

## TRUCK ROUTE ACCESS EVALUATION

Logan Aluminum  
Russellville - Logan County  
Site #2657

Report No. KTC-99-44

“Freight Movement and Intermodal Access in Kentucky”  
SPR 98-189

David H. Cain

with  
Ken Agent  
Brian Aldridge  
Lisa Aultman-Hall  
Nick Stamatiadis  
Joel Weber



Kentucky Transportation Center and the Department of Civil Engineering  
University of Kentucky

May 1999

## Table of Contents

1.0 Introduction .....	1
2.0 Truck Routes in Use .....	3
3.0 Route Data Collection and Field Inspections .....	4
3.1 Traffic Operations and Level of Service .....	6
3.2 Accident History .....	6
3.3 Cross Section Features .....	9
3.4 Curvature Features .....	9
3.5 Railroad Crossings .....	13
3.6 Bridges .....	13
3.7 Sight Distance .....	15
4.0 Route Evaluation and Recommendations .....	17
4.1 Problem Truck Miles and Truck Points .....	17
4.2 Maintenance Improvement Locations .....	19
4.3 Overall Route Rating .....	19
4.4 Conclusions and Recommendations .....	20
Appendices	
Appendix A: Phone Surveys Conducted with Facilities .....	22
Appendix B: Curvature Data .....	24

## List of Tables

Table 1: Route Designation Summary . . . . .	3
Table 2: Route Features and Method of Evaluation . . . . .	5
Table 3: High Critical Accident Rate Locations . . . . .	6
Table 4: Accident Types along Route One: (US 431 to Western Kentucky Parkway) . . . . .	8
Table 5: Accident Types along Route Two: (US 431 south to US 79 to Tennessee State Line) . . . . .	8
Table 6: Accident Types along Route Three: (US 431 to Tennessee State Line) . . . . .	8
Table 7: Summary of Curvature Features . . . . .	13
Table 8: Bridge Sufficiency Ratings for Route One: US 431 to Western Kentucky Parkway . . . . .	14
Table 9: Bridge Sufficiency Ratings for Route Two: US 431 to US 79 to Tennessee State Line . . . . .	14
Table 10: Bridge Sufficiency Ratings for Route Three: US 431 to Tennessee State Line . . . . .	15
Table 11: Summary of Problem Truck Miles and Truck Points for Route One . . . . .	17
Table 12: Summary of Problem Truck Miles and Truck Points for Route Two . . . . .	18
Table 13: Summary of Problem Truck Miles and Truck Points for Route Three . . . . .	18
Table 14: Interpretation of the Overall Route Ratings . . . . .	19

## List of Figures

Figure 1: Location of Truck Generating Site . . . . .	2
Figure 2: An Entrance to Logan Aluminum . . . . .	4
Figure 3: Shipping and Receiving Entrance. . . . .	4
Figure 4: Accident Locations . . . . .	7
Figure 5: Lane Widths . . . . .	10
Figure 6: Shoulder Widths . . . . .	11
Figure 7: US 79 at US 431 in Russellville . . . . .	12
Figure 8: US 431 at US 79 in Russellville . . . . .	12
Figure 9: US 79 and US 431 Intersection . . . . .	12
Figure 10: Bridge Locations . . . . .	16

## 1.0 Introduction

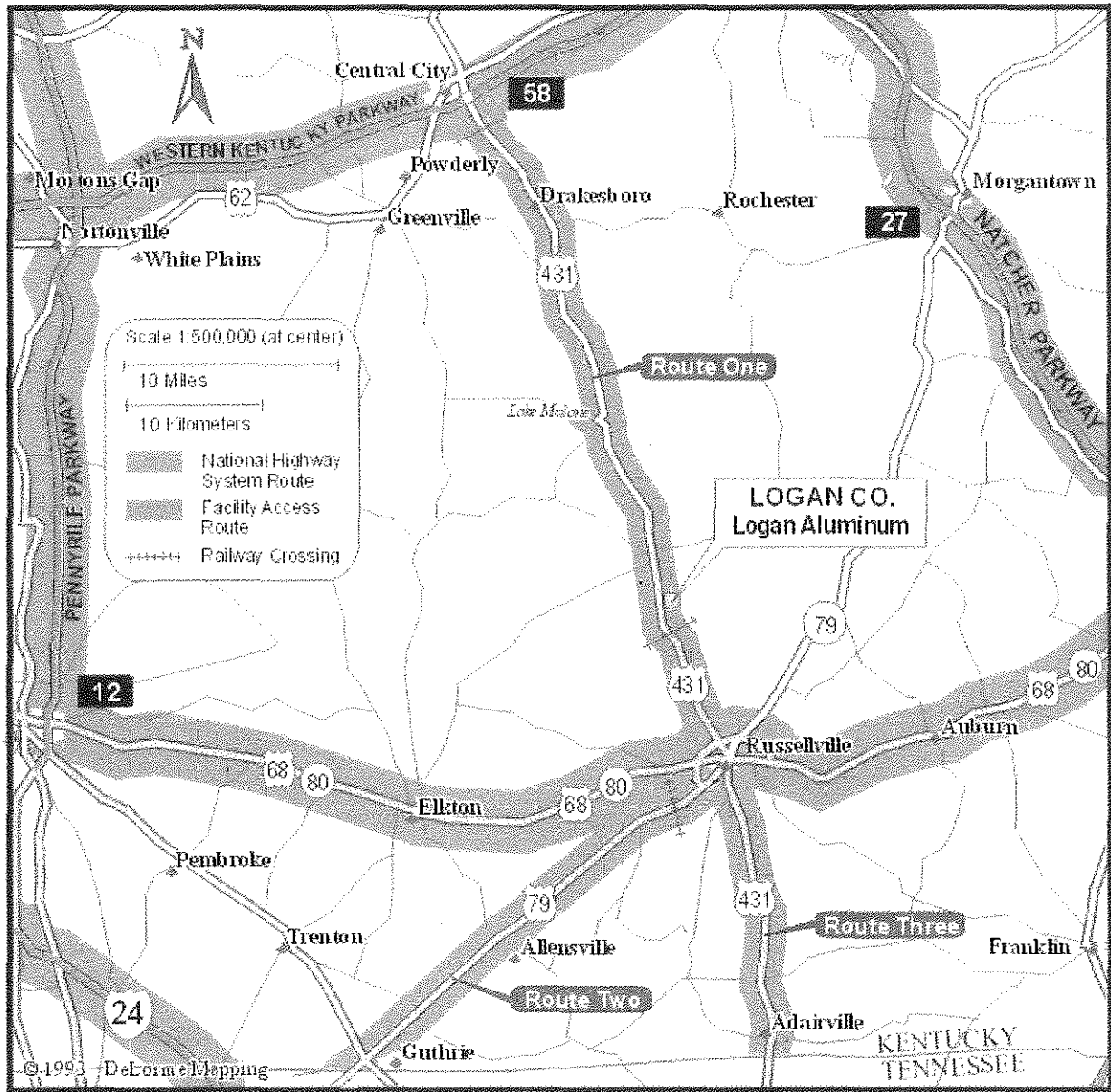
The Freight Movement and Intermodal Access in Kentucky Study (SPR 98-189) is being conducted by the Kentucky Transportation Center on behalf of the Kentucky Transportation Cabinet. There are two main objectives of the study: 1) evaluation of the access for trucks between intermodal or other truck generating sites and the National Highway System (NHS) and 2) furthering the understanding of freight commodity flows throughout the state. This report summarizes the access evaluation for a facility located in Logan County in the Barren River Development District (ADD) and KYTC Highway District # 3. The location of the site is shown in Figure 1. Work on other specific sites as well as the freight commodity flow task is ongoing and is documented elsewhere.

