

I. INTRODUCTION.....	1
A. PROJECT LOCATION	1
B. STUDY OBJECTIVES AND TASKS.....	4
C. PROGRAMMING AND SCHEDULE	5
II. EXISTING CONDITIONS.....	7
A. HIGHWAY SYSTEMS.....	7
B. GEOMETRIC CHARACTERISTICS	9
C. BRIDGES	9
D. TRAFFIC AND LEVEL OF SERVICE	10
1. <i>Existing Traffic Volumes (Year 2003)</i>	10
2. <i>Level of Service (Year 2003)</i>	13
3. <i>Estimated Future Traffic (Year 2025) Based on Historic Growth</i>	13
4. <i>Estimated Future Level of Service (Year 2025) Based on Historic Growth</i>	13
E. CRASH ANALYSIS	15
F. ADEQUACY RATINGS	18
G. ENVIRONMENTAL FOOTPRINT	18
H. PROGRAMMED HIGHWAY IMPROVEMENTS	18
III. INITIAL CABINET, PUBLIC AND AGENCY INPUT.....	23
A. PROJECT TEAM MEETING (JUNE 23, 2003)	23
B. LOCAL OFFICIALS AND AGENCIES MEETINGS - ROUND I (JULY 29, 2003)	24
1. <i>Local Officials and Agencies Meeting - Eddyville</i>	24
2. <i>Local Officials and Agencies Meeting - Fredonia</i>	25
C. PUBLIC INFORMATION MEETINGS - ROUND I (SEPTEMBER 29 TH AND 30 TH , 2003).....	26
1. <i>General Comments</i>	27
2. <i>Map Drawing Exercise</i>	28
3. <i>Public Comment Survey Responses</i>	31
D. RESOURCE AGENCY COORDINATION - ROUND I (NOVEMBER 2003).....	33
IV. ENVIRONMENTAL JUSTICE	37
A. MINORITY POPULATIONS.....	37
B. LOW INCOME POPULATIONS.....	39
C. AGE OF RESIDENTS.....	39
D. OTHER POPULATIONS	39
E. STUDY FINDINGS.....	40
V. PROJECT PURPOSE AND NEED	41
VI. ALTERNATIVES EVALUATION PROCESS.....	43
A. EVALUATION PROCESS.....	43
B. PROPOSED IMPROVEMENT ALTERNATIVES.....	44
VII. LEVEL 1 SCREENING.....	47
A. SCREENING PROCESS	47
B. SECOND PROJECT TEAM MEETING (MARCH 4, 2004)	47
C. REFINED LEVEL 1 SCREENING	48
VIII. ENVIRONMENTAL OVERVIEW.....	53
IX. GEOTECHNICAL OVERVIEW	57
A. POTENTIAL ISSUES	57
B. CONCLUSIONS	58
C. RECOMMENDATIONS	58
X. LEVEL 2 SCREENING.....	61

A. LOCAL OFFICIALS AND AGENCIES MEETING - ROUND II (JULY 26, 2004)	61
1. <i>Local Officials and Agencies Meeting - Fredonia</i>	61
2. <i>Local Officials and Agencies Meeting - Eddyville</i>	62
3. <i>Media Meeting - Eddyville</i>	62
B. PUBLIC INFORMATION MEETINGS – ROUND II (AUGUST 2004)	63
1. <i>General Comments</i>	64
2. <i>Public Comment Survey Responses</i>	65
C. RESOURCE AGENCY COORDINATION – ROUND II (AUGUST 2004)	65
D. LEVEL 2 SCREENING MATRIX	69
E. FINAL PROJECT TEAM MEETING (NOVEMBER 22, 2004)	70
F. PROJECT TEAM RECOMMENDATIONS	72
XI. CONCLUSIONS AND RECOMMENDATIONS	75
A. PROJECT PURPOSE AND NEED	75
B. PREFERRED ALTERNATIVE	75
C. POTENTIAL DESIGN CRITERIA AND CONSIDERATIONS	76
1. <i>Construction Sections</i>	76
2. <i>Typical Section</i>	78
3. <i>Access Control Recommendations</i>	78
4. <i>Traffic Forecast</i>	78
5. <i>Multimodal Considerations</i>	80
D. PHASE COSTS	80
E. FURTHER STUDY	80
F. SUMMARY OF ENVIRONMENTAL ISSUES FOR FUTURE PHASES	81
G. CONSTRUCTION CONSIDERATIONS	81
XII. ACKNOWLEDGEMENTS AND CONTACTS	83

LIST OF APPENDICES

PHOTOGRAPHS OF PROJECT AREA.....	APPENDIX A
EXISTING CONDITIONS.....	APPENDIX B
NEPA NOTICE AND MEETING MINUTES.....	APPENDIX C
RESOURCE AGENCY LETTERS - ROUND I.....	APPENDIX D
ENVIRONMENTAL JUSTICE REPORT	APPENDIX E
LEVEL 1 SCREENING.....	APPENDIX F
ENVIRONMENTAL OVERVIEW REPORT.....	APPENDIX G
GEOTECHNICAL OVERVIEW REPORT.....	APPENDIX H
RESOURCE AGENCY LETTERS - ROUND II.....	APPENDIX I

LIST OF FIGURES

FIGURE 1. PROJECT LOCATION.....	2
FIGURE 2. YEAR 2003 TRAFFIC AND LEVEL OF SERVICE.....	11
FIGURE 3. YEAR 2025 TRAFFIC AND LEVEL OF SERVICE WITH NO IMPROVEMENTS	14
FIGURE 4. VEHICLE CRASH INFORMATION BY SEVERITY.....	17
FIGURE 5. US 641 STUDY AREA: PERCENTILE RANKING AS COMPARED TO SIMILAR ROADS	19
FIGURE 6. PUBLIC INPUT: AREAS TO AVOID.....	29
FIGURE 7. PUBLIC INPUT: PROPOSED CORRIDORS	30
FIGURE 8. EVALUATION PROCESS	43
FIGURE 9. PROPOSED IMPROVEMENT ALTERNATIVES	45
FIGURE 10. LEVEL 2 SCREENING PROPOSED ALTERNATIVE CORRIDORS.....	71
FIGURE 11. PREFERRED ALTERNATIVE – ALTERNATIVE 4-REVISED.....	77
FIGURE 12. RECOMMENDED TYPICAL SECTION	79

LIST OF TABLES

TABLE 1. US 641 ROUTE LOG.....	3
TABLE 2. US 641 HIGHWAY SYSTEMS	8
TABLE 3. US 641 CURRENT AND FUTURE TRAFFIC CHARACTERISTICS AND LEVEL OF SERVICE (LOS)	12
TABLE 4. US 641 VEHICLE CRASH SEGMENT ANALYSIS	16
TABLE 5. US 641 VEHICLE CRASH SPOT ANALYSIS.....	16
TABLE 6. SIX-YEAR HIGHWAY PLAN IMPROVEMENT PROJECTS	20
TABLE 7. PUBLIC SURVEY RESPONSE SUMMARY - ROUND I.....	32
TABLE 8. LEVEL 1 SCREENING SUMMARY.....	49
TABLE 9. PUBLIC SURVEY RESPONSE SUMMARY - ROUND II (AUGUST 2004)	66
TABLE 10. LEVEL 2 SCREENING MATRIX	70
TABLE 11. CONSTRUCTION SECTIONS	76
TABLE 12. PHASE COSTS.....	80

I. INTRODUCTION

The purpose of this Alternatives Study is to gather critical information necessary to develop and evaluate alternatives for the possible reconstruction of a portion of US 641 in Lyon and Caldwell Counties. The southern terminus for the proposed project is from I-24 or the Wendell H. Ford Western Kentucky Parkway (hereafter referred to as the Ford Parkway) at or near Eddyville in Lyon County. The northern terminus is the proposed improved section of US 641 north of Fredonia in Caldwell County, for which the design phase has been completed.

Through this Alternatives Study, the Kentucky Transportation Cabinet (KYTC) is able to ensure that future project improvements to US 641 effectively address identified transportation needs. It also ensures that the project development efforts meet the principles of Federal requirements as defined in the National Environmental Policy Act (NEPA).

This report provides an introduction and description of the proposed project; identifies and analyzes existing conditions; presents an environmental and a geotechnical overview of the project area; summarizes the public and agency input received to date on the project; and provides recommendations on future project development.

Report Contents

- General Information
- Study Area Characteristics
- Public and Agency Input
- Preliminary Environmental Overview
- Environmental Justice and Community Impact Report
- Preliminary Geotechnical Overview
- Future Traffic Considerations
- Purpose and Need
- Recommendations and Conclusions

A. Project Location

The study area for the US 641 Alternatives Study runs from a point at or near Eddyville in southern Lyon County northeasterly to the proposed improvement of US 641 north of Fredonia in Caldwell County, just south of the Caldwell-Crittenden County line. The project study area is shown in **Figure 1**. A milepoint log of key points along existing US 641 is provided in **Table 1**.

The 2000 U.S. Census reported a population of 8,080 for Lyon County and 13,060 for Caldwell County.

The original town of Eddyville was named as the county seat when Lyon County was formed in 1854. The population of Eddyville in 2000 was 2,350. Lyon County encompasses the northeast region of the Land Between the Lakes National Recreational Area. This area was formed when the Cumberland and Tennessee Rivers were dammed, forming Barkley Lake on the east and Kentucky Lake on the west. A canal connects the two lakes. The Land Between the Lakes is a designated recreational space with marinas, campgrounds, and trails managed by the U.S. Forest Service. The Lakes area plays a primary role in the economy of Lyon County and Eddyville.

Figure 1. Project Location

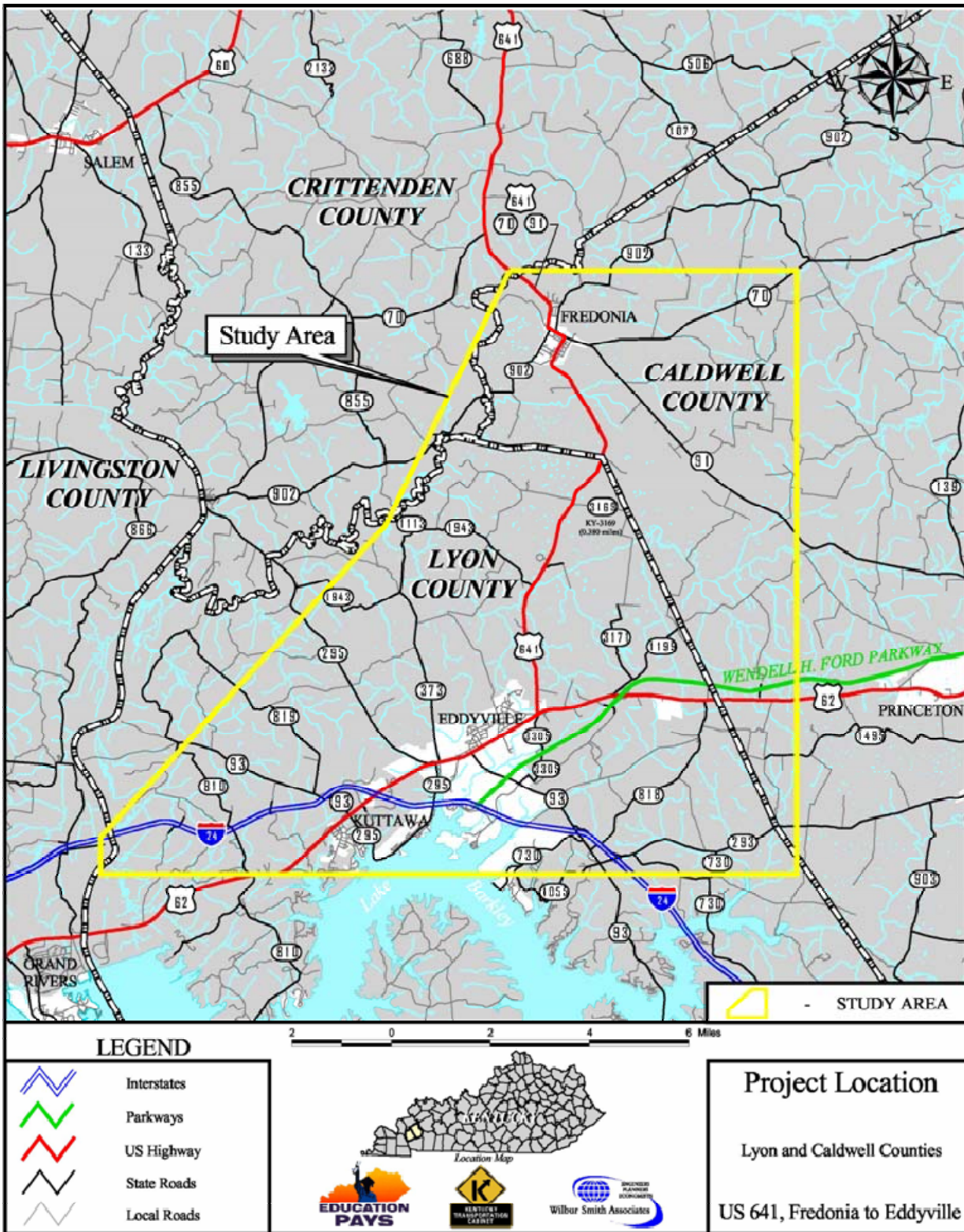


Table 1. US 641 Route Log

Milepoint	Description of Intersecting Road or Feature
<i>Lyon County</i>	
0.000	Begin Existing US 641 Within Study Area
0.000	US 62 (Western Kentucky Factory Outlet)
0.030	Chestnut Road
0.271	Business Row Road
0.279	Depot Road
0.512	Illinois Central Railroad Bridge - B00001
1.351	Cash Road
1.810	White Dorroh Road
2.094	Skinframe Creek Branch Bridge - B00002
2.533	Skinframe Creek Bridge - B00003
2.668	KY 1943
3.155	KY 3169
3.279	Breezy Loop
4.548	Beck Road
4.645	Coleman - Doles Road
5.715	Lyon/Caldwell County Line
<i>Caldwell County</i>	
0.000	Lyon/Caldwell County Line
0.820	Oak Road
1.433	Easley Creek Bridge - B00042
1.587	Mill Bluff Road
2.366	Old Dycusbury - Fredonia Road
2.384	Railroad Crossing
2.877	KY 70 (West Main Street)
3.081	KY 902 (Piney Lane)/Miller Street
3.202	KY 902 (Bakers Lane)
4.620	Livingston Creek Bridge - B00071
4.629	Caldwell/Crittenden County Line
4.629	End Study Area

Source: KYTC Highway Information Systems (HIS) Data, 2003

Kentucky Lake was formed when the Tennessee River was dammed by the Kentucky Dam, beginning in 1938. The dam generates electricity which is controlled by the Tennessee Valley Authority. This resulted in a shipping connection to Nashville from the Ohio and Mississippi rivers in Kentucky and other inland areas in Western Kentucky and Tennessee. Lake Barkley was formed when the Cumberland River was dammed by Barkley Dam in 1966 by the U.S. Corp of Engineers. Two towns, Kuttawa and Eddyville, were in its path and had to be relocated. Eddyville was relocated a few miles north to an open field. Foundations of Old Eddyville can still be seen around Lake Barkley when the water is down during the winter.

Originally settled in 1798, Eddyville was favored for its location on the Cumberland River. In this region of Kentucky, the Cumberland River played a role in shipping iron ore produced in the nearby western coal fields to New Orleans. Iron ore production was most significant during the mid-1800s. However, with the disruption caused by the Civil War, it did not recover to full capacity afterwards. Ruins of furnaces are still prevalent in

the region today. Farmers turned instead to the production of dark leafed tobacco which then became a primary cargo on the Cumberland River. The production of this type of tobacco was so high that the area became known as the “Black Patch” by the turn of the twentieth century.

Eddyville is also home to the Kentucky State Penitentiary, built in 1886 and nicknamed the “Castle on the Cumberland,” which is often a tourist photo opportunity because of its imposing stone construction.

Agriculture dominates the landscape with land devoted to livestock, primarily in Caldwell County, and tobacco, soybeans, and corn grown throughout the area. Agricultural lands devoted to grain and tobacco production or livestock grazing have enveloped the countryside so that forested areas are scattered.

Caldwell County has a section of the Trail of Tears running from Princeton, the county seat, to about 15 miles southeast of Fredonia. This was the route followed by the Cherokee Indians on their forced-removal to Oklahoma from the Great Smoky Mountains. Fredonia, located in the northwest corner of Caldwell County, was founded in 1836. Its current population is around 500 and the citizens proclaim that it is “A Small Valley with a Big Heart.”

B. Study Objectives and Tasks

The primary objectives of this study are to:

- Better define the project purpose and need;
- Identify and evaluate potential improvement alternatives; and
- Make recommendations for future improvements.

To accomplish these objectives, the study is also intended to:

- Afford an opportunity for public and agency input so that project needs, improvement alternatives, and potential issues and concerns can be clearly defined and addressed at the earliest stage of project development;
- Identify potential environmental issues; and
- Help expedite the project development process.

Specific tasks involved with this study include:

- Initiate contact with public officials and agencies;
- Listen to and share information with the public;
- Define project goals;
- Determine and analyze existing conditions and future needs;
- Identify preliminary environmental, geotechnical, and other concerns;
- Develop and evaluate project alternatives; and
- Provide recommendations.

C. Programming and Schedule

Currently, the only funds programmed for this project are the approximately \$1,500,000 for the Design phase of Priority Section 2, originally defined from KY 70 near Mexico to a section break west of Fredonia. Subsequent phases of project development, including Right-of-Way Acquisition, Utility Relocation, and Construction, were not scheduled in the KYTC's *Kentucky Six-Year Highway Plan FY 2003-2008*. Additional funding was also not included in the KYTC's *Kentucky Six-Year Highway Plan FY 2005-2010*.

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II. EXISTING CONDITIONS

Characteristics of US 641 and other major highways in the study area are identified in the following sections. Included are data and/or information on transportation systems, geometric characteristics, bridges, traffic conditions, crash history, and planned highway improvements. Features of the highways in the study area are summarized from the KYTC Highway Information System (HIS) database. Photographs of some features in the study area are contained in **Appendix A** and throughout this chapter.

Although US 641 in Crittenden County is outside of the defined study area, data is included in the summary tables for reference. Maps and table summaries located throughout this report may also include other roadway segments that fall outside of the project study area.

A. Highway Systems

Major highway systems information is shown in **Appendix B, Table B-1**, including the State Primary Road System, Functional Classification System, National Highway System (NHS), National Truck Network (NN), and Designated Truck Weight Class. Other highway systems information is displayed in **Appendix B, Table B-2**, including the Defense Highway Network, Forest Highway System, and others. The highway system information for US 641 is summarized in **Table 2**. Major highway systems for US 641 in the study area are as follows:

- State-maintained roads in Kentucky are classified into one (1) of five (5) categories under the State System, ranging from the highest order classification to the lowest as follows: Interstates, Parkways, Other State Primary roads, Rural Secondary roads, and Supplemental roads.

US 641 is currently classified as a State Primary route from its intersection with US 62 in Lyon County (MP 0.000) to the Lyon-Caldwell County Line (MP 5.715) and in Caldwell County from the Lyon-Caldwell County Line (MP 0.000) to the Caldwell-Crittenden County Line (MP 4.629). State Primary routes are those routes which are considered to be long-distance, high-volume intrastate routes that are of statewide significance. The routes have mobility as their prime function and are distinguished by high traffic-carrying capacity. These routes link major urban centers within the state and/or serve as major interregional corridors.

- One of 13 functional classification categories is assigned to each state-maintained road in Kentucky, based on the function the road provides and whether the road is an urban or rural road. These are classified from highest to lowest and by geographic designation as: Rural Interstate, Urban Interstate, Other Rural Freeways and Expressways (Principal Arterial), Other Urban Freeways and Expressways (Principal Arterial), Other Rural Principal Arterial, Other Urban Principal Arterial, Rural Minor Arterial, Urban Minor Arterial, Rural Major Collector, Urban Collector, Rural Minor Collector, Rural Local, and Urban Local.

In the study area, US 641 is classified as a Rural Minor Arterial. According to Federal criteria, Rural Minor Arterials provide a link to and between cities, towns, and other major traffic generators (e.g., major resorts) and help to form an integrated network. They are spaced at appropriate intervals so that all developed areas of the state are within a reasonable distance of an arterial. They are characterized by (1) traffic densities greater than roads that only provide local access, (2) relatively high overall travel speeds, and (3) minimum interference to through movements.

Table 2. US 641 Highway Systems

US 641
<p>Lyon County – MP 0.000 to MP 5.715 (US 62 to the Lyon-Caldwell County Line)</p> <ul style="list-style-type: none"> ○ State System – State Primary ○ National Truck Network – No ○ National Highway System – No ○ Functional Classification – Rural Minor Arterial ○ Truck Weight Class – AAA ○ Defense Highway Network – Yes
<p>Caldwell County – MP 0.000 to MP 4.629 (Lyon-Caldwell County Line to Caldwell-Crittenden County Line)</p> <ul style="list-style-type: none"> ○ State System – State Primary ○ National Truck Network – No ○ National Highway System – No ○ Functional Classification – Rural Minor Arterial ○ Truck Weight Class – AAA ○ Defense Highway Network – Yes
<p>Crittenden County – MP 0.000 to MP 7.494 (Caldwell-Crittenden County Line to US 60)</p> <ul style="list-style-type: none"> ○ State System – State Primary ○ National Truck Network – No ○ National Highway System – No ○ Functional Classification – Rural Minor Arterial ○ Truck Weight Class – AAA ○ Defense Highway Network – Yes

Source: KYTC Highway Information Systems (HIS) Data, 2003

- The National Highway System (NHS), first established in 1991 by the Intermodal Surface Transportation Efficiency Act (ISTEA), includes Interstate Highways and other significant Principal Arterials important to the nation's economy, defense, and mobility. US 641 is not on the NHS. However, the two possible southern termini, I-24 and the Ford Parkway, are both on the NHS.
- The National Truck Network (NN) includes roads designated for use by commercial trucks with increased dimensions (102 inches wide; 13 feet, 6 inches high; semi-trailers up to 53 feet long; and trailers up to 28 feet long – not to exceed two (2) trailers per truck). In the study area, US 641 is not on the NN. However, the two possible southern termini, I-24 and the Ford Parkway, are both on the NN.
- Kentucky Revised Statutes require weight limits on the state-maintained highway system. There are three (3) weight classification limits: (1) AAA – 80,000 lbs. maximum gross vehicle weight; (2) AA – 62,000 lbs. maximum gross vehicle weight; and (3) A – 44,000 lbs. maximum gross vehicle weight. In the study area, US 641 has a weight classification limit of AAA. [NOTE: For special circumstances, occasional exceptions may be granted for over-dimensional or overweight vehicles by permits issued by the KYTC, Division of Motor Carriers.]

