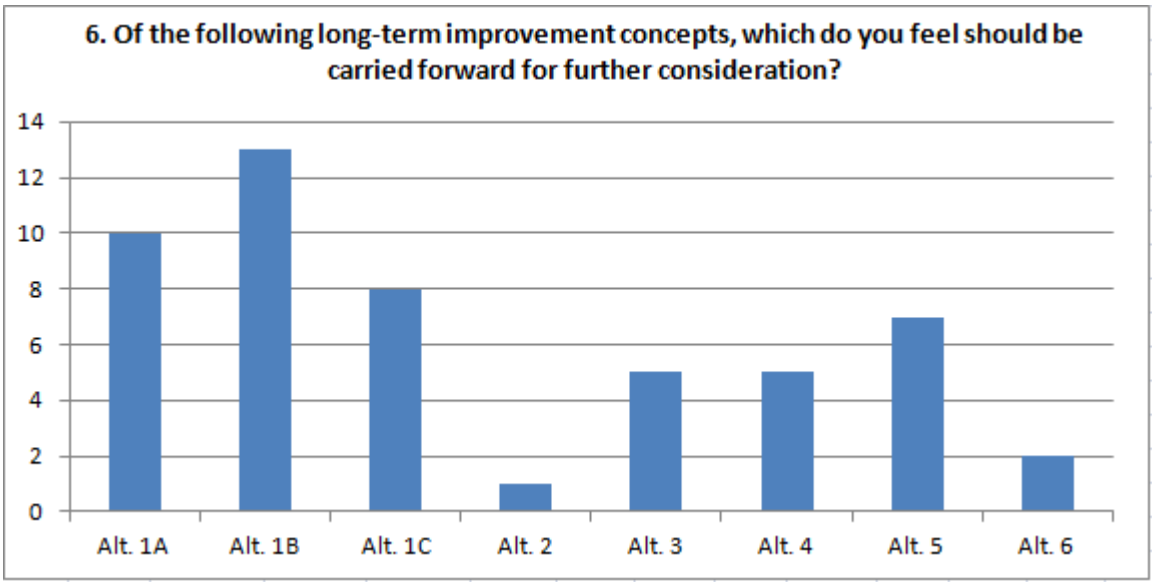

2. Do you own/lease/rent property that would be affected by the project?
No
4%
Yes
96%
24 Responses


3. How often do you drive this portion of KY 251?
Rarely 8%
2-3 times /month 0%
2-3 times /week 13%
Daily 79%
24 Responses


4. Do you think this project is needed?
No 9%
Yes 91%
23 Responses


5. a) Do you think a Roundabout at KY 251 intersection with KY 434 should be considered in the final recommendations?
YES
42%
NO
58%
24 Responses


5. b) Do you think realignment of Woodridge Ferry Road should be considered in the final recommendations?
YES
55%
NO
45%
24
Responses



The majority of the survey respondents (24 responses, 96%) indicated they own property that may be affected by the KY 251 project. In addition, most respondents (24 responses, 79%) said they drive the route daily. An overwhelming majority (23 responses, 91%) said the project is needed.

Two short-term or spot improvement options were addressed in the survey. The first asked if a roundabout should be considered at the KY 251 intersection with KY 434 to be considered in the final recommendations, and the small majority (24 responses, 58%) responded for it not to be considered. Another small majority (24 responses, 55%) responded in favor of having the realignment of Woodridge Ferry Road considered in the final recommendations.

Eight long-term corridor alternatives were offered for consideration. Three alternatives (Alt 1A, 1B, and 1C) followed the existing horizontal alignment of KY 251. Each alternative varied in the amount of improvements that were proposed. These alternatives received the most votes for further consideration. The alternative receiving the most overall was widening of KY 251 to 4 lanes with 8 foot shoulders. The second favorite was improving KY 251 with 2 lanes with 8 foot shoulders. The alternative with minor spot vertical improvements and reduced 4 foot shoulders was the third overall.

One other alternative, Alt. 6) was to build a new road west of KY 251 to connect KY 434 to KY 313. This was one of the least favorite options receiving only 2 responses for further consideration. The other alternatives included new horizontal routes that departed the current KY 251 alignment at differing locations based on the final intersection location with KY 313. Two alternatives, Alt. 2 and Alt. 3, would intersect KY 313 near the Master Lane intersection. These two were among the bottom three in receiving votes for future consideration. The remaining alternatives, Alt. 4 and Alt. 5, are proposed to intersect KY 313 near a possible future roadway under consideration by Fort Knox. These alternatives finished in the middle of the field for consideration by the received responses.

Respondents were provided an area for writing their own comments on the surveys. While a majority of people commented on their reasons for their responses and safety concerns, the most notable comment made was for traffic signals to be installed primarily at the KY 251 intersection with KY 434.

MEETING SUMMARY

KY 251 Scoping Study – Project Team Meeting

KYTC Item No. 4-153.00

December 23, 2011

A meeting was held with District 4 staff on Thursday, December 22 to discuss the KY 251 Scoping Study. The meeting was held at 9:00 AM in the District 4 Design Conference Room in Elizabethtown. In attendance at the meeting were:

- Charlie Allen – KYTC District 4 Planning
- Jill Asher – KYTC CO Planning
- Patty Dunaway – KYTC District 4
- Joseph Ferguson – KYTC District 4 Environmental
- John Moore - KYTC District 4 Project Development
- Paul Sanders - KYTC District 4 Project Development

- Brian Aldridge – ENTRAN
- Glenn Hardin - ENTRAN
- Heather Lawler - ENTRAN

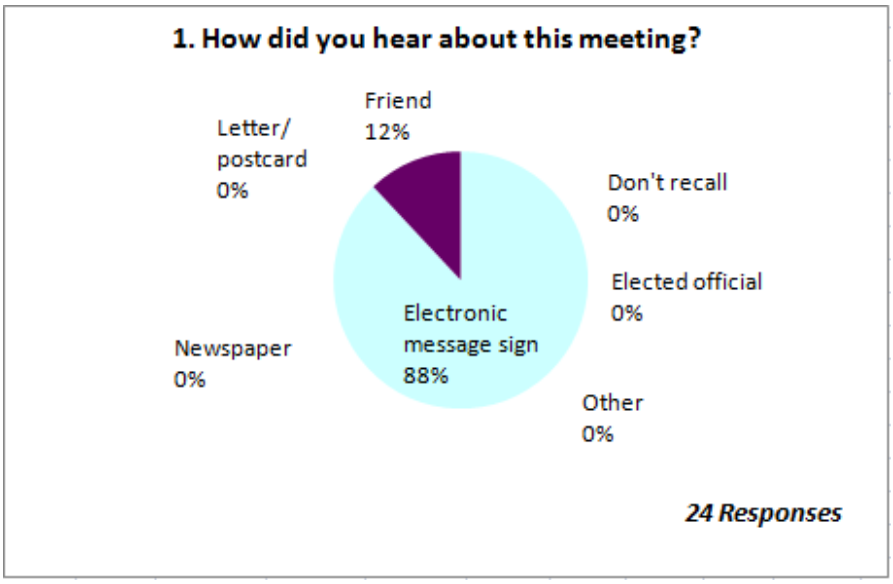
After introductions, Charlie Allen welcomed everyone to the third project team meeting for the study of KY 251 from KY 3005 (Ring Road) to KY 313 (Joe Prather Highway). He then asked Brian Aldridge to continue with Stantec's presentation.

Brian began with a brief overview of the study. The purpose of the KY 251 Scoping Study is to investigate the need and justification for transportation improvements and to develop and evaluate improvement concepts between KY 3005 and KY 313. The study corridor is approximately 5.3 miles in length.

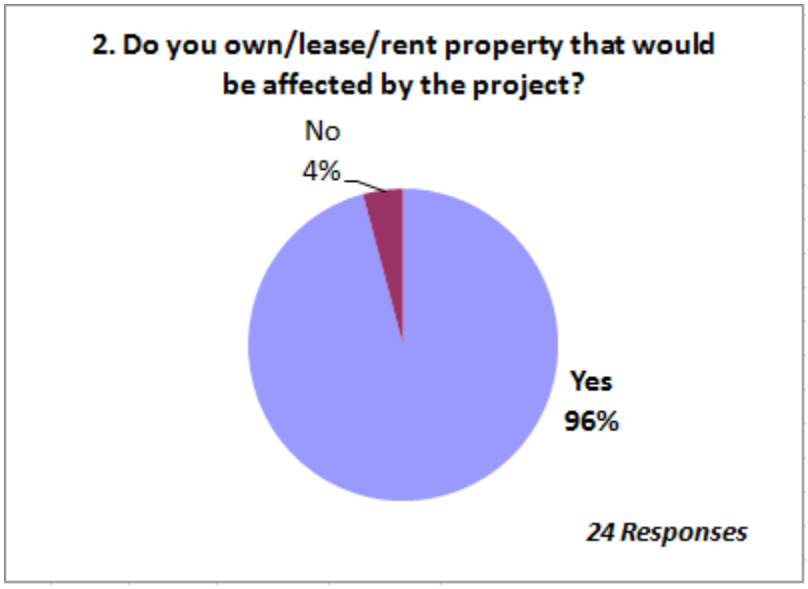
Brian provided a summary of the public meeting held on November 3, 2011. It followed an open house format, with brief presentations given at 5:15 pm and 6:15 pm. Attendance at the meeting was much better than expected. Brian said there were 114 members of the public in attendance based on the sign-in sheets. The following project exhibits were on display:

- Study Area Map with Conceptual Improvement Alternatives and Typical Sections
- Crash History
- Existing Traffic Volumes and 2035 Traffic Forecasts

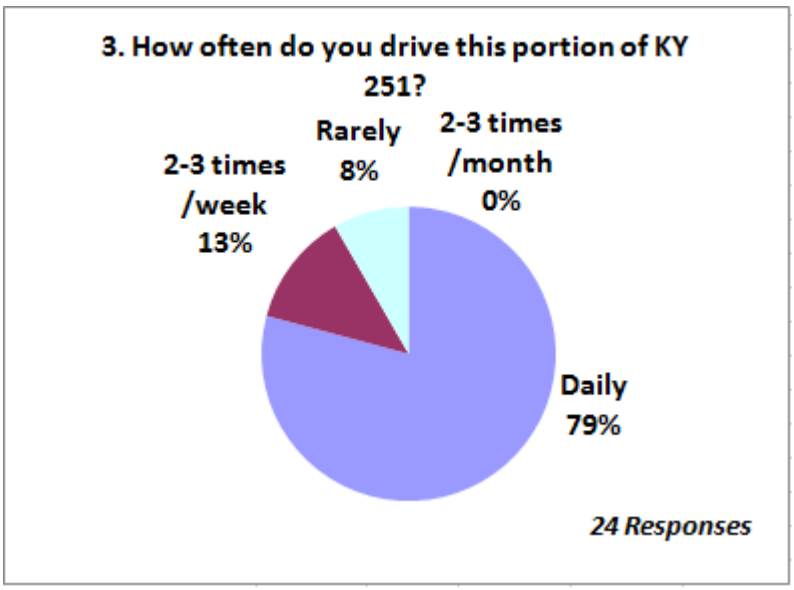
Public meeting attendees were given the option to either fill out their questionnaire at the meeting or return it by mail after the meeting. A total of 24 questionnaires were returned. Brian summarized the results of the questionnaire as follows:



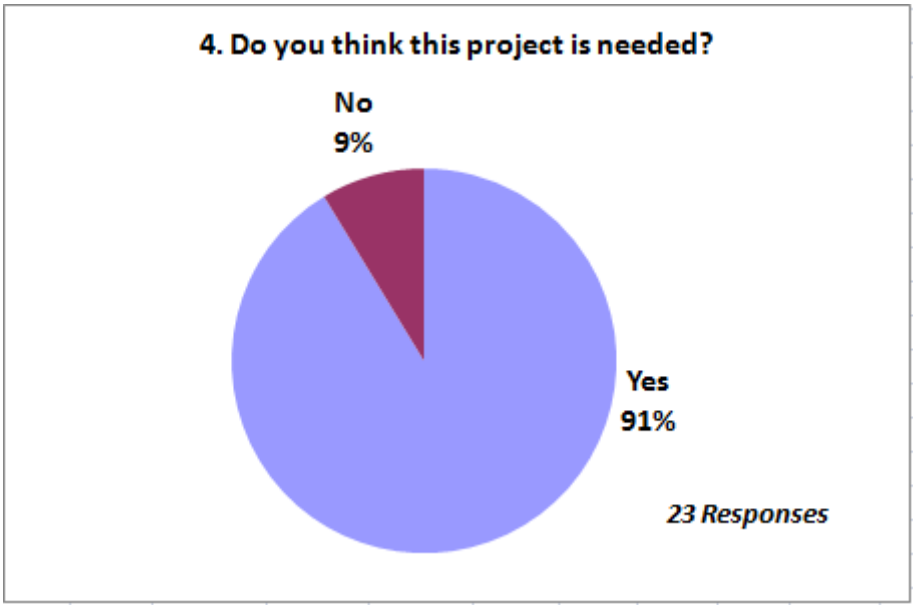
The Variable Message Signs used to advertise the public meeting appeared to work well as 88 percent of the respondents said that was how they heard about the meeting. The remaining 12 percent said they heard from a friend.



The majority of the survey respondents (24 responses, 96%) indicated they own property that may be affected by the KY 251 project. In addition, most respondents (24 responses, 79%) said they drive the route daily. An overwhelming majority (23 responses, 91%) said the project is needed.



Most respondents (24 responses, 79%) said they drive the route daily.



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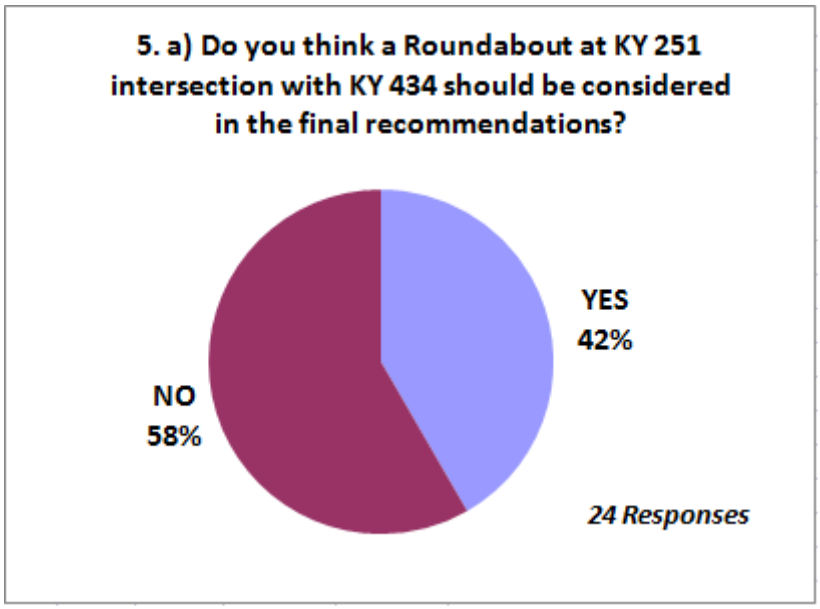
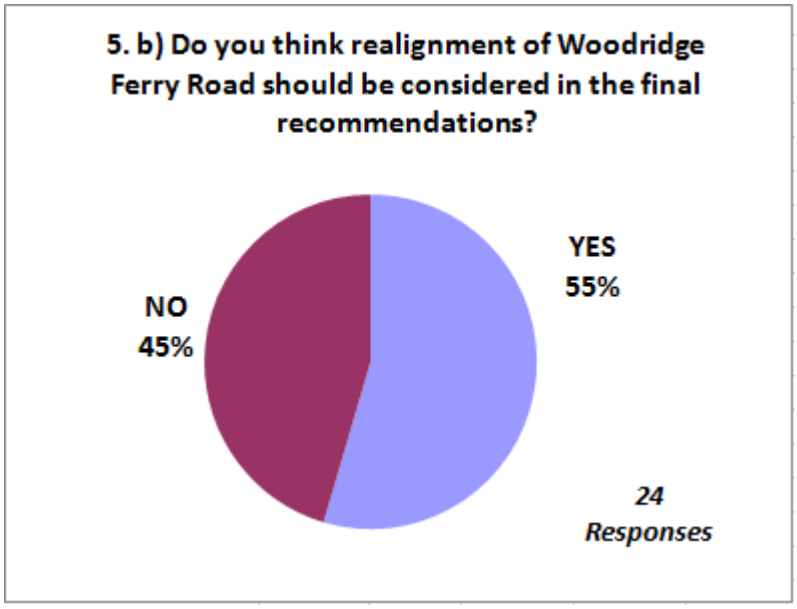
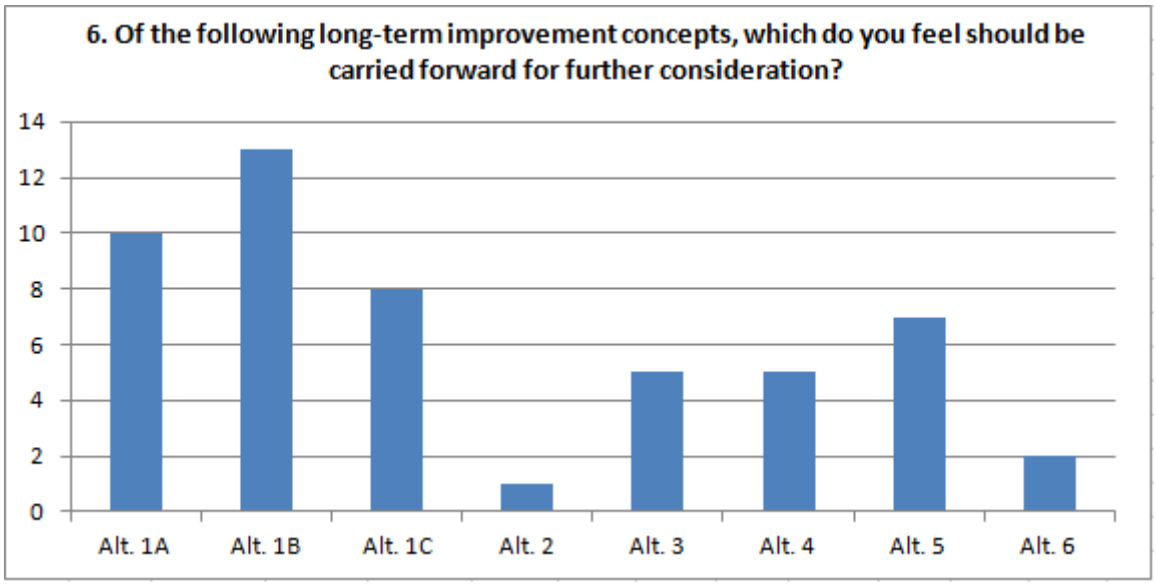


Two short-term or spot improvement options were addressed in the survey. The first asked if a roundabout should be considered at the KY 251 intersection with KY 434 to be considered in the final recommendations, and the small majority (24 responses, 58%) responded for it not to be considered



Another small majority (24 responses, 55%) responded in favor of having the realignment of Woodridge Ferry Road considered in the final recommendations.



Eight long-term alternatives were offered for consideration, and Brian provided a handout depicting these concepts. Three alternatives (Alternatives 1A, 1B, and 1C) followed the existing horizontal alignment of KY 251. Each alternative varied in the amount of improvements that were proposed. These alternatives received the most votes for further consideration. The alternative receiving the most overall was widening of KY 251 to four lanes with full eight foot shoulders. The second favorite was improving KY 251 with two lanes with eight foot shoulders. Alternative 1C, the alternative with minor spot vertical improvements and reduced four foot shoulders was the third overall.

The other alternatives included new horizontal routes that departed the current KY 251 alignment at differing locations based on the final intersection location with KY 313. Two alternatives, Alternative 2 and Alternative 3, would intersect KY 313 near the Master Lane intersection. These two were among the bottom three in receiving votes for future consideration. The remaining alternatives, Alternative 4 and Alternative 5, are proposed to intersect KY 313 near a possible future roadway under consideration by Fort Knox providing southern access into post from KY 313. These alternatives finished in the middle of the field for consideration by the received responses.

Respondents were provided an area for writing their own comments on the surveys. While a majority of people commented on their reasons for their responses and safety concerns, the most notable comment made was for traffic signals to be installed primarily at the KY 251 intersection with KY 434. Others commented that traffic has significantly increased (“doubled” or “tripled”) over the past few years, but the count data collected by the KYTC do not support that concern.

Brian provided another handout that included a mostly quantitative evaluation of the alternatives based on available data. Nine criteria were used in the exercise, with some focusing on measured values (i.e. cost or relocations) while others focused on more qualitative measures (“satisfies Purpose and Need” with high, medium, and low) values. Values from 1 to 10 were then assigned to each value for each alternative and the scores were summed up. The preliminary results, assuming each criterion was equally significant, suggest Alternative 4 was the best performer

followed by the No-Build alternative. Brian said the results of this exercise are to provide guidance to the study team in coming up with final recommendations.

There was some discussion concerning the evaluation exercise. It was noted that the Draft Purpose and Need includes conflicting needs – providing access from Elizabethtown to Fort Knox and I-65. Alternatives west of existing KY 251 would provide improved access to Fort Knox but not I-65, and vice-versa. Therefore, it was decided to remove access to I-65 from the Draft Purpose and Need. It was also decided that equal weights for the evaluation criteria is not the best way to evaluate the alternatives. Therefore, it was decided to disregard the ranking based on the scoring component of the evaluation and instead to consider only the values in the evaluation matrix.

Brian went on to discuss Stantec's preliminary recommendations. He said based on the traffic forecasts, public input, and evaluation of alternatives, Alternative 1C (the spot improvement alternative with two segments of grade corrections) is recommended as it addresses the segments with most of the vertical curvature issues and would not result in the massive right-of-way needs of the other, more intensive improvement options. Where the grades are not to be revised, "template" corrections are recommended to provide wider shoulders to KY 434. The goal would be to provide the same typical section as in the revised vertical segments (two eleven foot wide lanes with a four foot wide paved shoulder on each side of the roadway), but there are areas where this section will likely be impossible to construct on the existing vertical alignment. Both spot improvements are included in the overall recommendation. No improvements are currently recommended north of KY 434.

The proposed typical section was discussed. It was decided to recommend 12-foot wide lanes and a two-foot wide full depth shoulder. This section would be striped as two 11-foot wide lanes with a three-foot wide shoulder. There was additional discussion regarding the need for improvements to KY 434 west of KY 251. In particular, there are maintenance issues with the existing shoulders. It was agreed the final recommendation would include shoulder improvements to KY 434.

The meeting adjourned at approximately 10:15.

Appendix B – Environmental Overview

ENVIRONMENTAL OVERVIEW

KY 251 Improvements Project - KY 3005 to KY 313
Hardin County, Kentucky
Item 4-153.00

Submitted to:
Kentucky Transportation Cabinet
District 4
634 East Dixie Avenue
Elizabethtown, KY 42701

Submitted:
March 2011

Submitted by:

ENTRAN
ENGINEERING INFRASTRUCTURE SOLUTIONS

TABLE OF CONTENTS

REFERENCES

LIST OF ATTACHMENTS

ATTACHMENT A
Project Location and Environmental Footprint Mapping

A1. Project Location Map
A2. Environmental Footprint, Natural Environment
A3. Environmental Footprint, Human Environment

ATTACHMENT B
Supplemental Information

B1. Physiographic Regions of Kentucky
B2. Ecoregions of Kentucky
B3. Geologic Quadrangle Map, Colesburg Quadrangle
B4. Geologic Quadrangle Map, Elizabethtown Quadrangle
B5. Hardin County Karst Areas
B6. Project Area and Vicinity Soils Map
B7. Availability of Ground Water in Breckinridge, Grayson, Hardin, Larue, and Meade Counties, Kentucky (HA-33) AND
Source Water Assessment and Protection (SWAP) mapping
B8. USFWS List of Federal-Listed Species in Hardin County, Kentucky
B9. USFWS Kentucky Ecological Services Field Office List of Endangered, Threatened, & Candidate Species in Hardin County, KY
B10. KDFWR List of State-Listed Species in Hardin County, Kentucky
B11. KSNPC Response 1/19/2011
B12. KSS Response 1/18/2011
B13. USFWS Known *Myotis sodalis* Habitat-Project Vicinity Map
B14. NPS Land & Water Conservation Fund Detailed Listing of Grants, Hardin County 12/10/2010
B15. Kentucky Office of State Archaeology Response 1/10/2011
B16. Kentucky Heritage Council Response 1/7/2011

ATTACHMENT C
Photograph Index Map and Study Area Representative Photographs

EXECUTIVE SUMMARY

This Environmental Overview for the KY 251 Improvements Project in Hardin County, Kentucky identifies environmental resources and potential issues of concern, and establishes an environmental footprint for consideration in the development of project alternatives and avoidance and minimization of impacts. The project study area follows existing KY 251 from its intersection with KY 3005 (Ring Road) in Elizabethtown northward to its intersection with KY 313 (Joe Prather Highway), being approximately 5.3 miles long, having a width of 600 feet (centered on the existing KY 251 centerline), and encompassing approximately 388 acres (0.6 square mile).

Natural resources identified within the study area and issues which need to be addressed if impacted include:

- Fourteen streams, seven potential wetlands and three ponds: A comprehensive stream and wetland survey and impact assessment will need to be conducted as the project further develops. Unavoidable impacts to streams and/or wetlands will require coordination with the U.S. Army Corps of Engineers and Kentucky Division of Water, along with a determination of Section 404/401 permitting and mitigation requirements.

- Groundwater resources: Five mapped water wells and three sinkhole areas occur in the study area, all of which may provide potential pathways for contamination of groundwater. Water wells affected by the project will need to be sealed per KYTC standard specifications. Construction activities, especially in regards to vehicle fueling and maintenance and surface runoff from precipitation events, will be required to be directed away from all sinkhole areas.

- Public water supplies: The southern portion of the project corridor occurs within a Source Water Assessment and Protection (SWAP) area that drains south towards Elizabethtown. Construction activities may require the preparation of a Groundwater Protection Plan per 401 KAR 5:307.

- Potential habitat for two federal-endangered species: Potential habitat for Indiana bat and gray bat was identified within the study area. Additional habitat assessment and coordination with the USFWS Ecological Services Kentucky Field Office, Kentucky Department of Fish and Wildlife Resources and the Kentucky State Nature Preserves Commission will be required.

Human resources identified within the study area and issues which need to be addressed if impacted include:

- Section 4(f) and Section 106 resources have not been previously evaluated in the study area. A Phase I archaeological investigation and cultural historic survey performed by a KYTC pre-qualified consultant is needed to determine the presence (and NRHP eligibility) or absence of historic resources in the study area. In particular, the presence of the McMillen Cemetery, as indicated on USGS topographic mapping, will need to be verified and further evaluated.

- Hazardous materials concerns include one active UST facility, one potential abandoned UST facility, two unregulated businesses, and one ground-mounted electrical transformer location. A Phase I survey for hazardous materials concerns including UST's and potentially contaminated soils will be required.

- Agricultural lands occur as pasture and hay fields and are estimated to account for approximately 26 percent of the total study area. Coordination with the local NRCS office under regulations of the Farmland Protection Policy Act (FPPA) will be necessary.

- The City of Elizabethtown is regulated as a Small Municipal Separate Storm Sewer System (MS4), having a Phase II NPDES permit from KDOW, with the MS4 regulated boundary covering all of Hardin County; KYTC activities should be performed "in an environmentally sound manner … ensuring that planning, design, construction, operation, and maintenance projects and activities that are implicated by the MS4 program are performed in accordance with federal, state, and local environmental laws, regulations, and policies". Coordination with the KYTC-District 4 Environmental Coordinator, the KYTC-DEA and local MS4 Coordinators (Hardin County Fiscal Court and Elizabethtown) will be required as the project construction plans are developed and an NPDES NOI permit is prepared.

- Noise-sensitive receptors located within or adjacent to the study area include several residential neighborhoods/subdivision developments, a youth/adult camp and retreat center, and two churches. A project specific traffic noise impact analysis may need to be conducted to identify and mitigate traffic noise impacts.

I. PROJECT DESCRIPTION AND ENVIRONMENTAL SETTING

A. Project Description, History and Status

The KY 251 Improvements Project is located in Hardin County, Kentucky between the City of Elizabethtown and the Fort Knox Military Reservation. The proposed project will improve the corridor between KY 3005 (Ring Road, Mile Point 2.72) at the south terminus and KY 313 (Joe Prather Highway, MP 8.02) at the north terminus, having a total length of 5.3 miles. KY 251 is a north-south route between Elizabethtown and Radcliff (Attachment A1), comprised of an existing two-lane facility having undivided 9-foot lanes with no shoulders over rolling terrain.

A scoping study prepared for the project indicates that KY 251 carries between 3,600 and 6,000 vehicles per day with 10% truck traffic (KYTC, 2010a). The existing facility is deficient of Current Design standards for Rural Collector and Urban Arterial roadways. Due to Base Realignment and Closure (BRAC) activities at Fort Knox and a planned access road between KY 313 and the Fort Knox Wilson Road gate (Fort Knox Access Road, Item 4-100), the KY 251 corridor is projected to be a likely area for increased traffic volumes and development. An existing quarry in proximity to the project alignment produces frequent heavy truck use of KY 251 as access. Based on Current Design standards, KY 251 requires 11-12 foot driving lanes from KY 3005 (MP 2.72) to Wooldridge Ferry Road (MP 3.47) as an Urban Minor Arterial, and 22-24 foot of pavement (11-12 foot lane width) with 6-8 foot shoulders from Wooldridge Ferry Road (MP 3.47) to KY 313 (MP 8.02) as a Rural Major Collector.

The proposed project is intended to correct the geometric deficiencies of the existing roadway and improve safety along the corridor. A secondary realization of the project is improvement of travel time along the corridor to businesses in Elizabethtown, Fort Knox and I-65. This project was recommended by the Radcliff-Elizabethtown MPO in 2004, is currently on the 2008-2010 Biennial Highway Construction Plan for the planning phase, and is a continuation of improvements on KY 251 that are scheduled for construction from the project south terminus southward towards the center of Elizabethtown (Item 4-7030.00). Preliminary project alternatives include (but are not limited to) widening the driving lanes and adding shoulders to meet design standards, and widening the alignment from two to four lanes with a possible center turn lane to match the typical of the southward section being constructed under Item 4-7030.00.

The project study area has a width of 600 feet (300 feet to either side of the existing KY 251 centerline and extending 300-feet at each terminus) and encompasses approximately 388 acres (0.6 square mile). The study area follows the existing KY 251 alignment between KY 3005 and KY 313 (Attachment A1). This *Environmental Overview,* a component of the project Scoping Study, identifies environmental resources and potential issues of concern, and establishes an environmental footprint for consideration in the development of project alternatives and avoidance and minimization of impacts.

Information for this overview was obtained from literature review, review of information from resource agency databases, and an on-site reconnaissance (field survey) of the study area conducted on 16 February 2011 by ENTRAN personnel. Information obtained from secondary sources and the on-site reconnaissance was mapped on the aerial photograph base maps provided in Attachments A2 and A3.

Resources and issues of concern identified in the study area include those related to both the natural and human environment. Natural environment resources are presented in Section II, which includes streams, floodplains, wetlands, ponds, water supplies, threatened, endangered and special concern species and habitat, woodland and terrestrial areas, and parks (Attachment A2). Human environment resources are presented in Section III, which includes social and economic resources, historic and archaeological resources, hazardous materials concerns, agriculture, mining, air quality and noise, and additional concerns (Attachment A3).

B. Land Cover

Land cover was identified through a combination of aerial photograph review and on-site reconnaissance. General land cover in the area includes a mix of residential, wooded and agricultural lands surrounding existing roadway right-of-way, with commercial development concentrated at major road intersections (Attachment A2). The south terminus of the study area occurs within the Elizabethtown corporate limits, with land use in this area being commercial and suburban residential, including newer residential developments. Land use north of this area to SR 434 (Battle Training Road) is mixed rural residential, agricultural and wooded. North of SR 434 to the north project terminus, land use is a predominantly agricultural. Overall agricultural land covers an estimated 26% of the study area and wooded habitat 15%, with the majority of the remaining land use being residential.

C. Physiography and Topography

The project is located in the Muldraughs Hill subarea of the Mississippian Plateaus (also known as Western Pennyroyal) physiographic region (KGS, 2001a; Attachment B1), and the Mitchell Plain and Knobs-Norman Upland subareas of the Interior Plateau Ecoregion (Woods et al, 2002; Attachment B2). These ecoregion subareas are described as rolling karst plain containing depressions, dry valleys, and scattered ridges, knobs and hills with moderate to low gradient streams. Historic and potential natural vegetation includes bluestem prairie and oak-hickory or mixed deciduous forests, though much is replaced by extensive cropland and pastureland, with mixed oak forests common on steep slopes.

The majority of the study area has rolling terrain with moderate relief, occurring mostly along a ridgeline between bracketing drainage valleys. Review of the United States Geologic Survey Colesburg and Elizabethtown 7.5' topographic quadrangles (USGS, 1991a and 1991b; Attachment A1) indicates elevations in the study area range from about 800 feet above mean sea level at each terminus to approximately 900 feet above mean sea level in the central portion of the study area.

D. Geology and Soils

Bedrock in the study area is underlain by plane bedded sedimentary rocks of the Mississippian and Devonian Periods, overlain by shale and limestone of the Borden Formation, and capped by additional layers of Salem, St. Louis and St. Genevieve Limestones (Arms, et. al., 1979; Kepferle, 1966 and 1967; Attachments B3 and B4).

The majority of Hardin County, including all of the study area, is considered to be in an intense karst and very high karst potential area (KGS, 2001b and 2010a; Attachment B5). Intense and very high karst

indicates an area "underlain by bedrock with high potential for karst development…thick-bedded, typically fine-grained and pure limestone units with little or no insoluble content. May [Will] exhibit mature karst, including caves, sinkholes and springs where they crop out" (KGS, 2010b). Several sinkholes are mapped within the study area (KGS, 2003), and were observed during on-site reconnaissance activities (Attachment A2). The Kentucky Speleological Society reported there are no known caves listed along or near the project study area (KSS, 2011; Attachment B12-1).

Soils in the study area occur either in the Crider-Vertrees-Nicholson or the Sonora-Gatton-Riney soil association (Attachment B6). Both associations include minor amounts of Waynesboro series on uplands, which characterize the entire study area. These soil associations include nearly level to sloping, deep, well drained and moderately well drained soils on narrow to broad ridges, side slopes and hillsides. No soil units in the study area are considered hydric, though the Newark series, which comprises less than one percent of the study area, contains an approximately four percent hydric soil component (Arms, et. al. 1979 and USDA, 2010a).

E. Drainage

The project crosses three watersheds, one in the south and two in the north portion of the study area (Carey, 2003; KDOW, 2010a), including:

Study Area Location	HUC-11	Cataloging Unit	Watershed	Drainage Area (mi^2)
South	05110001200	Upper Green River	Valley Spring Creek	92.4
Northwest	05140102220	Salt River	Mill Creek	55.3
Northeast	05140103200	Rolling Fork River	Rolling Fork-Cedar Creek	54.3

The topographic division between the south and north watersheds is roughly the extent of Elizabethtown suburban development, in the vicinity of West Bryan Road extending west and Tunnel Hill Church Road extending east from KY 251, and approximately 1.2 mile north of the project south terminus. The topographic division between the northwest and northeast watersheds is roughly consistent with the alignment of KY 251 itself, with a majority of the project area being within the Mill Creek watershed of the Salt River.

