Planning Study

Southern Kentucky Corridor (I-66) Warren, Edmonson, Barren Counties

(Item # 03-66.00)

Prepared for

Kentucky Transportation Cabinet

By

BERNARDIN · LOCHMUELLER & ASSOCIATES, INC.
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TABLE OF CONTENTS

TABLES

APPENDICES

The appendices can be found on the CD that is included in the back of this report. These files are saved in PDF format.

EXECUTIVE SUMMARY

INTRODUCTION

The I-66 Corridor was originally defined in the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) as a "high priority corridor," and further defined within Kentucky in the 1995 National Highway System (NHS) Act. In the 1997 Southern Kentucky Corridor (I-66) Study, I-66 was deemed economically justified and financially feasible and then incorporated in the Statewide Transportation Plan (FY 1999-2018).

The Study Area is located in south-central Kentucky in the vicinity of Bowling Green. The Study Area is approximately 520 square miles in size as shown in Figure ES-1. The project area lies between the William H. Natcher Parkway, northwest of Bowling Green and the Louie B. Nunn (Cumberland) Parkway near Glasgow. This area includes portions of Warren County, Edmonson County, and Barren County. The Study Area is bisected by I-65, which connects the cities of Louisville (KY) and Nashville (TN). The Study Area is approximately 65 miles north of Nashville and 110 miles south of Louisville. Major routes include US 31W, US 68, US 231, KY 101, KY 185 and KY 234. The Study Area encompasses a population of approximately 100,000 people, including the communities of Bowling Green, Smiths Grove, Oakland, Brownsville, and Glasgow.

The purpose of this Planning Study is to identify and evaluate alternative interstate corridors, including a "no build" corridor, for the I-66 Corridor, between the William H. Natcher Parkway and the Louie B. Nunn (Cumberland) Parkway. The objective of this study is to find the corridors that best fulfill the established projects goals. These goals are to:

- Support the completion of I-66 across southern Kentucky to carry out the legislative intent of the Intermodal Surface Transportation Efficiency Act (ISTEA), the National Highway System Designation Act (NHS) of 1995, and the Transportation Equity Act for the 21st Century (TEA21).
- Provide an improved, efficient interstate facility between the William H. Natcher Parkway and the Louie B. Nunn (Cumberland) Parkway to allow for the system continuity of I-66 from West Virginia to Missouri.
- Improve accessibility throughout southern Kentucky to jobs, industry, urban centers, educational facilities, tourism and recreational facilities, with emphasis given to the Kentucky portions of the Appalachia and Lower Mississippi Delta regions.
- Improve interstate movement of people and freight by ensuring a safe transportation system that is accessible, integrated and efficient and offers flexibility of transportation choices across southern Kentucky.

I-66/BOWLING GREEN OUTER BELTLINE PLANNING STUDIES
STUDY AREA

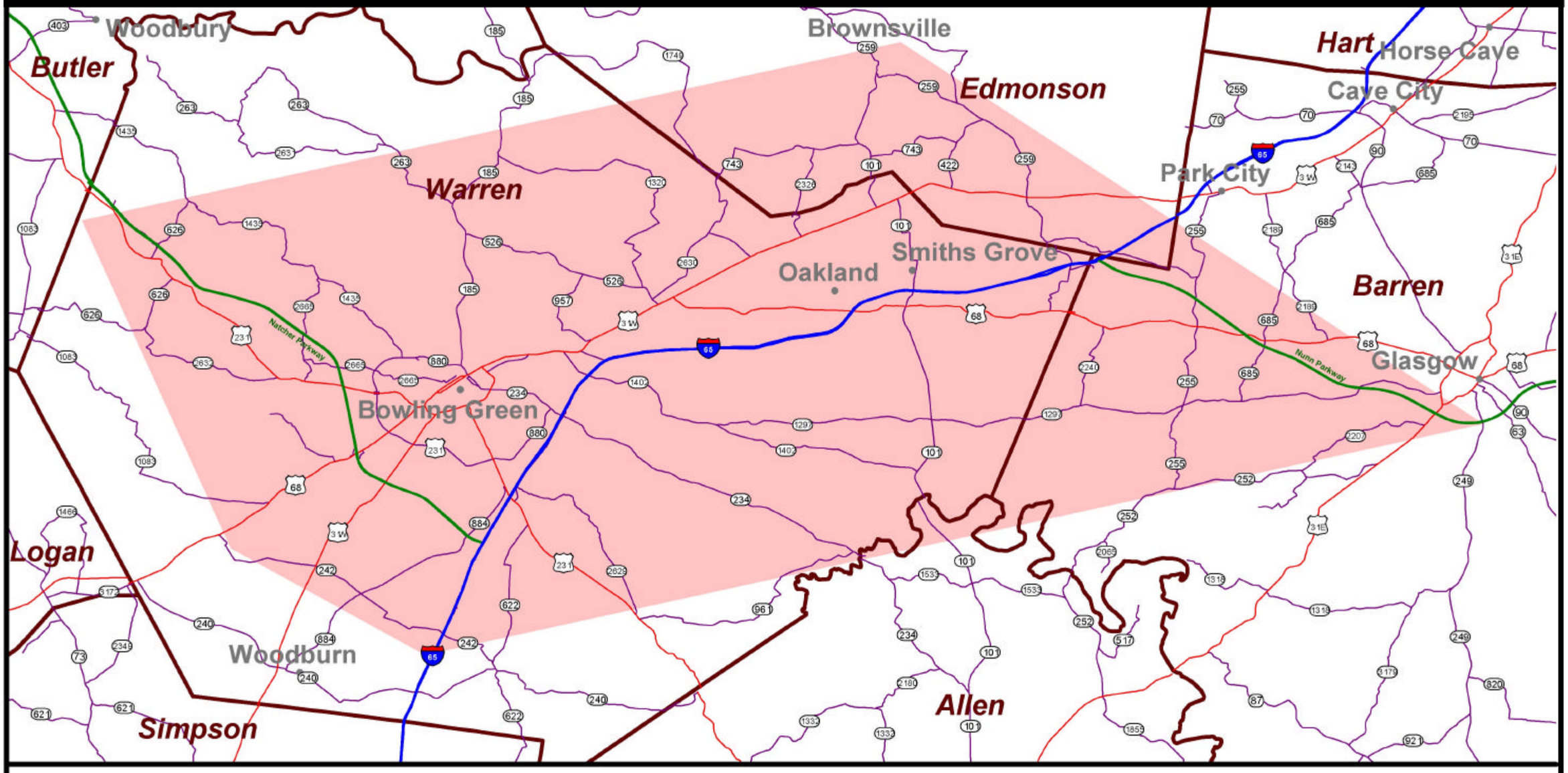


Figure ES-1

SCREENING PROCESS

The screening of corridors to evaluate performance relative to the established project goals included a review of traffic, engineering and environmental considerations. In addition, public input received as the result of an extensive public involvement effort was considered throughout the screening process. The screening process for this study was divided into two (2) levels, including a more qualitative Level 1 Screening of preliminary corridors and a more quantitative Level 2 Screening of final corridors that were carried through the Level 1 Screening. In addition to the "build" corridors considered, a "no build" corridor has also been considered throughout the evaluation process.

Traffic considerations consisted of the evaluation of existing traffic conditions and the development of a traffic model to assess future traffic conditions and needs. The engineering considerations included the evaluation of terrain, obstructions, potential interchange locations and configuration and potential bridge crossing locations based on USGS data and supplemental aerial photography. The environmental considerations consisted of literature searches and database review, including the development of a geographic information system (GIS) of previously recorded data for use in the development of corridors. Windshield surveys of the corridors were also conducted to identify additional areas of concern.

CORRIDORS CONSIDERED

The beginning of the proposed project is located on the William H. Natcher Parkway in the vicinity of Hadley. From this point, the corridors traverse east across Warren County toward the ending terminus, which is the Louie B. Nunn (Cumberland) Parkway's grade-separation of US 68/KY 80 near Glasgow. The straight-line distance for the project is approximately 30.9 miles from the beginning terminus to the ending terminus. Twenty-three (23) preliminary corridors as well as the "no build" option were evaluated in the Level 1 Screening. The lengths of preliminary corridors for the Level 1 Screening range from a low of 34.1 miles for Corridor 4 to a high of 49.8 miles for Corridor 14. Seven (7) corridors plus the "no build" were carried through for evaluation in the Level 2 Screening. The final corridor lengths range from a low of 34.1 miles for Corridor 4 to a high of 43.7 miles for Corridor 12. The average distance of the seven (7) "build" corridors is 37.5 miles.

The corridors consisted of options that included nearly all new terrain construction, all existing facility utilization, and corridors that included both new terrain construction, as well as utilizing portions of existing facilities. The seven (7) final corridors included three (3) routes that were completely north and west of I-65 from the Louie B. Nunn (Cumberland) Parkway to the William H. Natcher Parkway, as well as one (1) that was completely south and east of I-65 from the Louie B. Nunn (Cumberland) Parkway to the William H. Natcher Parkway. In addition, one (1) corridor was also evaluated that utilized the entire length of I-65 between the parkways and two (2) routes were evaluated that utilized a portion of I-65 and a portion of new terrain to the north of Bowling Green.

SCREENING OF CORRIDORS

Engineering

Corridor 2, the most northerly corridor, includes the longest new terrain construction length and also crosses the most difficult terrain of the corridors resulting in the highest total project cost. Corridor 12 involves no new terrain construction, relying completely on widening I-65, resulting in the lowest total project cost. However, Corridor 12 has the greatest concern for maintenance of traffic during construction. Corridors 4 and 10 take the more northerly route across the northside of Bowling Green crossing more rugged terrain resulting in higher costs; whereas, Corridor 5, north of Bowling Green and Corridor 23, south of Bowling Green, cross less difficult terrain and have relatively low project costs.

Geology

The northern corridors, that include Corridors 2, 4, 5, 10, and 11, have the greatest geological impacts. These corridors cross a significant length of the sinkhole plain along with portions of the Dripping Springs Escarpment and the Mammoth Cave Plateau. There will be several karst features traversed by these corridors including cave entrances and sinkholes. In addition, the northwest portion of the Study Area has more rugged terrain that will present more difficult construction. Corridor 12 traverses a large amount of the sinkhole plain, however, because this corridor completely relies on the upgrade of I-65, further impacts to the sinkhole plain will be minimal. Corridor 23 is the southern most corridor, and does not cross a large portion of the sinkhole plain. This corridor crosses primarily through the Central Pennyroyal region, which has much less karst development than the sinkhole plain to the north. Based on these considerations, corridors 12 and 23 would have a lesser impact to the existing geology of the Study Area.

Traffic

For the purposes of this study, the minimum acceptable level-of-service (LOS) is LOS C for rural areas and LOS D for urban areas. In the year 2030, Corridor 5 has the highest estimated average daily traffic (ADT) volume at 17,300 vehicles per day (vpd). In addition, the segment of Corridor 5 between the proposed KY 526 and KY 185 interchanges has the highest estimated segment volume at 23,700 vpd in the year 2030. Corridors 11 and 23 follow with estimated volumes of 17,100 vpd and 15,600 vpd respectively. Corridor 2 has the least estimated volume with 10,700 vpd, and it has only 12,700 vpd on the highest volume segment. These numbers show that corridors closer to the north side of Bowling Green and closer to I-65 carry the highest estimated average daily traffic volumes.

The highest ADT volume along I-65 between the Louie B. Nunn (Cumberland) and William H. Natcher Parkways is on the segment between KY 234 (Cemetery Road) and KY 446. The existing six-lane I-65 may achieve level-of-service (LOS) C at 53,200 vpd, LOS D at 64,500 vpd and LOS E at 86,900 vpd. Thus, with an assigned traffic volume of 97,300 vpd, the “no build” corridor with existing I-65 at six (6) lanes results in LOS F for this segment.

Corridor 23 appears to be the most effective in diverting traffic from existing I-65 between the Louie B. Nunn (Cumberland) and William H. Natcher Parkways. When I-65 was recently widened to six (6) lanes between the parkways, the reconstruction was designed to accommodate

the future expansion to eight (8) lanes within existing right-of-way and without reconstruction of overpasses. Corridor 23 leaves an estimated residual volume of 89,600 vpd on I-65, compared to 97,300 vpd for the "no build" corridor, so that a LOS C (equal or less than 95,700 vpd) may be achieved if existing I-65 is widened to eight (8) lanes. Paralleling a significant portion of I-65 from the Louie B. Nunn (Cumberland) Parkway to KY 446, Corridor 5 is the second most effective in diverting traffic from existing I-65. However, it would appear that no I-66 corridor alone diverts sufficient traffic from I-65 to avoid widening I-65 to eight (8) lanes by the year 2030. Further, because the widening of I-65 to eight (8) lanes has not been programmed, the adequacy of I-65 focuses on its current configuration as a six-lane facility.

Corridor 12 would involve widening existing I-65 to ten (10) lanes from the Louie B. Nunn (Cumberland) Parkway to the William H. Natcher Parkway. Year 2030 traffic assignments to Corridor 12 result in a high of 103,100 vpd on the urban segments between the William H. Natcher Parkway and KY 446 and a high of 85,700 vpd on the rural segments east of KY 446. If I-65 were widened to only eight (8) lanes from the Louie B. Nunn (Cumberland) Parkway to the William H. Natcher Parkway, LOS C may be achieved on all urban and rural segments except for the urban segment between KY 234 and KY 446 where only a LOS D may be achieved. Thus, widening I-65 to eight (8) lanes may achieve the minimum acceptable LOS for urban and rural areas, but I-65 must be widened to ten lanes to achieve the recommended LOS B in rural areas and LOS C in urban areas between the Louie B. Nunn (Cumberland) Parkway and the William H. Natcher Parkway.

In addition to Corridor 12, Corridors 10 and 11 would also use a portion of existing I-65 between the Louie B. Nunn (Cumberland) Parkway and their new alignment west of the US 68 interchange. The highest estimated volume segment on the common route for I-65 and I-66 is west of the US 68 interchange – 87,200 vpd for Corridor 10 and 85,900 vpd for Corridor 11. While LOS B may be achieved if the common route for I-65/I-66 is widened to ten lanes, LOS C may be achieved if I-65 is widened to eight (8) lanes between the Louie B. Nunn (Cumberland) Parkway and the new alignment west of the US 68 interchange.

Environmental Considerations

Corridor 2 crosses the sinkhole plain near Rocky Hill, the Dripping Springs Escarpment near Dripping Springs, and the Mammoth Cave Plateau. This corridor also includes the longest length within the Turnhole Spring Groundwater Basin, which flows through Mammoth Cave National Park to the Green River; however, the majority of the corridor is within the Graham Spring Groundwater Basin. Karst groundwater issues are anticipated for this corridor, which also has the highest number of potential relocations. Corridors 4 and 5 include the longest new terrain crossing of the sinkhole plain north of Smiths Grove and Oakland, creating the greatest potential for water quality concerns and karst impacts. The majority of these corridors lie within the Graham Spring Groundwater Basin. These corridors also have the highest potential farmland, prime farmland and historic impacts.

Corridors 10, 11 and 12 cross the sinkhole plain primarily along existing I-65; this substantially reduces potential karst impacts and water quality concerns as well as reduces potential land requirements and overall impacts. The majority of these corridors and all new terrain

construction lies within the Graham Spring Groundwater Basin. Corridor 12 relies completely on I-65 with no new terrain construction resulting in the least potential environmental impacts of all the corridors. Corridors 10 and 11 depart I-65 and take northerly routes around Bowling Green. Of these corridors, Corridor 11 is closer to Bowling Green and has fewer potential environmental impacts with the exception of historic impacts.

Corridor 23 is the only corridor south of I-65 and largely avoids the sinkhole plain resulting in generally low potential karst impacts and water quality concerns. The corridor also lies completely avoids the Turnhole Spring Groundwater Basin. In addition, this corridor has generally low potential environmental impacts with the exception of a relatively high potential for relocations and the highest potential impacts to identified cave openings.

Public Involvement

The public involvement process for this study was extensive including community outreach in many forms. Three sets of public information meetings were held with multiple meetings each time to cover the entire study area. A Citizens Advisory Group (CAG) was also created including representatives from a cross-section of the community. The CAG provided additional public input to the project team. In addition to this involvement by the general public, multiple meetings were also held with state and local officials, emergency services officials, as well as state and federal review agencies. The extensive public involvement process provided valuable insight into issues and concerns of the public as well as cost and benefits of various corridors. While many issues were raised regarding the potential corridors, there was generally more support for northern corridors as opposed to southern corridors. A timeline showing project meetings and milestones is shown on Figure ES-2.

RECOMMENDATIONS

The corridors that are recommended for further consideration after the Level 2 Screening are Corridors 10, 11, and 12 (see Figure ES-3). In addition to the three "build" corridors, the "no build" corridor must be considered throughout the National Environmental Policy Act (NEPA) process.

Corridor 10 utilizes existing I-65, has a short total length of 35.2 miles relative to other build corridors and provides better connectivity to Bowling Green. It has a short new terrain construction length of 18.9 miles, relative to other build corridors reducing overall impacts. Within Edmonson County, Corridor 10 boasts the greatest reduction in congested vehicle-hours of travel (VHT) and vehicle-miles of travel (VMT) overall and for trucks. This corridor satisfies the local and regional objectives of a reduction in travel time and user costs, the diversion of local traffic, and improved safety.

Corridor 11 also utilizes existing I-65, and then takes a new terrain route (14.8 miles) north of Bowling Green. It makes the greatest use of existing freeways compared to other new location corridors and provides better connectivity to Bowling Green by its close proximity to existing development on the north side of Bowling Green. It has the shortest new terrain construction length with 14.8 miles. Corridor 11 carries the highest average daily traffic volume, results in the

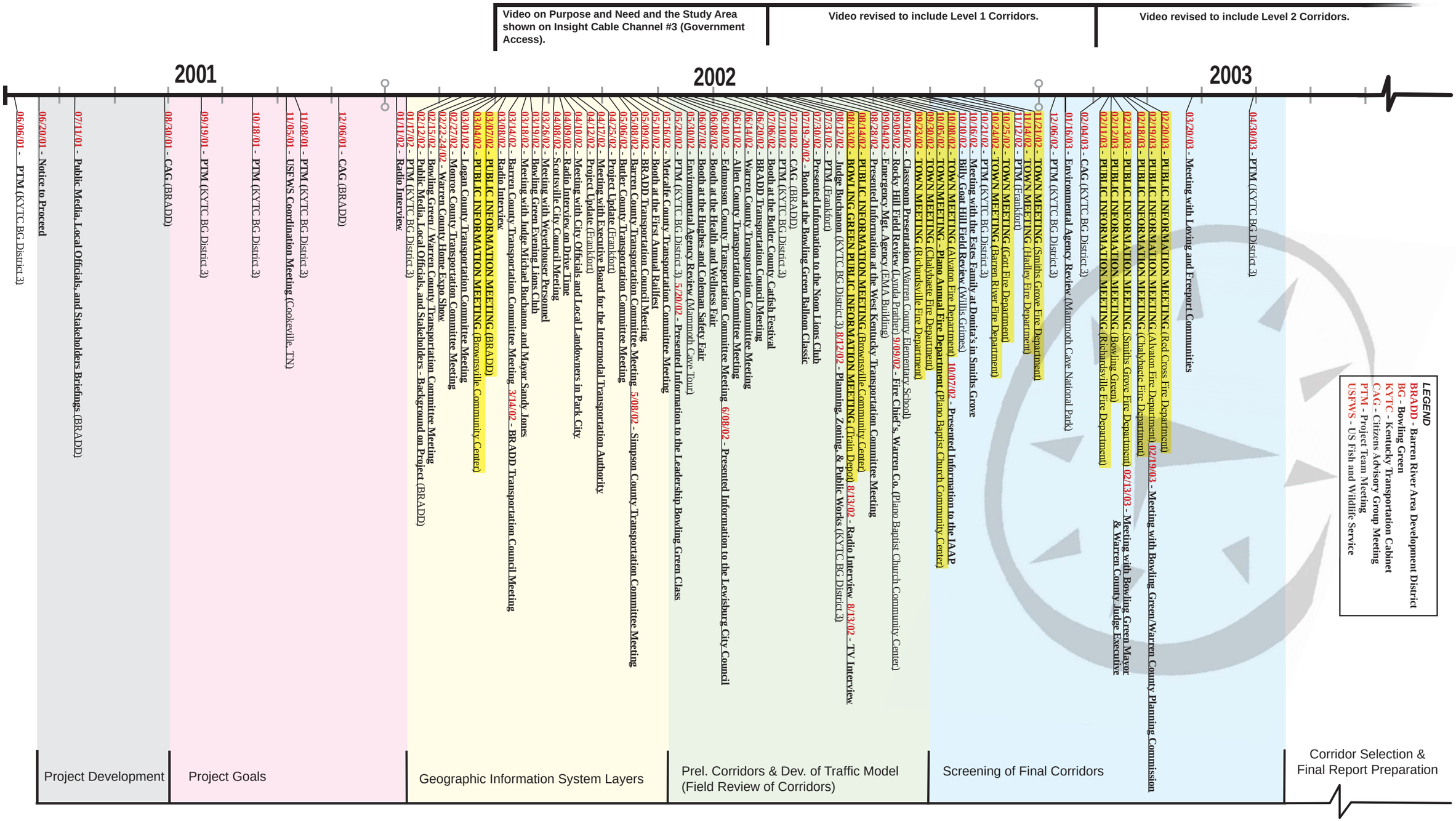
greatest reduction in regional and Warren County VHT for all vehicles, achieves a reduction in VHT for trucks in Edmonson County comparable to Corridor 10, and diverts the most VHT from non-freeway facilities in Warren County. Thus, the corridor also satisfies the local and regional objectives of a reduction in travel time and user costs, the diversion of local traffic, and improved safety. It also avoids new terrain construction in the Turnhole Spring Groundwater Basin. Ease of construction is also an advantage of this corridor relative to other corridors considered.

Corridor 12 utilizes existing I-65 for its entire length between the Louie B. Nunn (Cumberland) and William H. Natcher Parkways and would not require any new terrain construction. This corridor has the lowest construction and total project costs along with having the fewest number of proposed bridges and drainage crossings. Overall, this corridor has the greatest reduction in congested VMT for the entire network. Utilizing existing facilities for this entire corridor reduced essentially all potential environmental impacts to low. The impact to potentially National Register of Historic Places (NRHP) eligible historic structures and districts is low as well.

The corridors that were not recommended due to environmental, engineering, or traffic reasons were Corridors 2, 4, 5, and 23. All of these corridors consisted of entirely new terrain routes and were more costly to build. Because these corridors were entirely made up of new terrain, they were associated with potentially high environmental impacts. These corridors did not remove sufficient traffic from I-65 to avoid future widening of the roadway. Out of the four (4) non-recommended corridors, Corridors 2, 4, and 5 had the most environmental issues. Corridor 2 had the most difficult construction relative to other corridors considered and also performed poorly from a traffic perspective. Corridor 23 had the least public support from the third round of public information meetings, as well as a petition in opposition to the corridor.

I-66 and Bowling Green Outer Beltline Timeline

Figure ES-2



I-66 Corridors
Recommended Corridors

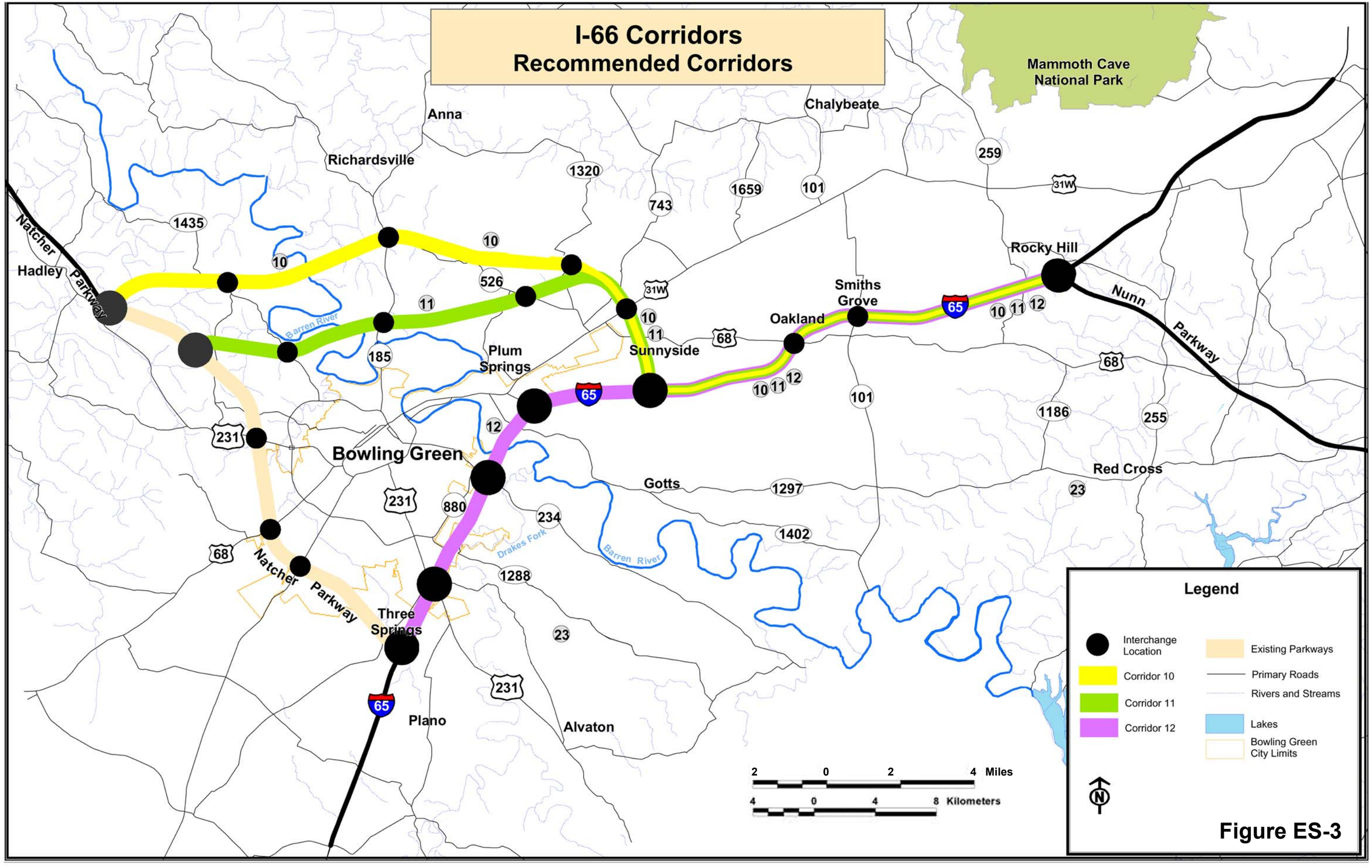


Figure ES-3

I. INTRODUCTION

A. Preface

The I-66 Corridor was originally defined in the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) as a "high priority corridor," and further defined within Kentucky in the National Highway Designation System (NHS) Act of 1995. In the 1997 Southern Kentucky Corridor (I-66) Study, I-66 was deemed economically justified and financially feasible and then incorporated in the Statewide Transportation Plan (FY 1999-2018). The goals of this project are to support the completion of I-66 across southern Kentucky to carry out the legislative intent of ISTEA, the NHS Act of 1995, and the Transportation Equity Act for the 21st Century (TEA21).

B. Study Purpose

The purpose of this Planning Study is to identify and evaluate interstate corridors, including a "no-build" option, for the I-66 Corridor, between the William H. Natcher Parkway and the Louie B. Nunn (Cumberland) Parkway. This study identified and evaluated potential corridors to determine technical feasibility; identified the social and environmental impacts; and ensured that the public would be involved in the planning process. The objective of this study is to find the corridors that best fulfill the established project goals. It is likely to have resulted in one or more corridors to be examined in more detail in future engineering and environmental studies. The established project goals are to:

- Support the completion of I-66 across southern Kentucky to carry out the legislative intent of the Intermodal Surface Transportation Efficiency Act (ISTEA), the National Highway Designation System (NHS) Act of 1995, and the Transportation Equity Act for the 21st Century (TEA21).

- Provide an improved, efficient interstate facility between the Natcher Parkway and the Nunn Parkway to allow for system continuity of I-66 from West Virginia to Missouri.

- Improve accessibility throughout southern Kentucky to jobs, industry, urban centers, educational facilities, tourism and recreational facilities, with emphasis given to the Kentucky portions of the Appalachia and Lower Mississippi Delta regions.

- Improve interstate movement of people and freight by ensuring a safe transportation system that is accessible, integrated and efficient, and offers flexibility of transportation choices across southern Kentucky.

C. Compatibility with Bowling Green Outer Beltline

The I-66 Corridor Planning Study was jointly conducted with the Bowling Green Outer Beltline Planning Study. The main reasons for this were because the Study Area for the Outer Beltline lies entirely within the Study Area for the I-66 Corridor and the corridor concepts considered for I-66, in some cases, are coincident with Outer Beltline corridors. A more thorough explanation of the compatibility of the two projects is included in Appendix A.