The sites to be evaluated were selected from two existing databases ( a truck facility survey from 1994 and the intermodal facility inventory) based on ADD and KYTC Highway District planner recommendations, geographic location, distance to the national highway system, and the number of trucks accessing the site. Consideration was also made for the freight type handled and transportation modes used. This site is located on US 431 in Logan County. The National Highway System route serving the area is US 68 shown in Figure 1.

A phone survey was conducted with the facility truck routing personnel early in the study process. The site was visited on October 26, 1998 for data collection and December 5, 1998 for video recording. The only facility in the area is Logan Aluminum located on US 431 north of Russellville. The approximate location is also shown in Figure 1. The surrounding area is generally rural and agricultural. The phone survey found approximately 200 trucks per day accessing this site (in and out), while HIS data indicates 720 trucks per day travel along US 431. The site trucks are generally flatbed truck 45-48 feet in length. The phone survey information can be found in Appendix B.

A concern mentioned in the phone survey was the absence of a southern bypass around Russellville. The Six Year Highway Plan includes the design for construction of a southern bypass. Also included in the Six Year Highway Plan is a project to widen a section of US 431 from near Logan Aluminum to north of the Russellville Bypass.

Figure 1: Location of Truck Generating Site



## 2.0 Truck Routes in Use

Three routes were indicated as access routes to the National Highway System from this site on US 431. The three routes were: US 431 from the Western Kentucky Parkway, US 431 from the Tennessee State Line south of Russellville near Adairville, and US 79 from the Tennessee State Line southwest of Russellville near Guthrie. None are on the National Truck Network. The two southern routes travel 1.9 miles on US 68 Bypass, a National Highway System Route. Logan Aluminum is located north of Russellville at approximately MP 21.3 on US 431 in Logan County. A route designation summary is shown in Table 1 and was obtained from HIS data.

**Table 1: Route Designation Summary**

Route	County	Milepoint	Functional System	Weight Class	AADT
US 431	Muhlenberg	Length	Rural Minor Arterial	AAA	1,955 - 6,840
US 431	Logan	0.000 - 11.43	Rural Minor Arterial	AAA	4,150
		11.43 - 13.896	Urban Principal Arterial	AAA	9,675
		15.128 - 15.789	Urban Principal Arterial	AAA	11,000
		15.789 - 31.898	Rural Minor Arterial	AAA	2,825 - 11,000
US 79	Logan	0.000 - 9.857	Rural Minor Arterial	AAA	2,640
		9.857 - 11.813	Urban Principal Arterial	AAA	2,640
US 79	Todd	Length	Rural Minor Arterial	AAA	2,143

US 68 is designated as a National Truck Network route and is also on the National Highway System. According to the phone survey approximately 30% of the truck traffic uses US 68, both east and west, while the remaining truck traffic uses the three routes evaluated in this reports. The justification in using these routes off the National Truck Network may be attributed to the more direct access to I-24 or Nashville to the south and Western Kentucky Parkway to the north.

Route One is approximately 28 miles in length and travels along US 431 to the Western Kentucky Parkway at Exit 58. The roadway has two lanes 11 feet in width with a good pavement surface. The terrain along this route is rolling and is primarily used for agriculture. A few sections of the roadway have moderate curves with 40-45 mph advisory signs and still fewer with 25 or 35 mph advisory signs. If a 102 inch wide truck were to use this route it would be an STAA violation.

Route Two follows US 431 south from the site to US 79 and continues south on US 79 about 21 miles through Todd County to the Tennessee State Line. The total route length is approximately 30 miles. Approximately 1.9 miles of the US 68 bypass along the route is on the National Highway System route. The terrain is lightly rolling to flat and is primarily used for agriculture. If a 102 inch wide truck were to use this route it would be in violation of STAA rules.

Route Three follows US 431 south from the site, around the bypass, then north on US 79 to US 431 South. The total route length is approximately 24 miles. The route is identical to the second route from the site to the intersection with US 79 southwest of Russellville. From this point

Route Three follows US 79 north approximately 1 mile to the junction with US 431 South. This route continues on US 431 for about 14 miles to the Tennessee State Line with a. This highway has two 12-foot lanes. The alignment is relatively straight. The area is rural in character and is flat and rolling. A small urban area, called Adairville, is located approximately 1.5 miles north of the Tennessee State Line. The speed limit through the area is 35 mph. A 4-way stop controlled intersection is located in the urban area. If a 102 inch wide truck were to use this route it would be an STAA violation.



**Figure 2: An Entrance to Logan Aluminum**



**Figure 3: Shipping and Receiving Entrance**

Truck access to Logan Aluminum off US 431 is very good via four entrances. One is shown in Figure 2. All are similar in layout and have right and left turning lanes from US 431. Each access is clearly identified by signs. The speed limit through the area is reduced to 45 mph. The terrain is mostly clear and flat. Each entrance crosses a single railroad track approximately 45 feet from the edge of the roadway and running parallel to US 431 as shown in Figure 3. There are no gates or warning lights at these crossing which have standard railroad crossing signs and do not appear to be used frequently.

### **3.0 Route Data Collection and Evaluation**

The route features that were evaluated in this study are shown in Table 2 along with a brief description of the evaluation method. While some of these features required only subjective evaluation by the engineer during site inspection, others required quantitative measurement in order to label the particular point or section as “preferred,” “adequate,” or “less than adequate” for truck access. The guidelines for labeling a point or section into one of these three descriptive categories are provided in both the interim and final report for this project. In several cases measurements were only taken where subjective evaluation indicated a problem might exist.

**Table 2: Route Features and Method of Evaluation**

Feature	Methodology	Team Consensus based on Committee Meeting and Draft Report Feedback	Feature Type
Offtracking	Lane Width with formula based on wheel and axle spacing	Evaluate where observation of trucks indicates possible offtracking - use HIS data and collect in field	Point
Max. Safe Speed on a Curve	Ball Bank Indicator Reading	Evaluate complete route due to ease of data collection	Point
Grade	Speed Reduction Tables with Percent Grade and Direct Observation	Evaluate where observation of trucks indicates speed reduction occurs using HIS data and collect in field as needed	Continuous
Lane Width	HIS data and field measurement	Review complete route due to ease of data collection	Continuous
Clear Zone	Observation	Subjective evaluation	Subjective
Shoulders	HIS data and field measurement	Evaluate where HIS data is available and estimate based on observation elsewhere	Continuous
Pavement Condition	Observation	Subjective evaluation	Subjective
Truck Stopping Sight Distance	Field measurements	Measure only when observation indicates possible problem	Point
Turning Radii	Field measurements and observations of trucks	Measure only when observation indicates possible problem	Point
Accident History	Accident data files and KTC High Truck Accident Report	Do for entire route	Subjective
Intersection LOS	Traffic counts	Only where problems are indicated by facility managers	Point
Route LOS	Traffic counts and travel time studies	Only where problems are indicated by managers	Continuous
RR Crossings	Field Observation	Evaluate all level crossings	Point
Bridges	KYTC Sufficiency Rating	Evaluate all bridges	Point



### 3.1 Traffic Operations and Level of Service

The survey of these sites indicated that there were no traffic problems or concerns for these routes. The only problems identified deal with geometric problems that are discussed in another section of the report. Thus, the route is assumed to operate at an acceptable level of service.