II. NATURAL ENVIRONMENT

A. Surface Streams

Information from the Kentucky Energy and Environment Cabinet, Department for Environmental Protection, Division of Water indicates that no Special Use Waters (cold water aquatic habitat, exceptional waters, reference reach waters, outstanding state resource waters, outstanding national resource waters, state wild rivers or federal wild and scenic rivers) occur in the study area (KDOW, 2010b). No high quality stream corridors were observed in the study area during the on-site reconnaissance conducted in February 2011.

A total of fourteen streams were identified in the study area during the February 2011 field reconnaissance, consisting of nine ephemeral features (S1, S2, S3, S4, S8, S10, S11, S13 and S14) and five non-USGS intermittent features (S5, S6, S7, S9 and S12; see Attachment A2). Based on review of USGS 7.5' topographic mapping (USGS, 1991a and 1991b), two of the ephemeral streams (S2 and S3) correspond to USGS mapped features.

None of the streams identified within the study area are listed in the 2010 KDOW 305(b) and 303(d) water quality reports (KDOW, 2010c and 2010d), and none have an assigned Designated Use. The nearest feature with a Designated Use evaluation is Mill Creek (River Miles 11.8 to 23.6), which is located approximately 0.38 mile downstream of the study area. Mill Creek is listed as "Fully Supporting" its Warm Water Aquatic Habitat Use designation. Additional Designated Use categories for Mill Creek have not been assessed due to insufficient or no data available. No Total Maximum Daily Loads (TMDLs) are available for the three watersheds which drain the project area.

A comprehensive stream survey and impact assessment, including evaluation of avoidance and minimization measures, will need to be conducted as this project further develops. Unavoidable impacts to streams will require coordination with the U.S. Army Corps of Engineers (USACE) and KDOW to determine Section 404/401 permitting and mitigation requirements.

B. Floodplains

Based on review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FEMA, 2007a, 2007b and 2007c) and floodplain data from the Kentucky Office of Technology-Division of Geographic Information (KOT-DGI, 2010a), there are no 100-Year floodplains within the study area. The nearest floodplain is associated with Buffalo Creek, located approximately 1,200 feet east of the south terminus of the study area.

C. Wetlands

Four National Wetland Inventory (NWI) wetlands or wetland components are mapped within the study area, including two palustrine unconsolidated bottom features, a palustrine unconsolidated shore feature, and a palustrine forested broad-leaved deciduous feature (USFWS, 2010a; Attachment A2). Based on review of soils information from the Hardin County Soil Survey (Arms, et. al, 1979), less than one percent of the study area includes Newark silt loam which has a four percent hydric soil component. No additional hydric soils are mapped in the study area; however three wet areas are indicated on soils mapping as either within or partially within the study area (USDA, 2010b).

The February 2011 on-site reconnaissance included a field check of NWI mapped features, as well as a reconnaissance of the study area to determine the occurrence of other potential wetlands. Three of the four NWI features were observed to exhibit wetland characteristics, and four additional potential emergent wetlands were observed (Attachment A2). The seven potential wetlands were associated with ponds (two features), drainage swales (three features), and bottomland fields (two features). No extensive or high quality wetlands were noted to occur in the study area from secondary source review, aerial mapping or field observation.

Potential wetlands were not verified through wetland determination or wetland delineation procedures. A comprehensive wetland survey and impact assessment, including evaluation of avoidance and minimization measures, will need to be conducted as this project further develops. Unavoidable wetland impacts will require coordination with the USACE and KDOW to determine Section 404/401 permitting and mitigation requirements.

D. Ponds

Three ponds were observed within the study area during the February 2011 on-site reconnaissance (Attachment A2). Pond 1 corresponds to a USGS-mapped feature and is a recreational pond in a rural residential setting. Pond 2 is a recreational pond surrounded by woods in a rural residential setting and did not correspond with any mapped secondary source feature. Pond 3 is in the general vicinity of an NWI-mapped feature and is an agricultural pond potentially used for watering horses.

E. Groundwater Resources and Public Water Supplies

Groundwater - Groundwater, spring, and water well information from the Kentucky Geologic Survey (KGS) and KDOW was reviewed for the project study area. In general, groundwater resources in Hardin County are fairly widespread and wells generally yield enough water for domestic supply (Brown and Lambert, 1963; Carey and Stickney, 2005; Attachment B7). Depths of drilled wells generally range from 60 to 300 feet.

Wells in the immediate project vicinity are primarily utilized for domestic supply (KGS, 2010c), consistent with the general rural and agricultural nature of the area. Information from KGS indicated that five water wells occur within the study area (Attachment A2), all having a static water depth between 25 and 65 feet:

- 1 unknown type well located south of Woodsway Drive, and
- 4 domestic, single household use wells located throughout the length of the study area.

The mapped locations of the five water wells above should be investigated more thoroughly as this project further develops.

No mapped springs occur within the study area based on KGS mapping and data (KGS, 2010c) and none were observed during the February 2011 on-site reconnaissance. The nearest mapped spring is located approximately 1.3 miles west of the study area.

Public Water Supplies - Based on information from the Kentucky Geologic Survey (KGS) and Kentucky Division of Water (KDOW), the southern portion of the study area from just north of West Bryan Road to the project south terminus occurs within a Source Water Assessment and Protection (SWAP) area (KDOW, 2010a; KOT-DGI, 2010b; see Attachment B7). Construction activities may require the preparation of a Groundwater Protection Plan per 401 KAR 5:307 as well as coordination with KDOW, the Green/Tradewater Rivers basin coordinator and local watershed management programs.

F. Threatened, Endangered and Special Concern Species

Secondary Source Information – Information concerning federal and state endangered, threatened and special concern species and unique habitats in the project vicinity was obtained from the United States Fish and Wildlife Service (USFWS, 2010b), the USFWS Ecological Services Kentucky Field Office (USFWS, 2010c), the Kentucky Department of Fish and Wildlife Resources (KDFWR, 2010), and the Kentucky State Nature Preserves Commission (KSNPC). The USFWS national office reports three federal-endangered species from Hardin County (Attachment B8), including Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), and clubshell mussel (*Pleurobema clava*). The USFWS Ecological Services Kentucky Field Office indicates an additional three federal-endangered species as having the potential to occur within Hardin County, including orangefoot pimpleback mussel (*Plethobasus cooperianus*), rough pigtoe mussel (*Pleurobema plenum*), and fat pocketbook mussel (*Potamilus capax*). Other USFWS listed species known or having the potential to occur within Hardin County include three federal-candidate species: sheepnose mussel (*Plethobasus cyphyus*), Kentucky glade cress (*Leavenworthia exigua laciniata*), and Icebox Cave beetle (*Pseudanophthalmus frigidus*); and one federal-delisted species: Eggert's sunflower (*Helianthus eggertii*) (Attachment B9).

The KDFWR indicates forty-six additional state-listed species in Hardin County, including nine state-endangered, twelve state-threatened and twenty-five state-special concern species (Attachment B10).

Based on data received from KSNPC, there are no reported occurrences of any state or federal listed species within the project study area boundaries. However, KSNPC records indicate seven listed species within 1-mile of the study area, one record within 5-miles, and eleven records within 10-miles (Attachment B11). The KSNPC also identified one exemplary natural community, a limestone slope glade community, within one-mile of the project study area. Due to the sensitive nature of listed-species information, mapped locations of these records are not included in this environmental overview.

1. Federal-Listed Species

There are no known records of any federal-listed species within the project study area boundaries based on review of database records, although six species are known from or have the potential to occur in Hardin County, including:

- **Indiana bat** (*Myotis sodalis*), federal and state endangered species known from Hardin County. In summer, found under exfoliating bark and in cavities of dead and live trees in upland and riparian forests, and wooded fencerows. In winter, found hibernating in caves and old mine portals (KDFWR).

- **gray bat** (*Myotis grisescens*), federal endangered and state threatened species known from Hardin County (within ten miles of the proposed project). Found in upland and bottomland forests and riparian areas in summer, and in sandstone and limestone caves, rockhouses, clifflines, auger holes, and abandoned mines in winter.

- **Clubshell mussel** (*Pleurobema clava*), federal and state endangered species known from Hardin County. Prefers small to medium-sized rivers and streams; found mostly deeply buried in sand and fine gravel (KDFWR).

- **Orangefoot pimpleback mussel** (*Plethobasus cooperianus*), federal endangered species having the potential to occur within Hardin County. Found in medium to large rivers in sand, gravel, and cobble substrates in riffles and shoals in deep water and steady currents as well as shallower shoals and riffles (NatureServe, 2011).

- **Rough pigtoe mussel** (*Pleurobema plenum*), federal endangered species having the potential to occur within Hardin County. Found in medium to large rivers (20 meters wide or greater) in sand, gravel, and cobble substrates in shoals. It is occasionally found on flats and muddy sand (NatureServe, 2011).

- **Fat pocketbook mussel** (*Potamilus capax*), federal endangered species having the potential to occur within Hardin County. Found in sand, mud, and fine gravel substrates and flowing water. It is also found in large rivers in slow-flowing water (often near the bank) in mud or sand. It has been found to be tolerant of depositional areas that are usually unfavorable to other mussel species (NatureServe, 2011).

Review of information provided in the Indiana Bat Mitigation Guidance for the Commonwealth of Kentucky (USFWS, 2008) indicates that the project study area occurs outside of the mapped USFWS Indiana Bat Recovery and Mitigation Focus Areas (RMFA's). The nearest specified RMFA's are mapped approximately 1.6 miles northwest, 5 miles west, and 2.8 miles southwest of the study area. These mapped locations contain both "Sensitive" and "Swarming" habitat, and only the northern project terminus connects to one of these mapped locations (1.6 miles northwest) by contiguous forested habitat. The nearest mapped "Maternity" summer habitats are located approximately 6.5 miles north and 6.8 miles northwest of the project north terminus. The nearest mapped Priority 1 and Priority 2 hibernacula location is approximately 8 miles west of the study area (Attachment B13). The Kentucky Speleological Society (KSS; Attachment B12) indicated that there are no known caves along KY 251 within the study area, and no caves were observed during the February 2011 on-site reconnaissance.

During the February 2011 on-site reconnaissance, potential summer habitat for the federal-endangered Indiana bat and gray bat was observed in the study area. Individual trees with exfoliating bark and/or cavities were of moderate size (8-20" dbh) and located within scattered woodlots, wooded fencerows or isolated in residential yards (see representative photographs in Attachment C). Due to the occurrence of potential summer habitat for federal-listed bats within the study area, additional habitat assessment and coordination with resource agencies may be required as the project further develops.

No suitable habitat for the federal-endangered clubshell mussel, orangefoot pimpleback mussel, rough pigtoe mussel or fat pocketbook mussel was observed in the study area.

2. State-Listed Species

There are no known records of any state-listed species within the project study area boundaries based on review of database records, although 46 species are known from or have the potential to occur in Hardin County, as summarized below. One state-endangered plant species, rough rattlesnake-root, has been recorded near (but outside) the study area in a glades complex roughly between KY 251 and Wooldridge Ferry Road and north of KY 434.

State-Endangered

- **Spotted sandpiper** (*Actitis macularius*), state endangered species with range in Hardin County. Found in wide range of open habitats having stream, lake or pond shoreline (KDFWR).

- **Bachman's sparrow** (*Aimophila aestivalis*), state endangered species with range in Hardin County. Found in forested floodplains, bottomland hardwoods, bald cypress wetlands, and riparian forests along large rivers and reservoirs (KDFWR).

- **American coot** (*Fulica americana*), state endangered species with range in Hardin County. Found in freshwater lakes, ponds, marshes, and larger rivers and on land bordering these habitats; wintering also on brackish estuaries and bays. Prefers calm open water with plenty of algae and other aquatic vegetation (NatureServe, 2011).

- **Pocketbook mussel** (*Lampsilis ovata*), state endangered species with range in Hardin County. Found in medium-sized to large rivers in sand and gravel (KDFWR).

- **Helianthus leafhopper** (*Mesamia stramineus*), state endangered species with range in Hardin County. (Note: preferred habitat not yet assessed) (KDFWR).

- **Southeastern myotis** (*Myotis austroriparius*), state endangered species with range in Hardin County. Special habitat features include snags and hollow trees. Wetlands may be classified as suitable if they have a buffer of suitable vegetation. Kentucky populations winter in caves (KDFWR).

- **Elfin skimmer** (*Nannothemis bella*), state endangered species with range in Hardin County. Found in bogs, sometimes calcareous fens with some sedge meadows and marl deposits. Adults are often found near the margin of the pond or bog in small pockets of sunshine.

- **Cicadellid leafhopper** (*Prairiana kansana*), state endangered species with range in Hardin County. (Note: preferred habitat not yet assessed) (KDFWR).

- **Rough rattlesnake-root** (*Prenanthes aspera*), state endangered species historically known from Hardin County (recorded observation in a glades complex roughly between KY 251 and Wooldridge Ferry Road and north of KY 434, nearby the proposed project). Found in dry prairies and barrens, limestone glades, dry open rocky woods, usually in acid soils.

State-threatened

- **Elktoe mussel** (*Alasmidonta marginata*), state threatened species with range in Hardin County. Small streams to medium size rivers in gravel and sand (KDFWR).

- **Blue-winged teal** (*Anas discors*), state threatened species historically known from Hardin County. Prefers marshes, ponds, sloughs, lakes, and sluggish streams (river pools) (NatureServe, 2011).

- **Lark sparrow** (*Chondestes grammacus*), state threatened species historically known from Hardin County. Prefers open situations with scattered bushes and trees, prairie, forest edge, cultivated areas, orchards, fields with bushy borders and savanna.

- **Northern harrier** (*Circus cyaneus*), state threatened species with range in Hardin County. Prefers reclaimed mine lands and emergent and shrub-dominated wetlands, with adjacent grassland/agricultural (KDFWR).

- **Kirtland's snake** (*Clonophis kirtlandii*), state threatened species with range in Hardin County. Inhabits urban areas including vacant lots, wet meadows, thickets, woods margins, waste areas, and wetland restoration sites; it also occurs in roadsides and adjacent old fields, open wetlands, and low woodlands (KDFWR).

- **Grape honeysuckle** (*Lonicera reticulata*), state threatened species historically known from Hardin County. Prefers rocky woods and banks.

- **Hooded merganser** (*Lophodytes cucullatus*), state threatened species historically known from Hardin County. Uses shallow water sloughs and ponds of floodplain forests with cavity trees. Non-breeding birds will use a variety of wetland habitats, including reservoirs, marshes, sloughs and ponds (KDFWR).

- **Eastern small-footed myotis** (*Myotis leibii*), state threatened species with range in Hardin County. Small-footed bats are associated with hilly and mountainous terrain near or in deciduous or evergreen forest. They roost primarily in rocky habitat (e.g., rock fissures, rock crevices, under rocks). During the summer, they have been observed roosting in hollow trees and under exfoliating bark, in buildings and in expansion joints of bridges (KDFWR).

- **Eastern slender glass lizard** (*Ophisaurus attenuates longicaudus*), state threatened species with range in Hardin County. Occurs in fairly dry rocky open woodlands, remnant glades and prairies, rocky fields, and utility line areas with some bare ground (KDFWR).

- **Rabbitsfoot mussel** (*Quadrula cylindrica cylindrica*), state threatened species with range in Hardin County. Prefers small to medium rivers with moderate to swift currents, and in smaller streams it inhabits bars or gravel and cobble close to fast current (KDFWR).

- **Great plains ladies'-tresses** (*Spiranthes magnicamporum*), state threatened species historically known from Hardin County. Prefers calcareous soil in prairies and glades.

- **Kentucky creekshell mussel** (*Villosa ortmanni*), state threatened species with range in Hardin County. Prefers small streams to medium-sized rivers in sand, mud, and gravel (KDFWR).

State special concern

- **Henslow's sparrow** (*Ammodramus henslowii*), federal species of management concern and state special concern species historically known from Hardin County. Prefers open fields and meadows with interspersed grass, weeds or shrubby vegetation, especially in damp or low-lying area. Migration and winter habitat includes grassy areas adjacent to pine or second-growth woods.

- **Northern madtom** (*Noturus stigmosus*), federal species of management concern and state special concern species historically known from Hardin County. Prefers large streams and rivers in moderate to swift current over gravel and sand, and sometimes debris or pondweed for cover.

- **Bewick's wren** (*Thryomanes bewickii*), federal species of management concern and state special concern species historically known from Hardin County. Prefers brushy areas, thickets and scrub in open country, open and riparian woodland. Found in country towns and farms.

- **Sharp-shinned hawk** (*Accipiter striatus*), state special concern species historically known from Hardin County. Prefers forest and open woodland, coniferous, mixed, or deciduous; primarily in coniferous. Migrates through various habitats, mainly along ridges, lakeshores, and coastlines.

- **Northern cavefish** (*Amblyopsis spelaea*), state special concern species with range in Hardin County. Obligate cave dweller, inhabiting cool (8-17 °C) hypogean streams with mixed mud/rock substrates in shoals and mixed sand/silt substrates in pools (KDFWR).

- **Shaggy cavesnail** (*Antroselates spiralis*), state special concern species with range in Hardin County. Found on the undersides of large stones in running water of springs and streams in caves. Occurs only in base-level cave streams and their spring orifices (KSNPC, 2009).

- **Great blue heron** (*Ardea herodias*), state special concern species with range in Hardin County. Found in freshwater habitats, lakes, ponds and marshes with adjacent woodlands (NatureServe, 2011).

- **Sedge wren** (*Cistothorus platensis*), state special concern species historically known from Hardin County. Prefers grasslands and savanna, especially where wet or boggy, sedge marshes, and locally occurs in dry cultivated grain fields.

- **Eastern hellbender** (*Cryptobranchus alleganiensis alleganiensis*), state special concern species with range in Hardin County. Occurs in rivers and large streams; known from the major river

systems in Kentucky including the Ohio, Licking, Kentucky, Green, Barren, Cumberland. Apparently requires reasonably good water quality (KDFWR).

- **Purple prairie-clover** (*Dalea purpurea*), state special concern species with range in Hardin County. Found in prairie patches and cedar glades in limestone regions (KDFWR).

- **Eastern corn snake** (*Elaphe guttata*), state special concern species with range in Hardin County. Occurs in/near sparsely to moderately dense forested uplands dominated by oak and/or pine with well-drained sandy or loamy soils. Sites offering a mix of prairie patches and forest stands with numerous to scattered grassy or weedy openings seem to be preferred. (KDFWR).

- **Longsolid mussel** (*Fusconaia subrotunda subrotunda*), state special concern species with range in Hardin County. Found in medium to large rivers in gravel with a strong current (KDFWR).

- **Gray treefrog** (*Hyla versicolor*), state special concern species with range in Hardin County. More or less arboreal but can persist in weed fields, shrubby areas, and thickets as well as along tree-lined fencerows and in forests (KDFWR).

- **Mississippi kite** (*Ictinia mississippiensis*), state special concern species with range in Hardin County. Primarily occurs in floodplain areas where tracts of bottomland forest are intermixed with or adjacent to farmland (KDFWR).

- **Black buffalo** (*Ictiobus niger*), state special concern species with range in Hardin County. Occurs in pools and backwaters of streams and larger rivers, but can also be found in reservoirs, oxbows, and other lentic environments; prefers stronger currents of rivers and reservoirs (KDFWR).

- **Dark-eyed junco** (*Junco hyemalis*), state special concern species with range in Hardin County. Prefers various sorts of coniferous, mixed, and deciduous forest; forest edge; forest clearings; bogs; open woodland; brushy areas adjacent to forest; and burned-over lands (NatureServe, 2011).

- **Burbot** (*Lota lota*), state special concern species with range in Hardin County. Prefers large rivers in slackwater (KDFWR).

- **Ghost crayfish** (*Orconectes inermis inermis*), state special concern species with range in Hardin County. Occurs in subterranean waters in cave streams. This species is often found in larger base-level pools where mud and silt substrates predominate. Prefers a rocky-gravel substrate in shallow pools where flow gradient is minimal (KDFWR).

- **Mammoth cave crayfish** (*Orconectes pellucidus*), state special concern species with range in Hardin County. Occurs in subterranean waters in cave streams (KDFWR).

- **Stargazing minnow** (*Phenacobius uranops*), state special concern species with range in Hardin County. Inhabits streams of moderate to high gradient in swift clear riffles and runs over clean gravel and pebble substrates (KDFWR).

- **Northern hairstreak** (*Satyrium favonius ontario*), state special concern species with range in Hardin County. Prefers open woodlands, oak groves, coastal barrens (KDFWR).

- **Barrens silky aster** (*Symphyotrichum pratense*), state special concern species with range in Hardin County. Prefers open dry woods, bluffs, prairies and glades.

- **Eastern ribbon snake** (*Thamnophis sauritus sauritus*), state special concern species with range in Hardin County. Associated with wetland habitats that harbor good populations of prey species including amphibians, mosquito fish (Gambusia), and/or topminnows (Fundulus). Typically inhabit wet meadows and sunny openings with low herbaceous vegetation along the margins of sloughs, sluggish streams, bayous, oxbows, and other slow-moving or standing water habitats (KDFWR).

- **American black bear** (*Ursus americanus*), state special concern species with range in Hardin County. Prefers mixed deciduous-coniferous forests with a thick understory (KDFWR).

- **Little spectaclecase mussel** (*Villosa lienosa*), state special concern species with range in Hardin County. In sandy substrates in slight to moderate current. Prefers mud, particularly when rich in detritus. Typically inhabits small creeks to medium-sized rivers, usually along the banks in slower currents (KDFWR).

During the February 2011 on-site reconnaissance, potential summer habitat for the state-endangered southeastern myotis (snags and hollow trees), and the state-threatened eastern small-footed myotis (hollow trees, exfoliating bark; hilly terrain near deciduous or evergreen forest) was observed in the study area. Individual trees exhibiting these characteristics were primarily of moderate size (8-20" dbh) and located within scattered woodlots, wooded fencerows or isolated in residential yards.

Potential habitat for the spotted sandpiper, American coot, elfin skimmer, blue-winged teal, northern harrier, hooded merganser, great blue heron, sedge wren, and eastern ribbon snake was observed in the study area in the form of ponds, emergent wetlands, wet meadows, and wet grasslands.

Potential habitat for the lark sparrow, Kirtland's snake, Henslow's sparrow, Bewick's wren, gray treefrog, and dark-eyed junco was observed in the study area in the form of open habitat with scattered bushes, shrubby vegetation, thickets, tree lined fencerows, roadsides and adjacent old fields.

Potential habitat for the rough rattlesnake-root, eastern slender glass lizard, purple prairie-clover, eastern cornsnake, northern hairstreak, and barrens silky aster was observed in the study area in the form of open, dry woodlands, oak groves, open fields, and utility line area.

Limited potential habitat for Bachman's sparrow, grape honeysuckle, great plains ladies'-tresses, sharp-shinned hawk, Mississippi kite and American black bear was observed in scattered locations within the

study area. Due to the limited nature of the preferred habitats present, the absence of records in proximity to the study area, and the general commercial and rural residential land uses present, these species would not be expected to be adversely affected by the construction of this project.

No suitable habitat for the pocketbook mussel, elktoe mussel, rabbitsfoot mussel, Kentucky creekshell mussel, northern madtom, northern cavefish, shaggy cavesnail, eastern hellbender, longsolid mussel, black buffalo, burbot, ghost crayfish, Mammoth cave crayfish, stargazing minnow, or little spectaclecase mussel was observed in the study area, and these species would not be expected to be adversely affected by the construction of this project..

Information on preferred habitat for helianthus leafhopper and a cicadellid leafhopper was not available (have not yet been assessed by KDFWR).

Due to the occurrence of potential habitat for multiple state-listed species within the study area, additional habitat assessment and coordination with resource agencies may be required as the project further develops.

G. Woodland Habitats

Woodland habitat accounts for about 15 percent (57 acres) of the project study area (Attachment A2; see representative photographs in Attachment C). Included are a few larger woodland tracts that extend beyond the study area, smaller fragmented woodlots, scrubby old fields, and wooded fencerows. A majority of woodlands within the study area occur in uplands and were comprised of oaks (*Quercus* sp.), ash (*Fraxinus* sp.), tulip poplar (*Liriodendron tulipifera*), and maple (*Acer* sp.) having a moderately open understory of honeysuckle shrub and herbaceous cover. A few hickories (*Carya* sp.) were scattered throughout the study area. Upland evergreen pine (*Pinus* sp.) tended to be more predominant in the northern parts of the study area. Bottomland wooded areas along streams consisted of American sycamore (*Platanus occidentalis*), silver maple (*Acer saccharinum*), and willow (*Salix* sp.). Scrubby old field habitat consisted of a mix of cedar (*Juniperus virginiana*), locust (*Gleditsia triacanthos*), osage (*Maclura* sp.), and tulip poplar saplings. Wooded fencerow included cedar, pine, black cherry (*Prunus serotina*), hackberry (*Celtis occidentalis*) and boxelder (*Acer negundo*). All wooded habitats had areas of scrubby briars, blackberry and rose. None of these wooded areas were considered to be unique or of high quality.

H. Public Parks – Section 4(f) and Section 6(f) Facilities

Based on the on-site reconnaissance and review of information from KSNPC, the National Park Service (NPS, 2010), and other available mapping, no state or federal managed areas, parks, forests or preserves (Section 4(f) resources) occur in the study area. No facilities in the study area were identified as having received a Land and Water Conservation Fund (LWCF) grant (Section 6(f) resources; Attachment B14). Section 4(f) resources relative to archaeological sites and cultural and historic properties are discussed in Section III.B of this document.

III. HUMAN ENVIRONMENT

A. Social and Economic Resources

Through a combination of review of secondary source information, aerial photography and on-site reconnaissance, the following social and economic resources were identified in the study area (Attachment A3):

Schools, Institutions and Learning Centers – No schools or learning centers occur in the study area, and one institution was identified:

- *Camp Nikao and Conference Center,* 7566 Shepherdsville Road (KY 251), a ministry outreach center of the Kentucky Church of God of Prophecy

Churches - Two churches were identified:

- *Church of Jesus Christ of Latter Day Saints,* 2950 Shepherdsville Road (KY 251)
- *Heavenbound Baptist Church,* 6857 Shepherdsville Road (KY 251)

Cemeteries - No cemeteries were identified in the study area during the on-site reconnaissance. However, one feature is noted from USGS mapping (Colesburg Quad), located southeast of the south intersection of KY 251 and Sycamore Road, approximately 250 feet east of KY 251 centerline.

- *McMillen Cemetery,* 6556 Shepherdsville Road (KY 251)

At the time of the on-site reconnaissance, this area was observed to be an open field contiguous to a residential home, marked only by a single tree. No discernable characteristics were observed from the roadway right-of-way, such as fencing, headstones, and gravel drive or road side signage to indicate the presence of a cemetery. Additional research of secondary source materials including online resources (e.g. Kentucky Historical Society cemeteries database, genealogy sites, etc.) found no reference to McMillen Cemetery in Hardin County aside from this USGS mapped reference. This cemetery is possibly a private family cemetery as it is mapped within the same property parcel as the residential home. The presence of this cemetery will need to be verified as the project further progresses.

Fire Departments and Hospitals - No fire departments or hospitals were identified in the study area.

Shopping Centers - Two shopping centers were identified:

- *Cool Springs Shopping Center*, southwest corner of KY 251 and KY 3005 (Ring Road). Stores included Jeff's Prescription Shop (2415 Ring Road, only business/building within the study area), Citizens Union Bank and additional businesses.

- *Pavilion Shopping Center,* northwest corner of KY 251 and KY 3005 (Ring Road). Stores included Gondolier Italian Restaurant & Bar (2414 Ring Road, only business/building within the study area), Heartland Primary Care, AcuteCare, and additional businesses.

Industrial and Business Parks - No industrial or business parks occur in the study area. The Kentucky Cabinet for Economic Development reports multiple industrial and business parks in the Elizabethtown area, all of which are located south of downtown Elizabethtown.

Several individual businesses were scattered throughout the study area. Aside from the KY 251/KY 3005 intersection, the KY 251/KY 434 intersection contained the only additional concentration of businesses within the study area.

Federal Facilities – The Fort Knox Military Reservation occurs at the project north terminus at KY 251 and KY 313. All land north of the existing KY 313 right-of-way is on the military property. No additional federal facilities are located within or adjacent to the project area.

Golf Courses - No public golf courses occur in the study area.

B. Archaeological and Cultural Historic Resources – Section 106 and Section 4(f) Resources

Information concerning archaeological and cultural historic resources in the vicinity of the project study area was obtained from the Kentucky Office of State Archaeology (KOSA) and the Kentucky Heritage Council (KHC) in December 2010. A summary of key findings is provided below. Section 106 review under the Historic Preservation Act and evaluation and coordination with the Federal Highway Administration under Section 4(f) of the Department of Transportation Act of 1966 will be required if any archaeological or cultural historic resources are identified and impacted by the project.

1. Archaeological Resources

Review of information from the Kentucky Office of State Archaeology indicates one prior archaeological survey has been performed which partially overlaps a small portion of the project study area at the north project terminus (KOSA, 2011; Attachments A3 and B15). The prior archaeological survey identified one previously recorded archaeological site (National Register eligibility undetermined.) Specific information regarding the location, context and content of this site was not provided.

Since most of the project area has not been previously surveyed, a Phase I archaeological site investigation will be required to determine the presence or absence of archaeological resources throughout the extent of the study area.

2. Cultural Historic Resources

Review of information from the Kentucky Heritage Council indicated no previously recorded historic resources occur in or adjacent to the study area (KHC, 2011; Attachment B16). An initial project review (KYTC, 2010a) indicated the possibility of structures 50 years of age or older present within the study area, and recommended further study.

An on-site reconnaissance of the study area performed on 16 February 2011 by ENTRAN personnel identified several residences and associated structures that appeared to be more than 50 years in age. A cultural historic survey performed by a KYTC pre-qualified consultant will be required as this project

further develops to determine the presence (and NRHP eligibility) or absence of cultural historic resources in the study area.

One cemetery is indicated on USGS mapping (Colesburg Quad) within the project study area, namely the McMillen Cemetery located southeast of the south intersection of KY 251 and Sycamore Road, approximately 250 feet east of KY 251 centerline. At the time of on-site reconnaissance, this area was observed to be an open field contiguous to a residential home, marked only by a single tree (see additional discussion in Section III.A.) This site is possibly a private family cemetery as it is mapped within the same property parcel as the residential home. The presence of this cemetery will need to be verified and further evaluated for NRHP eligibility.

C. Hazardous Materials Concerns

Properties with hazardous material concerns were identified through review of state and federal database records and an on-site reconnaissance of the study area. Federal and state regulatory database records research was provided by FirstSearch Technology Corporation (2010).

Overall, five sites within the project study area were identified as having potential hazardous material concerns as described below and shown on Attachment A3.

1. Underground Storage Tanks

Review of state UST/AST (Underground Storage Tank/Aboveground Storage Tank), LUST (Leaking Underground Storage Tank) and State Petroleum Cleanup databases indicated five UST/AST and LUST records in the project vicinity. Four of these records (three LUST and one UST, the John O S BP) were determined to lie well outside the study area limits. The remaining record, James Moore Fence Company (UST) is reported as a Verified Removal.

An initial review of the study area (KYTC, 2010a) identified three potential UST/Hazmat sites along KY 251 between KY 3005 and KY 313, including a possible trucking company, a gas station, and a service company (McMillen Mechanical). An on-site reconnaissance of the study area conducted by ENTRAN personnel on 16 February 2011 identified the gas station at the southwest corner of KY 251 and KY 434 intersection as the single confirmed UST concern facility:

Property ID 1. *434 Food Mart and Marathon*; 3069 Battle Training Road (KY 434), Elizabethtown; currently Marathon Gas Station and convenience store; three service islands present, two UST's and two fuel AST's present within the study area. The UST's are located under asphalt nearest to the intersection; the AST's are located along the south edge of the property.

The remaining two facilities identified in the initial (2010) project review did not exhibit UST concerns. Those facilities are further described in Section III.C.5 Additional Hazardous Materials Concerns.

One additional property, located at the southeast corner of KY 251 and East Bryan Road, has been identified as a potential UST concern. At the time of February 2011 on-site reconnaissance this

property was an empty lot having several concrete pads, the remnants of a possible building foundation, a partial asphalt and gravel parking area along KY 251, and an adjacent grass area which appeared to be filled and graded. The layout of the concrete pads resembled potential parking spots for automobile fueling or a base for fuel islands. This location may contain remnants of former service or filling station equipment, including potential abandoned UST's and/or petroleum contaminated soils. This property is identified on Attachment A3 as:

Property ID 2. *Potential Abandoned Service/Filling Station*; KY 251 and East Bryan Road; currently vacant lot; exhibits characteristics of prior automotive service/filling station, including potential UST (present or removed) location, service islands, building foundation and parking areas.

A Phase I survey for UST's will need to be conducted as the project further develops should either of these properties be impacted by construction or excavation activities.

2. USEPA Regulated Sites

USEPA regulated sites and incident reports in the vicinity of the study area were determined through review of the USEPA Envirofacts Data Warehouse (USEPA, 2010a) and the FirstSearch Technology Corporation (2010) regulatory database search of the following databases:

USEPA NPL (National Priority List-Active and Delisted); CERCLIS (Comprehensive Environmental Response Compensation and Liability Information System –Superfund); NFRAP (CERCLIS Archived Sites); RCRA (Resource Conservation and Recovery Information System, RCRIS, RCRA Corrective Action, Treatment Storage and Disposal Facilities, and Generators); ERNS (Emergency Response Notification System); and Brownfields;

STATE Sites (State LEADS List); SWL (Permitted Operating Landfills); LUST (Senate Bill 193); UST/AST; and Brownfields.

The USEPA Envirofacts Data Warehouse Locational Reference Tables data query for all USEPA registered facilities reported one facility in the study area:

Air Facility System (AFS)

Gohmann Asphalt and Construction, 3250 Shepherdsville Road; potential uncontrolled emissions Particulate Matter < 10μm; crushed and broken limestone mining and quarrying, and asphalt paving mixture and block manufacturing.

The Hardin County Property Valuation Administrator website (2011) indicated there are no properties in Hardin County with the street address of 3250 Shepherdsville Road. The only property in Hardin County registered to Gohmann Asphalt is located at 2776 Battle Training Road (KY 434), which was observed to be approximately 1,600 feet west of the study area. It is therefore determined that this facility does not occur within the study area and is of no further concern.

The regulatory database search report identified three NFRAP and one RCRA sites in the vicinity of the study area. Additional research determined that each of these four sites are located well away from the study area and do not present any concerns for the project.

3. Oil and Gas Wells

Oil and gas well locations in the vicinity of the study area were identified through review of information from the Kentucky Geological Survey, Geologic Information Service (KGS, 2010d) and on-site reconnaissance. No oil and gas wells are located within the study area. The nearest active oil or gas well is located approximately 3 miles east of the study area, with several dry and abandoned wells closer than this distance. No oil or gas fields are mapped within or in the vicinity of the study area.