II. EXISTING AND FUTURE CONDITIONS

A. Study Area

1. Geographic Location

The study is located in south-central Kentucky in the Mississippi Plateau Physiographic region. The project area lies between the Natcher Parkway, northwest of Bowling Green and the Nunn (Cumberland) Parkway near Glasgow, generally 9 to 10 miles on either side of I-65. This area includes portions of Warren, Edmonson, and Barren Counties. The Study Area is bisected by I-65, which connects the cities of Louisville (KY) and Nashville (TN). The Study Area is approximately 65 miles north of Nashville and 110 miles south of Louisville. Major routes include US 31W, US 68/KY80, US 231, KY 101, KY 185 and KY 234. Communities in the vicinity of the Study Area are Bowling Green, Smiths Grove, Oakland, Brownsville, Glasgow and Plum Springs.

2. Termini and Project Length

The beginning of the proposed project is located on the Natcher Parkway in the vicinity of Hadley. From this point, the proposed corridors travel east across Warren County toward the ending terminus at the Nunn Parkway's grade-separation of US 68/KY 80 near Glasgow. The straight-line distance for the project is approximately 30.9 miles from the beginning terminus to the ending terminus. The current travel distance between the project termini is approximately 43 miles along the existing four-lane controlled access facilities (Natcher Parkway, I-65, Nunn Parkway) and approximately 36 miles along the shortest route utilizing US31W and US231 across the north side of Bowling Green (see Figure 1).

B. Existing Facilities and System Characteristics

The Study Area is currently served by I-65, the Natcher Parkway, the Nunn (Cumberland) Parkway, US 31W, US 68/KY 80, US 231, and numerous state highways. Table 1 summarizes the major features of these facilities.

I-65. Interstate 65 is the only existing interstate facility in the Study Area. Running from Chicago (IL) to Mobile (AL), I-65 links Bowling Green to Louisville (KY) on the north and Nashville (TN) on the south, where east-west interstate connections exist. The interstate enters the northeast corner of the Study Area near its interchange with the Nunn (Cumberland) Parkway, passes through the east side of the Bowling Green urban area and exits at the southwest corner of the Study Area. From the Natcher Parkway to the Nunn (Cumberland) Parkway, I-65 is presently being widened from a four-lane to a six-lane facility with bridge structures to accommodate an eight-lane facility.

I-66/BOWLING GREEN OUTER BELTLINE PLANNING STUDIES
STUDY AREA

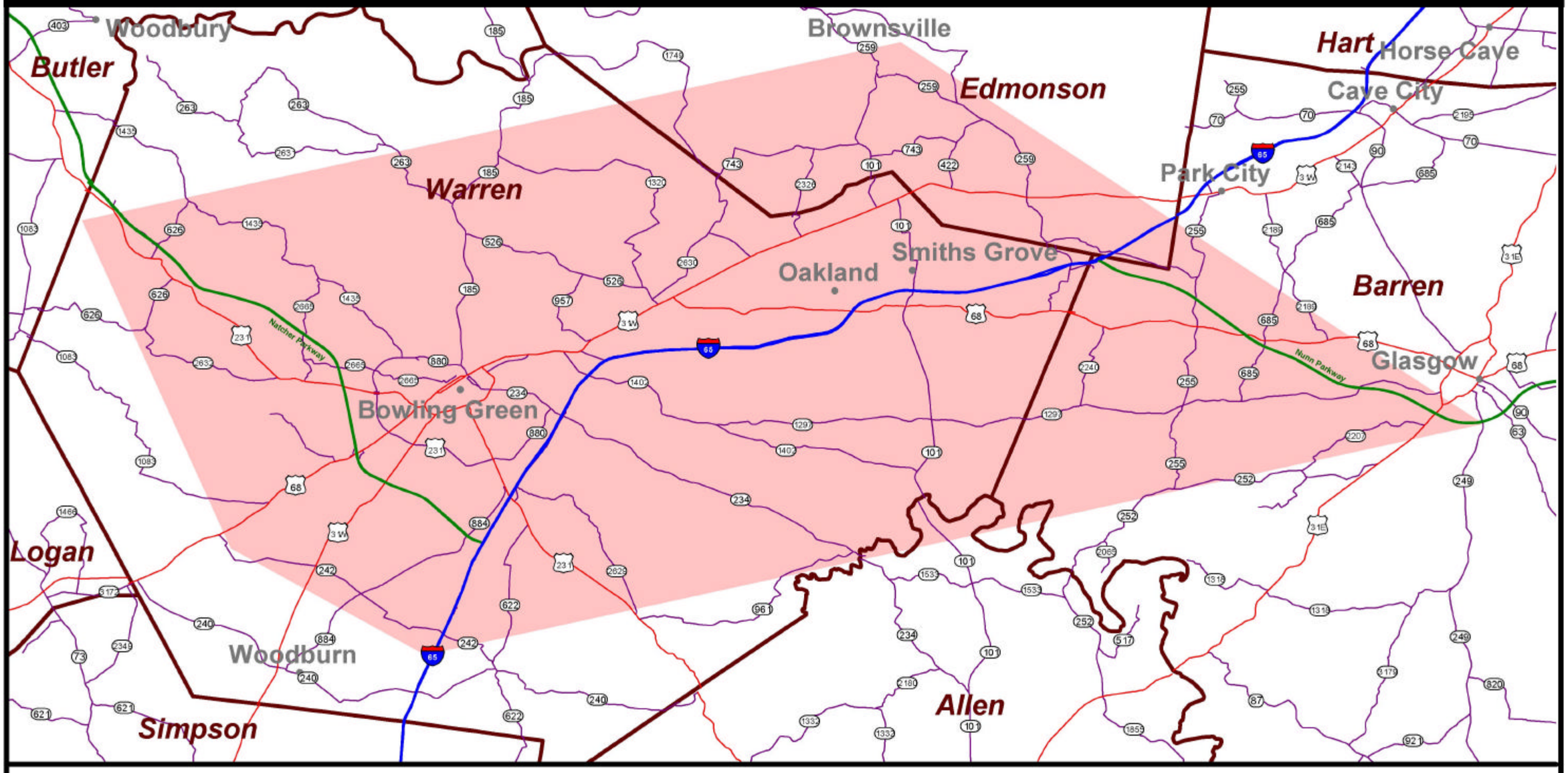


Figure 1 - Study Area

Table 1: Existing Roadway Characteristics

Route	Begin Mile Point	End Mile Point	Segment	Functional Class	Number of Lanes	Lane Width (ft.)	Shoulder Width (ft.)
I-65	0.000	20.539	Simpson Co. Line to Natcher Pkwy	Rural Interstate	4	12	10
	20.539	28.006	Natcher Parkway to KY 446	Urban Interstate	4*	12	10
	28.006	53.956	KY 446 to Hart Co. Line	Rural Interstate	4*	12	10
Natcher Parkway	0.000	7.422	I-65 to US 231	Urban Other Freeway	4	12	6
	7.422	26.419	US 231 to KY 79	Rural Principal Arterial	4	12	6
Nunn Parkway	0.000	11.445	I-65 to US 31E	Urban Other Freeway	4	12	10
	11.445	13.990	US 31E to KY 90	Rural Principal Arterial	4	12	4
US 31W	0.000	8.788	Simpson Co. Line to Memphis Jct. Rd.	Rural Major Collector	2	10	2
	8.788	18.866	Memphis Jct. Rd to Jackson Grove Church Rd	Urban Minor Arterial	2-4	9-13	0-4
	18.866	20.905	Jackson Church Grove Rd. to US 68	Rural Major Collector	4	11	2
	20.905	29.114	US 68 to Edmonson Co. Line	Rural Major Collector	2	10	2-4
	0.000	7.996	Warren Co. Line to Barren Co. Line	Rural Major Collector	2	10	2-4
US 68/ KY 80	0.000	5.021	Logan Co. Line to KY 1083	Rural Principal Arterial	2	12	2-4
	5.021	7.514	KY 1083 to KY 432	Rural Principal Arterial	4	12	10
	7.514	9.407	KY 432 to KY 880	Urban Principal Arterial	4	12	2
	9.407	10.623	KY 880 to Business US 231	Urban Principal Arterial	2-3	11	2
	10.623	13.060	Business US 231 to US 31W (then over US 31W)	Urban Principal Arterial	4	10-12	0
	13.060	25.027	US 31W to Barren Co. Line	Rural Major Collector	2	9	2-3
US 231	0.000	7.988	Allen Co. Line to KY 622	Rural Principal Arterial	2	10	2
	7.988	14.028	KY 622 to KY 880 via Campbell Lane to US 68	Urban Principal Arterial	4	11-12	0-10
	14.028	16.445	US 68 to KY 880 to Natcher Parkway	Urban Minor Arterial	2	10-11	2-10
	16.445	27.581	Natcher Parkway to Butler Co. Line	Rural Major Collector	2	9	3
KY 101	0.000	7.865	Allen Co. Line to I-65	Rural Major Collector	2	9	3
	7.865	12.850	I-65 to Edmonson Co. Line	Rural Minor Arterial	2	10	0-10
	0.000	4.131	Warren Co. Line to KY 259	Rural Minor Arterial	2	10	0-10
KY 185	0.000	0.309	US 68 to Garvin Lane	Urban Minor Arterial	2-4	10-11	0-4
	0.309	12.222	Garvin Lane to Butler Co. Line	Rural Major Collector	2	9-12	4-10
KY 234	0.365	10.333	KY 961 to I-65	Rural Major Collector	2	10	4
	10.333	13.552	I-65 to US 68	Urban Minor Arterial	2-4	10-12	1-2
KY 259	0.000	3.087	US 68 to Edmonson Co. Line	Rural Minor Collector	2	7-8	3-4
	0.000	9.242	Warren Co. Line to KY 101	Rural Minor Collector	2	7-8	3-4
	9.242	12.096	KY 101 to KY 70	Rural Minor Arterial	2	8	4
KY 446	0.000	0.970	I-65 to US 31W	Urban Principal Arterial	4	12	10
KY 880	0.000	1.866	KY 185 to KY 1435	Urban Minor Arterial	4	12	10
	1.866	3.292	KY 1435 to Jennings Creek Bridge	Rural Minor Arterial	2	12	10
	3.292	3.646	Jennings Creek Bridge to US 231 (Morgantown Rd)	Urban Minor Arterial	2	12	10
	3.646	6.426	US 231 (Scottsville Road) to KY 234 (Cemetery Rd)	Urban Collector	2	10	3

Source: Kentucky Transportation Cabinet Highway Information System (HIS)
Note: * These segments of I-65 were being widened to six lanes during the course of this planning study.

Nunn (Cumberland) and Natcher Parkways. These parkways are four-lane divided highways with full access control, and are classified as Urban Other Freeways within the Bowling Green and Glasgow areas and as Rural Principal Arterials elsewhere. They belong to both the National Highway System (consisting of about 155,000 miles of Interstate and Other Principal Arterials throughout the Nation) and the National Truck Network.

The Natcher Parkway begins at the US 60 Bypass in Owensboro, runs southeast parallel to US 231 and intersects with the Wendell H. Ford (Western Kentucky) Parkway (about 25 miles north of the Study Area). South of the Wendell H. Ford (Western Kentucky) Parkway, it runs along the west side of the Bowling Green urban area and terminates south of Bowling Green at I-65. The Natcher Parkway has been proposed as the route for I-66 from north of the Study Area to the Wendell H. Ford (Western Kentucky) Parkway where I-66 is routed westward along the Wendell H. Ford (Western Kentucky) Parkway to I-24. The Nunn (Cumberland) Parkway begins at I-65 near the Warren-Edmonson-Barren County Line, passes around the south side of Glasgow as it exists the Study Area, and terminates at US 27 in Somerset. The Nunn (Cumberland) Parkway from Glasgow to Somerset is proposed as I-66.

US 31W, US 68/KY 80 and US 231. These United States (US) numbered routes vary in number of lanes (from two to four lanes) and functional class (from Rural Major Collector to Urban Principal Arterial) as they traverse the Study Area. When the routes do not parallel higher functional class roadways such as I-65 and the Natcher Parkway, they are generally classified as arterials. These routes carry substantial traffic volumes and serve as important through routes across the Study Area.

Having been superceded nationally as a Principal Arterial by I-65, US 31W generally parallels I-65 through the Study Area. It enters the northeast edge of the Study Area near Park City and continues south generally parallel to I-65. US 31W passes through the center of the Bowling Green urban area and exits the region at the southwest edge of the Study Area traveling towards Franklin (KY) and Nashville (TN). US 31W is on the National Truck Network.

US 68/KY 80 also parallels I-65 through the eastern portion of the Study Area. It enters the western edge of the Study Area from Russellville (KY), joins US 31W northeast of downtown Bowling Green, continues on a common alignment with US 31W for about seven (7) miles, and breaks away from US 31W to follow a more direct route eastward toward Glasgow where it exits the Study Area. From the Natcher Parkway in Bowling Green to the Edward T. Breathitt (Pennyrile) Parkway in Hopkinsville (KY), US 68/KY 80 is a four-lane divided Principal Arterial on the National Highway System and the National Truck Network.

US 231 enters the Study Area from the north (traveling parallel to the Natcher Parkway from Owensboro, KY), runs southeast through the Bowling Green urban area, and ends at US 31E in Scottsville (KY), southeast of the Study Area. US 231 is presently being widened to four lanes in the Study Area from the current four-lane section southeast of I-65 to the Allen County Line. This segment of US 231 is on the National Highway System.

KY 446, KY 234 and KY 880. In addition to the US numbered routes passing through the Bowling Green urban area, these state highways are part of the arterial network of the City of Bowling Green, and carry high daily traffic volumes. On the National Truck Network, KY 446 connects US 31W/US 68 to I-65 entering the north side of Bowling Green. With the new I-65/KY 234 (Cemetery Road) interchange open to traffic, KY 234 is becoming an even more important entry point to the Bowling Green urban area. KY 234 is also a Rural Major Collector from I-65 to the northern portion of Allen County. KY 880 serves as the Inner Beltline for the Bowling Green urban area.

KY 101, KY 185 and KY 259. KY 101 is the major north-south route in eastern Warren County and southern Edmonson County. KY 101 is classified as a Rural Major Collector from I-65 to northern Allen County and as a Rural Minor Arterial from KY 259 in southern Edmonson County to I-65. An Intermediate Planning Study for the reconstruction of KY 101 from I-65 south of Smiths Grove to US 31W was completed in 2001. KY 259 is the primary north-south artery from the Wendell H. Ford (Western Kentucky) Parkway through Edmonson County to its intersection with KY 101. KY 259 also is functionally classified as a Rural Minor Collector from KY 101 near Rhoda in Edmonson County to US 68 in Warren County. A Design Study Report was completed for this segment of KY 259, which examined reconstruction with a connection to the existing I-65/Nunn (Cumberland) Parkway interchange. KY 185 is the major north-south route in north central Warren County. It enters the Study Area from the north near the of the Warren-Butler-Edmonson County Line and travels to KY 880 in Bowling Green. KY 185 is classified as a two-lane Rural Major Collector except for a short four-lane segment classified as an Urban Minor Arterial inside the City of Bowling Green.

C. Existing Traffic Volumes and Level-of-Service

Traffic operating conditions are described by level-of-service (LOS) ratings similar to the school grading system of A through F (LOS A being the best, representing relatively free-flow conditions with little interference from other traffic and LOS F being the worst, representing a breakdown or even a failure in traffic flow). LOS A is the most desirable and LOS F is unacceptable. For the purposes of this study, the minimum acceptable LOS assumed for this study is LOS C for rural areas and LOS D for urban areas.

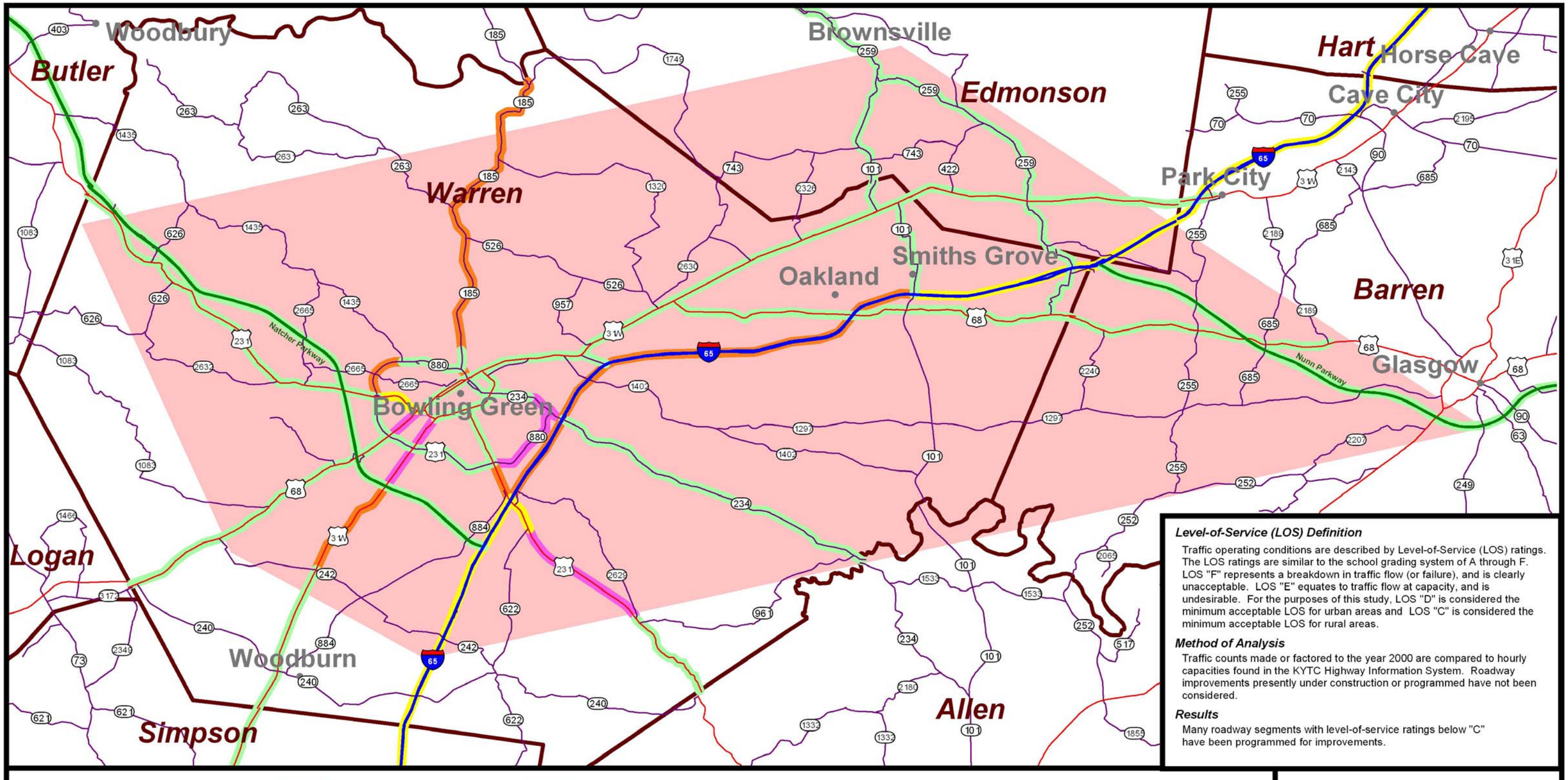
The LOS for roadway segments is determined by dividing the average daily traffic (ADT) by the existing capacity (equivalent to the volume-to-capacity or V/C ratio) for the type of facility (i.e., the functional classification and number of lanes) during peak periods. A volume-to-capacity (V/C) ratio of 1.00 correlates to LOS E. Figure 2 shows the LOS for major facilities in the Study Area in the year 2000 without "committed" improvements (described in Section E in this chapter). Table 2 reports the LOS in the year 2000 based on the Kentucky Transportation Cabinet (KYTC) Highway Information System (HIS). Facility segments operating at an unacceptable LOS are highlighted in yellow. Facility segments with "committed" lane additions are highlighted in green. It can be readily observed that improvements have been programmed for most facility segments with capacity deficiencies in the year 2000. However, "committed" improvements do not fully address future deficiencies as described later in Section G of this chapter.

The KYTC Highway Information System establishes LOS E capacities by functional class and number of lanes for level terrain using average statewide factors. In the case of I-65 from the Natcher Parkway to KY 446, a LOS E capacity for rolling terrain has been substituted to better reflect the operational characteristics of this facility. For a more detailed discussion the peak-hour percent of daily traffic (K-factor), directional distribution of traffic (D-factor) and percent of trucks assumptions used the evaluation of the performance of I-65, please refer to the page 59 of the Traffic Analysis Technical Memorandum included as Appendix B.

According to the KYTC Highway Information System for the year 2000, Interstate 65 is a four-lane facility with a LOS E in urban areas and LOS D or E in rural areas resulting in unacceptable daily operating conditions in both urban and rural areas throughout the Study Area. In fact, segments of I-65 from the Natcher Parkway to KY 101 operated at capacity (LOS E) in the year 2000. (As discussed later, I-65 is being widened from the Natcher Parkway to the Nunn Parkway and farther north to address traffic flow concerns.)

Existing traffic flow conditions on the Natcher Parkway and Nunn Parkway exhibit the highest level-of-service (i.e., LOS A).

In the year 2000, the two-lane sections of US 31W were operating at capacity (LOS E) from KY 242 to the Natcher Parkway (southwest of Bowling Green) and at failure (LOS F) from the Natcher Parkway to University Drive. [As discussed later, under committed projects, US 31W is programmed for widening to four-lanes from north of KY 242 to US 231 (Campbell Lane)]. The remainder of US 31W has an acceptable level-of-service in the Study Area.



Level-of-Service (LOS) Definition

Traffic operating conditions are described by Level-of-Service (LOS) ratings. The LOS ratings are similar to the school grading system of A through F. LOS "F" represents a breakdown in traffic flow (or failure), and is clearly unacceptable. LOS "E" equates to traffic flow at capacity, and is undesirable. For the purposes of this study, LOS "D" is considered the minimum acceptable LOS for urban areas and LOS "C" is considered the minimum acceptable LOS for rural areas.

Method of Analysis

Traffic counts made or factored to the year 2000 are compared to hourly capacities found in the KYTC Highway Information System. Roadway improvements presently under construction or programmed have not been considered.

Results

Many roadway segments with level-of-service ratings below "C" have been programmed for improvements.

Figure 2: Year 2000 Level-of-Service without Committed Roadway Improvements

Sources: Kentucky Transportation Cabinet Highway Information System (HIS) for average daily traffic counts and historical annual growth rates by facility classification.
Bernardin-Lochmueller & Associates, Inc. for LOS analysis based on the "Highway Capacity Manual" (1994).

Table 2: Existing Traffic Volumes and Level-of-Service

Route	Begin MP	End MP	Segment	Functional Class (b)	Existing Lanes	Existing Hourly Capacity (c)	2000 ADT	V/C Ratio (d)	Existing LOS (f)
I-65	0.000	20.539	Simpson Co. Line to Natcher Pkwy	1	4	2,985	36,800	0.758	D
	20.539	25.664	Natcher Pkwy to US 231	11	4	2,940 (e)	44,800	0.919	E
	25.664	28.006	US 231 to KY 446	11	4	2,940 (e)	44,500	0.913	E
	28.006	35.562	KY 446 to US 68	1	4	2,943	42,400	0.886	E
	35.562	37.551	US 68 to KY 101	1	4	2,943	44,500	0.930	E
	37.551	43.135	KY 101 to Nunn Pkwy	1	4	2,943	36,500	0.762	D
	43.135	47.696	Nunn Pkwy to KY 255	1	4	2,550	29,800	0.718	D
	47.696	52.523	KY 255 to KY 70	1	4	2,550	30,700	0.740	D
	52.523	53.956	KY 70 to Hart Co. Line	1	4	2,550	32,200	0.776	D
Natcher Parkway	0.000	3.576	I-65 to US 31W	12	4	3,991	13,600	0.215	A
	3.576	4.969	US 31W to US 68	12	4	3,991	13,800	0.218	A
	4.969	7.422	US 68 to US 231	12	4	3,991	7,820	0,124	A
	7.422	26.419	US 231 to KY 79	2	4	3,603	8,490	0.148	A
Nunn Parkway	0.000	11.445	I-65 to US 31E	12	4	3,603	6,920	0.121	A
	11.445	13.990	US 31E to KY 90	2	4	3,265	8,670	0.166	A
US 31W	0.000	1.464	Simpson Co. Line to KY 242	7	2	1,837	5,420	0.339	A
	1.464	5.283	KY 240 to KY 242	7	2	1,837	8,230	0.515	B
	5.283	8.788	KY 242 to Memphis Junction Road	7	2	1,349	10,700	0.912	E
	8.788	8.986	Memphis Junction Rd. to Natcher Pkwy	16	2	1,349	11,600	0.989	E
	8.986	10.567	Natcher Pkwy to US 231 (Campbell Lane)	16	2	1,010	17,300	1.747	F
	10.567	11.805	US 231 to Business US 231 (University)	16	2	1,446	17,300	1.220	F
	11.805	12.812	Bus. US 231 (University) to Bus. US 231	16	4	2,828	19,400	0.399	B
	12.812	13.699	Bus. US 231 (Scottsville Rd.) to KY 234	16	4	2,828	20,600	0.307	B
	13.699	14.670	KY 234 to US 68 (Louisville Rd.)	16	4	2,828	22,000	0.328	B
	14.670	17.371	US 68 (Riverview Dr.) to KY 446	14	4	2,828	30,800	0.668	C
	17.371	18.866	KY 446 to Jackson Grove Church Rd.	16	4	2,461	22,500	0.532	C
	18.866	20.905	Jackson Church Grove Rd. to US 68	7	4	2,649	12,200	0.318	A
	20.905	23.538	US 68 to KY 743	7	2	1,361	7,140	0.603	C
	23.538	29.114	KY 743 to Edmonson Co. Line	7	2	1,346	3,240	0.277	A
	0.000	3.565	Warren Co. Line to KY 259	7	2	1,361	1,790	0.151	A
	3.565	7.996	KY 259 to Barren Co. Line	7	2	1,332	1,950	0.168	A
	0.000	0.894	Edmonson Co. Line to KY 255	7	2	1,797	2,100	0.134	A
	0.894	6.823	KY 255 to KY 90	7	2	1,817	3,130	0.198	A
US 68/ KY 80	0.000	0.319	Logan Co. Line to KY 240	2	2	1,509	8,580	0.625	C
	0.319	3.201	KY 240 to KY 242	2	2	1,608	4,560	0.312	B
	3.201	5.021	KY 242 to KY 1083	2	2	1,608	9,870	0.675	C
	5.021	7.514	KY 1083 to KY 432	2	4	2,526	14,400	0.357	B
	7.514	8.196	KY 432 to Natcher Pkwy	14	4	2,526	20,600	0.500	B
	8.196	9.407	Natcher Pkwy to KY 880/US 231	14	4	2.534	26,400	0.540	C
	9.407	10.550	KY 880 W to Business US 231	14	2	1,305	19,000	1.514	F
	10.550	13.060	Business US 231 to US 31W	14	4	1,538	17,000	0.678	C
	13.060	18.452	US 31W to I-65	7	2	1,754	2,820	0.185	A
	18.452	20.059	I-65 to KY 101	7	2	1,461	3,090	0.243	A
	20.059	25.027	KY 101 to Barren Co. Line	7	2	1,445	2,810	0.224	A

Note: (a) The highest average daily traffic (ADT) volume and worst LOS are shown for a segment when multiple values are available from the KYTC HIS. Yellow shaded values fail to meet minimum acceptable LOS C for rural areas and LOS D for urban areas. Green shaded lanes are programmed for widening.