### 3.2 Accident History

In 1997 the Kentucky Transportation Center studied all state-maintained roads throughout Kentucky and determined average truck accident rates for different types of road sections. A critical accident rate was then calculated using the average accident rate for a specific highway type along with an assumed level of statistical significance and exposure (vehicle miles traveled). Table 3 shows the locations along these routes with high critical accident rates.

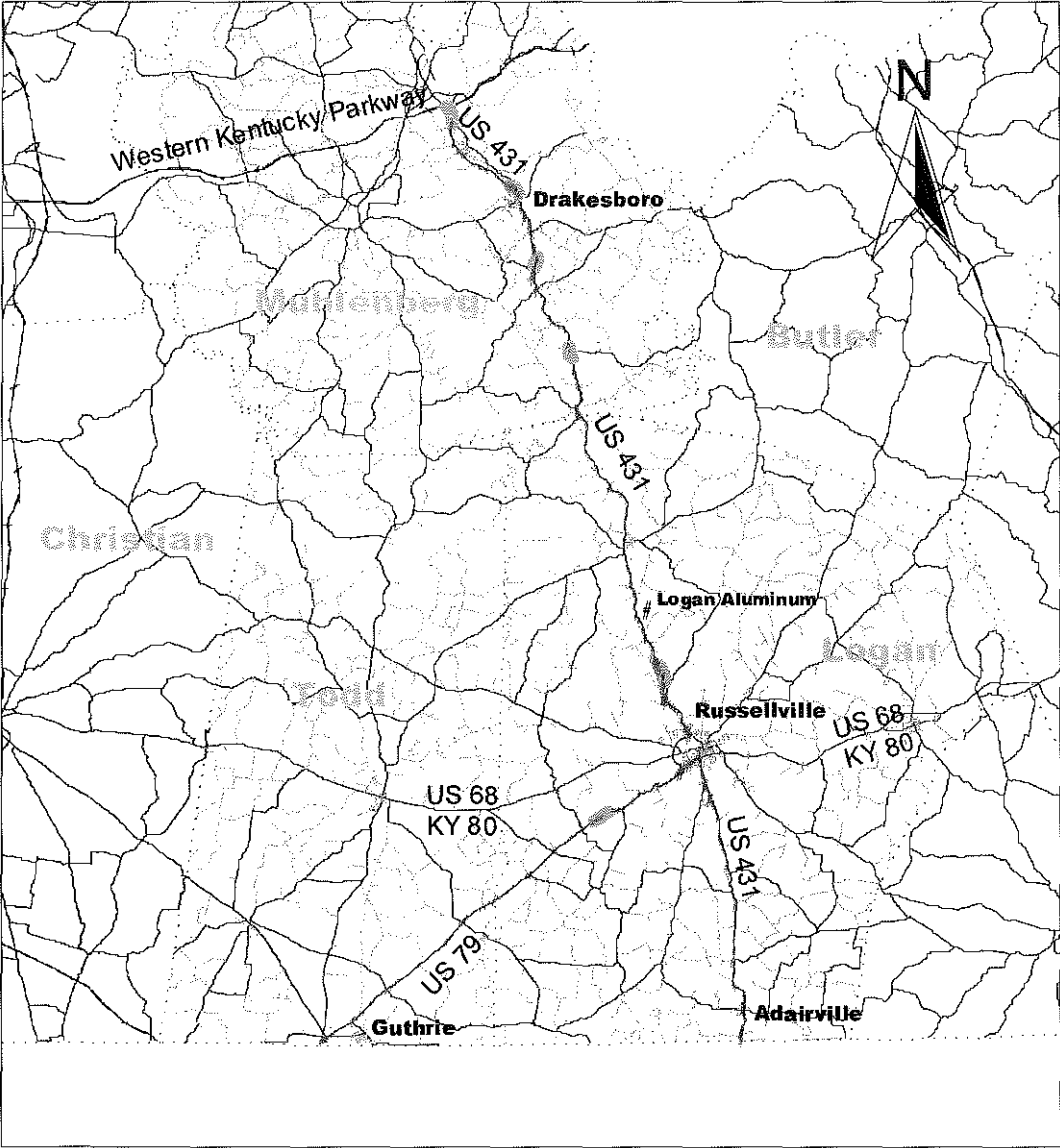
**Table 3. High Critical Accident Rate Locations**

County	Route	Milepoint	Critical Accident Factor
Logan	US 79	5.851 - 6.601	2.18
Logan	US 431	17.984 - 18.945	1.15
Muhlenberg	US 431	2.879 - 3.454	2.92
Muhlenberg	US 431	7.900 - 8.420	1.10
Muhlenberg	US 431	11.458 - 12.082	1.15
Muhlenberg	US 431	16.609 - 17.484	1.74
Todd	US 79	1.827 - 2.046	1.49
Todd	US 79	3.197 - 3.973	1.24

A section of US 431 in Muhlenberg County, at MP 2.879-3.454 had a high critical accident factor ( the ratio of the actual accident rate to the critical accident rate) of 2.9. Most of the accidents occurred at the Rocky Creek Bridge which is a narrow concrete bridge. Figure 4 shows the locations of accidents during the years 1995, 1996, and 1997. The figure shows that the accidents were scattered along US 431, with a significant number occurring between the site and Russellville and at the Rocky Creek Bridge.

A summary of the accidents along the individual truck routes is shown in Tables 4, 5 and 6 for the same three year period. Truck accidents represent a significant portion of the overall accidents along Route One. The 11.5% of accidents involving trucks is higher than the percent trucks along US 431 (8.9%). The 15.2% of accidents involving trucks on Route Two is also higher than the percent trucks on KY 79 (9.2%) US 431 (8.9%). Route Three had 9.7% of accidents involving trucks which is below the percent trucks traveling along US 431 south of Russellville (12.8%) and KY 79 in Russellville (9.2). The 9.7% is higher than the section of US 431 north of Russellville (8.9%). The high percent of truck accidents along Route One and Route Two suggests there may be some safety concerns from an accident history point of view.