4. Landfills

Review of information from Kentucky Energy and Environment Cabinet, Division of Waste Management (KDWM), Solid Waste Branch and the Hardin County Solid Waste Division indicated there are two active Contained or CDD solid waste facilities in Hardin County (KDWM, 2010; Hardin County Government, 2010). The county and incorporated cities are serviced by the Pearl Hollow Landfill, a county operated, contained landfill approximately 5 miles east of the project study area. The Fort Knox Military Reservation contains the Fort Knox Landfill, a federally owned CCD (construction & demolition debris) landfill approximately 8 miles northwest of the project study area.

The federal and state regulatory database search report acquired for the project (FirstSearch Technology Corporation, 2010) reported six records for permitted landfills (SWL) in the vicinity of the study area, including two operating, three terminated and one inactive record. Five of these records were determined to relate to locations well outside the study area and do not present any concerns for the project. The sixth record (J Raphael Hughes Property, permit KYSW-0406-040463) could not be geographically located due to lack of information.

During the on-site reconnaissance of the study area, no evidence of active or closed landfills was observed in or adjacent to the study area.

5. Additional Hazardous Materials Concerns

Three additional facilities in the project study area exhibited potential hazardous materials concerns as observed during the on-site reconnaissance, including:

Property ID 3. *McMillen Mechanical, Inc.*; 6671 Shepherdsville Road (KY 251); service company specializing in mechanical and electrical contracting, HVAC, plumbing; three buildings on site; one fuel AST observed on site, along outside wall of largest building facing KY 251; concern due to operation type.

Property ID 4. *B.O.S.S. Vehicle Sales*; 7855 Shepherdsville Road (KY 251); signage indicates "Truck & Trailer Sales & Service"; automotive service garage, multiple heavy vehicles and semi-

trailers on site; no evidence of UST's or AST's observed from roadway right-of-way; concern due to operation type.

Property ID 5. *Gondolier Italian Restaurant & Bar*, 2414 Ring Road (KY 3005); two ground-mounted transformers located on east side of property, adjacent to existing KY 251 right-of-way; ownership uncertain (private or utility); presence of PCB's uncertain.

McMillen Mechanical and B.O.S.S. Vehicle Sales had been previously identified as potential concern sites in the initial project review (KYTC, 2010a).

A Phase I survey for hazardous materials concerns may need to be conducted as the project further develops should the identified properties be impacted by construction or excavation activities.

D. Agriculture

Review of 2007 Agricultural Census data from the United States Department of Agriculture (USDA) indicates that Hardin County is ranked 33rd out of 120 Kentucky counties in agricultural production value, with the typical agricultural practices of hay, grass silage and greenchop (39,968 acres), corn (25,894 acres) and soybean (23,861 acres) (USDA, 2007). Review of soil data information of the project study area (USDA, 2010b) indicated that no prime farmland soils occur within the study area.

On-site reconnaissance indicated that agricultural lands in the study area consisted of mostly small lots of fenced pasture (primarily horses) and open hay fields. One fallow row-crop field was observed near the project south terminus. Several active farms were identified through the central and north portions of the study area, with signage indicative of horse farm operations. Land dedicated to agriculture was estimated to account for approximately 26 percent of the total study area (Attachment A3).

Impacts to farmland are regulated by the Farmland Protection Policy Act (FPPA). Coordination with the local NRCS office will be necessary as the project develops, to determine if there will be adverse impacts to farmland associated with the proposed project.

E. Mining

The presence of mines or quarries in the study area was investigated through review of information from the Kentucky Department for Natural Resources (Division of Mine Permits, Division of Mine Reclamation and Enforcement, and Division of Abandoned Mine Lands; KDNR, 2010), Kentucky Mine Mapping Information (2010), and on-site reconnaissance. Review of secondary source information indicated several active mines and/or quarries occur in Hardin County. The Fort Knox Quarry, a limestone quarry operated by Vulcan Construction Materials, is the nearest operating mine or quarry and is located approximately 0.75 mile west of the project study area along Battle Training Road. There are no mined out areas mapped within the county, and the county is not covered by any of the Division of Abandoned Mine Lands' three field offices.

No active or inactive mining operations were observed within or adjacent to the study area during the on-site reconnaissance.

F. Air Quality and Noise

1. Air Quality

Review of available USEPA Envirofacts data for Hardin and adjoining counties (USEPA, 2010a) did not indicate any air quality issues for the reporting year through September 2010. Review of available USEPA Green Book data (USEPA, 2010b) indicates adjoining Bullitt and Jefferson Counties (Louisville, KY-IN area) are in Nonattainment status for particulate matter *PM-2.5 1997* pollutant criteria, while Hardin County is not listed for any criteria pollutants. The Kentucky Transportation Cabinet (KYTC), Division of Planning's Air Quality Modal Program does not list Hardin County as an Air Quality Non-Attainment Area (*8-Hour Ozone* or *PM2.5*) as of July 2007 (KYTC, 2010b).

2. Noise

Noise-sensitive receptors observed within or adjacent to the study area included the following:

- Low density residential neighborhood developments (e.g. maximum of five dwelling units per acre) such as Bluegrass Road, Amber Wood and Grand Hill Villas in the south of the study area, a small mobile home park, Five Oaks Drive and The Woods between West Bryan Road and Battle Training Road;
- Camp Nikao, youth and adult camp and retreat facility in the north of the study area; and
- Two churches, one in the south and one in the center of the study area.

Aside from the specified residential areas, the majority of the study area exhibited very low density (i.e. two or fewer dwelling units per acre) rural residential and agricultural development patterns with widely separated single family residential structures along KY 251. A project-specific traffic noise impact study may need to be conducted to identify and mitigate noise impacts as this project further develops.

G. Additional Items of Concern

MS4 - The City of Elizabethtown and Hardin County are regulated as a Small Municipal Separate Storm Sewer System (MS4), each having a Phase II NPDES permit from KDOW (KYTC, 2010c). The MS4 regulated boundary covers all of Hardin County, including the City of Elizabethtown and Fort Knox Military Reservation. As such, KYTC activities should be performed "in an environmentally sound manner … ensuring that planning, design, construction, operation, and maintenance projects and activities that are implicated by the MS4 program are performed in accordance with federal, state, and local environmental laws, regulations, and policies" (KYTC, 2010d). Coordination with the KYTC-District 4 Environmental Coordinator, the KYTC-DEA, and local MS4 Coordinators will be required as the project construction plans are developed and an NPDES NOI permit is prepared.

Utility Corridors - Utility corridors will require consideration as this project further develops. Specific utility corridors identified during February 2011 on-site reconnaissance included:

- Local water distribution line; a six-inch gravity-fed water distribution line is reported to run along KY 251 (KYTC, 2010a); the presence of this and additional public utilities (electric, phone

and/or cable lines) were observed along each side of KY 251 throughout the length of the study area;

- Petroleum transmission pipelines cross KY 251 at two locations; a Mid-Valley Pipeline Co crude oil pipeline in the southern portion of the study area just south of Five Oaks Dr., and a Marathon petroleum pipeline in the northern part passing through the McMillen Mechanical property, near the southern intersection of KY 251 and Sycamore Road.

Socioeconomic and Environmental Justice - Information regarding socioeconomic data and the presence or absence of environmental justice populations is being provided by the Lincoln Trail Area Development District for inclusion in the project scoping study. During on-site reconnaissance of the study area, one small mobile home neighborhood (consisting of about five mobile homes) was identified along KY 251 southbound, south of Five Oaks Drive (see Attachment A3b).

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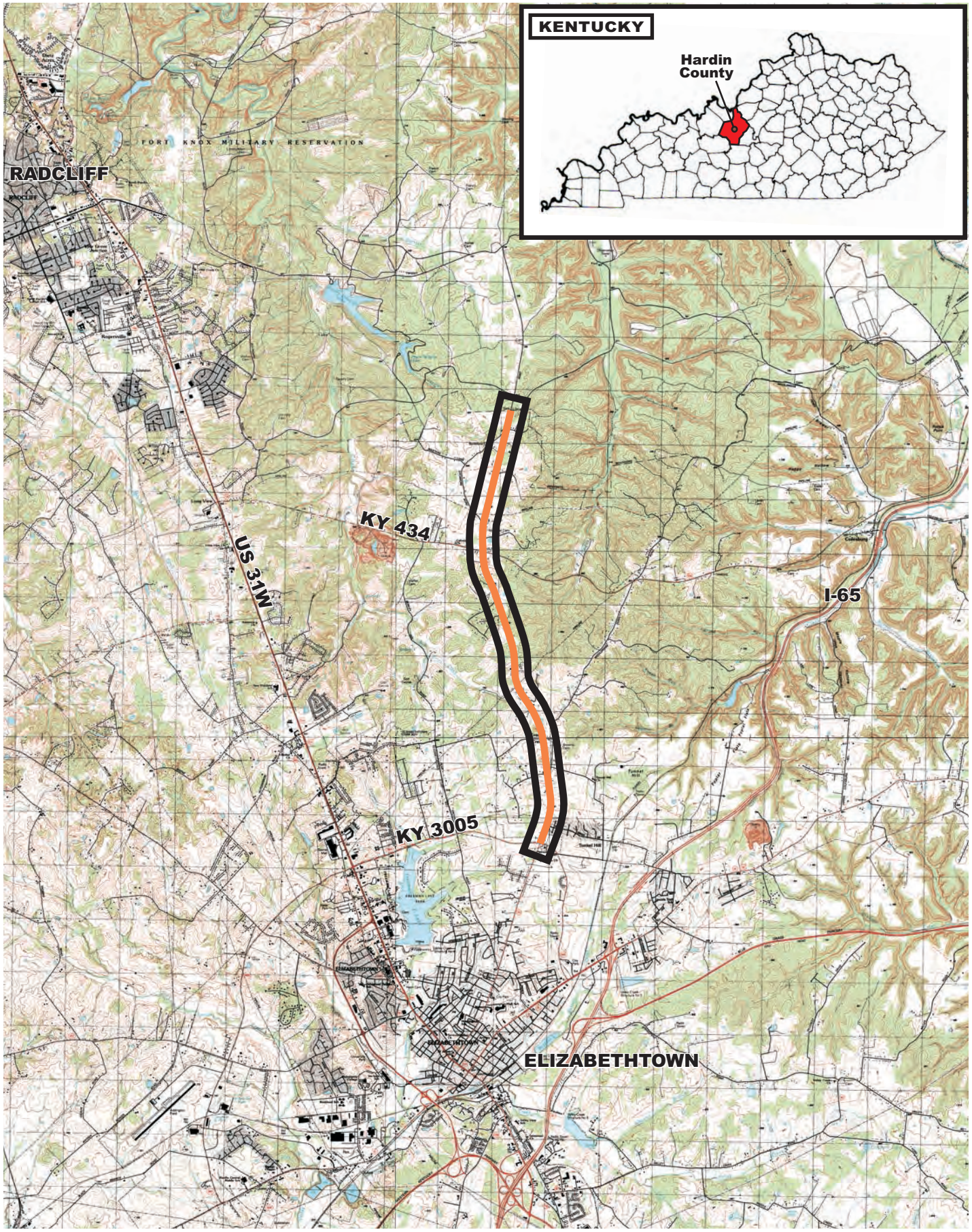
ATTACHMENT A

A1. Project Location Map
A2a-d. Environmental Footprint, Natural Environment
A3a-d. Environmental Footprint, Human Environment



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March 2011

NORTH

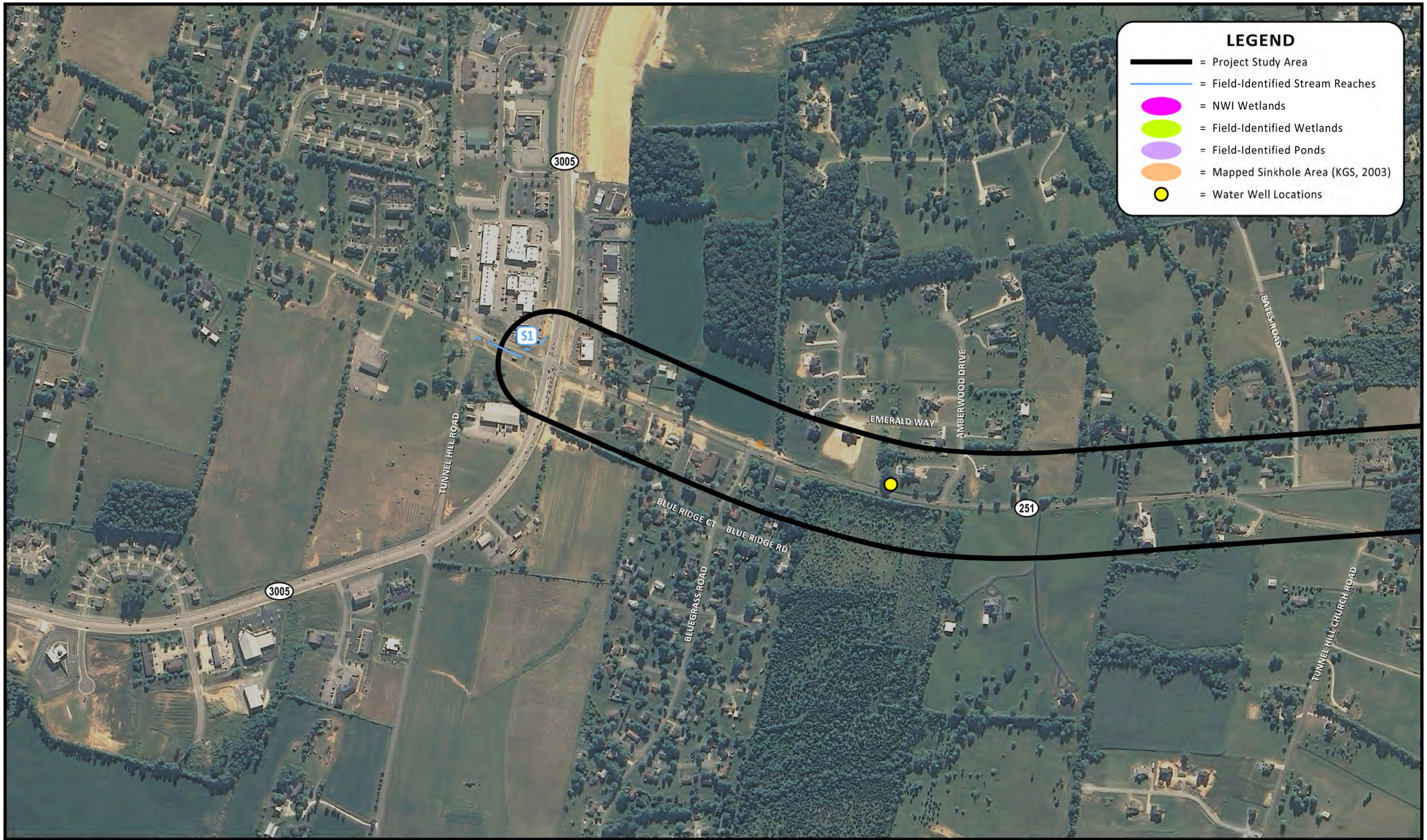
ENTRAN

Environmental Overview

KY 251 Improvements Project – KY 3005 to KY 313
Hardin County, Kentucky; Item 4-153.00

Attachment A1

Project Location Map



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March 2011 NORTH

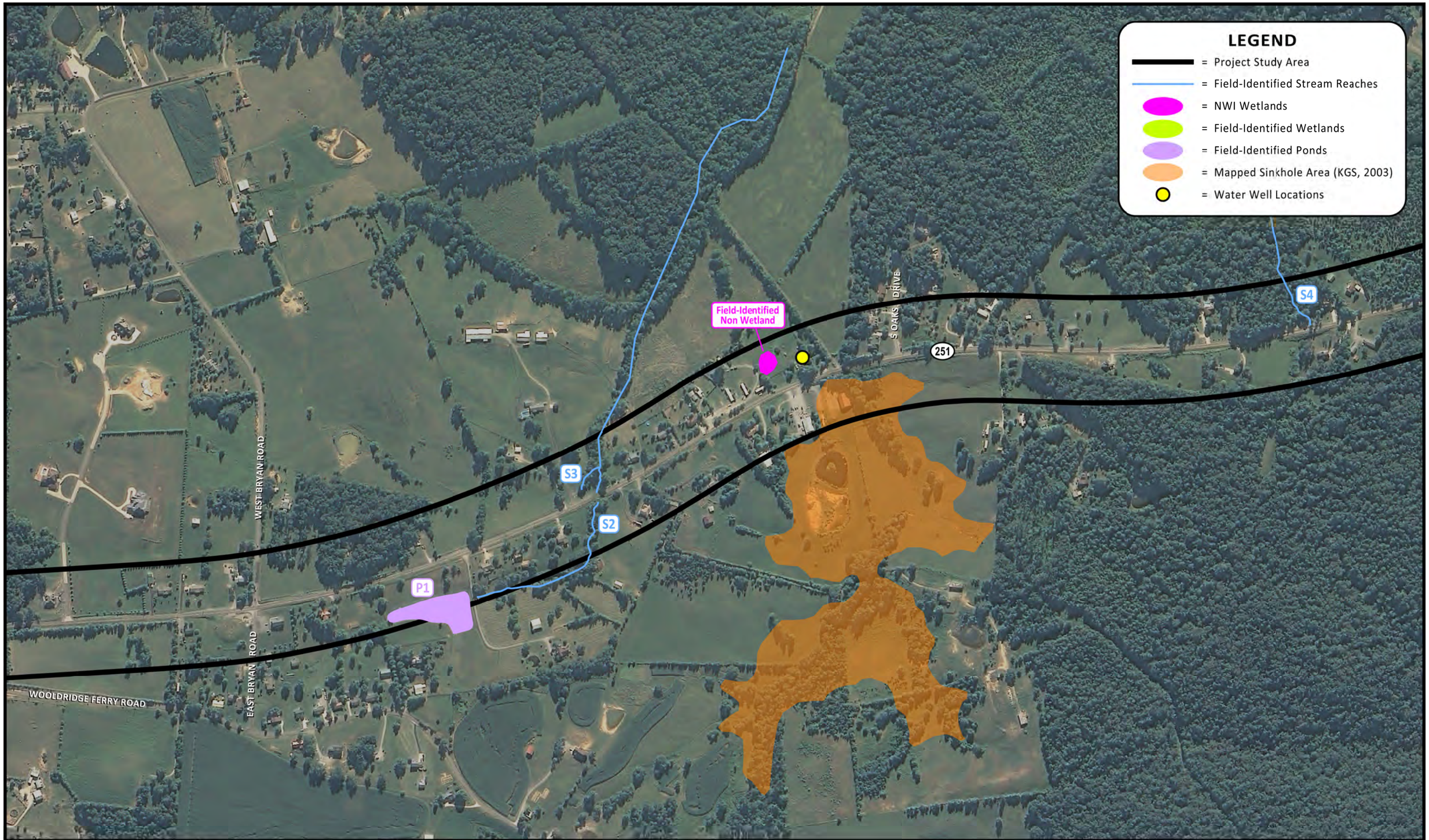
ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment A2a

Natural Environment



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March 2011 NORTH

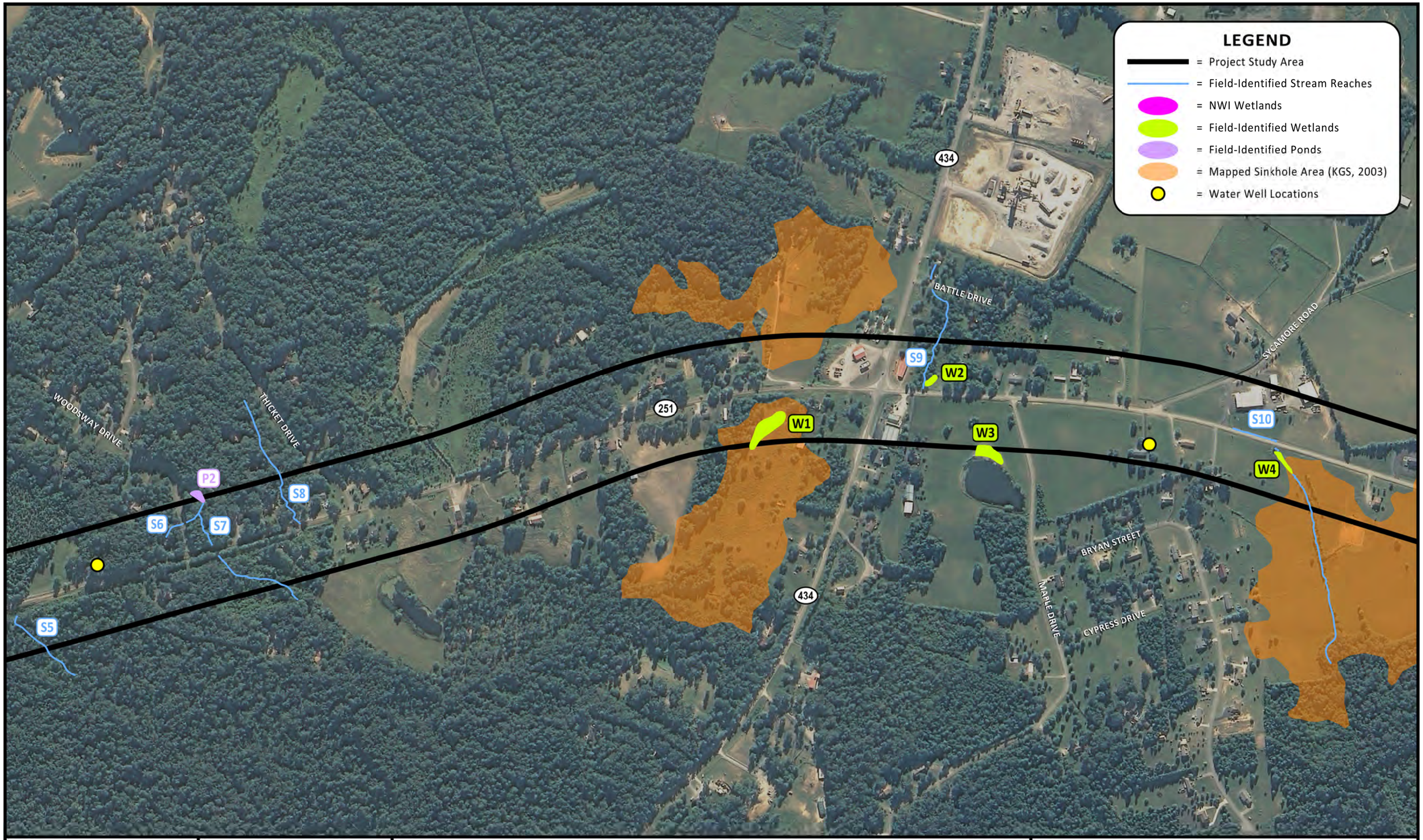
ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment A2b

Natural Environment



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March 2011 NORTH

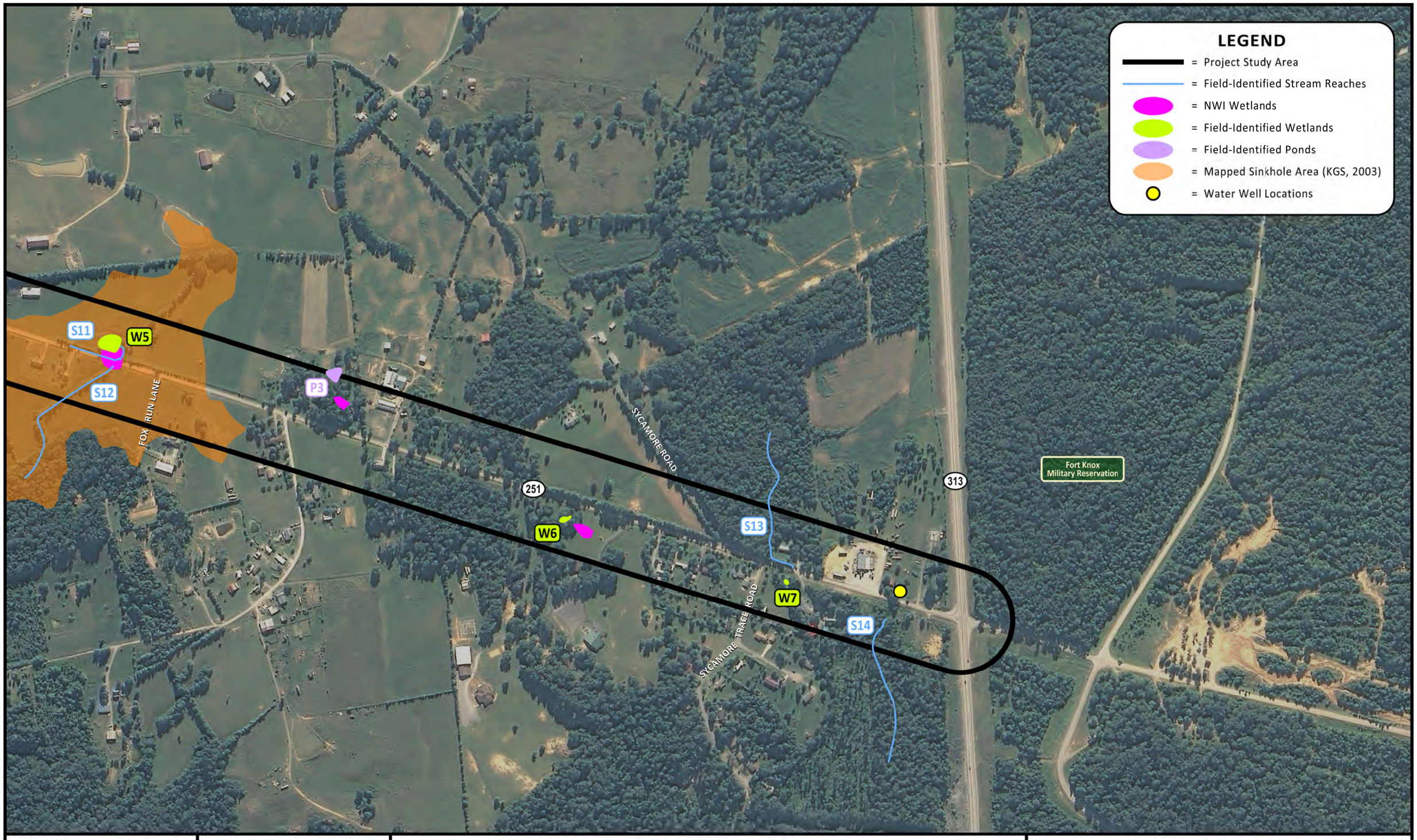
ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment A2c

Natural Environment



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March 2011

NORTH

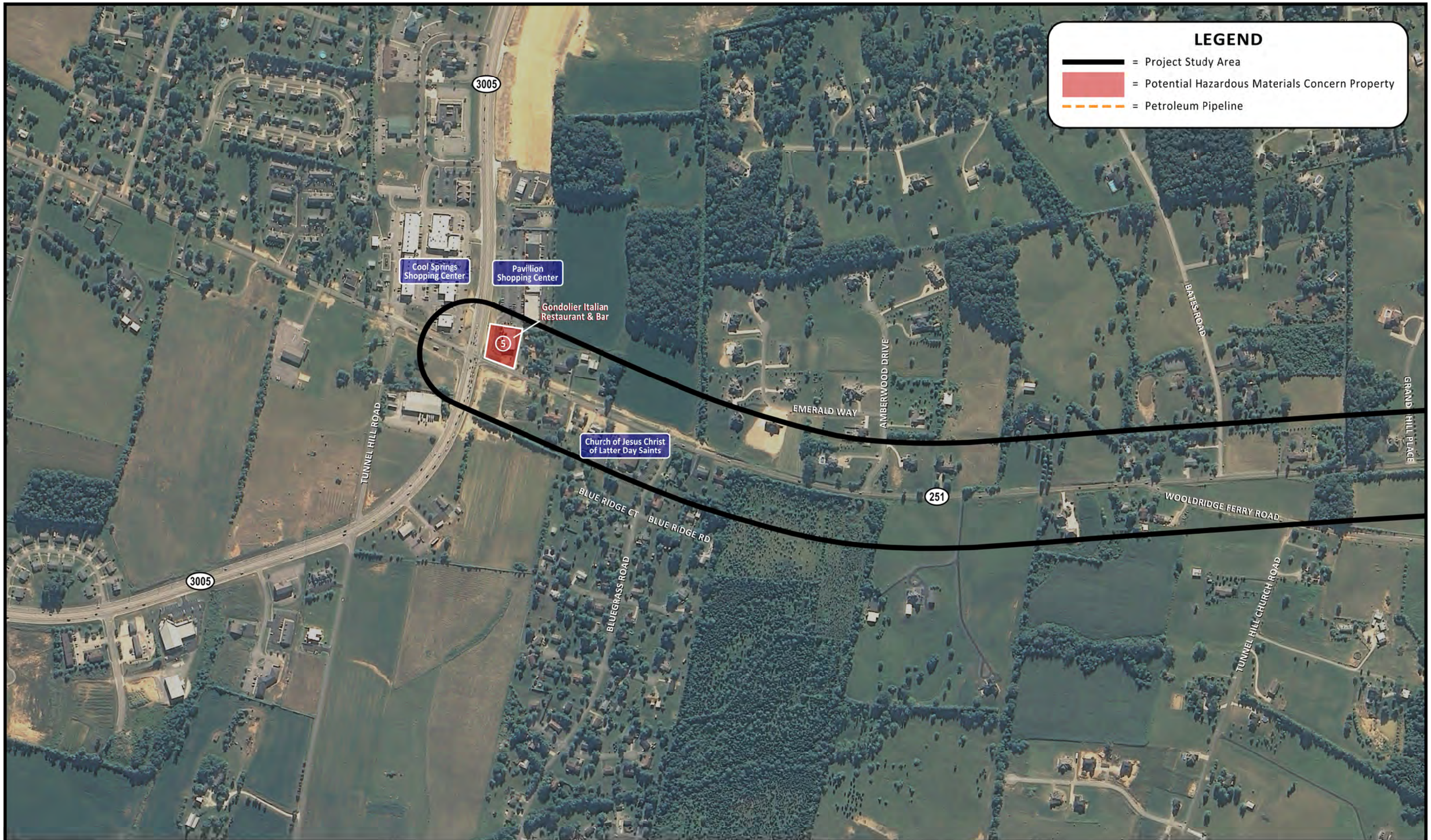
ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment A2d

Natural Environment



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NORTH

March 2011

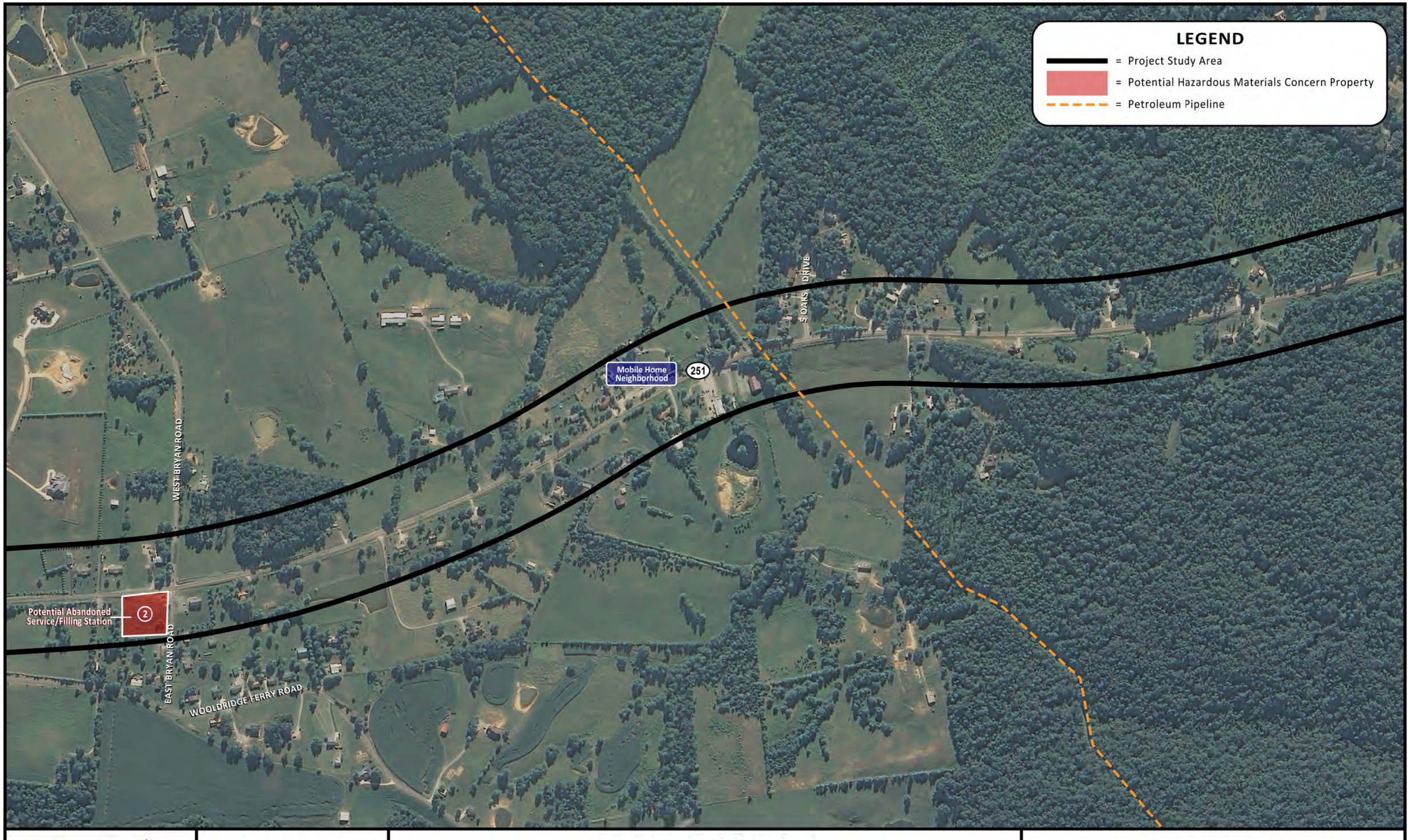
ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment A3a