Table 2: Existing Traffic Volumes and Level-of-Service (continued) (a)

Route	Begin MP	End MP	Segment	Functional Class (b)	Existing Lanes	Existing Hourly Capacity (c)	2000 ADT	V/C Ratio (d)	Existing LOS (f)
US 231	0.000	3.236	Allen Co. Line to KY 961	2	2	1,546	4,710	0.335	B
	3.236	3.500	KY 961to KY 2629	2	2	1,546	7,880	0.561	C
	3.500	7.988	KY 2629 to KY 622	2	2	1,310	24,400	2.049	F
	7.988	9.106	KY 622 to I-65	14	4	2,220	26,400	0.730	D
	9.106	10.601	I-65 to KY 880 (Lovers Lane)	14	4	2,732	39,600	0.889	E
	10.601	13.188	KY 880 over Campbell to US 31W	14	4	2,636	27,700	0.645	C
	13.188	14.028	US 31W over Campbell to US 68	14	4	2,636	20,200	0.470	B
	14.028	15.510	US 68 to KY 880	16	2	1,618	10,400	0.656	C
	15.510	16.445	KY 880 to Natcher Pkwy	16	2	1,618	10,100	0.175	A
	16.445	18.406	Natcher Pkwy to KY 2632	7	2	1,445	5,920	0.471	B
	18.406	27.851	KY 2632 to Butler Co. Line	7	2	1,445	2,350	0.187	A
Business US 231	0.000	2.066	KY 880 (Lovers Ln.) to US 31W	16	4	3,115	34,600	0.646	C
	2.066	2.507	US 31W to US 68 (University Dr.)	16	4	3,018	19,600	0.378	B
	2.507	3.899	US 68 (Russellville Rd.) to KY 880	16	2	1,554	10,900	0.715	D
KY 101	0.000	3.082	Allen Co. Line to KY 1297	2	2	1,531	1,240	0.093	A
	3.082	7.277	KY 1297 to US 68	2	2	1,421	1,810	0.146	A
	7.277	7.865	US 68 to I-65	2	2	1,503	3,160	0.242	A
	7.865	11.641	I-65 to US 31W	2	2	1,412	5,010	0.408	B
	11.641	12.850	US 31W to Edmonson Co. Line	2	2	1,616	3,290	0.234	A
	0.000	4.131	Edmonson Co. Line to KY 259	2	2	1,381	5,340	0.445	B
KY 185	0.000	0.309	US 68 to KY 880/Gordon Ave.	16	2	1,569	14,800	0.910	E
	0.309	0.737	KY 880 to Double Springs Road	16	4	2,995	10,300	0.200	A
	0.737	1.569	Double Springs Rd. to Garvin Lane	16	2	1,569	10,100	0.657	C
	1.569	12.222	Garvin Lane to Butler Co. Line	7	2	1,344	10,600	0.924	E
KY 234	0.365	10.333	KY 961 to I-65	7	2	1,333	5,920	0.511	B
	10.333	12.081	I-65 to Hayes Lane	16	2	1,569	18,300	1.190	F
	12.081	12.222	Hayes Lane to US 68 (Kentucky St.)	16	4	1,955	21,700	0.645	C
KY 259	0.000	3.087	US 68 to Edmonson Co. Line	2	2	1,381	204	0.017	A
	0.000	2.083	Warren Co. Line to US 31W	2	2	1,381	1,090	0.091	A
	2.083	9.242	US 31W to KY 101	2	2	1,381	1,480	0.123	A
	9.242	12.096	KY 101 to KY 70	2	2	1,381	4,710	0.392	B
KY 446	0.000	0.970	I-65 to US 31W	14	4	3,180	13,900	0.268	A
KY 880	0.000	1.866	KY 185 (Gordon Ave.) to KY 1435	16	4	3,108	13,100	0.245	A
	1.866	3.646	KY 1435 to US 231 (Morgantown Rd.)	6	2	1,569	11,800	0.853	E
	3.646	6.426	US 231 (Scottsville Rd.) to KY 234	17	2	1,569	12,800	1.036	F

Source: Kentucky Transportation Cabinet Highway Information System (HIS) and Bernardin-Lochmueller & Associates, Inc.
Notes: (a) The highest average daily traffic (ADT) volume and worst LOS are shown for a segment when multiple values are available from the KYTC HIS. Yellow shaded values fail to meet minimum acceptable LOS C for rural areas and LOS D for urban areas. Green shaded lanes are programmed for widening.
(b) Functional Class: 1 = rural interstate, 2 = rural principal arterial, 6 = rural minor arterial , 7 = rural major collector, 8 = rural minor collector, 11 = urban interstate, 12 = urban other freeway, 14 = urban principal arterial, 16 = urban minor arterial, 17 = urban collector
c) Existing hourly capacity at service flow for LOS E as reported in the KYTC Highway Information System. For two-lane facilities, the cited capacity is for both directions. For four or more lane facilities, the cited capacity is for one direction only.
(d) V/C ratio is volume to service flow for LOS E as reported in the KYTC Highway Information System.
(e) KYTC Highway Information System hourly capacity for level terrain (3,880 vph) replaced by hourly capacity for rolling terrain (2,940 vph).
(f) Level-of-Service versus V/C ratio comparison: See Appendix B: Traffic Analysis Technical Memorandum, Table 2.

US 68/KY 80 operates at an unacceptable level-of-service for the two-lane segment between KY 880 (Campbell Lane) and Business US 231 (Morgantown Road), but other segments operate at an acceptable level-of-service.

US 231 (Scottsville Road) operates at an unacceptable level-of-service for the two-lane segment from KY 2629 (Old Scottsville Road) to KY 622 (Plano Road). (As discussed later, US 231 is currently being widened to four lanes from KY 622 southeast into Allen County.) The four-lane segments of US 231 (Scottsville Road) from KY 622 (Plano Road) through the I-65 interchange to KY 880 (Campbell Lane/Lovers Lane) are presently operating at LOS D and E. Other segments of US 231 operate at an acceptable level-of-service.

The two-lane segment of KY 185 (Veterans Memorial Lane) from US 68/KY 80 (Kentucky Street) to KY 880 (Gordon Avenue) is operating at LOS E. (A widening is programmed for this segment as described later.) The rural portion of KY 185 from Garvin Lane (Old Richardsville Road) to the Butler County Line is also operating at LOS E.

The two-lane segment of KY 234 (Cemetery Road/Fairview Avenue) from I-65 to Hayes Lane operates at an unacceptable level-of-service was being widened to four lanes during this study, and is now four lanes.

Finally, the two-lane segment of KY 880 (Veterans Memorial Lane) from KY 1435 (Barren River Road) to US 231 (Morgantown Road) is operating at LOS E; and the two-lane segment of KY 880 (Lovers Lane) from US 231 (Scottsville Road) to KY 234 (Cemetery Road) operates at an unacceptable level-of-service. (The last segment of KY 880 from US 231 to KY 234 is programmed for widening.) Only the four-lane segment of KY 880 (Veterans Memorial Lane) from KY 185 (Gordon Avenue) to KY 1435 (Barren River Road) shows acceptable operating conditions.

A more detailed discussion of operational conditions of the existing transportation facilities in the Study Area as well as additional traffic information is included in the Traffic Analysis Technical Memorandum included as Appendix B.

D. Crashes

Between 1997 and 1999, 5,736 traffic crashes were reported by the Kentucky Transportation Cabinet Highway Information System within the Study Area on I-65, the Natcher Parkway, the Louie B. Nunn (Cumberland) Parkway, KY 101, KY 255, KY 1297, US 31W, US 68, US 231, and Business US 231. These crashes included 1,853 non-fatal injury crashes and 17 crashes involving fatalities. Referring to Figure 3, analysis of the Highway Information System crash data revealed that there were at least seven roadway segments along these routes with a Critical Rate Factor greater than 1.00. (A Critical Rate Factor greater than 1.00

means that the crashes are not occurring at random and that other factors may be involved.)

There is evidence that heavy congestion contributed to the elevated crash rates on at least one (1) of these seven (7) critical segments. Forty-two percent of the crashes on the critical section of US 68/KY 80 between Milepost 9.435 and 13.060 (Campbell Lane to 1st Avenue) were classified as rear-end type collisions, which are associated with high levels of congestion.

Because the calculation of accident rates and Critical Rate Factors depends heavily on the length of the segment, it is possible that shorter segments may have a Critical Rate Factor greater than 1.00. In light of the high number of crashes on I-65 and Business US 231, shorter segments of these roadways may have Critical Rate Factors in excess of 1.00. An analysis of more detailed crash data included in the 2000 Bowling Green Transportation Plan identified many tenth-of-a-mile roadway segments in the Bowling Green area (including segments of I-65, US 31W, US 68, and US 231 among others) with Critical Rate Factors above 1.00.

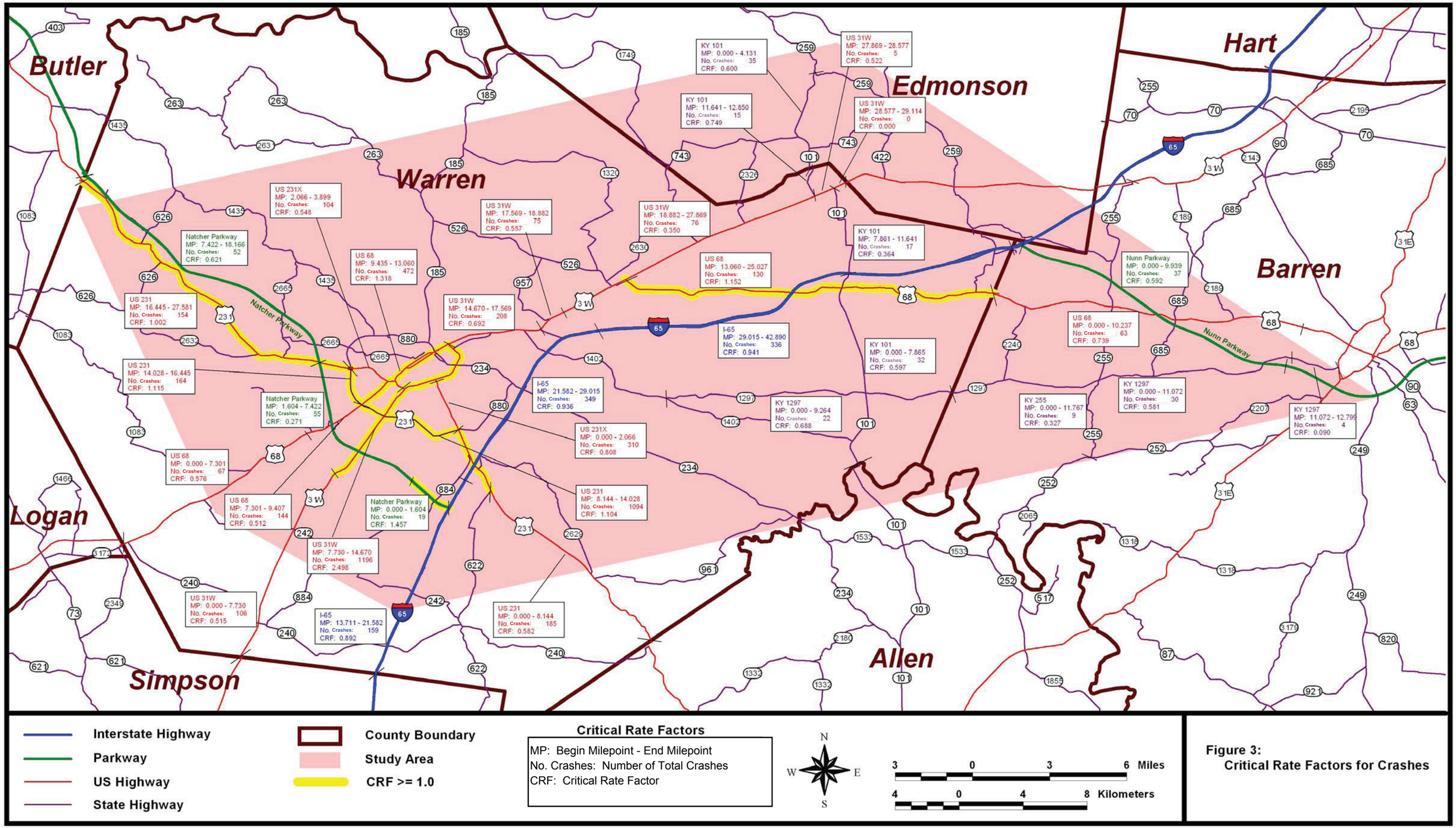


Figure 3:
Critical Rate Factors for Crashes

E. Committed Projects

The I-66 Corridor was originally defined and designated as a "high priority corridor" in the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA). The I-66 Corridor was added to the National Highway System (about 155,000 miles of interstates and principal arterials through the nation) within the State of Kentucky in the 1995 National Highway System (NHS) Act. After being found economically justified and financially feasible in the 1997 Southern Kentucky Corridor (I-66) Study, I-66 was incorporated in the Statewide Transportation Plan (FY 1999-2018).

Aspects of the Bowling Green Outer Beltline first appeared in the 1972 Bowling Green Transportation Plan, and were carried forward into the 1983 Bowling Green Transportation Plan. The beltline was further defined in the 1990 Comprehensive Plan for Warren County and again in the 2000 Bowling Green Transportation Plan.

In addition to these two proposed projects, there are a number of other planned "major capital" improvements that may affect traffic operations in the Study Area. For analysis purposes, "committed" or "programmed" projects were added to the existing roadways to constitute the "no build" option, and had to satisfy two criteria in the KYTC 2000 Six Year Highway Plan. First, "major capital" improvements with the potential to expand the traffic flow capacity of the existing roadway network were included. Such "capacity expansion" projects include major roadway widenings, new or relocated roadways, and new or expanded interchanges. [While the highway and transportation plans include many other improvements for "capacity preservation" (such as bridge and pavement replacement/reconstruction, intersection and signal improvements, etc.), these projects are not listed because they do not increase through traffic carrying capabilities.] Second, "capacity expansion" projects must be programmed for a phase subsequent to planning in the Six Year Highway Plan, be recently completed, or under construction.

Based on the KYTC 2000 Six Year Highway Plan, the committed "capacity expansion" projects (i.e., projects with a phase funded beyond planning) included in the "no build" option within the Study Area are (refer to Figure 4):

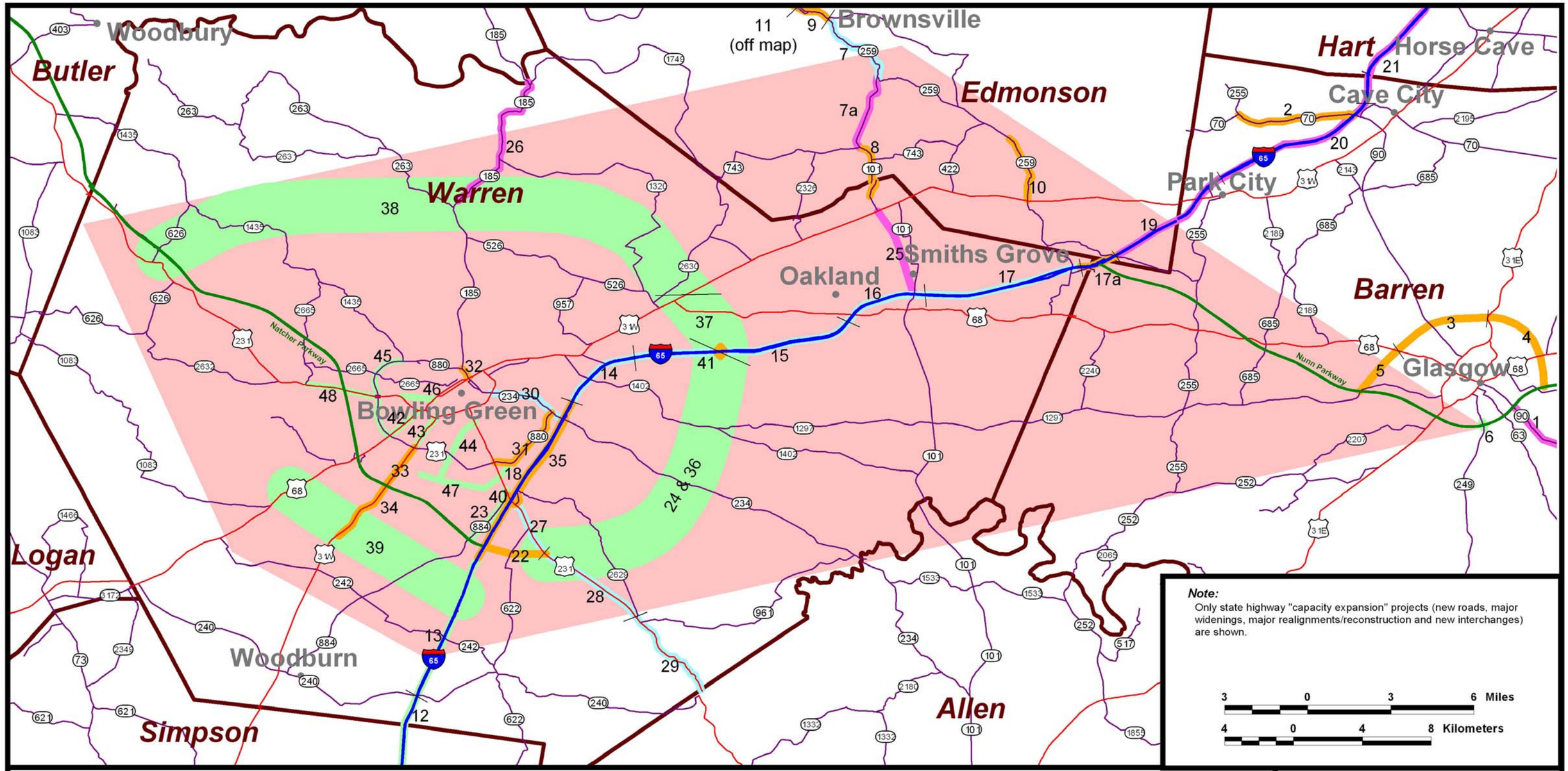


Figure 4:
Committed Projects Location Map

Sources: Kentucky Transportation Cabinet 2000 Six Year Highway Plan.
Kentucky Transportation Cabinet 2002 Six Year Highway Plan.
Kentucky Transportation Cabinet 1999 Statewide Transportation Plan (FY 1999-2018).
Bowling Green Transportation Plan (2001).

- Map Key #1 -- KY 90 from the Nunn (Cumberland) Parkway to the Metcalfe County Line (realignment and minor widening)
- Map Key #2 -- KY 70 from I-65 to the Mammoth Cave National Park entrance (realignment and minor widening)
- Map Key #3/4/5 -- Glasgow Outer Loop from the Nunn (Cumberland) Parkway east of Glasgow to the Nunn (Cumberland) Parkway west of Glasgow near KY 1297 (new construction of a four-lane divided facility)
- Map Key #7a/8/25 -- KY 101 from I-65 to KY 259 near Rhoda (realignment and minor widening)
- Map Key #7/9/11 -- KY 259 from Rhoda to Brownsville (realignment and minor widening)
- Map Key #10 -- KY 259 through the Knobs area north of US 31W (realignment and minor widening)
- Map Key #14-21 -- I-65 from Natcher Parkway to north of KY 224 in Hart County (widen to six lanes)
- Map Key #22 -- Natcher Parkway Extension from I-65 to US 231 (Scottsville Road)
- Map Key #26 -- KY 185 from KY 263 to the Butler County Line (realignment and minor widening)
- Map Key #27-29 -- US 231 from southeast of Cumberland Trace to US 31E in Allen County (widen to four lanes)
- Map Key #30 -- KY 234 (Cemetery Road) from Collett Lane to east of I-65 with a new interchange at I-65 (widen to five lanes)
- Map Key #31 -- KY 880 (Lovers Lane) from US 231 (Scottsville Road) to KY 234 (Cemetery Road) (widen to five lanes)
- Map Key #32 -- KY 185 (Veterans Memorial Lane) from KY 880 to the 7th and College Street intersection (new route completing a one-way pair)
- Map Key #33/34 -- US 31W from Dillard Road to US 231 (Campbell Lane) (widen to five lanes)
- Map Key #35 -- KY 2158 (Cumberland Trace) from US 231 (Scottsville Road) to KY 234 (Cemetery Road) (widen to three lanes)

Refer to Table 5 of Appendix B “Technical Memorandum: Traffic Analysis” for a complete listing of projects displayed in Figure 4.

F. Regional Travel Model Development

A regional travel demand model was developed for roughly a 13-county area encompassing the I-66/Bowling Green Outer Beltline Study Area and surrounding counties. (See Figure 5) The Bowling Green Regional Travel Model is a composite of the Kentucky Statewide Traffic Model (KySTM)[1] and the Bowling Green Transportation Plan Travel Model.[2] The Traffic Analysis Technical Memorandum is included in Appendix B.

Thus, the Bowling Green Transportation Plan Travel Model roadway network and travel analysis zone (TAZ) system were incorporated into a clipped portion of the KySTM covering portions of 13 counties. The Warren County TAZ system from the Bowling Green Transportation Plan was reviewed for consistency with 2000 Census Tract boundaries and major geographic barriers such as rivers and freeways. A few TAZs required minor boundary adjustments and splits. Appropriate adjustments were made to centroid connectors in Warren County including the elimination of a few inappropriate centroid connections to freeways between interchanges. A few adjustments were made to the Warren County roadway network to ensure all freeway interchanges were modeled. For the balance of the Regional Travel Model outside Warren County, roadway network was added to ensure the representation of all state roadways, TAZs were split, and appropriate changes were made to centroid connectors.

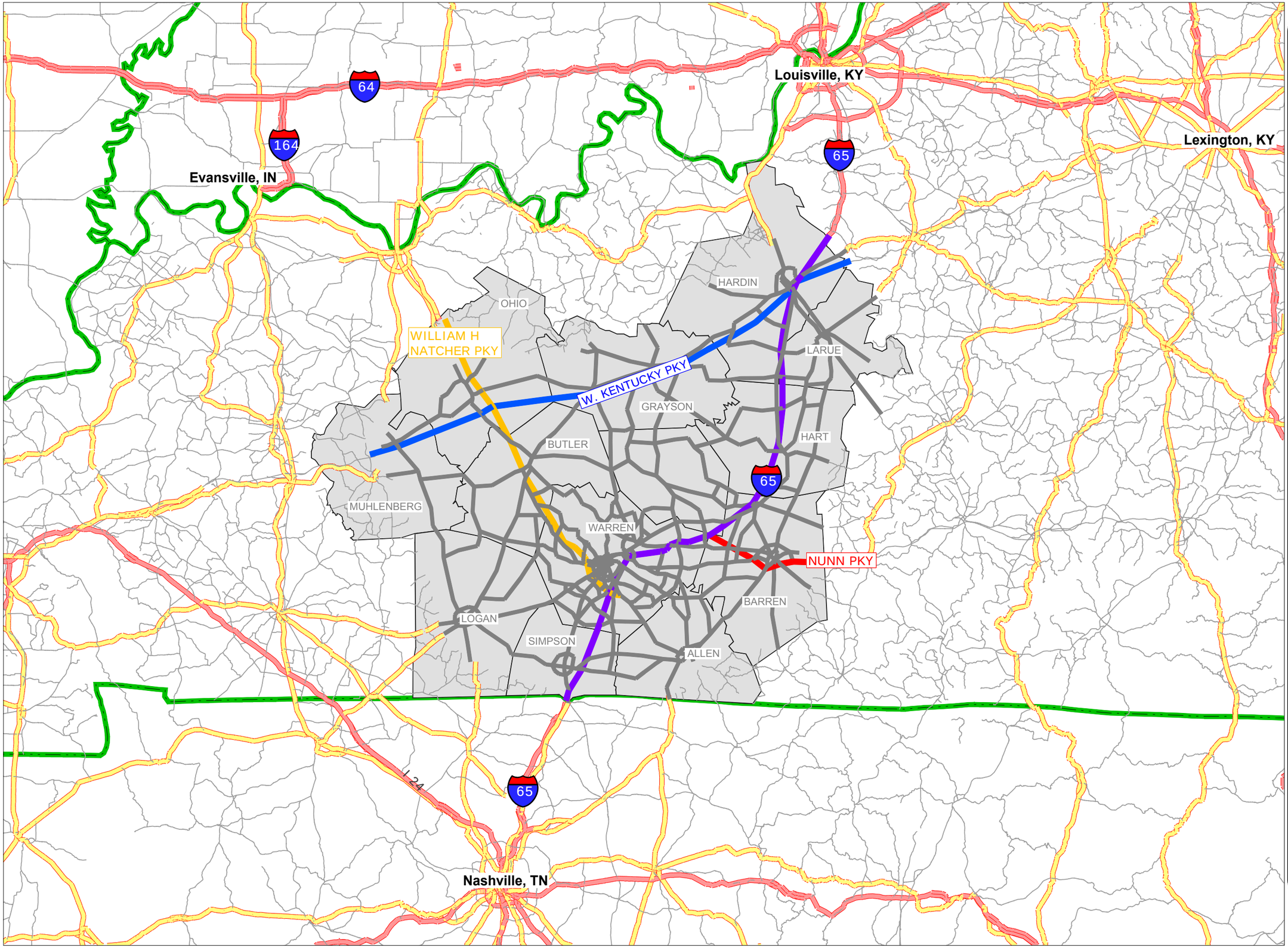
To ensure consistent trip generation throughout the region, the KySTM trip generation equations were used in the regional model; however, Western Kentucky University remains a special generator consistent with the Bowling Green Transportation Plan Travel Model. To ensure consistency with other KYTC traffic studies, the KySTM protocols for roadway link attributes and roadway capacities were used throughout the region. A unique speed-functional class table was created for the Regional Travel Model. On the other hand, the gravity model aspect of the Bowling Green Transportation Plan Travel Model was expanded to the entire region for internal trip distribution. Congestion is also recognized in the choice of travel paths through application of capacity constraint in the Regional Travel Model (similar to the Bowling Green Transportation Plan Travel Model).

[1] *Kentucky Statewide Traffic Model: Final Calibration Report*; prepared for Kentucky Transportation Cabinet by Wilbur Smith Associates; April, 1997. *Kentucky Statewide Traffic Model Update*; prepared for Kentucky Transportation Cabinet by Wilbur Smith Associates; January, 2001. *Traffic Model Coordination for the I-66 (Southern Kentucky) Corridor*; prepared for Kentucky Transportation Cabinet by Wilbur Smith Associates; October 5, 2001.

[2] Bowling Green Transportation Plan; prepared for Kentucky Transportation Cabinet by HNTB; August, 2000. Bowling Green/Warren County, Kentucky Travel Demand Forecasting Model: Documentation of Model Extension and Validation; prepared for Kentucky Transportation Cabinet by HNTB; June, 2000.

Figure 5

Regional Travel Model Geographic Area and Network Coverage



N
W E
S

Map Legend

Map Layers
- State (High)
- Model Area Counties
- Model Network

Key Corridors
- Western Kentucky Parkway
- Natcher Parkway
- I-65
- Nunn Parkway

Street Type
- Highway
- Highway (Divided)
- Primary
- Secondary
- Local
- Vehicle Trail
- Other

0 8 16 24
Miles

BERNARDIN LOCHMUELLER & ASSOCIATES, INC

In conclusion, the Regional Travel Model reflects 2000 Census and year 2000 employment data, provides greater network and travel analysis zone (TAZ) detail than either of the source travel models, incorporates new year 2030 socioeconomic forecasts for TAZs (as later described), and better replicates actual traffic volumes than either of the source travel models.

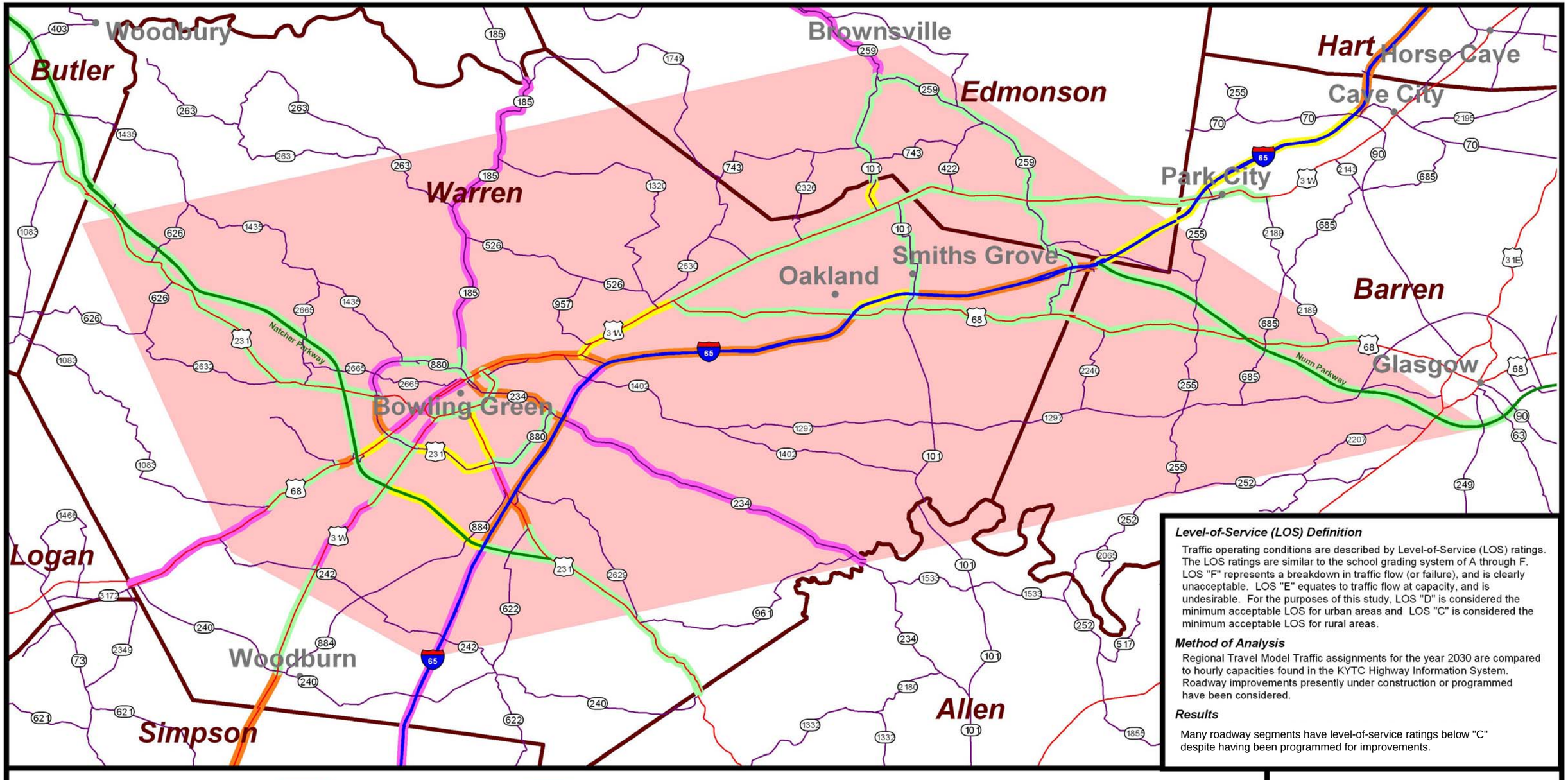
G. Future Traffic Volumes and Level-of-Service (No Build Traffic Conditions)

Future travel in the year 2030 was assigned to the No Build (Existing-Plus-Committed) Roadway Network based on the Kentucky Statewide Traffic Model (KySTM) and the Kentucky State Data Center (SDC) growth scenarios. While both assignments included the through traffic associated with assumed completion of I-66 throughout the Commonwealth, the Kentucky State Data Center population forecasts result in slightly higher traffic assignments. The resulting traffic conditions for two growth scenarios appear in Table 3 for major facilities in Warren County. Figure 6 shows the level-of-service for the Study Area for the SDC growth scenarios. (Refer to Appendix B Figures 14 through 17 of the Traffic Analysis Technical Memorandum for additional LOS displays on the two growth scenarios based on the Regional Travel Model.)