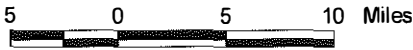
**Figure 4: Accident Locations (1995-1997)**



**LEGEND**

- # Facility
- Accidents: 1-3
- Accidents: 4-12
- # Accidents: 13-26
- Critical Accident Rate Section

**Scale - 1:440000**



**Table 4: Accident Types along Route One (US 431 to Western Kentucky Parkway)**

	<i>Non-Truck Accidents</i>	<i>Truck Accidents</i>	<i>Percent Trucks</i>
Total	315	41	11.5
Fatal Accidents	1	1	50.0
Injury	113	8	6.6
Intersection	85	10	10.5

**Table 5: Accident Types along Route Two (US 431 to KY 79 to Tennessee State Line)**

	<i>Non-Truck Accidents</i>	<i>Truck Accidents</i>	<i>Percent Trucks</i>
Total	239	43	15.2
Fatal Accidents	6	0	0.0
Injury	69	13	15.9
Intersection	57	15	20.8

**Table 6: Accident Types along Route Three (US 431 to Tennessee State Line)**

	<i>Non-Truck Accidents</i>	<i>Truck Accidents</i>	<i>Percent Trucks</i>
Total	298	32	9.7
Fatal Accidents	5	0	0.0
Injury	99	6	5.7
Intersection	90	11	10.9

### **3.3 Cross Section Features**

Figures 5 and 6 show the sections of the route having different widths of lanes and shoulders. All access routes to this site are two-lane roadways with the exception of the routes using the bypass west of Russellville. The bypass is a 4-lane divided roadway. US 431 has lane widths of either 11 feet (“adequate”) or 12 feet (“preferred”). US 79 has primarily 10-foot, “less than adequate”, lanes in Todd County and Logan County. All pavements are generally in good condition.

US 431 north from the site to the Western Kentucky Parkway has 11-foot lanes. This feature is rated “adequate” with 12-foot lanes being “preferred.” There are several speed advisory signs posted along this route in Muhlenberg County.

Clear zone problems potentially occur on US 431 where older type concrete bridge railings are near the edge of the pavement. Guardrails extend for approximately 0.6 mile in the vicinity of Wolf Lick Creek in Logan County. Curbs are present along US 79 in Russellville near the US 431 intersections and along US 431 in Adairville. Several buildings in Adairville are located directly next to the sidewalk. This situation also affects the sight distance at a 4-way stop intersection in Adairville. Along the southbound lane of US 431 in Adairville, utility poles have been placed between the sidewalk and the curb thus affecting the clear zone space for the roadway.

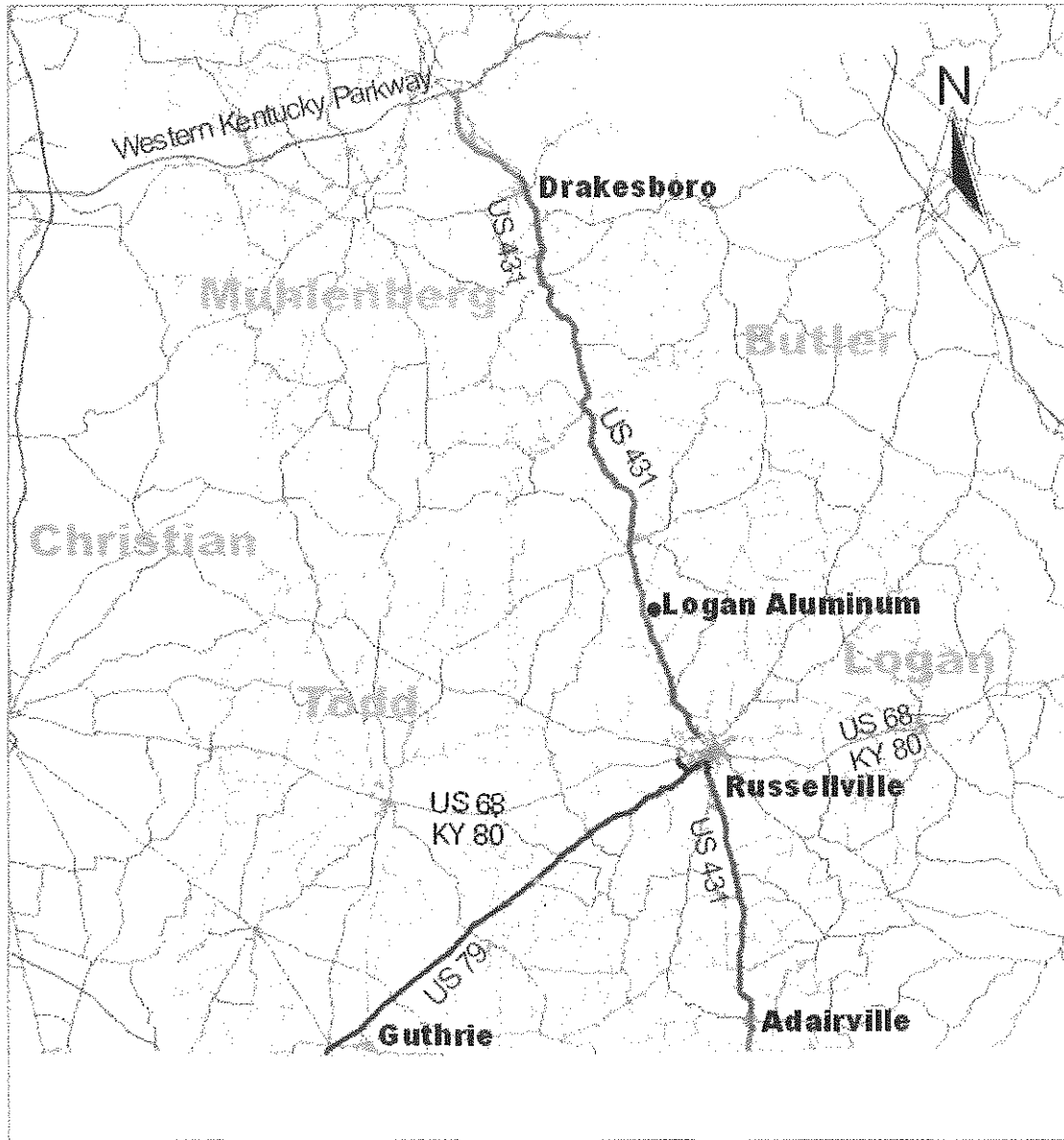
### **3.4 Curvature Features**

Grades are considered problematic if they cause trucks to slow down excessively. No such grades were found on these routes.

Offtracking is considered a problem where a truck cannot stay in its lane through a curve. Tables B1, B2 and B3 in Appendix B show the approximate milepoints of all curves where offtracking could be a problem as calculated from lane width and degree of curvature. The number of curves on each route rated less than “preferred” is shown in Table 7.

One turning radius problem was noted and observed. The potential problem is where trucks make any turn at the intersection of US 79 and US 431 in Russellville as shown in Figures 7 and 8 and illustrated in Figure 9. This was a location for concern as reported by the phone survey. Both routes have two 10-foot lanes, curbs, and join at 90 degree angles. There are no turning lanes at this signalized intersection. The stop bars have been set back a considerable distance to allow opposing traffic adequate space to negotiate turns. This turning radius is rated “less than adequate”.