Human Environment



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March 2011

NORTH

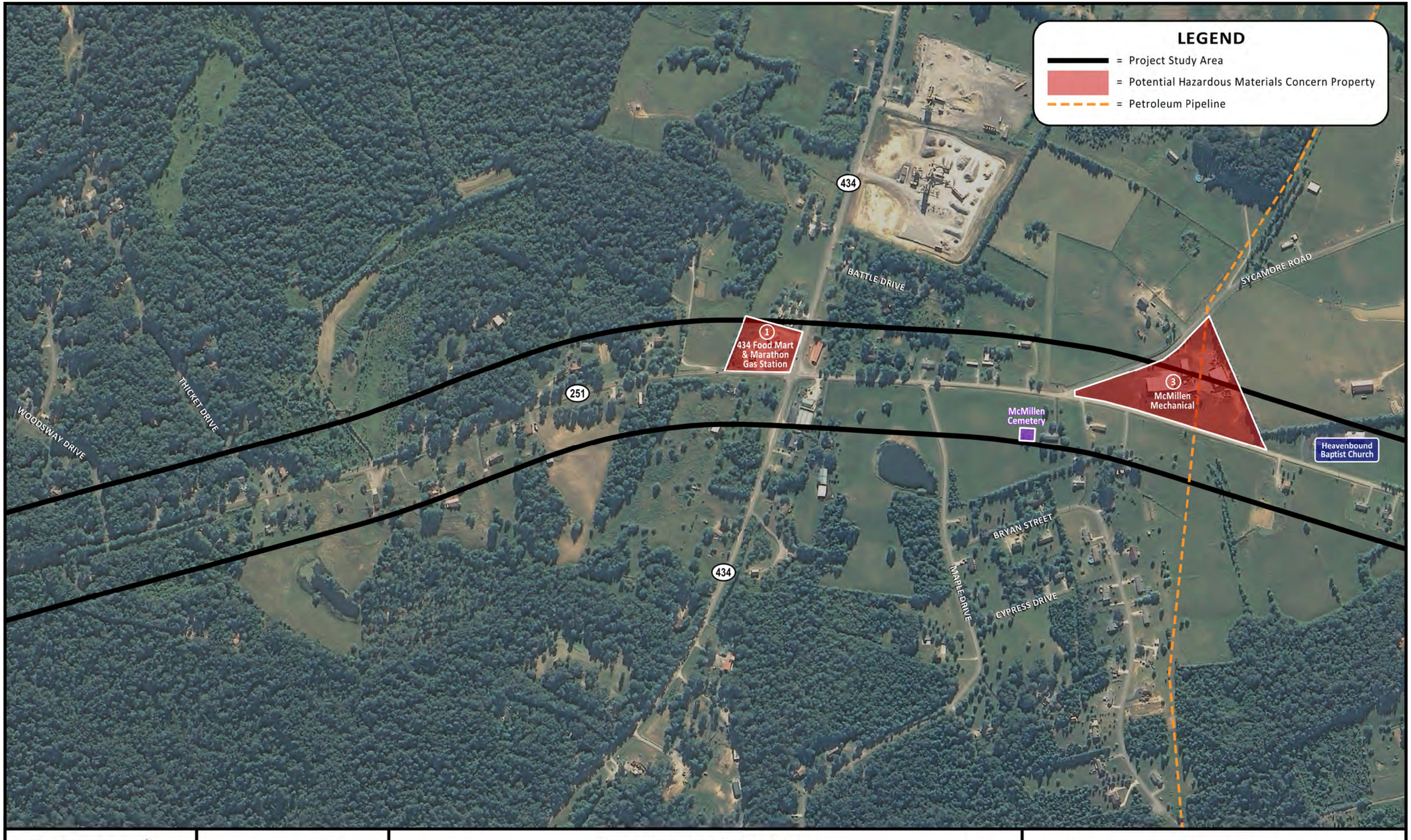
ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment A3b

Human Environment



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March 2011

NORTH

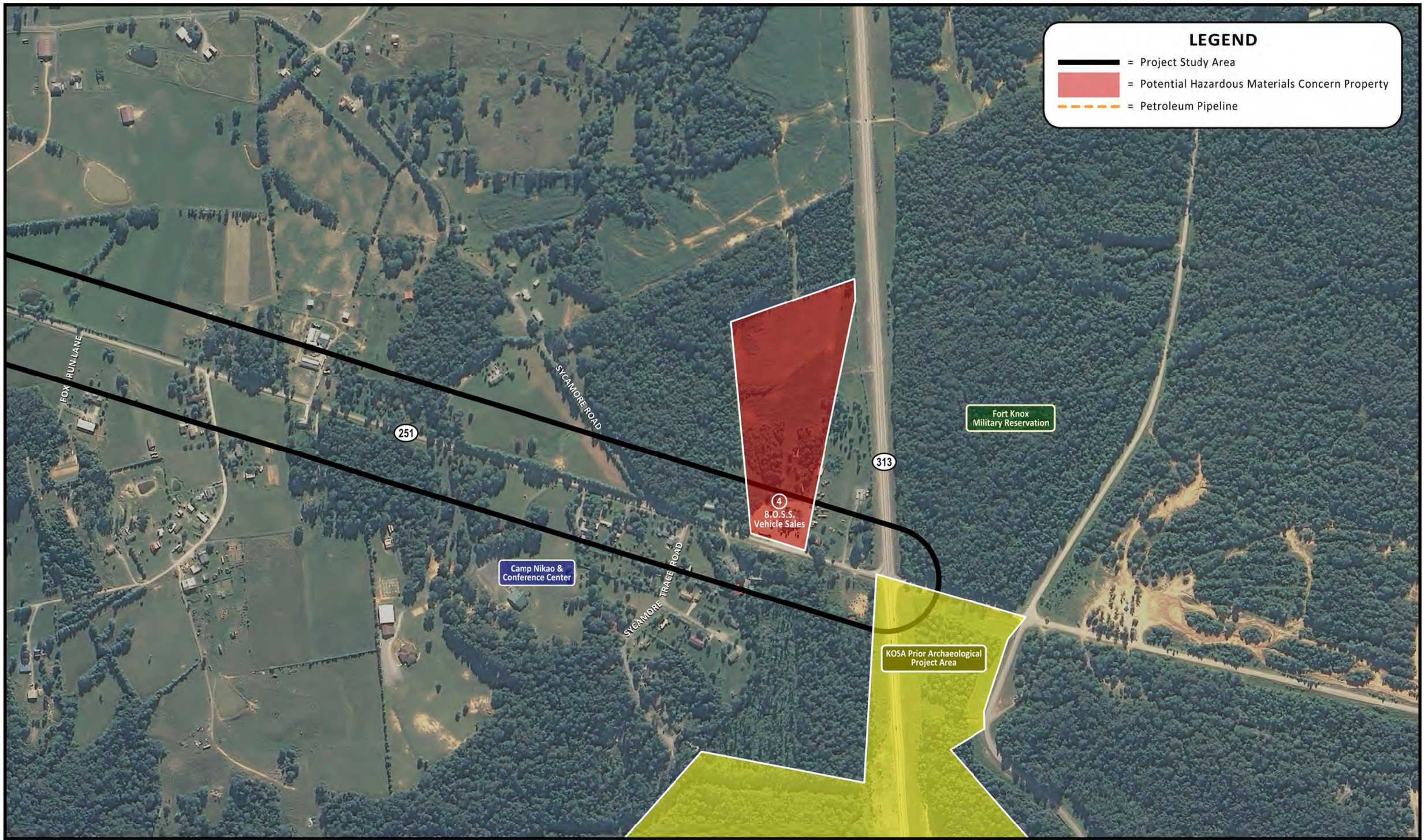
ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment A3c

Human Environment



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March 2011

NORTH

ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment A3d

Human Environment

ATTACHMENT B
Supplemental Information

ATTACHMENT B1

Physiographic Regions of Kentucky

KENTUCKY GEOLOGICAL SURVEY
James C. Cobb, State Geologist and Director
UNIVERSITY OF KENTUCKY, LEXINGTON

MAP AND CHART 24
Series XII, 2001

ILLUSTRATED PHYSIOGRAPHIC DIAGRAM OF KENTUCKY

View the KGS World Wide Web site at www.uky.edu/kgs

Note: Numbers on map indicate where the photographs were taken.

For information on obtaining copies of this map and other Kentucky Geological Survey maps and publications call:
Publication Sales
(859) 257-3896

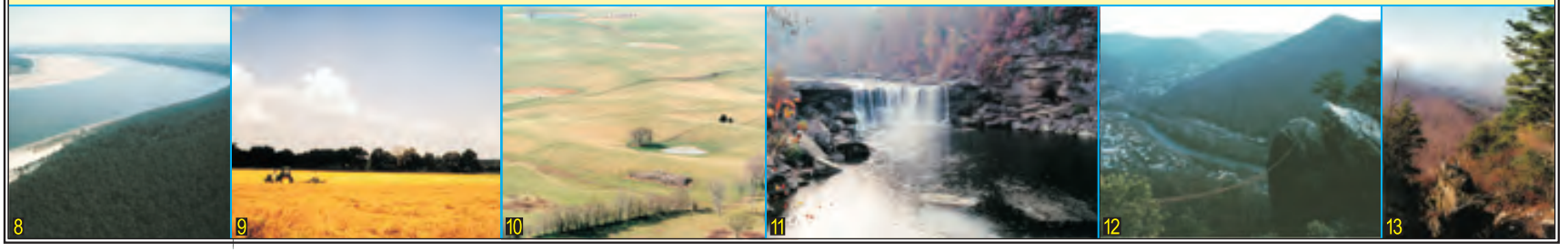
0 40 mi
0 50 km
scale

N

Ohio River
Mississippi River

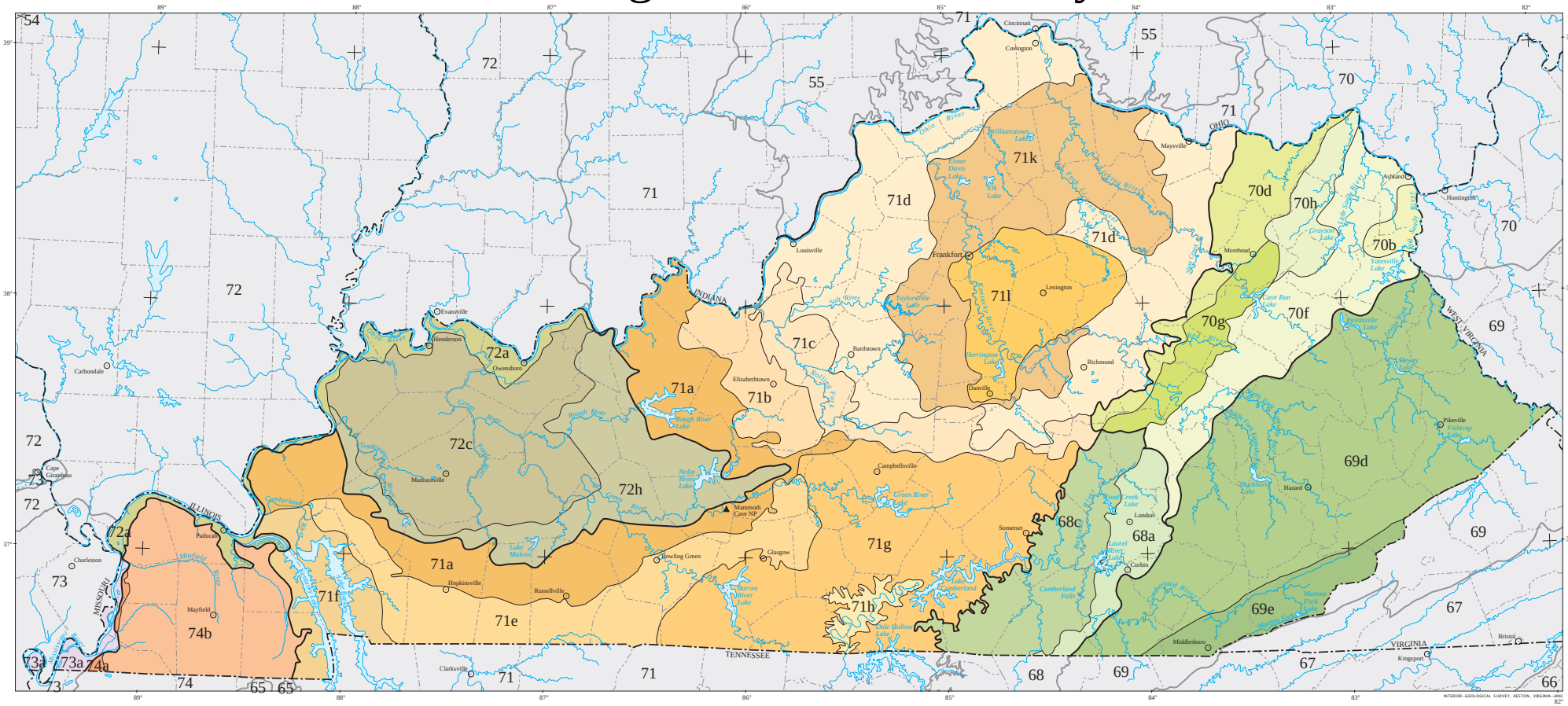
1 WESTERN KENTUCKY COAL FIELD
2 FLUORSPAR DISTRICT
3 MISSISSIPPI EMBAYMENT
4 MULDRAUGHS HILL
5 DRIPPING SPRINGS ESCARPMENT
6 MISSISSIPPIAN PLATEAUS
7 OUTER BLUEGRASS BELT
8 INNER BLUEGRASS REGION
9 EDEN SHALE
10 THE KNOBS
11 BLUEGRASS ESCARPMENT
12 THE KNOBS
13 POTTSVILLE ESCARPMENT
14 EASTERN KENTUCKY COAL FIELD
15 PINE MT.
16 CUMBERLAND MOUNTAIN

modified from A.K. Lobeck



ATTACHMENT B2

Ecoregions of Kentucky



PRINCIPAL AUTHORS: Alan J. Woods (Dynamac Corporation), James M. Omernik (USEPA), William H. Martin (Division of Natural Areas, Eastern Kentucky University), Greg J. Pond (KDEP, Division of Water, Water Quality Branch), William M. Andrews (Kentucky Geological Survey), Sam M. Call (KDEP, Division of Water, Water Quality Branch), Jeffrey A. Comstock (Indus Corporation), and David D. Taylor (USFS).

COLLABORATORS AND CONTRIBUTORS: Terry Anderson (KDEP, Division of Water, Water Quality Branch), John Brumley (KDEP, Division of Water, Water Quality Branch), Julian Campbell (The Nature Conservancy), Thomas R. Loveland (USGS), Jim Harrison (USEPA), and Mike Mills (KDEP, Division of Water, Water Quality Branch).

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CITING THIS POSTER: Woods, A.J., Omernik, J.M., Martin, W.H., Pond, G.J., Andrews, W.M., Call, S.M, Comstock, J.A., and Taylor, D.D., 2002, Ecoregions of Kentucky (color poster with map, descriptive text, summary tables, and photographs): Reston, VA., U.S. Geological Survey (map scale 1:1,000,000).

This project was partially supported by funds from the USEPA's Office of Research and Development through USEPA Region IV's Regional Ecological Assessment Program (REAP) via contract 68-D-01-0005 to Dynamac Corporation.

Level III ecoregion
Level IV ecoregion
County boundary
State boundary
International boundary

15 10 5 0 30 60 mi
30 20 10 0 60 120 km

Albers Equal Area Projection
Standard parrallels 37° N and 39° N

68 Southwestern Appalachians
- 68a Cumberland Plateau
- 68c Plateau Escarpment

69 Central Appalachians
- 69d Dissected Appalachian Plateau
- 69e Cumberland Mountain Thrust Block

70 Western Allegheny Plateau
- 70b Monongahela Transition Zone
- 70d Knobs–Lower Scioto Dissected Plateau
- 70f Ohio/Kentucky Carboniferous Plateau
- 70g Northern Forested Plateau Escarpment
- 70h Carter Hills

71 Interior Plateau
- 71a Crawford–Mammoth Cave Uplands
- 71b Mitchell Plain
- 71c Knobs–Norman Upland
- 71d Outer Bluegrass
- 71e Western Pennyroyal Karst Plain
- 71f Western Highland Rim
- 71g Eastern Highland Rim
- 71h Outer Nashville Basin
- 71k Hills of the Bluegrass
- 71l Inner Bluegrass

72 Interior River Valleys and Hills
- 72a Wabash–Ohio Bottomlands
- 72c Green River–Southern Wabash Lowlands
- 72h Caseyville Hills

73 Mississippi Alluvial Plain
- 73a Holocene Meander Belts

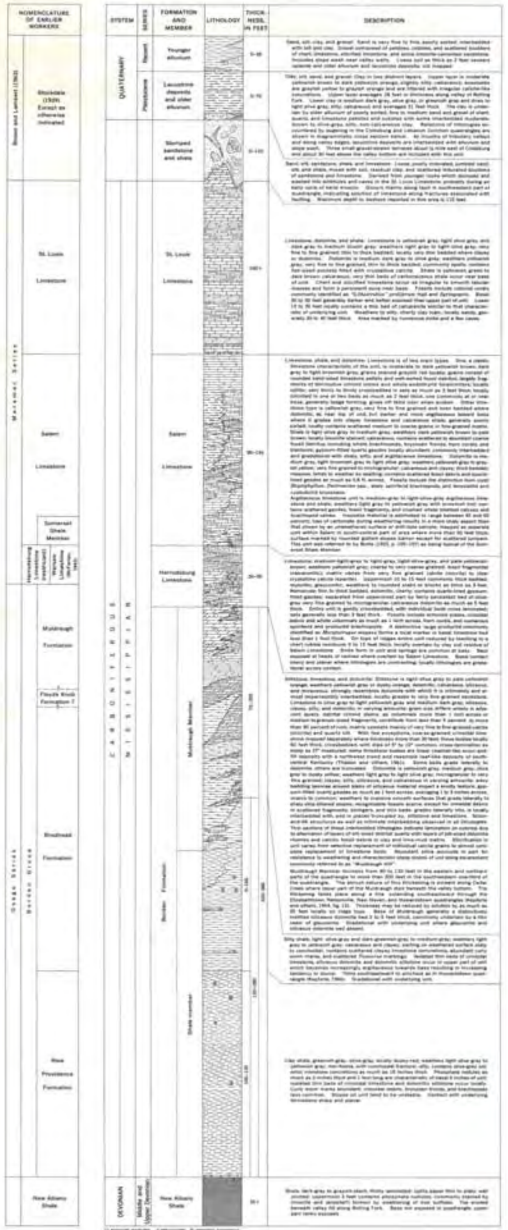
74 Mississippi Valley Loess Plains
- 74a Bluff Hills
- 74b Loess Plains

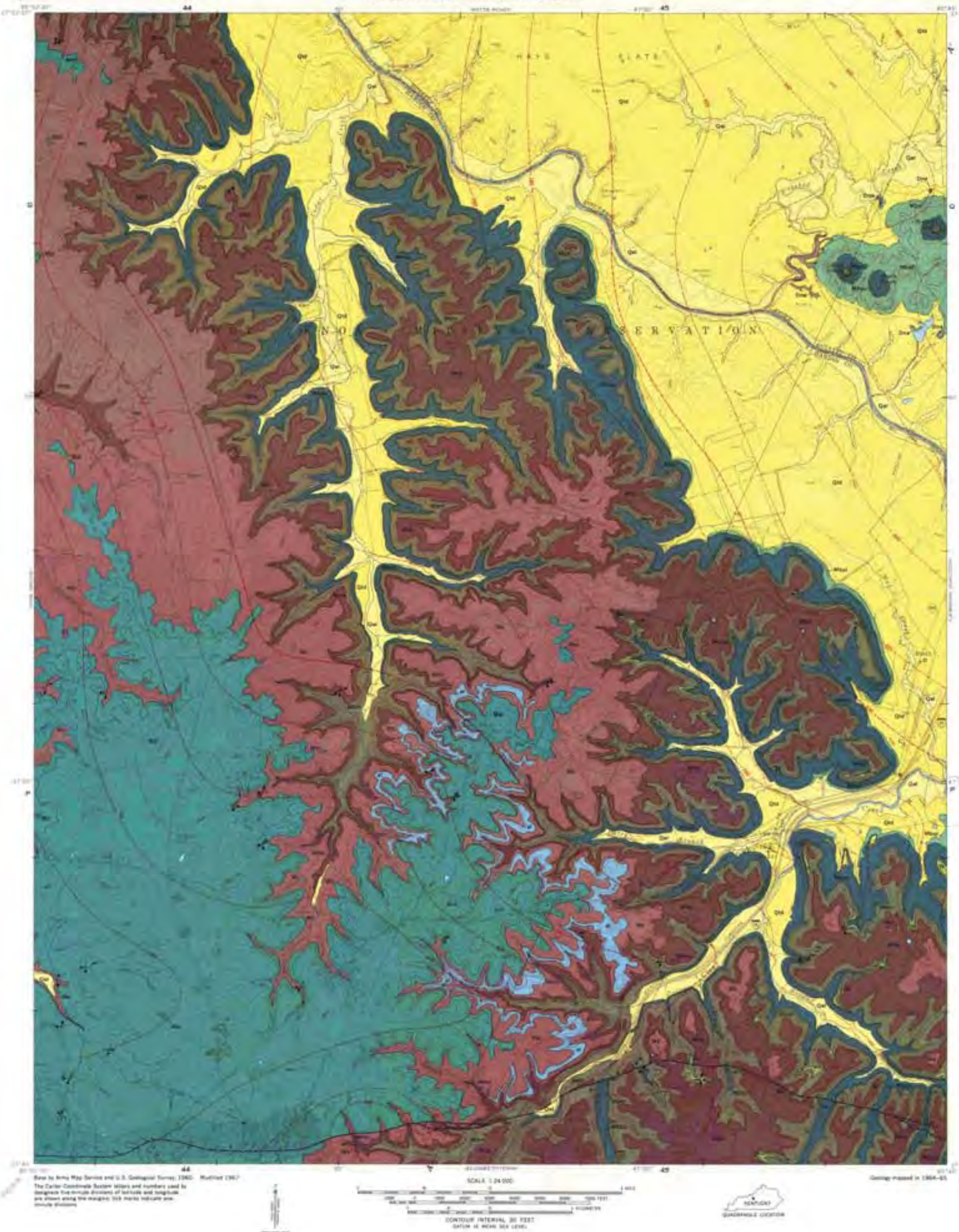
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
WILLIAM T. PECORA, DIRECTOR

ATTACHMENT B3

PREPARED IN COOPERATION WITH
THE COMMONWEALTH OF KENTUCKY, UNIVERSITY OF KENTUCKY
KENTUCKY GEOLOGICAL SURVEY
WALLACE W. HAGAN, DIRECTOR AND STATE GEOLOGIST

GEOLOGIC QUADRANGLE MAP
COLESBURG QUADRANGLE, KENTUCKY
GQ-602





EXPLANATION

Younger alluvium

Lacustrine deposits and older alluvium

St. Louis Limestone

Salem Limestone

Harrodsburg Limestone

Borden Formation

New Albany Shale

QUATERNARY · MISSISSIPPIAN · CARBONIFEROUS · DEVONIAN

Patterned area shows slumped sandstone and shale of probable Late Mississippian age

Contact
Dashed where approximately located; short dashed where inferred; dotted where concealed

Fault
Dashed where approximately located; short dashed where inferred; dotted where concealed

Strike and dip of beds

Strike of vertical joints

Strike of vertical joint sets

Structure contours

DRILL HOLES FROM WHICH SUBSURFACE STRUCTURAL DATA WERE OBTAINED

Dry hole

Auger hole

Abandoned quarry

ECONOMIC GEOLOGY

Eight exploratory holes have been drilled for oil and gas in the quadrangle. No oil or gas was mentioned in the logs of these holes. During mapping, however, gas was observed bubbling from a creek where it crosses the fault in the second valley west of Maple Hollow in the northeastern part of the mapped area.

Limestone for road metal, soil-grade, and fill has been quarried from the Harrodsburg Limestone and from the Muldraugh Member of the Borden Formation, but no quarries were active within the quadrangle in 1965.

Clay shale from the lower part of the shale member of the Borden Formation is used elsewhere in producing brick, tile, and expanded-shale aggregate. Samples from the Lebanon Junction quadrangle to the east (Walker, 1963, p. 22) indicate that the shale is suitable, at least locally, for red brick and tile. Firing tests on a sample of the upper part of the lacustrine clay taken at a depth of 12 to 17 feet from auger hole G (see diagrammatic cross section) indicate it is light firing and may be suitable for coated face brick, structural tile, and flue lining. A sample of the lower silty clay taken at a depth of 41 to 45 feet from the same hole had a poor firing color and a narrow firing range, and at best might be used for common brick (Preston McGrain, written communication, 1965). Bloating tests for both samples were negative. Periodic flooding of the Rolling Fork should be taken into account in any plans to use this deposit.

Water for domestic and farm use is obtained from wells in alluvium and from wells and springs in the basal part of the St. Louis, the upper part of the Salem, and the Harrodsburg Limestones. Thick limestone bodies in the Muldraugh Member of the Borden are potential sources of limited amounts of water. Auger drilling indicates that the gravel underlying the lacustrine deposits along the Rolling Fork is water bearing.

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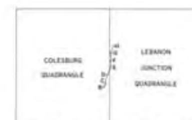
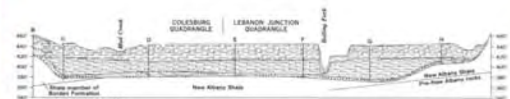


INDEX MAP SHOWING LOCATION OF AUGER HOLES ON DIAGRAMMATIC CROSS SECTION



Diagrammatic cross section showing lithology and thickness of lacustrine deposits and alluvium encountered by auger drilling across valley of Rolling Fork in Colesburg and Lebanon Junction quadrangles. Brown calcareous clay and gray calcareous, silty clay rest on a basal alluvium comprising sand, gravel, and clay. Recent deposits of silt alluvium occur along present channels of Rolling Fork and Mud Creek. Data for Lebanon Junction quadrangle furnished by W. L. Peterson

GEOLOGIC MAP OF THE COLESBURG QUADRANGLE, HARDIN AND BULLITT COUNTIES, KENTUCKY

By

Roy C. Kepferle

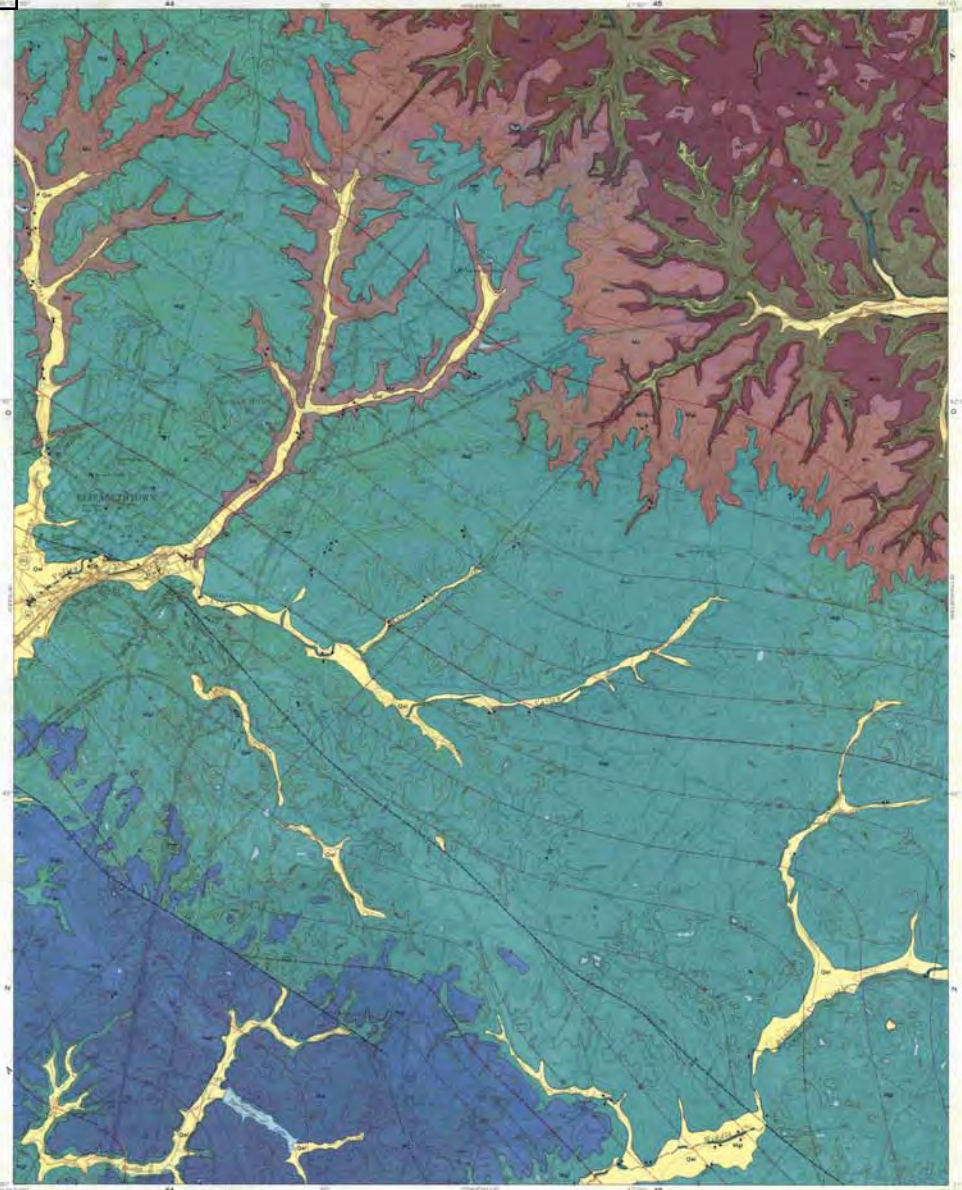
1967

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
WILLIAM T. PECORA, DIRECTOR

ATTACHMENT B4

PREPARED IN COOPERATION WITH
THE COMMONWEALTH OF KENTUCKY, UNIVERSITY OF KENTUCKY
KENTUCKY GEOLOGICAL SURVEY
WALLACE W. HAGAN, DIRECTOR AND STATE GEOLOGIST

GEOLOGIC QUADRANGLE MAP
ELIZABETHTOWN QUADRANGLE, KENTUCKY
GQ-559



SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

ECONOMIC GEOLOGY

REFERENCES CITED

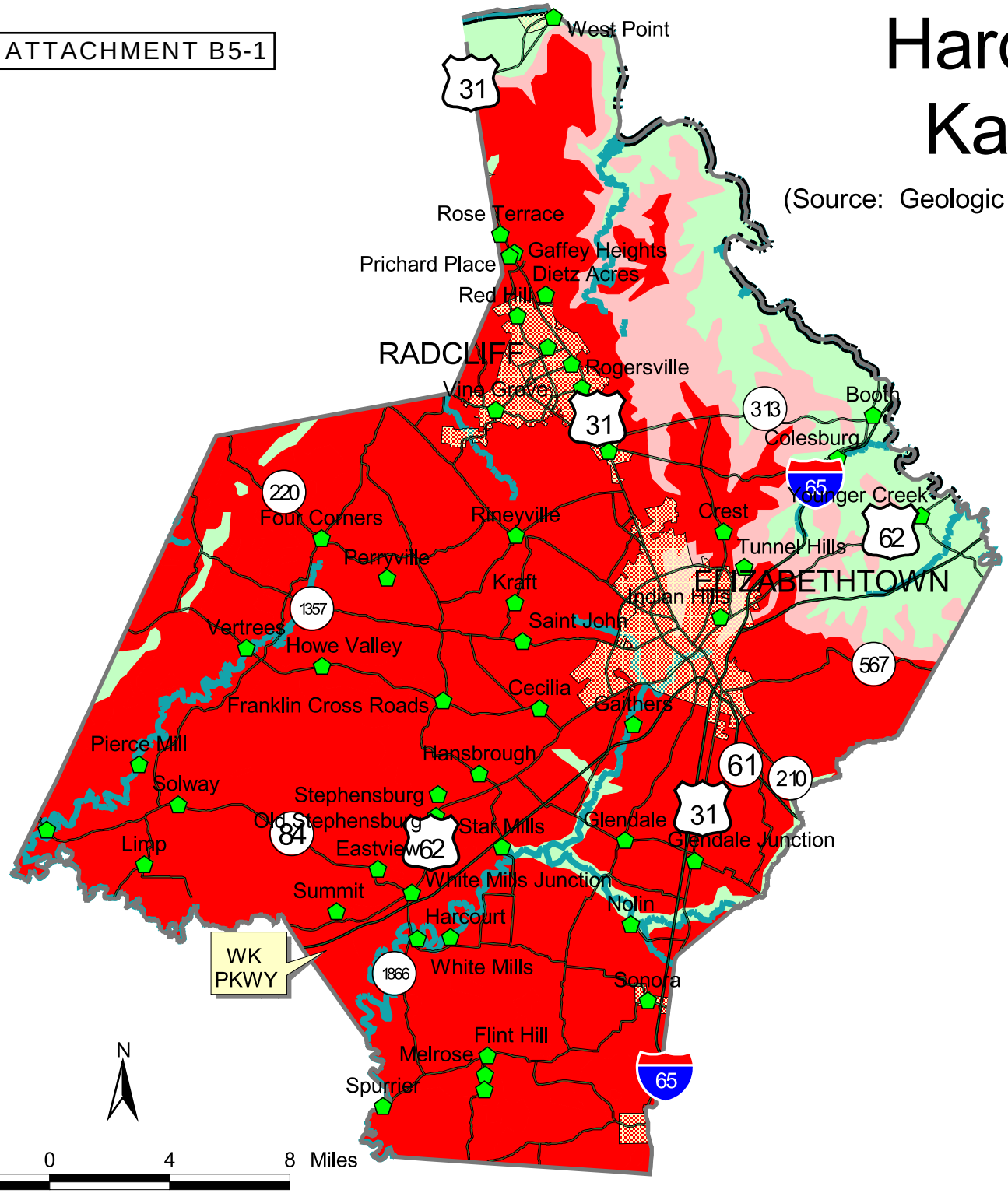
GEOLOGIC MAP OF THE ELIZABETHTOWN QUADRANGLE, HARDIN AND LARUE COUNTIES, KENTUCKY

By
Roy C. Kepferle
1966

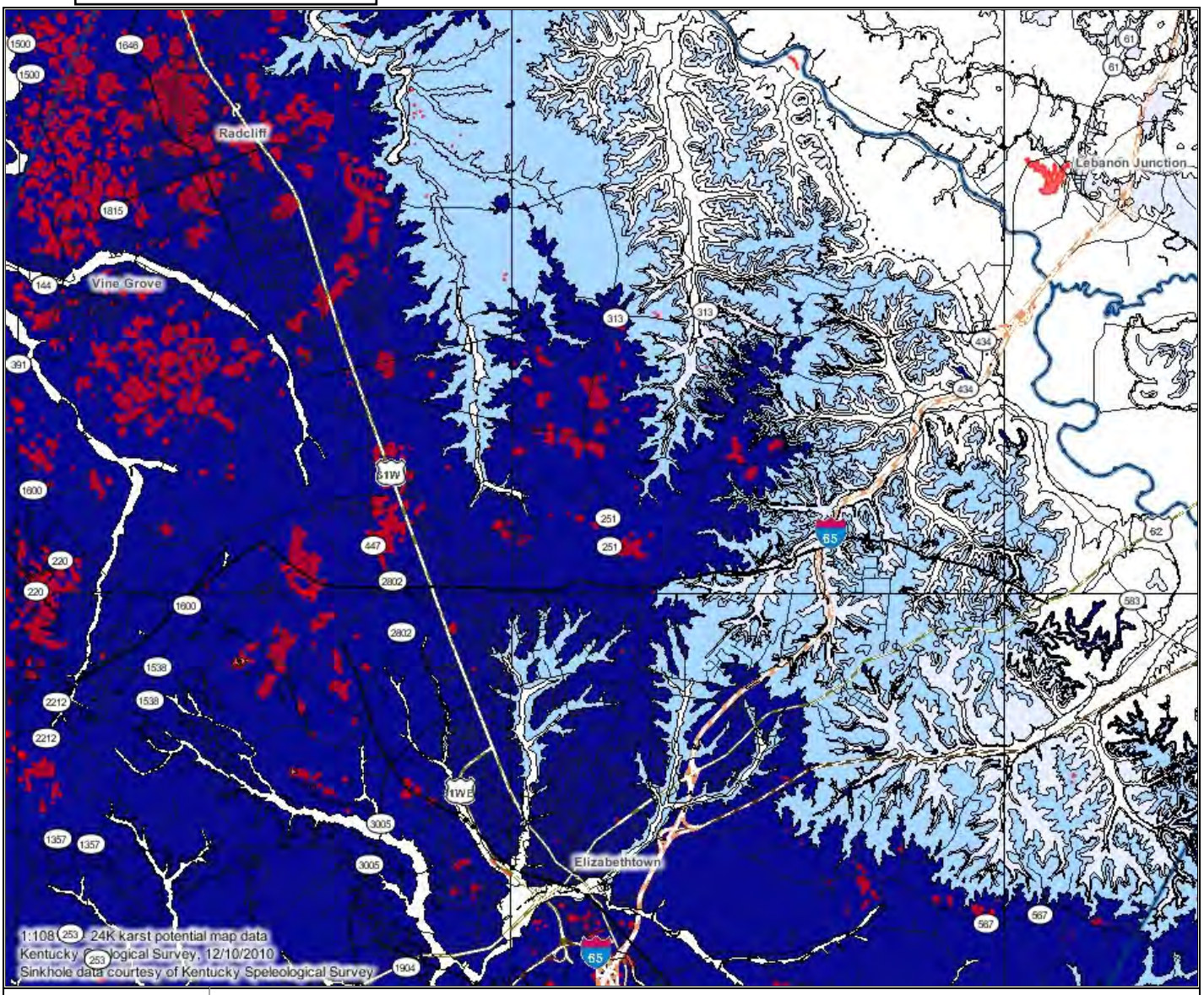
ATTACHMENT B5-1

Hardin County Karst Areas

(Source: Geologic Map of Kentucky, Scale, 1:500,000)



ATTACHMENT B5-2



Current Scale = 1:108,185

- Display Legend For Printing

See ATTACHMENT B5-3 for Legend

PRINT THIS PAGE

ATTACHMENT B5-3

Karst Potential Classification

The karst potential map shows the tendency for geologic units to develop or have karst features such as sinkholes, springs, caves, or other solution features. The classification is based on lithology. The lithologic characteristics used are percentage of $CaCO_3$ in the carbonate portion of the unit, grain size, bedding thickness, and insoluble components. Insoluble components may occur as a mineral grains within the limestone lithology or as interbeds of noncarbonate rock. These criteria were evaluated for all rock units and combined rock units that appear on the map, and resulted in about 50 distinct rankings. These rankings were reduced to three to five simplified classes by analysis of their frequency of distribution and the scale of the map data.