Referring to Table 3, I-65 as a six-lane facility fails to achieve minimum acceptable level-of-service standards in rural and urban areas in the year 2030 for both the Kentucky Statewide Traffic Model (KySTM) and State Data Center growth forecasts in Warren County. In fact, only two segments in Barren County achieve LOS C under the lower KySTM forecast.

I-65. This means that I-65 would have to be widened to at least eight lanes to achieve LOS C (less than 95,680 vehicles per day) in rural areas and LOS D (less than 113,390 vehicles per day) in urban areas, provided trucks are only 25 percent of the total daily traffic volume. At present, trucks represent 40 percent of the total daily traffic volume. If this high percent of trucks continues into the future, even eight lanes will not be sufficient to achieve a LOS D (less than 86,000 vehicles per day) on the urban stretch of I-65 between US 231 and KY 446.

US 31W. While the programmed four-laning of US 31W from Memphis Junction Road to US 231 (Campbell Lane) addresses year 2000 LOS E and F problems on this segment, year 2000 LOS E and F problems from KY 242 to Memphis Junction Road and from US 231 (Campbell Lane) to Business US 231 (University Drive) grow worse by the year 2030. Further, under the SDC Growth Scenario, US 31W drops to LOS E from the Simpson County Line to KY 240 and US 68 (Riverside Drive) to KY 446. From Jackson Grove Church Road to US 68, US 31W drops to LOS D in the year 2030 under both growth scenarios.



Level-of-Service (LOS) Definition

Traffic operating conditions are described by Level-of-Service (LOS) ratings. The LOS ratings are similar to the school grading system of A through F. LOS "F" represents a breakdown in traffic flow (or failure), and is clearly unacceptable. LOS "E" equates to traffic flow at capacity, and is undesirable. For the purposes of this study, LOS "D" is considered the minimum acceptable LOS for urban areas and LOS "C" is considered the minimum acceptable LOS for rural areas.

Method of Analysis

Regional Travel Model Traffic assignments for the year 2030 are compared to hourly capacities found in the KYTC Highway Information System. Roadway improvements presently under construction or programmed have been considered.

Results

Many roadway segments have level-of-service ratings below "C" despite having been programmed for improvements.

Figure 6:
Year 2030 Level-of-Service with Committed Roadway Improvements (State Data Center Growth Scenario) Constitutes "No Build" Option Conditions

Sources: Kentucky Transportation Cabinet Highway Information System (HIS) for average daily traffic counts and historical annual growth rates by facility classification.
Bernardin-Lochmueller & Associates, Inc. for LOS analysis based on the "Highway Capacity Manual" (1994).

Table 3: Future Traffic Volumes and Level-of-Service for No Build Corridor

Route	Segment	Functional Class (b)	Existing Year 2000				No Build Alternative (E+C Network)					
									Statewide Traffic Model		State Data Center	
			Lanes	Hourly Capacity (c)	2000 ADT	LOS (e)	Lanes	Hourly Capacity (c)	2030 ADT	Future LOS	2030 ADT	Future LOS
I-65	Simpson Co. Line to Natcher Pkwy	1	4	2,985	36,800	D	4	2,985	49,300	F	51,900	F
	Natcher Pkwy to US 231	11	4	2,940 (d)	44,800	E	6	4,305	69,000	E	76,700	E
	US 231 to KY 234	11	4	2,940 (d)	44,500	E	6	4,305	78,600	E	86,700	E
	KY 234 to KY 446	11	4	2,940 (d)	44,500	E	6	4,305	84,000	E	97,300	F
	KY 446 to US 68	1	4	2,943	42,400	E	6	4,305	69,400	E	81,300	E
	US 68 to KY 101	1	4	2,943	44,500	E	6	4,305	61,100	D	63,700	D
	KY 101 to Louie B. Nunn Pkwy	1	4	2,943	36,500	D	6	4,305	61,700	D	69,300	E
	Nunn Pkwy to KY 255	1	4	2,550	29,800	D	6	4,305	49,100	C	54,100	D
	KY 255 to KY 70	1	4	2,550	30,700	D	6	4,305	49,100	C	54,100	D
	KY 70 to Hart Co. Line	1	4	2,550	32,200	D	6	4,305	60,800	D	67,800	E
Natcher Parkway	I-65 to US 31W	12	4	3,991	13,600	A	4	3,265	41,000	C	47,800	D
	US 31W to US 68	12	4	3,991	13,800	A	4	3,991	37,800	C	42,800	C
	US 68 to US 231	12	4	3,991	7,820	A	4	3,991	21,800	B	24,300	B
	US 231 to KY 79	2	4	3,603	8,490	A	4	3,603	17,200	A	19,200	B
Nunn Parkway	I-65 to US 31E	12	4	3,603	6,920	A	4	3,603	17,000	B	15,200	A
	US 31E to KY 90	2	4	3,265	8,670	A	4	3,265	18,200	B	19,800	B
US 31W	Simpson Co. Line to KY 240	7	2	1,837	5,420	A	2	1,837	13,600	D	13,900	E
	KY 240 to KY 242	7	2	1,837	8,230	B	2	1,837	11,000	C	9,500	C
	KY 242 to Memphis Junction Road	7	2	1,349	10,700	E	2	1,349	25,900	F	27,800	F
	Memphis Junction Rd. to Natcher Pkwy	16	2	1,349	11,600	E	4	3,352	31,200	C	37,200	C
	Natcher Pkwy to US 231 (Campbell Lane)	16	2	1,010	17,300	F	4	3,352	27,800	C	31,200	C
	US 231 to Business US 231 (University)	16	2	1,446	17,300	F	2	1,446	19,100	F	20,700	F
	Bus. US 231 (University) to Bus. US 231	16	4	2,828	19,400	B	4	2,828	24,900	C	26,600	C
	Bus. US 231 (Scottsville Rd.) to KY 234	16	4	2,828	20,600	B	4	2,828	27,800	C	31,000	C
	KY 234 to US 68 (Louisville Rd.)	16	4	2,828	22,000	B	4	2,828	24,000	C	25,700	C
	US 68 (Riverview Dr.) to KY 446	14	4	2,828	30,800	C	4	2,828	39,900	D	42,700	E
	KY 446 to Jackson Grove Church Rd.	16	4	2,461	22,500	C	4	2,461	30,800	D	32,400	D
	Jackson Grove Church Rd. to US 68	7	4	2,649	12,200	A	4	2,649	29,700	D	30,600	D
	US 68 to KY 743	7	2	1,361	7,140	C	2	1,361	5,300	B	6,900	C
	KY 743 to KY 101	7	2	1,346	3,240	A	2	1,346	6,600	C	8,300	C
	KY 101 to Edmonson Co. Line	7	2	1,376	3,240	A	2	1,376	4,200	A	6,000	B
	Warren Co. Line to KY 259	7	2	1,361	1,790	A	2	1,361	1,400	A	2,000	A
	KY 259 to Barren Co. Line	7	2	1,332	1,950	A	2	1,332	2,500	A	3,300	A
	Edmonson Co. Line to KY 255	7	2	1,797	2,100	A	2	1,797	2,500	A	2,900	A
	KY 255 to KY 90	7	2	1,817	3,130	A	2	1,817	3,800	A	4,300	A
US 68/ KY 80	Logan Co. Line to KY 240	2	2	1,509	8,580	C	2	1,509	14,500	F	15,300	F
	KY 240 to KY 242	2	2	1,608	4,560	B	2	1,608	13,000	E	17,100	F
	KY 242 to KY 1083	2	2	1,608	9,870	C	2	1,608	14,800	F	17,400	F
	KY 1083 to KY 432	2	4	2,526	14,400	B	4	2,526	26,000	C	26,800	C
	KY 432 to Natcher Pkwy	14	4	2,526	20,600	B	4	2,526	37,800	E	40,200	E
	Natcher Pkwy to KY 880/US 231	14	4	2,534	26,400	C	4	2,534	34,700	D	37,400	D
	KY 880 to Business US 231	14	2	1,305	19,000	F	2	1,305	30,200	F	30,400	F
	Business US 231 to US 31W	14	4	1,538	17,000	C	4	1,538	30,100	F	30,100	F
	US 31W to Sunnyside Road	7	2	1,754	2,820	A	2	1,754	6,300	B	10,100	C
	Sunnyside Rd. to I-65.	7	2	1,412	2,150	A	2	1,412	5,000	B	8,700	C
	I-65 to KY 101	7	2	1,461	3,090	A	2	1,461	6,900	C	8,900	C
	KY 101 to Barren Co. Line	7	2	1,445	2,810	A	2	1,445	3,700	A	3,600	A
	Warren Co. Line to KY 685	7	2	1,397	2,980	A	2	1,397	4,500	A	4,900	B

Note: (a) The highest average daily traffic (ADT) volume and worst LOS are shown for a segment when multiple values are available from the KYTC HIS. Shaded values fail to meet minimum acceptable LOS C for rural areas and LOS D for urban areas.

Table 3: Future Traffic Volumes and Level-of-Service for No Build Corridor

Route	Segment	Functional Class (b)	Existing Year 2000				No Build Alternative (E+C Network)					
									Statewide Traffic Model		State Data Center	
			Lanes	Hourly Capacity (c)	2000 ADT	LOS (e)	Lanes	Hourly Capacity (c)	2030 ADT	Future LOS	2030 ADT	Future LOS
US 231	Allen Co. Line to KY 961	2	2	1,546	4,710	B	4	2,220	13,400	B	15,700	B
	KY 961to KY 2629	2	2	1,546	7,880	C	4	2,220	13,200	B	16,700	B
	KY 2629 to KY 622	2	2	1,310	24,400	F	4	2,220	20,700	C	24,800	C
	KY 622 to I-65	14	4	2,220	26,400	D	4	2,220	24,000	C	34,600	E
	I-65 to KY 880 (Lovers Lane)	14	4	2,732	39,600	E	4	2,732	45,100	F	47,900	F
	KY 880 over Campbell to US 31W	14	4	2,636	27,700	C	4	2,636	33,500	D	34,500	D
	US 31W over Campbell to US 68	14	4	2,636	20,200	B	4	2,636	21,500	C	22,500	C
	US 68 to KY 880	16	2	1,618	10,400	C	2	1,618	14,700	E	15,100	E
	KY 880 to Natcher Pkwy	16	2	1,618	10,100	A	4	3,352	18,200	B	18,600	B
	Natcher Pkwy to KY 2632	7	2	1,445	5,920	B	2	1,445	6,900	C	7,500	C
	KY 2632 to Butler Co. Line	7	2	1,445	2,350	A	2	1,445	3,000	A	3,500	A
Business US 231	KY 880 (Lovers Ln.) to US 31W	16	4	3,115	34,600	C	4	3,115	36,900	D	38,800	D
	US 31W to US 68 (University Dr.)	16	4	3,018	19,600	B	4	3,018	24,900	C	26,600	C
	US 68 (Russellville Rd.) to KY 880	16	2	1,554	10,900	D	2	1,554	15,400	F	15,900	F
KY 101	Allen Co. Line to KY 1297	7	2	1,531	1,240	A	2	1,531	3,200	A	4,400	A
	KY 1297 to US 68	7	2	1,421	1,810	A	2	1,421	3,400	A	5,300	B
	US 68 to I-65	7	2	1,503	3,160	A	2	1,503	5,600	B	6,000	B
	I-65 to US 31W	6	2	1,412	5,010	B	2	1,412	7,300	C	7,300	C
	US 31W to Edmonson Co. Line	6	2	1,616	3,290	A	2	1,616	7,200	C	10,800	D
	Edmonson Co. Line to KY 259	6	2	1,381	5,340	B	2	1,381	7,000	C	6,900	C
KY 185	US 68 to KY 880/Gordon Ave.	16	2	1,569	14,800	E	4	2,995	23,700	B	24,600	B
	KY 880 to Double Springs Road	16	4	2,995	10,300	A	4	2,995	14,200	A	14,600	A
	Double Springs Rd. to Garvin Lane	16	2	1,569	10,100	C	2	1,569	14,200	F	14,600	F
	Garvin Lane to Butler Co. Line	7	2	1,344	10,600	E	2	1,344	13,700	F	14,000	F
KY 234	KY 961 to I-65	7	2	1,333	5,920	B	2	1,333	26,700	F	30,900	F
	I-65 to Hayes Lane	16	2	1,569	18,300	F	4	2,636	38,500	E	42,600	E
	I-65 to US 68 (Kentucky St.)	16	4	1,955	21,700	C	4	1,955	27,900	D	28,000	E
KY 259	US 68 to Edmonson Co. Line	8	2	1,381	204	A	2	1,381	1,000	A	1,000	A
	Warren Co. Line to US 31W	8	2	1,381	1,090	A	2	1,381	800	A	800	A
	US 31W to KY 101	8	2	1,381	1,480	A	2	1,381	1,500	A	1,500	A
	KY 101 to KY 70	6	2	1,381	4,710	B	2	1,381	8,200	C	12,300	F
KY 446	I-65 to US 31W	14	4	3,180	13,900	A	4	3,180	38,300	D	43,100	E
KY 880	KY 185 (Gordon Ave.) to KY 1435	16	4	3,108	13,100	A	4	3,108	22,500	B	22,700	B
	KY 1435 to US 231 (Morgantown Rd.)	6	2	1,569	11,800	E	2	1,569	20,400	F	20,200	F
	US 231 (Scottsville Rd.) to KY 234	17	2	1,569	12,800	F	4	2,660	19,100	C	22,900	C

Source: Bernardin-Lochmueller & Associates, Inc.

Notes: (a) The highest average daily traffic (ADT) volume and worst LOS are shown for a segment when multiple values are available from the KYTC HIS. Yellow shaded values fail to meet minimum acceptable LOS C for rural areas and LOS D for urban areas. Green shaded lanes are programmed for widening.

(b) Functional Class: 1 = rural interstate, 2 = rural principal arterial, 6 = rural minor arterial, 7 = rural major collector, 8 = rural minor collector, 11 = urban interstate, 12 = urban other freeway, 14 = urban principal arterial, 16 = urban minor arterial, 17 = urban collector

c) Existing hourly capacity at service flow for LOS E as reported in the KYTC Highway Information System. For two-lane facilities, the cited capacity is for both directions. For four or more lane facilities, the cited capacity is for one direction only.

(d) KYTC Highway Information System hourly capacity for level terrain (3,880 vph) replaced by hourly capacity for rolling terrain (2,940 vph).

(e) Level-of-Service versus V/C ratio comparison: See Appendix B: Traffic Analysis Technical Memorandum, Table 2.

US 68/KY 80. Without programmed improvements, the two-lane segment of US 68/KY 80 from KY 880 (Campbell Lane) to Business US 231 (Morgantown Road) continues to experience LOS F into the future. In the future, University Drive and the one-way pair of Adams Street/Kentucky Street (US 68/KY 80) from Old Morgantown Road to KY 234 (6th Avenue) also begin to experience LOS E and F operational problems.

US 231. While the programmed four-laning of US 231 (Scottsville Road) from KY 2629 (Old Scottsville Road to KY 622 (Plano Road) addresses existing operational problems for this segment, other segments of US 231 from KY 622 to KY 880 (Campbell Lane) experience greater congestion in the future. Further, the two-lane segment of Veterans Memorial Lane (US 231) from US 68 to Business US 231 (Morgantown Road) drops to LOS E in the future.

US 231 Business. The two-lane section of Morgantown Road (US 231) begins to experience future operational failure from US 68 (Russellville Road) to Veterans Memorial Lane (KY 880/US 231).

KY 185. While the four-laning of KY 185 (Veterans Memorial Lane) from US 68 (Kentucky Street) to Gordon Avenue improves operations over the year 2000, the remaining two-lane segments of KY 185 from Double Springs Road to the Butler County Line experience operational failure in the year 2030.

KY 234. Despite the programmed four-laning of KY 234 (Cemetery Road/Fairview Avenue) from I-65 to Haynes Lane (that has been recently completed), Cemetery Road/Fairview Avenue/6th-7th Avenue will experience LOS E and F conditions from east of I-65 to US 68 (Kentucky Street) in the future.

KY 446. Finally, KY 446 drops to LOS D under the KySTM growth scenario and to LOS E under the SDC growth scenario by the year 2030.

III. GENERAL ENVIRONMENTAL OVERVIEW

An environmental study was conducted in the Study Area to identify significant human and natural environmental areas of concern. These areas were considered in the development of corridors to avoid environmental "hot spots" where possible and to minimize potential impacts otherwise. The purpose of this overview is also to show the potential human and natural environmental impacts associated with the construction of each of the seven "build" corridors. The complete Environmental Overview report is located in Appendix C.

In the first phase of the study, information was extrapolated through Geographic Information System (GIS) data gathered from numerous sources including coordination with various local, state and federal agencies. From the information gathered, an environmental "footprint" map was prepared to illustrate the known areas of concern (e.g. streams, wetlands, karst features, churches, schools, etc.). In the second stage of the study, information was supplemented through additional coordination with local, state and federal agencies along with information obtained from windshield surveys of the local area. In addition, information was gathered through public and agency meetings regarding issues of concern within the Study Area.

A. General Overview

The Study Area is located primarily in Warren County, Kentucky with smaller portions in Edmonson County and Barren County. Warren County is located in south-central Kentucky in the Mississippian Plateau Physiographic region. The I-66 Corridor Study Area is generally bisected by I-65 with the Natcher Parkway at the western boundary and the Nunn (Cumberland) Parkway at the eastern boundary. The waterway draining the majority of the Study Area is the Barren River, which flows through the western portion of the Study Area from southeast to northwest through Bowling Green. Main tributaries of the Barren River in the Study Area include the Gasper River northwest of Bowling Green and the West Fork of Drakes Creek southeast of Bowling Green. The Barren River drains into the Green River north of the Study Area. The Green River flows through Mammoth Cave National Park generally east to west, just outside of the Study Area to the north. The Green River also directly drains a smaller portion the Study Area to the north and east prior to its confluence with the Barren River.

A large portion of the Study Area is drained via underground flow largely associated with the karst plain that generally runs through the center of the Study Area from Park City to Bowling Green. The majority of this area also drains southwest to the Barren River, while a smaller portion to the north and east flows through the Mammoth Cave Region to the Green River. This underground flow through the highly soluble limestone underlying the region has led to the formation of the extensive cave passages in the region. Although cave entry points and passageway locations are largely confidential, extensive cave passages

exist under the Study Area. The climate of the Study Area is characterized by having cold winters and warm summers with four (4) distinct seasons. The average annual temperature is 57 degrees Fahrenheit with an average precipitation of 47 inches.

B. Specific Human Environmental Considerations

1. Land Use

The Study Area includes a mixture of residential, agricultural, and forest land, as well as floodplains and wetlands. Agriculture is the dominant land use within the Study Area due to large expanses of sinkhole plain in the eastern portion of Warren County that extends into Barren County. Warren County ranks among the top 10 in the state for a variety of agricultural activities. Forestland is mainly restricted to northwestern Warren County and southern Edmonson County in the areas outside of the sinkhole plain. The Study Area is in the western mesophytic forest region, which is comprised of an Oak-Hickory forest along the Dripping Springs Escarpment. Primary residential areas are located in the vicinity of Bowling Green and in the northern portion of the Study Area in the vicinity of the towns of Smiths Grove and Oakland. More scattered residential development also occurs southeast of Bowling Green extending from US 231 (Scottsville Road), KY 234 (Cemetery Road) and KY 1402 (Porter Pike), as well as north of Bowling Green along KY 185.

2. Historic

Early settlement in the area consisted of hunters and trappers. After the initial settlement of the area, farmers began to immigrate to this region to farm the vast fertile sinkhole plain. As the population grew, the village of Bowling Green became the center of culture and trade in the area. Most of the historical structures within the Study Area can be found on the major historical roadways surrounding the city of Bowling Green and the communities of Oakland and Smiths Grove. A full report on historical resources is located in Appendix C.

3. Archaeology

The majority of the Study Area has high potential for encountering archaeological resources. The major areas of these high potential impacts include dissected and undissected regions associated with ridge tops and karst features. Past archaeological studies have found a total of 233 known recorded sites within the Study Area. Of the sites found 217 sites are prehistoric, eight (8) are historic, and eight (8) are a mix of the two. A complete report on archaeological resources can be found in Appendix C.

4. Hazardous Wastes and Underground Storage Tanks

Information regarding Comprehensive Environmental, Response, Compensation, and Liability Information System (CERCLIS) and the Resource Conservation and Recovery Information System (RCRIS) was used to identify any hazardous waste sites within the Study Area. Information from the Kentucky Department of Natural Resources Underground Storage Tank Division was used to identify UST sites within the Study Area as well. There was one (1) Resource Conservation and Recovery Act (RCRA) site and one (1) Underground Storage Tank (UST) site found within the final corridors. Additional sites may be uncovered in future studies when more detailed information on right-of-way is available. This would be the case especially where existing right-of-way is utilized.

C. Specific Natural Environmental Considerations

1. Threatened and Endangered Species

A total of 13 federally listed "endangered" and "threatened" species were identified within the study area and vicinity. These species included: catspaw, clubshell, fanshell, gray bat, Indiana bat, Mammoth Cave shrimp, northern riffleshell, orangefoot pimpleback, pink mucket, red-cockaded woodpecker, ring pink, rough pigtoe and Eggert's sunflower. Many of these species are mussels, which are located in mussel beds in the Barren River and Drakes Creek in the western portion of the Study Area. Two species are bats, which are found in caves associated with the karst topography as well as in forested areas throughout the Study Area. The Mammoth Cave shrimp, or Kentucky Cave shrimp is limited to the Turnhole Spring Groundwater Basin in the northeastern portion of the Study Area. In addition, many state listed "endangered" and "threatened" species were identified within the project area.

2. Wetlands and Water Quality

Wetland impacts within the Study Area are anticipated to be minimal. Due to the karst topography, wetlands and surface water, for that matter, are infrequent occurrences. All of the larger wetlands within the Study Area are along the Barren River and its larger tributaries. Numerous smaller isolated wetlands are scattered throughout the Study Area, the majority of these are anticipated to be sinkhole ponds.

Water quality issues for the Study Area are closely associated with the karst topography. There are three major underground drainage basins in the Study Area. These basins are Turnhole Spring, Lost River, and Graham Springs. The Turnhole Spring basin drains into the Green River, while the Lost River and the Graham Springs basins drain into the Barren River. Due to the susceptibility to runoff pollution, groundwater quality in karst areas is of greater concern than in

non-karst areas because of the speed with which runoff reaches the groundwater in karst areas. Karst drainage concerns will be an issue with all potential corridors.

3. Geology and Soils

The Study Area falls into four (4) geologic regions. These regions include the Caseyville Hills, Mammoth Cave Plateau, Western Pennyroyal, and Central Pennyroyal. Most of the Study Area sits on top of highly soluble limestone of the Mississippian Age; this is the reason for the vast expanses of karst geology located in the region. A full report on geologic issues is included in Appendix D. A review of the Soil Survey for Warren County, Kentucky showed that main soil complexes within the project area are the Fredonia-Caneyville, Pembroke-Crider, Baxter-Nicholson, and Lawrence-Nicholson. Primary mineral resources in the Study Area are oil and gas, as well as limestone. The largest concentration of oil and gas wells occurs in the area north of Bowling Green.

4. Air Quality

Warren and Barren Counties are currently listed in Attainment status for the National Ambient Air Quality Standards (NAAQS); whereas, Edmonson County has been listed as Maintenance since January 3, 1995, for the 8-hour ozone standard. The Maintenance status for Edmonson County indicates that pollutant levels are approaching NAAQS limits. Both I-66 and the Bowling Green Outer Beltline are listed in the Kentucky Transportation Cabinet 2000 Six Year Highway Plan on page 272 and 273 respectively.

IV. INITIAL PUBLIC AND AGENCY PARTICIPATION

A. Early Coordination Meetings

The initial coordination meetings in the development of this Planning Study included meetings of the project team, state and local public officials and a Citizens Advisory Group (CAG) that was created for this project. A project timeline showing major meetings with these groups is included in Figure 7.

1. Project Team Meetings

Several project team meetings were held in the initial stages of project planning. The project team included KYTC District 3, KYTC Central Office Planning, Barren River Area Development District (BRADD), Federal Highway Administration (FHWA), Bernardin, Lochmueller & Associates, Inc. (BLA), H.C. Nutting Company, and the Kentucky Geological Survey. These early meetings were held to develop the study approach and public involvement process, define the Study Area, begin development of project goals, and review related project studies. Minutes from these meetings are included in Appendix E.

A project area was established that would allow corridor options both north and south of I-65 between the Natcher and Nunn (Cumberland) Parkways. Meetings with local officials and the Citizens Advisory Group (CAG) initiated the public involvement process. Additional public involvement activities included local media press releases, resource agency coordination meetings and public information meetings.

2. Meetings with State and Local Officials

The initial stakeholders and local officials meetings were held on July 11, 2001 and February 12, 2002. These meetings were held to inform the attendees about the status of the project, obtain background information on the project, and gain input on goals to be established for the project. Several issues were raised at these meetings including: the potential to utilize existing routes for I-66; the potential to utilize the Bowling Green Outer Beltline for I-66; environmental concerns relative to the karst landscape and water quality; the ability to accommodate existing land use plans and minimize sprawl; the relationship of I-66 to the Kentucky Tri-modal Transpark development; the amount of additional traffic that would be attracted by I-66; and the feasibility of I-66 in the Bowling Green area. Minutes from these meetings are included in Appendix E.

I-66 and Bowling Green Outer Beltline Timeline

Figure 7

Video on Purpose and Need and the Study Area shown on Insight Cable Channel #3 (Government Access).

Video revised to include Level 1 Corridors.

Video revised to include Level 2 Corridors.