**Figure 5: Lane Widths**



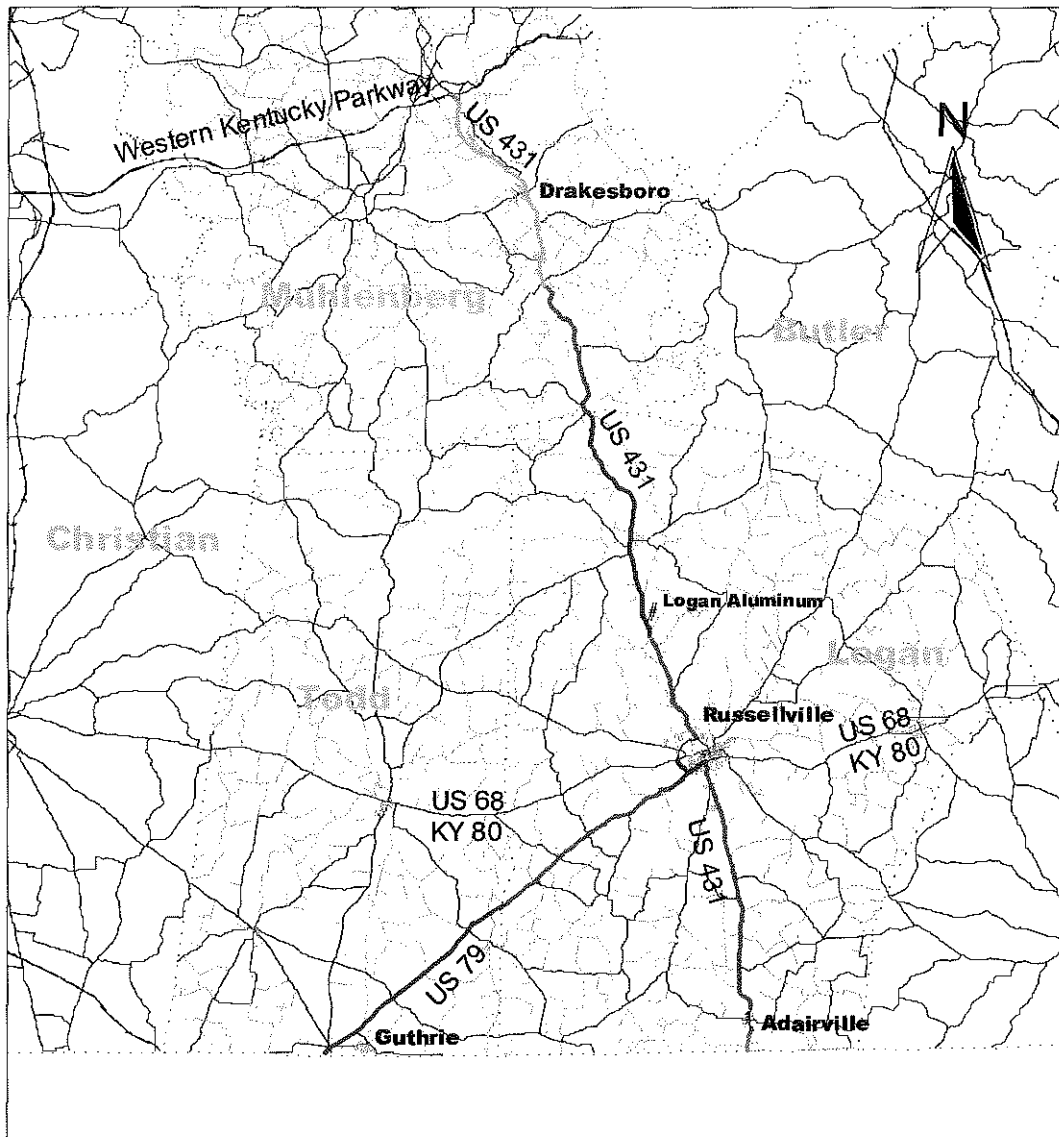
**LEGEND**

- Facility
- ⋯ Lane Width: 9 Feet
- Lane Width: 10 Feet
- - - Lane Width: 11 Feet
- · - · Lane Width: 12 Feet




**Scale - 1:440000**



**Figure 6: Shoulder Widths**



**LEGEND**

#	Facility
	Shoulder Width - 1 Foot
	Shoulder Width - 2 Feet
	Shoulder Width - 3 - 4 Feet

**Scale - 1:440000**



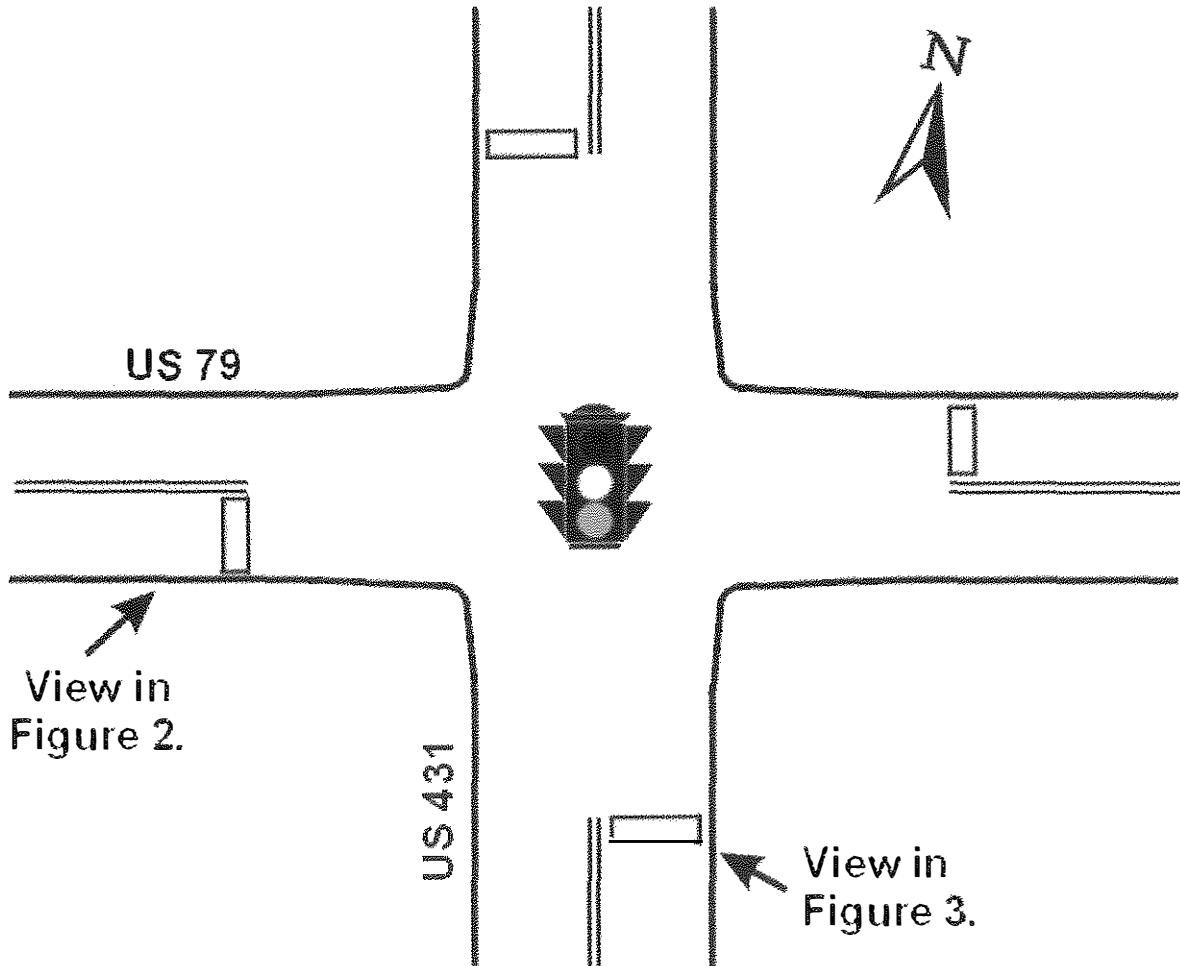


Figure 7: US 79 at US 431 in Russellville.