B. Geometric Characteristics

Geometric characteristics for major routes in the study area are listed in **Appendix B, Table B-3**, including the number of lanes, lane widths, shoulder widths, roadway type, local terrain, route speed limits, and pavement type. The percent passing sight distance information was not available in KYTC's HIS database for most of the study area routes. In the study area, US 641 has the following characteristics:

- An undivided highway cross-section;
- Rolling terrain;
- In Lyon County, two (2) 12-foot driving lanes from MP 0.000 to MP 0.108 and two (2) 11-foot wide lanes from MP 0.108 to 5.607;
- In Caldwell County, two (2) ten-foot lanes from MP 0.000 to MP 2.319, two (2) 12-foot lanes from MP 2.319 to 2.877, and two (2) 11-foot lanes from MP 2.877 to MP 4.629;
- Shoulders of approximately four (4) feet, except for 10-foot shoulders between MP 0.000 and MP 0.108 in Lyon County;
- High flexible pavement; and
- Posted speed limits of 55 mph, except for a section in Fredonia in Caldwell County from MP 2.218 to MP 3.308 where it is posted at 35 mph.

C. Bridges

Bridge data for the routes considered in this study are listed in **Appendix B, Table B-4**. According to the KYTC, a bridge structure is eligible for Federal rehabilitation funds when it meets two criteria: (1) the bridge has a sufficiency rating below 50.0 and (2) the bridge is considered either structurally deficient or functionally obsolete:

- Structurally deficient bridges cannot carry the weight they were originally designed to carry.

- Bridges are considered to be functionally obsolete if the bridges or bridge approaches do not meet today's geometric design standards.

Three (3) bridges along US 641 are considered to be functionally obsolete:

- B00002 over a branch of Skinframe Creek at MP 2.094 in Lyon County;
- B00003 over Skinframe Creek (B00003) at MP 2.533 in Lyon County; and
- B00042 over Easley Creek at MP 1.433 in Caldwell County.

Currently, no bridges along US 641 in the study area meet both of the rating criteria, so none are eligible for Federal rehabilitation funds. However, one bridge in Lyon County (B00003 over Skinframe Creek at MP 2.533) is very close to meeting the criteria needed for the use of Federal rehabilitation funds, since it has a rating of 51.0 and is classified as functionally obsolete.



Paducah and Louisville Bridge over KY 373 in Lyon County

D. Traffic and Level of Service

Existing (Year 2003) and estimated future (Year 2025) traffic and operational conditions for each major route in the study area are discussed in the following subsections.

1. Existing Traffic Volumes (Year 2003)

Existing traffic volumes (Year 2003) for segments of the study area routes were summarized based primarily on information provided in the HIS database. If unavailable, truck percentages were derived for the study area routes using default values from the Division of Multimodal Programs' *2002 Traffic Forecasting Report* or estimated based on similar segments and/or roadways in the project area. Traffic characteristics for all routes in the study area are shown in **Figure 2** and in **Appendix B, Table B-5**. Traffic data for US 641 is summarized in **Table 3**.

The existing traffic volumes along US 641 in the study area range between 3,080 and 3,400 vehicles per day (vpd). Existing truck percentages are approximately 16.8% of the total traffic along the study route. In comparison, existing traffic volumes along I-24 range between 16,100 and 25,900 vpd. Traffic volumes along the Ford Parkway range between 7,610 and 10,300 vpd.

Figure 2. Year 2003 Traffic and Level of Service

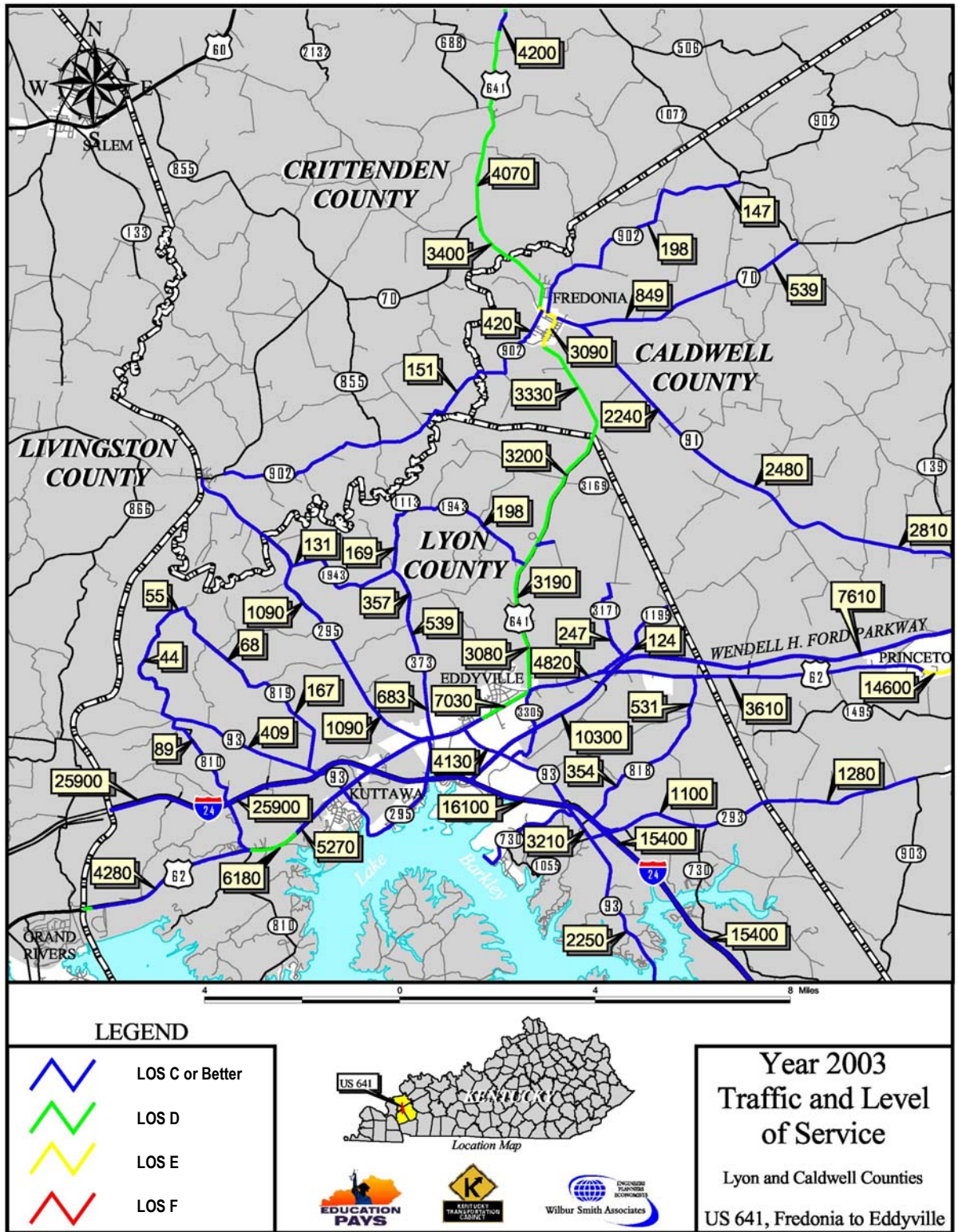


Table 3. US 641 Current and Future Traffic Characteristics and Level of Service (LOS)

Begin MP	End MP	Length (miles)	% Trucks	2003 ADT	2003 LOS	Annual Growth Rate	2025 ADT	2025 LOS
Lyon County								
US 641 MP 0.000 to MP 5.715								
0.000	0.108	0.108	16.8	3080	C	2.2%	5000	D
0.108	0.512	0.404	16.8	3080	D	2.2%	5000	D
0.512	2.668	2.156	16.8	3190	D	2.2%	5100	D
2.668	5.715	3.047	16.8	3200	D	2.2%	5200	D
Caldwell County								
US 641 MP 0.000 to MP 4.629								
0.000	1.587	1.587	16.8	3330	D	2.2%	5400	D
1.587	2.218	0.631	16.8	3090	D	2.2%	5000	D
2.218	2.366	0.148	16.8	3090	E	2.2%	5000	E
2.366	2.530	0.164	16.8	3090	E	2.2%	5000	E
2.530	2.877	0.347	16.8	3090	E	2.2%	5000	E
2.877	3.308	0.431	16.8	3400	E	2.2%	5500	E
3.308	4.629	1.321	16.8	3400	D	2.2%	5500	D
Crittenden County								
US 641 MP 0.000 to MP 7.494								
0.000	1.175	1.175	16.8	3400	D	1.5%	4700	D
1.175	2.960	1.785	10.2	4070	D	1.5%	5600	E
2.960	3.188	0.228	10.2	4070	E	1.5%	5600	E
3.188	3.630	0.442	8.3 ¹	4200	E	1.5%	5800	E
3.630	5.030	1.400	8.3 ¹	4200	D	1.5%	5800	E
5.030	5.038	0.008	8.3 ¹	4200	D	1.5%	5800	D
5.038	5.430	0.392	8.3 ¹	4200	C	1.5%	5800	C
5.430	5.464	0.034	8.3 ¹	4200	D	1.5%	5800	D
5.464	5.708	0.244	8.3 ¹	4200	D	1.5%	5800	E
5.708	6.520	0.812	8.3 ¹	4940	D	1.5%	6800	E
6.520	6.986	0.466	8.3 ¹	4940	E	1.5%	6800	E
6.986	7.028	0.042	8.3 ¹	4940	E	1.5%	6800	E
7.028	7.494	0.466	8.3 ¹	6170	E	1.5%	8500	E

Source: KYTC Highway Information Systems (HIS) Database, 2003 and Wilbur Smith Associates, 2004

¹ Default value - 2002 Traffic Forecasting Report, KYTC Division of Multimodal Programs

2. Level of Service (Year 2003)

Level of Service (LOS) is a qualitative measure of highway traffic conditions, as defined in the *2000 Highway Capacity Manual*, published by the Transportation Research Board (TRB). Individual levels of service characterize these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six (6) levels of service are defined and given letter designations from A to F, with LOS A as the best condition, representing free flow conditions, and ranging to LOS F, the worst condition, representing severe congestion and/or time delays. Typically, a minimum of LOS D is considered acceptable in urban areas and LOS C is considered acceptable in rural areas. Existing LOS for each route in the study area is shown in **Figure 2** and in **Appendix B, Table B-5**. **Table 3** shows the existing LOS calculated for segments of US 641 in the study area.

Level of Service (LOS)

- LOS is used to describe traffic conditions, where LOS A is the best and LOS F is the worst.
- US 641 currently operates at LOS D and E in the study area.
- All other study area routes operate at LOS C or better except US 62 in Eddyville.

Almost all of US 641 in Lyon County (MP 0.108 to MP 5.715) currently operates at LOS D, while the Caldwell County segment of US 641 (4.629 miles) operates at LOS D and LOS E in the study area. All other study area routes currently operate at LOS C or better except US 62 in Eddyville, which operates at LOS D.

3. Estimated Future Traffic (Year 2025) Based on Historic Growth

Future traffic was estimated using historic growth rates and assuming no future improvements along the portion of US 641 in the study area. The growth rates were based on KYTC's historic traffic counts for Lyon and Caldwell Counties. Traffic along US 641 was forecasted with a compounded annual growth rate of 2.2% through Year 2025, resulting in an increase of over 60 percent from 2003 to 2025, or an ADT range from 5,000 to 5,500 vpd. Projected future year traffic volumes are shown in **Figure 3** and **Appendix B, Table B-5**. US 641 future traffic is summarized in **Table 3**.

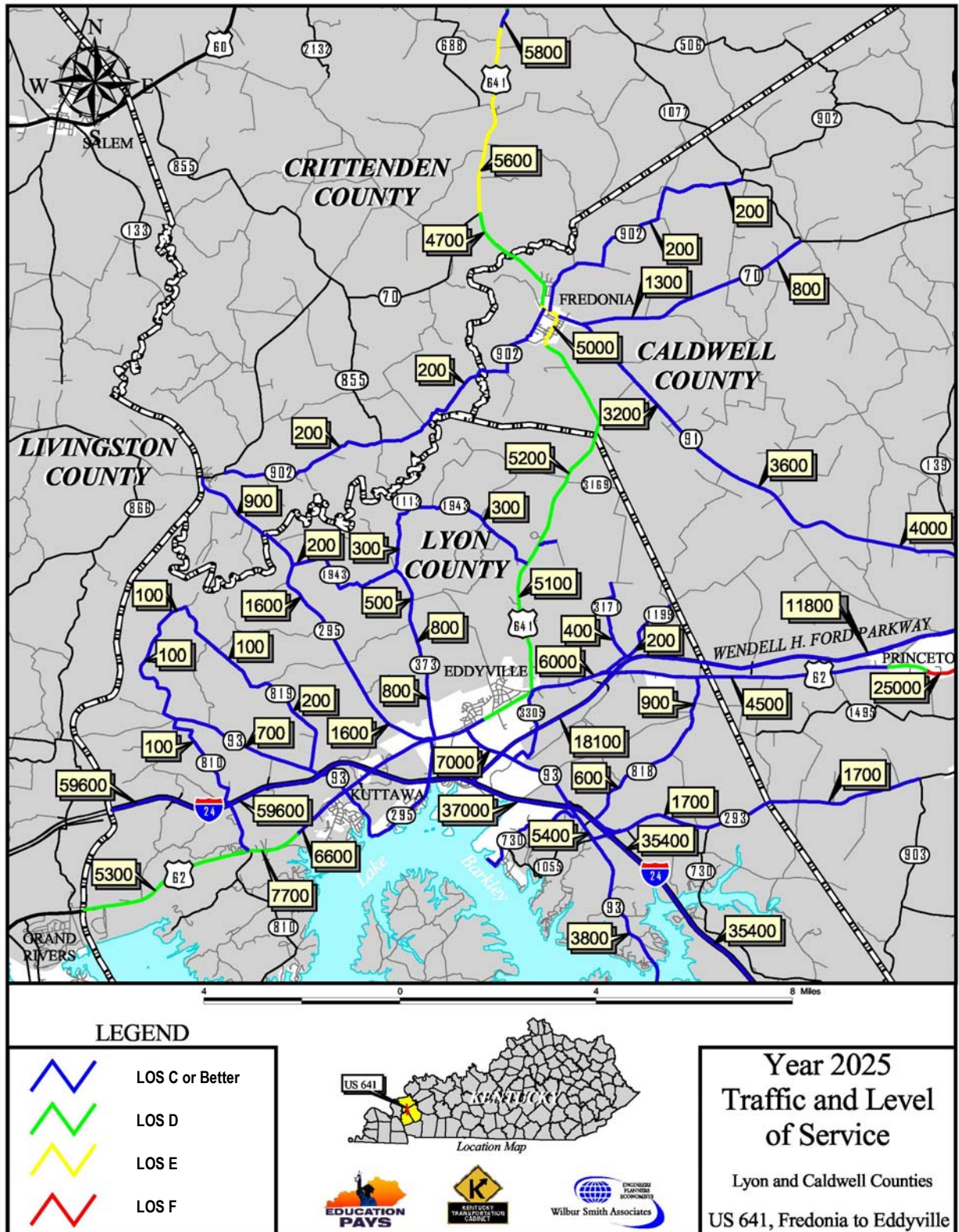


Traffic along US 641 slowed because of a mowing crew

4. Estimated Future Level of Service (Year 2025) Based on Historic Growth

The study portion of US 641 in Lyon County (5.715 miles) is expected to operate at LOS D in the Year 2025, while the Caldwell County segment of US 641 (4.629 miles) would continue to operate at LOS D and E. Most of the other study area routes are expected to operate at LOS C or better in the Year 2025. The estimated future LOS is shown for the study area in **Figure 3** and in **Appendix B, Table B-5**. Future LOS for US 641 is summarized in **Table 3**.

Figure 3. Year 2025 Traffic and Level of Service with No Improvements



E. Crash Analysis

Crash data for major routes in the study area were considered for a four-year period (January 1, 1999 to December 31, 2002). The location of crashes with valid milepoint designations, recorded in the HIS database (1999) and Collision Report Analysis for Safer Highways (CRASH) database (2000-2002), are shown by corridor segment in **Appendix B, Table B-6** and summarized in **Table 4** and by spot locations (0.1 miles in length) in **Appendix B, Table B-7** and summarized in **Table 5**.

A spot location or a segment of roadway is considered to be a high crash location when its crash rate is higher than the average crash rate for similar roads in the state. This is measured by the Critical Rate Factor (CRF), i.e., the ratio of the crash rate for the spot or segment compared to the critical crash rate for similar roads. When the critical rate factor is greater than 1.0, crashes may not be occurring randomly at a given location. The critical rate factors are calculated using the methodology presented in the Kentucky Transportation Center's *Analysis of Traffic Accident Data in Kentucky (1997-2001)*¹.

As part of this process, each crash was classified into one (1) of three (3) categories based on the degree of severity: fatal, injury, or property-damage-only. During the period studied, there were no fatal, twenty-four (24) injury, and fifty-seven (57) property-damage-only crashes along US 641 in Lyon and Caldwell Counties.

Figure 4 displays the crash data by severity and location. As shown in **Table 4** and **Figure 4**, no high crash segments were found along US 641 in Lyon and Caldwell Counties, indicating that historical crash rates are not higher than those for similar highways in Kentucky. However, as shown in **Table 5**, four (4) high crash spot locations were identified, all within Fredonia. A fifth location was identified along US 62 at US 641 as shown in **Appendix B, Table B-7**. Additional high crash segment and spot locations were identified in close proximity to the study area along US 641 in Crittenden County.



High crash spot location along US 641 in Fredonia

¹ Agent and Pigman. *Analysis of Traffic Accident Data in Kentucky (1997-2001)*. Kentucky Transportation Center. August 2002.

Table 4. US 641 Vehicle Crash Segment Analysis

Begin MP	End MP	Length (Miles)	ADT	Vehicle Crashes				Critical Rate Factor
				Fatal	Injury	PDO	Total	
Lyon County								
0.000	0.512	0.512	3080	0	0	0	0	0.00
0.512	2.668	2.156	3190	0	5	13	18	0.46
2.668	5.715	3.047	3200	0	4	9	13	0.25
Caldwell County								
0.000	1.587	1.587	3330	0	2	6	8	0.26
1.587	2.877	1.290	3090	0	8	10	18	0.72
2.877	4.629	1.752	3400	0	5	19	24	0.70
Crittenden County								
0.000	1.175	1.175	3400	0	10	16	26	1.04
1.175	3.188	2.013	4070	0	14	18	32	0.71
3.188	5.708	2.520	4200	0	12	16	28	0.50
5.708	7.028	1.320	4940	0	4	15	19	0.51
7.028	7.494	0.466	6170	0	3	7	10	0.51

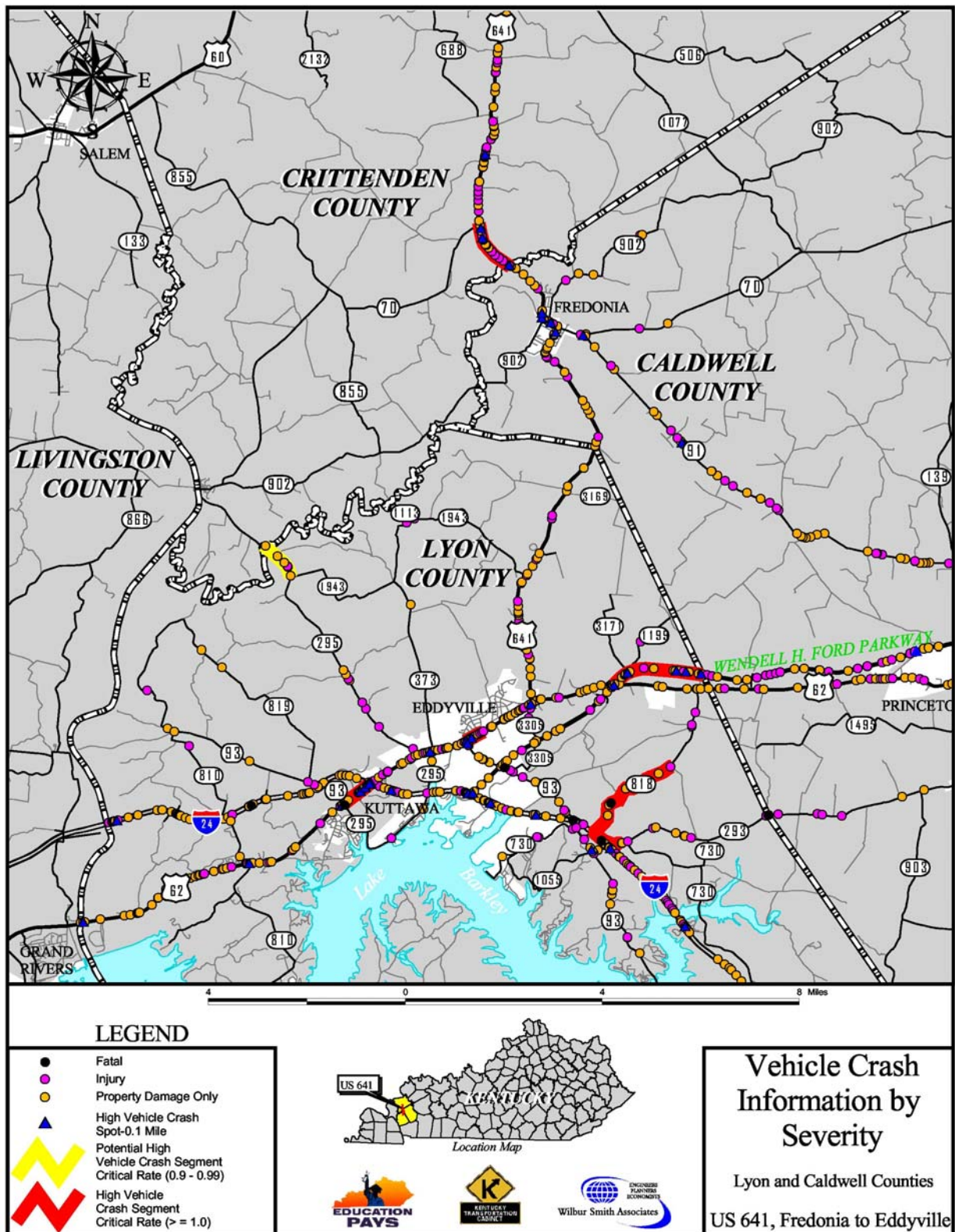
Source: Kentucky Transportation Cabinet, HIS Database, 2003 and CRASH Database, 1999 – 2002

Table 5. US 641 Vehicle Crash Spot Analysis

Begin MP	End MP	Length (Miles)	ADT	Vehicle Crashes				Critical Rate Factor
				Fatal	Injury	PDO	Total	
Caldwell County								
2.700	2.800	0.100	3090	0	1	4	5	1.15
3.000	3.100	0.100	3400	0	1	4	5	1.08
3.200	3.300	0.100	3400	0	2	6	8	1.74
3.302	3.402	0.100	3400	0	1	4	5	1.08
Crittenden County								
0.000	0.100	0.100	3400	0	1	4	5	1.08
0.500	0.600	0.100	3400	0	2	2	4	0.87
0.800	0.900	0.100	3400	0	2	4	6	1.30
1.000	1.100	0.100	3400	0	2	3	5	1.08
2.300	2.400	0.100	4070	0	1	3	4	0.78
2.512	2.612	0.100	4070	0	3	3	6	1.17
2.900	3.000	0.100	4070	0	2	2	4	0.78
3.900	4.000	0.100	4200	0	1	3	4	0.77
5.661	5.761	0.100	4570	0	5	1	6	1.09
5.800	5.900	0.100	4940	0	0	4	4	0.69
6.700	6.800	0.100	4940	0	1	4	5	0.87
7.437	7.537	0.100	6170	0	2	6	8	1.21

Source: Kentucky Transportation Cabinet, HIS Database, 2003 and CRASH Database, 1999 – 2002

Figure 4. Vehicle Crash Information by Severity



F. Adequacy Ratings

The KYTC HIS database provides an adequacy rating percentile for many major routes. This rating is based on condition, safety, and service of the route. Condition considers only the condition of the road's pavement. Safety is evaluated based on lane width, shoulder width, median type, alignment, and critical rate. Service considers the route's volume-to-capacity ratio and access control. **Figure 5** depicts the adequacy ratings assigned to various study area routes and the percentile group, divided into fifths, in which each route is included.