2001

2002

2003

04/30/03 - PTM (KYTC BG District 3)

03/20/03 - Meeting with Loving and Freeport Communities

02/20/03 - PUBLIC INFORMATION MEETING (Red Cross Fire Department)

02/19/03 - PUBLIC INFORMATION MEETING (Alvaton Fire Department) 02/19/03 - Meeting with Bowling Green/Warren County Planning Commission

02/18/03 - PUBLIC INFORMATION MEETING (Chalybeate Fire Department)

02/13/03 - PUBLIC INFORMATION MEETING (Smiths Grove Fire Department) 02/13/03 - Meeting with Bowling Green Mayor & Warren County Judge Executive

02/12/03 - PUBLIC INFORMATION MEETING (Bowling Green)

02/11/03 - PUBLIC INFORMATION MEETING (Richardsville Fire Department)

02/04/03 - CAG (KYTC BG District 3)

01/16/03 - Environmental Agency Review (Mammoth Cave National Park)

12/06/02 - PTM (KYTC BG District 3)

11/21/02 - TOWN MEETING (Smiths Grove Fire Department)

11/14/02 - TOWN MEETING (Hadley Fire Department)

11/12/02 - PTM (Frankfort)

10/25/02 - TOWN MEETING (Gott Fire Department)

10/24/02 - TOWN MEETING (Barren River Fire Department)

10/21/02 - PTM (KYTC BG District 3)

10/16/02 - Meeting with the Estes Family at Donita's in Smiths Grove

10/10/02 - Billy Goat Hill Field Review (Willis Grimes)

10/08/02 - TOWN MEETING (Alvaton Fire Department) 10/07/02 - Presented Information to the IAAP

10/05/02 - TOWNMEETING - Plano Annual Fire Department (Plano Baptist Church Community Center)

09/30/02 - TOWN MEETING (Chalybeate Fire Department)

09/23/02 - TOWN MEETING (Richardsville Fire Department)

09/16/02 - Classroom Presentation (Warren County Elementary School)

09/09/02 - Rocky Hill Field Review (Lynda Prather) 9/09/02 - Fire Chief's, Warren Co. (Plano Baptist Church Community Center)

09/04/02 - Emergency Mgt. Agency (EMA Building)

08/28/02 - Presented Information at the West Kentucky Transportation Committee Meeting

08/14/02 - PUBLIC INFORMATION MEETING (Brownsville Community Center)

08/13/02 - BOWLING GREEN PUBLIC INFORMATION MEETING (Train Depot) 8/13/02 - Radio Interview 8/13/02 - TV Interview

08/12/02 - Judge Buchanon (KYTC BG District 3) 8/12/02 - Planning, Zoning, & Public Works (KYTC BG District 3)

07/31/02 - PTM (Frankfort)

07/30/02 - Presented Information to the Noon Lions Club

07/19-20/02 - Booth at the Bowling Green Balloon Classic

07/18/02 - CAG (BRADD)

07/10/02 - PTM (KYTC BG District 3)

07/06/02 - Booth at the Butler County Catfish Festival

06/20/02 - BRADD Transportation Council Meeting

06/14/02 - Warren County Transportation Committee Meeting

06/11/02 - Allen County Transportation Committee Meeting

06/10/02 - Edmonson County Transportation Committee Meeting 6/08/02 - Presented Information to the Lewisburg City Council

06/08/02 - Booth at the Health and Wellness Fair

06/07/02 - Booth at the Hughes and Coleman Safety Fair

05/30/02 - Environmental Agency Review (Mammoth Cave Tour)

05/20/02 - PTM (KYTC BG District 3) 5/20/02 - Presented Information to the Leadership Bowling Green Class

05/16/02 - Metcalfe County Transportation Committee Meeting

05/10/02 - Booth at the First Annual Railfest

05/09/02 - BRADD Transportation Council Meeting

05/08/02 - Barren County Transportation Committee Meeting 5/08/02 - Simpson County Transportation Committee Meeting

05/06/02 - Butler County Transportation Committee Meeting

04/25/02 - Project Update (Frankfort)

04/17/02 - Meeting with Executive Board for the Intermodal Transportation Authority

04/12/02 - Project Update (Frankfort)

04/10/02 - Meeting with City Officials and Local Landowners in Park City

04/09/02 - Radio Interview on Drive Time

04/08/02 - Scottsville City Council Meeting

03/26/02 - Meeting with Weyerhouser Personnel

03/19/02 - Bowling Green Evening Lions Club

03/18/02 - Meeting with Judge Michael Buchanon and Mayor Sandy Jones

03/14/02 - Barren County Transportation Committee Meeting 3/14/02 - BRADD Transportation Council Meeting

03/08/02 - Radio Interview

03/07/02 - PUBLIC INFORMATION MEETING (BRADD)

03/04/02 - PUBLIC INFORMATION MEETING (Brownsville Community Center)

03/01/02 - Logan County Transportation Committee Meeting

02/27/02 - Monroe County Transportation Committee Meeting

02/22-24/02 - Warren County Home Expo Show

02/15/02 - Bowling Green / Warren County Transportation Committee Meeting

02/12/02 - Public Media, Local Officials, and Stakeholders - Background on Project (BRADD)

01/17/02 - PTM (KYTC BG District 3)

01/11/02 - Radio Interview

12/06/01 - CAG (BRADD)

11/08/01 - PTM (KYTC BG District 3)

11/05/01 - USFWS Coordination Meeting (Cookeville, TN)

10/18/01 - PTM (KYTC BG District 3)

09/19/01 - PTM (KYTC BG District 3)

08/30/01 - CAG (BRADD)

07/11/01 - Public Media, Local Officials, and Stakeholders Briefings (BRADD)

06/20/01 - Notice to Proceed

06/06/01 - PTM (KYTC BG District 3)

LEGEND

BRADD - Barren River Area Development District

BG - Bowling Green

KYTC - Kentucky Transportation Cabinet

CAG - Citizens Advisory Group Meeting

PTM - Project Team Meeting

USFWS - US Fish and Wildlife Service

Corridor Selection & Final Report Preparation

Screening of Final Corridors

Prel. Corridors & Dev. of Traffic Model (Field Review of Corridors)

Geographic Information System Layers

Project Goals

Project Development

3. Citizens Advisory Group

The Citizens Advisory Group (CAG) consisted of interested parties representing various communities and populations from the Study Area including towns, businesses, and industry and interest groups. The group was created as a representative group that could provide input from their constituencies as well as inform their constituencies about progress on the project and issues being addressed. Early Citizens Advisory Group meetings were held on August 30, 2001 and December 6, 2001. These meetings were held to obtain background information on the project, inform the group about the current status of the project, and receive comments on project goals. In addition, draft materials for the public information meetings were presented for feedback from the group. Issues raised by the CAG included: environmental concerns (i.e., karst impacts, cultural resource impacts, and pollution in general); access improvement as a result of I-66; potential upgrades to existing facilities; traffic impacts on I-66 and I-65 including truck traffic; and the potential diversion of traffic from I-65. Minutes from the Citizens Advisory Group meetings are included in Appendix E.

B. Initial Public Information Meetings

An initial set of public information meetings was held on Monday, March 4, 2002 at the Brownsville Community Center in Brownsville in Edmonson County and on Thursday, March 7, 2002 at the Barren River Area Development District Regional Conference Center in Bowling Green in Warren County. A total of 109 citizens attended the March 4th meeting and a total of 120 citizens attended the March 7th meeting. The primary focus of the meetings was to introduce the public to the I-66 Corridor Planning Study. The purpose of the Planning Study was to identify and evaluate interstate route corridors, including the "no-build" alternate, for I-66 between the Natcher Parkway and the Nunn (Cumberland) Parkway. The study would determine one or more corridors to be further examined in preliminary engineering and environmental studies. At the meeting, a project overview was presented to explain the purpose, issues, schedule and project goals for the Planning Study.

The public was also presented with an environmental footprint map of the Study Area. Attendees learned about typical issues addressed during roadway planning, design and construction. These issues include environmental, economic and engineering considerations, along with road building steps and timelines. The meeting focused on the importance of gaining public interest and involvement in development of the proposed corridors. A public comment survey was disseminated to the attendees so that the public could submit written ideas, opinions, and comments for consideration during the development of potential project corridors and for the identification of the impacts resulting from the proposed new interstate.

A total of 24 comment sheets on I-66 were returned to the KYTC from both public information meetings. The following represents a general summary of citizen's responses received:

1. Do you feel that a new interstate route between the Louie B. (Cumberland) Parkway and the Natcher Parkway would provide benefits to the area?
Eighty seven percent (87%) of the respondents indicated a new interstate would provide positive benefits by relieving traffic from I-65, reducing cross-town traffic, and stimulating economic growth and tourism for the surrounding counties and towns. Twelve percent (12%) of the respondents disagreed, stating a new route would promote urban sprawl, be too expensive to build, and have a plethora of environmental impacts.

2. Do you feel like this project would result in any problems for the area?
Thirty three percent (33%) of the respondents perceived problems resulting from the relocation of homes and businesses, environmental impacts and a waste of taxpayer money on unwanted construction. Sixty six percent (66%) of the respondents answered "no" to this question.

3. If a new roadway is built, where should it be located? Please feel free to draw on the map on the back of the survey.
Seven (7) respondents provided renderings of routes with locations ranging from north of Bowling Green to south of Bowling Green with connections to abutting counties.

4. What are the potential impacts of the project, both positive and negative? Are there problems, sensitive areas, special needs or other factors that should be considered in locating or designing the road?
Respondents indicated a special need for a new bridge across the Barren River. Increased revenue from expanded economic development opportunities and better connections to existing roads and highways was viewed as a positive benefit. Sensitive areas of concern included prime farmland, the Mammoth Cave area, historical sites, churches, cemeteries and the natural environment.

Copies of the March 2002 Public Meetings Summary, public comment surveys, summaries of citizen response sheets and additional I-66 Planning Study information are contained within the official meeting documentation entitled "Public Information Meeting, I-66/Bowling Green Eastern Outer Beltline, Warren/Edmonson Counties, Item Number 3-66, March 4 & 7, 2002." A summary of these meetings is included in Appendix E.

C. Initial Resource Agency Coordination

The first Resource Agency Coordination meeting was held at the Mammoth Cave National Park "Rotunda" Conference Room on May 30, 2002. In addition to the meeting, a coordination mailing soliciting comments regarding the project was sent to allow an opportunity for comments to be provided by agencies and stakeholders. The purpose of this meeting as well as the mailing was to brief the agencies about the initiation of the I-66 Planning Study, including early public involvement and data gathering, and to receive input on project issues, needs and concerns to provide guidance for the study team in the development of corridors relative to major issues of concern.

The major issues identified by various agencies in regard to the development of the project included: karst geology (caves, sinkholes, underground drainage, etc.); water quality; threatened and endangered species; future development; and traffic demand. The minutes of the meeting and comments received are included in Appendix F.

D. Project Goals

The project goals were developed through coordination with local officials, review agencies and the public, taking into account the legislation that originally identified I-66. The goals are also directed toward addressing the transportation needs of the Bowling Green region.

Based on the input received, these goals are to:

- Commitment: Support the completion of I-66 across southern Kentucky to carry out the legislative intent of the Intermodal Surface Transportation Efficiency Act (ISTEA), the National Highway Designation System (NHS) Act of 1995, and the Transportation Equity Act for the 21st Century (TEA21).
- Congestion: Provide an improved, efficient interstate facility between the Natcher Parkway and the Nunn (Cumberland) Parkway to allow for system continuity of I-66 from West Virginia to Missouri.
- Access: Improve accessibility throughout southern Kentucky to jobs, industry, urban centers, educational facilities, tourism and recreational facilities, with emphasis given to the Kentucky portions of the Appalachia and Lower Mississippi Delta regions.

It should be noted that a fourth goal concerning connectivity was added after these initial project goals were developed based on comments received. A discussion of the refinement of project goals can be found on page 49.

V. DEVELOPMENT OF CORRIDORS

A. Corridor Development Process

The evaluation of corridors for the I-66 Corridor utilized a three-step process, including data collection and Geographic Information System (GIS) development, followed by a Level 1 Screening of preliminary corridors and concluded with a more detailed Level 2 Screening of final corridors.

The evaluation process was initiated at the onset of the Planning Study with establishment of the project Study Area. This Study Area encompassed the geographic area to be investigated for the location of corridor routes; and, in this case, consisted of a generally trapezoidal shape stretching from the Natcher Parkway, northwest of Bowling Green, to the Nunn (Cumberland) Parkway, near Glasgow. The project Study Area is shown in Figure 1. Once the Study Area was established, known and published data were gathered relating to the physical characteristics, and the natural and man-made environments in the area. This information was then assimilated into a GIS that was used to establish the location of the 2,000-foot wide corridors.

Level 1 Screening involved a qualitative analysis focusing on the achievement of project goals. It identified the preliminary corridors that merited further consideration in a more detailed evaluation in a Level 2 Screening. The Level 1 Screening criteria consisted of a hierarchy of considerations starting with the fatal flaws that have the potential to result in a non-permittable action; projects goals which were established at the onset of the study; major environmental issues which include most of the key natural and man-made resources; engineering and traffic issues such as length, constructability and connectivity; and public and agency input. Each of the preliminary corridors was reviewed under each of the criteria, and given a yes/no answer or a high/medium/low rating. The advantages and disadvantages of each corridor were identified and any corridor not satisfying each of the project goals was eliminated from further consideration.

Following the Level 1 Screening, the corridors that merited further consideration were reviewed, and refinements were made to improve their performance and to avoid or reduce adverse impacts on certain natural and man-made resources. Each corridor's characteristics and their corresponding impacts were determined and quantified. The Level 2 Screening of the final corridors consisted of a detailed quantitative evaluation based on their engineering characteristics and their relative impacts on traffic and mobility, natural and man-made environmental impacts, and public and agency input.

B. Definition of the Study Area

1. Establishment of the Study Area

The KYTC 2000 Six-Year Highway Plan defined the termini for this segment of I-66 as from the Natcher Parkway to the I-65/Louie B. Nunn (Cumberland) Parkway interchange. However, to consider a full range of potential alternate corridors both north and south of Bowling Green from the Natcher Parkway to the Nunn (Cumberland) Parkway, the Study Area was expanded to incorporate the entire segment of the Nunn (Cumberland) Parkway between I-65 and Glasgow and the entire segment of the Natcher Parkway from I-65 to KY 626 (near Hadley). Thus, the termini would be the Natcher Parkway (north or south of Bowling Green) and the Nunn (Cumberland) Parkway (from I-65 to Glasgow). The Study Area encompasses approximately 462 square miles in a nearly trapezoidal shape as shown in Figure 1.

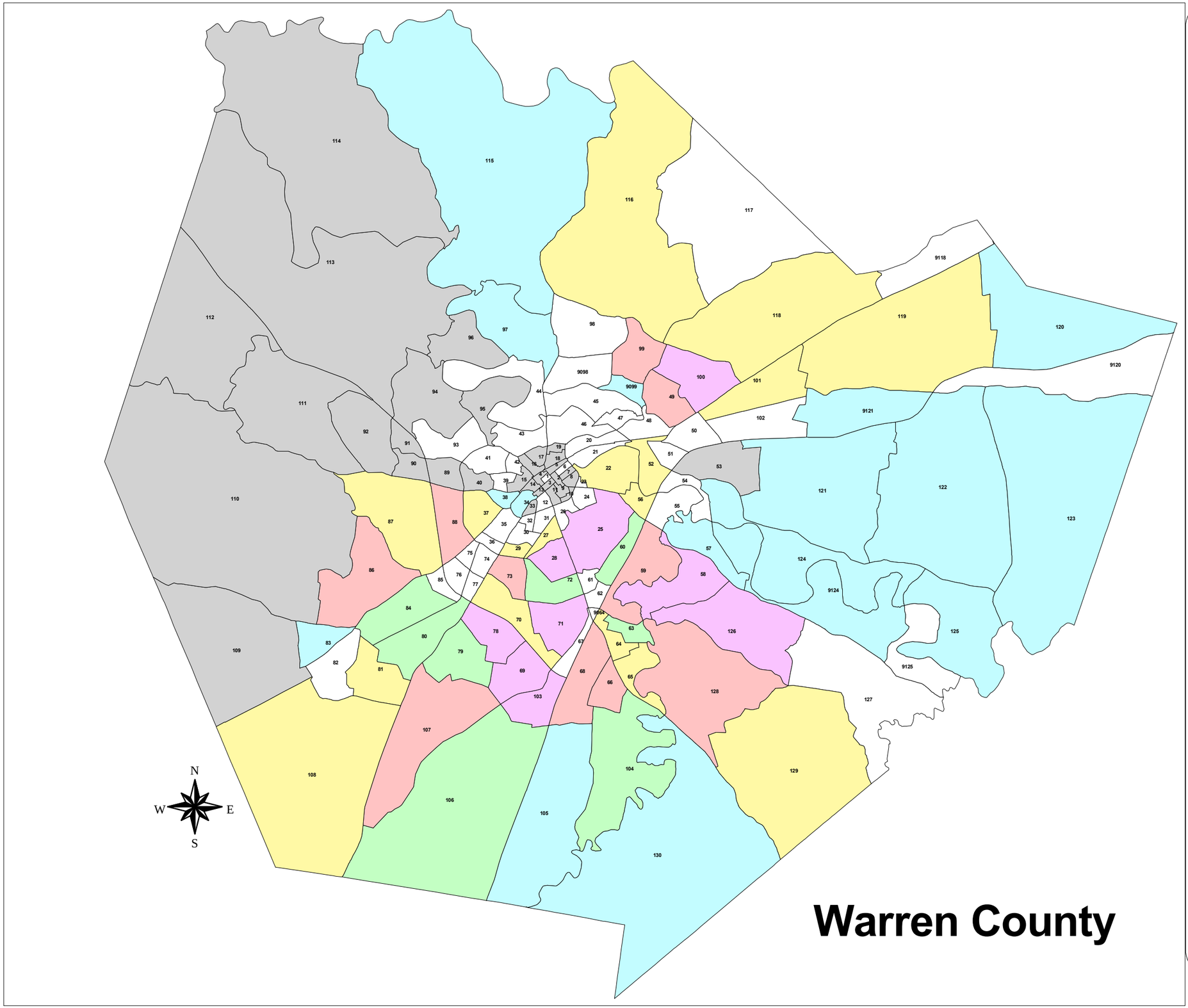
2. Future Conditions of the Study Area

The past growth trends within the project area have been and still are centered around the City of Bowling Green, with lesser amounts in Smiths Grove and Oakland. Residential development has been continuing to increase along the outer fringes of Bowling Green. Residential growth in Bowling Green has been predominantly in a southerly direction. Several subdivisions have been built in the areas along both sides of US 231 and east toward I-65. Business areas have developed in the vicinity of these homes to serve residents in these areas. Industrial developments have been expanding to the south along US 31W and to a greater extent, to the northeast in the US 31W corridor east of the Barren River.

Two scenarios were used to predict future population and employment growth in the Study Area for the year 2030. These data sources came from the Kentucky Statewide Traffic Model (KySTM) and the Kentucky State Data Center (SDC). The data from these two scenarios were derived from information acquired in the 2000 Census. The SDC year 2030 population forecast reflects the results of the 2000 Census, and is about 10% higher than the KySTM forecast. The SDC population forecast for Warren County in 2030 is 142,200, which is an increase of 49,700 from the 2000 Census. The KySTM population forecast for Warren County is 125,300 for the year 2030, an increase of 32,700 from the 2000 Census count. With the predicted growth in population and workers, comes more housing developments, businesses, and industry. Future growth was allocated on the basis of adopted comprehensive plans, recent development activity, and the industrial commercial parks directory by local city and county planning officials. In the future, residential growth is expected to continue on the southeast side of Bowling Green. A map illustrating population change for the SDC growth scenario (Figures 8) shows that growth trends will continue along the southern edge of Bowling Green with moderate growth occurring in the northeast along US 31W.

Figure 8

2000-2030 Population Change by TAZ
SDC Growth Scenario



Map Legend

High Population Forecast

2000-2030 Population Change by TAZ

G	-49 to -1
F	0 to 100
E	101 to 200
D	201 to 400
C	401 to 800
B	801 to 1600
A	Greater than 1600

0 2 4 6 Miles

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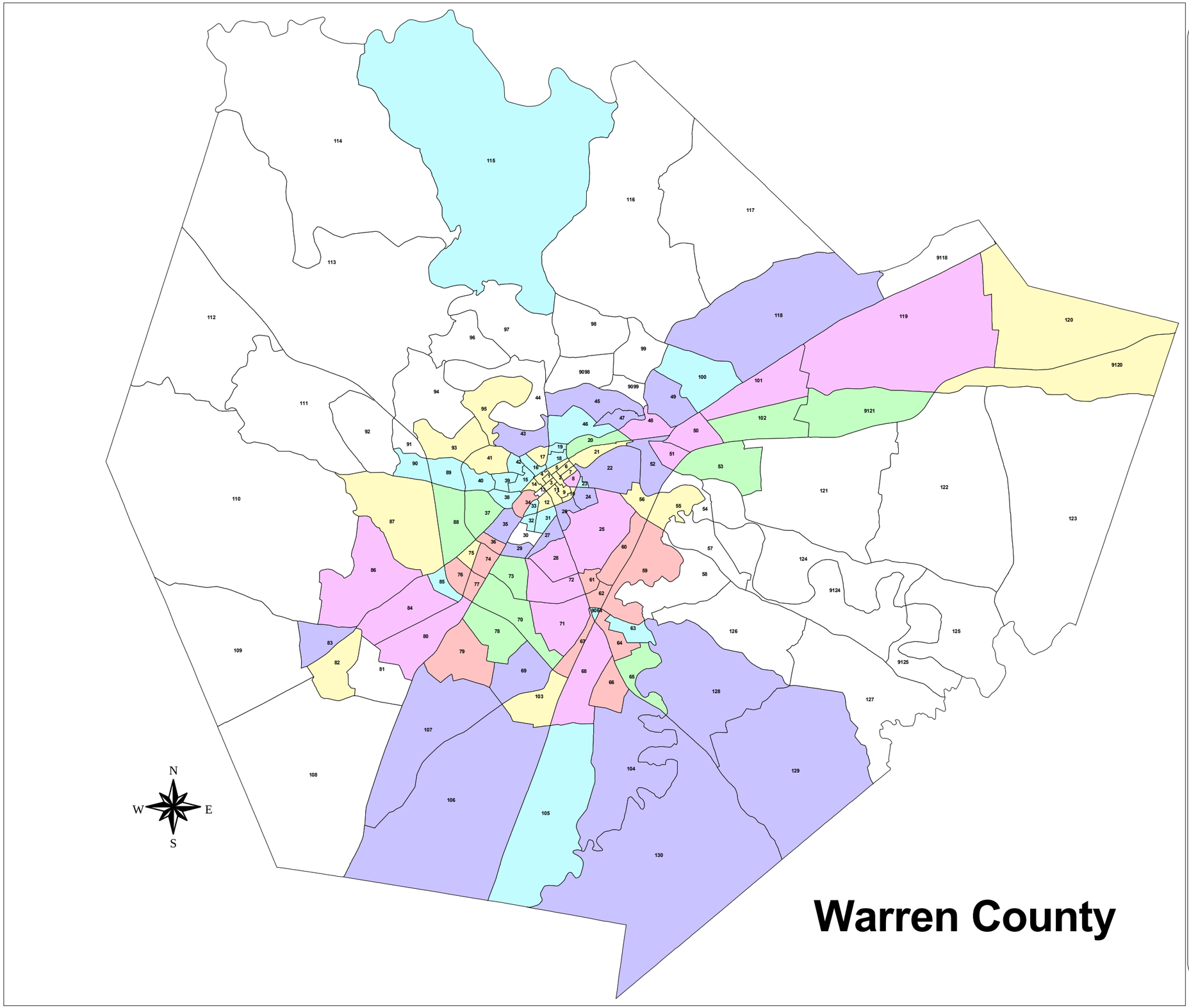
This map also shows that the northwestern portion of Warren County and Bowling Green will have a population decrease. The characteristics of employment change (Figure 9) follow the same pattern. The majority of the growth will once again be centered around Bowling Green with the greatest amount of growth occurring to the south and northeast of the city generally along the US 31W corridor. The KySTM growth scenario shows similar population and employment changes (refer to Appendix B).

The main reasons for these growth patterns are associated with terrain. The rough terrain in northwest Warren County is a hindrance to construction (including roads, sanitary sewers and waterlines). At the same time, the areas in the south and northeast are within the sinkhole plain, an area that is relatively flat. This area is more appealing to development because it is along traditional highway and rail routes and because public utilities are easier to extend. The northeastern region of Bowling Green also has high potential for development because of the proposed Kentucky Tri-modal Transpark project. If this project is realized, there may be a new airport and many more opportunities for industrial and commercial growth within this area.

Figure 9

2000-2030 Employment Change by TAZ
SDC Growth Scenario



Map Legend

High Employment Forecast
2000-2030 Employment Change by TAZ

G	0 to 10
F	11 to 50
E	51 to 100
D	101 to 200
C	201 to 400
B	401 to 800
A	Greater than 800

0 2 4 6 Miles

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C. Development of Initial Corridors

The preliminary corridors were developed based on several factors. Input received from agency coordination and the public was taken into account and several corridors were developed with a concerted effort to avoid identified environmental concerns. In addition to the "no build" option, twenty three (23) preliminary corridors were developed, which covered the entire Study Area. These corridors are described below and shown in Figure 10.

1. Description of Initial Corridors

Corridor 1 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it proceeds northwest on new terrain, crossing US 31W near Dripping Spring, before climbing the escarpment near KY 101. The corridor then continues in a westerly direction to parallel KY 1320, crossing KY 185 near Anna, and proceeds to just north of Richardsville. It then generally parallels KY 2631 west of Richardsville, crossing the Barren River at mile marker 7, and connects with the Natcher Parkway near Hadley. The total length of this corridor is 35.5 miles, with 29.6 miles utilizing new terrain.

Corridor 2 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it proceeds northwest on new terrain, crossing US 31W near Dripping Spring, before climbing the escarpment near KY 101. The corridor then continues in a westerly direction to parallel KY 1320, before taking a turn toward the southwest near Sand Hill. The corridor crosses KY 185 near its intersection with KY 526, crossing the Barren River at mile marker 19 and KY 1435 near the Barren River Fire Station #2, before connecting with the Natcher Parkway near Hadley. The total length of this corridor is 35.4 miles, with 29.5 miles utilizing new terrain.

Corridor 3 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it proceeds west northwest on new terrain, crossing KY 101 north of Smiths Grove and US 31W near Tuckertown. The corridor then continues in a northwest direction to parallel KY 1320, crossing KY 185 near Anna, and proceeds to just north of Richardsville. It then generally parallels KY 2631 west of Richardsville, crossing the Barren River at mile marker 7, and connecting with the Natcher Parkway near Hadley. The total length of this corridor is 41.1 miles, with 35.2 miles utilizing new terrain.

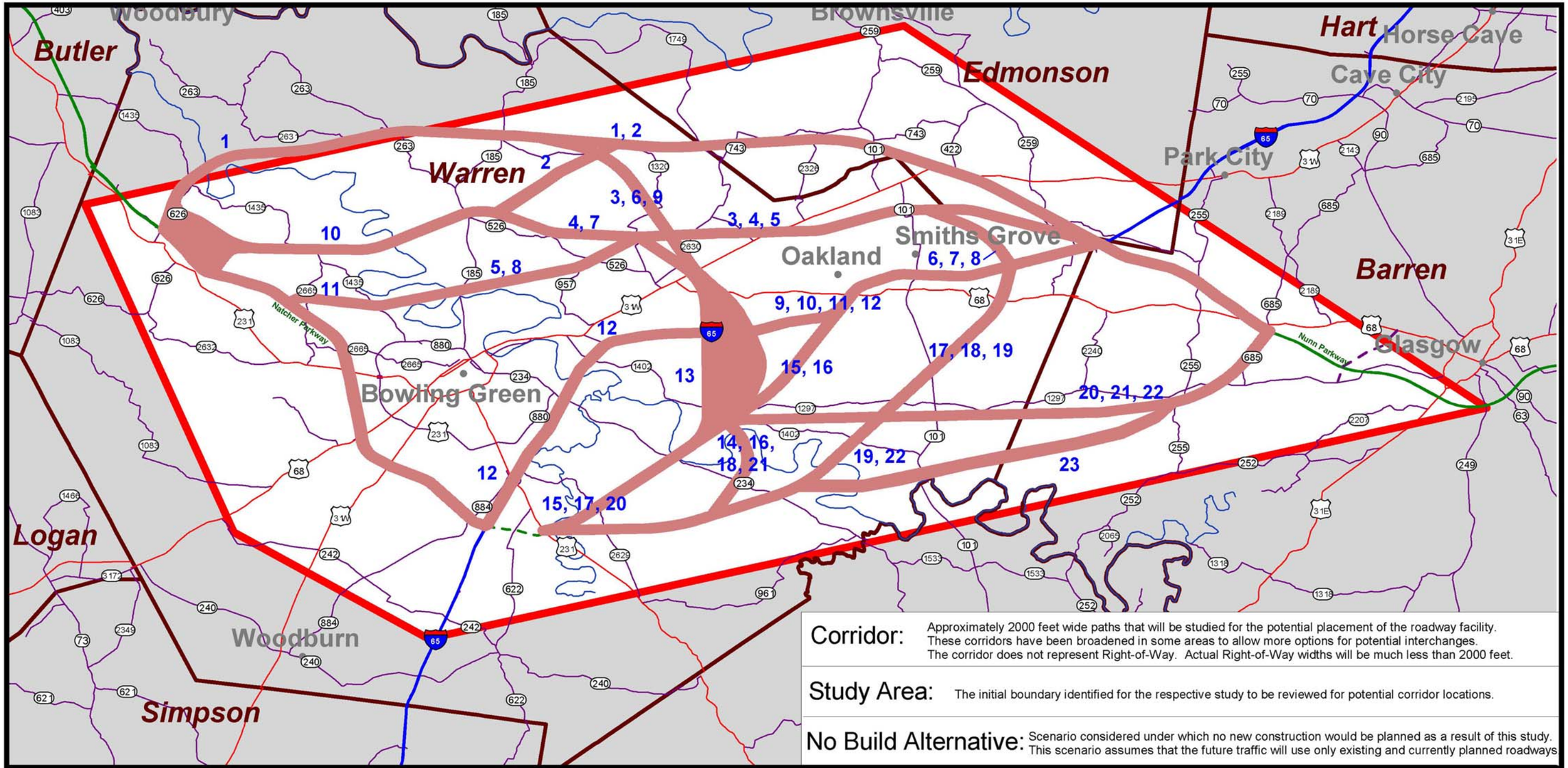


Figure 10
PRELIMINARY I-66 & BOWLING GREEN OUTER BELTLINE CORRIDORS

Corridor 4 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it proceeds west-northwest on new terrain, crossing KY 101 north of Smiths Grove and US 31W near Tuckertown. Unlike Corridors 1, 2 and 3, this corridor remains in the sinkhole plain and does not climb the escarpment. The corridor then continues in a westerly direction to parallel KY 526 and crosses KY 185 near its intersection with KY 526. It then travels west-southwest to cross the Barren River at mile marker 19 and KY 1435 near the Barren River Fire Station #2, before connecting with the Natcher Parkway near Hadley. The total length of this corridor is 34.1 miles, with 28.2 miles utilizing new terrain.

Corridor 5 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it proceeds west northwesterly on new terrain, crossing KY 101 north of Smiths Grove and US 31W near Tuckertown. Unlike Corridors 1, 2 and 3, this corridor remains in the sinkhole plain and does not climb the escarpment. The corridor then continues in a westerly direction, before turning southwest to intersect KY 526, near its intersection with KY 957. It then proceeds west-southwest to cross KY 185 near its crossing of the Barren River and continues to its own crossing of the Barren River at mile marker 26. The corridor continues to the west to connect with the Natcher Parkway south of Hadley near the KY 2665 bridge over the Natcher and follows the Natcher Parkway to the vicinity of Hadley. The total length of this corridor is 34.9 miles, with 24.3 miles utilizing new terrain.