Figure 8: US 431 at US 79 in Russellville.

Figure 9: US 79 and US 431 Intersection



**Table 7. Summary of Curvature Features as Calculated**

	Number of Curves with less than “preferred” Offtracking Rating	
	“adequate”	“less than adequate”
Route One: US 431 to Western KY Parkway	6	26
Route Two: US 431 to US 79 to TN State Line	11	22
Route Three: US 431 to TN State Line	8	16

### 3.5 Railroad Crossings

There are three at-grade railroad crossings on the truck access routes as shown in Figure 1. Route One, along US 431 in Muhlenberg County, has a crossing about two miles south of the Western Kentucky Parkway. The crossing has gates and flashing lights. The crossing is “preferred” for truck traffic.

There are two crossings on Route Two which follows US 431 and US 79 to the Tennessee State Line. The first crossing is on US 431 about a mile south of the entrances to Logan Aluminum. This crossing is gated and has flashing lights. The crossing surface is in good condition and would be considered “preferred” for truck traffic.

The next crossing on Route Two is on US 79 south of the Russellville Bypass. It is located approximately 1.5 miles south of the intersection. The pavement is in good condition and eight-foot shoulders extend approximately 0.2 miles in both directions from the crossing. This crossing has a “preferred” rating.

There are four at-grade crossings to Logan Aluminum off US 431 at the four facility entrances. Each entrance crosses a single railroad track which runs parallel to US 431 as shown in Figure 6. The track is situated approximately 45 feet beyond the edge of the right turning lane and all crossings are in good condition. There are no gates or warning lights at these crossings, all of which have standard railroad crossing signs.

### 3.6 Bridges

The bridges on the three truck access routes for this facility are summarized in Tables 8, 9, and 10 and shown in Figure 10. The sufficiency rating and the prioritizing levels used by KYTC can be used in this study as follows: “preferred”: 80.0-100.0, “adequate”: 50.0-79.9, and “less than adequate”: 0.0-49.9. Of the 14 bridges on US 431 to the Western Kentucky Parkway three were rated “preferred” and eleven were rated “adequate.” There are seven bridges on the US 431 and US 79 route to the Tennessee State Line. Two were rated “preferred” and five were rated “adequate.” The US 431 route south to the Tennessee State Line has two bridges and both were rated “adequate.” No bridge on any access route servicing this facility had a “less than adequate” rating which is equivalent to a Bridge Sufficiency Rating of less than 50.0.

**Table 8: Bridge Sufficiency Ratings for Route One: US 431 to Western Kentucky Parkway.**



Route	County	Milepoint	Bridge No.	Sufficiency Rating	Evaluation Rating
US 431	Logan	27.412	B0002	65.5	“adequate”
		27.725	B0003	65.8	“adequate”
		28.646	B0004	75.9	“adequate”
		28.905	B0005	64.1	“adequate”
		29.695	B0074	88.1	“preferred”
	Muhlenberg	3.454	B0017	65.5	“adequate”
		3.634	B0016	61.4	“adequate”
		5.922	B0015	75.8	“adequate”
		6.412	B0014	75.8	“adequate”
		7.02	B0013	75.8	“adequate”
		10.991	B0099	83.9	“preferred”
		12.448	B0018	64.5	“adequate”
		13.307	B0009	88.6	“preferred”
		17.484	B0008	73.5	“adequate”

**Table 9: Bridge Sufficiency Ratings for Route Two: US 431 to US 79 to Tennessee State Line.**

Route	County	Milepoint	Bridge No.	Sufficiency Rating	Evaluation Rating
US 79	Todd	1.942	B0011	72.4	“adequate”
		2.285	B0013	92.3	“preferred”
		4.338	B0014	94.1	“preferred”
		7.609	B0012	76.7	“adequate”
	Logan	2.91	B0026	76.7	“adequate”
		4.639	B0025	75.5	“adequate”
		5.927	B0024	75.7	“adequate”

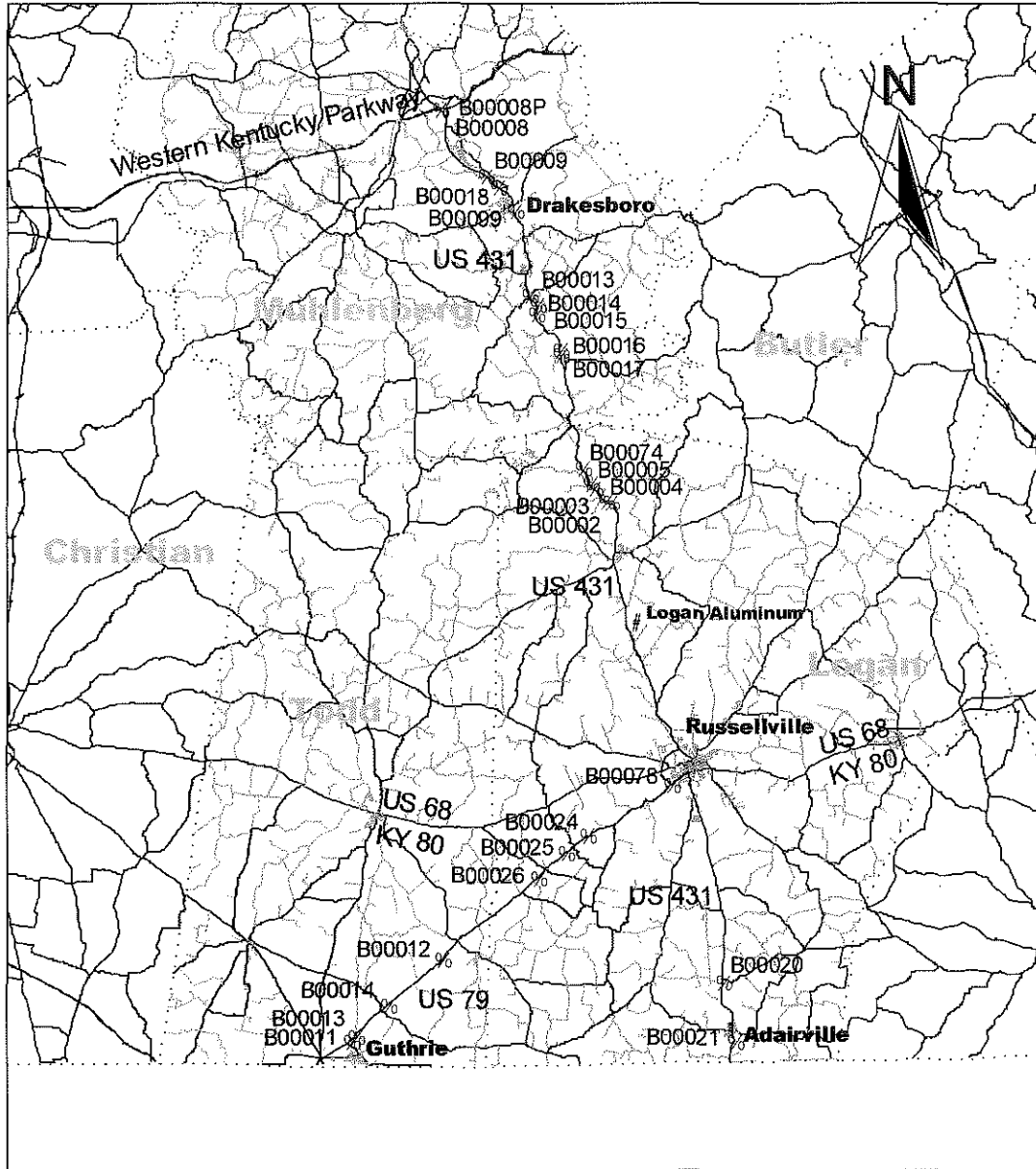
**Table 10: Bridge Sufficiency Ratings for Route Three: US 431 south to Tennessee State Line.**