1:500,000 (small scale) map data (viewed at scales 1:150,001 and smaller) displays three classes:

INTENSE
Areas underlain by bedrock with high potential for karst development. May exhibit mature karst, including caves, sinkholes, and springs where they crop out.

PRONE
Areas underlain by bedrock with moderate potential for karst development. Development of karst features in this category is variable and dependent on site-specific conditions. Occurrence of caves may be influenced by physiographic setting, unit thickness, and lithology.

NONKARST
Areas underlain by bedrock with limited or no potential for karst development. Karst features rare or absent.

1:24,000 (large scale) map data (viewed at scales 1:150,000 and greater) displays five classes:

VERY HIGH
Thick-bedded, typically fine-grained and pure limestone units with little or no insoluble content. Will exhibit mature karst, including caves, sinkholes, and springs where they crop out.

HIGH
Limestone units with low insoluble content, but varied grain size and bedding characteristics. Likely to contain karst features. Occurrence of caves may be influenced by physiographic setting, unit thickness, and lithology.

MEDIUM
Limestone units and coarse-grained, or siliciclastic units with limestone interbeds. Limestone units may contain a high percentage of insoluble minerals. Siliciclastic units will only be karst-prone where limestone beds occur in the near surface. Development of karst features in this category is variable and dependent on site-specific conditions.

LOW
Siliciclastic units with minor limestone beds or units primarily composed of dolomite. Karst features are poorly developed or absent.

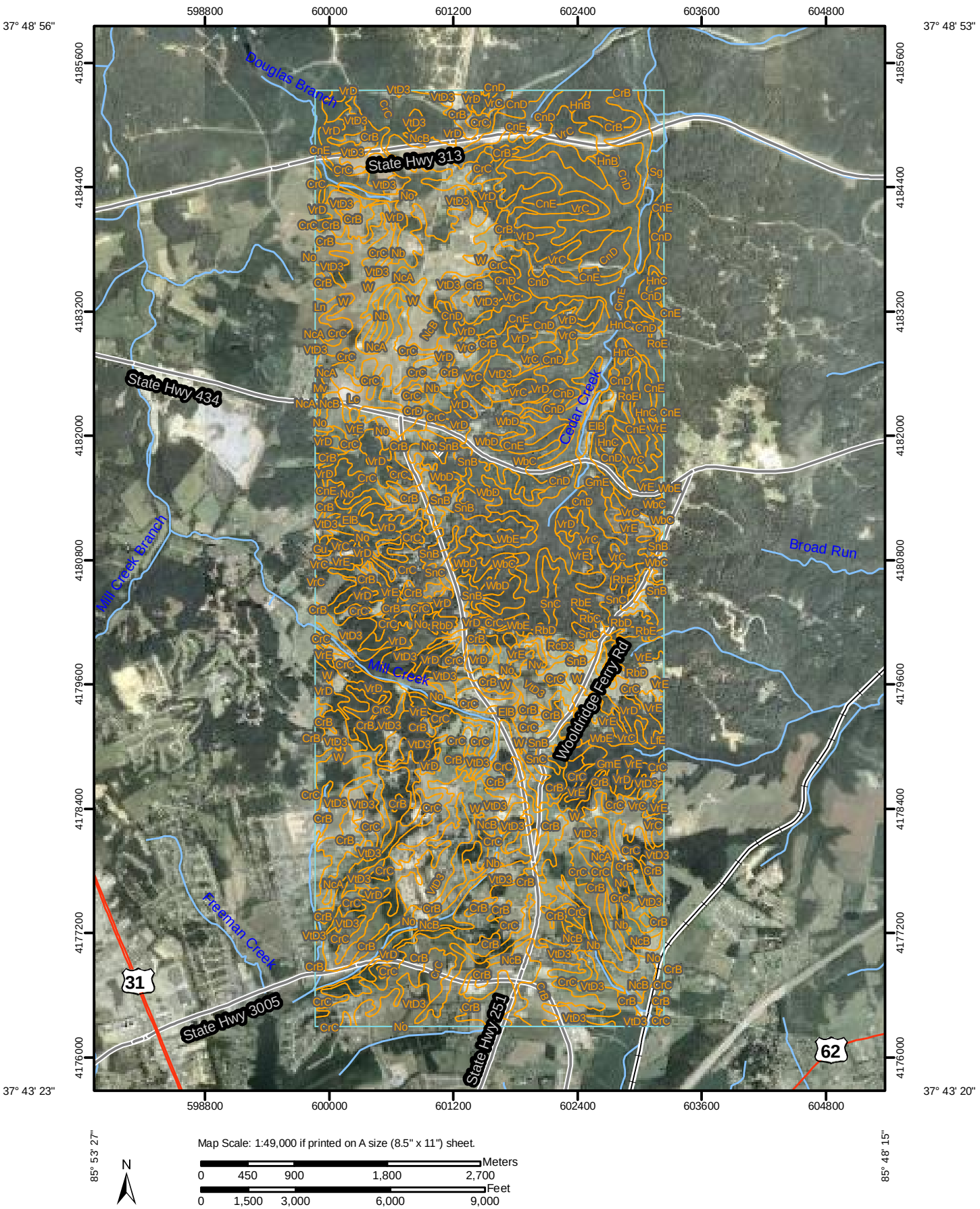
NONKARST
Consolidated or unconsolidated siliciclastic units. Karst features rare or absent.

*Note: A more detailed and precise karst classification method is in development. When the testing and evaluations are complete, the method will be used to add enhanced categories in the karst classification.

Geologic Map Service Tutorials:

- Creating a customized area download of the map image for use in a GIS

ATTACHMENT B6-1



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:49,000 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hardin and Larue Counties, Kentucky
Survey Area Data: Version 9, Feb 24, 2010

Date(s) aerial images were photographed: 8/16/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Hardin and Larue Counties, Kentucky (KY621)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
CnD	Caneyville-Rock outcrop complex, 6 to 20 percent slopes	431.9	5.7%
CnE	Caneyville-Rock outcrop complex, 20 to 30 percent slopes	342.4	4.5%
CrB	Crider silt loam, 2 to 6 percent slopes	931.9	12.4%
CrC	Crider silt loam, 6 to 12 percent slopes	1,350.2	17.9%
CrD	Crider silt loam, 12 to 20 percent slopes	23.1	0.3%
ElB	Elk silt loam, 2 to 6 percent slopes	36.4	0.5%
GmE	Garmon silt loam, 25 to 60 percent slopes	507.6	6.7%
Gu	Gullied land (riney)	2.8	0.0%
HnB	Hagerstown silt loam, 2 to 6 percent slopes	8.8	0.1%
HnC	Hagerstown silt loam, 6 to 12 percent slopes	32.0	0.4%
Lc	Lawrence silt loam	21.5	0.3%
LfE	Lenberg-Frondorf complex, 20 to 30 percent slopes	11.4	0.2%
Ln	Lindside silt loam	7.4	0.1%
Mv	Melvin silt loam	5.9	0.1%
Nb	Newark silt loam	69.5	0.9%
NcA	Nicholson silt loam, 0 to 2 percent slopes	49.2	0.7%
NcB	Nicholson silt loam, 2 to 6 percent slopes	450.1	6.0%
No	Nolin silt loam	270.1	3.6%
Nv	Nolin variant fine sandy loam (grigsby)	4.9	0.1%
OtA	Otwell silt loam, 0 to 2 percent slopes	0.8	0.0%
RbC	Riney loam, 6 to 12 percent slopes	9.5	0.1%
RbD	Riney loam, 12 to 20 percent slopes	32.4	0.4%
RbE	Riney loam, 20 to 30 percent slopes	146.7	1.9%
RcD3	Riney sandy clay loam, 6 to 20 percent slopes, severely eroded	11.6	0.2%
RoE	Rock outcrop-Corydon complex, 12 to 30 percent slopes	19.0	0.3%
Sg	Sensabaugh silt loam	61.8	0.8%
SnB	Sonora silt loam, 2 to 6 percent slopes	114.8	1.5%
SnC	Sonora silt loam, 6 to 12 percent slopes	195.8	2.6%
VrC	Vertrees silt loam, 6 to 12 percent slopes	258.0	3.4%
VrD	Vertrees silt loam, 12 to 20 percent slopes	520.3	6.9%
VrE	Vertrees silt loam, 20 to 30 percent slopes	221.3	2.9%
VtD3	Vertrees silty clay loam, 6 to 20 percent slopes, severely eroded	1,071.1	14.2%

Hardin and Larue Counties, Kentucky (KY621)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
W	Water	14.1	0.2%
WbC	Waynesboro loam, 6 to 12 percent slopes	112.2	1.5%
WbD	Waynesboro loam, 12 to 20 percent slopes	122.0	1.6%
WbE	Waynesboro loam, 20 to 30 percent slopes	66.0	0.9%
Totals for Area of Interest		**7,534.5**	**100.0%**

ATTACHMENT B7-1

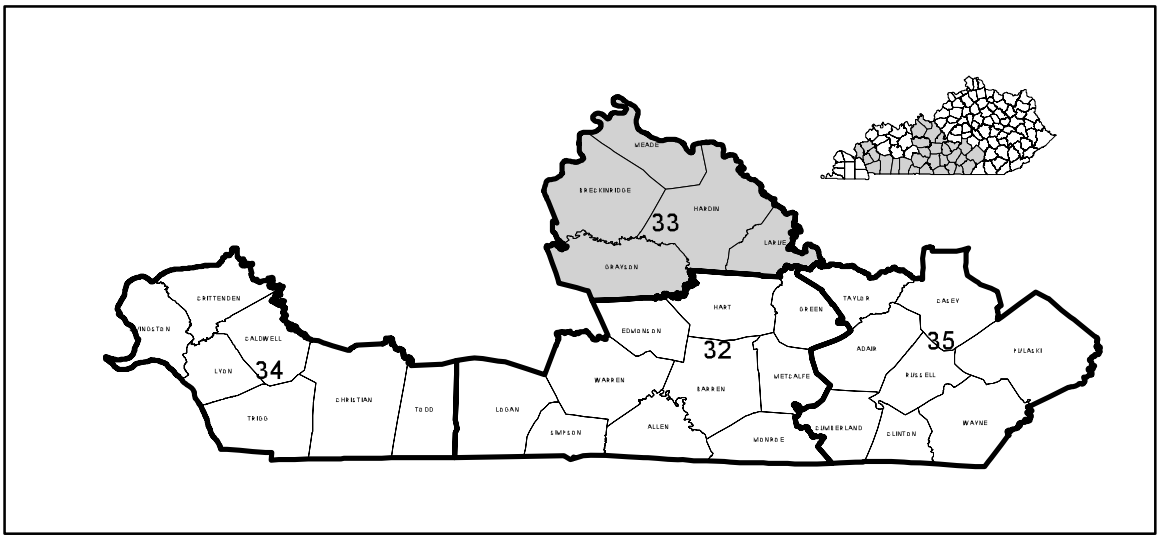
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE COMMONWEALTH OF KENTUCKY
AND THE KENTUCKY GEOLOGICAL SURVEY
UNIVERSITY OF KENTUCKY

AVAILABILITY OF GROUND WATER IN BRECKINRIDGE, GRAYSON, HARDIN, LARUE, AND MEADE COUNTIES, KENTUCKY

By
R.F. Brown and T.W. Lambert

HYDROLOGIC INVESTIGATIONS
ATLAS HA-33



INDEX MAP OF THE MISSISSIPPIAN PLATEAU REGION, KENTUCKY, SHOWING COUNTY GROUPS AND AREA OF THIS ATLAS

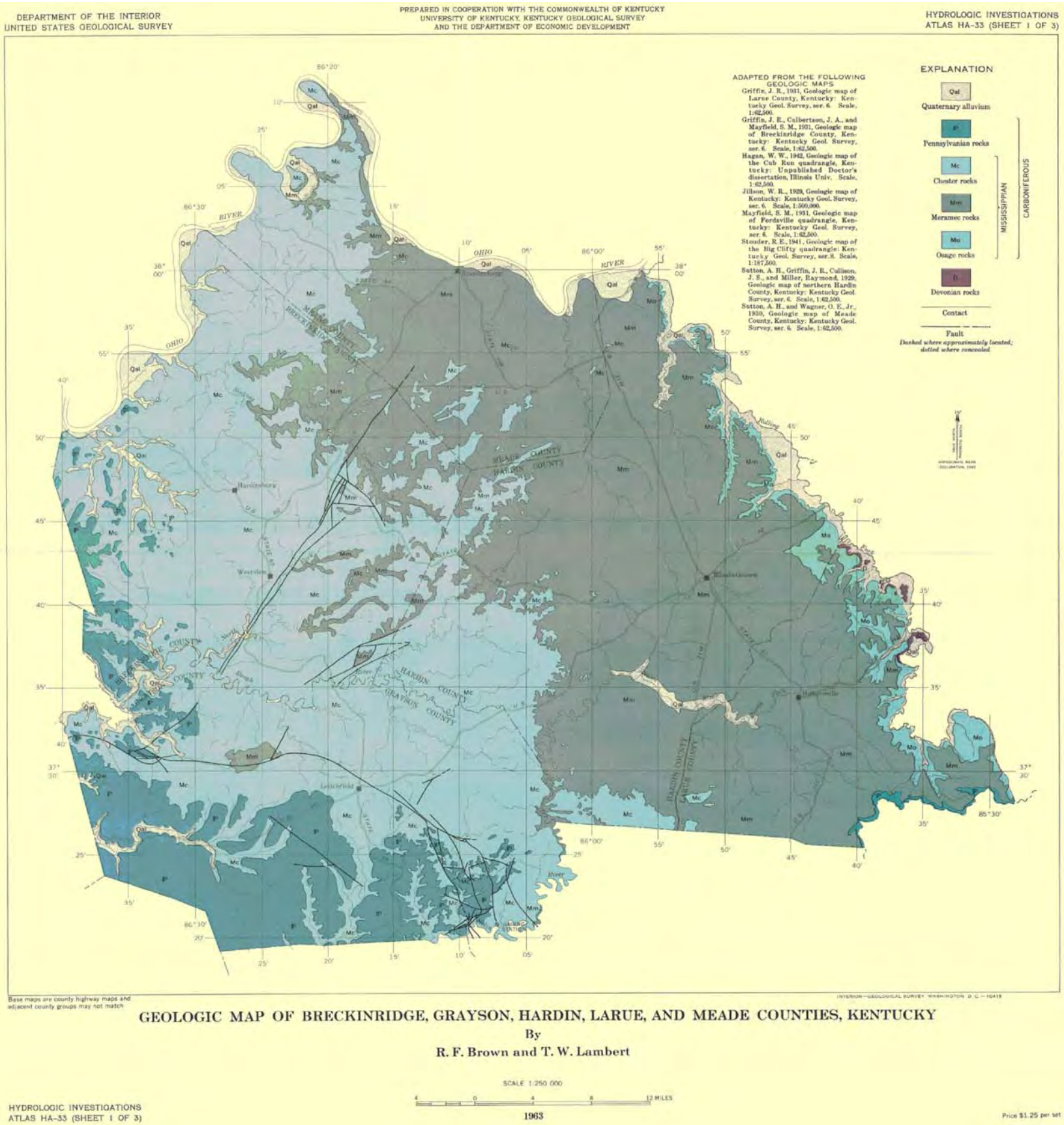
This is 1 of 4 atlases (HA-32 to HA-35) showing geology and availability of ground water in the Mississippian Plateau region, Kentucky U.S. Geological Survey Water-Supply Paper 1603 contains a text description and illustrations providing further information on the occurrence and quality of ground water in the Mississippian Plateau region.

PUBLISHED BY THE U.S. GEOLOGICAL SURVEY

WASHINGTON, D.C.

1963

ATTACHMENT B7-2



GEOLOGIC MAP OF BRECKINRIDGE, GRAYSON, HARDIN, LARUE, AND MEADE COUNTIES, KENTUCKY

By

R. F. Brown and T. W. Lambert

SCALE 1:250 000

4 0 4 8 12 MILES

1963

HYDROLOGIC INVESTIGATIONS
ATLAS HA-33 (SHEET 1 OF 3)

Price $1.25 per set

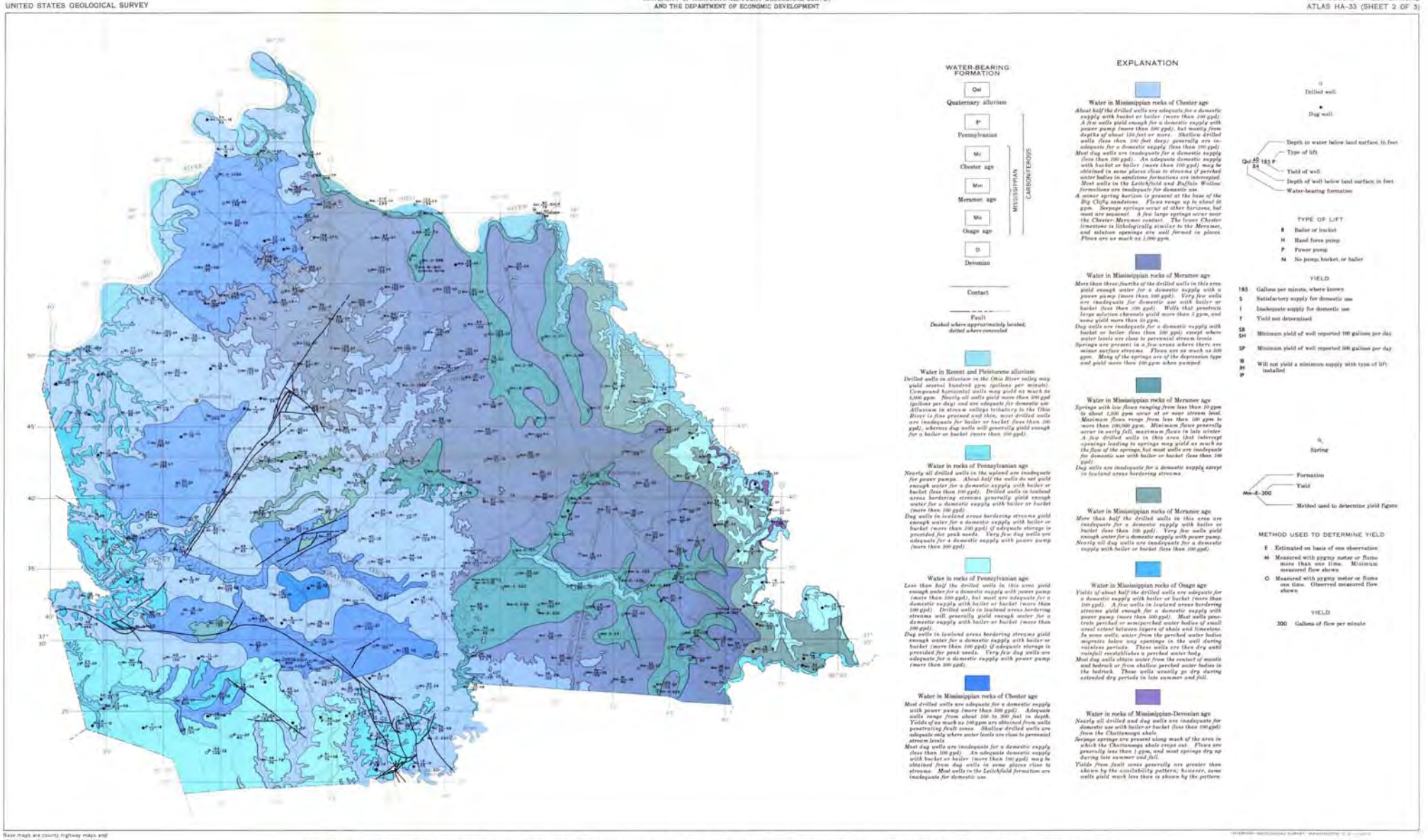
Note: not intended for fine viewing; see original reference document for accurate interpretation.

ATTACHMENT B7-3

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE COMMONWEALTH OF KENTUCKY
UNIVERSITY OF KENTUCKY, KENTUCKY GEOLOGICAL SURVEY
AND THE DEPARTMENT OF ECONOMIC DEVELOPMENT

HYDROLOGIC INVESTIGATIONS
ATLAS HA-33 (SHEET 2 OF 3)



Base maps are county highway maps and adjacent county groups may not match

AVAILABILITY OF GROUND WATER IN BRECKINRIDGE, GRAYSON, HARDIN, LARUE, AND MEADE COUNTIES, KENTUCKY

By

R. F. Brown and T. W. Lambert

SCALE 1:250 000

1963

HYDROLOGIC INVESTIGATIONS
ATLAS HA-33 (SHEET 2 OF 3)

Note: not intended for fine viewing; see original reference document for accurate interpretation.

ATTACHMENT B7-4

UNITED STATES GEOLOGICAL SURVEY
AND THE DEPARTMENT OF ECONOMIC DEVELOPMENT
ATLAS HA-33 (SHEET 3 OF 3)

SYSTEM	SERIES	FORMATION OR GROUP	THICKNESS (IN FEET)	SECTION	LITHOLOGY	TOPOGRAPHY	WATER-BEARING CHARACTER
QUATERNARY	Recent and Pleistocene	Alluvium	0–120		Silt, clay, sand, and gravel in Ohio River valley. Silt, clay, and minor amounts of sand and gravel in tributary valleys.	Terraces and floodplains. Valley-train deposits in terraces occur along the Ohio River.	Yields several hundred gallons per minute to drilled wells in alluvium in the Ohio River valley. Yields as much as 5,000 gpm (gallons per minute) to compound horizontal wells. Nearly all wells furnish more than 500 gpd (gallons per day); enough water for a domestic supply with a power pump. Alluvium in stream valleys tributary to the Ohio River is fine grained and thin; most wells do not furnish enough for a boiler or bucket (less than 100 gpd).
CARBONIFEROUS — PENNSYLVANIAN		Caseyville sandstone	0–100		Sandstone, yellowish-brown, medium-grained, crossbedded, and poorly cemented lenticular conglomerate. Massive in places.	Underlies dissected uplands and ridgetops in western part of area. Caps isolated hilltops.	Yields enough water for a domestic supply with a power pump (more than 500 gpd) to wells in lowland areas bordering streams. Wells in upland generally are inadequate (yields less than 100 gpd).
		Latonia Shale / Buffalo Wallow Formation	0–125		Variegated shale with thin-bedded sandstone and limestone. Thickness varies greatly owing to pre-Pennsylvanian erosion.	Gently rolling uplands and fairly steep slopes adjacent to stream valleys. Sandstone forms ledges, some massive, form small benches.	Yield little or no water to wells.
		Tar Springs sandstone			Sandstone, gray, fine-grained, locally bituminous, and dark-gray shale. Lithology varies greatly within short distances.		
	Chester	Glen Dean limestone	50–70		Limestone, dark- to bluish-gray, fine- to medium-grained, very fossiliferous; black to gray shale near top.	Gently rolling uplands, dissected on perimeter of Dripping Springs escarpment.	Sandstone formations yield enough water for a domestic supply with bailer or bucket (more than 100 gpd) in lowland areas bordering streams and in broad upland areas where there is a substantial saturated thickness in perched water bodies. Deep wells that tap the sandstone formations near perennial stream level furnish enough for a domestic supply with a power pump (more than 500 gpd). Close to outcrop areas, particularly near major escarpments, yields from perched water bodies generally are low and not dependable. Minor spring horizons occur near the base of most of the sandstones on discontinuous layers of shale. The most prominent springs are those which discharge from the base of the Big Clifty sandstone. These are the "dripping springs" of the Dripping Springs escarpment. Many of these springs go dry during the late fall and summer, and very few are adequate for a domestic supply with a power pump.
		Hardinsburg sandstone	30		Sandstone, gray, fine- to medium-grained, massive to thin-bedded; contains red or green shale.	Underlies dissected uplands and ridgetops. Forms small benches on hillsides.	
		Haney limestone[1]	35		Limestone, gray, fine-to medium-grained, medium crystalline to oolitic in places, very distinctive light-gray block, chert, and variegated shales.	Gently rolling to fairly flat uplands; moderate bluffs near the heads of valleys.	
		Big Clifty sandstone	75		Sandstone, gray, fine- to coarse-grained, massive, crossbedded; contains green fissile shale.	Forms a major escarpment (Dripping Springs escarpment) of several hundred feet of relief. Underlies gently rolling uplands.	
		Beech Creek ls.[1]	10		Limestone, gray, finely to coarsely crystalline, oolitic to coarsely crinoidal.	Form lower part of Dripping Springs escarpment. Have numerous large sinks into which overlying sandstone has collapsed. Underlie gently rolling upland.	Limestone formations yield small to adequate supplies from solution openings. In lowland areas bordering streams some wells furnish enough for a domestic supply with a power pump (more than 500 gpd). Most in upland areas are inadequate for a domestic supply with a bailer or bucket (less than 100 gpd). Deep wells that encounter solution openings in limestone may produce more than 5 gpm, but most deep wells are inadequate for a domestic supply with bailer or bucket (less than 100 gpd). Where karst is formed on the Paoli limestone, some wells yield more than 5 gpm from solution openings in the Paoli and the underlying Ste. Genevieve limestone. Close to outcrop areas, particularly near major escarpments, yields from perched water bodies generally are inadequate during dry periods. Springs occur at the base of many of the limestones where they crop out on escarpments and hillsides. Adjacent to large upland areas, flows are as much as 1,000 gpm and low flows are more than 5 gpm from some springs.
		Elwren sandstone[2]	30		Shale, soft, gray or green.		
		Reelsville limestone[2]	10		Limestone, white to light-gray, fine- to medium-grained, oolitic to coarsely crinoidal.		
		Sample sandstone[2]	30		Sandstone, gray, medium-grained, with black and gray shale.	Forms a small bench or "double step" in the Dripping Springs escarpment in Meade and Breckinridge Counties. Underlies dissected uplands and ridgetops.	
		Beaver Bend limestone[2]	20		Limestone, light- to dark-gray, fine- to medium-grained, oolitic in places.	Forms small benches on hillsides. Underlies gently rolling upland. Sinkholes are present in upland areas.	
			15		Sandstone or black clayey shale.		
		Mooretown sandstone[2]	40		Limestone, light- to dark-gray, fine- to medium-grained, argillaceous to oolitic in places.	Forms small benches where sandstone is locally massive. Underlies relatively flat upland. Shows collapse structure into sinkholes in underlying Paoli limestone.	
		Paoli limestone[2]				Underlies rolling karst areas. Forms lower part of the Dripping Springs escarpment in most areas. Contains numerous sinkholes into which the overlying sandstone has collapsed.	
	Meramec	Ste. Genevieve limestone	150–200		Limestone, light-gray to white, oolitic, crossbedded, fine-grained in places; contains a minor amount of chert. Limestone breccia is usually present at the top of the formation.	Underlies rolling karst areas. Greatly dissected in places. Forms steep bluffs along the Ohio River.	Yields more than 50 gpm to wells from large solution openings in karst areas. Most wells encounter solution openings, but in areas high above perennial streams these solution openings are dry in late summer and fall and many wells are inadequate. Contains major caverns of Mammoth Cave area which have large, connected, subsurface streams. Springs having low flows ranging from less than 10 to about 1,500 gpm occur at or near stream level. Smaller springs discharge from perched water bodies in upland areas but many go dry during late summer and fall.
		St. Louis limestone	300		Limestone, gray to tan, fine-grained, coarsely crystalline, dolomitic, argillaceous, cherty. Gypsum present locally.	Underlies rolling karst areas. Has less relief than karst on Ste. Genevieve limestone, but sinkholes are steeper. Forms steep bluffs along the Ohio River.	Yields more than 50 gpm to wells from large solution openings in karst areas. Most wells penetrate solution openings and are inadequate for a domestic supply with a power pump. Major spring horizon; many springs have low flows of several hundred to several thousands of gallons per minute. Many springs are used for public and industrial water supplies.
		Spergen[3] and Warsaw limestones	70		Limestone, brown to gray, very crystalline, dolomitic, argillaceous, fossiliferous; contains chert and some shale.	Underlie gently rolling uplands. Karst in upper part. Form cap of Muldraugh escarpment in Hardin and Larue Counties. Form steep bluffs above exposures of Borden group.	Yields enough water for a domestic supply with a power pump where solution openings are encountered close to perennial stream level. Minor spring horizon in upper part.
					Limestone, gray, granular to fine-grained, argillaceous, crinoidal, crossbedded, with small gypsum geodes and chert. Siltstone near base.		Yields enough water for a domestic supply with bailer or bucket (100 gpd). Wells that encounter large solution openings produce more than 5 gpm. Minor spring horizon near base at contact zone of limestone and underlying siltstone.
	Osage	Borden group[3] — Muldraugh[3]	50		Limestone, gray to yellow, granular to fine-grained, siliceous, crinoidal, silty, geodiferous; contains chert beds. Gray calcareous geodiferous siltstone. Unit grades laterally from one lithology to another.	Underlies rolling dissected uplands. Forms steep bluffs near the Muldraugh escarpment. Small valleys are steep and V-shaped.	Yields enough water for a domestic supply with bailer or bucket (more than 100 gpd). Wells in lowland areas close to streams produce more than 5 gpm from solution openings. Most wells obtain water from perched water bodies supported by discontinuous shale layers, and many are dry during late summer and fall. Minor spring horizons occur throughout the formation. Flows are as much as 30 gpm, but most are seasonal. Where the formation consists predominantly of siltstone, most wells are inadequate for domestic use (less than 100 gpd).
		Floyd Knob[4]	10		Limestone, yellow to brown, impure, siliceous, crinoidal, with chert, and greenish-black glauconitic siltstone.		
		Brodhead[5]	100		Limestone, white to gray, siliceous, crinoidal, and a few small geodes. Gray locally calcareous and locally massive siltstone; contains chert beds. Gray to green silty siliceous locally fossiliferous shale; contains calcium carbonate concretions. Unit grades laterally from one lithology to another.		
		New Providence shale[5]	150		Shale, green to gray, clayey; contains iron oxide concretions and small phosphatic nodules at base.	Forms lower part of "knobs" near base of Muldraugh escarpment.	Yields little or no water to wells.
DEVONIAN		New Albany shale	40		Shale, black, fissile.	Forms lower part of "knobs" near base of Muldraugh escarpment. Caps small round hills away from the base of the escarpment.	Yields little or no water to wells. Seepage springs are present at numerous horizons, but most of them go dry during late summer and fall.

See list of references in Water-Supply Paper 1400.
1. As used by Weller (1927).
2. As used by McFarlan, Rexroin, Walker, and Troxel (1955).
3. As used by Stockdale (1939)—Salem limestone of Cummings (1951)—Sellersburg shale member of Warsaw limestone.
4. As used by Stockdale (1939).
5. Of Stockdale (1939).

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1963

GENERALIZED COLUMNAR SECTION OF BRECKINRIDGE, GRAYSON, HARDIN, LARUE, AND MEADE COUNTIES, KENTUCKY

By

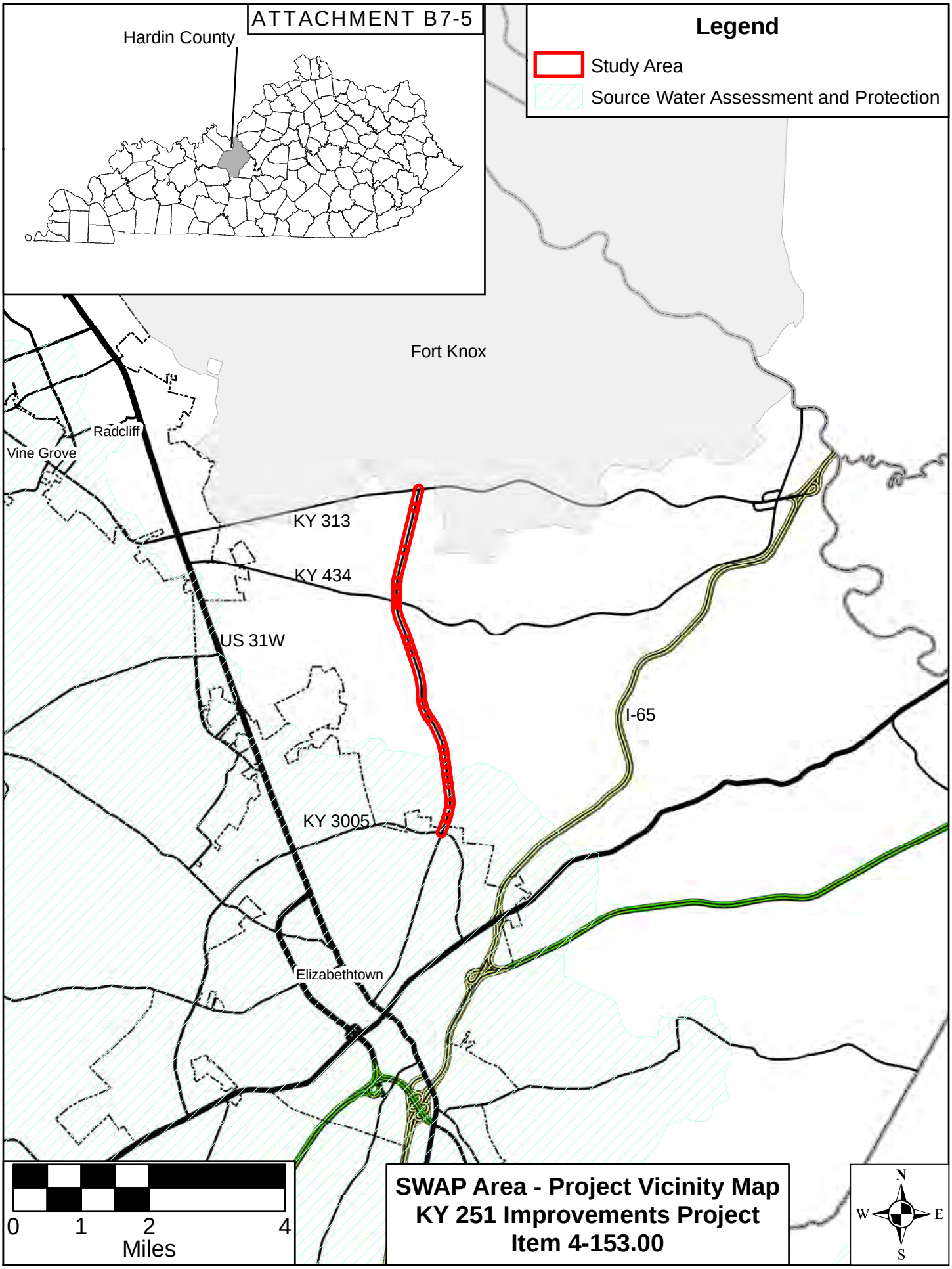
R. F. Brown and T. W. Lambert

HYDROLOGIC INVESTIGATIONS
ATLAS HA-33 (SHEET 3 OF 3)

1963

Price $1.25 per set

Note: not intended for fine viewing; see original reference document for accurate interpretation.