Corridor 6 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately three (3) miles before proceeding northwest on new terrain, crossing KY 101 north of Smiths Grove and US 31W near Tuckertown. The corridor then continues in a northwesterly direction to parallel KY 1320, crossing KY 185 near Anna, and proceeds to just north of Richardsville. It then generally parallels KY 2631 west of Richardsville, crossing the Barren River at mile marker 7, and connects with the Natcher Parkway near Hadley. The total length of this corridor is 41.9 miles, with 33.3 miles utilizing new terrain and 2.7 miles of I-65 widening.

Corridor 7 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately three (3) miles before proceeding northwest on new terrain, crossing KY 101 north of Smiths Grove and US 31W near Tuckertown. Unlike Corridors 1, 2 and 3, this corridor remains in the sinkhole plain and does not climb the escarpment. The corridor then continues in a

westerly direction to parallel KY 526 and crosses KY 185 near its intersection with KY 526. It then proceeds west-southwest to cross the Barren River at mile marker 19 and KY 1435 near the Barren River Fire Station #2, before connecting with the Natcher Parkway near Hadley. The total length of this corridor is 34.9 miles, with 26.3 miles utilizing new terrain and 2.7 miles of I-65 widening.

Corridor 8 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately three miles before proceeding northwest on new terrain, crossing KY 101 north of Smiths Grove and US 31W near Tuckertown. Unlike Corridors 1, 2 and 3, this corridor remains in the sinkhole plain and does not climb the escarpment. The corridor then continues in a westerly direction, before turning southwest to intersect KY 526, near its intersection with KY 957. It then proceeds west-southwest to cross KY 185 near its crossing of the Barren River and continues to its own crossing of the Barren River at mile marker 26. The corridor continues to the west to connect with the Natcher Parkway south of Hadley near the KY 2665 bridge over the Natcher and follows the Natcher Parkway to the vicinity of Hadley. The total length of this corridor is 35.6 miles, with 22.3 miles utilizing new terrain and 2.7 miles of I-65 widening.

Corridor 9 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately 12 miles to the vicinity of Sunnyside-Gott Road before proceeding north on new terrain. This corridor is in the general vicinity of the Kentucky Tri-modal Transpark development and crosses US 68/KY 80 near Sunnyside and US 31W near Warren East High School. The corridor then continues in a northwesterly direction to parallel KY 1320, crossing KY 185 near Anna, and proceeding just north of Richardsville. It then generally parallels KY 2631 west of Richardsville, crossing the Barren River at mile marker 7, and connecting with the Natcher Parkway near Hadley. The total length of this corridor is 43.9 miles, with 27.9 miles utilizing new terrain and 12.1 miles of I-65 widening.

Corridor 10 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately 12 miles to the vicinity of Sunnyside-Gott Road before proceeding north on new terrain. This corridor is in the general vicinity of the Kentucky Tri-modal Transpark development and crosses US 68/KY 80 near Sunnyside and US 31W near Warren East High School. The corridor then continues in a westerly direction to parallel KY 526 and crosses KY 185 near its intersection with KY 526. It then proceeds west-southwest to cross the Barren River at mile marker 19 and KY 1435 near the Barren River Fire Station #2,

before connecting with the Natcher Parkway near Hadley. The total length of this corridor is 36.9 miles, with 18.9 miles utilizing new terrain and 12.1 miles of I-65 widening.

Corridor 11 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately 12 miles to the vicinity of Sunnyside-Gott Road before proceeding north on new terrain. This corridor is in the general vicinity of the Kentucky Tri-modal Transpark development and crosses US 68/KY 80 near Sunnyside and US 31W near Warren East High School. The corridor then continues in a westerly direction, before turning southwest to intersect KY 526, near its intersection with KY 957. It then proceeds west-southwest to cross KY 185 near its crossing of the Barren River and continues to its own crossing of the Barren River at mile marker 26. The corridor continues to the west to connect with the Natcher Parkway south of Hadley near the KY 2665 bridge over the Natcher and follows the Natcher Parkway to the vicinity of Hadley. The total length of this corridor is 37.7 miles, with 15.0 miles utilizing new terrain and 12.1 miles of I-65 widening.

Corridor 12 - This corridor can best be described as the "Improvement of Existing Routes" corridor since it utilizes the Nunn (Cumberland) Parkway, I-65 and the Natcher Parkway. It begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately 23 miles to the I-65/Natcher Parkway interchange. This corridor will likely include the widening of I-65 to accommodate I-66 traffic, as well as traffic using I-65. The corridor then continues in a northwesterly direction, utilizing the Natcher Parkway to the vicinity of Hadley. The total length of this corridor is 43.7 miles, with 22.6 miles of additional lanes on I-65.

Corridor 13 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately 12 miles to the vicinity of Sunnyside-Gott Road before proceeding south on new terrain. This corridor would likely utilize the same interchange as a planned roadway to be constructed to connect I-65 with US 31W in the general vicinity of the Kentucky Tri-modal Transpark development. The corridor then continues in a southwesterly direction, to a crossing of the Barren River at mile marker 48. It continues to the southwest, crossing Drake's Creek and connecting with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 44.7 miles, with 9.6 miles utilizing new terrain and 12.1 miles of I-65 widening.

Corridor 14 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately 12 miles to the vicinity of Sunnyside-Gott Road before proceeding south on new terrain. This corridor would likely utilize the same interchange as a planned roadway to be constructed to connect I-65 with US 31W in the general vicinity of the Kentucky Tri-modal Transpark development. The corridor then continues in a southerly direction, to a crossing of the Barren River at mile marker 51. After crossing the Barren River, this corridor turns to the west and continues westerly to cross Drake's Creek and connect with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 49.8 miles, with 14.7 miles utilizing new terrain and 12.1 miles of I-65 widening.

Corridor 15 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately eight (8) miles to just west of the I-65/US 68-KY 80 interchange before proceeding southwest on new terrain. This corridor would likely require reconfiguration or elimination of this interchange to accommodate a system-to-system interchange. The corridor then continues in a southwesterly direction, to a crossing of the Barren River at mile marker 48. It continues to the southwest, crossing Drake's Creek and connecting with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 43.1 miles, with 12.0 miles utilizing new terrain and 8.1 miles of I-65 widening.

Corridor 16 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately eight (8) miles to just west of the I-65/US 68-KY 80 interchange before proceeding southwest on new terrain. This corridor would likely require reconfiguration or elimination of this interchange to accommodate a system-to-system interchange. The corridor then continues in a southwesterly direction, to a crossing of the Barren River at mile marker 51. After crossing the Barren River, this corridor turns to the west and continues westerly to cross Drake's Creek and connect with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 48.2 miles, with 17.1 miles utilizing new terrain and 8.1 miles of I-65 widening.

Corridor 17 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately three (3) miles before proceeding southwest on new terrain to a point near Kepler. The corridor then continues in a westerly direction generally parallel to KY 1297 to the vicinity of Gott. It turns to the southwest to cross the Barren River at mile marker 48 and continues southwesterly, crossing Drake's Creek and connecting with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 43.5 miles, with 17.8 miles utilizing new terrain and 2.7 miles of I-65 widening.

Corridor 18 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately three (3) miles before proceeding southwest on new terrain to a point near Kepler. The corridor then continues in a westerly direction generally parallel to KY 1297 to the vicinity of Gott. It turns to the south to cross the Barren River at mile marker 51 and then turns back westerly, crossing Drake's Creek and connecting with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 48.6 miles, with 22.9 miles utilizing new terrain and 2.7 miles of I-65 widening.

Corridor 19 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and follows the Nunn (Cumberland) Parkway to the I-65/Nunn (Cumberland) Parkway interchange. At this point, it utilizes I-65 for approximately three (3) miles before proceeding southwest on new terrain crossing KY 1297 at a point near Kepler. The corridor then continues in a southwesterly direction and crosses the Barren River at mile marker 57. It then turns toward the west, crossing Drake's Creek and connecting with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 43.5 miles, with 17.8 miles utilizing new terrain and 2.7 miles of I-65 widening.

Corridor 20 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and proceeds southwest on new terrain generally parallel to KY 685. In the vicinity of Red Cross, it curves toward the west to parallel KY 1297 and continues to the vicinity of Gott. The corridor then turns to the southwest to cross the Barren River at mile marker 48 and continues southwesterly, crossing Drake's Creek and connecting with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the

Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 40.5 miles, with 23.4 miles utilizing new terrain.

Corridor 21 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and proceeds southwest on new terrain generally parallel to KY 685. In the vicinity of Red Cross, it curves toward the west to parallel KY 1297 and continues to the vicinity of Gott. It turns to the south to cross the Barren River at mile marker 51 and then turns back westerly, crossing Drake's Creek and connecting with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 45.7 miles, with 28.6 miles utilizing new terrain..

Corridor 22 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and proceeds southwest on new terrain generally parallel to KY 685. In the vicinity of Red Cross, it curves toward the west to parallel KY 1297 to a point near Kepler. The corridor then continues in a southwesterly direction and crosses the Barren River at mile marker 57. It then turns toward the west, crossing Drake's Creek and connecting with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 40.5 miles, with 23.4 miles utilizing new terrain.

Corridor 23 - This corridor begins on the Nunn (Cumberland) Parkway at its grade-separation with US 68 near Glasgow and proceeds southwest on new terrain generally parallel to KY 685. In an effort to avoid the sinkhole plain south of I-65, the corridor intersects KY 1297 between Red Cross and Beckton and continues in a southwesterly direction to cross the Barren River, just downstream of Martinsville Ford at mile marker 58. It then turns toward the west, crossing Drake's Creek and connecting with the Natcher Parkway Extension south of Bowling Green at US 231. The corridor then utilizes the Natcher Extension and Natcher Parkway for approximately 17 miles to the vicinity of Hadley. The total length of this corridor is 39.9 miles, with 22.8 miles utilizing new terrain.

No Build – In addition to the 23 "build" corridor options, the "no build" option was also considered. The "no build" would consist of no new construction and would rely on the existing transportation network to meet the future demands.

2. Meetings with State and Local Officials

Between the public information meetings in March of 2002 and August of 2002, meetings were held with stakeholders and local officials to discuss the initial corridors (see Figure 7). These meetings are documented in Appendices E and F.

3. Citizens Advisory Group

A third Citizens Advisory Group (CAG) meeting was held on July 18, 2002, to review the initial corridors. This meeting is documented in Appendix E.

4. Second Set of Public Information Meetings

A second round of public information meetings was held on Wednesday, August 14, 2002 at the Bowling Green Public Library-Depot Branch in Warren County and on Thursday, August 15, 2002 at the Brownsville Community Center in Edmonson County. A total of 195 citizens attended the August 14th meeting and a total of 128 citizens attended the August 15th meeting. The second round of meetings was designed to present the I-66 preliminary corridor concepts and to elicit further comment from the public regarding environmental concerns. The information at the meeting consisted of the project overview (which outlined the purpose of the I-66/Bowling Green Outer Beltline Planning Study, issues, and project goals) and preliminary I-66/Bowling Green Outer Beltline corridors that were identified on the basis of public and agency input, and information gathered to date.

At the meeting, exhibits were provided displaying environmental footprint maps of the Study Area (including the 23 preliminary corridors for I-66), aerial photography maps of the Study Area including preliminary corridors for I-66, and geological maps and diagrams explaining the karst geology in the Study Area. A handout packet included a survey form, which citizens were encouraged to complete and return at the meeting or via a prepaid, preaddressed envelope included in the packet. In addition to the August 14th and 15th open format meetings, eight (8) "town hall" style meetings were held throughout the Study Area as an outreach effort to inform citizens of the corridor projects in outlying areas of the region. The town hall style meetings were held primarily in the unincorporated portions of the Study Area at local fire departments. The same information was provided as was provided at the large open format meetings including a short presentation about the projects. These meetings were targeted at the more rural portions of the Study Area to get feedback from a more diverse cross section of the potentially affected population.

A total of 48 citizen comment survey forms were received for the I-66 project. The following represents a general summary of the responses received:

1. **Are the goals for the I-66 Planning Study clear and understandable? Please discuss any comments or concerns about the goals that you might have.**
   Eighty five percent (85%) of the respondents answered "yes," seven percent (7%) answered "no" and eight percent (8%) had no comment for this

question. Comments included minimizing the impact of vehicles in high traffic areas in and around Bowling Green, a need for increased tourism and industry, preference for a northern route to benefit Edmondson County and several "no build" comments were submitted.

2. **With the goals of the project in mind, what are the potential impacts of the proposed locations for the I-66 Corridor, both positive and negative? Are there problems, sensitive areas, special needs or other factors that should be considered in locating the I-66 Corridor?**
   Respondents indicated a preference for a northern route. Some respondents worried about too many interchanges and favored economic development but viewed diverted traffic as a potential problem. Other concerns included avoiding congestion around Bowling Green, improving safety, reduced travel times, and potential impacts to Mammoth Cave, farms, and smaller communities.

3. **Besides the locations shown on the map, are there any other locations that should be considered for the I-66 Corridor? Please let us know why you feel these locations should be considered. Please draw your locations on the map on the back of the survey.**
   Twenty nine percent (29%) of the respondents submitted alternate I-66 corridors for review.

4. **Please provide us with any other concerns, comments or issues that you think we should consider for the I-66 Corridor.**
   Respondents questioned whether the Intermodal Transportation Authority's Transpark development and the I-66 corridor would conflict or complement each other. Some viewed the I-66 corridor as a barrier to wildlife and historic sites. Many favored a northern route while others preferred an I-65 and Nunn (Cumberland) Parkway alternate. Some expressed a desire for the "no build" option, while others wanted a project to start as soon as possible. Other comments included considering a mass transit system, making I-66 appealing to the eye, and avoiding Mammoth Cave and its ecosystems.

Copies of the August 2002 Public Meetings Summary, public comment surveys, summaries of citizen response sheets and additional I-66 Planning Study information are contained within the official meeting documentation entitled "Public Information Meeting, I-66/Bowling Green Eastern Outer Beltline, Warren/Edmonson Counties, Item Number 3-66, August 14 & 15, 2002." A summary of these meetings is included in Appendix E.

5. Refinement of Project Goals

Based on comments received from the public, as well as environmental resource agencies, the project goals presented at the initial meetings were refined. The primary modification to the project goals included the addition of a fourth goal

statement, which addresses safety and efficiency in the mobility of people and freight. The fourth goal is as follows:

"Connectivity: Improve interstate movement of people and freight by ensuring a safe transportation system that is accessible, integrated and efficient, and offers flexibility of transportation choices across southern Kentucky."

6. Refinement of Corridors

In addition to the refinement of the project goals, the corridors were also refined based on public and agency input and additional information that was gathered. These refinements were primarily small shifts in short segments of the corridors; however, some substantial shifts were also included in response to public comments.

The most substantial shifts included the shift of the most southern corridor to a new Barren River crossing location farther south and a significant portion of the corridor being moved south away from KY 1297. Several comments were received regarding the potential residential impacts along KY 1297, which prompted this substantial shift. In addition to this shift, a link was added between the most northerly corridor and the corridor directly south of it near KY 185. This modification was added due to comments in favor of a far northern route. However, the preliminary traffic data indicated that routes closer to Bowling Green would receive more utilization. In order to increase the utilization and overall performance of the northern corridor, this connection was added.

The remainder of the corridor refinements included minor shifts to avoid unmarked cemeteries, developments and other potential issues as they were identified throughout the evaluation process.

VI. SCREENING OF CORRIDORS

A. Level 1 Screening of Corridors

The Level 1 Screening of preliminary corridors included a qualitative based evaluation of engineering, traffic and environmental considerations taking into account public and agency input received from early coordination and public information meetings. The evaluations concentrated on consideration for "fatal flaws" that could result in a non-permittable action, and performance relative to the project goals. The forms utilized for the Level 1 Screening of the preliminary I-66 corridors are included in Appendix G.

1. Engineering Considerations

Engineering considerations evaluated for the Level 1 Screening included major factors that would affect the cost of the project. These factors included: total length of the corridor; length of new terrain construction; number of intersecting routes; and constructability. The total length was separated into new terrain construction and I-65 widening and also included the utilization of the existing parkways from designated termini on the Natcher and Nunn (Cumberland) Parkways. The I-65 widening and new terrain construction were evaluated for constructability, which accounts for the difficulty of the terrain crossed and the potential maintenance of existing traffic concerns.

2. Traffic Considerations

Traffic considerations for the Level 1 Screening were based on the project goals. Potential performance of the corridors relative to the project goals was evaluated based on the total length of the corridors, improved connectivity added by the corridor and the proximity to major traffic generators. The total length of the corridors between designated termini was evaluated for potential travel time savings over the existing routes. The connectivity of the corridors and their proximity to major traffic generators were evaluated to determine relative efficiency with which the corridors would transport people and goods, reduce user costs, divert local traffic and improve access.

3. Environmental Considerations

Environmental considerations evaluated for the Level 1 Screening included major issues that could lead to concerns over potential impacts, including substantial mitigation requirements. In addition, avoidance and minimization potential in future development of the project were considered. The criteria included, among others, Section 4(f) resources, Section 106 considerations, waters of the U.S. (including wetlands), federally listed species, relocations, community impacts, karst features, and the potential to affect water quality. Potential impacts for all

criteria were ranked as high, medium or low. Based on the rankings, an overall environmental impacts consideration was developed for each corridor.

4. Public and Agency Input

The public and agency input used for the Level 1 Screening was derived from the second round of public information meetings where the preliminary corridors were presented for comment, and the first agency coordination meeting where route concepts were presented and agency input was requested on regulatory issues in the Study Area. In addition, various meetings with local officials were conducted to determine the level of support for the various corridors. The comments received from all coordination activities were evaluated to determine if particular corridors had substantial support or opposition. Documentation of public/local officials meetings and agency meetings are included in Appendices E and F respectively.

5. Corridors Not Carried Forward

The Level 1 Screening criteria, as presented in Appendix G, consist of a hierarchy of considerations starting with "fatal flaws" that have the potential to result in a non-permittable action; projects goals that were established at the onset of the studies; major environmental issues including most of the key natural and man-made resources; major engineering and traffic issues such as length, difficulty of construction and connectivity; and public and review agency input. Each of the criteria were given a yes/no answer or a high/medium/low rating for each corridor. Any corridor not satisfying each of the project goals was not carried forward for further consideration. During the Level 1 Screening process, 16 of the 23 original corridors were discarded due to their poor performance relative to the screening criteria.

The majority of the corridors north of I-65 using the most northerly alignment were dismissed because of poor traffic performance due to their distance from Bowling Green. These were Corridors 1, 3, 6, and 9. Corridors 7 and 8 had a poor constructability rating due to interchange spacing concerns along I-65 as well as potentially high impacts to karst features, prime farmland and Section 106 and 4(f) resources.

The corridors south of I-65 generally had high potential impacts to the sinkhole plain. Additionally, most did not create travel time savings compared to the "no build" option. Other problems were poor connectivity, poor constructability due to interchange spacing, and failure to satisfy local and regional objectives. The corridors south of I-65 that were dismissed included 13, 14, 15, 16, 17, 18, 19, 20, 21, and 22.

The corridors that were retained for consideration after the Level 2 Screening

included 2, 4, 5, 10, 11, 12 and 23, which are shown in Figure 11. In addition to these corridors, the "no build" option was also retained for further consideration.

B. Level 2 Screening of Corridors

Following the Level 1 Screening, the surviving corridors were assessed in a quantitative manner. This more detailed screening included additional data collection, traffic modeling, engineering cost estimates, and additional public and agency involvement. For comparison of the corridors, an evaluation matrix was developed for each corridor and criterion (see Table 4 at the end of this chapter).

1. Methodology and Assumptions

During the Level 2 Screening, the corridors were evaluated based on each corridor's engineering characteristics and their relative impacts on traffic and mobility, the natural and man-made environment, and public and agency input. Further study was conducted through literature searches, GIS, agency coordination, public meetings, and windshield surveys. Corridors were studied using 400-foot study bands to approximate the magnitude of impact of the anticipated right-of-way needed. Some issues required larger study bands. Threatened and endangered species were evaluated within a two-mile band. Archeological and historical resources, and cave entrances were evaluated within a 2,000-foot band. All of the information obtained through this research was documented. Using this documentation, each corridor's strengths and weakness were measured. The corridors that best satisfied traffic and engineering objectives and posed the least impact upon environmental features were recommended to be carried forward for future engineering and environmental studies.

During the course of the screening, several assumptions were made to ensure consistent comparison of the "no build" and "build" options. These included the following:

1. The new terrain typical section for the I-66 Corridor and the Bowling Green Outer Beltline is a four-lane, divided freeway with two 12-foot lanes in each direction and a depressed grass median.
2. The right-of-way for the I-66 Corridor and the Bowling Green Outer Beltline will vary; however, an average right-of-way width of 400 feet has been used for estimation purposes.
3. While the final corridors for both the I-66 Corridor and the Bowling Green Outer Beltline are 2,000 feet wide, a narrower 400-foot wide corridor was used to more accurately estimate the "true" impacts of the proposed projects. The center 400 feet of the 2,000-foot corridor was used to estimate impacts of the project, even though the actual location of the route could lie anywhere within the 2,000-foot corridor. This provides an estimate of the impacts that better reflects construction of this type of highway facility.

Adjusting the location of the alignment within the corridor may reduce actual impacts.

4. Interchanges or grade separations have been included at the intersections with all federal, state and local routes.
5. No improvements have been considered for the Natcher Parkway, the Nunn (Cumberland) Parkway or the Natcher Extension. At some point in the future, reconstruction of both parkways may be needed to meet current interstate standards, but no costs for reconstruction have been included with this project. KYTC will need to consider whether upgrading the parkways to current interstate standards is needed if I-66 is coincident with the parkways.
6. For those I-66 corridors that include widening I-65 (Corridors 10, 11 and 12), a 10-lane freeway along the current I-65 route has been considered for estimation of costs, traffic, and impacts to the natural and human environment. Because of the recent reconstruction projects along I-65 to convert it to a six-lane freeway, the preliminary cost estimates only include the costs to add two additional lanes in each direction, to reconstruct each of the interchanges and grade separations and to add 50 feet of right-of-way on each side. For the future traffic forecasts for the other I-66 corridors not utilizing any portion of the existing I-65 corridor, I-65 has been considered a six-lane freeway because of current widening that has been completed or is underway to six lanes between the Nunn (Cumberland) and Natcher Parkway. However, bridge structures are of sufficient width as a result of the I-65 reconstruction to accommodate eight lanes in the future.
7. For estimation purposes, the bridges crossing the Barren River and Drakes Fork have been considered completely spanning the entire 100-year floodplain as designated by FEMA in their National Flood Insurance Program.
8. The unit costs and preliminary cost estimates are in Year 2002 dollars and have not been adjusted for inflation to a midpoint of construction of the facilities. This is partially because no funding exists for these projects and neither is included in the latest KYTC Six Year Highway Plan. Another reason is that construction costs have fluctuated in recent years instead of continuing an upward increase due to inflation.
9. Two growth scenarios were tested for this project. The first used population and employment data assembled by Bernardin, Lochmueller & Associates, Inc. These forecasts were compared to forecasts from Woods & Poole Economics, Inc. and the U.S. Bureau of Economic Analysis, and are consistent with the year 2030 forecast of the Kentucky Statewide Traffic Model. The second used population and employment data from the Kentucky State Data Center. Based on review of the data, the second set of data forecasts a higher rate of growth for the Bowling Green and Warren County area. The traffic information shown in the corresponding table (see Table 1) for the various corridors was developed using the higher growth scenario to show the worst-case scenario.

I-66 Corridors
Level 2 Screening of Final Corridors

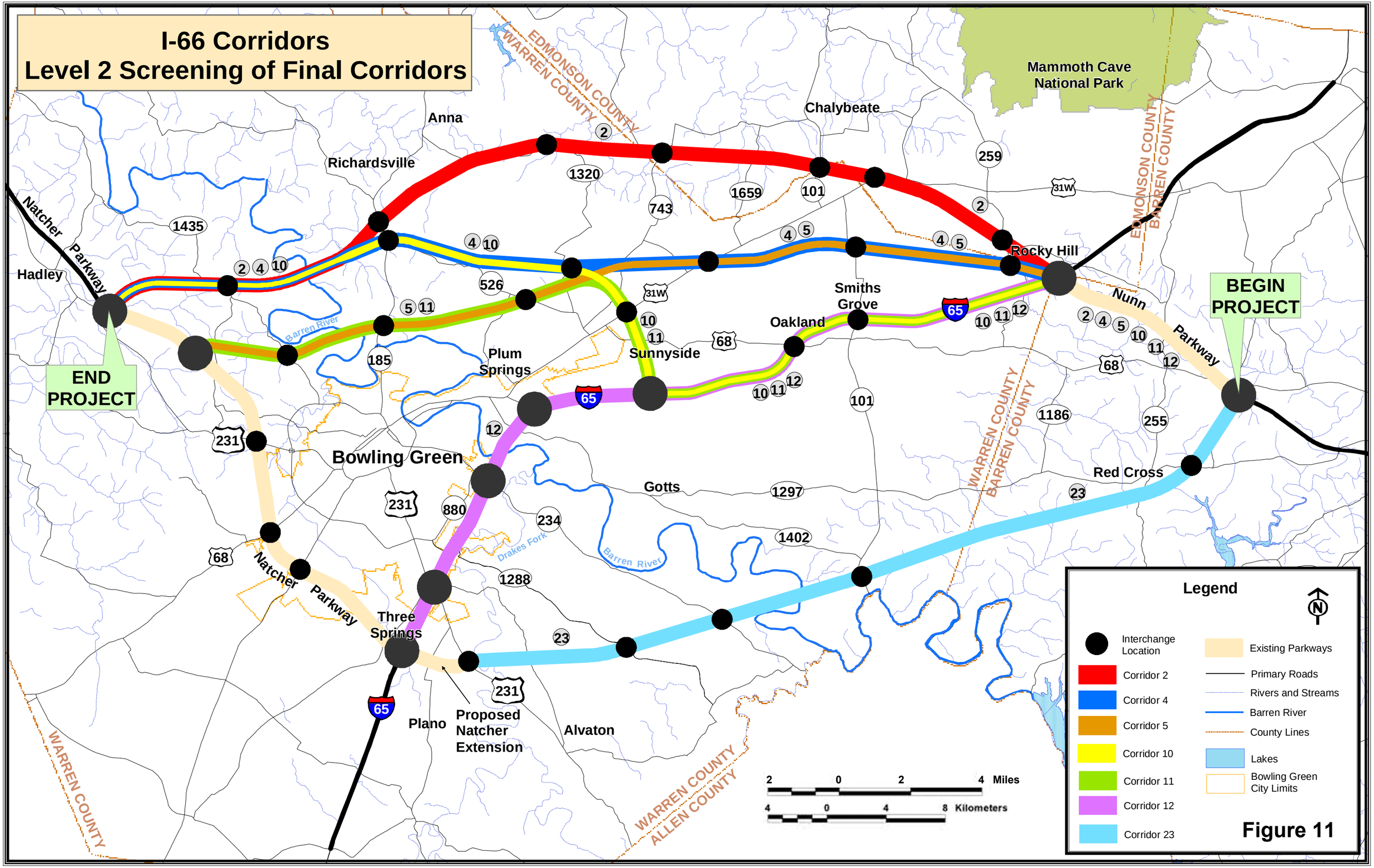


Figure 11

10. The Existing-Plus-Committed (E+C) Network, shown in the first two columns of data in the evaluation table (see Table 1) and utilized within the traffic considerations section, represents the highway network for the existing system plus any currently committed projects in the Bowling Green area and represents the "no build" option for I-66. The traffic measures for both growth scenarios for the "no build" option are shown to demonstrate the difference between each.
11. It should be noted that existing traffic along I-65 ranges from 36,500 vehicles per day (vpd), between KY 101 and the Nunn (Cumberland) Parkway, to 44,800 vpd, between the Natcher Parkway and US 231. The future traffic forecasts on I-65 with each of the proposed I-66 corridors are greater than 89,000 vpd. In order to provide an unconstrained comparison of the corridors, I-65 was modeled as a 10-lane freeway, even though the traffic volume corresponding to level-of-service C for an eight-lane freeway is 95,700 vpd (K=9%, D=55%, T=25% trucks, rolling terrain). [The percent of trucks in the traffic stream affects the level-of-service (LOS) thresholds. For example, if the percent of trucks were 40 percent instead of 25 percent, the maximum daily traffic volume for LOS C would drop to 70,900 vpd for an 8-lane freeway. Thus, an 8-lane facility would not be able to achieve a LOS of C for rural areas, and a 10-lane facility may be necessary to achieve LOS C.]

2. Engineering Considerations

The corridors considered in the Level 2 Screening were refined based on an alignment developed using USGS quadrangle maps supplemented with aerial photography. In addition, design plans for the current I-65 widening and the Natcher Parkway extension were used. Estimates were developed based on costs for construction (including the roadway, bridges, drainage and mitigation), right-of-way acquisition, utility relocations and design. A Policy on Geometric Design of Highways and Streets (AASHTO 2001) was followed for the development of horizontal alignments. Based on the alignments developed, construction costs were developed for the four-lane new terrain sections and for the ten-lane widening of I-65 based on a "unit cost per mile" basis. Earthwork costs were figured with a factor included for various terrain types crossed. Drainage structures and pavement were also calculated on a per mile basis. In addition, costs were included for interchanges by type, overpass crossings for all state and local routes intersected, bridge crossings for all railroads and streams crossed, and the Barren River bridge crossing. Additional costs included construction mobilization and maintenance of traffic for I-65 widening.