If a road or road segment falls into the lowest percentile groups, this indicates that a problem may exist that merits further investigation. As shown in **Figure 5**, the ratings for the study portion of US 641 in Lyon County (5.715 miles) are in the highest percentile: between 81% and 100%. All of US 641 in Caldwell County (4.629 miles) falls in the three lowest percentiles: between 0% and 60%.

G. Environmental Footprint

An environmental footprint was developed for the US 641 project area. This preliminary environmental analysis identified potential issues and concerns within and surrounding the defined project area.

A local area Geographic Information System (GIS) was assembled for this project using environmental resource information data collected from numerous sources that include: Federal, state, and local databases; agency contacts; field investigations; and existing in-house data. The compiled data was geo-referenced as needed using the GIS developed for the project. Windshield surveys of the project area included consideration of known and unknown environmental issues within the project area.

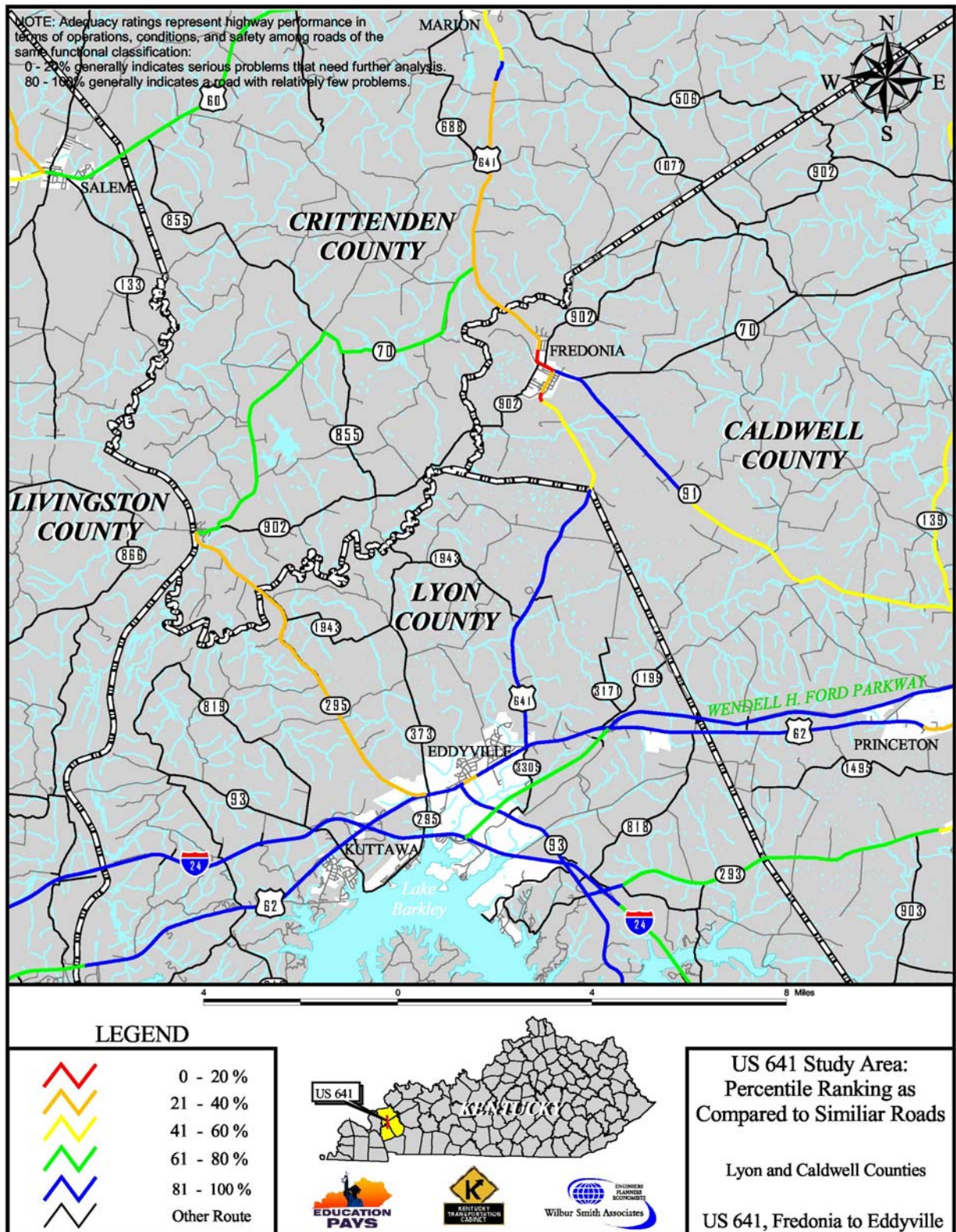
The environmental footprint, shown in **Appendix B, Figure B-1**, includes a variety of features including: utilities, streams, EPA sites, cemeteries, and churches. The aerial photograph highlights structures, terrain and potential prime farmland. Other features important to this project and highlighted on the environmental footprint are the West Kentucky State Penitentiary Farm, Fredonia Quarry, Mill Bluff Springs, and a geotechnical structural low. Geotechnical data was provided by the Division of Materials and Kentucky Geological Survey as part of the initial resource agency coordination. The information received from both agencies is described in more detail in the following chapter.

In addition to the environmental footprint, Environmental and Geotechnical Overviews were conducted on eight (8) alternatives as discussed in **Chapter VI**. The overviews provided additional detail within a more defined area. The Environmental and Geotechnical Overviews are discussed in **Chapters VIII and IX**, respectively.

H. Programmed Highway Improvements

The proposed improvement to US 641 in this Alternatives Study would connect with a programmed improvement to US 641 in Crittenden County from Marion to Fredonia, as shown in **Table 6**. Design for this project has been completed and \$3,300,000 and \$3,520,000 was programmed for right-of-way purchase and utility relocation, respectively, in Fiscal Year 2004.

Figure 5. US 641 Study Area: Percentile Ranking as Compared to Similar Roads



Source: KYTC Highway Information Systems (HIS) Data, 2003

Table 6. Six-Year Highway Plan Improvement Projects

Route	Item Number	Begin MP	End MP	Length (miles)	Project Description	Scope of Work	Stage of Project Development	Fiscal Year Scheduled	Estimated Phase Cost
Lyon County									
I-24	01-7.00	35.200	35.300	0.100	Add Restroom Facility to I-24 Eastbound & Westbound Weigh Stations in Lyon County	Weigh Station Rehab (P)	Construction	2003	\$950,000
							Total:		\$950,000
US 62	01-307.01	9.352	12.213	2.900	From End of 4-Lane at Eddyville East to Western Kentucky Parkway	Major Widening (O)	Right of Way	2002	\$2,000,000
							Utility Relocation	2004	\$4,000,000
							Construction	2006	\$11,000,000
						Total:		\$17,000,000	
Caldwell County									
KY 139	02-141.00	7.573	8.173	0.600	Reconstruct Substandard Curves @ Rock Springs Hill	Safety (P)	Design	2006	\$400,000
							Total:		\$400,000
N/A	02-153.00	N/A	N/A	N/A	New Connector From Hopkinsville Rd (KY 91) to Wilson Warehouse Rd (KY 293) Northeast of Princeton	New Route (O)	Design	2007	\$900,000
							Total:		\$900,000
KY 126	02-1059.00	2.260	2.360	0.100	Replace Bridge Over Dreen Creek (B 23) 1.0 mile Northwest of Jct. KY 672	Bridge Replacement (P)	Design	2005	\$250,000
							Right of Way	2007	\$50,000
							UtilityRelocation	2007	\$100,000
							Total:		\$400,000
WK 9001	02-2011.00	18.260	25.655	7.400	Western KY Parkway From MP 18.26 to MP 25.655, Begin PCC Pavement	Pavement Rehab - PRK (P)	Design	2003	\$70,000
							Construction	2003	\$4,000,000
							Total:		\$4,070,000
WK 9001	02-5005.00	15.2	15.72	0.500	Correct Rockfall Hazard at MP 15.2 to MP 15.72 Eastbound & Westbound	Rockfall Mitigation (P)	Construction	2002	\$1,100,000
							Total:		\$1,100,000
Crittenden County									
US 641	01-187.20	N/A	N/A	5.200	Relocation of US 641 from Marion to I-24/Wendell H. Ford Parkway; Marion to KY 70 Near Mexico	Relocation (O)	Design	2002	\$1,500,000
							Right of Way	2004	\$3,300,000
							Utility Relocation	2004	\$3,520,000
							Construction	2006	\$22,000,000
							Total:		\$30,320,000
US 641	01-187.30	N/A	N/A	5.000	Relocation of US 641 from Marion to I-24/Wendell H. Ford Parkway; from KY 70 near Mexico	Relocation (O)	Design	2005	\$1,500,000
							Total:		\$1,500,000
KY 91	01-326.01	11.162	11.262	0.100	Operation of cave-in-rock ferry at Ohio River	Ferry Operation (P)	Construction	2003	\$262,000
							Total:		\$262,000
KY 91	01-326.02	11.162	11.262	0.100	Operation of cave-in-rock ferry at Ohio River	Ferry Operation (P)	Construction	2004	\$262,000
							Total:		\$262,000
KY 91	01-326.03	11.162	11.262	0.100	Operation of cave-in-rock ferry at Ohio River	Ferry Operation (P)	Construction	2005	\$262,000
							Total:		\$262,000
KY 91	01-326.04	11.162	11.262	0.100	Operation of cave-in-rock ferry at Ohio River	Ferry Operation (P)	Construction	2006	\$262,000
							Total:		\$262,000

Source: Kentucky Six-Year Highway Plan FY 2003-2008

In addition to the proposed improvement to US 641, there are other projects in Lyon and Caldwell Counties, as summarized in **Table 6**, that are in the KYTC's *Kentucky Six-Year Highway Plan FY 2003-2008*, usually referred to as the Six-Year Highway Plan. Major activities include:

- \$17 million for right-of-way purchase, utility relocation, and construction for a major widening of US 62 in Lyon County, from the existing 4-lane section in Eddyville to the interchange with the Ford Parkway. This project includes the section of US 62 at the southern terminus of existing US 641 in the study area.
- Other smaller projects such as rehabilitation of the I-24 weigh stations, KY 139 safety corrections, design of a new connector northeast of Princeton, KY 126 bridge replacement, and pavement rehabilitation along the Ford Parkway.

In addition, no additional funds for US 641 improvements in Lyon and Caldwell Counties have been included in the KYTC's *Kentucky Six-Year Highway Plan FY 2005-2010*.

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III. INITIAL CABINET, PUBLIC AND AGENCY INPUT

Local citizens, public officials and representatives of government resource agencies were given the opportunity to provide input throughout the course of the US 641 Alternatives Study. This chapter describes the first round of public and agency involvement that occurred throughout the study process and describes the comments and input received as a result of those efforts. Activities undertaken as part of the second round of cabinet, public and agency involvement are summarized in **Chapter X**, as they relate to the development of improvement alternatives. In addition to the information

presented in this chapter and **Chapter X**, materials related to the public involvement process are included in the *September, 2003 US 641 Alternatives Study Public Meeting Notebook* and the *August, 2004 US 641 Alternatives Study Public Meeting Notebook*, which are separate documents containing a summary of public meeting events.

To initiate the public involvement effort, a NEPA Public Notice was published in the Federal Register. A copy of the notice is included in **Appendix C**.

Public and Agency Involvement

- Project Team Meetings
- Local Officials/Stakeholders Meetings
- Public Involvement Meetings
- Public Comment Surveys
- Resource Agency Coordination

A. Project Team Meeting (June 23, 2003)

The first Project Team Meeting was conducted on Monday, June 23, 2003, at the KYTC District 1 Office in Paducah, Kentucky. The purpose of the meeting was to discuss the project history and purpose, scope of work and related activities, preliminary data/exhibits, project issues, and public involvement needs and ideas. A copy of the meeting minutes is included in **Appendix C**. Items discussed by those present at the meeting included:

- According to District 1 staff, this project grew out of a proposed bypass of Marion in Crittenden County. During the public involvement phase of that study, the local officials and public expressed that, in lieu of the proposed bypass, there was a greater need for an improved connector highway from I-24 at Eddyville to Marion. This connector was envisioned as a major improvement that would improve access from Eddyville to Henderson. As a result, the KYTC agreed to switch the project development funds for the bypass to project development activities for a proposed new Eddyville-to-Marion connector. The project was funded in two priority sections. According to KYTC traffic forecasts, the improved route from Eddyville to Henderson could potentially divert up to 10,000 trips from the Edward T. Breathitt Parkway.
- The first priority section of the proposed connector from Fredonia to Marion was nearing completion of Phase II Design at the time of the first project team meeting. The new improvement was being designed to follow one of the alignments defined in the *US 641 and KY 91 Corridor Needs Study* completed in December, 1999, and undertaken by the Pennyryle Area Development District (PADD). This first priority section of the roadway would tie into Marion to the south and follow a path east of existing US 641. This northern section of the Eddyville-to-Marion connector is designed as a four-lane, partially controlled access facility with a 60-foot median. On the southern end, this first priority section would terminate northwest of Fredonia near Livingston Creek in Caldwell County, which would become the northern terminus for the Eddyville-to-Fredonia segment being addressed in this US 641 Alternatives Study. In the design of the first priority section, it was assumed that

sections of US 641 to the south of the first priority section may be routed west of, instead of through, Fredonia.

- It was announced that the PADD is in the process of negotiating with the state for the future development of a 500-acre to 800-acre industrial “super-site” known as the Pennyrite WestPark Industrial Park. The primary portion of the land would come from the West Kentucky State Penitentiary Farm operated by the Kentucky Department of Corrections, although some additional land may be acquired from local landowners. The site is near the Fredonia Valley Railroad which interchanges with the Paducah and Louisville Railway. A draft feasibility study has been conducted by PADD and more information would become available in the near future after further meetings with state officials.
- It was agreed that potential impacts on prime farmland in the area would be a key issue to be considered during the study.
- Some preliminary alternatives were discussed, including:
 - Relocating the Ford Parkway (future I-66/I-69) north of Eddyville to eliminate potential impacts on Lake Barkley due to a reconfiguration of the I-24/Ford Parkway interchange, and
 - An eastern bypass of Fredonia, instead of a western bypass, to provide connection to routes coming into Fredonia from the east, especially KY 91.

Preliminary project goals were identified as follows:

- Provide connectivity between I-24 and US 60;
- Provide regional access to the National Truck Network and National Highway System (since Marion is not currently served by a legal route for 102-inch wide trucks);
- Stimulate economic development in the region; and
- Address safety and capacity concerns.

B. Local Officials and Agencies Meetings - Round I (July 29, 2003)

As part of the public involvement portion of this study, two meetings were held on Tuesday, July 29, 2003, with local officials, potential stakeholders, and the media: the first in the morning at the Lyon County Public Library in Eddyville and the second in the afternoon at the Lions Club in Fredonia. The purposes of this meeting were to inform these groups about the project and to gain input about the issues and concerns of the community. Copies of the meeting minutes are included in **Appendix C**.

1. Local Officials and Agencies Meeting - Eddyville

A total of 27 persons attended the local officials meeting in Eddyville to discuss the alternatives study, including project team



US 641 Local Officials & Agencies Meeting (Round I) in Eddyville, KY at the Lyon County Public Library

members. Topics discussed during the meeting included:

- Project history, including the segment from Fredonia to Marion, currently in design;
- Study area, including possible project termini and alternatives;
- Project purpose and goals;
- Scope of work and project schedule; and
- Local issues.

Some of the local issues identified were as follows:

- The project should serve the site of the Pennyriple WestPark Industrial Park on some portion of the West Kentucky State Penitentiary Farm, located southeast of Fredonia.
- At present, the local economy is largely based around tourism, although there are efforts to expand this base into other industries.
- The Mineral Mounds State Park could benefit from improved access to the region, potentially expanding the tourism base in the area.
- The project area includes traditional farmland and there will probably be resistance from some family farm owners, especially those with “family lineage” farms and strong roots to the land in this area.
- The project would depend on the funding allocation in the next Six-Year Highway Plan update, so there is a need to move this project forward as quickly as possible.
- The study should consider both full and partial access control for the new route.
- Other highway projects should be considered, such as widening US 62 to four lanes.
- There may be potential problems with karst around Fredonia.

The group identified the following to be considered as additional project goals:

- Improve access for economic development;
- Increase service to industrial areas; and
- Improve access to recreational areas and lakes.

2. Local Officials and Agencies Meeting - Fredonia

A total of 21 persons attended the local officials meeting in Fredonia to discuss the alternatives study, including project team members. Topics discussed during the meeting included:

- Project history, including the segment from Fredonia to Marion, currently in design;
- Study area and possible project termini;
- Project purpose and goals;



US 641 Local Officials & Agencies Meeting (Round 1) in Fredonia, KY at the Lions Club

- Scope of work and project schedule; and
- Local issues.

Some of the local issues identified were as follows:

- The quarry operation in Fredonia is an important environmental issue.
- There are “wildlife refuge area” signs posted at the Department of Corrections farm complex. This area should be checked for its wildlife status as a potential environmental issue.
- No-passing zones, farm equipment, truck traffic, and quarry traffic make the existing US 641 route dangerous.
- A staff member expressed concern about the safety of the 210 Western Kentucky Correctional Complex employees who drive US 641 to work. The proposed route would provide improved access to the complex and the farm.
- Farmland impacts will be a concern with the public. Splitting of farms should be minimized as part of this project.
- A new route should not come through Fredonia, but should not be located too far outside the city limits due to the costs of additional infrastructure.
- Because escapees are a potential reality, the proposed route should not be located through the middle of the West Kentucky State Penitentiary Farm, but to the east or the west.

The group identified the following to be considered as additional project goals:

- Address the loss of industry due to the lack of oversized truck access and provide economic growth for the region, not only for Crittenden County, but for all of West Kentucky, by providing improved access from the Henderson area to the south;
- Provide a connection to services in Paducah; and
- Serve as an alternative to the future I-66 and I-69 corridors.

C. Public Information Meetings - Round I (September 29th and 30th, 2003)

On Monday, September 29, 2003, and Tuesday, September 30, 2003, Public Involvement Meetings were held at the Lyon County Public Library in Eddyville, Kentucky, and Fredonia Lions Club in Fredonia, Kentucky, respectively. The meetings were held from 5:00 p.m. to 7:00 p.m. The purposes of the meetings were to provide preliminary information to the public on the proposed project and to seek public input on possible issues, impacts, destination points, and alternatives. A total of 68 persons registered their attendance at the two-hour public session in Eddyville, including eight (8) KYTC, ADD, and consultant staff. A total of



Children at the Fredonia Public Meeting taking advantage of coloring books and crayons provided by the KYTC

49 persons registered their attendance in Fredonia, including seven (7) KYTC, ADD, and consultant staff. Minutes for each meeting are included in **Appendix C**.

The public involvement meetings were arranged with several project information stations, and KYTC and consultant staff were available to answer questions and discuss issues. Upon arrival, attendees were given a survey questionnaire, project brochure, and information regarding KYTC roadway projects.

A PowerPoint slide presentation was prepared for the public involvement meeting, providing information on the current US 641 Alternatives Study. The presentation included information such as: the study area; preliminary project goals; traffic, design and environmental considerations; public involvement opportunities; and contact information. This slide show was played continuously during the public involvement session, with a seating area provided nearby for viewers.

A section of the room was set up in a straight line arrangement of project exhibits, including the following titles:

- What is the project study area?
- How many cars and trucks are on area roadways today (2003) and what is the level of service?
- If there are no new road improvements, how many cars and trucks will be on area roadways in 2025 and what is the level of service?
- What are the environmental issues? (presented on aerial photography and topographic mapping)
- Where are the most crashes occurring?
- What is the overall performance of the highways?

Attendees were asked to complete the survey questionnaire prior to leaving the meeting, if possible, or return it to the KYTC at a later date in the postage-paid envelope provided. A table was available to attendees to fill out their survey form and read over the project materials. Refreshments were also provided.

1. General Comments

Attendees were invited to discuss any questions or concerns with KYTC and consultant staff. General comments included the following:

- One couple noted how close their home was located to existing US 641 and was concerned about US 641 being widened instead of relocated/reconstructed.
- A couple of individuals were interested in what the typical section would be for the section from Fredonia to Marion and if the section from Eddyville to Fredonia would be the same.



*US 641 Public Meeting Exhibit Station
at Fredonia's Lions Club on September
30, 2003*

- One individual noted that he drives US 641 most everyday with little to no delay.
- A couple of persons said that the road was unsafe due to speeding trucks and few passing opportunities.
- One couple noted the need for bypassing Fredonia due to an alarming number of accidents within the area, including one fatal accident in which they were involved.
- Other Fredonia residents noted being aware of a high number of accidents within Fredonia.
- A few attendees were interested in knowing if the section from Fredonia to Marion would continue south of the existing southern termini because they are property owners along Old Mexico Road and are concerned about losing all or a portion of their property.
- One individual noted the importance of avoiding crossings with the Paducah and Louisville Railway and drew an example corridor demonstrating how this could be accomplished.