ATTACHMENT B7-5
Hardin County
Legend
Study Area
Source Water Assessment and Protection
Fort Knox
Radcliff
Vine Grove
KY 313
KY 434
US 31W
I-65
KY 3005
Elizabethtown
0 1 2 4
Miles
N
W
E
S
SWAP Area - Project Vicinity Map
KY 251 Improvements Project
Item 4-153.00

ATTACHMENT B8

USFWS List of Federal Threatened, Endangered and Special Concern Species for Hardin County, KY

Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Birds	Arctic peregrine Falcon (Falco peregrinus tundrius)		Recovery	Fairbanks Fish And Wildlife Field Office		
Clams	Tubercled blossom (pearlymussel) (Epioblasma torulosa torulosa)	AL; Free-Flowing Reach of the Tennessee River below the Wilson Dam, Colbert and Lauderdale Counties, AL	Experimental Population, Non-Essential	Office Of The Regional Director		
Clams	purple cat's paw (=purple cat's paw pearlymussel) (Epioblasma obliquata obliquata)	AL; Free-Flowing Reach of the Tennessee River below the Wilson Dam, Colbert and Lauderdale Counties, AL	Experimental Population, Non-Essential	Office Of The Regional Director		
Clams	Clubshell (Pleurobema clava)	Entire Range; Except where listed as Experimental Populations	Endangered	Pennsylvania Ecological Services Field Office	Clubshell/Northern Riffleshell (2 spp.)	Final
Flowering Plants	Kentucky glade cress (Leavenworthia exigua laciniata)		Candidate	Kentucky Ecological Services Field Office		
Flowering Plants	Eggert's sunflower (Helianthus eggertii)		Recovery	Tennessee Ecological Services Field Office		
Insects	Icebox Cave beetle (Pseudanophthalmus frigidus)		Candidate	Kentucky Ecological Services Field Office		
Mammals	Indiana bat (Myotis sodalis)		Endangered	Bloomington Ecological Services Field Office	Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision	Draft Revision 1
Mammals	Gray bat (Myotis grisescens)		Endangered	Columbia Ecological Services Field Office	Gray Bat	Final

http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=21093

ATTACHMENT B9

U.S. Fish & Wildlife Service
Kentucky Ecological Services Field Office

U.S. Fish & Wildlife Service
330 West Broadway, Rm 265
Frankfort, KY 40601
Phone: 502-695-0468
Fax: 502-695-1024

Endangered, Threatened, & Candidate Species in ____HARDIN County, KY

Group	Species	Common name	Legal* Status	Known** Potential	Special Comments
Mammals	*Myotis grisescens*	gray bat	E	K	
	Myotis sodalis	Indiana bat	E	K	
Mussels	*Pleurobema clava*	clubshell	E	K	
	Plethobasus cooperianus	orangefoot pimpleback	E	P	
	Plethobasus cyphyus	sheepnose	C	P	
	Pleurobema plenum	rough pigtoe	E	P	
	Potamilus capax	fat pocketbook	E	P	
Plants	*Helianthus eggertii*	Eggert's sunflower	Delisted	K	Species was de-listed August 18, 2005

NOTES:

* Key to notations: E = Endangered, T = Threatened, C = Candidate, CH = Critical Habitat

**Key to notations: K = Known occurrence record within the county, P = Potential for the species to occur within the county based upon historic range, proximity to known occurrence records, biological, and physiographic characteristics.

ATTACHMENT B10-1

Species Information

State Threatened, Endangered, and Special Concern Species observations for selected counties

Linked life history provided courtesy of NatureServe Explorer.
Records may include both recent and historical observations.
US Status Definitions Kentucky Status Definitions

List State Threatened, Endangered, and Special Concern Species observations in 1 selected county.
Selected county is: Hardin.

Scientific Name and Life History	Common Name and Pictures	Class	County	US Status	KY Status	WAP	Reference
Accipiter striatus	Sharp-shinned Hawk	Aves	Hardin	PS	S	Yes	Reference
Actitis macularius	Spotted Sandpiper	Aves	Hardin	N	E	Yes	Reference
Aimophila aestivalis	Bachman's Sparrow	Aves	Hardin	N	E	Yes	Reference
Alasmidonta marginata	Elktoe	Bivalvia	Hardin	N	T	Yes	Reference
Amblyopsis spelaea	Northern Cavefish	Actinopterygii	Hardin	N	S	Yes	Reference
Ammodramus henslowii	Henslow's Sparrow	Aves	Hardin	N	S	Yes	Reference
Anas discors	Blue-winged Teal	Aves	Hardin	N	T		Reference
Antroselates spiralis	Shaggy Cavesnail	Gastropoda	Hardin	N	S		Reference
Ardea herodias	Great Blue Heron	Aves	Hardin	N	S		Reference
Chondestes grammacus	Lark Sparrow	Aves	Hardin	N	T	Yes	Reference
Circus cyaneus	Northern Harrier	Aves	Hardin	N	T	Yes	Reference
Cistothorus platensis	Sedge Wren	Aves	Hardin	N	S	Yes	Reference
Clonophis kirtlandii	Kirtland's Snake	Reptilia	Hardin	N	T	Yes	Reference
Cryptobranchus alleganiensis alleganiensis	Eastern Hellbender	Amphibia	Hardin	N	S	Yes	Reference
Elaphe guttata	Eastern Corn Snake	Reptilia	Hardin	N	S	Yes	Reference
Fulica americana	American Coot	Aves	Hardin	N	E		Reference
Fusconaia subrotunda subrotunda	Longsolid	Bivalvia	Hardin	N	S	Yes	Reference
Hyla versicolor	Gray Treefrog	Amphibia	Hardin	N	S	Yes	Reference

ATTACHMENT B10-2

Ictinia mississippiensis	Mississippi Kite	Aves	Hardin	N	S	Yes	Reference
Ictiobus niger	Black Buffalo	Actinopterygii	Hardin	N	S	Yes	Reference
Junco hyemalis	Dark-eyed Junco	Aves	Hardin	N	S		Reference
Lampsilis ovata	Pocketbook	Bivalvia	Hardin	N	E	Yes	Reference
Lophodytes cucullatus	Hooded Merganser	Aves	Hardin	N	T	Yes	Reference
Lota lota	Burbot	Actinopterygii	Hardin	N	S	Yes	Reference
Mesamia stramineus	Helianthus Leafhopper	Insecta	Hardin	N	E		Reference
Myotis austroriparius	Southeastern Myotis	Mammalia	Hardin	N	E	Yes	Reference
Myotis grisescens	Gray Myotis	Mammalia	Hardin	LE	T	Yes	Reference
Myotis leibii	Eastern Small-footed Myotis	Mammalia	Hardin	N	T	Yes	Reference
Myotis sodalis	Indiana Bat	Mammalia	Hardin	LE	E	Yes	Reference
Nannothemis bella	Elfin Skimmer	Insecta	Hardin	N	E		Reference
Noturus stigmosus	Northern Madtom	Actinopterygii	Hardin	N	S	Yes	Reference
Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Reptilia	Hardin	N	T	Yes	Reference
Orconectes inermis inermis	Ghost Crayfish	Malacostraca	Hardin	N	S	Yes	Reference
Orconectes pellucidus	Mammoth Cave Crayfish	Malacostraca	Hardin	N	S	Yes	Reference
Phenacobius uranops	Stargazing Minnow	Actinopterygii	Hardin	N	S	Yes	Reference
Pleurobema clava	Clubshell	Bivalvia	Hardin	LE, XN	E	Yes	Reference
Prairiana kansana	A Cicadellid Leafhopper	Insecta	Hardin	N	E		Reference
Quadrula cylindrica cylindrica	Rabbitsfoot	Bivalvia	Hardin	N	T	Yes	Reference
Satyrium favonius ontario	Northern Hairstreak	Insecta	Hardin	N	S		Reference
Thamnophis sauritus sauritus	Eastern Ribbon Snake	Reptilia	Hardin	N	S	Yes	Reference
Thryomanes bewickii	Bewick's Wren	Aves	Hardin	N	S	Yes	Reference
Ursus americanus	American Black Bear	Mammalia	Hardin	PS	S	Yes	Reference
Villosa lienosa	Little Spectaclecase	Bivalvia	Hardin	N	S	Yes	Reference
Villosa ortmanni	Kentucky Creekshell	Bivalvia	Hardin	N	T	Yes	Reference

44 species are listed

ATTACHMENT B11-1

Steven L. Beshear
Governor

Leonard K. Peters
Secretary
Energy and Environment Cabinet

Donald S. Dott, Jr.
Director

Commonwealth of Kentucky
Kentucky State Nature Preserves Commission
801 Schenkel Lane
Frankfort, Kentucky 40601-1403
502-573-2886 Voice
502-573-2355 Fax

January 19, 2011

Michael de Villiers
ENTRAN
1848 Summit Road
Cincinnati, OH 45237

Data Request 11-078

Dear Mr. de Villiers:

This letter is in response to your data request of December 27, 2010 for the KY 251 improvements project. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Kentucky State Nature Preserves Commission occur near the project area on the Elizabethtown and Colesburg USGS Quadrangles, as shown on the map provided. Please see the attached reports for more information, which reflect analysis of the project area with three buffers applied:

1-mile for all records – 7 records
5-mile for aquatic records – 1 record
5-mile for federally listed species – no records
10-mile for mammals and birds – 11 records

Prenanthes aspera (Rough Rattlesnake-root, KSNPC endangered) is found in dry prairies and barrens, limestone glades, dry open rocky woods, usually in acid soils. It has been observed nearby, along with several other rare species, in a glades complex roughly between KY 251 and Wooldrige Ferry Road and north of KY 434.

Myotis grisescens (Gray myotis, federally listed endangered, KSNPC threatened) has been observed near the Hardin/Meade county line within ten miles of the proposed project. A thorough survey for this species should be conducted by a qualified biologist if suitable habitat will be disturbed. The survey should include a search for potential roost and winter sites, and a mistnetting census at numerous points within the proposed corridor, particularly in preferred summer habitat. Summer foraging habitats include upland forests, bottomland forests and riparian corridors. Suitable roost and winter sites include sandstone and limestone caves,

rockhouses, clifflines, auger holes, and abandoned mines. In order to avoid impacts to bats, bottomland forests and riparian corridors, particularly near caves, should not be disturbed.

Accipiter striatus (Sharp-shinned Hawk, KSNPC special concern) can be found in a variety of habitats from semi-open farmland to woodland openings and borders. This species typically nests in areas of extensive forest, especially areas with some evergreen trees.

Ammodramus henslowii (Henslow's Sparrow, KSNPC special concern, federal species of management concern) is associated with fallow hayfields, ungrazed pastures with scattered small trees and tall weeds, grassland, and brushland.

Thyromanes bewickii (Bewick's Wren, KSNPC special concern, federal species of management concern) can be found in brushy areas, thickets, scrub in open country, open and riparian woodlands, and in country towns and farms.

I would like to take this opportunity to remind you of the terms of the data request license, which you agreed upon in order to submit your request. The license agreement states "Data and data products received from the Kentucky State Nature Preserves Commission, including any portion thereof, may not be reproduced in any form or by any means without the express written authorization of the Kentucky State Nature Preserves Commission." The exact location of plants, animals, and natural communities, if released by the Kentucky State Nature Preserves Commission, may not be released in any document or correspondence. These products are provided on a temporary basis for the express project (described above) of the requester, and may not be redistributed, resold or copied without the written permission of the Kentucky State Nature Preserves Commission's Data Manager (801 Schenkel Lane, Frankfort, KY, 40601. Phone: (502) 573-2886).

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed, and new plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural Heritage Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

If you have any questions or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Sara Hines
Data Manager

SLD/SGH

Enclosures: Data Report and Interpretation Key

ATTACHMENT B12-1

From: Thomas, Randall
Sent: Thursday, January 27, 2011 1:44 PM
To: Osborne, Deborah; Aldridge, Brian
Subject: FW: KY 251 Hardin County Data Request

Deb/Brian:

As you can see below, the Kentucky Speleological Society (KSS) tells us there's no karst listed in their records in the vicinity of the project.

Randall Thomas, P.G.
Senior Environmental Planner

ENTRAN

400 East Vine Street, Suite 300
Lexington, KY 40507
T 859.233.2100
D 859.422.1848
F 859.254.9664
M 859.285.7691
www.entran.us

From: SGentry177@aol.com [mailto:SGentry177@aol.com]
Sent: Tuesday, January 18, 2011 1:45 PM
To: currens@email.uky.edu; Thomas, Randall
Cc: SGentry177@aol.com
Subject: Re: KY 251 Hardin County Data Request

Randall & Jim

I went thru the Hardin Country data. There is nothing listed along/ near this route. If anything is located during fields work please let us know.

Steve

Take nothing but pictures, kill nothing but time, leave nothing but footprints

In a message dated 1/17/2011 12:01:42 P.M. Eastern Standard Time, currens@email.uky.edu writes:

Dear Randall,

Sorry this has taken so long. Just got back from a weeklong meeting in St. Louis. I've searched the KSS files easily accessible to me and cannot find any caves that are recorded along the KY 251 route. Perhaps Steve Gentry can be on some help since Hardin is his county.

Jim Currens

ATTACHMENT B12-2

From: Thomas, Randall [mailto:RThomas@entran.us]
Sent: Thursday, December 23, 2010 2:36 PM
To: Currens, James C
Subject: KY 251 Hardin County Data Request

Hi, Jim. Attached is a data request form for karst information and a couple of figures depicting the area of Hardin County that we are working on for KYTC. I'm sorry that I have forgotten exactly how you told me to make this request when we spoke on the tphone a few weeks ago. Just let me know how I am supposed to make this request and the payment and other steps I should follow thereafter and I will gladly do so. Thanks, and Merry Christmas and Happy New Year.

Sincerely,

Randall

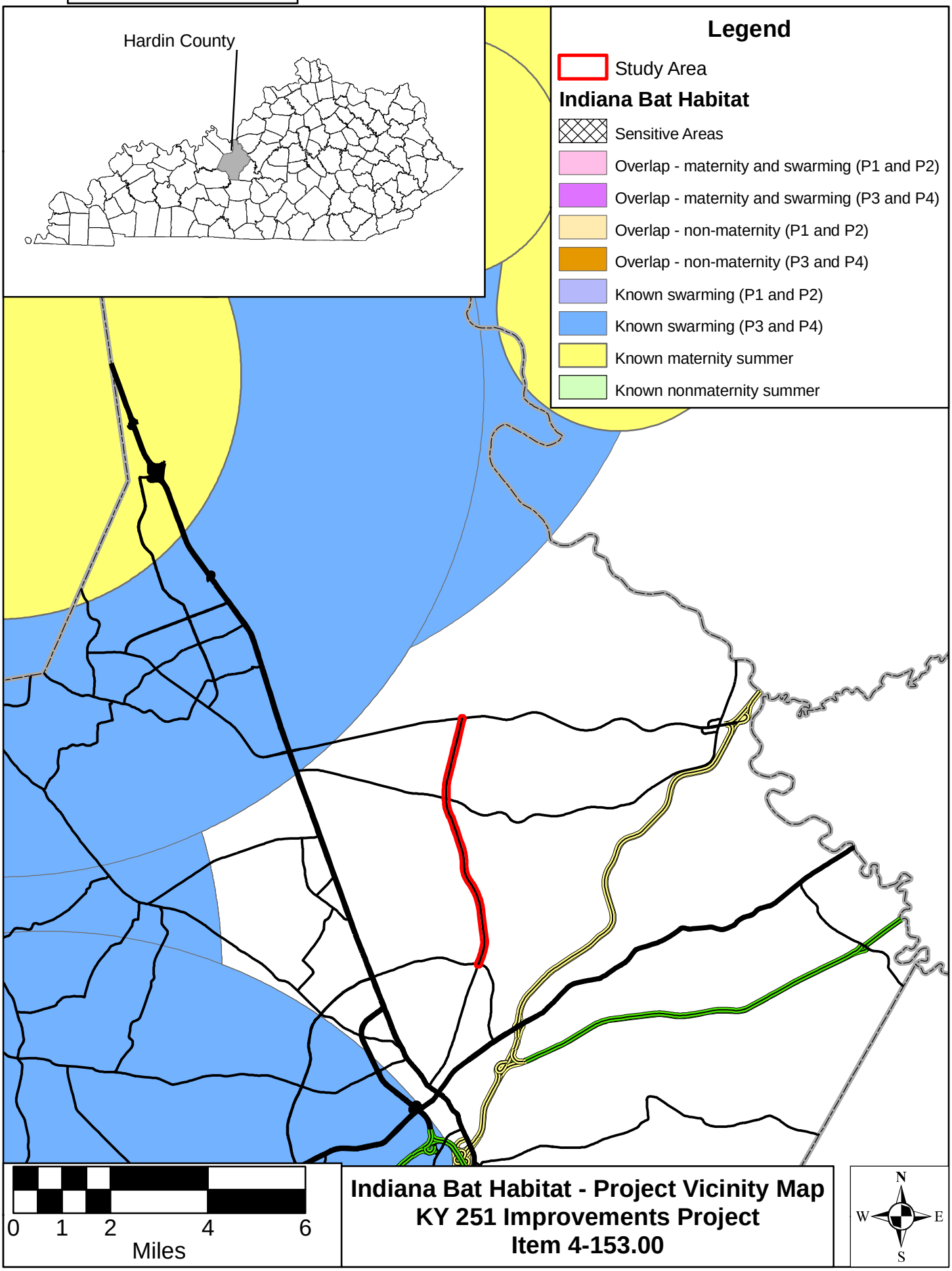
859-285-7691

Randall Thomas, P.G.
Senior Environmental Planner

ENTRAN

400 East Vine Street, Suite 300
Lexington, KY 40507
T 859.233.2100
D 859.422.1848
F 859.254.9664
M 859.285.7691
www.entran.us

ATTACHMENT B13



Indiana Bat Habitat - Project Vicinity Map
KY 251 Improvements Project
Item 4-153.00

ATTACHMENT B14-1

United States Department of the Interior
National Park Service
Land & Water Conservation Fund

Detailed Listing of Grants Grouped by County

Today's Date: 12/10/2010

KENTUCKY - 21

Grant ID & Element	Type	Grant Element Title	Grant Sponsor	Amount	Status	Date Approved	Exp. Date	Cong. District
HARDIN								
28 - XXX	D	UNIVERSITY DRIVE RECREATION PROJ	CITY OF ELIZABETHTOWN	$10,616.63	C	1/17/1969	12/31/1970	2
59 - XXX	C	TAYLOR'S RIVER BEND PARK	HARDIN COUNTY	$12,149.43	C	9/5/1969	12/31/1971	2
228 - XXX	D	WEST POINT CITY PARK	CITY OF WEST POINT	$4,570.13	C	10/12/1973	12/31/1975	2
245 - XXX	A	VINE GROVE PARK	CITY OF VINE GROVE	$4,050.80	C	2/15/1974	6/30/1976	2
309 - XXX	D	ELIZABETHTOWN UNIVERSITY PARK	CITY OF ELIZABETHTOWN	$21,400.79	C	1/8/1975	6/30/1977	2
313 - XXX	A	DUVALL BALLPARK	CITY OF RADCLIFF	$12,753.75	C	1/8/1975	6/30/1977	2
314 - XXX	A	COLVIN PARK	CITY OF RADCLIFF	$12,243.75	C	1/9/1975	6/30/1977	2
366 - XXX	D	RADCLIFF CITY PARK	CITY OF RADCLIFF	$10,052.36	C	3/1/1976	6/30/1978	2
443 - XXX	D	DUVALL BALLPARK	CITY OF RADCLIFF	$20,791.68	C	3/14/1977	6/30/1979	2
529 - XXX	D	ELIZABETHTOWN NEIGHBORHOOD PARK	CITY OF ELIZABETHTOWN	$70,503.12	C	4/24/1978	6/30/1980	2
558 - XXX	D	VINE GROVE CITY PARK	CITY OF VINE GROVE	$30,627.87	C	11/15/1978	6/30/1984	2
559 - XXX	D	COLVIN PARK	CITY OF RADCLIFF	$30,224.49	C	11/15/1978	12/31/1983	2
699 - XXX	D	FREEMAN LAKE PARK	CITY OF ELIZABETHTOWN	$11,240.90	C	10/20/1980	10/31/1985	2
758 - XXX	D	RADCLIFF CITY PARK	CITY OF RADCLIFF	$20,329.56	C	10/22/1981	10/31/1986	2
764 - XXX	D	UPTON COMMUNITY PARK	CITY OF UPTON	$16,853.58	C	1/12/1983	12/31/1987	2
790 - XXX	D	DAWLEY PARK	CITY OF RADCLIFF	$25,391.90	C	8/17/1983	9/15/1984	2
860 - XXX	R	WEST POINT CITY PARK	CITY OF WEST POINT	$10,124.00	C	6/22/1984	6/30/1986	2
861 - XXX	D	DAWLEY PARK	CITY OF RADCLIFF	$111,145.76	C	7/3/1984	5/31/1989	2
876 - XXX	D	ELIZABETHTOWN SOFTBALL COMPLEX	CITY OF ELIZABETHTOWN	$33,501.60	C	9/5/1984	8/31/1986	2
952 - XXX	D	COLVIN PARK	CITY OF RADCLIFF	$6,241.20	C	3/5/1986	2/28/1988	2
956 - XXX	C	WEST POINT MEMORIAL PARK	CITY OF WEST POINT	$30,456.00	C	3/20/1986	2/1/1990	2

ATTACHMENT B14-2

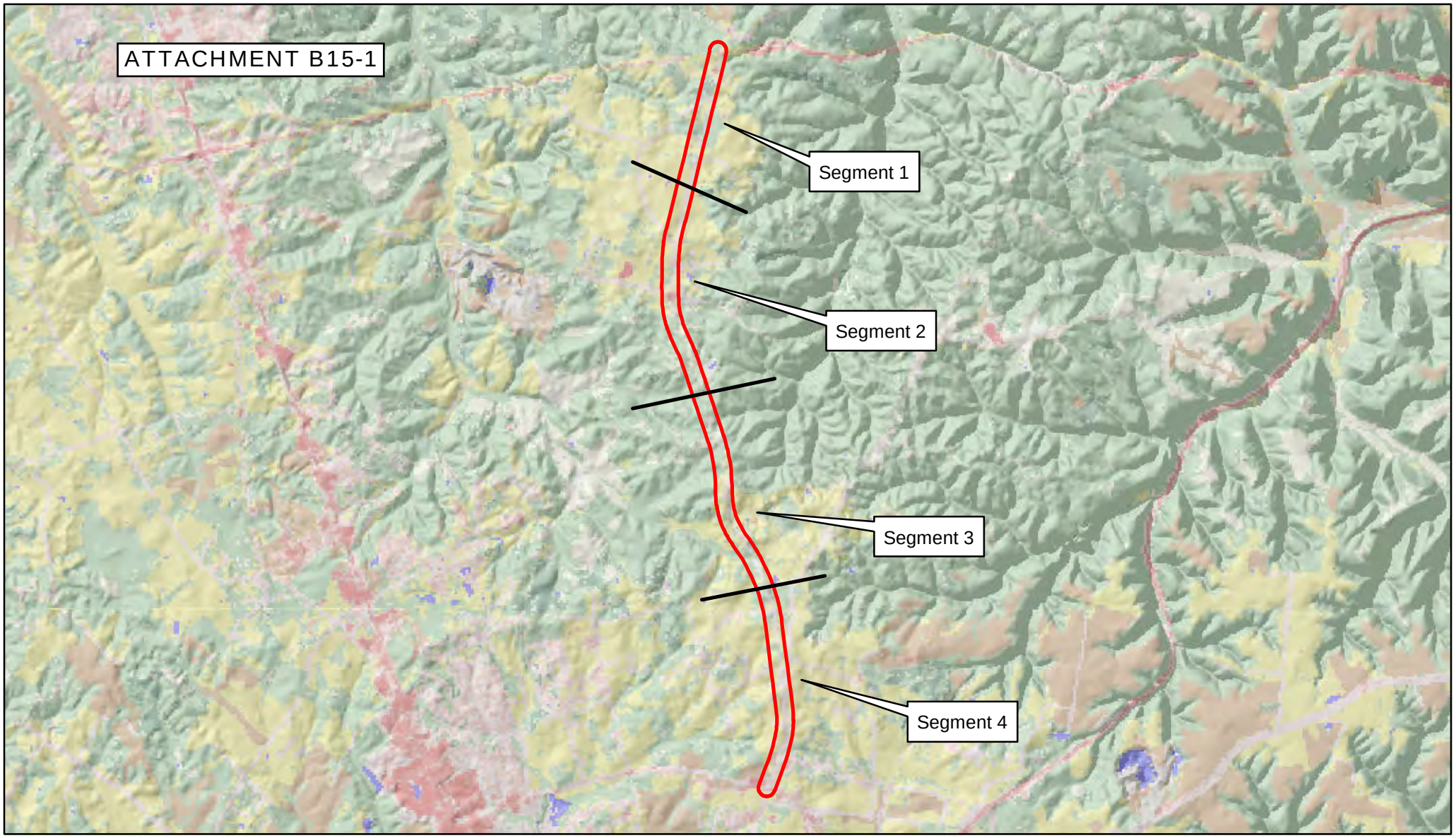
United States Department of the Interior
National Park Service
Land & Water Conservation Fund

Detailed Listing of Grants Grouped by County

Today's Date: 12/10/2010

KENTUCKY - 21

Grant ID & Element	Type	Grant Element Title	Grant Sponsor	Amount	Status	Date Approved	Exp. Date	Cong. District
HARDIN								
1023 - XXX	D	AMERICAN LEGION PARK SHELTER	CITY OF ELIZABETHTOWN	$5,391.00	C	8/4/1987	7/31/1989	2
1097 - XXX	D	VETERANS MEMORIAL PARK	CITY OF WEST POINT	$21,762.41	C	7/31/1991	7/31/1994	2
1154 - XXX	D	DAWLEY PARK SOCCER EXPANSION	CITY OF RADCLIFF	$17,422.50	C	6/27/1994	5/31/1996	2
1341 - XXX	D	RINEYVILLE COMMUNITY PARK	HARDIN COUNTY FISCAL COURT	$75,000.00	C	8/25/2005	7/30/2010	2
			HARDIN County Total:	**$624,845.21**		**County Count:**	**25**	
HARLAN								
61 - XXX	D	LITTLE SHEPHERD TRAIL	DEPT. OF NATURAL RESOURCES	$23,966.85	C	12/24/1969	12/31/1972	5
146 - XXX	C	CLOVERFORK COMMUNITY PARK	CITY OF EVARTS	$11,099.06	C	9/12/1972	12/31/1974	5
337 - XXX	D	LYNCH CITY PARK	CITY OF LYNCH	$20,384.00	C	6/13/1975	6/30/1977	5
850 - XXX	D	BENHAM CITY PARKS	CITY OF BENHAM	$20,194.60	C	2/21/1984	2/28/1989	5
1107 - XXX	D	CLOVER VALLEY RECREATIONAL PARK	CITY OF EVARTS	$21,052.64	C	8/15/1991	8/31/1994	5
1136 - XXX	D	BENHAM CITY PARK	CITY OF BENHAM	$6,885.54	C	6/23/1993	6/30/1995	5
1157 - XXX	D	LOYALL PARK	CITY OF LOYALL	$2,672.91	C	8/22/1994	7/31/1996	5
1158 - XXX	D	DRESSIN PARK	CITY OF HARLAN & HARLAN COUNTY	$17,422.50	C	8/22/1994	7/31/1996	5
1248 - XXX	D	CUMBERLAND/SECC TENNIS COURTS	CITY OF CUMBERLAND	$49,151.84	C	9/4/2002	9/30/2007	5
1325 - XXX	D	EVARTS PLAYGROUND	CITY OF EVARTS	$17,588.00	C	8/25/2005	7/30/2010	5
1339 - XXX	D	BENHAM RV PARK	CITY OF BENHAM	$16,237.38	C	9/14/2005	7/30/2010	5
1396 - XXX	D	SOUTH EVARTS RV PARK	CITY OF EVARTS	$23,700.00	A	5/19/2009	7/30/2013	5
			HARLAN County Total:	**$230,355.32**		**County Count:**	**12**	



Project Area

Archaeological Project Boundaries

N
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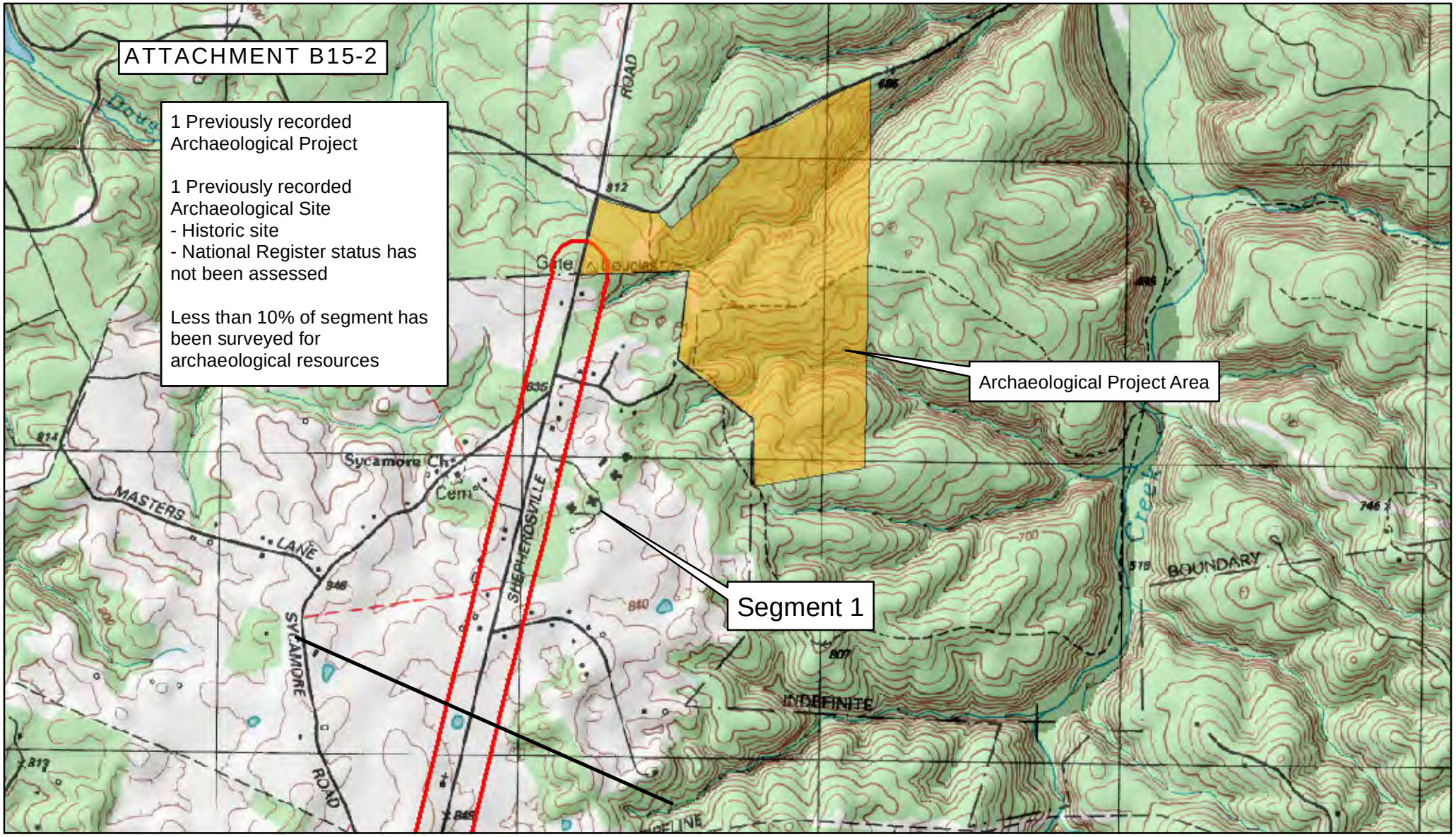
0 0.4 0.8 1.6 2.4 3.2 4
Kilometers

KY 251 Scoping Study

Kentucky Office of State Archaeology
University of Kentucky, 1020A Export Street, Lexington, KY 40506
phone: 859-257-1944 fax: 859-323-1968 email:ky-osa@lsv.uky.edu

Confidential Information
Not for Public Release



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Project Area

Archaeological Project Boundaries

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Kilometers

KY 251 Scoping Study

Kentucky Office of State Archaeology
University of Kentucky, 1020A Export Street, Lexington, KY 40506
phone: 859-257-1944 fax: 859-323-1968 email:ky-osa@lsv.uky.edu