Preconstruction costs were calculated for design activities for roadways and bridges as well as right-of-way acquisition and utility relocation. Design costs were based on a percentage of total construction cost. Right-of-way estimates included a per acre land cost for various land uses cross calculated based on an

estimated constant right-of-way width. In addition, relocation costs were included for potential displacements and billboard removal along I-65. Utility relocation costs were estimated on a per mile basis along existing alignment or along new terrain alignment.

Other engineering considerations include overall length of the Barren River and Drakes Fork crossings; the number of roads crossed, along with the number of interchanges and overpasses; and the ratings of maintenance of traffic during construction and constructability.

Corridor 2 includes the longest new terrain construction length and also crosses the most difficult terrain of the corridors resulting in the highest total project cost. Corridor 12 involves no new terrain construction, relying completely on widening I-65, resulting in the lowest total project cost; however, this corridor has the greatest concern for maintenance of traffic during construction. Corridors 4 and 10 take the more northerly route across the north side of Bowling Green crossing more rugged terrain resulting in higher costs; whereas, Corridors 5 and 23 cross less difficult terrain and have relatively low costs.

3. Geotechnical Considerations

The Study Area contains four (4) geologic regions, shown in Figure 12, including Western Pennyroyal (sinkhole plain), Mammoth Cave Plateau, Central Pennyroyal, and Caseyville Hills. Most of the entire Study Area lies within the Western Pennyroyal. This heavily karsted area was created through the solubility of the St. Louis and St. Genevieve limestone bedrock, which lays beneath this plain. The topography of this region is rolling to flat with low elevations. Outside of the sinkhole plain, along the southern portion of the Study Area, is the Central Pennyroyal (consisting of relatively high relief), which sits upon a less soluble layer of Warsaw limestone. This area has little karst development, and is crossed by surface streams. The northern portion of the Study Area resides on top of soluble St. Louis and St. Genevieve limestone that is capped by a layer of sandstone. This area is the Mammoth Cave Plateau, which is separated from the Western Pennyroyal by the Dripping Springs Escarpment. The Mammoth Cave Plateau is characterized by higher elevations and steeper terrain. This area has a high abundance of subsurface karst features. The Caseyville Hills region is found in the most northern section of the Study Area. This area has only a small portion that extends into the project area. Caseyville Hills resides on top of Pennsylvanian Age limestone that contains deposits of coal, shale, and sandstone. Topography for this region consists of moderately high relief with steep ridges and narrow valleys.

Topography and Geologic Regions of the I-66 Study Area

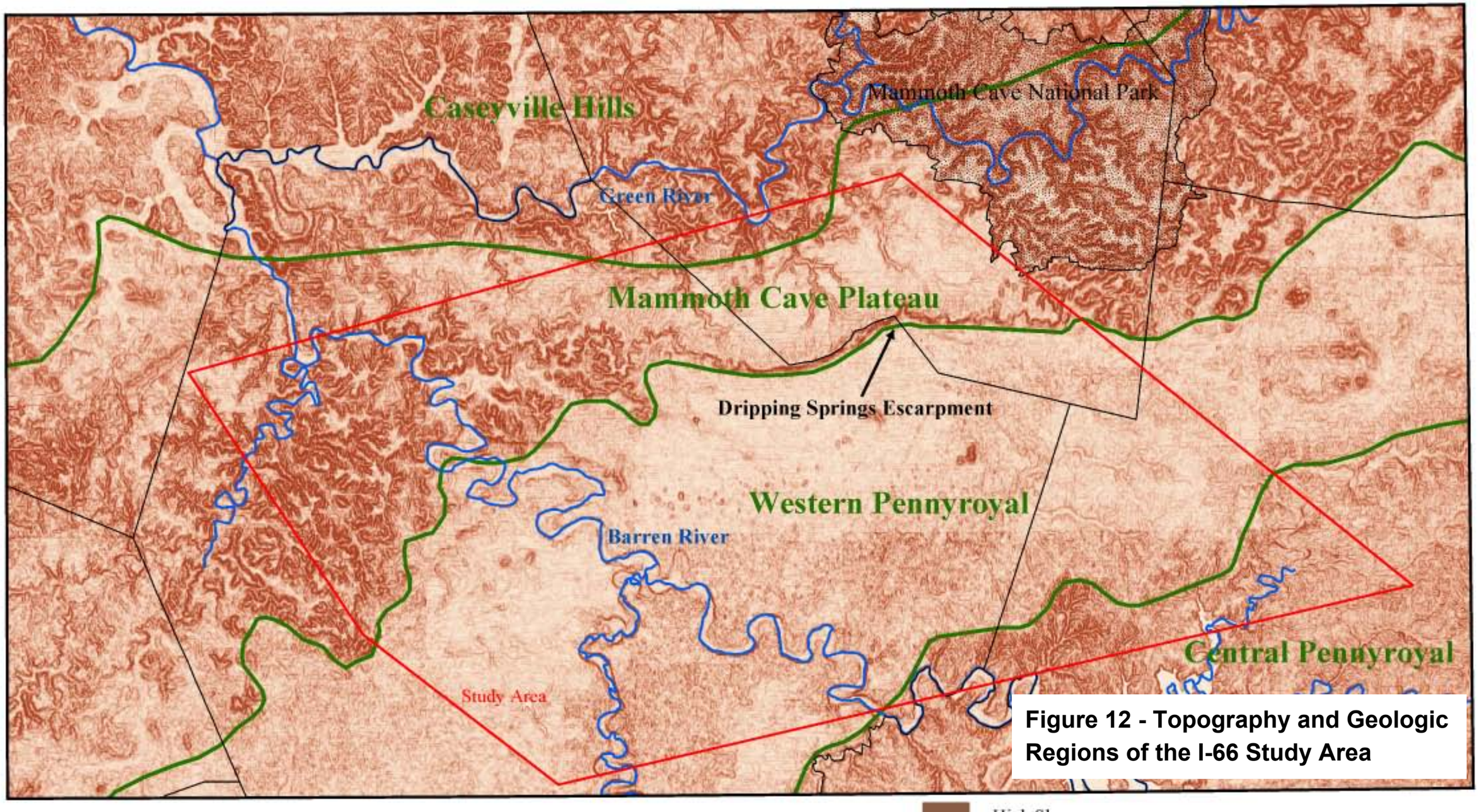


Figure 12 - Topography and Geologic Regions of the I-66 Study Area

The terrain in the Study Area varies from a steeper more dissected area in the northwest to a relatively flat to rolling landscape in the eastern portion. This landscape poses potential geological concerns such as loss of karst features, the Dripping Springs Escarpment, faults, expanding shales, oil and gas wells, and tar bearing sandstone. The karst features of the sinkhole plain are highly susceptible to runoff pollution, as well as soil erosion. There may also be sinkhole collapses as a result of construction. Oil and gas deposits are located throughout the entire Study Area and need to be avoided wherever possible. The tar bearing sandstone is located in the Mammoth Cave Plateau area beyond the Dripping Springs Escarpment, and can be used for construction purposes. The faults associated with this area are all located in the northern most portion of the project area. These faults could cause slight damage to structures in the event of an earthquake. A complete Geotechnical Report is included in Appendix D in addition to a Geological Overview of the Bowling Green Area.

The northern most corridors, which include Corridors 2, 4, 5, 10, and 11, have the greatest number of geological impacts. These corridors include long sections that cross the sinkhole plain along with portions of the Dripping Springs Escarpment and the Mammoth Cave Plateau. There will be several karst features traversed by these corridors including cave entrances and sinkholes. In addition, the northwest portion of the Study Area has rugged terrain that will be difficult to construct a roadway within due to increased excavation, rock excavation and blasting.

Corridor 12 traverses a large amount of the sinkhole plain; however, because this corridor completely relies on the upgrade of I-65, further impacts to the sinkhole plain will be minimal. However, it is still in the sinkhole plain and could have problems with drainage and karst construction from widening. Corridor 23 is the southern most alternate and does not cross a large portion of the sinkhole plain. Most of this corridor's length is in the Central Pennyroyal, which has much less karst development than the sinkhole plain to the north. Corridors 12 and 23 would have less impact to the existing geology.

4. Traffic Considerations

The traffic considerations for the Level 2 Screening were evaluated based on modeling of the future roadway network for each of the "build" corridors. The future traffic volumes for each of the model scenarios were compared to the "no build" option, which consisted of only the existing roadway network plus committed projects (E+C) currently in development. The traffic modeling was based on the regional travel demand model that was developed for roughly a 13-county area encompassing the I-66 Corridor Study Area and surrounding counties. The Bowling Green Regional Travel Model is a composite of the Kentucky Statewide Traffic Model (KySTM) and the Bowling Green Transportation Plan Travel Model. The Regional Travel Model reflects 2000 Census and year 2000 employment data, provides greater network and travel analysis zone (TAZ) detail

than either of the source travel models, incorporates new year 2030 socioeconomic forecasts for TAZs, and better replicates actual traffic volumes than either of the source travel models. The new terrain "build" corridors are represented as four-lane freeways in the Regional Travel Model with interchanges as described. Where the I-66 Corridor coincides with any portion of existing I-65, I-65/I-66 is coded in the model as a ten-lane freeway (except for the "no build" option). Based on the model output, various criteria were evaluated to determine the performance of each corridor relative to the project goals as described below.

A reduction of the congested vehicle-hours of travel (VHT) on I-65 between the Nunn (Cumberland) Parkway and the Natcher Parkway over the "no build" option measures the traffic achievement of I-66 Corridor Goal 1 ("Support I-66 across southern Kentucky to carry out the legislative intent of ISTEA, the NHS Act of 1995, and the Transportation Equity Act for the 21st Century") and I-66 Corridor Goal 2 ("Provide an improved interstate facility between the Natcher Parkway and the Nunn (Cumberland) Parkway so that I-66 will be continuous from West Virginia to Missouri"). The highest average daily traffic (ADT) volume remaining on I-65 between the Nunn (Cumberland) Parkway and the Natcher Parkway is an indicator of the level of congestion remaining on I-65 and establishes whether or not I-65 must be widened further in addition to the current I-65 improvement. The highest ADT volume on any common segment of I-65 and I-66 indicates whether or not the widening of I-65 to ten lanes is necessary for any common route for I-65 and I-66. For the eight-laning of I-65 in Warren County, thresholds have been established at 95,700 ADT for LOS C and 113,900 ADT for LOS D. Congested speed on the "build" corridor is also an indicator of improved performance over the "no build" option.

A regional reduction of the congested VHT and vehicle-miles of travel (VMT) for all vehicles and trucks over the "no build" option measures the traffic achievement of I-66 Corridor Goal 3 ("Provide improved access in southern Kentucky to jobs, industry, urban centers, educational institutions, tourism, and recreation facilities") and I-66 Corridor Goal 4 ("Provide an efficient means of transporting people and goods"). Because the addition of any new roadway is assumed to add to the total VMT of a "no build" option, build corridors that add a lesser amount of VMT are more effective. The average ADT on any new roadway and the highest ADT of any segment of the new roadway are indicators of the effectiveness of the new facility.

In addition, the effectiveness in satisfying local and regional objectives is also a traffic consideration. Reduction in VMT and congested VHT on non-freeway arterial and collector streets in Warren County over the "no build" option is an indicator of the effectiveness in diverting local traffic from congested roadways and attracting greater traffic to freeways, which have lower accident rates (crashes per 100 million vehicle-miles of travel).

A reduction of congested VHT and VMT in Warren and Edmonson Counties and a reduction of the VHT and VMT for trucks in Warren and Edmonson Counties over the "no build" option determines the effectiveness of a "build" corridor in reducing user costs. Because truck travel time and vehicle-operating costs are greater than automobiles, truck VHT is the best indicator of travel time savings and truck VMT is the best indicator of a reduction or the least increase in vehicle-operating costs.

Relative to providing better access to Edmonson County, a reduction of VMT and congested VHT for trucks and automobiles in Edmonson County is the best traffic performance measure.

Corridor 5 has the highest estimated average daily traffic (ADT) volume at 17,300 vehicles per day (vpd). In addition, the segment of Corridor 5 between the proposed KY 526 and KY 185 interchanges has the highest estimated segment volume at 23,700 vpd. Corridors 11 and 23 follow with estimated volumes of 17,100 vpd and 15,600 vpd, respectively. Corridor 2 has the least estimated volume at 10,700 vpd, and has only 12,700 vpd on the highest volume segment. These numbers show that corridors closer to the north side of Bowling Green and those closer to I-65 carry the highest average daily traffic volumes.

The highest estimated ADT volume along I-65 between the Nunn (Cumberland) and Natcher Parkways is on the segment between KY 234 (Cemetery Road) and KY 446. For the Kentucky State Data Center growth scenario, this segment of I-65 is projected to carry 97,300 vpd in the year 2030 under the "no build" option. The existing six-lane I-65 may achieve LOS C at 53,200 vpd, LOS D at 64,500 vpd and LOS E at 86,900 vpd. Thus, the "no build" option with existing I-65 at six lanes results in LOS F for this segment using the Kentucky State Data Center growth scenario. If the lower KySTM growth scenario were realized, the "no build" option would handle 84,000 vpd resulting in a LOS E; and existing six-lane I-65 could not achieve the minimum acceptable LOS D for urban areas.

Corridor 23 appears to be the most effective in diverting traffic from existing I-65 between the Nunn (Cumberland) and Natcher Parkways. Corridor 23 leaves an estimated residual volume of 89,600 vpd on I-65, compared to 97,300 vpd for the "no build" option, so that LOS C (equal or less than 95,700 vpd) may be achieved if existing I-65 is widened to eight lanes. Paralleling a portion of I-65 from the Nunn (Cumberland) Parkway to KY 446, Corridor 5 is the second most effective in diverting traffic from existing I-65. However, it would appear that no I-66 corridor alone diverts sufficient traffic from I-65 to avoid the need to widen of I-65 to eight lanes within existing right-of-way by the year 2030.

Corridor 12 would involve the widening of existing I-65 to ten lanes from the Nunn (Cumberland) Parkway to the Natcher Parkway. Year 2030 traffic assignments to Corridor 12 result in a high of 103,000 ADT on the urban

segments between the Natcher Parkway and KY 446 and a high of 85,700 ADT on the rural segments east of KY 446. If I-65 were widened to only eight lanes from the Nunn (Cumberland) Parkway to the Natcher Parkway, LOS C may be achieved on all urban and rural segments except for the urban segment between KY 234 and KY 446 where only a LOS D may be achieved. Thus, widening I-65 to eight lanes may achieve the minimum acceptable LOS for urban and rural areas, but I-65 must be widened to ten lanes to achieve the recommended LOS B in rural areas and C in urban areas between the Nunn (Cumberland) Parkway and the Natcher Parkway.

In addition to Corridor 12, Corridors 10 and 11 would also use a portion of existing I-65 between the Nunn (Cumberland) Parkway and their new alignment west of the US 68 interchange. The highest volume segment on the common route for I-65 and I-66 is west of the US 68 interchange – 87,200 vpd for Corridor 10 and 85,900 vpd for Corridor 11. While LOS B may be achieved if the common route for I-65/I-66 is widened to ten lanes, LOS C may be achieved if I-65 is widened to eight lanes within existing right-of-way between the Nunn (Cumberland) Parkway and the new alignment west of the US 68 interchange.

5. Environmental Considerations

Environmental considerations evaluated for the Level 2 Screening included an extensive list of both natural and human environmental issues. The following are categories of issues that were evaluated for potential impacts: aquatic and terrestrial ecosystems; federal and state listed species; cultural resources; socioeconomic data; geological data; managed lands; air quality; and noise. Several criteria were evaluated under each of these categories with potential impacts for each quantified based on the working alignment within the 2,000-foot corridor, or based on a specified buffer distance for selected criteria as defined in the methodology and assumptions. Table 4 (the Level 2 Screening matrix) shows the potential impacts for all of the criteria.

The criteria evaluated were identified through literature searches and GIS database research, and gathering information from the public at public meetings. Additionally, windshield surveys of the corridors were conducted to check the data compiled to the extent possible and to add supplemental data, such as potential relocations.

The major natural environmental considerations for the Study Area include the karst geology and related issues. The unique subterranean ecosystem provided by the karst geology contains several rare species and is susceptible to disturbance. In addition, the nature of drainage in karst areas creates an increased potential for groundwater contamination. In many areas, surface water runoff moves underground almost immediately with little dilution. Once underground, it moves very quickly and can reach the groundwater table with little filtration. For these

reasons, special consideration must be given to karst features and any potential construction in karst areas.

The major human environmental considerations in the Study Area include cultural resources, farmland (including prime farmland), relocations and environmental justice. Bowling Green is an area with a rich history, located along the Barren River and the historic route between Louisville and Nashville. Within Bowling Green, six National Register-listed historic districts have been identified. The economy of the area outside of Bowling Green has historically been agricultural based and many farmsteads remain throughout the area. Additionally, karst features in the area also attracted prehistoric peoples to the area, and a high potential for archaeological sites is anticipated as well. Due to the largely agricultural nature of the area outside of Bowling Green, farmland impacts are also of concern. The primary area of prime farmland within the Study Area is north of I-65 in the northern portion of the sinkhole plain where the terrain is more level.

Corridor 2 crosses the sinkhole plain, the escarpment and the Mammoth Cave Plateau. This corridor also includes the longest length within the Turnhole Spring groundwater basin, which is home to the Mammoth Cave shrimp and flows through Mammoth Cave National Park to the Green River. The Mammoth or Kentucky Cave shrimp is a federally endangered specie. While this corridor does not have the longest length through the sinkhole plain, additional karst impacts are anticipated on the Mammoth Cave Plateau due to vertical conduits, which are anticipated to be encountered. Corridor 2 has the highest impacts on forest, which also increases potential impacts on the federally endangered Indiana bat. Corridor 2 also has the highest number of potential relocations.

Corridors 4 and 5 include the longest new terrain crossing of the sinkhole plain, creating the greatest potential for water quality concerns and karst impacts. These corridors also have the highest potential farmland impacts (including prime farmland). The corridor route between I-65 and US 31W, north of Smiths Grove and Oakland, also has potential for impacts to historic resources, including a potential historic district. Once the corridors diverge and cross north of Bowling Green, Corridor 4 takes a more northerly route, resulting in more forest impacts. These impacts include large forest blocks. Corridor 5 takes a more southerly route, staying closer to Bowling Green and has potential to impact a second potential historic district. In addition, the crossing of Corridor 5 over the Barren River is in the proximity of known mussel beds with federally endangered species records. The federally listed mussel species include Northern Riffleshell, Clubshell, and Fanshell. In addition to these, both Corridors 4 and 5 have potential to impact the federally endangered Indiana and Gray bats.

Corridors 10, 11 and 12 cross the sinkhole plain primarily along existing I-65; this substantially reduces potential karst impacts that would result from new construction; however, the karst plain would still be impacted). Using portions of existing I-65 also reduces water quality concerns, as well as reduces potential land impacts. Corridor 12 relies completely on I-65 and the Natcher and Nunn (Cumberland) Parkways with no new terrain construction, resulting in the least number of potential environmental impacts of all the corridors. Corridors 10 and 11 depart I-65 and take northerly routes around Bowling Green. Corridor 10 takes the more northerly route, resulting in more forest impacts (which includes large forest block impacts); whereas, Corridor 11 has the potential to impact a potential historic district near the Barren River crossing. The crossing of Corridor 11 over the Barren River is in the proximity of known mussel beds with federally endangered species records. The federally listed mussel species include Northern Riffleshell, Clubshell, and Fanshell. The existing crossing of I-65 over the Barren River near the mouth of Drakes Creek is also in proximity to mussel beds with these federally listed species.

Corridor 23 is the only corridor south of I-65 and largely avoids the sinkhole plain resulting in generally low potential karst impacts and water quality concerns. The corridor also completely avoids the Turnhole Spring groundwater basin. In addition, this corridor generally has low potential environmental impacts for other criteria with the exception of a relatively high potential for relocations and the highest potential impacts to identified cave openings. Records of the federally endangered gray bat were identified in proximity to Corridor 23, the increased number of cave openings increases the potential to impact the gray bat.

6. Additional Agency Coordination

A second agency coordination meeting was held January 16, 2003 at Mammoth Cave National Park. Coordination letters along with information packets were also mailed to agencies and stakeholders with a request for comments on the proposed project. The meeting was held to present the Level 2 Screening of corridors that was provided in the information packet and to receive direct feedback from the agencies. Numerous comment letters were received in response. The minutes of the meeting, as well as all comments received, are included in Appendix F.

Specific agency comments relative to corridors or routes were included in some correspondence (copies of correspondence received from agencies are attached to the minutes in Appendix F). The United States Environmental Protection Agency noted that Corridors 12 and 23 would result in the least number of environmental impacts and that Corridors 2, 4 and 5 would potentially impact threatened and endangered species. The United States Fish and Wildlife Service recommended the selection of alignments be as close to Bowling Green as possible. The Kentucky Department for Fish and Wildlife Resources commented that Corridor

23 would have the least impacts on the sinkhole system associated with the Mammoth Cave area and that Corridors 4, 5, 10 and 11 would have the least impacts in combination with the Bowling Green Outer Beltline. The City of Bowling Green and the Bowling Green/Warren County Planning Commission stated a preference for Corridors 10, 11 and 12.

7. Third Set of Public Information Meetings

A third series of public information meetings was held throughout the month of February 2003. Six (6) public information meetings were held at the following locations: the Richardsville Fire Department, Warren East High School, Smiths Grove Fire Department, the Chalybeate Fire Department, the Alvaton Fire House #3, and at Red Cross Elementary School. A total of approximately 350 citizens attended the meetings with an average of approximately 50 citizens per meeting. The third round of public meetings was held by KYTC to present a narrowed down set of the preliminary corridors for additional review and comment. The corridors were reduced from 23 to seven (7) for I-66, as a result of the Level 1 Screening and extensive input from the public.

In addition, a local outreach meeting was held at the Mount Zion Baptist Church in Oakland, Kentucky to present the information and address concerns regarding the potential I-65 interchange location identified. Twelve citizens attended this meeting.

Citizens attending the meetings were asked to sign in and were given a handout packet of meeting information as they entered. Exhibits displayed included aerial photography maps of the Study Area including Level 2 preliminary corridors for I-66. Information contained in the packets included a survey form with a map on the back, a project overview with a map on the back, an Evaluation Process "funnel" diagram, a public involvement process timeline, Level 1 Screening forms and a Level 2 Screening draft evaluation table.

The survey form contained in the handout packet requested citizens to rank the top three (3) routes that they prefer for the location of the I-66 Corridor, and return it at the meeting or via a prepaid, preaddressed envelope included in the packet. A total of 74 citizens comment survey forms were received by KYTC for the I-66 project. All respondents were asked to submit their preferred first, second, and third corridor choices. However, some citizen’s responses included combinations anywhere from one to three corridor selections, and some only included identification of a non-preferred corridor.

Although the “no build” option was identified most often on survey forms returned (twenty three respondents indicated that the “no build” option was preferred), a majority of attendees at the meetings favored a “build” corridor with generally more preference for corridors north of I-65. Corridor 4 was the most

selected "build" corridor option, with nine survey forms identifying this selection. In addition, 34 survey forms identified Corridor 23 as a non-preferred corridor, and a petition opposing Corridor 23 was submitted that included 90 signatures.

Copies of the February 2003 Public Meetings Summary, public comment surveys, summaries of citizen response sheets and additional I-66 Planning Study information are contained within the official meeting documentation entitled "Public Information Meeting, I-66/Bowling Green Eastern Outer Beltline, Warren/Edmonson Counties, Item Number 3-66 and 3-103, February 11-13 & 18-20, 2003." A summary of these meetings is included in Appendix E.

C. Compatibility of I-66 Corridor and Bowling Green Outer Beltline

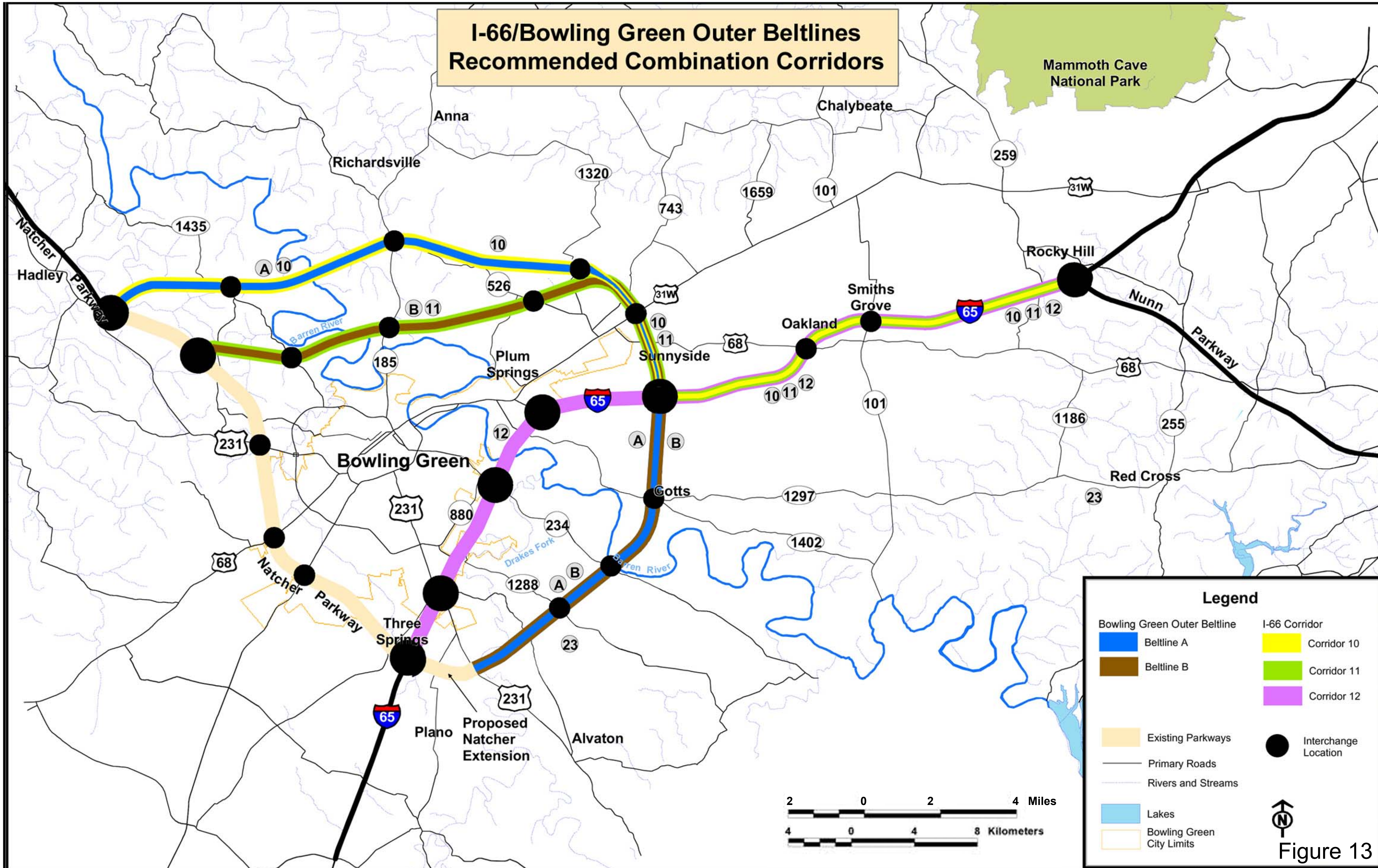
The compatibility of I-66 corridors with the Bowling Green Outer Beltline primarily focuses on the ability of the I-66 Corridor to complement the connectivity of the Bowling Green area and assist in the development of the Outer Beltline. Two freeways, the Natcher Parkway and I-65, serve Bowling Green. However, some areas around the city are lacking connectivity, primarily north of the city where a link between I-65 on the northeast side and the Natcher Parkway on the northwest side would provide connectivity around the city and much needed access across the Barren River. In addition, a connector route between the Natcher Parkway terminus south of Bowling Green around the developing area on Scottsville Road (US 231) to I-65 on the northeast side has also been identified.

The I-66 corridors that would provide the most utilization and provide portions of the connectivity links identified include Corridors 10 and 11, which would complete the entire northern connection. Corridors 4 and 5 would also provide a large portion of the northern connection, but would still require a connection to I-65. Corridors 2 and 23 provide only small segments of the identified connectors; whereas, Corridor 12 would provide no additional connections.

In addition to the potential utilization of the corridors for portions of the Outer Beltline, consideration must also be given to the performance of the corridor, relative to traffic considerations and impacts, in conjunction with the Outer Beltline. While the performance of the I-66 corridors north of I-65 are generally enhanced by the completion of the Outer Beltline, the performance of Corridor 23 south of I-65 decreases due to the completion of the Outer Beltline. Because Corridors 10 and 11 completely overlap with the northern portion of the Outer Beltline, these corridors in combination with the Outer Beltline, produce the least impacts overall. Conversely, because Corridors 2 and 23 provide very little overlap, these corridors, in combination, produce the highest impacts overall. Corridor 12 produces moderate impacts in combination. Because there is no overlap with the connectivity from Corridor 12, this combination would require the most new terrain construction for the Outer Beltline. Corridors 4 and 5 include a significant amount of overlap to complete the northern leg of the Outer

Beltline, which reduces overall impacts compared to Corridors 2 and 23. However, these combinations include the most impacts to the sinkhole plain and cultural resources, which increase the overall impacts of the combinations. The recommended combinations of corridors are shown in Figure 13.