2. Map Drawing Exercise

One table was set up with one environmental footprint map and one project study area map. Markers were provided for attendees to circle areas on the environmental footprint that should be avoided. As shown in **Figure 6**, areas identified included:

- Most areas along US 641 between Eddyville and Fredonia;
- Several cemeteries not shown on the environmental footprint;
- West Kentucky State Penitentiary Farm;
- Prime farmland east and west of KY 373 in Lyon County;
- Land north of the Paducah and Louisville Railway between KY 373 and US 641; and
- Mill Bluff Spring which includes a cave and spring, located just off KY 902 near the Caldwell/Crittenden County Line.

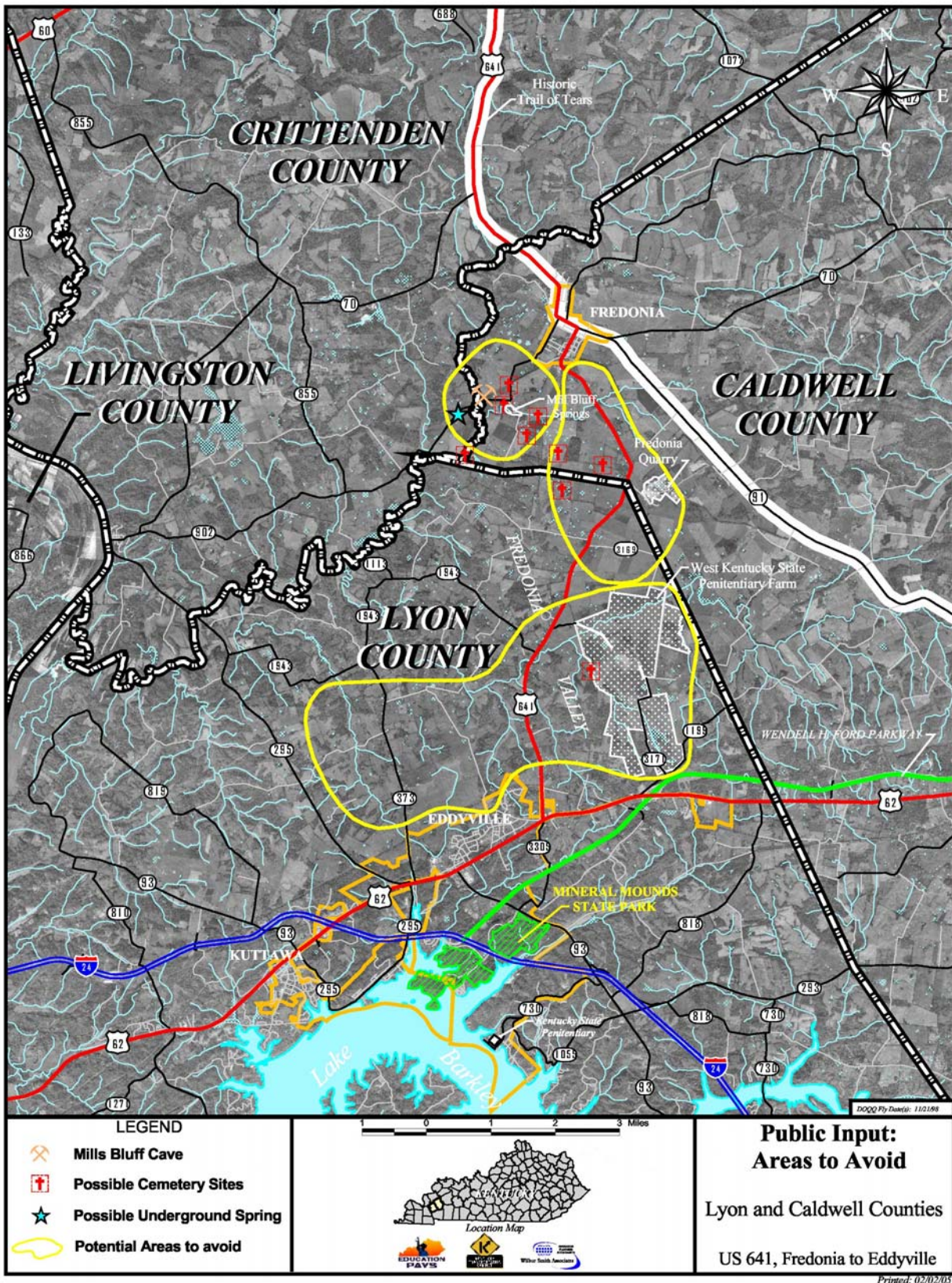


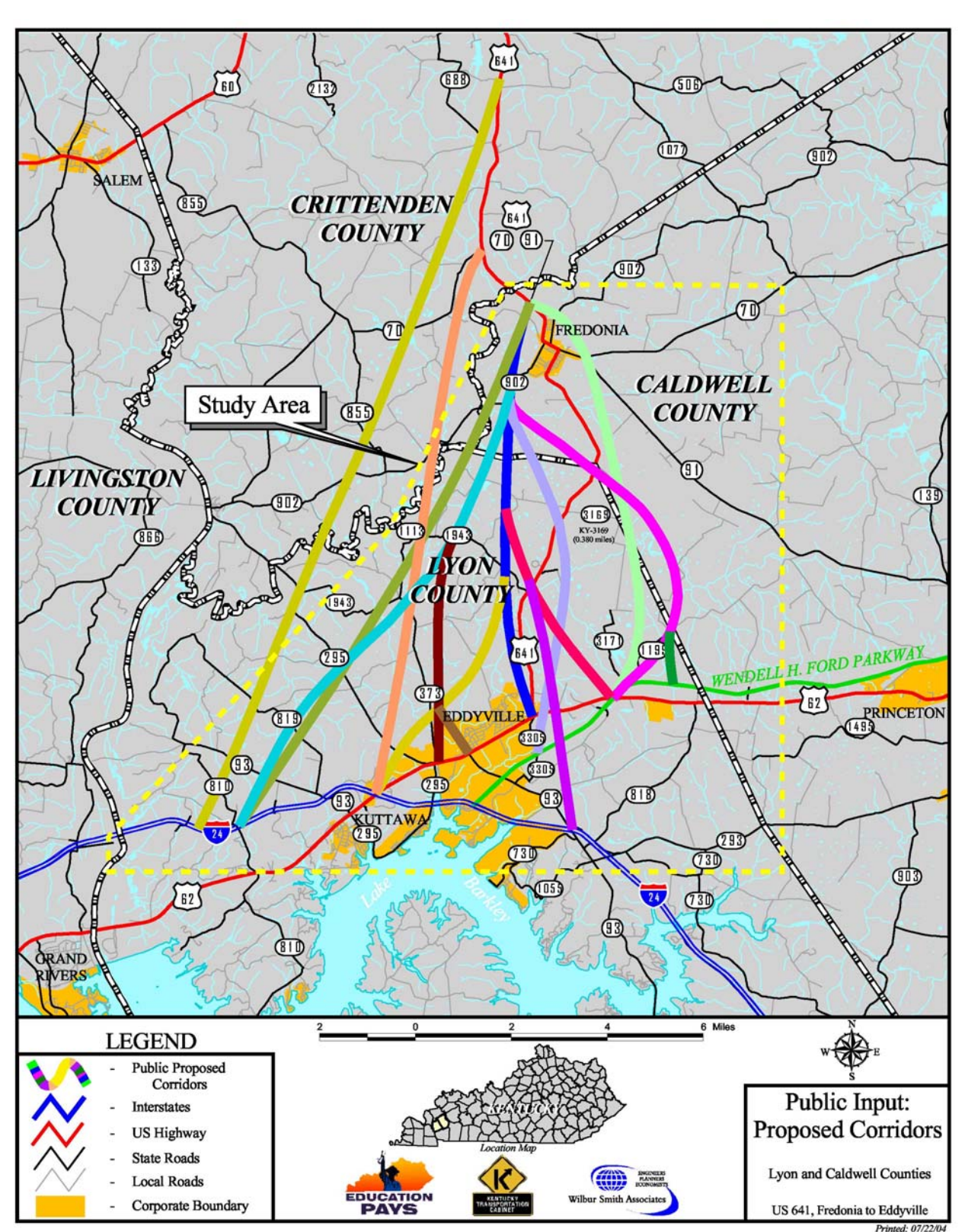
Map drawing station at the Lyon County Public Meeting on September 29, 2003

In addition, markers were provided for attendees to draw potential corridors for a relocated/reconstructed US 641 on the project study area map. As shown in **Figure 7**, general corridors starting at the northern termini included:

- East and west around Fredonia to an eastern terminus at the Ford Parkway between US 62 and the Lyon/Caldwell County Line.
- West around Fredonia to a terminus near the US 641 and US 62 intersection. A couple of alternatives continued on to the Ford Parkway and I-24.
- West around Fredonia to a terminus near the KY 373 intersection with US 62.
- West around Fredonia to a terminus near the KY 810 overpass of I-24.

Figure 6. Public Input: Areas to Avoid





3. Public Comment Survey Responses

As part of the public meeting handout, the KYTC supplied a survey form so that citizens of the area could provide input on the project. The KYTC collected 68 surveys from the two public meetings in Fredonia and Eddyville.

Responses to the six questions on the public comment survey are tabulated in **Table 7** and summarized below:

- The majority (51 of 68) of the survey respondents felt that reconstructing or relocating US 641 is needed.
- Thirty respondents (30) indicated that US 641 is dangerous with several narrow and curvy sections. Many stated that the accident rate is high on this road. Twenty-two respondents (22) believe that the large truck traffic is a major problem. It was also suggested that the road should be widened with larger shoulder areas for these large trucks.
- Twenty-nine (29) respondents prefer the proposed US 641 corridor to connect with I-24. Twenty-one (21) respondents want the corridor to connect with the Ford Parkway. Twenty-one (21) respondents said that US 641 should connect with US 62.
- More specifically, eleven (11) respondents preferred a southern terminus near the I-24 weigh station. Another ten (10) respondents preferred a location near the I-24/US 62 interchange. Seven (7) respondents each preferred a southern terminus at the existing US 62/US 641 intersection and the Ford Parkway interchange with US 62. Several respondents provided no response to the question.
- Over half (38 of 68) of the respondents currently use US 641 on a daily basis. Thirteen (13) respondents use the roadway three times a week. Seventeen respondents (17) use US 641 no more than once a week.
- The majority (38) of the respondents felt that personal properties or homes are sensitive areas that should be considered if this new route is constructed. Thirty-one (31) respondents noted prime farmland as sensitive areas, while historic or cultural sites were identified as sensitive by fourteen (14) respondents.

Table 7. Public Survey Response Summary – Round I**1. Do you think reconstruction or relocation of US 641 from Eddyville to Fredonia is needed?**

Yes	No	No response
51	13	4
75%	19%	6%

2. What problems currently exist on US 641 that the proposed project should address?¹

Large truck traffic	Dangerous roads	Narrow road for heavy truck traffic	No problems	Other	No response
22	30	16	7	6	11
24%	33%	17%	8%	7%	12%

3. If US 641 were relocated near Eddyville, to which highway should it connect?²

Wendell H. Ford (WK) Parkway	I-24	US 62	Other	No response
21	29	21	1	1
29%	40%	29%	1%	1%

4. At or near what location should it connect on the southern end (near Eddyville)?

Near weigh station on I-24	Near I-24 / US 62 interchange	Along US 62	US 62 / US 641	US 62 / WF Parkway	Along WF Parkway	Other	No response
11	10	4	7	7	4	8	17
16%	15%	6%	10%	10%	6%	12%	25%

5. How often do you use US 641 now?

Every Day	Three times per week	Once per week	Once per month	Rarely	Never	No response
38	13	8	8	1	0	0
56%	19%	12%	12%	1%	0%	0%

6. Are there sensitive areas that should be considered if this new route is constructed?³

Personal properties or homes	Business/commercial property	Natural areas or habitats	Historic or cultural sites	Prime farmland	Other	No response
38	10	7	14	31	17	18
28%	7%	5%	10%	23%	13%	13%

¹ Several responses included multiple problems² A few responses included two highways³ Most responses included multiple areas

D. Resource Agency Coordination - Round I (November 2003)

Many local, state and federal resource agencies, with diverse areas of public responsibility, were included in this planning process. Input was solicited through written requests on two occasions. For the first round of resource agency coordination, each agency was sent a project brochure detailing the preliminary statement of study purpose and project goals, a project location and environmental features map, year 2003 traffic characteristics, and vehicle crash information. For the second round, each resource agency was sent a preferred alternative corridors map in addition to the identical project brochure that was sent during the first round. This section describes the input received from these organizations after the initial contact. The remainder of recipients did not provide a response. Response letters from the various resource agencies are located in **Appendix D** and are summarized below.

Resource Agencies

- City Agencies
- Local Interest Groups
- KYTC Division Offices
- Other State Agencies
- Federal Agencies

The following 19 agencies responded by offering comments or concerns regarding the project:

- Crittenden County Economic Development Corporation (CCEDC): The CCEDC strongly endorsed the proposed route and saw no issues or concerns that would adversely affect the project. The CCEDC felt it was critical that the roadway be in close proximity to the forthcoming 5-county endorsed Pennyrile WestPark Industrial Park adjacent to the West Kentucky State Penitentiary Farm. Attracting large manufacturing companies will hinge greatly on whether there is a 4-lane highway that brings industrial transportation to and from the park.
- J. R. Gray, State Representative: Rep. Gray saw no particular concerns with the proposed highway in and around Fredonia. However, he felt the highway should be located close to the Pennyrile WestPark Industrial Park in order to attract potential industries. Easy access should be provided to Interstate 24 and/or the Ford Parkway.
- Kentucky Cabinet for Workforce Development: An improved roadway would promote industrial development, residential development, and promote growth of educational facilities. The Cabinet has no objection to the project, other than financial concerns due to the economic downturn and geographical considerations.
- Kentucky Department of Corrections: The preference of the Department is that the new highway should not come any closer to the institution than the present situation to provide safety for the public.
- Kentucky Department of Fish and Wildlife Resources (KDFWR): The Kentucky Fish and Wildlife Information System indicates that the federally endangered Indiana bat and Gray bat are known to occur in the Fredonia 7.5 minute USGS quadrangle. Known to exist in the Eddyville quadrangle are the bald eagle and pink mucket. In quadrangles in which gray bats are known to occur, cave entrances should be surveyed for potential use. In quadrangles in which Indiana bats are known to occur, any wooded areas that may be impacted by the proposed project should be examined for potential Indiana bat habitat. Other state threatened or endangered species known to exist in the area include the spottail shiner, great blue heron, rabbitsfoot, barking treefrog, chain pickerel, sedge wren, chestnut lamprey, black buffalo, pocketbook, and osprey.

Recommendations for portions of the project that might cross intermittent or perennial streams include: development/excavation during a low flow period; proper placement of erosion control structures; replanting of disturbed areas after construction; return of all disturbed instream habitat to its original condition; preservation of any tree canopy overhanging the stream; and return of all rights-of-way to original elevation.

- Kentucky Department for Surface Mining Reclamation and Enforcement, Natural Resources and Environmental Protection Cabinet: The department has identified one active rock quarry located just east of US 641 between Eddyville and Fredonia on the Lyon and Caldwell county line. This quarry is permitted under the name of Martin Marietta Materials, Inc (Permit No. 017-9403). The local address is 297 Fredonia Quarry Road, Fredonia, KY 42411. The Latitude is 37°10'32", and the Longitude is 88°01'48" on the Fredonia quadrangle.
- Kentucky Division of Aeronautics: The proposed project should not affect any public Kentucky airport.
- Kentucky Division for Air Quality, Natural Resources and Environmental Protection Cabinet: Kentucky Division for Air Quality Regulations 401 KAR 63:010 (Fugitive Emissions) and 401 KAR 63:005 (Open Burning) apply to the proposed project. The project must also meet the conformity requirements of the Clean Air Act as amended and the transportation planning provisions of Title 23 and Title 49 of United States Code. Every effort should be made to maintain compliance with these regulations and requirements. The Division also suggests an investigation into compliance with applicable regulations in the local governments.
- Kentucky Division of Materials, Geotechnical Branch: The project is located within the Eddyville and Fredonia Geologic Quadrangle, underlain with Quaternary Alluvium. Bedrock includes the Ste. Genevieve Limestone, St. Louis Limestone, and Salem Limestone. A geologic map was attached for reference. The geotechnical concerns of the study area are as follows. Due to faulting in the vicinity of Eddyville, any bedrock in the cut sections will likely contain fractures and joints causing cut slopes in rock to be flatter than normal. The branch recommends avoiding mapped springs and investigating unmapped springs before final alternatives are chosen. It is also preferred to avoid sinkholes in the area. On the Fredonia Quadrangle, a structural low exists and contains many sinkholes. This area should be avoided.
- Kentucky Transportation Cabinet, Division of Traffic, Permits Branch: This project should provide for a partially controlled access facility, with access control fencing and all possible access points set on the plans in accordance with 603 KAR 5:120. The design speed should be the same as the anticipated posted speed when the project is completed. The Permits Branch should be notified if the proposed route is to be placed on the National Highway System.
- Kentucky Division of Waste Management: The Division requests the use of Pulverized Glass Aggregate (PGA) in roadbed construction, where feasible. The Division provided a list of superfund sites by county and underground storage tank sites in enforcement.
- Kentucky Geologic Survey, University of Kentucky: The Kentucky Geologic Survey noted that the proposed project is in the Mississippian Plateau (Pennyroyal or Pennyrile) Physiographic Regions, which is underlain by limestone. The project

would encounter karst features in the limestone such as sinkholes and caves. The project would not encounter any pre- or post-landslide hazard. It would encounter unconsolidated sediments, such as clay, silt, sand, and gravel, and chert rubble in the streams. Resource conflicts could be encountered such as prior ownership of property for quarrying or mining. The project would encounter the St. Louis Limestone and Fredonia Limestone Member of the Ste. Genevieve Limestone. The St. Louis might contain expansive aggregate layers that would not be suitable for construction stone. The project area would encounter faulted areas. Finally, there is a low potential for liquefaction or slope failure in the unconsolidated sediments at or near streams by bedrock ground motion.

- United States Department of Agriculture, Natural Resources Conservation Service (NRCS): NRCS is concerned with potential impacts that the proposed highway project might have upon prime farmland soils and additional farmlands of statewide importance. Form NRCS-CPA-106 must be submitted to NRCS if federal dollars are to be used to convert important farmlands from agricultural uses to non-agricultural uses.
- United States Department of the Army, Nashville District, Corps of Engineers: Based on a review of the location map, the proposed project would not affect lands owned or operated by the Corps of Engineers. After reviewing the basic plans, the proposal may require the replacement, widening, and/or construction of bridges and culverts. Depending on the plans, the work may meet the criteria for approval by Nationwide Permit #14 for the deposit of fill material associated with road crossings. Some level of Department of the Army permitting would probably be required for the project. Wetland and stream impacts should be avoided, if possible.
- United States Department of the Interior, Fish and Wildlife Service: Excessive sedimentation during daily construction can be prevented through application of Best Management Practices (BMPs). It was recommended to consider having an inspector on-site during all construction activities to ensure that work areas are stabilized on a daily or regular basis.

Within the proposed project area, the endangered Indiana bat and gray bat may exist. It was recommended that the project area be surveyed for caves, rock shelters, and underground mines to identify and avoid impacts to potential habitats for the Indiana bat. Also, it was recommended that tree removal should be completed during the appropriate season to avoid impacts to summer roosting Indiana bats and swarming behavior.

- Kentucky Transportation Cabinet, Division of Environmental Analysis: Based on the planning study data, the following comments were provided: no adverse impacts anticipated relative to air quality and noise; given the potential for long channel changes, stream impacts should be avoided or minimized; if unavoidable, mitigation and permitting may be required; ecological, archaeological and cultural historic impacts will have to be assessed with a baseline study; and specific details concerning underground storage tanks and hazardous materials would need to be obtained once alignments are proposed.
- Kentucky State Police: Forwarded letter to the Mayfield Post.
- Kentucky State Nature Preserve Commission: No KSNPC-listed species or unique natural areas were anticipated in the project area. However, the following issues were noted: 1) general avoidance of wetland areas, 2) the area is known to be

inhabited by gray bats, and 3) consideration should be made to minimizing further fragmentation of forested tracts.

- Department of Military Affairs: The proposed project would not impact the department in anyway.

IV. ENVIRONMENTAL JUSTICE

This chapter provides a summary of the *Environmental Justice and Community Impact Report* completed February 2004 by the Pennyriple Area Development District as part of this planning study. This report assesses potential environmental justice concerns related to the proposed project. The entire document is included in **Appendix E**.

According to the 2000 Census, there are six (6) Census Tracts and thirteen (13) Block Groups that encompass the US 641 study area in Lyon and Caldwell Counties. Exhibits showing the location and data for the Census Tracts and Block Groups are included in **Appendix E**.

Key issues are discussed in the following sections. To address some issues in more detail, additional analysis is presented beyond the findings discussed in the report, and is based on a review of the data included in that report.

A. Minority Populations

- Black Population
 - The Lyon County population is 6.7% Black, as compared to the national average of 12.3% and Kentucky state average of 7.3%.
 - The Census Tract 9601, Block Group 001 population is 15.3% Black, which is higher than the national and state averages. This area lies just south of US 62 and is therefore south of the study area through which some or all of the alternative US 641 corridors would pass.
 - The Census Tract 9601, Block Group 002 population is 11.5% Black, which is higher than the state average. This is the area through which some or all of the US 641 alternative corridors pass.
 - The averages in Tract 9601, Block Groups 001 and 002 appear to be elevated because they include the population of the West Kentucky State Penitentiary Farm located in this area.
 - Each of the other Census Tracts and Block Groups show no significant difference in population composition according to race within the area where the study corridors are located.
 - The Caldwell County population is 4.8% Black, as compared to the national average of 12.3% and Kentucky state average of 7.3%.
 - In the study area, the Census Tract 9801 population is 0.7% Black, which falls well below the national and state averages.
 - In the study area, the Census Tract 9802 population is 9.9% Black, which falls below the national average but is greater than the state average.
 - However, the only Block Groups in Tract 9802 that could be immediately affected by the proposed project, Block Groups 004 and 005, have a Black population of 4.1% and 0.2%, respectively, both well below both the national and state averages.
 - Each of the other Census Tracts and Block Groups show no significant difference in population composition according to race within the area where the study corridors are located.