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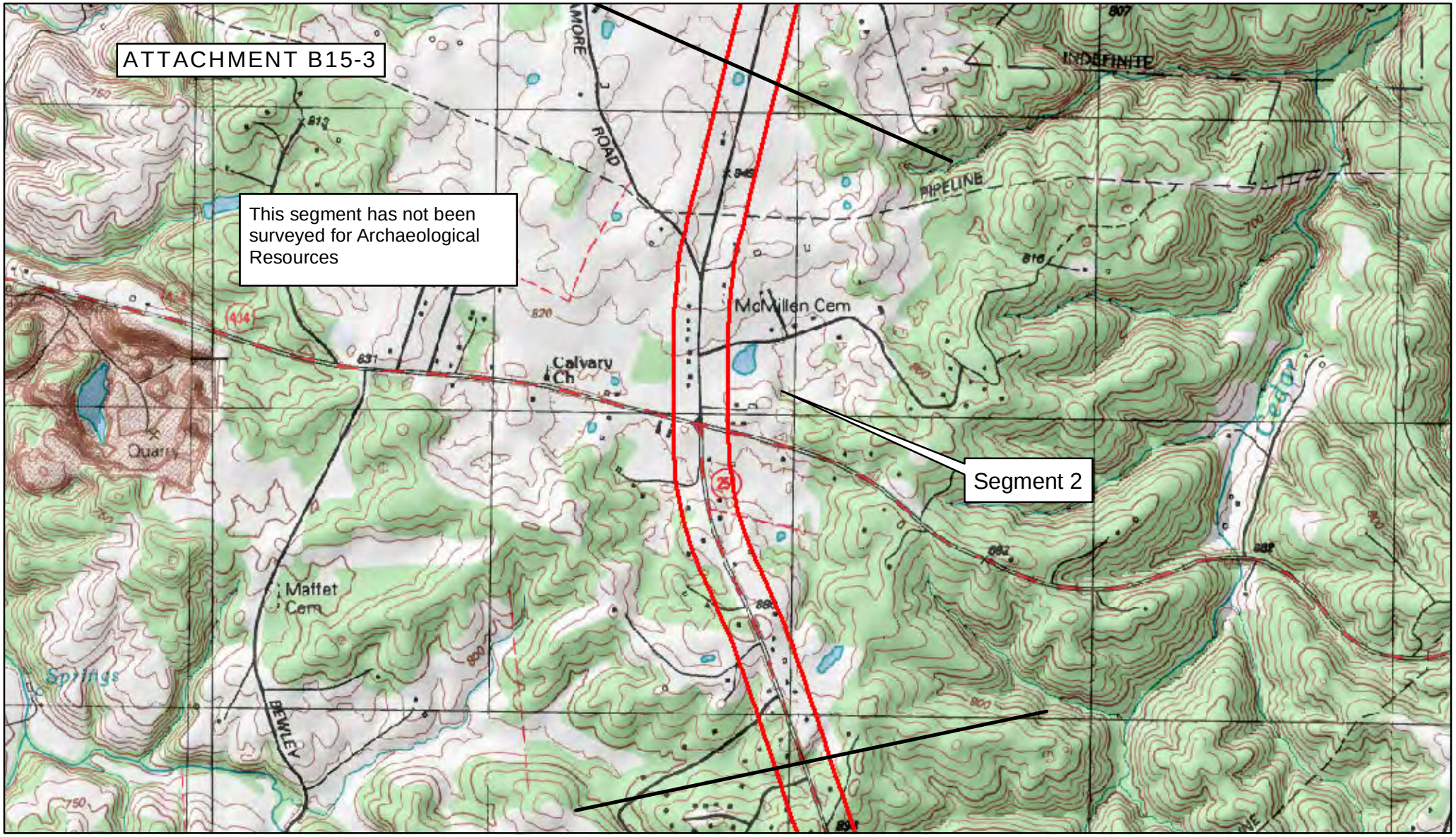

Project Area

Archaeological Project Boundaries

N W E S

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KY 251 Scoping Study

Kentucky Office of State Archaeology
University of Kentucky, 1020A Export Street, Lexington, KY 40506
phone: 859-257-1944 fax: 859-323-1968 email:ky-osa@lsv.uky.edu

Confidential Information
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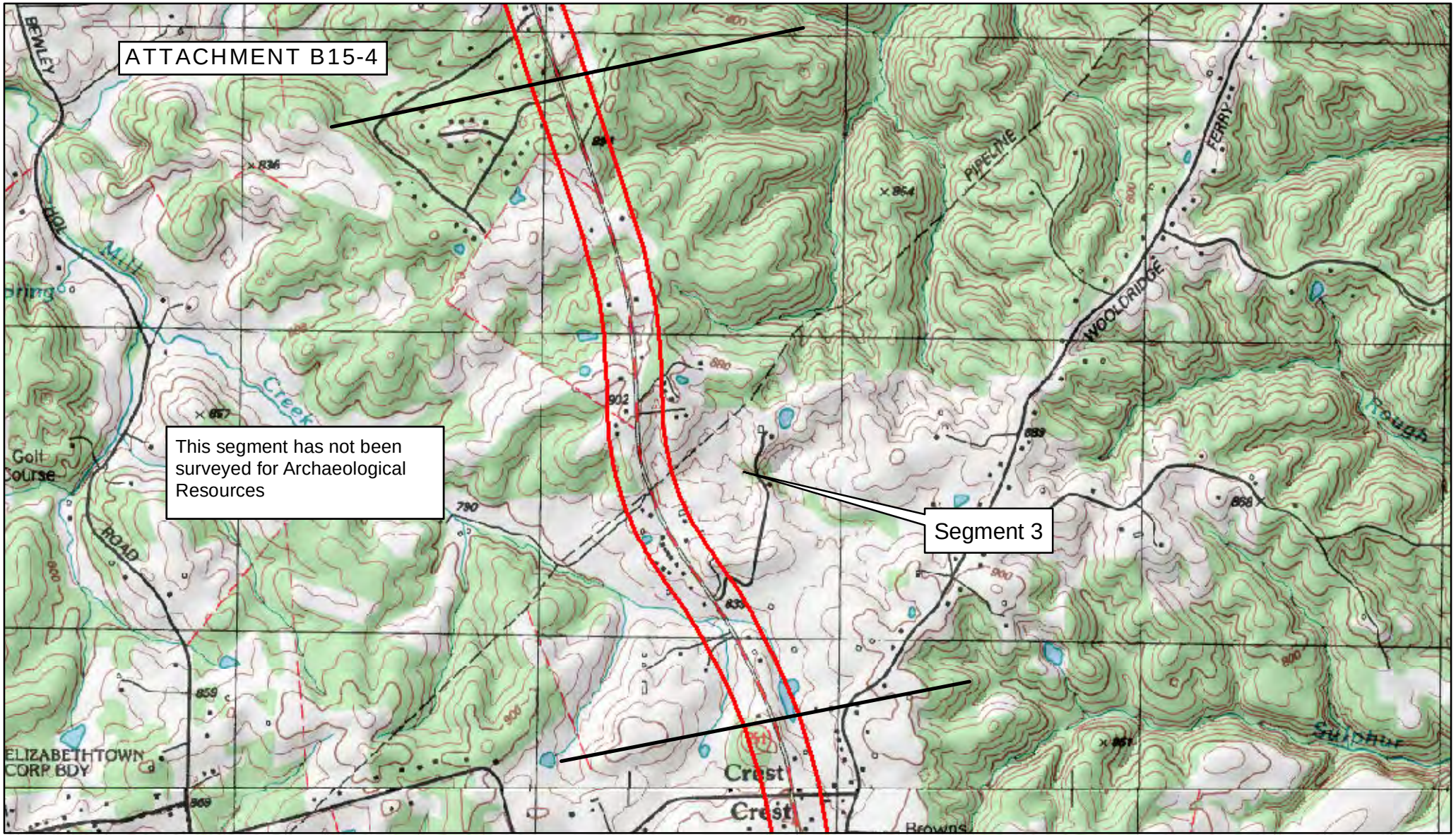

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Project Area

Archaeological Project Boundaries

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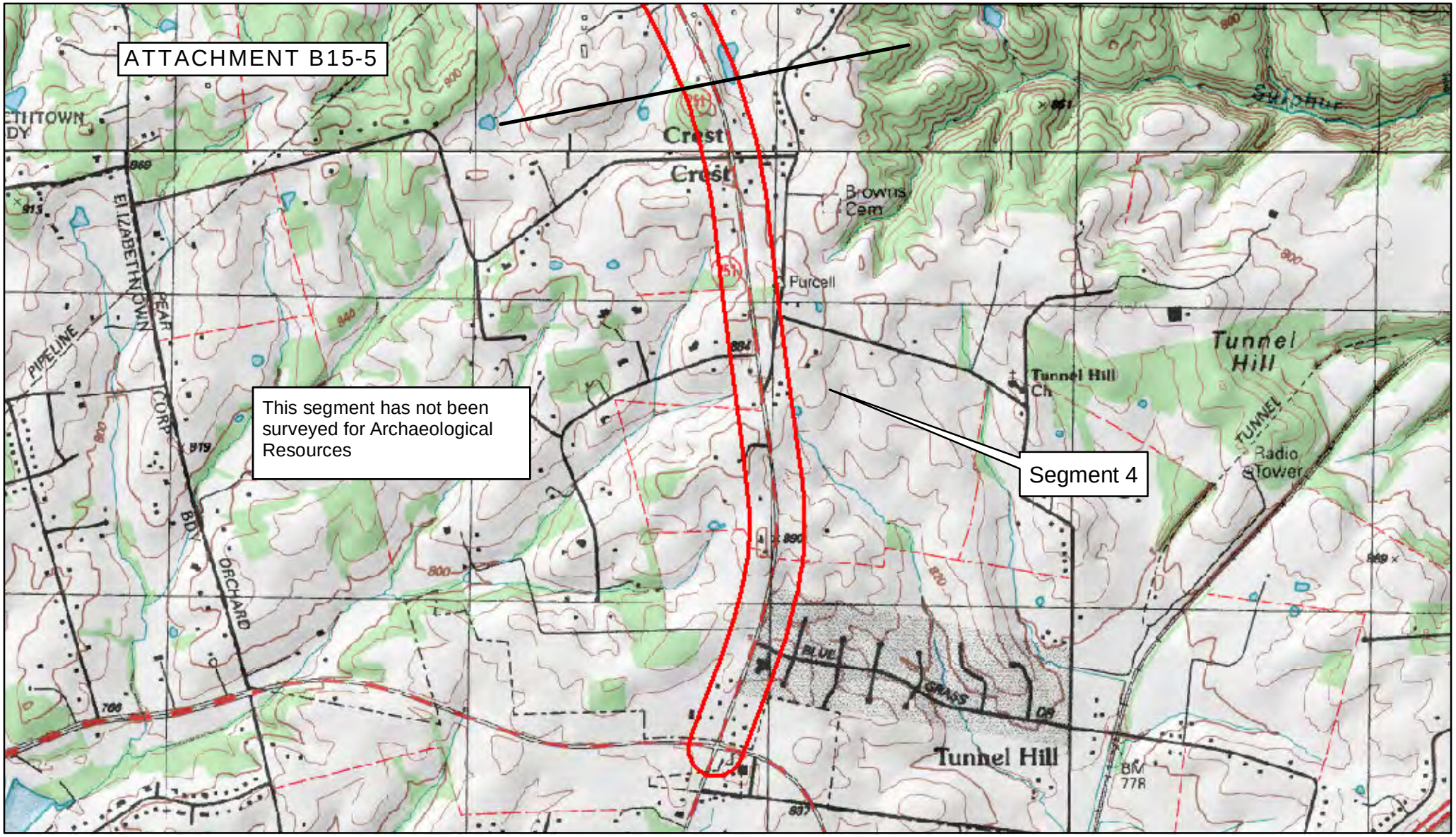
Kilometers

KY 251 Scoping Study

Kentucky Office of State Archaeology
University of Kentucky, 1020A Export Street, Lexington, KY 40506
phone: 859-257-1944 fax: 859-323-1968 email:ky-osa@lsv.uky.edu

Confidential Information
Not for Public Release



Project Area

Archaeological Project Boundaries

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Kilometers

KY 251 Scoping Study

Kentucky Office of State Archaeology
University of Kentucky, 1020A Export Street, Lexington, KY 40506
phone: 859-257-1944 fax: 859-323-1968 email:ky-osa@lsv.uky.edu

Confidential Information
Not for Public Release

ATTACHMENT B15-6

Kentucky Office of State Archaeology

University of Kentucky, 1020A Export Street, Lexington, KY 40506

Phone:(859)257-1944 Fax: (859)323-1968 Email: ky-osa@lsv.uky.edu

Confidential Information; Not for Public Release

KY 251 Scoping Study

Site Check Performed On: 1/10/2011

Archaeological Sites:
One previously recorded archaeological site was recorded within the first segment of your project area. This site is an historic site and its eligibility for inclusion on the National Register of Historic Places has not been determined. No other archaeological sites have been recorded within your project area.

Archaeological Project Areas:
One archaeological survey has been identified within your project area. This survey partially overlaps with the first segment of your project area and less than 10% of this segment has been surveyed for archaeological resources. The remaining segments of your project area have not been surveyed for archaeological resources. The citation for the previously recorded archaeological project is:

1980 O'Malley, Nancy, Boyce N. Driskell, Julie Riesenweber, and Richard S. Levy with contributions by Michael B. Collins
Stage I Archaeological Investigations at Fort Knox, Kentucky. Program for Cultural Resource Assessment, University of Kentucky. Manuscript on file at the Kentucky Office of State Archaeology, Lexington, KY.

ATTACHMENT B16-1

Kentucky Heritage Council

300 Washington Street, Frankfort, KY 40601
Phone:502-564-7005 Fax:502-564-5820

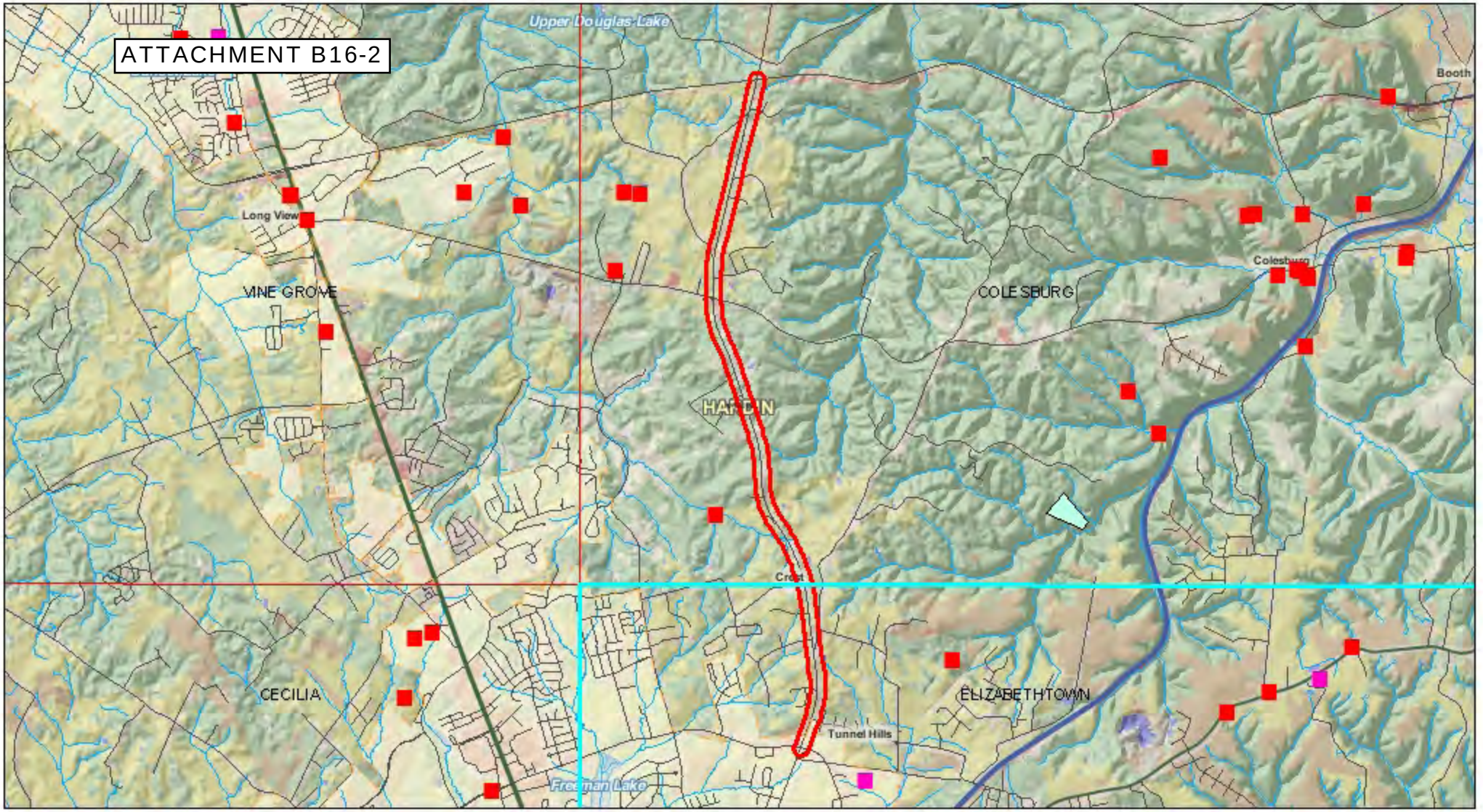
Confidential Information
Not for Public Release

Title: FY11-0976 KY 251 Scoping Study

Historic Resources Check Performed On: 1/7/2011

There were no previously recorded historic resources in your project area.

ATTACHMENT B16-2



Project Area
National Register Properties
National Historic Landmarks
Historic Survey Resources
Historic Coded Properties
Large National Register Properties
National Register Districts

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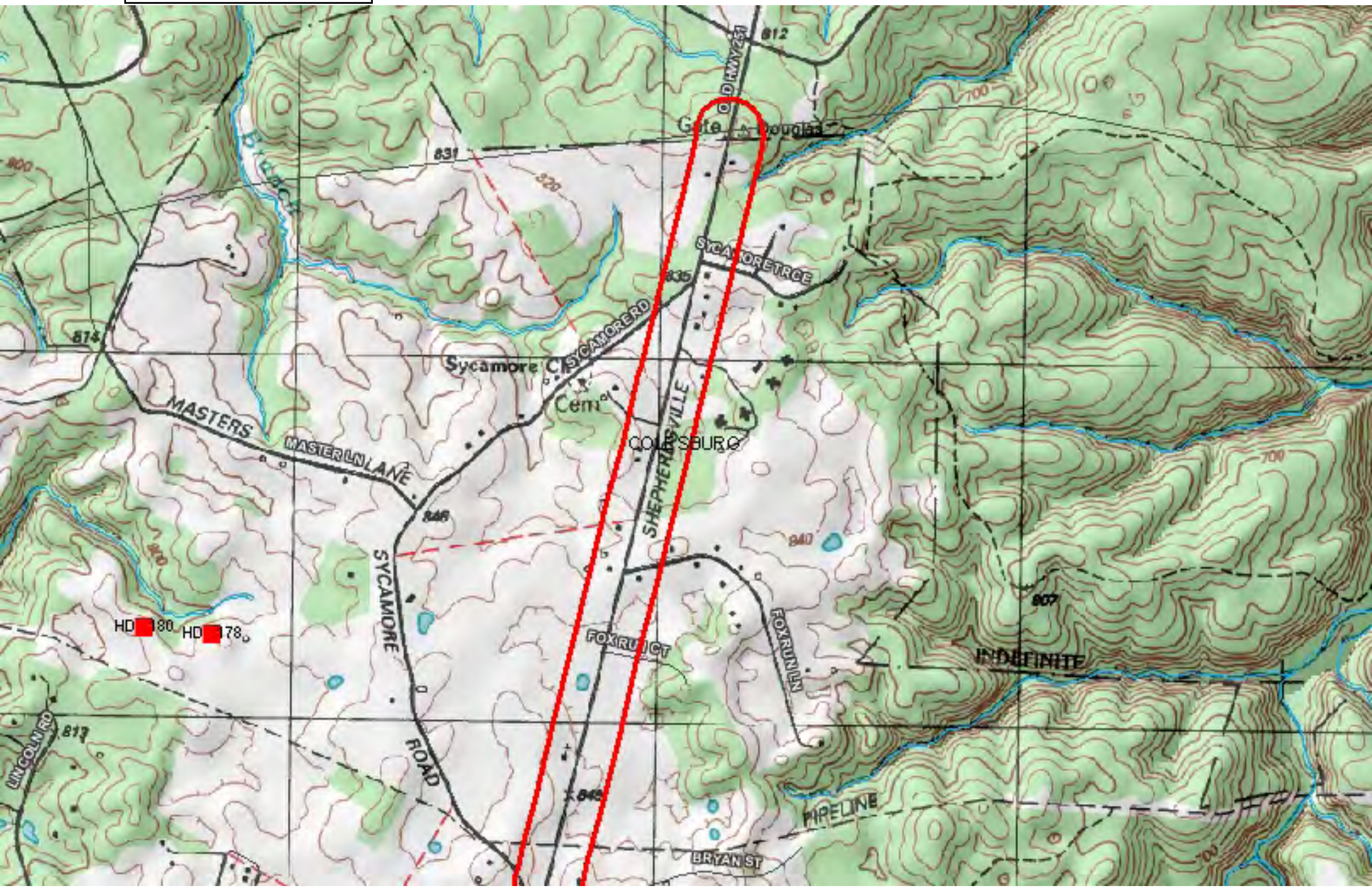
0 0.20.40.60.8 1
Miles

Title: FY11-0976

Kentucky Heritage Council
300 Washington Street, Frankfort, KY 40601
Phone: 502-564-7005 Fax: 502-564-5820

Confidential Information
Not for Public Release

ATTACHMENT B16-3



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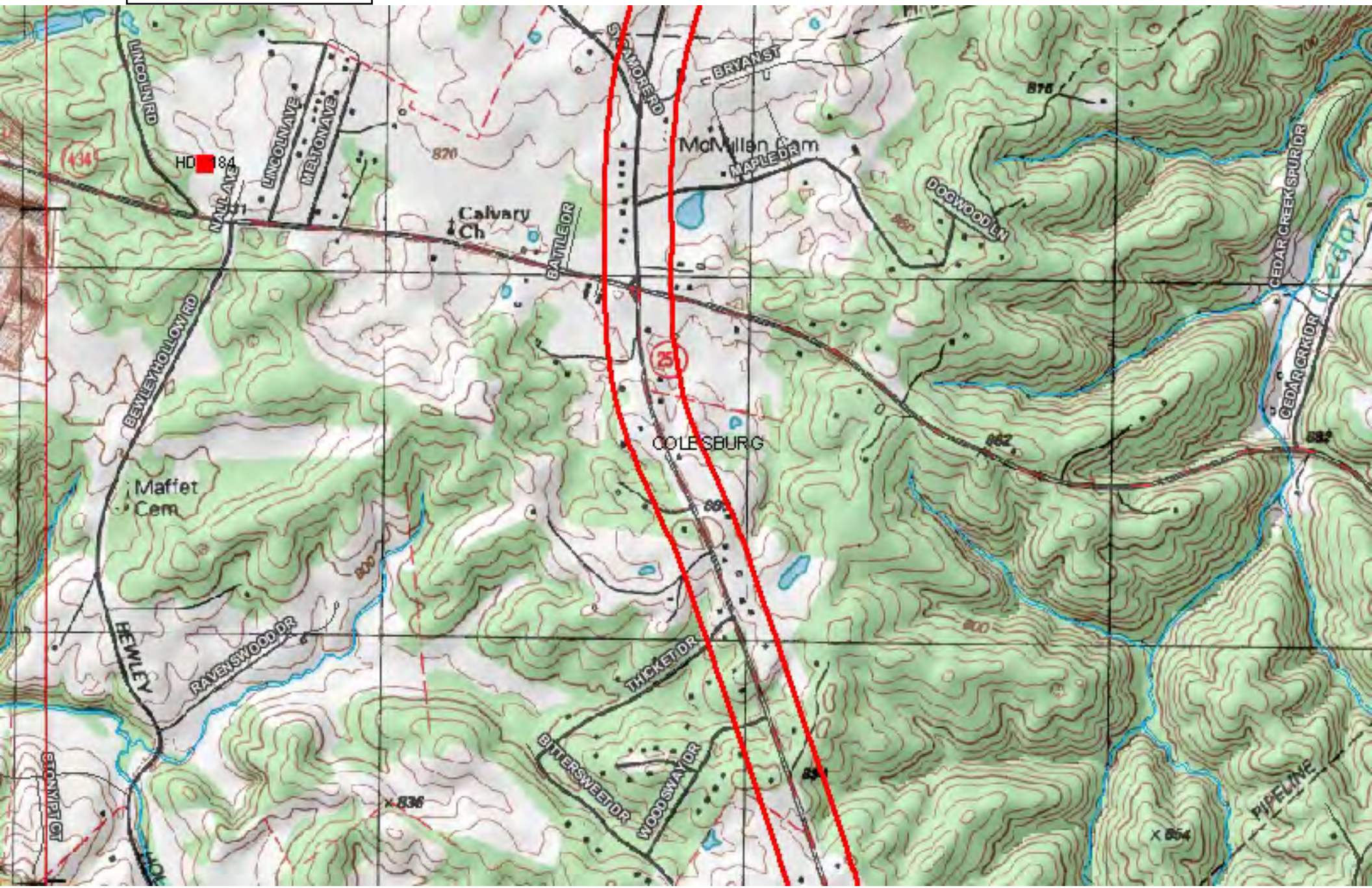

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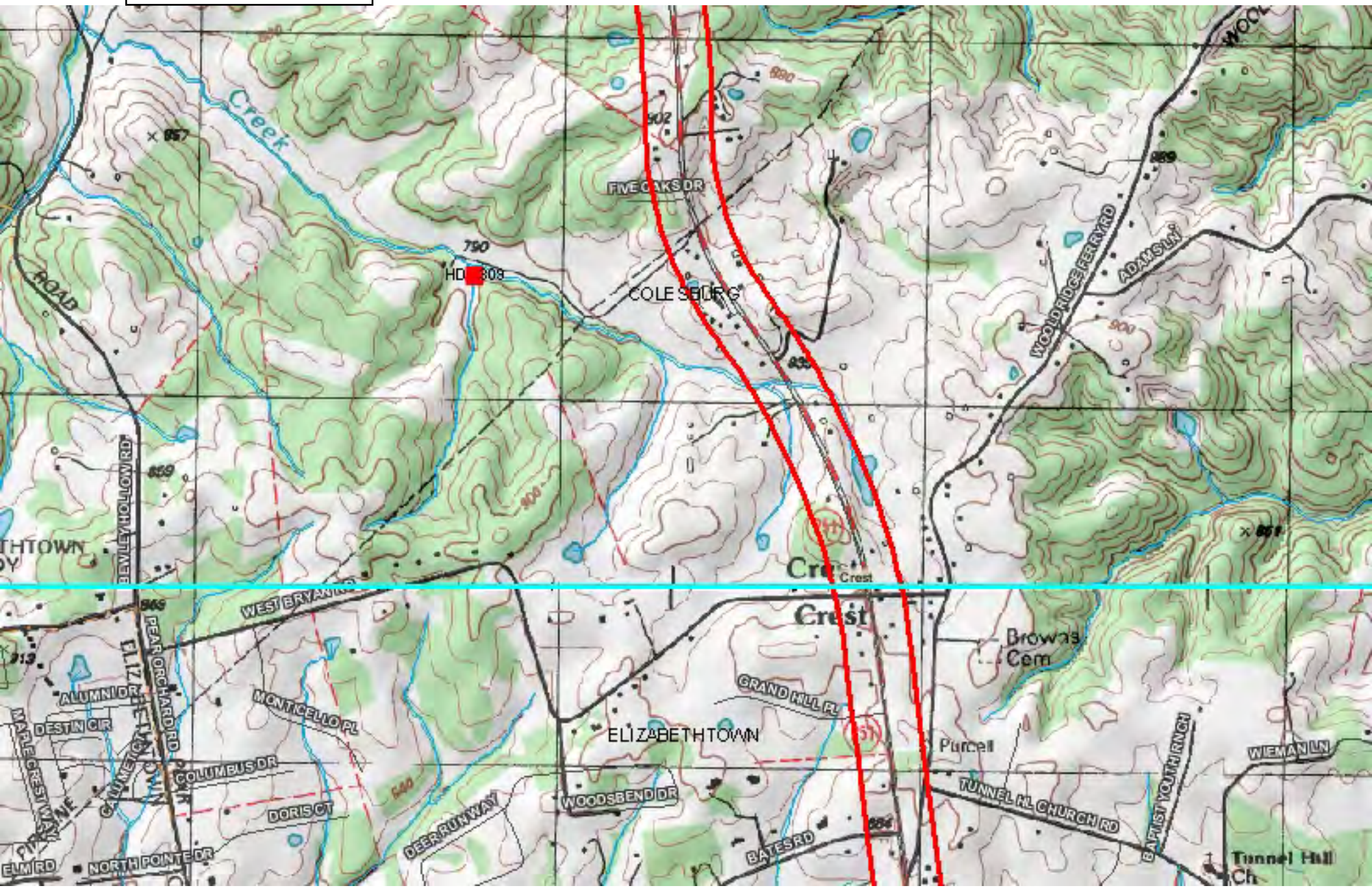

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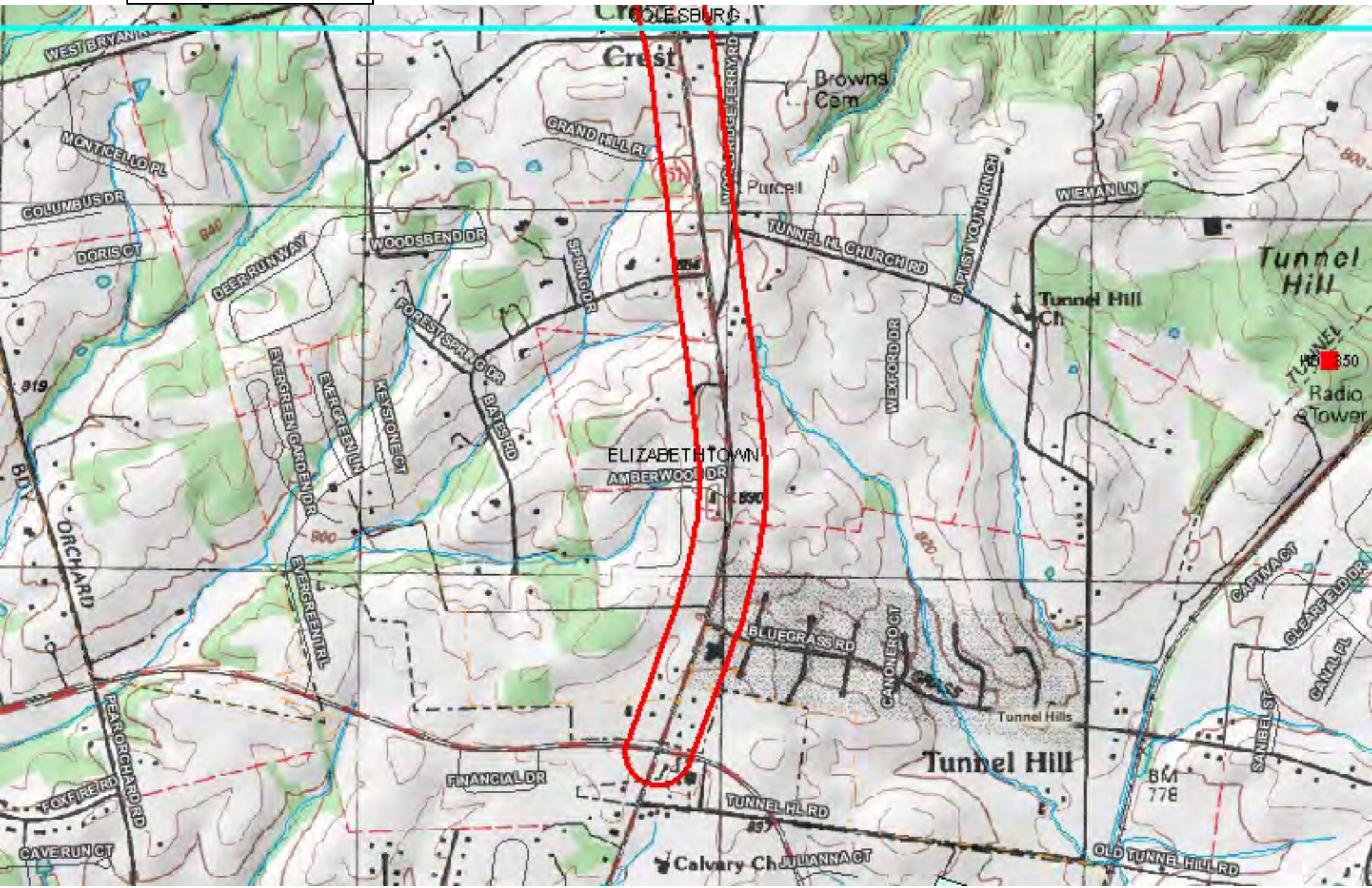
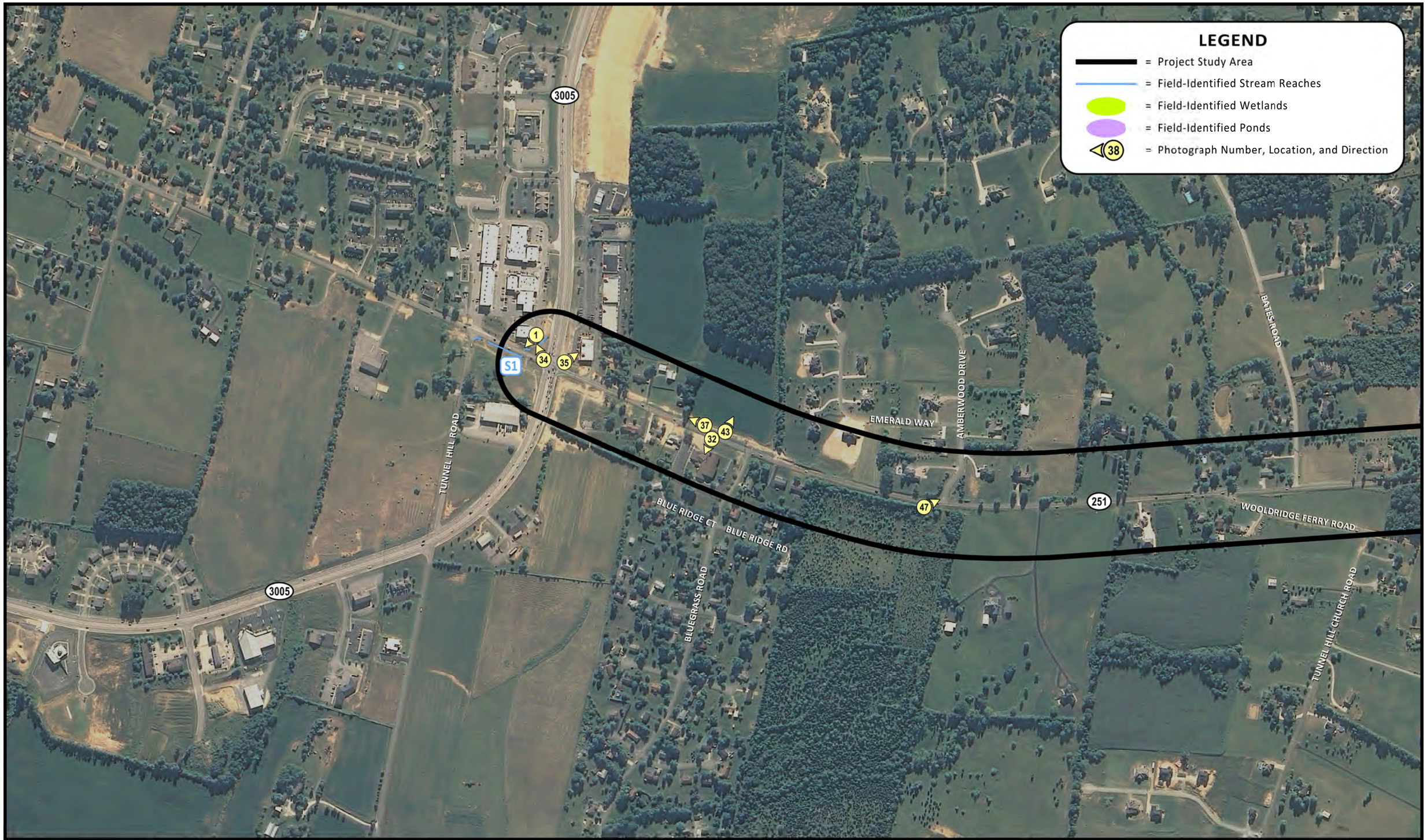