Route	County	Milepoint	Bridge No.	Sufficiency Rating	Evaluation Rating
US 431	Logan	0.987	B0021	65.9	“adequate”
		4.025	B0020	66.2	“adequate”

### 3.7 Sight Distance

Inadequate sight distance could be a potential problem in Adairville at the 4-way stop controlled intersection of US 431 and KY 591. Buildings are located on the corners greatly restricting the view in at least one direction. The problem is lessened due to traffic being required to stop at all approaches to the intersection.

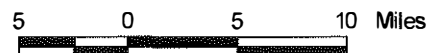
**Figure 10: Bridge Locations**



**LEGEND**

#	Facility
% B00000	Bridges - Bridge Number
—	Freight Access Route

**Scale - 1:440000**



## 4.0 Composite Route Evaluation and Recommendations

### 4.1 Problem Truck Miles and Truck Points

In order to compare different routes to consider the relative urgency of needed route improvements the features rated “preferred,” “adequate” and “less than adequate” along a route are to be normalized for the number of miles, number of points and number of trucks using the route section. In the case of this Logan county route, four features that were evaluated quantitatively have sections or points that are considered only “adequate” or “less than adequate”. A section or point that is considered “less than adequate” is weighted two times that of an “adequate” point or section. Less than “preferred” sections are weighted by length as well as the number of trucks passing that point. The number of trucks was obtained from HIS data.

Tables 11, 12, and 13 contain the total problem truck miles and total problem points for lane and shoulder widths, offtracking, and bridges which apply to these routes. The rating of these routes relative to others evaluated will be reported in the final report.

**Table 11: Summary of Problem Truck Miles and Truck Points for Route One: US 431 to Western Kentucky Parkway**

Feature	Road	County	Location	Points*	Length (miles)	Trucks (/day)	Truck- Truck- points miles
<b>Lane Width</b>	US 431	Logan	MP 21.3-31.9	1	10.6	720	7,632
	US 431	Muhlenberg	MP 0.0-17.5	1	17.5	720	12,600
<b>Total</b>							<b>20,232</b>
<b>Bridge Ratings</b>	US 431	Logan	B0002	1		720	720
	US 431	Logan	B0003	1		720	720
	US 431	Logan	B0004	1		720	720
	US 431	Logan	B0005	1		720	720
	US 431	Muhlenberg	B0017	1		720	720
	US 431	Muhlenberg	B0016	1		720	720
	US 431	Muhlenberg	B0015	1		720	720
	US 431	Muhlenberg	B0014	1		720	720
	US 431	Muhlenberg	B0013	1		720	720
	US 431	Muhlenberg	B0018	1		720	720
	US 431	Muhlenberg	B0008	1		720	720
<b>Total</b>							<b>7,920</b>
<b>Offtracking</b>		See Table B1					<b>19,430</b>

\*1 point for “adequate” features and 2 points for “less than adequate” features (0 points for “preferred” features not shown)

**Table 12: Summary of Problem Truck Miles and Truck Points for Route Two: US 431 to US 79 to Tennessee State Line**

Feature	Road	County	Location	Points*	Length (miles)	Trucks (/day)	Truck-points	Truck-miles
<b>Lane Width</b>	US 431	Logan	MP 15.1-21.3	1	6.2	720		4,464
	US 79	Logan	MP 0.0-10.8	1	10.8	245		2,646
	US 79	Todd	MP 0.0-10.6	1	10.6	210		2,226
<b>Total</b>								<b>9,336</b>
<b>Shoulder</b>	US 79	Todd	MP 0.0-10.6	2	10.6	210		4,452
	US 79	Logan	MP 0.0- 10.8	2	10.8	245		5,292
	US 431	Logan	MP 15.1-21.3	2	6.2	720		8,928
<b>Total</b>								<b>18,672</b>
<b>Bridge Ratings</b>	US 79	Todd	MP 1.942	1		210	210	
	US 79	Todd	MP 7.609	1		235	235	
	US 79	Logan	MP 2.910	1		150	150	
	US 79	Logan	MP 4.639	1		245	245	
	US 79	Logan	MP 5.972	1		245	245	
<b>Total</b>							<b>1,085</b>	
<b>Offtracking</b>		See Table B2						<b>12,368</b>

\*1 point for “adequate” features and 2 points for “less than adequate” features (0 points for “preferred” features not shown)

**Table 13: Summary of Problem Truck Miles and Truck Points for Route Three: US 431 south to Tennessee State Line**

Feature	Road	County	Location	Points*	Length (miles)	Trucks (/day)	Truck-points	Truck-miles
<b>Lane Width</b>	US 431	Logan	MP 0.0-13.9	1	13.9	565		7,854
	US 431	Logan	MP 15.1-21.3	1	6.2	720		4,464
	US 79	Logan	MP 10.8-11.8	1	1.0	245		245
<b>Total</b>								<b>12,563</b>
<b>Shoulder</b>	US 79 (Curbed)	Logan	MP 11.6-11.8	2	0.2	245		98
	US 431	Logan	MP 1.0-13.9	2	12.9	565		14,577
	US 431	Logan	MP 15.1-21.3	2	6.2	720		8,928
<b>Total</b>								<b>23,603</b>
<b>Bridge Ratings</b>	US 431	Logan	MP 0.987	1		440	440	
	US 431	Logan	MP 4.025	1		400	400	
<b>Total</b>							<b>840</b>	
<b>Offtracking</b>		See Table B3						<b>14,597</b>

\*1 point for “adequate” features and 2 points for “less than adequate” features (0 points for “preferred” features not shown)

## 4.2 Maintenance Improvement Locations

No additional routine maintenance is indicated along the routes.