- American Indian
 - The Lyon County population is 0.3% American Indian, as compared to the national average of 0.9% and Kentucky state average of 0.2%.
 - In the study area in Lyon County, the Census Tract 9601 population is 0.3% American Indian, which is below the national average, but higher than the state average.
 - The largest concentrations of the American Indian population in Lyon County, Census Tract 9601, are in Block Groups 002 and 003, both in the immediate study area, at 0.3% and 0.6%, respectively. Both exceed the state average.
 - Also in Census Tract 9601, the Block Group 004 population is 1.0% American Indian, just higher than the national average. However, this area lies south of I-24 west of Eddyville and would not be affected by the proposed project.
 - Each of the other Census Tracts and Block Groups show no significant difference in population composition according to race within the area where the study corridors are located.
 - The Caldwell County population is 0.1% American Indian, as compared to the national average of 0.9% and Kentucky state average of 0.2%.
 - In the study area in Caldwell County, the Census Tract 9801 and 9802 populations are 0.1% and 0.2% American Indian, which is below the national average and below or equal to the state average. The population in the block groups in those Census Tracts range from 0.0% to 0.2%, also below the national and below or equal to state averages.
 - Each of the other Census Tracts and Block Groups show no significant difference in population composition according to race within the area where the study corridors are located.
- Asian, Hispanics, and Other
 - The Lyon County population is 0.7% Hispanic, as compared to the national average of 12.5% and Kentucky state average of 1.5%. For Asian and other minorities, the populations are 0.2% and 1.0%, respectively; as compared to the national average of 3.6% and 8.0%, respectively, and Kentucky state average of 0.7% and 1.6%, respectively.
 - The Caldwell County population is 0.6% Hispanic, as compared to the national average of 12.5% and Kentucky state average of 1.5%. For Asian and other minorities, the populations are 0.2% and 1.0%, respectively.
 - The Asian, Hispanic, and other minority populations in both Lyon County and Caldwell County and in all Census Tracts and Block Groups are less than the national and statewide averages.

Members of the project area community focus group were consulted to confirm the findings presented above. They did not recognize any minority concentrations that seemed higher than average. While it appears that this project would have little impact on minority communities in Lyon and Caldwell Counties, attention should be given to consider such populations during future phases of this project.

B. Low Income Populations

- The poverty level (% of total population in poverty) in Lyon County is 10.3%, compared to the national average of 12.0% and Kentucky state average of 15.4%.
 - In Census Tract 9601, Block Group 003 has a poverty level of 12.9% and Block Group 005 has a poverty level of 12.9%, both greater than the national average but less than the state average.
 - These two Block Groups appear to be slightly above the national and county averages primarily due to a concentration of trailer parks in the Census block. This concentration of trailer parks will not be directly affected by the proposed project.
- The poverty level in Caldwell County is 15.6%, which is much greater than the national average of 12.0% and slightly higher than the Kentucky statewide average of 15.4%.
 - Census Tract 9802, located in the study area, has a high poverty level of 21.2%. In that Census Tract, Block Groups 003, 004, and 005 have poverty levels of 18.8%, 34.0%, and 20.9%, respectively.
 - In the study area in Caldwell County, the poverty level of Block Group 002 of Census Tract 9801 (12.9%) was higher than the national average, but lower than the state and county averages.

Members of the project area community focus group were consulted to confirm the conclusions about the study area. They did not recognize any significant concentrations of the population below the poverty level that would be directly affected by the proposed project. However, block groups within census tract 9802 should be given consideration in future phases of this project.

C. Age of Residents

- The percentage of the population over age 65 in both Lyon County (16.8%) and Caldwell County (18.0%) exceed the national average of 12.4% and Kentucky statewide average of 12.5%.
 - Some Block Groups in the study area have a slightly higher percentage of people aged 18 to 64 and a consistently higher percentage of the population over age 65.
 - This is consistent with percentages of the population for each county because of the increased number of retirees who choose to live in the Lakes area.

Members of the project area community focus group were consulted to confirm the conclusions about the study area. They did not recognize any significant concentrations of individuals of a particular age group. It appears that this project would have little impact on populations of a particular age group in Lyon and Caldwell Counties. While the aged population is not a measure included in typical environmental justice analysis, such populations should be given consideration in future phases of this project.

D. Other Populations

There are no populations identified by the community focus groups beyond the Census data obtained that would potentially be impacted by the US 641 project. This includes

the Amish or other religious communities, as well as any other issues of importance to the project area.

E. Study Findings

It appears that the US 641 relocation/reconstruction will have little or no impact on minority communities in Lyon and Caldwell Counties. Block groups with concentrations of low income residents should be given consideration as this study moves forward.

V. PROJECT PURPOSE AND NEED

As a result of the planning process and public involvement efforts, project goals were identified for the proposed reconstruction of US 641, based on a compilation of input from highway officials, local government agencies, interest groups, members of the general public, and the project team. These goals address accessibility, economic benefit, connectivity, and safety and operational conditions of US 641. These goals have been used in preparing the Purpose and Need for the proposed project during future project development efforts, including design and environmental activities.

Following is a brief discussion of the Purpose and Need for the proposed US 641 project:

- **The proposed project is needed to provide improved regional access along a reconstructed US 641 or an alternate route that will:**

- **Allow the designation of the route for the legal operation of 102-inch wide trucks between Eddyville and Fredonia.**

Lyon and Caldwell Counties are served by two designated National Truck Network (NN) roadways: I-24 and the Ford Parkway. The NN is a designated system which allows trucks with increased dimensions, including 102-inch wide trucks. In Kentucky, increased dimension trucks are allowed five (5) driving miles from a NN roadway as long as they are on state-maintained facilities and one (1) mile on non-state maintained publicly-owned, public use highways. Fredonia, in Caldwell County, and Marion, in Crittenden County, both fall geographically outside these legal limits restricting the ability for local businesses to ship using 102-inch wide trucks.

Limited truck access to Marion and surrounding areas is an issue for site development and the potential for bringing in new local jobs. The potential to improve the economic vitality of Lyon, Caldwell, and Crittenden Counties and surrounding counties would be greater with improved truck access to and from the area. Many local officials and community members have expressed strong support for the project. The reconstruction of US 641 between Fredonia and Marion has recently completed the design stage. If and when constructed, the section from Eddyville to Fredonia would become increasingly important to complete the connection to existing NN roadways.

- **Provide improved access to the National Truck Network and National Highway System to support economic development initiatives in the region.**

I-24 and the Ford Parkway are the only National Highway System (NHS) routes within Lyon and Caldwell Counties. Developed in response to requirements included in the Intermodal Surface Transportation Efficiency Act (ISTEA), the NHS includes designated roadways important to the nation's economy, defense, and mobility.

Designation of US 641 as a NN and/or NHS roadway is considered an important step in boosting economic development within the region. Of particular emphasis, is providing connection to the Pennyryle WestPark Industrial Park, proposed north of the West Kentucky State Penitentiary Farm. Consideration could be given to providing a fully-controlled access roadway to the Park entrance, discussed in more detail in the next chapter.

- **Provide improved access from north of and in the vicinity of Eddyville to regional recreational and tourist areas, including Lake Barkley and Kentucky Lake.**

Kentucky Lake and Lake Barkley were created in 1938 and 1966, respectively. Along with the Land Between the Lakes National Recreational Area, the region has grown to

be an important tourist destination. Access to these recreational areas is provided by I-24, the Ford Parkway, the Julian M. Carroll Parkway, US 68, US 641, and other state and local roads. Of these, US 641 provides an important connection for those originating from the north including areas of Illinois and Indiana.

- **Providing a direct connection to either I-24 or the Ford Parkway through an extension of the programmed US 641 project between Fredonia and Marion is needed to afford the opportunity for an improved corridor from I-24 near Eddyville to US 60 near Henderson.**

Currently, the combination of US 641 between Eddyville and Marion and US 60 between Marion and Henderson serve as an alternate route to the Ford Parkway and Edward T. Breathitt Parkway. In the case of closure or delay on either parkway, additional strain may be placed on the US 641 corridor. Increased capacity will help the roadway handle temporary spikes in traffic and reduce related traffic and congestion concerns.

- **Improved roadway geometrics would help alleviate public concerns about safety and level of service along the existing US 641 corridor.**

Local residents have expressed concerns about safety and level of service, particularly as it relates to truck traffic along US 641. When asked what problems currently exist along US 641, 33 percent of those surveyed responded that US 641 was a dangerous road. Twenty-four percent responded that they were concerned with the large number of trucks along US 641, and another 17 percent felt the roadway was too narrow to handle large truck traffic. The public also noted specific accident history along US 641 in Fredonia, which is confirmed by the crash analysis conducted as part of this study.

Level of service along US 641 was calculated to be LOS D for both existing (2003) and future (2025) years, except for a small section passing through Fredonia. In the future year, this section of US 641 is expected to be LOS E. One contributing factor to poor level of service along the roadway is the limited passing sight distance along the route. The ability to pass can be further hindered with the presence of high truck traffic traveling through the area or to and from the quarry, for example.

As proposed, the reconstructed US 641 would be a divided, four-lane facility, eliminating passing concerns. Also, the corridor would bypass Fredonia and the identified high crash spot locations.

VI. ALTERNATIVES EVALUATION PROCESS

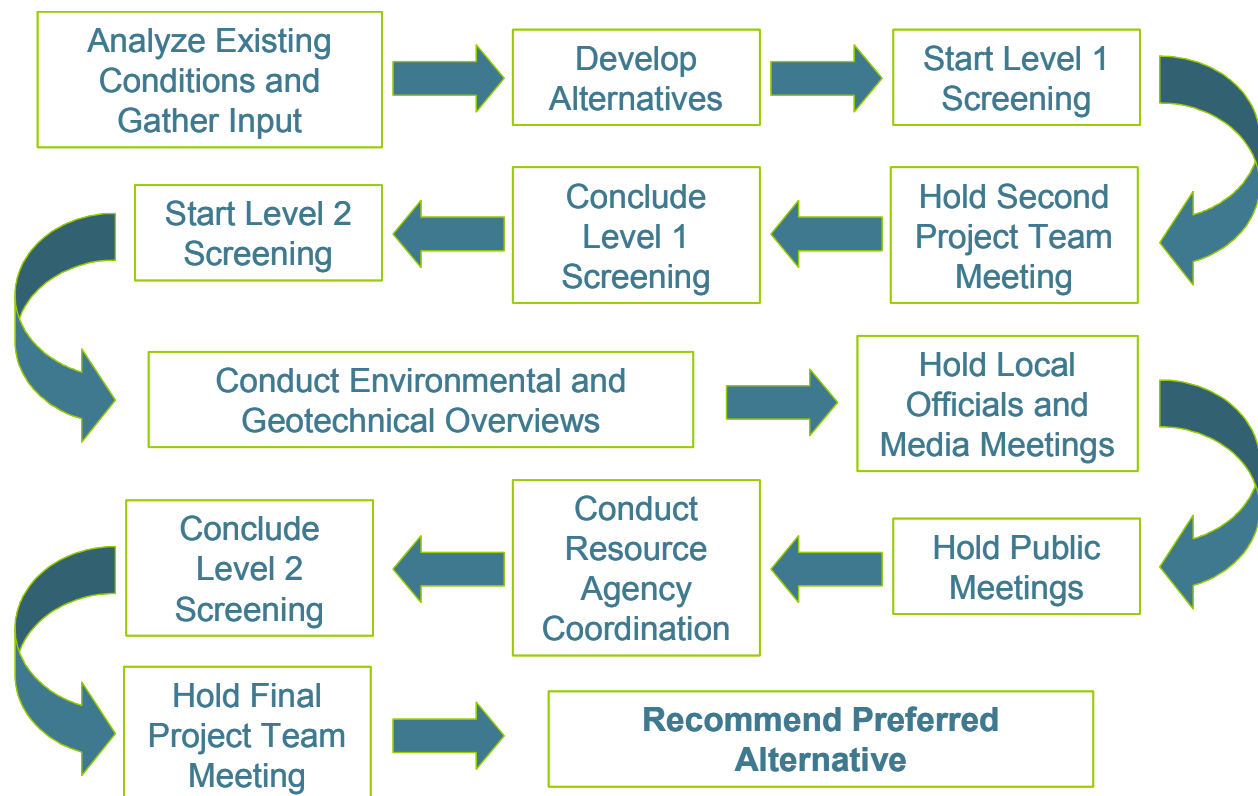
Following the existing conditions review and first round of public involvement, potential improvement alternatives were developed for the possible reconstruction of US 641. These were based on an analysis of existing conditions and on input received from early public involvement.

A. Evaluation Process

A tiered evaluation process was undertaken to determine a recommended alternative(s). Initially, 12 alternatives were developed, and these were evaluated as part of a Level 1 Screening process. Findings were presented to the project team (see **Chapter VII**) and minor adjustments were recommended. In that meeting, the project team also added two (2) new alternatives, for a total of 14 alternatives, and recommended that six (6) of the 14 alternatives be eliminated from further evaluation.

As part of the Level 2 Screening process, environmental and geotechnical assessments were conducted. Local citizens, public officials and representatives of government resource agencies were then given the opportunity to react to the proposed improvement alternatives through a second round of public involvement activities. Results of the Level 2 Screening were summarized and presented to the project team for discussion (see **Chapter X**). The result of this meeting was the recommendation of a preferred build alternative. **Figure 8** depicts the alternatives development and evaluation process, which is outlined in more detail in the following chapters.

Figure 8. Evaluation Process

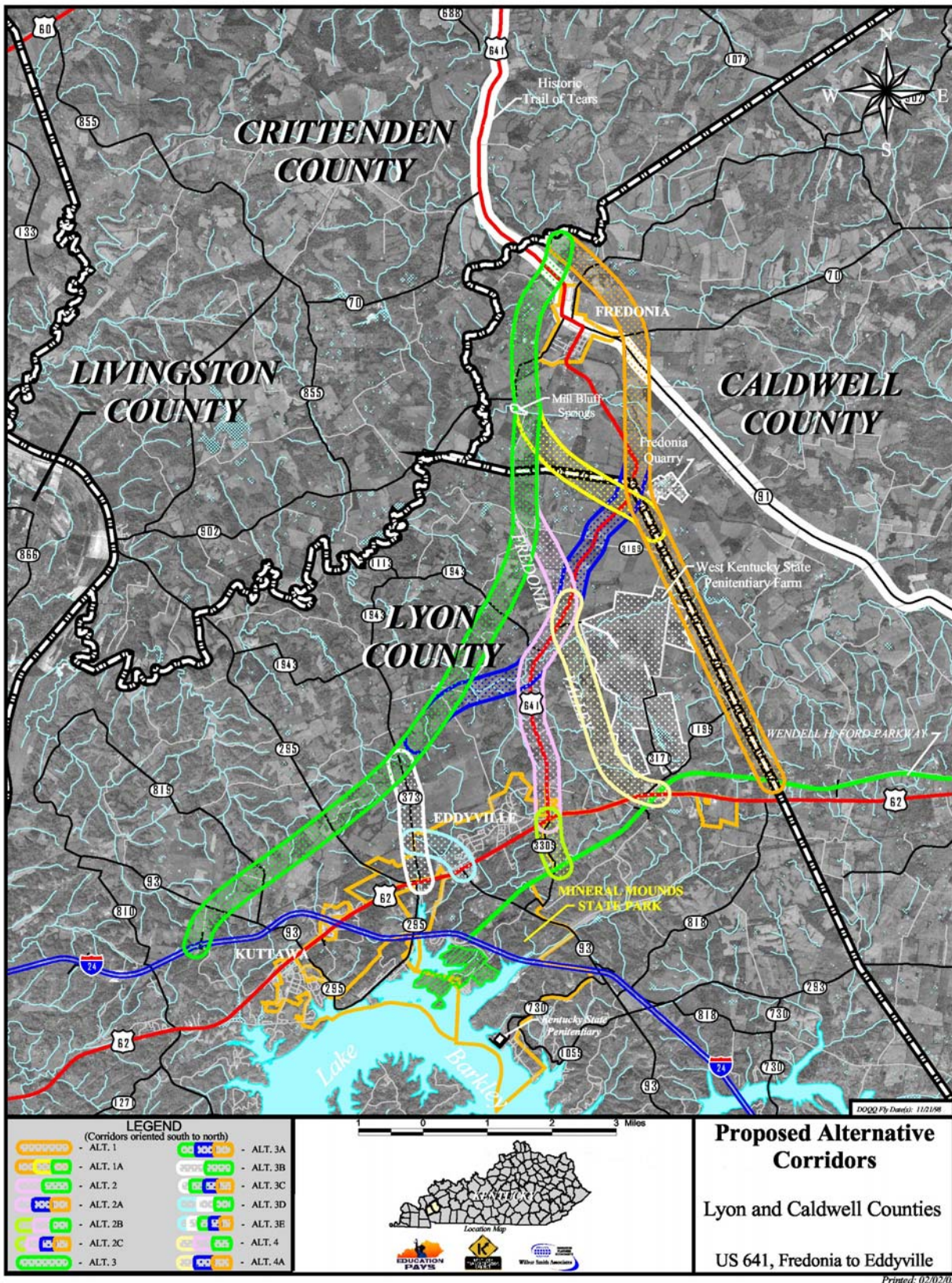


B. Proposed Improvement Alternatives

As presented in **Figure 9**, 14 alternatives were developed for the possible reconstruction of US 641. The first 12 alternatives were developed initially, while the latter two (2) were recommended at the project team meeting, as described in **Chapter VII**. The alternatives are described as follows:

- **Alternative 1:** The southern terminus would be a new interchange proposed along the Ford Parkway at the Caldwell/Lyon County Line. The corridor would follow the county line to an intersection with existing US 641. The corridor would then turn due north. At KY 70, the corridor would curve to the northwest around Fredonia to an intersection with the proposed US 641 Priority Section 1 north of existing US 641.
- **Alternative 1A:** The southern terminus would be a new interchange proposed along the Ford Parkway at the Caldwell/Lyon County Line. The corridor would follow the county line to the Fredonia Quarry and then proceed northwest through the northeast corner of Lyon County and into Caldwell County. The corridor would continue north on the western side of Fredonia to a terminus with US 641 northwest of Fredonia.
- **Alternative 2:** Starting at the existing US 641 and US 62 intersection and proceeding north along existing US 641, Alternative 2 would follow US 641 to just north of the entrance for the West Kentucky State Penitentiary Farm. The corridor would continue northwest to a point just south of the Caldwell/Lyon County Line. The corridor would proceed north crossing the Caldwell/Lyon County Line and continue north on the western side of Fredonia to a terminus with US 641 northwest of Fredonia.
- **Alternative 2A:** Starting at the existing US 641 and US 62 intersection and proceeding north along existing US 641, Alternative 2A would follow US 641 to the Fredonia Quarry. The corridor would then turn due north. At KY 70, the corridor would curve to the northwest around Fredonia to an intersection with the proposed US 641 Priority Section 1 north of existing US 641.
- **Alternative 2B:** Alternative 2B would have a southern terminus at a new interchange along the Ford Parkway near MP 1.7. The corridor would generally follow KY 3305 toward US 62, intersecting US 62 at US 641. Alternative 2B would then follow the same corridor as Alternative 2.
- **Alternative 2C:** Alternative 2C would have a southern terminus at a new interchange along the Ford Parkway near MP 1.7. The corridor would generally follow KY 3305 toward US 62, intersecting US 62 at US 641. Alternative 2C would then follow the same corridor as Alternative 2A.
- **Alternative 3:** Alternative 3 would have a southern terminus along I-24 between the Paducah and Louisville railroad crossing and KY 810. The corridor would continue northeast intersecting KY 93, KY 819, KY 295 and KY 373. The corridor will continue in a northeast direction. The corridor would cross KY 1943 turning due north and intersecting Alternative 2 just south of the Caldwell/Lyon County Line. Similar to Alternative 2, the corridor would proceed north crossing the Caldwell/Lyon County Line and continue north on the western side of Fredonia to a terminus with US 641 northwest of Fredonia.

Figure 9. Proposed Improvement Alternatives



- Alternative 3A: Alternative 3A would have a southern terminus along I-24 between the Paducah and Louisville crossing and KY 810. The corridor would continue northeast intersecting KY 93, KY 819, KY 295 and KY 373. The corridor then turns more to the east and intersects existing US 641 just south of KY 1943. The corridor then follows the same path as Alternative 2A. The corridor would follow US 641 to the Fredonia Quarry. The corridor would then turn due north. At KY 70, the corridor would curve to the northwest around Fredonia to an intersection with the proposed US 641 Priority Section 1 north of existing US 641.
- Alternative 3B: Alternative 3B would have a southern terminus along US 62 at KY 373. The corridor would follow along KY 373 for approximately two (2) miles. The corridor would then head in a northeast direction. The corridor would cross KY 1943 turning due north and intersecting Alternative 2 just south of the Caldwell/Lyon County Line. Similar to Alternative 2, the corridor would proceed north crossing the Caldwell/Lyon County Line and continue north on the western side of Fredonia to a terminus with US 641 northwest of Fredonia.
- Alternative 3C: Alternative 3C would have a southern terminus along US 62 at KY 373. The corridor would follow along KY 373 for approximately two (2) miles. The corridor would then turn more to the east and intersect existing US 641 just south of KY 1943. The corridor would follow the same path as Alternative 2A. The corridor would follow US 641 to the Fredonia Quarry. The corridor would then turn due north. At KY 70 the corridor would curve to the northwest around Fredonia to an intersection with the proposed US 641 Priority Section 1 north of the existing US 641.
- Alternative 3D: Alternative 3D would have a southern terminus along US 62 at KY 93. The corridor would travel northwest intersecting KY 373 near the Paducah and Louisville Railroad crossing. From there, Alternative 3D would follow the same path as Alternative 3B.
- Alternative 3E: Alternative 3E would have a southern terminus along US 62 at KY 93. The corridor would travel northwest intersecting KY 373 near the Paducah and Louisville Railroad crossing. From there Alternative 3E would follow the same path as Alternative 3C.
- Alternative 4: Alternative 4 would have a southern terminus at the US 62 and Ford Parkway interchange. US 62 would be reconfigured to make US 641 the primary direction. The corridor would follow along the western edge of the West Kentucky State Penitentiary Farm. The corridor would cross existing US 641 at the West Kentucky State Penitentiary Farm entrance. The corridor would continue northwest to a point just south of the Caldwell/Lyon County Line. The corridor would proceed north crossing the Caldwell/Lyon County Line and continue north on the western side of Fredonia to a terminus with US 641 northwest of Fredonia.
- Alternative 4A: Alternative 4A would have a southern terminus at the US 62 and Ford Parkway interchange. US 62 would be reconfigured to make US 641 the primary direction. The corridor would follow along the western edge of the West Kentucky State Penitentiary Farm. The corridor would merge into existing US 641 at the West Kentucky State Penitentiary Farm entrance. The corridor would then follow the same path as Alternatives 2A and 3A. The corridor would follow US 641 to the Fredonia Quarry. The corridor would then turn due north. At KY 70, the corridor would curve to the northwest around Fredonia to an intersection with the proposed US 641 Priority Section 1 north of the existing US 641.