ATTACHMENT C
Photograph Index Map and Study Area Representative Photographs



0 100 200 300 500 FEET

March 2011 NORTH

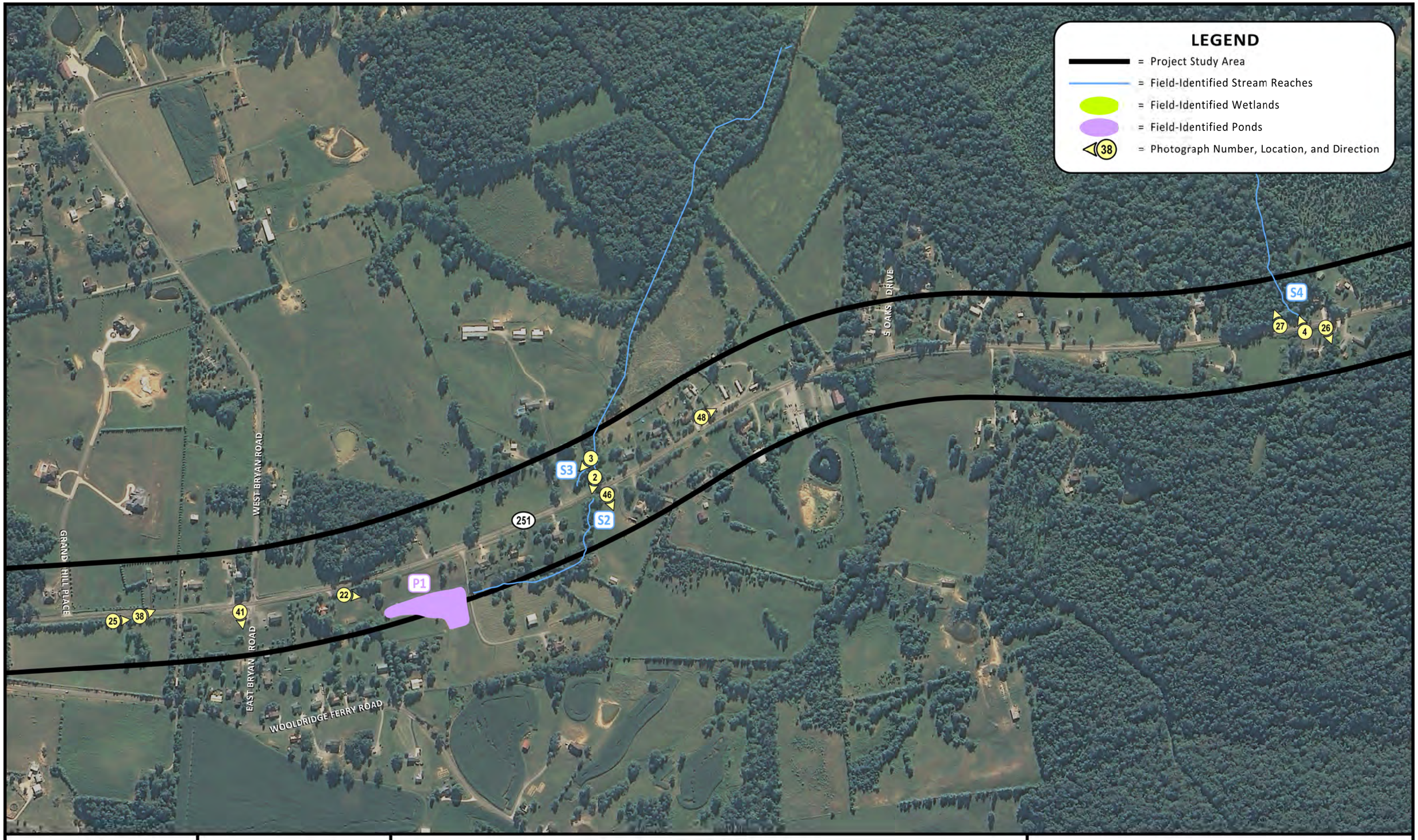
ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment C1

Photograph Index Map



0 100 200 300 500 FEET

March 2011

NORTH

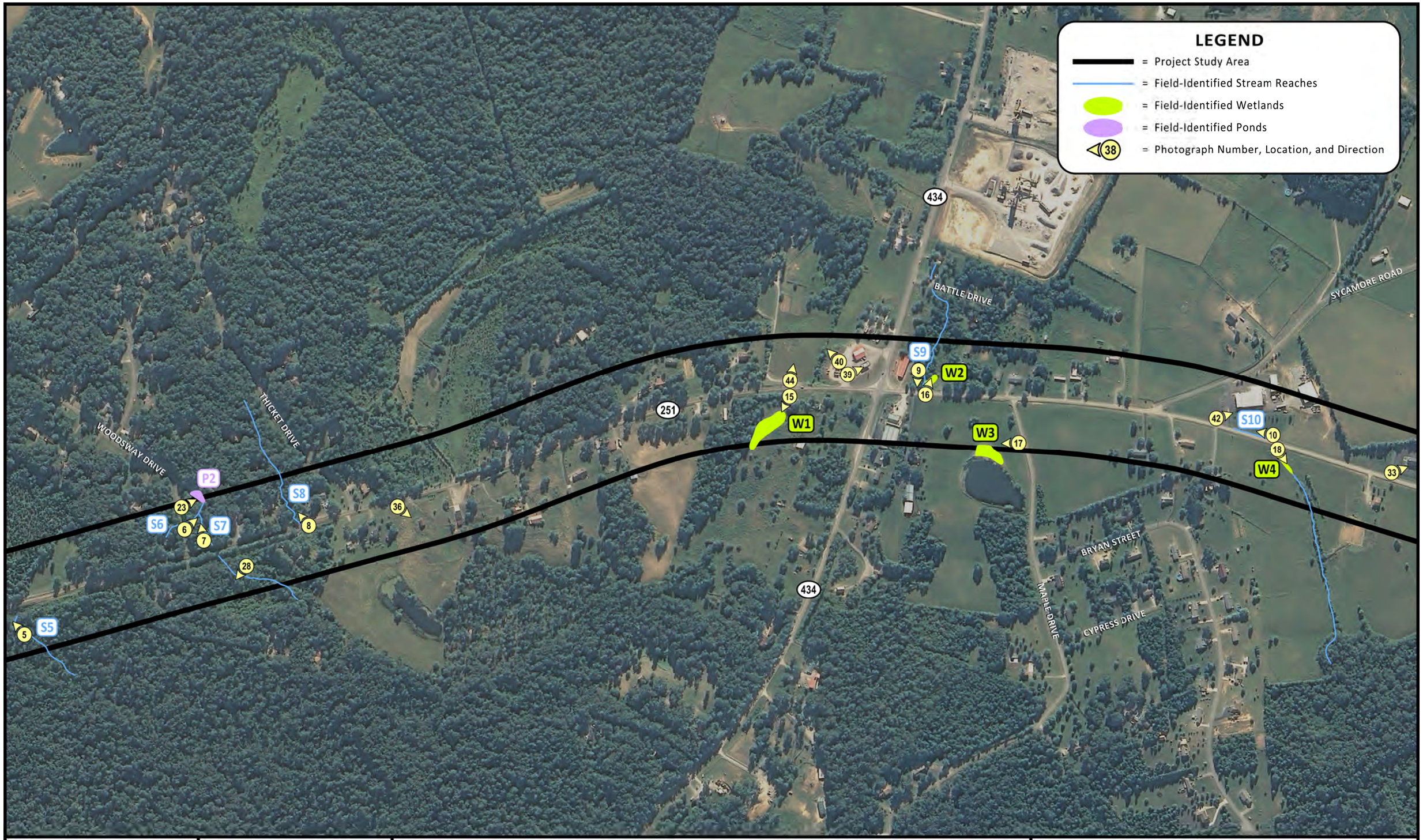
ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment C2

Photograph Index Map



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March 2011 NORTH

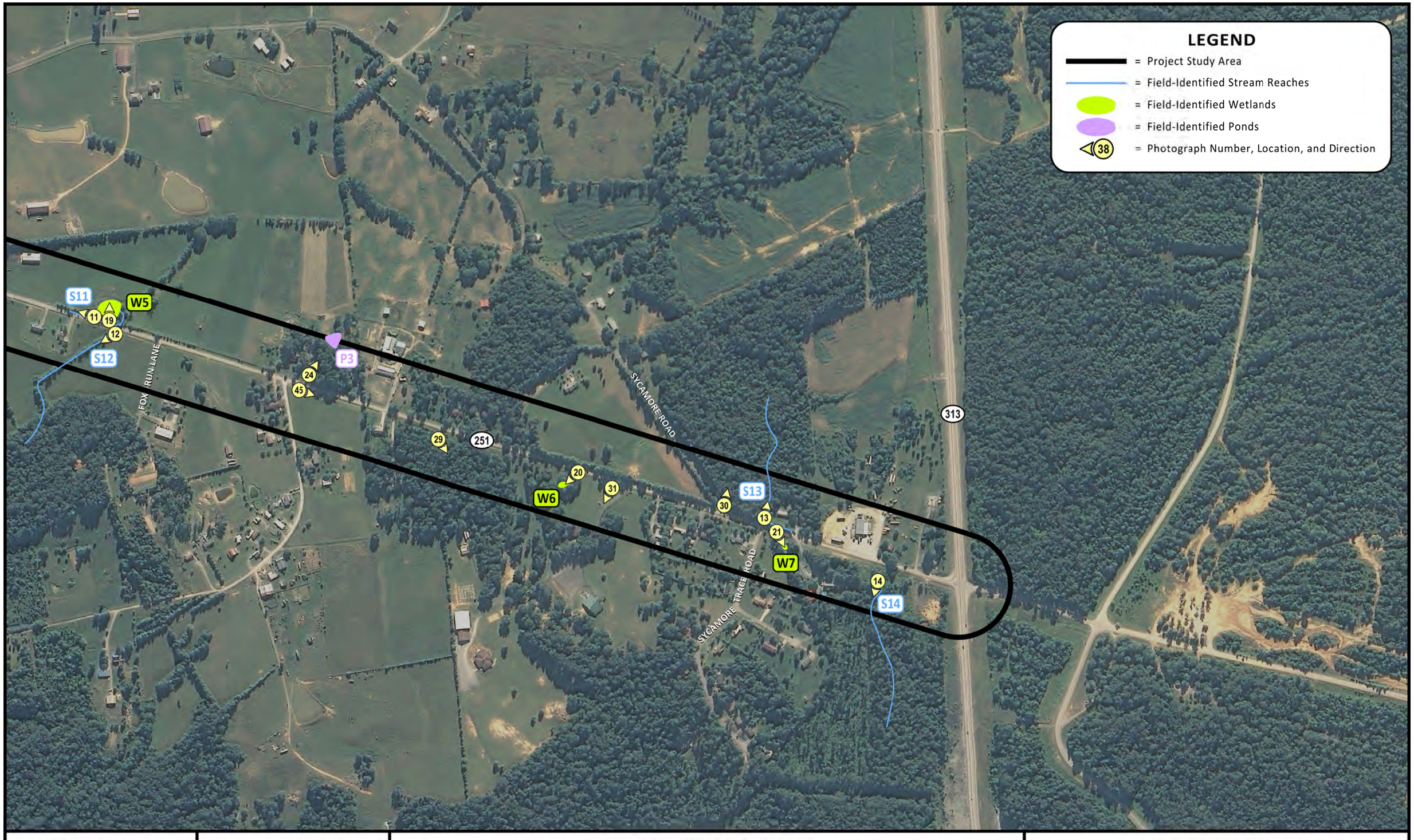
ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment C3

Photograph Index Map



0 100 200 300 500 FEET

March 2011

NORTH

ENTRAN

Environmental Overview

KY 251 Improvement - KY 3005 to KY 313
Hardin County, Kentucky; Item No. 4-153.00

Attachment C4

Photograph Index Map

Photo 1: Representative photograph of a non-USGS stream (S1); ephemeral; looking downstream; facing south.

Photo 2: Representative photograph of USGS Mill Creek headwater (S2); ephemeral; looking upstream; facing east.

Photo 3: Representative photograph of USGS unnamed tributary to Mill Creek headwater (S3); ephemeral; looking upstream; facing southeast.

Photo 4: Representative photograph of a non-USGS stream (S4); ephemeral; looking downstream; facing west.

Photo 5: Representative photograph of a non-USGS stream (S5); intermittent; looking upstream; facing southwest.

Photo 6: Representative photograph of a non-USGS stream (S6); intermittent; looking downstream; facing northwest.

Photo 7: Representative photograph of a non-USGS stream (S7); intermittent; looking downstream; facing west.

Photo 8: Representative photograph of a non-USGS stream (S8); ephemeral; looking downstream; facing southwest.

Photo 9: Representative photograph of a non-USGS stream (S9); intermittent; looking upstream; facing east.

Photo 10: Representative photograph of a non-USGS stream (S10); ephemeral; looking upstream; facing south.

Photo 11: Representative photograph of a non-USGS stream (S11); ephemeral; looking upstream; facing south.

Photo 12: Representative photograph of a non-USGS stream (S12); intermittent; looking downstream; facing southeast.

Photo 13: Representative photograph of a non-USGS stream (S13); ephemeral; looking downstream; facing west.

Photo 14: Representative photograph of a non-USGS stream (S14); ephemeral; looking downstream; facing east.

Photo 15: Representative photograph of potential wetland (W1); emergent bottomland field; facing east.

Photo 16: Representative photograph of potential wetland (W2); emergent bottomland field; facing northwest.

Photo 17: Representative photograph of potential wetland (W3); emergent edge of pond; facing south.

Photo 18: Representative photograph of potential wetland (W4); emergent swale; facing east.

Photo 19: Representative photograph of potential wetland (W5); emergent pond (NWI); facing west.

Photo 20: Representative photograph of potential wetland (W6); emergent swale (NWI); facing southeast.

Photo 21: Representative photograph of potential wetland (W7); emergent swale; facing northeast.

Photo 22: Representative photograph of pond (P1); recreational pond; facing north.

Photo 23: Representative photograph of pond (P2); recreational pond; facing northwest.

Photo 24: Representative photograph of pond (P3); agricultural/recreational pond; facing northwest.

Photo 25: Representative photograph of potential habitat for Indiana bat, gray bat, southeastern myotis, and small-footed myotis; trees with exfoliating bark, split trunks, cavities; facing north.

Photo 26: Representative photograph of potential habitat for Indiana bat, gray bat, southeastern myotis, and small-footed myotis; trees with exfoliating bark, split trunks, cavities; facing northeast.

Photo 27: Representative photograph of woodland habitat; upland woods; facing southwest.

Photo 28: Representative photograph of woodland habitat; upland woods; facing southeast.

Photo 29: Representative photograph of woodland habitat; upland woods; facing northeast.

Photo 30: Representative photograph of woodland habitat; upland evergreen pine stand; facing west.

Photo 31: Representative photograph of institutional land use; Camp Nikao and Conference Center; facing southeast.

Photo 32: Representative photograph of institutional land use; Church of Jesus Christ of Latter Day Saints; facing east.

Photo 33: Representative photograph of institutional land use; Heavenbound Baptist Church; facing northwest.

Photo 34: Representative photograph of commercial land use; Cool Springs Shopping Center; facing southwest.

Photo 35: Representative photograph of commercial land use; Pavilion Shopping Center; facing north.

Photo 36: Representative photograph of potential cultural historic resource; old barn possibly 50 years of age or older; facing northeast.

Photo 37: Representative photograph of single household rural residential land use along KY 251; facing south.

Photo 38: Representative photograph of single household rural residential land use along KY 251; facing northwest.

Photo 39: Representative photograph of hazardous materials concern site; UST concern facility; Property ID 1; Food Mart and Marathon, 3069 Battle Training Road (KY 434); facing northwest.

Photo 40: Representative photograph of hazardous materials concern site; AST concern facility; Property ID 1; Food Mart and Marathon, 3069 Battle Training Road (KY 434); facing west.

Photo 41: Representative photograph of hazardous materials concern site; UST concern facility; Property ID 2; Potential Abandoned Service/Filling Station, KY 251 and East Bryan Road; facing east.

Photo 42: Representative photograph of hazardous materials concern site; additional concerns; Property ID 3; McMillen Mechanical, Inc., 6671Shepherdsville Road (KY 251); AST present on site; facing northwest.

Photo 43: Representative photograph of agricultural land use; fallow row-crop field; facing west.

Photo 44: Representative photograph of agricultural land use; fenced hay field; facing west.

Photo 45: Representative photograph of agricultural land use; fenced hay field; facing northeast.

Photo 46: Representative photograph of agricultural land use; fenced horse pasture; facing east.

Photo 47: Representative photograph of noise-sensitive receptors; Amber Wood neighborhood; facing northwest.

Photo 48: Representative photograph of noise-sensitive receptors; mobile home neighborhood; facing northwest.

Appendix C – Environmental Justice Overview

KY 251 Scoping Study - KYTC Item No. 4-153.00

KY Transportation Cabinet

Final Report
May 2012

Stantec Inc.

One Team. Infinite Solutions.

Stantec

TABLE OF CONTENTS

1.0 Introduction

The Kentucky Transportation Cabinet (KYTC) initiated the KY 251 Scoping Study to seek improvement strategies for current and anticipated future transportation deficiencies within a portion of Hardin County. The project study area, shown in **Figure 1**, is north of the city of Elizabethtown and includes the section of KY 251 from Ring Road (KY 3005) to the Joe Prather Highway (KY 313). KY 251 is a north-south route paralleling US 31W to the west and I-65 to the east. The U.S. Department of Defense 2005 Base Realignment and Closure (BRAC) plan affecting the Fort Knox Military Reservation is a contributing factor to the study and the anticipated need for improvements in the surrounding areas.

This report is to provide information to assist in the determination of socioeconomic impacts in the project study area. Data from the U.S Census Bureau and the 2010 Census was primarily utilized for the analysis. For information not currently obtainable from the 2010 Census, the 2000 Census information was referenced.

2.0 Environmental Justice

On February 11, 1994, Executive Order 12898, entitled *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* was signed. Executive Order 12898 states:

> "…each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…"

The U.S. Department of Transportation (DOT) outlines the three primary Environmental Justice goals as:

1. To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority populations and low-income populations.
2. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
3. To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority populations and low-income populations.

Low-income is defined in U.S. DOT Order (5610.2) as "a person whose median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines." A low-income population is "any readily identifiable group of low-income persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons…"

The U.S. DOT order defines minority as:

1. Black (a person having origins in any of the black racial groups of Africa);
2. Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
3. Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or
4. American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

A minority population is "any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons…"

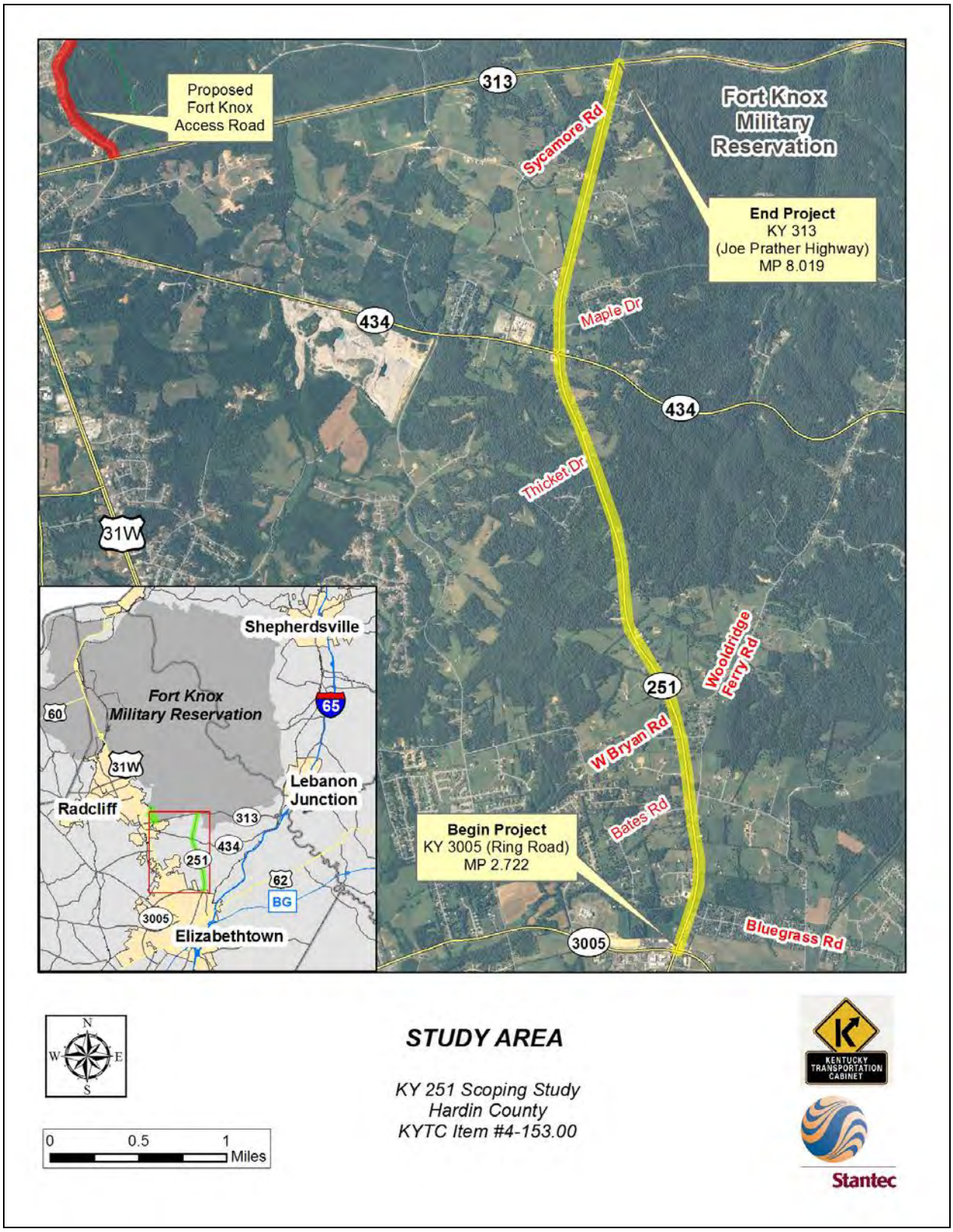


Figure 1: Study Area for the KY 251 Scoping Study

A disproportionately high and adverse effect on a minority or low-income population means an adverse effect that:

1. is predominately borne by a minority population and/or low-income population, or
2. will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

Elderly and disabled populations (also used in this analysis) are not specifically recognized under the definition of an Environmental Justice community. However, the U.S. DOT specifically encourages the early examination of potential populations of the elderly, children, disabled, and other populations protected by Title VI of the Civil Rights Act of 1964 and related nondiscrimination statutes. The following terms are defined using US Census Bureau terminology and data:

1. **Elderly Persons** include persons of age 65 and older.
2. **Persons with Disabilities** include persons for which any of the three following conditions were true:
   A. They were 5 years old and over and had a sensory, physical, mental, or self-care disability;
   B. They were 16 years old and over and had a going outside the home disability; or
   C. They were 16 to 64 years old and had an employment disability.

3.0 METHODOLOGY

Data for this study was collected by using the method outlined by the KYTC document, "Methodology for Assessing Potential Environmental Justice Concerns for KYTC Planning Studies" that is located in *Appendix A, Methodology*. The U.S. Census Data used in the report is taken from American Fact Finder Summary File 3.

4.0 CENSUS DATA ANALYSIS

U.S. Census data is arranged according to geographic unit. The U.S. Census Bureau defines geographical units as:

Census Tract (CT) – "A small, relatively permanent statistical subdivision of a county or statistically equivalent entity delineated for data presentation purposes by a local group of census data users or the geographic staff of a regional census center in accordance with Census Bureau guidelines. CTs generally contain between 1,000 and 8,000 people. CT boundaries are delineated with the intention of being stable over many decades, so they generally follow relatively permanent visible features. They may also follow governmental unit boundaries and other invisible features in some instances; the boundary of a state or county is always a census tract boundary."

Block Group (BG) - "A statistical subdivision of a CT. A BG consists of all tabulation blocks whose numbers begin with the same digit in a CT. BGs generally contain between 300 and 3,000 people, with an optimum size of 1,500 people."

Census Block (CB) – "An area bounded on all sides by visible and/or invisible features shown on a map prepared by the Census Bureau. A CB is the smallest geographic entity for which the Census Bureau tabulates decennial census data."

There is one (1) census tract and three (3) Block Groups that are relevant to this study area. The census tract is shown in **Figure 2**. The US Census tables in this report include the total number and percentages for minorities, elderly population, disabled population and low-income population levels for the census tract covering the study area and Hardin County. Due to the limited data available at the block group level from the 2010 Census, only the information for the census tract is being used for comparison.

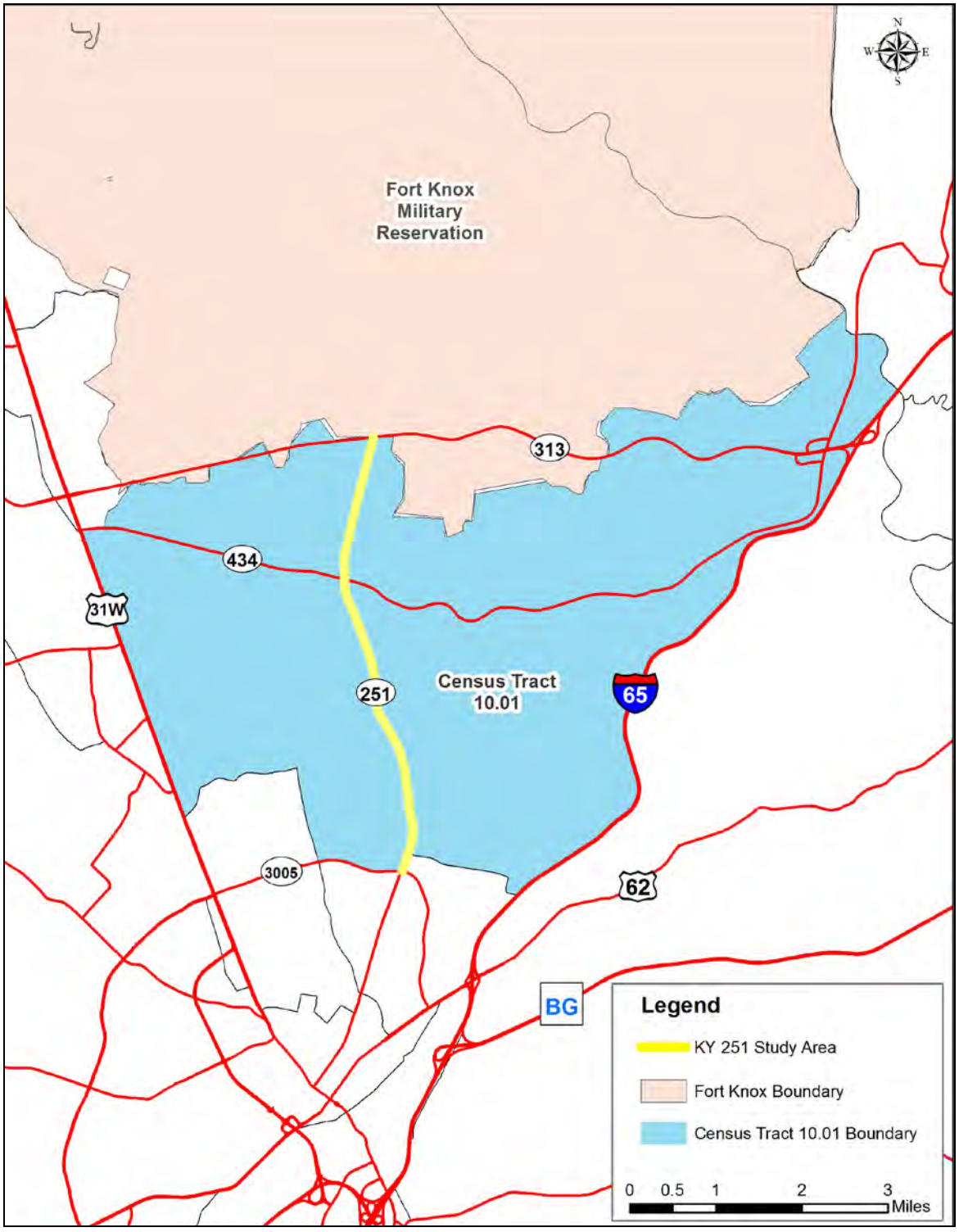


Figure 2: 2010 U.S. Census Tract for Study Area

5.0 Study Findings / Population by Persons of Minority Origin

The total population for Census Tract 10.01 in Hardin County is 6,762. The majority race in the CT is "White Only" with a population of 5,537, 81.9% of the total population. The remaining minority population (18.1%) is primarily African American with a population of 460 (6.8%) and Hispanic with 280 (4.1%) people. The Hardin County minority population is 25,889 for 24.5% of the total county population of 105,543. The African American population accounts for 11.6% and Hispanics for 5.0% of the total county population. CT 10.01 has a lower than average population of minorities compared to the overall county population with a lower African American population and a slightly higher Hispanic population in the area in relation to Hardin County as a whole.

Population by Race				
Race	Census Tract 10.01		Hardin County	
	Population	Percentage	Population	Percentage
White Alone	5,537	81.9%	79,654	75.5%
Black / African American	460	6.8%	12,275	11.6%
Hispanic	280	4.1%	5,317	5.0%
Asian	164	2.4%	2,104	2.0%
American Indian / Alaska Native	39	0.6%	541	0.5%
Native Hawaiian / Pacific Islander	21	10.6%	354	9.5%
Some Other Race	63	0.9%	1,553	1.5%
Two or More Races	198	2.9%	3,745	3.5%

6.0 Study Findings / Population by Persons 65 and Over

Of the total population of Hardin County, 11,608 people were 65 years of age or older. This is 11% of the population in the county. In Census Tract 10.01, 693 people were 65 or older. This relates to 10.25% of the total population of 6,762 in the tract. This number in the tract is comparably similar with the overall Hardin County percentage of individuals considered in the elderly population. The Kentucky elderly population is 13.3% of the state's total.

Population by Persons 65 and Over				
Population 65 and Older	Census Tract 10.01		Hardin County	
	Population	Percentage	Population	Percentage
Total Population	6,762		105,543	
Age 65 and older	693	10.25%	11,608	11.0%

7.0 Study Findings / Population by Persons with Disabilities

Information regarding disabilities has been obtained from the 2000 Census as figures were not available from the 2010 Census for this category. For the noninstitutionalized population 5 years and over in Hardin County,

the percentage of those with disabilities was 20.5%. CT 10.01 had 23.6% of its population fall under the category of individuals with a disability. This is slightly higher than the overall county.

Population by Total Disabilities				
People with Disabilities	Census Tract 10.01		Hardin County	
	Population	Percentage	Population	Percentage
Noninstitutionalized Civilian from 5 to 15 years	83	9.6%	951	5.9%
Noninstitutionalized Civilian from 16 to 64 years	820	23.7%	11,420	20.5%
Noninstitutionalized Civilian from 65 and older	228	49.4%	4,122	47.7%
Totals	1,131	23.6%	16,493	20.5%

8.0 Study Findings / Population by Persons Below Poverty Level

As indicated from the Census data, the percentage of individuals living in Kentucky below the poverty level is 18.9%, higher than the national average of 15.3%. The population in Hardin County for which poverty levels have been determined that fall below the poverty line is 13.0% of the total county population. Census Tract 10.01 numbers indicate that a slightly higher proportion of 14.4% falls below the poverty level within the study area. This number falls below the national average and is significantly below the state average.

Population Under Poverty				
People Below Poverty Level	Census Tract 10.01		Hardin County	
	Population	Percentage	Population	Percentage
For Whom Status is Determined	5,936		96,318	
Below Poverty Level	854	14.4%	12,503	13.0%

9.0 Conclusion

After analysis of the study area, there appears to be limited deviation from Hardin County to the Census Tract level in regard to race, age, and income levels. There is a potential concern regarding the percentage of the population with disabilities and low income households in the potentially affected census tract compared to the overall county. It may be possible that additional consideration be given to further study and determine the socioeconomic impact that the proposed project may have on this group and changes that may occur throughout the development of the project.

Appendix

Study Methodology

Methodology for Assessing Potential Environmental Justice Concerns for KYTC Planning Studies

Updated: February 1, 2002

The demographics of the affected area should be defined using U.S. Census data (Census tracts and block groups) and the percentages for minorities, low-income, elderly, or disabled populations should be compared to those for the following:

- Other nearby Census tracts and block groups,
- The county as a whole,
- The entire state, and
- The United States.

Information from PVA offices, social service agencies, local health organizations, local public agencies, and community action agencies can be used to supplement the Census data. Specifically, we are interested in obtaining the following information:

- Identification of community leaders or other contacts who may be able to represent these population groups and through which coordination efforts can be made.
- Comparison of the Census tracts and block groups encompassing the project area to other nearby Census tracts and block groups, county, state, and United States percentages.
- Locations of specific or identified minority, low-income, elderly, or disabled population groups within or near the project area. This may require some field reviews and/or discussions with knowledgeable persons to identify locations of public housing, minority communities, ethnic communities, etc., to verify Census data or identify changes that may have occurred since the last Census. Examples would be changes due to new residential developments in the area or increases in Asian and/or Hispanic populations.
- Concentrations or communities that share a common religious, cultural, ethnic, or other background, e.g., Amish communities.
- Communities or neighborhoods that exhibit a high degree of community cohesion or interaction and the ability to mobilize community actions at the start of community involvement.
- Concentrations of common employment, religious centers, and/or educational institutions with members within walking distance of facilities.
- Potential effects, both positive and negative, of the project on the affected groups as compared to the non-target groups. This may include, but are not limited to:
  1. Access to services, employment or transportation.
  2. Displacement of persons, businesses, farms, or non-profit organizations.
  3. Disruption of community cohesion or vitality.
  4. Effects to human health and/or safety.
- Possible methods to minimize or avoid impacts on the target population groups.

Methodology for Assessing Potential Environmental Justice Concerns
for KYTC Planning Studies
Page 2

If percentages of these populations are elevated within the project area, it should be brought to the attention of the Division of Planning immediately so that coordination with affected populations may be conducted to determine the affected population's concerns and comments on the project. Also, with this effort, representatives of minority, elderly, low-income, or disabled populations should be identified so that, together, we can build a partnership for the region that may be incorporated into other projects. Also, we hope to build a Commonwealth-wide database of contacts. We are available to participate in any meetings with these affected populations or with their community leaders or representatives.

In identifying communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The selection of the appropriate unit of analysis may be a governing body's jurisdiction, a neighborhood, census tract, or other similar unit that is to be chosen so as not to artificially dilute or inflate the affected population. A target population also exists if there is (1) more than one minority or other group present and (2) the percentages, as calculated by aggregating all minority persons, exceed that of the general population or other appropriate unit of geographic analysis.

Maps should be included that show the Census tracts and block groups included in the analysis as well as the relation of the project area to those Census tracts and block groups.