Given the above described factors, Corridors 10 and 11 provide the greatest benefit to and are most compatible with the Bowling Green Outer Beltline. Additional discussion of the compatibility of these two project is provided in Appendix A. The Bowling Green Outer Beltline is discussed thoroughly in a separate Planning Study Report.



I-66/Bowling Green Outer Beltlines
Recommended Combination Corridors
Mammoth Cave National Park
Chalybeate
Anna
Richardsville
Hadley
Natcher Parkway
Bowling Green
Plum Springs
Sunnyside
Oakland
Smiths Grove
Rocky Hill
Nunn Parkway
Cotts
Red Cross
Three Springs
Plano
Proposed Natcher Extension
Alvaton
Barren River
Drakes Fork
Legend
Bowling Green Outer Beltline
Beltline A
Beltline B
I-66 Corridor
Corridor 10
Corridor 11
Corridor 12
Existing Parkways
Primary Roads
Rivers and Streams
Lakes
Bowling Green City Limits
Interchange Location
2 0 2 4 Miles
4 0 4 8 Kilometers
Figure 13

TABLE 4

I-66 Corridor Level 2 Screening Evaluation

Red: least desirable, **Green**: most desirable

Criteria	Unit	E+C KySTM^	E+C SDC^^	Final I-66 Corridors						
				2	4	5	10	11	12	23
Engineering Considerations										
Length: Total	Miles	n/a	n/a	33.8	32.3	32.5	35.2	35.2	41.7	37.8
New Location	Miles	n/a	n/a	27.9	26.4	24.0	17.4	14.8	0.0	22.8
I-65 Widening	Miles	n/a	n/a	0.0	0.0	0.0	11.9	11.9	22.6	0.0
Utilization of Parkways	Miles	n/a	n/a	5.9	5.9	8.5	5.9	8.5	19.1	15.0
Estimated Pre-Construction Cost ($) (Design, Right-of-Way & Utilities)	Million $	n/a	n/a	$36.64	$31.62	$28.04	$42.49	$38.73	$47.08	$28.17
Estimated Construction Cost ($) (Roadway, Drainage, Bridge & Mitigation)	Million $	n/a	n/a	$448.50	$397.22	$336.89	$439.98	$381.69	$302.50	$330.29
TOTAL PROJECT COST ($)	Million $	n/a	n/a	$485.14	$428.84	$364.93	$482.47	$420.42	$349.58	$358.46
RIVER CROSSINGS										
Bridge Length over the Barren River (ft)	Lin. Ft.	n/a	n/a	2,200	2,200	1,800	2,200	1,800	1,400	1,200
Bridge Length over the Drakes Fork (ft)	Lin. Ft.	n/a	n/a	0	0	0	0	0	0	1,250
Proposed Number of Bridges/Drainage Crossings	Number	n/a	n/a	14	7	5	6/1	3/1	0/2	7
Roads Crossed: Interstates, US & Major State Routes	Number	n/a	n/a	7	7	8	9	10	11	9
Other State Routes & Local Roads	Number	n/a	n/a	35	27	22	32	28	10	31
Proposed Number of Interchanges (Existing/Proposed)	Number	n/a	n/a	1/8	1/7	1/7	3/6	3/6	10/0	4/6
Proposed Number of Overpasses	Number	n/a	n/a	16	17	13	9/3	9/3	0/7	16
Maintenance of Traffic during Construction **	Rating	n/a	n/a	L	L	L	M	M	H	L
Constructability Rating (Terrain, Obstructions, Conflicts, etc.) **	Rating	n/a	n/a	H	M	L	M	L	M	L
Traffic Considerations										
I-66 Average Daily Traffic (ADT) Forecast -- Average	ADT	n/a	n/a	10,660	13,660	17,260	13,400	17,140	n/a	15,690
I-66 ADT Forecast -- Highest Segment	ADT	n/a	n/a	12,670	17,720	23,700	17,690	20,370	n/a	20,250
I-65 (Natcher to Nunn) ADT -- Highest Segment	ADT	84,029	97,309	95,760	95,320	94,160	97,960	95,470	103,070	89,630
% Change from E+C (SDC)	%	---	---	-1.6%	-2.0%	-3.2%	0.7%	-1.9%	5.9%	-7.9%
I-65/I-66 Common Section ADT -- Highest Segment	ADT	n/a	n/a	n/a	n/a	n/a	87,220	85,900	103,070	n/a
I-66 (Natcher to Nunn) Congested Speed	mph	61.7	59.6	65.0	65.0	65.0	64.4	64.6	64.1	65.0
% Change from E+C (SDC)	%	---	---	9.0%	9.0%	9.0%	8.1%	8.2%	7.4%	9.0%
I-65 (Natcher to Nunn) Congested Vehicle Hours of Travel (VHT)	VHT	27,600	32,400	31,630	30,870	29,690	33,310	32,170	32,060	28,620
% Change from E+C (SDC)	%	---	---	-2.4%	-4.7%	-8.3%	2.8%	-0.7%	-1.0%	-11.6%

I-66 Corridor Level 2 Screening Evaluation

Red: least desirable, **Green**: most desirable

Criteria	Unit	E+C KySTM^	E+C SDC^^	Final I-66 Corridors						
				2	4	5	10	11	12	23
Regional Congested Vehicle Hours of Travel (VHT)	VHT	583,920	667,240	671,880	670,310	669,350	669,620	668,500	672,040	671,130
% Change from E+C (SDC)	%	---	---	0.7%	0.5%	0.3%	0.4%	0.2%	0.7%	0.6%
Regional Congested VHT for Trucks	VHT	71,330	77,960	78,390	78,300	78,170	78,210	78,110	78,190	78,070
% Change from E+C (SDC)	%	---	---	0.6%	0.4%	0.3%	0.3%	0.2%	0.3%	0.1%
Warren County Congested VHT	VHT	172,340	204,050	202,180	202,250	200,680	201,960	200,430	204,180	202,880
% Change from E+C (SDC)	%	---	---	-0.9%	-0.9%	-1.7%	-1.0%	-1.8%	0.1%	-0.6%
Warren County Non-Freeway Congested VHT	VHT	130,670	155,810	151,970	149,910	148,350	149,380	148,140	155,317	153,610
% Change from E+C (SDC)	%	---	---	-2.5%	-3.8%	-4.8%	-4.1%	-4.9%	-0.3%	-1.4%
Warren County Congested VHT for Trucks	VHT	17,640	19,730	19,430	19,560	19,400	19,520	19,370	19,440	19,300
% Change from E+C (SDC)	%	---	---	-1.5%	-0.8%	-1.6%	-1.1%	-1.8%	-1.4%	-2.2%
Edmonson County Congested VHT	VHT	11,240	15,150	16,950	15,060	15,280	14,730	14,900	15,210	15,140
% Change from E+C (SDC)	%	---	---	11.9%	-0.6%	0.9%	-2.7%	-1.7%	0.4%	0.0%
Edmondson County Non-Freeway Congested VHT	VHT	9,090	12,760	12,390	12,240	12,440	12,310	12,470	12,830	12,790
% Change from E+C (SDC)	%	---	---	-2.9%	-4.1%	-2.5%	-3.5%	-2.3%	0.5%	0.2%
Edmonson County Congested VHT for Trucks	VHT	1,440	1,580	1,810	1,570	1,580	1,550	1,550	1,570	1,570
% Change from E+C (SDC)	%	---	---	15.0%	-0.6%	0.0%	-1.5%	-1.5%	-0.3%	-0.3%
Regional Vehicle Miles of Travel (VMT)	VMT	23,075,370	25,823,750	26,374,480	26,386,940	26,401,710	26,383,020	26,382,150	26,268,230	26,270,700
% Change from E+C (SDC)	%	---	---	2.1%	2.2%	2.2%	2.2%	2.2%	1.7%	1.7%
Regional VMT for Trucks	VMT	3,826,380	4,063,940	4,107,580	4,107,270	4,106,800	4,110,670	4,110,020	4,107,190	4,102,070
% Change from E+C (SDC)	%	---	---	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	0.9%
Warren County VMT	VMT	5,973,780	6,765,850	6,848,820	6,962,820	6,958,070	6,993,790	6,978,620	6,919,450	6,828,350
% Change from E+C (SDC)	%	---	---	1.2%	2.9%	2.8%	3.4%	3.1%	2.3%	0.9%
Warren County Non-Freeway VMT	VMT	3,409,330	3,877,440	3,817,930	3,785,100	3,758,490	3,786,710	3,764,330	3,858,920	3,826,040
% Change from E+C (SDC)	%	---	---	-1.5%	-2.4%	-3.1%	-2.3%	-2.9%	-0.5%	-1.3%
Warren County VMT for Trucks	VMT	870,960	925,890	922,600	937,450	936,160	942,770	940,660	941,040	924,700
% Change from E+C (SDC)	%	---	---	-0.4%	1.2%	1.1%	1.8%	1.6%	1.6%	-0.1%
Edmonson County VMT	VMT	495,570	648,340	767,780	653,630	659,650	632,070	637,410	650,370	647,620
% Change from E+C (SDC)	%	---	---	18.4%	0.8%	1.7%	-2.5%	-1.7%	0.3%	-0.1%
Edmonson County Non-Freeway VMT	VMT	357,050	495,640	473,872	473,340	478,210	477,440	482,690	497,950	496,630
% Change from E+C (SDC)	%	---	---	-4.4%	-4.5%	-3.5%	-3.7%	-2.6%	0.5%	0.2%
Edmonson County VMT for Trucks	VMT	77,740	82,820	98,610	83,000	83,190	81,750	81,830	82,530	82,600
% Change from E+C (SDC)	%	---	---	19.1%	0.2%	0.4%	-1.3%	-1.2%	-0.4%	-0.3%

I-66 Corridor Level 2 Screening Evaluation

Red: least desirable, **Green**: most desirable

Criteria	Unit	E+C KySTM^	E+C SDC^^	Final I-66 Corridors						
				2	4	5	10	11	12	23
Environmental Considerations*										
Aquatic/Terrestrial Ecosystems										
Water Quality Issues**	Rating	n/a	n/a	M	H	H	M	M	L	M
Ground Water Basins: Green River	Length crossed(mi)	n/a	n/a	3.0	1.5	1.5	1.1	1.1	1.1	0
Barren River	Length crossed(mi)	n/a	n/a	10.1	19.4	17.9	22.7	21.1	28.2	5.5
Streams: 1st Order (Intermittent)	Number	n/a	n/a	11	8	5	9	6	2	6
2nd Order (Perennial)	Number	n/a	n/a	7	2	1	2	1	0	0
3rd Order (Perennial)	Number	n/a	n/a	1	1	1	2	2	2	0
4th Order (Perennial)	Number	n/a	n/a	0	0	0	0	0	0	0
5th Order (Perennial)	Number	n/a	n/a	0	0	0	0	0	0	0
6th Order (Perennial)	Number	n/a	n/a	0	0	0	0	0	0	1
7th Order (Perennial)	Number	n/a	n/a	1	1	1	1	1	1	1
Total	Number	n/a	n/a	20	12	8	14	10	5	8
Open Water Habitats (Ponds & Lakes)	Acres	n/a	n/a	7.2	8.5	6.3	4.3	2.0	2.1	8.8
Floodplains	Lin. Ft.	n/a	n/a	8,778	7,931	6,348	9,618	8,126	2,164	2,622
Wetlands: Forested	Acres	n/a	n/a	2.4	0.4	0.0	0.2	0.0	0.0	2.3
Scrub/Shrub	Acres	n/a	n/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Emergent	Acres	n/a	n/a	1.3	1.4	1.3	0.6	0.6	1.5	0.6
Aquatic Bed	Acres	n/a	n/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	Acres	n/a	n/a	3.7	1.7	1.3	0.8	0.6	1.5	2.9
Wild and Scenic Rivers***	Yes/No	n/a	n/a	No	No	No	No	No	No	No
Big Trees (e.g., State Champion)	Number	n/a	n/a	0	0	0	0	0	0	0
Federal and State Species**										
Federally Endangered	Number	n/a	n/a	0	2	5	0	3	3	1
Federally Threatened	Number	n/a	n/a	0	0	0	0	0	0	0
State Listed Species*****	Number	n/a	n/a	3	3	7	2	6	4	1
Total	Number	n/a	n/a	3	5	12	2	9	7	2
Historic/Archaeological Impacts****										
Historic Structures (Listed)	Number	n/a	n/a	0	0	0	0	0	0	0
Historic Structures (Potentially Eligible)	Number	n/a	n/a	1	2	5	1	4	1	1
Historic Districts (Listed)	Number	n/a	n/a	0	0	0	0	0	0	0
Historic Districts (Potentially Eligible)	Number	n/a	n/a	1	1	2	0	1	0	0

I-66 Corridor Level 2 Screening Evaluation

Red: least desirable, **Green**: most desirable

Criteria	Unit	E+C KySTM^	E+C SDC^^	Final I-66 Corridors						
				2	4	5	10	11	12	23
Archaeological Resource Potential	Rating	n/a	n/a	H	H	H	H-M	H-M	M	H
Archaeological Sites: National Register	Number	n/a	n/a	0	0	0	0	0	0	0
Historic	Number	n/a	n/a	0	0	0	0	0	0	3
Prehistoric	Number	n/a	n/a	2	2	2	4	4	3	8
Total	Number	n/a	n/a	2	2	2	4	4	3	11
Historic Cemeteries	Number	n/a	n/a	2	2	2	3	3	3	5
Socioeconomic Impacts										
Land Use: Farmland*******	Acres	n/a	n/a	964	1,006	1,030	732	733	235	952
Forest	Acres	n/a	n/a	384	271	129	250	121	5	149
Wetland/Water	Acres	n/a	n/a	4	5	6	3	5	1	6
Residential/Business	Acres	n/a	n/a	0	0	0	4	4	33	0
Land Use: % Farmland	%	n/a	n/a	71	78	88	74	85	86	86
% Forest	%	n/a	n/a	28	21	11	25	14	2	13
% Wetland	%	n/a	n/a	<1	<1	<1	<1	<1	<1	<1
% Residential/Business	%	n/a	n/a	0	0	0	<1	<1	12	0
Percent Prime Farmland (Estimate)********	%	n/a	n/a	28	34	42	14	24	0	25
Large Forest Block (KSNPC)*********	Number	n/a	n/a	21	16	5	16	5	0	1
Large Forest Block (KSNPC)*********	Acres	n/a	n/a	261	189	10	182	10	0	5
Relocations: Homes	Number	n/a	n/a	44	20	27	22	28	42	44
Mobile Homes	Number	n/a	n/a	7	3	3	5	4	0	4
Businesses	Number	n/a	n/a	0	0	0	0	0	5	0
Schools	Number	n/a	n/a	0	0	0	0	0	0	0
Public Facilities	Number	n/a	n/a	1	1	0	1	0	0	0
Cemeteries	Number	n/a	n/a	1	0	0	0	0	0	1
Churches	Number	n/a	n/a	0	1	0	1	0	0	0
# of Railroad Tracks: Active	Number	n/a	n/a	1	1	1	1	1	0	0
Abandoned	Number	n/a	n/a	0	0	0	0	0	0	0
Utilities: Transmission Lines	Number	n/a	n/a	3	3	3	6	6	5	3
Pipelines	Number	n/a	n/a	1	1	4	1	4	1	0
Towers (Radio/Cellular)	Number	n/a	n/a	0	0	0	0	0	0	0
Water Towers	Number	n/a	n/a	0	0	0	0	0	0	0
Substations	Number	n/a	n/a	1	0	0	0	0	0	0
Fiber Optics	Number	n/a	n/a	0	0	0	1	1	1	0
Environmental Justice Issues**	Rating	n/a	n/a	L	L	M	L	L	L	M

I-66 Corridor Level 2 Screening Evaluation

Red: least desirable, **Green**: most desirable

Criteria	Unit	E+C KySTM^	E+C SDC^^	Final I-66 Corridors						
				2	4	5	10	11	12	23
UST Facilities: Existing	Number	n/a	n/a	0	0	0	0	0	0	0
Abandoned	Number	n/a	n/a	1	0	0	0	0	0	0
Landfills (Old)	Number	n/a	n/a	0	0	0	0	0	0	0
CERCLA Sites	Number	n/a	n/a	0	0	0	0	0	0	0
RCRA Sites	Number	n/a	n/a	0	0	0	0	0	1	0
TRI Sites	Number	n/a	n/a	0	0	0	0	0	0	0
Geological Issues										
Number of Cave Entrances******	Number	n/a	n/a	5	7	3	8	4	2	12
Sinkholes	Number	n/a	n/a	75	54	51	144	141	175	76
Sinkholes	Acres	n/a	n/a	127	366	365	125	122	134	158
Oil and Gas Wells	Number	n/a	n/a	22	20	8	19	7	1	5
Dry and Abandoned Wells	Number	n/a	n/a	6	11	7	7	6	0	9
Oil Batteries	Number	n/a	n/a	0	0	0	0	0	0	0
Quarries	Number	n/a	n/a	0	1	1	1	1	0	0
Coal Mines	Number	n/a	n/a	0	0	0	0	0	0	0
Managed Lands										
Federal Lands	Number	n/a	n/a	0	0	0	0	0	0	0
State Lands	Number	n/a	n/a	0	0	0	0	0	0	0
Nature Conservancy Lands	Number	n/a	n/a	0	0	0	0	0	0	0
City Parks	Number	n/a	n/a	0	0	0	0	0	0	0
Air Quality										
Project is in the 6-Year Plan***	Yes/No	n/a	n/a	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Highway Noise										
Potential for Noise Impacts**	Rating	n/a	n/a	M	L	M	L	M	L	L

* Evaluation does not include any modifications to the existing Natcher and Nunn Parkways or the Natcher Extension
** Denotes a probability, i.e., H – High, M – Moderate, L - Low
*** Denotes a Yes or No response
**** Denotes within 1 mile of the centerline
***** Does not include Federally Listed Species
****** Denotes within 1,000 feet of the centerline
******* Land use impacts do not include existing transportation land use of I-65
******** Denotes estimated percent of new terrain construction crossing prime farmland
********* Large Forest Blocks identified by Kentucky State Nature Preserves Commission
^ KySTM -- Forecasts based on similar data to that in the Kentucky Statewide Travel Model
^^ SDC -- Forecasts based on information received from State Data Center in 2002

VII. RECOMMENDATIONS AND PREFFERRED CORRIDORS

A. Project Goals

The project goals for the proposed I-66 between the Natcher Parkway and Nunn (Cumberland) Parkway are to:

1. Commitment: Support the completion of I-66 across southern Kentucky to carry out the legislative intent of the Intermodal Surface Transportation Efficiency Act (ISTEA), the National Highway Designation System (NHS) Act of 1995, and the Transportation Equity Act for the 21st Century (TEA21).

2. Congestion: Provide an improved, efficient interstate facility between the Natcher Parkway and the Nunn (Cumberland) Parkway to allow for system continuity of I-66 from West Virginia to Missouri.

3. Access: Improve accessibility throughout southern Kentucky to jobs, industry, urban centers, educational facilities, tourism and recreational facilities, with emphasis given to the Kentucky portions of the Appalachia and Lower Mississippi Delta regions.

4. Connectivity: Improve interstate movement of people and freight by ensuring a safe transportation system that is accessible, integrated and efficient, and offers flexibility of transportation choices across southern Kentucky.

B. Recommendations and Preferred Corridors

The Level 1 Screening of the 23 preliminary corridors resulted in a set of seven (7) corridors that were retained for further study in addition to the "no build" option. These corridors include 2, 4, 5, 10, 11, 12, and 23. These corridors faired the best during the Level 1 Screening Process. Each corridor was evaluated on certain criteria, which included its ability to fulfill project goals, impacts upon major environmental issues, public and agency support, as well as engineering and traffic issues. In the Level 2 Screening, these corridors were analyzed in further detail to determine which corridor would best suit the project goals and at the same time pose the least amount of engineering difficulty and environmental impacts. The corridors recommended for further consideration after the Level 2 Evaluation were Corridors 10, 11, and 12 (see Figure 14). In addition to the three "build" corridors, the "no build" option must also be fully evaluated throughout the NEPA process.

I-66 Corridors
Recommended Corridors

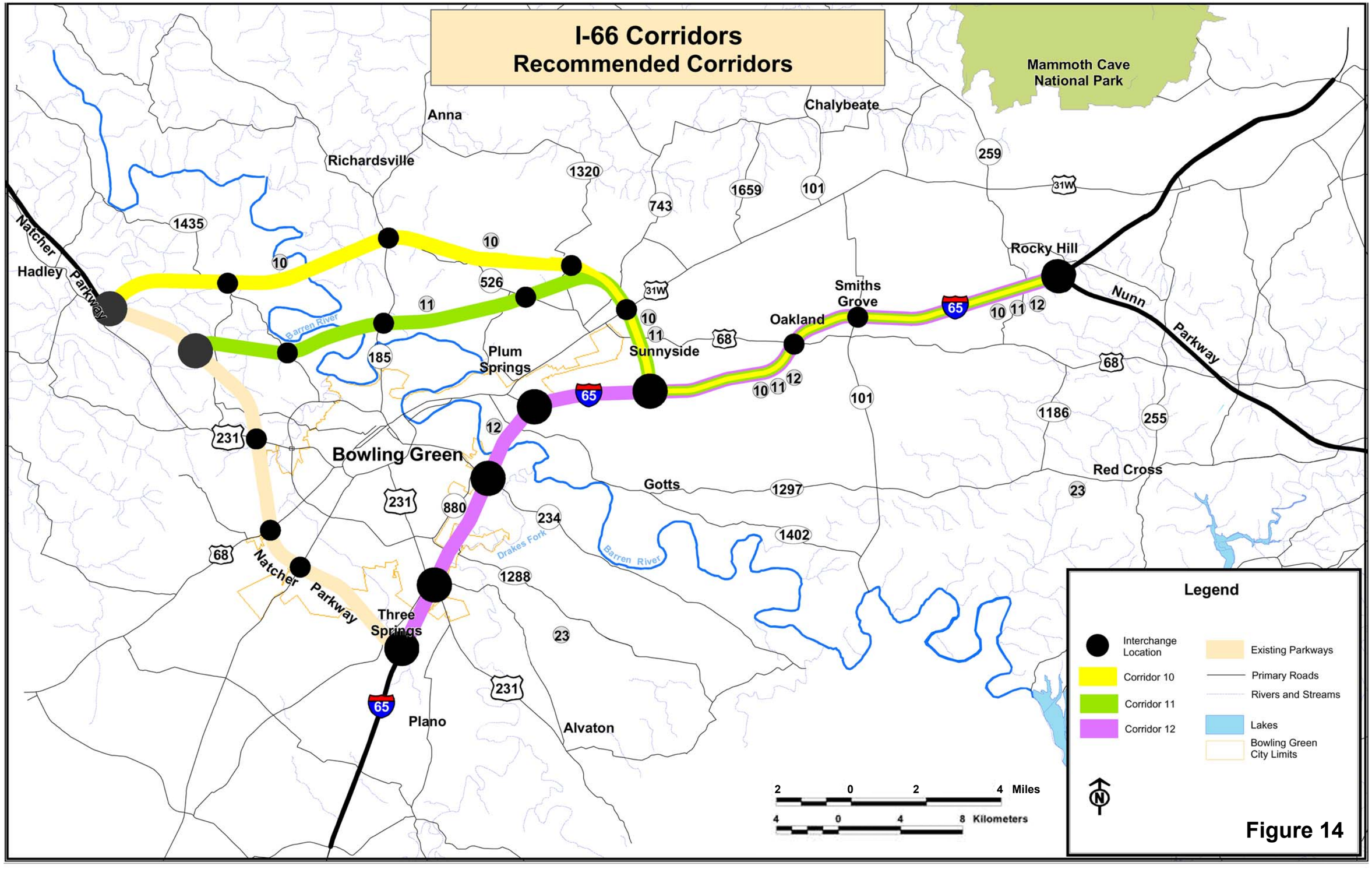


Figure 14

Corridor 10 utilizes existing I-65, and then takes a new terrain route north of Bowling Green. It has a total length of 35.2 miles and provides better connectivity to Bowling Green by its closer proximity to existing development around Bowling Green. It has a short new terrain construction length of 18.9 miles. Within Edmonson County, Corridor 10 boasts the greatest reduction in congested vehicle-hours of travel (VHT) and vehicle-miles of travel (VMT) overall and for trucks. In addition, with the exception of Corridor 11, it makes more use of existing freeway facilities than the other new location corridors and has support from the City of Bowling Green and Warren County.

As for environmental impacts, Corridor 10 appears to have low potential impacts upon threatened and endangered species, National Register of Historic Places (NRHP) eligible historic sites and districts, prime farmland, relocations, and the sinkhole plain. The corridor also avoids new terrain construction in the Turnhole Spring Groundwater Basin, which flows into the Mammoth Cave System. This corridor satisfies the local and regional objectives of a reduction in travel time and user costs, diversion of local traffic and improved safety.

Corridor 11 utilizes existing I-65, and then takes a new terrain route north of Bowling Green. It makes the greatest use of existing freeways compared to other new location corridors and provides better connectivity to Bowling Green by its closest proximity to existing development on the north side of Bowling Green. It has the shortest construction length of the new terrain routes at 14.8 miles. Corridor 11 carries the highest average daily traffic volume, results in the greatest reduction in regional and Warren County VHT for all vehicles, achieves a reduction in VHT for trucks in Edmonson County comparable to Corridor 10, and diverts the most VHT from non-freeway facilities in Warren County. Thus, the corridor also satisfies the local and regional objectives of a reduction in travel time and user costs, diversion of local traffic and improved safety. It also avoids new terrain construction in the Turnhole Spring Groundwater Basin. High constructability is also an advantage of this corridor.

Corridor 12 utilizes existing I-65 for its entire length between the Nunn (Cumberland) and Natcher Parkways and would not require any new terrain construction. This corridor has the lowest construction and total project costs along with having the fewest number of proposed bridges and drainage crossings. Overall, this corridor has the greatest reduction in congested VMT for the entire network. However, this corridor improvement results in the least reduction in VHT for the region and Warren County, and directs the least VHT from non-freeway facilities in Warren and Edmonson Counties. The elimination of new terrain construction, by utilization of existing facilities for this entire corridor, reduced essentially all potential environmental impacts considerations to low. The impact to potentially NRHP eligible historic structures and districts is low as well.

In addition to the three corridors recommended for further evaluation, the "no build" option should also continue to be evaluated further. The "no build" option would provide no additional connectivity to the Bowling Green area, and would not improve the existing access of the area, relying on existing facilities to meet increased traffic demands. The "no build" option would not include any new construction to create environmental impacts.

Corridors 10 and 11 would provide the most benefit in combination with the Bowling Green Outer Beltline by completing the entire northern portion of the Beltline. Corridor 12 and the "no build" option would provide little benefit in combination with the Beltline by including no coincidental sections with the Beltline corridors. A complete discussion of the compatibility of the two projects is included in Appendix A.

The corridors that were not recommended due to environmental, engineering, or traffic reasons were Corridors 2, 4, 5, and 23. All of these corridors consisted of entirely new terrain routes and were more costly to build. Since these corridors were made up of entirely new terrain, they had high potential environmental impacts associated with them. These corridors did not remove sufficient traffic from I-65 to avoid future widening of the roadway. Out of the four (4) non-recommended corridors, Corridors 2, 4, and 5 had the highest number of environmental issues. Corridor 2 had the worst rating of constructability and also performed poorly from a traffic perspective. Corridor 23 had the least public support from the third round of public information meetings and a petition in opposition to the corridor as well.

C. Special Considerations and Commitments

All corridors recommended for further consideration cross areas of karst topography. Primary concerns of roadway construction through these areas include water quality associated with the vulnerability of groundwater resources. Due to the rapid infiltration of surface water runoff in karst regions, runoff can reach the groundwater with little filtration and is difficult to trace or contain once moving underground. In addition, subterranean ecosystems associated with caves and karst geology include rare species and are typically fragile and susceptible to disturbance. The potential for encountering unknown voids and conduits in the subsurface during construction and the potential for disturbance to known karst features dictate that special considerations be given to potential construction in these areas.

Further development of the recommended corridors identified should continue to avoid and minimize potential impacts to karst features as additional detailed information is gathered. Where potential impacts to karst features cannot be

avoided, special design considerations should be implemented. These measures will include the utilization of grass-lined waterways to filter runoff prior to discharge to the subsurface, detention basins to contain potential contaminant spills and any other Best Management Practices (BMPs) being used to mitigate potential karst impacts at the time of design and construction.

D. Future Activities to Consider

The recommendations provided in this section identify the corridors which best meet the goals specified for this project with the least potential environmental impacts. The evaluations of corridors to this point have been conducted with information gathered through agency coordination, literature reviews, GIS databases, the public, and windshield surveys. Further evaluation of the recommended corridors to identify a single preferred corridor will require detailed surveys and analysis to identify specific impacts associated with each corridor. The results of this detailed analysis should be presented in a formal NEPA document for public presentation and agency review.