VII. LEVEL 1 SCREENING

The first step in evaluating the proposed alternatives, including the no build alternative, was to conduct a Level 1 Screening. A Draft Level 1 Screening was developed prior to the Second Project Team Meeting and later finalized based on the discussions from this March 4, 2004 meeting.

A. Screening Process

The No Build Alternative and each of the 12 build alternatives were evaluated as part of the Level 1 Screening. Criteria were developed, giving consideration to the project purpose and need (based on preliminary project goals and objectives), potential environmental and community impacts, planning level cost estimates, public input, and transportation and traffic issues. Alternatives were then given a High, Medium-High, Medium, Low-Medium, and Low rating based on how well they met these criteria. A draft version of the Level 1 Screening results was presented to the project team for discussion as described in the following section.

B. Second Project Team Meeting (March 4, 2004)

The Second Project Team Meeting was conducted on Thursday, March 4, 2004 at the KYTC District 1 Office in Paducah, Kentucky. The purpose of the meeting was to review early public and resource agency input received to date, discuss the proposed alternatives and Level 1 Screening, and plan future project activities including the second round meetings with local officials and the public. A copy of the meeting minutes is included in **Appendix C**.

Items discussed by those present at the meeting included the following:

- The Pennyrile WestPark Industrial Park site is supported by the Governor's Office and is expected to continue.
- The Trail of Tears had not been a concern on the northern section of US 641 currently in design and is not anticipated to be on the section under study.
- Based on the evaluation, the corridors interchanging with I-24 scored lower than several of the others. There were concerns that this corridor, which was the most favored terminus from the public survey summary, would be eliminated from consideration too quickly. To address this concern, it was agreed that corridors with a rating of medium would also be carried forward to a Level 2 Screening.
- Concern was expressed over the width of the corridor along existing US 641. It was felt that 1000' on either side would not be adequate if a preferred alignment were to be a reasonable distance behind existing residences along US 641.
- Two new corridors were recommended: (1) rebuilding the interchange at Exit 4 and (2) a new corridor parallel and immediately adjacent to the West Kentucky State Penitentiary Farm from the Exit 4 interchange to a point near the existing farm entrance. The corridor then would follow existing alignments east or west of Fredonia. The interchange would be reconfigured to make US 641 to the north the predominant movement and would have US 62 intersect US 641 in a "T" configuration. The project team agreed that this alternative should be added and carried forward.

- It was recommended by one (1) attendee that a fully-controlled facility to the Pennyrile WestPark Industrial Park from the south be considered. North of the park would be a partially controlled facility similar to the Priority 1 Section north of Fredonia.
- It was recommended that the rating of Alternative Corridors 3 and 3A be reconsidered. In particular, the project team felt that the community and environmental impacts, compatibility with project goals, and public support for the corridor had not been adequately evaluated for these two alternatives. After some discussion, it was agreed that this was the case and that the consultant would modify the evaluation process for these corridors based on the input from the project team.
- In discussing which corridors would not be carried forward, the Chief District Engineer recommended that Alternative Corridors 2B and 2C also be reconsidered and revised. After some discussion, it was decided by the project team that (1) the section of these alternatives from the Wendell H. Ford Western Parkway to US 62 had potentially high negative community and environmental impacts and (2) these two alternatives should be removed from further consideration.
- In summary, based on the discussion at the meeting, the project team decided that:
 - Alternatives 2B, 2C, 3B, 3C, 3D, and 3E should not be carried forward;
 - Alternatives 1, 1A, 2, 2A, 3, and 3A should be carried forward; and
 - Two (2) new alternative corridors, starting at Exit 4 and paralleling the West Kentucky State Penitentiary Farm should be developed and carried forward.

C. Refined Level 1 Screening

As recommended by the project team, two (2) additional alternative corridors were added, for a total of 14 “build” alternatives. With additional alternatives and based on recommendations received at the project team meeting, the initial screening was refined. For the recommendation column, a rating of low, low-medium, medium, medium-high, or high was assigned to each proposed corridor based on how well it met the established screening criteria. The Level 1 Screening is summarized in **Table 8**. More detailed tables and explanation are provided in **Appendix F**.

Based on the results of the Level 1 Screening and the recommendation of the project team, Alternatives 1, 1A, 2, 2A, 3, 3A, 4, and 4A were carried forward for the next round of public involvement.

The other alternatives were eliminated for the following reasons:

- Alternative 2B: High negative community and environmental impacts including relocations; close proximity of a new interchange to Exit 1 and Exit 4 along the Ford Parkway; and low public support.
- Alternative 2C: High negative community and environmental impacts including relocations; close proximity of a new interchange to Exit 1 and Exit 4 along the Ford Parkway; and low public support.

Table 8. Level 1 Screening Summary

Alternative	Transportation/Traffic					
	Length of Corridor (miles)	Travel Time (minutes)	Interchange Suitability	Project Phasing Suitability	Safety Concerns	Number of Intersecting US and KY Routes
No Build	9.8	11.4	--	--	High	5
1	9.3	9.3	1.9 miles to US 62 interchange	High	Low	7
1A	9.8	9.8	1.9 miles to US 62 interchange	High	Low	5
2	9.4	9.4	--	Medium	Medium	5
2A	9.9	9.9	--	High	Medium	7
2B	10.1	10.1	1.7 miles to I-24 interchange	Medium	Low	7
2C	10.6	10.6	1.7 miles to I-24 interchange	High	Low	9
3	13.0	13.0	1.4 miles to weigh station	Low	Low	8
3A	14.4	14.4	1.4 miles to weigh station	Medium	Low	11
3B	10.6	10.6	--	Low	Medium	5
3C	12.0	12.0	--	Medium	Medium	8
3D	10.9	10.9	--	Low	Medium	5
3E	12.3	12.3	--	Medium	Medium	8
4	9.4	9.4	At existing interchange	Medium	Low	5
4A	9.9	9.9	At existing interchange	High	Low	7



Most favorable alternate in addressing the particular criterion.

Least favorable alternate in addressing the particular criterion.

Table 8. Level 1 Screening Summary (cont.)

Alternative	Cost	Environmental Impacts	Compatibility with Preliminary Project Goals	Public Comments Support Alternative	Recommendation
No Build	\$0	Low	Low	Low	Medium
1	\$89,400,000	Low	Medium	Medium	High
1A	\$93,400,000	Low	Medium	Medium	Medium-High
2	\$85,720,000	Medium	High	Medium	High
2A	\$91,704,000	Medium	High	Medium	High
2B	\$108,496,000	High	High	Low	Low-Medium
2C	\$114,672,000	High	High	Low	Low-Medium
3	\$119,000,000	Medium	Low	Medium	Low-Medium
3A	\$141,720,000	Low	Medium	Medium	Medium
3B	\$94,584,000	Medium	Medium	Low	Low
3C	\$110,520,000	Low	Low	Medium	Low
3D	\$97,176,000	High	Low	Low	Low
3E	\$113,208,000	High	Low	Low	Low
4	\$85,200,000	Medium	High	Medium	Medium-High
4A	\$95,536,000	Low	High	Medium	High

Most favorable alternate in addressing the particular criterion.

Least favorable alternate in addressing the particular criterion.

- Alternative 3B: Does not adequately meet project purpose to provide improved regional truck access to the NHS or NN since it does not connect directly to either I-24 or the Ford Parkway; low public support; less access to industrial development; less effective as an alternate truck route for US 641; high impact to prime farmlands; and less access to area roadways.
- Alternative 3C: Does not adequately meet project purpose to provide improved regional truck access to the NHS or NN since it does not connect directly to either I-24 or the Ford Parkway; less access to industrial development and high number of stream crossings.
- Alternative 3D: Does not adequately meet project purpose to provide improved regional truck access to the NHS or NN since it does not connect directly to either I-24 or the Ford Parkway; low public support; less access to industrial development; less effective as an alternate truck route for US 641; high negative community and environmental impacts including relocations; and less access to area roadways.
- Alternative 3E: Does not adequately meet project purpose to provide improved regional truck access to the NHS or NN since it does not connect directly to either I-24 or the Ford Parkway; low public support; less access to industrial development; high negative community and environmental impacts including relocations; and high construction costs.

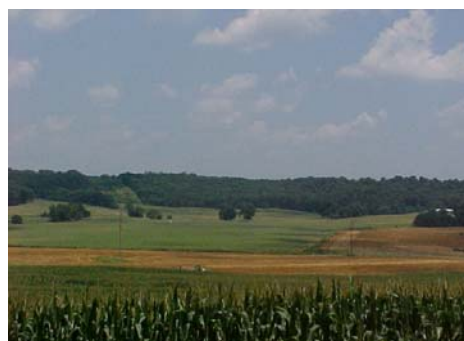
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VIII. ENVIRONMENTAL OVERVIEW

This chapter provides a summary of the environmental issues identified in the project area based on a separate Environmental Overview Report completed July 2004. The full version of the Environmental Overview Report is included in **Appendix G**. Many environmental features identified within the project area are shown on **Figure B-1** in **Appendix B**.

Construction of the proposed project is not expected to change current land use in the project area. Due to the terrain in the study corridors and the dominant agricultural base of much of the adjacent area, the project is not expected to induce significant new housing or commercial development, nor result in unanticipated additional pressure on public services. Current land use applications and trends are expected to continue for the future, and the project is not expected to interfere with any zoning or development plans in the area since local officials in both Lyon and Caldwell Counties have expressed support for the project.

Farmland is the most abundant resource in the study area, including a mixture of pasture, cropland, and subsistence gardens. Some individual farmland properties may be negatively affected, depending on the corridor selected, but the farmland conversion would not represent a serious net loss of farmland along the corridor or for the region as a whole. However, efforts should be made in future phases to further define the effects of alternatives on individual agricultural complexes and reduce land conversion impacts by design modifications where practical. Future phases should be coordinated with the Natural Resources Conservation Service, and farmland impact assessment evaluations will be needed under the Farmland Protection Policy Act (FPPA).



*Prime farmland along KY 91 in
Caldwell County*

Air quality is not expected to be adversely impacted with the proposed project, nor is highway noise expected to influence project feasibility or alternative location designations. The project area has been designated an attainment area for all transportation-related pollutants (CO, HC, NO_x, and TSP). However, future phases will require project-level emissions since the project does not originate from a conforming Statewide Transportation Improvement Plan (STIP). The project will need to be added to the Six-Year Highway Plan and the STIP prior to advancement.

Highway noise impacts are not expected to be a major concern on this project and are not expected to influence project feasibility or location decisions. Most receptors are single isolated structures, and several of the receptors (residences) may be acquired for project construction.

Aquatic and terrestrial ecosystems could experience adverse impacts from construction activities associated with stream channelization, culvert and bridge structures, and non-point source discharges. The project lies within a well-developed karst region where few detailed investigations have been conducted; therefore, all springs and sinking streams should be inventoried and monitored prior to and during any major highway construction. Best Management Practices (BMPs) and erosion and sediment control plans should be employed to prevent adverse impacts to sensitive resources.

Potential wetland impacts could be more than the area threshold determined by the U.S. Army Corps of Engineers (USACE). Additional investigations should be conducted to confirm the presence of jurisdictional wetlands and establish practicable avoidance measures as necessary. If mitigation is necessary, coordination with the USACE will be required.

Flood Insurance Rate Maps provided by the Federal Emergency Management Agency (FEMA) for Caldwell County indicate that none of the US 641 alternatives encounter any floodplain areas. According to FEMA, Lyon County does not have a Flood Insurance Rate Map. Therefore, any identified potential floodplain impacts should be addressed in accordance with current KYTC standard procedures.

There are a few expanses of forest areas in or near the project corridors that support a complex community of wildlife species. There are also some intermittent and perennial streams that are capable of supporting fish and aquatic macro-invertebrate communities. Other types of potential wildlife habitats include agricultural fields, pastures, wooded areas, areas near settlements, fence rows, and grassy road rights-of-way. Standing snags are an important habitat type for birds, waterfowl, dens for mammals, and possible hibernacula for bats. Mature forests should be avoided since they contain the greatest amount of biodiversity and biomass, and abandoned fields also contain large amounts of diversity.



Lake Barkley along I-24

The predominant wildlife species expected are species capable of co-existing with humans. There are no areas that are pristine or considered critical habitats for threatened or endangered species, and it is highly unlikely that the project will have sensitive species. Additional fieldwork will be necessary to identify wildlife in the corridor to determine if they are threatened or endangered and to assess the quantity and quality of the habitats that do exist.

The Kentucky Division of Forestry lists one big tree in Caldwell County, a Carolina buckthorn located approximately 1.75 miles south of the southernmost terminus of Alternatives 1 and 1A.

According to the U.S. Fish and Wildlife Service (USFWS), summer roost habitat and/or winter hibernacula exist in the project area for the federally endangered Indiana bat and gray bat. The Kentucky Department of Fish and Wildlife Resources indicates that four federally threatened and endangered species are known to occur in the Fredonia and Eddyville 7.5-minute USGS quadrangle. These include the Indiana bat, gray bat, Bald Eagle, and pink mucket. The Kentucky State Nature Preserves Commission indicates that 55 occurrences of plants and animals and no occurrences of monitored exemplary natural communities are located within five miles of the project area (see table in **Appendix G**). Additional investigations will be necessary during the Preliminary Engineering and Environmental (PE/E) phases of the project.

The Kentucky Heritage Council (KHC) files list records for eight properties identified within the study corridors. A field review found that two of these sites were no longer extant and a third was in a ruinous condition and could not be evaluated under National Register of Historical Places criteria as a standing structure. In addition to the five remaining KHC sites, six more properties were identified within the study corridors for a total of eleven (11) potential structures within the project area that meet the 50 years of age or older criterion requiring evaluation for historic significance (see **Appendix G** for a description of the original eight sites and the additional six sites). A determination of historic significance should be made as soon as possible, the presence of structures or sites eligible for listing on the National Register of Historic Places could materially affect



Historic home near Fredonia

project location decisions.

One known archaeological site, Mill Bluff Spring, lies within or near the study area, and it should be avoided if possible. Otherwise, none of the US 641 alternative corridors intersect any archaeological sites currently listed in or considered eligible for listing in the National Register of Historical Places. Initial project area research indicates that the project corridors bisect a variety of ecological zones that may contain a variety of prehistoric archaeological sites. Therefore, project-specific Phase I archaeological investigations should be conducted in accordance with current KYTC procedures.

One active underground storage tank (UST) site and four former UST sites have been designated for investigation as sites of potential environmental concern. The active site is the Lyon County School Bus Garage at 101 Jenkins Road in Eddyville. The four former UST sites are former gas stations that are likely to have had their USTs removed, but this could not be verified for all sites. These sites were located at the southern terminus of Alternatives 2 and 2A and near the junction of US 641 and US 62. If any of these sites would be affected by the proposed project, they should be evaluated for petroleum and toxic substances contamination.

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IX. GEOTECHNICAL OVERVIEW

This chapter provides a summary of the environmental issues identified in the project area based on a separate Geotechnical Overview Report completed in July 2004. This report, which includes topographic and geologic maps, is included in **Appendix H**.

All eight proposed corridors lie within Lyon and Caldwell Counties. Sections of the proposed corridors which lie along the eastern side of the study area would be located within the Fredonia Valley. The Fredonia Valley is characterized by gently rolling hills, and the majority of the valley is comprised of farmland, pasture, or forest. The sections of the proposed corridors along the western side of the study area would be located in moderately sloping terrain with narrow valleys. The terrain is steeper and hillier west and directly north of Eddyville.

A. Potential Issues

Within the project area, geotechnical issues identified for further consideration throughout future phases of this project include the following:

- Fault Zones: Two major fault zones were identified on the geologic maps. One unnamed fault zone lies along the southern edge of the project area. These faults are northeast-southwest trending. The Tabb Fault System is an east-west trending series of faults less than one mile north of Fredonia. It is advisable for the corridors to cross faults in a perpendicular manner. Each of the proposed corridors appears to cross the faults at nearly perpendicular angles.
- Karst Activity: Numerous sinkholes were noted in the northern and eastern portions of the project area, mostly within the Fredonia Valley. The majority of the bedrock underlying the Fredonia Valley is comprised of limestone capped with 5 to 10 feet of sandstone. However, when the sandstone cap is absent, there is considerable karst activity. In general, the entire Fredonia Valley is in a high risk karst area.
- Quarry: The Fredonia Quarry is located southeast of Fredonia along the east side of existing US 641. The quarry is an open pit mining operation currently about 110 feet below the existing grade. Mineral rights may have been split from the surface land ownership. Also, blasting for road cuts near the quarry may present some concern for the miner's safety.
- Gas and Oil Wells: There appear to be no active oil or gas wells within any of the eight proposed corridors. However, four abandoned wells are shown on area maps: one west of Eddyville along the edges of Alternatives 3 and 3A, and three near the end of the project, north of US 641 and west of KY 902. These four abandoned wells were not observed in the field; however, oil and gas rights may have been split from the surface land ownership. Since there are no active wells, this should not be a major issue for this project.
- Mining: Based on a review of topographic and geologic maps, no strip mining appears to have occurred within the project area. Contact with the Kentucky Department of Mines and Minerals indicates that no major coal resources exist and no previous deep coal mining appears to have occurred in the project area. According to existing geologic maps, a mine shaft may have once been located north of Fredonia, probably a remnant of fluorspar deep mining activities. Although the mine shaft is not located in the project area, it may indicate that deep mining has taken place. During the processing of fluorspar, the generation of lead is a byproduct, so there is a likelihood of soil or water contamination.

B. Conclusions

From a geotechnical and constructability standpoint, the proposed corridor should avoid problem areas or potential geotechnical problems, as discussed above. The project faces constructability issues (i.e., sinkholes) which are inherent to the local terrain. However, these issues cannot be eliminated and sound engineering solutions are available to address them.

The most favorable corridor should avoid construction along existing US 641 and the railroad track north of Fairview. Also, the most favorable corridor should avoid closed depressions (sinkholes) by proper alignment selection. From a constructability standpoint, the most favorable corridors should be in the flatter terrain to reduce the amount of cuts and fills required and the likelihood of cut or fill slope instability problems.

Portions of each route are located within karst areas. Remediation of karst areas can be expensive, so it is best to avoid such areas. The corridors have been ranked, from a geotechnical perspective, primarily based on the likelihood of karst activity, but also with regard to its overlap with existing US 641. The ranking from most favorable to least favorable of the eight alternative corridors from a geotechnical perspective is as follows:

- Alternative 3
- Alternative 4
- Alternative 2
- Alternative 4A
- Alternative 3A
- Alternative 2A
- Alternative 1A
- Alternative 1

C. Recommendations

From a geotechnical perspective, the following general conclusions and recommendations are applicable to the proposed corridor:

- Cut soils will likely be used as fill material for this project. Also, some rock excavation in deep cut areas is expected. Based on the local geology, the soil will probably be low to high plasticity mixtures of silt and clay. Chert fragments will also be likely. The rock from deep excavations will probably consist of limestone, shale, or sandstone. Soil or shot rock fill should be placed according to requirements as specified in the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction (latest edition).
- Shrink/swell of newly placed fill should not be of significant concern in most areas. Newly placed fill will need to be placed with proper moisture controls and compaction. However, consolidation of soft, alluvial soils near the valley bottoms may present some settlement concerns for embankments or for box culverts or other drainage structures. Undercutting and stabilization of soft/wet alluvial soils will likely be required when the roadway crosses alluvial areas.
- The majority of the cutting and filling for this project will likely be in soil and, therefore, the majority of the cut and fill slopes would be in soil. The roadway

subgrade could be constructed with durable rock if a more stable road base is desired. For preliminary planning purposes only, expect 2.5H:1V cut and/or fill slopes. Shear strength testing of residual and compacted fill soils will be required. Rock toe buttresses may be required at the toe of slopes in deep alluvial soil areas.

- Depending on the final selected grades, a few cut slopes in rock are expected. Cut slopes in massive, durable sandstone or limestone are typically stable on cut slope angles of $\frac{1}{4}$ H:1V. Cut slopes in durable shale, poor limestone, or fractured sandstone are typically less stable and require cut slopes of $\frac{1}{2}$ H:1V. Pre-splitting will likely be required once the rock disintegration zone (RDZ) has been encountered. An overburden bench and flattened cut slopes will be required above the RDZ. Rock coring and a geologic evaluation will be required before specific cut slope recommendations can be presented.
- Groundwater seeps or springs should be expected in down-dip cut areas, especially those cuts that intersect the soil/rock interface. Special construction considerations will likely be required to collect and pipe groundwater in these areas if significant groundwater flows are anticipated or encountered.
- High plasticity soil will probably be used for the majority of the roadway subgrade. Chemical stabilization of the soil subgrade should be expected. The subgrade could be constructed with durable rock if a more stable road base is desired. Some shot rock fill material may be available, depending on the final selected grades. Local geology suggests that some durable limestone or sandstone may be available in the project area. However, there will probably not be sufficient volume to provide a durable rock roadbed without importing additional material.
- Box culverts (or other minor structures) can probably be located on shallow foundations bearing on either stiff soil or rock. Bridge foundations will probably need to bear on rock, either shallow foundations on rock or through driven steel piling or drilled shafts. Karst activity will complicate the installation of rock-bearing foundations. Some modifications of designed foundations are anticipated if pinnacled rock and/or voids are detected in the rock beneath the foundations. Also, large chert boulders can be present in the soil mass, which could deflect driven piles. A detailed geotechnical exploration is warranted in karst areas to assess conditions.
- The project site is located in western Kentucky about 100 miles east of the New Madrid Fault Zone. Seismic loads are presented in the Kentucky Building Code (2002 Edition), Table 1608.2, page 232, for Caldwell County and page 233 for Lyon County. In general, the project is located in a seismic zone, which indicates moderate to severe damage to structures during large earthquake events.

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X. Level 2 Screening

A Level 2 Screening was conducted to further define the alternatives. This process began with conducting the environmental and geotechnical overviews, as described in **Chapters VIII and IX**. Following the conclusion of these studies, the second round of public and agency input was conducted and is described below. The input received as part of these activities was summarized and presented to the project team for discussion, which resulted in the recommendation of a preferred corridor.

A. Local Officials and Agencies Meeting - Round II (July 26, 2004)

As part of the public involvement portion of this study, two meetings were held on Tuesday, July 26, 2004, with local officials and potential stakeholders: the first in the morning at the Lions Club in Fredonia and the second in the afternoon at the Lyon County Public Library in Eddyville. In addition, a separate meeting was held in the afternoon at the Lyon County Public Library for the media. The purpose was to present information and get input on public survey results following the September, 2003 public meetings; early resource agency input; 14 project alternatives considered to date; level one screening of all 14 alternatives; the final eight (8) alternatives to be carried forward for further evaluation; and the results of the environmental overview and geotechnical overview of those eight alternatives. Copies of the meeting minutes are included in **Appendix C**.

1. Local Officials and Agencies Meeting - Fredonia

A total of 24 persons attended the local officials meeting in Fredonia to discuss the Alternatives Study, including project team members. Topics discussed during the meeting included:

- Review of input received to date, including public survey summary, areas to avoid, proposed corridors, and resource agency input;
- Environmental justice results;
- Proposed alternatives;
- Review of environmental and geotechnical overviews;
- Next steps; and
- Local issues.

Some of the comments and local issues identified were as follows:

- There is concern over why this project is not fully funded.
- Alternative 1 does not provide a good connection.
- Alternative 3 is preferred, but would take prime farmland.
- There is not a big concern with the southern terminus being US 62 as opposed to I-24 or the Ford Parkway.
- Fredonia is concerned with taking business from the city. Alternative 3 would help business less than the eastern bypass alternative.
- The quarry would have to find a connection to Alternative 3. A lot of this business is going south.

- Alternative 2A is a win-win for everyone: it helps the industrial park, quarry, and Fredonia. 4A could also meet these criteria.

2. Local Officials and Agencies Meeting - Eddyville

A total of 19 persons attended the local officials meeting in Eddyville to discuss the alternatives study, including project team members. Topics discussed during the meeting included:

- Review of input received to date, including public survey summary, areas to avoid, proposed corridors, and resource agency input;
- Environmental justice results;
- Proposed alternatives;
- Review of environmental and geotechnical overviews;
- Next steps; and
- Local issues.

Some of the comments and local issues identified were as follows:

- It was clarified that Alternative 4 would have direct access to the Ford Parkway while Alternative 2 would terminate at US 62.
- Alternative 3 is not favored.
- Alternative 4 would pass through a property where the Nature Conservancy is working with the property owner to restore its natural habitat.
- It was noted that the ultimate typical section would be a four-lane partially controlled facility.
- It was suggested all utility companies be involved in the agency coordination.
- It was noted that wetlands would be evaluated more thoroughly in the next phase of work.
- More than one corridor could be carried forward to the next phase; however, as part of the NEPA process, the objective is to eliminate corridors that don't adequately meet the purpose and need of the project or that have a major environmental issue. Even if other corridors are carried forward, the study could still recommend a preferred alternative, subject to further investigation.

3. Media Meeting - Eddyville

A total of 10 persons attended the media meeting in Eddyville to discuss the alternatives study, including project team members. Topics discussed during the meeting included:

- Review of input received to date, including public survey summary, areas to avoid, proposed corridors, and resource agency input;
- Environmental justice results;
- Proposed alternatives;
- Review of environmental and geotechnical overviews;

- Next steps; and
- Local issues.

Some of the comments and local issues identified were as follows:

- A couple of questions related to funding were raised. It was noted that right-of-way, utilities and construction dollars for the section north of Fredonia have not been authorized. For the section south of Fredonia, a five (5) mile section is included in the KYTC Six-Year Highway Plan for design, but this money hasn't been authorized as yet. It was also explained that the most recent Six-Year Highway Plan hasn't been approved by the General Assembly. This can be confusing because the most recent unapproved version does have variations from the previous approved plan.
- As part of the recommendations of this study, a phasing plan for implementation will be identified, since the entire project can't be built at one time.
- It was noted that more than one corridor could be carried forward to the next phase of work. However, as part of the NEPA process, the objective is to eliminate the corridors that don't adequately meet the purpose and need of the project or that have potentially significant environmental concerns. The study could recommend that more than one alternative be carried forward into the next phase, but still recommend a preferred alternative, subject to further evaluation.

B. Public Information Meetings – Round II (August 2004)

On Monday, August 23, 2004, and Tuesday, August 24, 2004, Public Involvement Meetings were held at the Lyon County Public Library in Eddyville, Kentucky and Fredonia Lions Club in Fredonia, Kentucky, respectively. The meetings were held from 5:00 p.m. to 7:00 p.m. CDT. The purposes of the meetings were to allow the public to review their previous input on the proposed project, view the Level 1 Screening process to discover how the recommended alternatives were chosen, and express their opinions on their favorite and least favorite alternatives. A total of 80 persons registered their attendance at the two-hour public session in Eddyville, not including the thirteen KYTC, ADD, and consultant staff. A total of 90 persons registered their attendance in Fredonia, not including the thirteen KYTC, ADD, and consultant staff. Minutes for each meeting are included in **Appendix C**.

The public involvement meetings were arranged with multiple project information stations, and KYTC, ADD, and consultant staff members were available to answer questions and discuss issues. Upon arrival, attendees were given a survey questionnaire, project brochure, proposed alternative corridors map, public survey summary, and information regarding KYTC roadway projects.

A section of the room was set up in a straight line arrangement of project exhibits, including the following titles:

- What are the preliminary project goals?
- What is the history of the US 641 Alternatives Study?
- How many cars and trucks are on area roadways today (2003) and what is the level of service?
- If there are no new road improvements, how many cars and trucks will be on area roadways in 2025 and what is the level of service?

- What areas did the public want to avoid?
- What corridors were proposed by the public?
- September 2003 Public Meetings – Survey Response Summary
- What corridor alternatives were proposed following the public meetings?
- Level 1 Screening – Project Goals
- Level 1 Screening – Environmental
- Level 1 Screening – Cost
- Level 1 Screening – Summary
- What corridor alternatives were considered for further evaluation?



Project exhibits displayed in Eddyville prior to the start of the public meeting

Attendees were asked to complete the survey questionnaire prior to leaving the meeting, or return it to the KYTC at a later date in the postage-paid envelope provided. A table was available to attendees to fill out their survey form and read over the project materials. Refreshments were also provided.

1. General Comments

Attendees were invited to discuss any questions or concerns with KYTC and consultant staff. General comments included the following:

- A number of individuals expressed concern that one or more of the proposed alternatives would go through their home and/or farmland.
- Several attendees expressed interest in the preferred alternative providing access to the proposed Pennyrile WestPark Industrial Park north of the West Kentucky State Penitentiary Farm.
- The cost of the proposed alternative was a major consideration for many people when deciding on their preferred alternative.
- One individual wanted the proposed alternative to be relocated away from the existing US 641 to reduce the risk of relocations along the existing route.
- A number of individuals expressed strong opposition towards the proposed project.
- One individual that lives on US 641 stated that the existing road was safe for truck traffic.
- Several attendees commented that Alternative 1 would destroy the most prime farmland in the study area.



Public Meeting at the Lions Club in Fredonia

- One individual did not want the proposed alternative to bypass Fredonia due to fear of the family gas station losing significant business.
- A missing cemetery was identified on the exhibits by one attendee. The location was identified on a handout map and provided to the consultant.

2. Public Comment Survey Responses

As part of the public meeting handout, the KYTC supplied a survey form so that citizens of the area could provide input on the project. The KYTC collected surveys from the two public meetings in Fredonia and Eddyville.

Responses to the four questions on the public comment survey are tabulated in **Table 9** and summarized below:

- The largest percentage (40%) of the survey respondents, including local officials, preferred Alternative 2 as the improvement route for US 641. The second most preferred route was Alternative 1 (20%).
- Few respondents noted any areas within the preferred corridor alternatives which should be avoided.
- Of the 149 responses, 46 respondents (31%) would drive their preferred corridor on a daily basis, while 37 (25%) respondents would drive the corridor on a weekly basis.
- Almost half of the respondents (47%) chose Alternative 1 as the least favored improvement alternative for US 641. Alternative 3 came in second as the least preferred route (27%).

C. Resource Agency Coordination – Round II (August 2004)

Input was solicited from many local, state, and federal resource agencies a second time through written requests. Each agency was sent a project brochure and map of the eight (8) corridor alternatives to review. Response letters from the 27 responding resource agencies are located in **Appendix I** and are summarized below:

- Crittenden County Fiscal Court: In response to a request for input, the Crittenden County Fiscal Court passed a resolution in support of the US 641 project. The resolution was passed on September 30, 2004. It stated that it was in the best interest of the citizens of Crittenden County for the KYTC to establish a four-lane highway to replace existing US 641. The benefits would include enhancement to public safety, economic development and quality of life. The Crittenden County Fiscal Court endorsed as their first choice, Alternative 3; second choice, Alternative 2; and third choice, Alternative 4.
- Atmos Energy Corporation: Atmos Energy serves the cities of Fredonia, Marion and Eddyville and also the Fredonia Quarry and the West Kentucky State Penitentiary with natural gas. The relocation routes will affect their existing right-of-ways. A brief description of their lines and their proximity to the proposed alternatives were listed for review. In particular, Alternatives 1 and 3 both cross Atmos Energy lines.

Table 9. Public Survey Response Summary – Round II (August 2004)**1. Which improvement alternative do you prefer for US 641? (Check One)¹**

Alternative	1	1A	2	2A	3	3A	4	4A	No response
Number of Responses	30	4	64	12	8	4	21	11	8
Percent of Total	20%	3%	43%	8%	5%	3%	14%	7%	5%

1. Which improvement alternative do you prefer for US 641? (Check One)²

Alternative	1	1A	2	2A	3	3A	4	4A	No response
Number of Responses	28	3	56	11	6	2	16	9	8
Percent of Total	20%	2%	40%	8%	4%	1%	12%	6%	6%

2. Are there any areas within your preferred corridor alternative which should be avoided?

Few responses were recorded.

3. If your preferred corridor alternative existed today, how often would you drive it?

Alternative	Every Day	Once per week ³	Once per month	Rarely	Never	No response
Number of Responses	46	37	11	22	5	28
Percent of Total	31%	25%	7%	15%	3%	19%

4. Which improvement alternative do you NOT prefer for US 641? (Check One)¹

Alternative	1	1A	2	2A	3	3A	4	4A	No response
Number of Responses	65	15	8	8	48	16	11	9	17
Percent of Total	43%	10%	5%	5%	32%	11%	7%	6%	11%

4. Which improvement alternative do you NOT prefer for US 641? (Check One)²

Alternative	1	1A	2	2A	3	3A	4	4A	No response
Number of Responses	59	5	2	4	34	1	1	2	17
Percent of Total	47%	4%	2%	3%	27%	1%	1%	2%	14%

Notes

¹ Several responses included multiple alternatives

² Only one-answer responses are included

³ Responses included those who stated "2 or 3 times per week" in the Other box

- Crittenden County Economic Development Corporation (CCEDC): The CCEDC strongly endorses Alternative 2A. The CCEDC identified no adverse effects if this Alternative were chosen. With the forthcoming development of the 5-county Pennyriple WestPark Industrial Park on 800 acres on state-owned property adjacent to the West Kentucky State Penitentiary Farm, it is economically vital that the new US 641 be in close proximity to this site. Attracting large companies will hinge greatly on 4-lane highway access.
- City of Marion Planning Commission: Mr. Ford, representing both the City of Marion Planning Commission and CCEDC strongly supported Alternative 2A. He felt that Alternative 2A will support the Pennyriple WestPark Industrial Park as well as small business owners located in Fredonia and Marion.
- Dorsey Ridley, Kentucky State Senator, 4th District: Senator Ridley had two comments regarding the alternative routes proposed for the project: 1) it appears that Alternative 2 would affect the fewest individuals and require the smallest number of relocations, by bringing the route around to the west, it would make for easier right-of-way acquisition; 2) beyond the Fredonia area, he was quite concerned about how the project will co-exist with both the quarry and the West Kentucky State Penitentiary Farm. For environmental and safety reasons it might appear that using the present corridor in this area would be prudent.
- Kentucky Department of Corrections, Western Kentucky Corrections Complex (WKCC): Alternatives 1, 4, and 4A may compromise the mission of the WKCC. A four-lane highway running adjacent to or crossing prison property may provide access to dangerous contraband (e.g., drugs and weapons) and provide the potential for escape through easier facilitation. WKCC opposes these three alternatives.
- Kentucky Department of Travel, Commerce Cabinet: It appears that each proposed route, with the exception of Alternative 3, will make travel to Mineral Mounds State Park much easier for the traveler. Each route has what appears to be a minimal impact upon natural habitat and historic sites in the area. This is the case to a lesser extent with Alternative 1, Alternative 1A, and Alternative 2A. The Kentucky Department of Fish and Wildlife, Kentucky Historical Society, and the Kentucky Heritage Council should be contacted for an opportunity to provide input relating to their interest. The efforts to improve the Kentucky roadways are greatly appreciated.
- The Nature Conservancy: Alternatives 4 and 4A would divide a 600-acre farm the Conservancy is currently partnering with. Alternatives 1 and 1A would divide a 1000-acre property they also work with to establish good conservation practices on their property. Consideration should be given to not fragmenting these and other large tracts of land.
- Kentucky State Police, Mayfield Post: The Commander of the Kentucky State Police (KSP) Mayfield Post supports the goal of improving connectivity. A reconstructed or relocated US 641 should benefit the agency and the public by decreasing the number of accidents by improving the roadway character. The KSP is not aware of any issues that might have a negative impact on the proposal.
- Cabinet for Health and Family Services: The Cabinet currently leases property in the study area; however, didn't feel the project would create a hardship on their staff or clients. Felt the project would ultimately have a positive impact on the traffic flow in the area.

- Kentucky Transportation Cabinet, Division of Environmental Analysis: The Noise status and Air Quality status of the project likely would not be a problem. If the project is to be federally funded then limited base studies would be required to determine any Air and Noise impacts. Stream and Wetland impacts should be limited/avoided. These areas if impacted would require 401 and 404 permits. Several listed endangered species potentially located in the project area will likely require a biological assessment. Mitigation will be required if any of the specific habitat areas are impacted and/or unavoidable. Specific details concerning HAZMAT and storage tanks would need to be obtained through a site assessment although one known site is present, four other former service station sites could pose problems. A cultural historic base study will be required due to the potential impact to resources in the project vicinity. An Archaeological survey will be required in order to determine if any potentially eligible sites are present in the area of concern.
- Kentucky Department of Fish and Wildlife Resources (KDFWR), Commerce Cabinet: The Kentucky Fish and Wildlife Information System indicates that there are several Federal threatened and endangered species within a 10-mile radius of the project site and several state threatened and endangered species within a 2-mile radius of the site. A list of these species was enclosed. KDFWR provided specific recommendations on how to address this issue. KDFWR also noted that the project may have impacts on wetlands and waterways and also made specific recommendations on how to address those issues.
- Kentucky Department of Natural Resources: The project is located in an area of known oil and gas exploration. Oil and gas operators should be contacted regarding possible impacts.
- Kentucky Division for Air Quality, Natural Resources and Environmental Protection Cabinet: Kentucky Division for Air Quality Regulations 401 KAR 63:010 (Fugitive Emissions) and 401 KAR 63:005 (Open Burning) apply to the proposed project. The project must also meet the conformity requirements of the Clean Air Act as amended and transportation planning provisions of Title 23 and Title 49 of United States Code. Every effort should be made to maintain compliance with these regulations and requirements. The Division also suggests an investigation into compliance with applicable regulations in the local governments.
- Department for Natural Resources, Environmental and Public Protection Cabinet: The department has identified one active rock quarry located in the project area. This quarry is permitted under the name of Martin Marietta Materials, Inc (Permit No. 017-9403).
- Kentucky Transportation Cabinet, Division of Traffic, Permits Branch: The Permits Branch makes the same recommendations as previously mentioned, these include: 1) This project should provide for a partially controlled access facility, with access control fencing and all possible access points set on the plans in accordance with 603 KAR 5:120; 2) The design speed should be the same as the anticipated posted speed when the project is completed; and 3) The Permits Branch should be notified if the proposed route is to be placed on the National Highway System.
- Division of Conservation, Environmental and Public Protection Cabinet: The Division noted that no agricultural districts were established in the project area. [Note: Following receipt of this letter, an application was filed to establish an agricultural district along US 641 southeast of Fredonia] Both prime farmland and farmland of

statewide importance could be impacted by this project. Recommended best management practices (BMPs) be utilized to prevent non-point source water pollution.

- Kentucky Airport Zoning Commission: The proposed alternatives will have no adverse affect to air navigation. However, if construction equipment exceeds 200 feet above ground level, then a permit will have to be issued by the Commission.
- Federal Aviation Administration: If construction activities exceed 200 feet in height above the ground level, notice will need to be given to FAA.
- Department of Health & Human Services, United States Public Health Service: The department did not have any project specific comments, but did identify the following areas of potential public health concern: 1) air quality, 2) water quality and quantity, 3) contamination of wetlands and floodplains, 4) hazardous materials and wastes, 5) non-hazardous solid waste and other materials, 6) noise, 7) occupational health and safety, 8) land use and housing, and 9) environmental justice.
- Kentucky Department of Agriculture: The agency has no specific concerns or issues concerning the project.
- Kentucky Department of Military Affairs: There are no impacts from the proposed project that concern this agency.
- Kentucky Department of Parks: The proposed project will not directly impact any of the Department's facilities.
- Kentucky Department of Vehicle Enforcement, Justice and Public Safety Cabinet: There are no concerns from a vehicle enforcement standpoint.
- Kentucky Division of Materials, Geotechnical Branch: The Branch has no further comments concerning the project at this time.
- Kentucky Education Cabinet: The Cabinet does not have any comments to offer at this time.
- United States Coast Guard, Bridge Branch: A Coast Guard bridge permit would not be required on this project.

D. Level 2 Screening Matrix

A Level 2 Screening matrix, presented in **Table 10**, was developed to summarize key findings from the Environmental Overview, Geotechnical Overview, Round II public input, and Round II resource agency feedback. Each of these components is described in more detail in previous sections. In addition, the final eight (8) alternatives were ranked in accordance with how well they adhered to the Purpose and Need.

Table 10. Level 2 Screening Matrix

Alternative	Level 1 Screening Recommendation	Revised Purpose and Need ¹	Environmental Overview - Impacts ²	Geotechnical Overview ³	Public Input - Round II ⁴	Resource Agency Feedback ⁵	Recommendation
No Build	Medium	Low	Low	--	--	--	Recommended for further study
1	High	Medium	Medium	1	4	Low	Not recommended for further study
1A	Medium-High	Medium	Low	2	3	Medium	Not recommended for further study
2	High	Low	Medium	6	8	High	Not recommended for further study
2A	High	Low	Medium	3	7	High	Not recommended for further study
3	Low-Medium	Low	High	8	2	Low	Not recommended for further study
3A	Medium	Medium	High	4	1	Medium	Not recommended for further study
4	Medium-High	High	Medium	7	6	Low	Recommended for further study
4A	High	High	Medium	5	5	Low	Not recommended for further study

Notes:

- 1) The Purpose and Need was revised to include recommending a direct connection to either I-24 or the Ford Parkway.
- 2) Included impacts to potential historic structures, underground storage tanks, and archaeological sites.
- 3) As ranked in the Geotechnical Overview Report with 8 representing the most favorable alternative.
- 4) As ranked by the public considering both questions 1 and 4 with 8 representing the most favorable alternative.
- 5) Specific comments for and against each alternative are summarized in Section C.

Most favorable alternate in addressing the particular criterion.
Least favorable alternate in addressing the particular criterion.

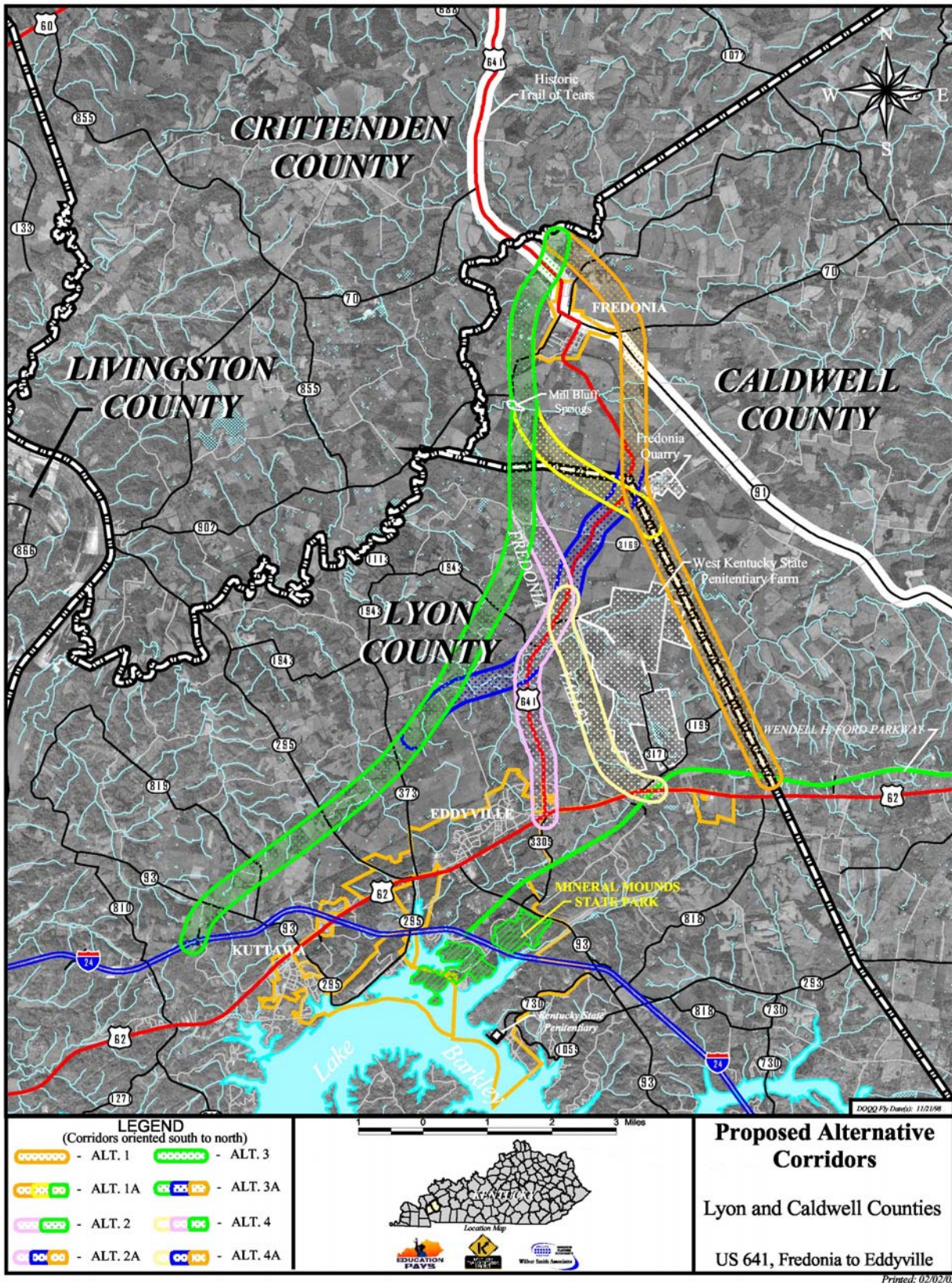
E. Final Project Team Meeting (November 22, 2004)

The Final Project Team Meeting was held on November 22, 2004 at the KYTC District 2 Conference Room in Madisonville, Kentucky. Attendees at the meeting included staff from the PADD, KYTC Districts 1 and 2, KYTC Division of Planning, and the project consultant. The purpose of the meeting was to review input to date, discuss the proposed alternatives, and make final recommendations for the study. The meeting minutes are included in **Appendix C**.

As discussed in **Chapter VII** and shown in **Figure 10**, the final proposed alternatives presented for consideration by the project team include:

- Alternative 1: Traveling east around Fredonia with a southern termini at the Ford Parkway;
- Alternative 1a: Traveling west around Fredonia with a southern termini at the Ford Parkway;
- Alternative 2: Traveling west around Fredonia with a southern termini at the existing US 62/US 641 intersection;
- Alternative 2a: Traveling east around Fredonia with a southern termini at the existing US 62/US 641 intersection;
- Alternative 3: Traveling west of Fredonia with a southern termini at I-24;

Figure 10. Level 2 Screening Proposed Alternative Corridors



- Alternative 3a: Traveling east around Fredonia with a southern termini at I-24;
- Alternative 4: Traveling west around Fredonia with a southern termini at Exit 4 along the Ford Parkway; and
- Alternative 4a: Traveling east around Fredonia with a southern termini at Exit 4 along the Ford Parkway.

The information included in the Level 2 Screening was presented to the project team for discussion. The following special considerations were discussed in varying levels of detail:

- Potential impacts on prime farmland;
- A newly proposed agricultural district located southeast of Fredonia and just north of the West Kentucky State Penitentiary Farm property;
- Avoidance of Mill Bluff Spring;
- Nature Conservancy concerns about wildlife habitat protection;
- Avoiding or minimizing locating on or near karst/sinkholes in the area;
- Avoidance of and access to the Fredonia quarry;
- Relative impacts on the West Kentucky State Penitentiary Farm;
- Forecasted traffic along US 641 for the build condition;
- Multimodal/Intermodal considerations;
- The importance of providing access to the Pennyrile WestPark Industrial Park just north of the West Kentucky State Penitentiary Farm; and
- Avoiding or minimizing utility impacts and/or involvement.
- As a result of these discussions, the conclusion was reached that the public in the study area favors (1) staying along existing US 641 as much as possible on the southern end of the proposed project and (2) providing a western bypass of Fredonia on the northern end of the proposed project. It was also agreed by the project team that there is a strong need to provide good truck access to the Pennyrile WestPark Industrial Park.

At the conclusion of the meeting, Alternative 4 and the No Build Alternative were recommended for further study. The other seven (7) alternatives were not recommended for further study and specific reasons for dismissal are discussed in the following section.

F. Project Team Recommendations

Based upon consideration of project purpose and need, transportation issues, access needs, potential environmental and community impacts, and public/agency input, the project team agreed that the following alternatives would not be considered for further study:

- Alternative 1: May not serve the project purpose adequately because the southern terminus is too far from Eddyville and I-24; has major potential prime farmland impacts; most opposed alternative by public; opposed by 95% of local

officials/stakeholders; probability of geotechnical problems due to karst topography; opposed by West Kentucky State Penitentiary Farm for security reasons; and crosses Atmos Energy gas lines.

- Alternative 1A: May not serve the project purpose adequately because the southern terminus is too far from Eddyville and I-24; major potential prime farmland impacts; passes through potential new agricultural district; has second highest number of potential impacts on historic sites; probability of geotechnical problems due to karst topography; opposed by West Kentucky State Penitentiary Farm for security reasons; and may cross Atmos Energy gas lines.
- Alternative 2: Although it is the most favored alternative by local officials/stakeholders and the public, it does not adequately meet the project purpose to provide improved regional truck access and access to the NHS or Truck Network since it does not connect directly to either I-24 or the Ford Parkway; has second highest number of potential relocations; has highest number of potential impacts on historic sites; and has second highest potential impacts on sewer lines and utility lines.
- Alternative 2A: Does not adequately meet the project purpose to provide improved regional truck access and access to the NHS or Truck Network since it does not connect directly to either I-24 or the Ford Parkway; has highest number of potential relocations; has highest potential impacts on sewer lines and utility lines; has major potential farmland impacts near Fredonia; and passes through potential new agricultural district.
- Alternative 3: Does not provide access to the Pennyryle WestPark Industrial Park; has relatively high potential relocation impacts; could have a major impact on prime farmland since it has one of the two longest sections located on new alignment; and one of the two longest routes which translates into the highest construction cost and increased state maintenance mileage in the future.
- Alternative 3A: Has relatively high potential relocation impacts; could have a major impact on prime farmland since it has one of the two longest sections located on new alignment; one of the two longest routes which translates into the highest construction cost and increased state maintenance mileage in the future; would impact prime farmland and pass through a potential new agricultural district east of Fredonia; and possibility of karst topography east of Fredonia.
- Alternative 4A: Has major potential farmland impacts and passes through potential new agricultural district near Fredonia.

The project team recommended Alternative 4, to include minor revisions, be carried forward along with the No Build Alternative to the next phase of development. This recommendation is discussed in more detail in **Chapter XI**.

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XI. CONCLUSIONS AND RECOMMENDATIONS

This chapter provides conclusions and recommendations for improvements to US 641 from Eddyville to Fredonia and tying into an improved section of US 641 north of Fredonia currently in the design phase. The recommendations made in this chapter are the result of the Alternatives Study process for the US 641 corridor.

A. Project Purpose and Need

The purpose and need, discussed in detail in the previous chapter, for the proposed US 641 improvement is as follows:

- Provide improved regional access along a reconstructed highway or an alternate route that will:
 - Allow the designation of the route for the legal operation of 102-inch wide trucks between Eddyville and Fredonia;
 - Provide improved access to the National Truck Network and National Highway System to support economic development initiatives in the region; and
 - Provide improved access from north of and in the vicinity of Eddyville to regional recreational and tourist areas, including Lake Barkley and Kentucky Lake.
- Provide a direct connection to either I-24 or the Ford Parkway through an extension of the programmed US 641 project between Fredonia and Marion. This would provide an improved corridor from I-24 near Eddyville to US 60 near Henderson that could serve as an alternate corridor to the Edward T. Breathitt (Pennyryle) Parkway and the Ford Parkway; and
- Help to alleviate public concerns about safety and level of service along the existing US 641 corridor by providing a reconstructed highway or an alternate route with improved roadway geometrics for motorists traveling between Eddyville and Fredonia.

B. Preferred Alternative

Alternative 4 was selected as the preferred alternative; however, the project team agreed that a revised version should be taken into the next phase of project development to better address public concerns. Specifically, Alternative 4 should be modified to minimize the impacts on farmland and wildlife habitats and be positioned to the south and west of Fredonia as close as deemed practical.

To minimize impacts on farmland and wildlife habitats, Alternative 4 was revised to utilize more of existing US 641. The Alternative 4-Revised section just south of Fredonia was shifted east merging with the existing corridor southwest of the Fredonia Quarry. The corridor closely follows existing US 641 south until it diverges east near the Paducah and Louisville Railway. The corridor alignment also provides improved access to the Pennyryle WestPark Industrial Park and the Fredonia Quarry.

Alternative 4-Revised is closer to Fredonia as a result of the revisions and allows the Mill Bluff Spring to be avoided. The Kentucky Department of Corrections was opposed to the close proximity of Alternative 4 to the West Kentucky State Penitentiary Farm. The shift of the corridor closer to US 641 helps address their concerns. Alternative 4-Revised would allow US 641 to be re-aligned near the existing Ford Parkway

interchange (Exit 4) and US 62 to be re-aligned as a T-intersection with US 641. Alternative 4-Revised is presented in **Figure 11**.

In addition to Alternative 4-Revised, the No Build Alternative is recommended to be carried forward to the next phase. However, it should be noted that it does not meet the project purpose because it does not (1) allow the designation of the route for the legal operation of 102-inch wide trucks between Eddyville and Fredonia, (2) provide improved access to the National Truck Network and National Highway System, (3) provide improved access to regional recreational and tourist areas, (4) provide a direct connection to either I-24 or the Ford Parkway from the northern section, and (5) address safety and level of service concerns, particularly in the Fredonia area.

C. Potential Design Criteria and Considerations

Potential design criteria and considerations for the proposed US 641 route are noted here for planning purposes only. Construction sections, typical section, and access control considerations, traffic forecast, and multimodal considerations are addressed. These criteria are general recommendations based upon the information gathered through this planning phase of study. Specific geometric parameters should be defined during future design phases of the project when more detailed information is available.

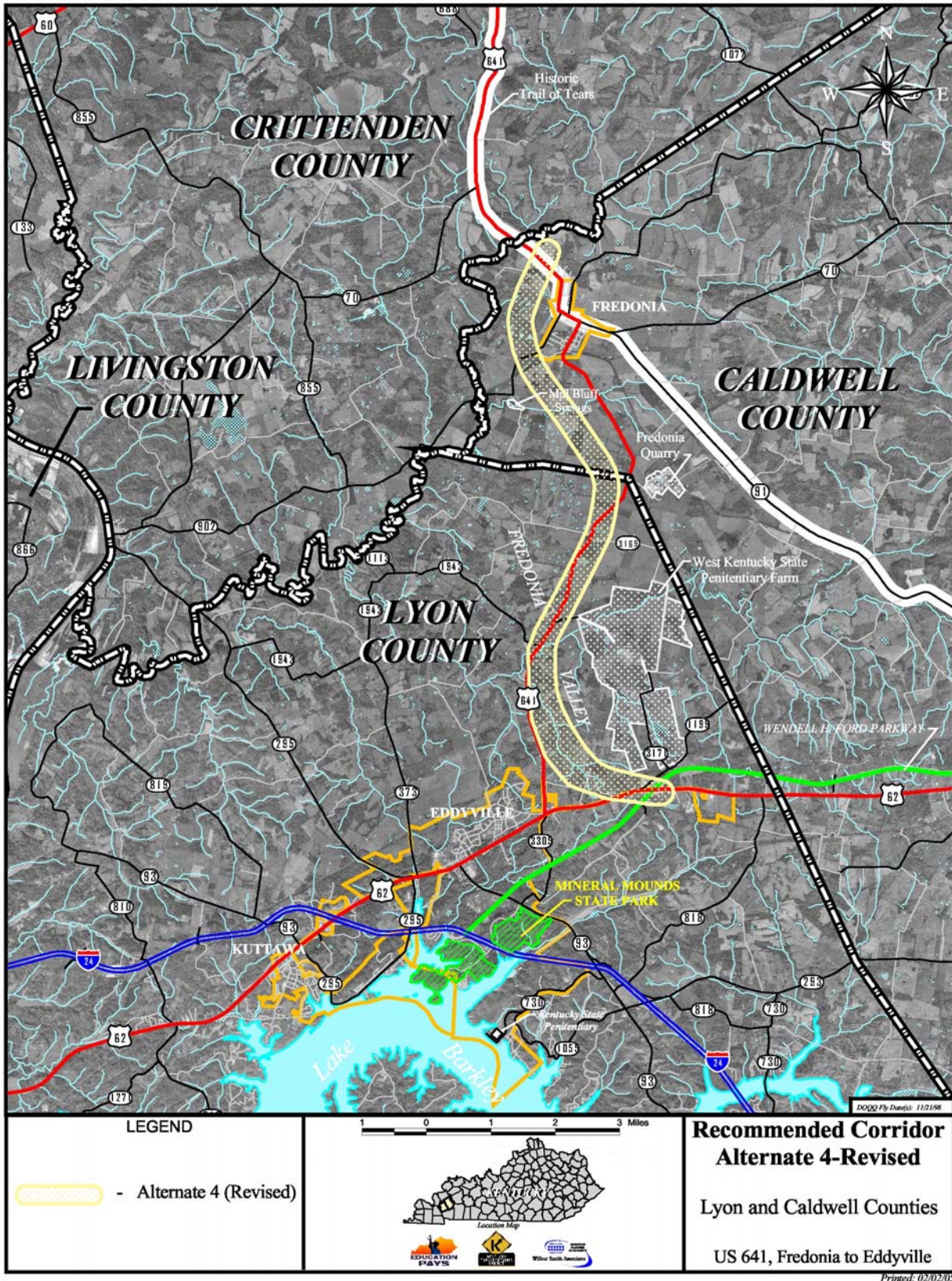
1. Construction Sections

The project team agreed that the proposed project should be built from south to north, with the first section from the Ford Parkway to a tie-in point along existing US 641 near KY 1943 at MP 2.668. The second section would generally follow along US 641 to the beginning of the west bypass of Fredonia at approximately MP 5.000. The third section from MP 5.000 would be on new alignment to an intersection point at KY 902. The final section would continue along new alignment ending at Priority Section 1 already designed north of Fredonia. These priority sections are described in **Table 11**.

Table 11. Construction Sections

Segment	Begin Milepoint	Segment Description	Begin Description	End Milepoint	End Description	Length (miles)
1	N/A	New location	Wendell H. Ford Parkway (Exit 4)	2.668	US 641 at KY 1943	3.2
2	2.668	Along existing US 641	KY 1943	5.000	0.355 mile north of Coleman-Doles Road	2.3
3	5.000	New location	US 641 at 0.355 mile north of Coleman-Doles Road	N/A	KY 902	2.9
4	N/A	New Location	KY 902	N/A	Priority 1 Section at US 641	1.5

Figure 11. Preferred Alternative – Alternative 4-Revised



2. Typical Section

The typical section would match the northern section now designed for US 641 between Fredonia and Marion. This will likely include:

- Four (4) 12-foot lanes with usable shoulder widths of 10 feet;
- Sixty-foot median;
- A design speed of 70 miles per hour; and
- Minimum stopping sight distance of approximately 730 feet.

Figure 12 displays an example typical section provided by Florence and Hutchinson, the lead design firm on the Priority 1 section of US 641, between Fredonia and Eddyville.

3. Access Control Recommendations

If feasible, a full access control facility should be considered from the Ford Parkway to existing US 641 near the Pennyriple WestPark Industrial Park, with partial access control, where possible, for the remaining portion of the proposed project. Access control fencing should be provided and all possible access points set in accordance with 603 KAR 5:120.

4. Traffic Forecast

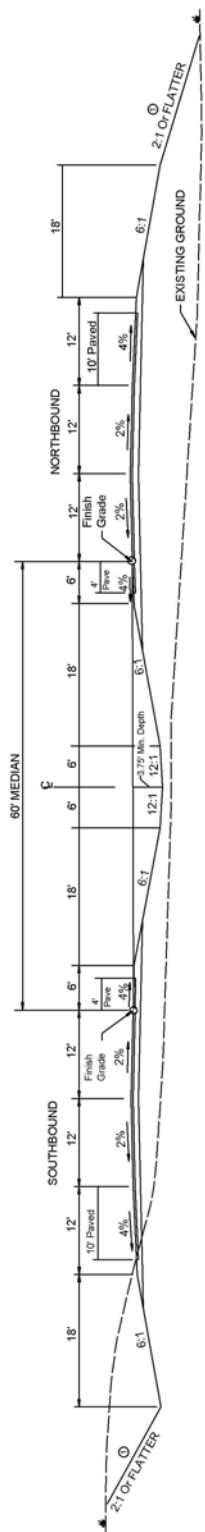
A traffic forecast report² was prepared in October, 2002, for Priority Section 1 of US 641 in Crittenden County. Using the Kentucky Statewide Travel Demand Model, traffic along the improved section of US 641 north of Fredonia would be approximately 15,300 vpd in 2027. This is assuming that improvements are made throughout the US 60/US 641 corridor between Henderson and Eddyville.

Based on the 2025 No Build traffic forecast derived in **Chapter II**, US 641 south of Fredonia experiences a drop in traffic of approximately 500 vpd when compared to the section north of Fredonia. A similar reduction would be expected for the build scenario given the increase in traffic is attributed to through traffic. Therefore the following conclusions can be drawn:

- Traffic along US 641 between Eddyville and Fredonia is forecasted to be approximately 14,800 vpd in 2027.
- Traffic along US 641 south, and potentially north, of the Pennyriple WestPark Industrial Park would likely increase over the above value if developed as anticipated. Additional study would be required to determine the full effects on traffic as a result of this development.

² *Traffic Forecast Report, Crittenden County, US 641 Relocation. Prepared by Jordon, Jones & Goulding, Inc. Prepared for Kentucky Transportation Cabinet, Division of Multimodal Programs. October 29, 2002.*

Figure 12. Recommended Typical Section



Source: US 641 Priority 1 Typical Section, Florence & Hutchinson

Note: Not to scale

5. Multimodal Considerations

Two key issues related to multimodal and intermodal transportation were identified through the course of this study and should be considered as this project moves into future phases.

- Consideration should be given to rail service into and out of the proposed Pennyrile WestPark Industrial Park. This could include coordinating to provide rail service within the right-of-way of the proposed US 641 project, avoid the need for new rail crossings if possible, and/or ensure that rail overpasses are considered where appropriate.
- No special bicycle/pedestrian facilities were identified as being needed at this time; however, there was discussion at the final project team meeting that the shoulders could be used for bicycles on any new roadway segments where the access was not fully controlled, but bicycle/pedestrian accommodations should be considered in accordance with KYTC policy during the next phases of project development.

D. Phase Costs

The estimated total cost for Alternative 4-Revised is \$90,810,000. Cost estimates for each of the four (4) construction sections previously identified are summarized below and shown by phase in **Table 12**:

- Section 1 – \$35,600,000
- Section 2 – \$20,010,000
- Section 3 – \$23,200,000
- Section 4 – \$12,000,000

Table 12. Phase Costs

Priority Segment	Length of Segment (miles)	Design (\$mil)	Right-of-Way (\$mil)	Utility (\$mil)	Construction (\$mil)	Total (\$mil)
1	3.2	\$0.96	\$2.24	\$2.24	\$30.16	\$35.60
2	2.3	\$0.69	\$1.61	\$1.61	\$16.10	\$20.01
3	2.9	\$0.87	\$2.03	\$2.03	\$18.27	\$23.20
4	1.5	\$0.45	\$1.05	\$1.05	\$9.45	\$12.00
Total	9.9	\$2.97	\$6.93	\$6.93	\$73.98	\$90.81

E. Further Study

Further consideration and study is recommended to determine the feasibility of a connector facility between the US 641 preferred corridor and KY 91. Through the study process, it was determined that motorists traveling to and from the east via the Ford

Parkway will regularly travel KY 91 between Fredonia and Princeton. A connection between the improved US 641 and KY 91 would allow motorists, particularly truck traffic, to continue to make this movement, while utilizing an improved corridor.

F. Summary of Environmental Issues for Future Phases

A number of issues related to environmental factors and sensitive land uses were identified through the course of this study that should be considered as this project moves into future phases. These issues have been discussed in greater detail throughout earlier portions of this report; however, several important issues include:

- Agriculture and Farmlands: Farmland is the most abundant resource in the study area. Several landowners along US 641 have applied for designation as an agricultural district. Coordination with these and other landowners will be important in future phases to minimize impacts to farmsteads in the project area.
- Threatened and Endangered Species: Threatened and endangered species should be carefully monitored. The U.S. Fish and Wildlife Service (USFWS) lists four (4) threatened and endangered species as possibly occurring in the project area. They are the Indiana bat, gray bat, Bald Eagle, and pink mucket.
- Water Quality and Aquatic Habitats: Special consideration should be given to the karst topography of the region. All springs and sinking streams should be inventoried and monitored prior to construction. Best Management Practices (BMPs) and erosion and sediment control plans should be employed to prevent adverse impacts to sensitive resources.
- Cemeteries and Unmarked Graves: There are a number of cemeteries documented or observed within the project area. Other cemeteries may be unmarked and are likely to be encountered during construction in this area.
- Archaeological Consideration: Mill Bluff Spring lies in close proximity to the preferred alternative. Alternative alignments should avoid this site.
- Cultural Resources: Consideration should be given to five (5) potential structures in close proximity to the recommended alternative that meet the 50 years of age or older criteria. A determination of historic significance will be needed for these sites.

G. Construction Considerations

A number of issues were identified through the course of this study that should be considered as part of future construction phases. Potential issues related to the construction of the proposed corridor include:

- Threatened and Endangered Species: With bat habitat known to exist within the project area, tree clearing would need to be conducted between November 15th and March 31st in order to avoid impacting the summer roosting period and fall swarming period.
- Erosion and Sedimentation Control: Measures should be utilized to control erosion and sedimentation during, and after, the commencement of earth-disturbing activities. The construction of this project may initially increase the amount of erosion. There may also be an increase in non-point source pollution after the construction of this project. Careful consideration should be given to erosion control

methods and to decreasing the amount of non-point source pollution that reaches surface and ground water.

- Air Quality Impacts during Construction: Construction period air quality impacts will need to be evaluated to (1) expose the potential short-term effects of site preparation, demolition, materials storage and construction and (2) determine if any appropriate mitigation commitments are to be incorporated into the project plans.
- Geologic Conditions: If deemed necessary, a more detailed study of karst topography within the study area, particularly the structural low condition south of Fredonia, should be considered as the project develops.
- Quarry: The Fredonia Quarry is located southeast of Fredonia along the east side of existing US 641. Blasting for road cuts near the quarry may present some concern for the miner's safety. Coordination with the quarry during construction is recommended.

XII. ACKNOWLEDGEMENTS AND CONTACTS

A number of individuals are responsible for the success of this important project. This study would not have been possible without the time, effort, and knowledge of these individuals:

- For contributions to this project, thanks go to Wayne Mosley, Tim Choate, Alan Thomas, Chris Kuntz, Johnny Wall, Kevin McClearn, Nick Hall, Everett Green, and the other KYTC District 1 and 2 staff members who assisted with this effort.
- Thanks also to Craig Morris with the Pennyrile Area Development District for assistance throughout the project.
- Thanks, too, to the KYTC Division of Planning staff, including Project Manager Jimmy Wilson, Branch Manager Daryl Greer, and the data management staff.

Additional information regarding the US 641 Alternatives Study can be obtained from the following KYTC Division of Planning staff members:

- Annette Coffey, P.E., Director
- Daryl J. Greer, P.E., Branch Manager
- Jimmy C. Wilson, P.E., Project Manager

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