## 4.3 Overall Route Rating

In order to account for both the subjectively and objectively evaluated route features along truck routes throughout the state, a panel of UK engineers who studied the route and its features either during a site visit or by viewing a video of trucks using the routes scored the overall access on a scale of 1 through 10. The interpretation for these ratings is shown in Table 14.

Route One on US 431 in Muhlenberg and Logan Counties connecting the facility and the Western Kentucky Parkway was given an overall rating of 6 indicating that minor improvements could improve this route. The 11-foot lane widths, less than “preferred” shoulder widths, and the stretch of curvy roadway in Muhlenberg contribute to the reduced rating.

Route Two follows US 431 in Logan County and US 79 in Logan and Todd Counties to the Tennessee State Line. This route was given an overall rating of 7 indicating that minor improvements could improve this route. Although the alignment is relatively straight and flat, US 79 has 10-foot lanes and less than “preferred” shoulder widths.

Route Three follows US 431 south from the facility to US 79 north and then south on US 431 to the Tennessee State Line. This route was given a rating of 5 indicating that minor improvements are required on this route. This is due to the highly restrictive turning radius at the US 79 and US 431 intersection, the presence of curbs along portions of US 79 in Russellville and US 431 in Adairville, clear zone problems in Adairville and the 11-foot lane widths on US 431.

**Table 14: Interpretation of the Overall Route Rating**

<b>Overall Route Rating</b>	<b>Qualitative Interpretation of Rating</b>
<b>1</b>	<b>Trucks should not be using this route</b>
<b>2</b>	<b>Major construction is required to improve this route</b>
<b>3 to 5</b>	<b>Minor improvements are <u>required</u> on this route</b>
<b>6 to 8</b>	<b>Minor improvements could <u>improve</u> this route</b>
<b>9</b>	<b>Minor problems exist that do not seriously impede truck access</b>
<b>10</b>	<b>Trucks are served with reasonable access</b>

## 4.4 Conclusions and Recommendations

In conclusion, the following problems were identified along the truck access routes to the Logan Aluminum Site:

- 11-foot lane widths on US 431;
- Less than “preferred” shoulder widths on US 431;
- 10-foot lane widths on US 79;
- Less than “preferred” shoulder widths on US 79;
- Less than “preferred” bridge sufficiency ratings on all routes; and
- Turning radius at US 431 and US 79.

The turning radius problem should be addressed. Major construction to correct other problems should be considered depending on future traffic and truck projections. Continuation of the bypass south of Russellville would correct many problems.

The Six Year Highway Plan Project to widen US 431 from north of the intersection with US 68/KY 80 to the Logan Aluminum entrances will correct deficiencies associated with this section of roadway.

## **Appendices**

## Appendix A: Phone Surveys Conducted with Facilities

### PHONE SURVEY RESULTS

<u>Facility ID</u>	<u>Facility Name</u>	<u>Location / City</u>	<u>County</u>	<u>ADD</u>
2657	LOGAN ALUMINUM	RUSSELLVILLE	LOGAN	BARREN RIVER

<u>Contact Name</u>	<u>Title</u>	<u>Phone</u>	<u>Fax</u>
GARY HARNETT	MGR.	6339	
MO OELKER	TRAFFIC MGR.	6181	
BEV. WOODSON	SECRETARY	6641	

1. Is the location of your facility on the map correct? YES
2. Our information shows about 200 trucks per day access your facility. Is that correct?  
If not, fill in correct volume. YES
3. Is the truck traffic to and from your facility seasonal or mostly constant?  
CONSTANT
4. (If truck traffic is seasonal) Is the \_\_\_ trucks/day for the peak season?
5. What is the most common size truck operating at your facility? 45' - 48' SEMITRAILER
6. What is the largest truck operating at your facility? 6 AXLE SEMI
7. What type of freight or commodity is shipped, and is incoming and outgoing freight different?  
(one may be an empty truck) IN -ALUMINUM INGOTS (SHEETING)  
OUT - ALUMINUM COILS
8. Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon) NOON - 8 PM
9. What traffic congestion and delay problems along the routes are you aware of, or feel need improvement?  
Location (route segment, intersection, etc.) Time and Day of Week  
INTERSECTION OF KY 79 - US 431N HAS BAD TURN  
IS ON DESIGNATED TRUCK ROUTE - TURN NEARLY IMPOSSIBLE  
TRUCKS USE ALTERNATE ROUTE NORTH ON US 431 SOUTH OF RUSSELLVILLE  
STRAIGHT ACROSS KY 79 TO 2<sup>ND</sup> ST. R. ON 2<sup>ND</sup> TO US 431 - L ON US 431 TO LOGAN  
AL. RUSSELLVILLE BYPASS WHEN COMPLETED WILL RELIEVE THIS PROBLEM  
AND OTHERS IN CITY.  
DIFFICULTY WILL STILL EXIST WITH ABSENCE OF SOUTHERN BYPASS  
LARGE NUMBER OF TRUCKS TRAVEL TO/ FROM NASHVILLE USING US 431 FROM  
SOUTH OF RUSSELLVILLE.
10. Where do trucks at your facility go to and come from? (This may be an interstate, cities, general direction-N,S,E,W) NATIONWIDE, 30% USE US 68/ KY 80 BOTH EAST & WEST, KY 79 S TO I-24, US 431 NORTH & SOUTH
11. Do you have any other problems or concerns along the route you would like us to consider?  
US 431 N TO WK POOR CURVES LOW SHOULDERS INADEQUATE SHOULDERS



**12. Would you like a copy of the final report (roadway/route evaluation ???)**

**YES**

**NOTES/COMMENTS:**

**NARROW BRIDGE ON US 431N CURVES TOO SHARP ON US 431N**

## Appendix B: Curvature Data

**Table B1: Potential Offtracking Locations for Route One (US 431 to Western KY Parkway)**

County	Route	Location	Points	Trucks	Truck-Points
Logan	US 431	MP 21.3	2	720	1440
Logan	US 431	MP 21.6	1	720	720
Logan	US 431	MP 22.2	1	720	720
Logan	US 431	MP 22.4	2	720	1440
Logan	US 431	MP 22.6	1	720	720
Logan	US 431	MP 22.9	1	720	720
Logan	US 431	MP 23.1	2	720	670
Logan	US 431	MP 23.3	2	720	1440
Logan	US 431	MP 23.6	1	720	720
Logan	US 431	MP 24.5	2	720	1440
Logan	US 431	MP 26.0	1	720	720
Logan	US 431	MP 26.6	2	720	1440
Logan	US 431	MP 26.9	2	720	1440
Logan	US 431	MP 27.7	2	720	1440
Logan	US 431	MP 28.1	2	720	1440
Logan	US 431	MP 28.5	2	720	1440
Logan	US 431	MP 29.2	2	720	1440
Logan	US 431	MP 29.6	2	720	1440
Logan	US 431	MP 29.8	2	720	1440
Logan	US 431	MP 30.0	2	720	1440
Logan	US 431	MP 30.2	2	720	1440
Logan	US 431	MP 30.4	2	720	1440
Logan	US 431	MP 30.7	2	720	1440
Logan	US 431	MP 30.8	2	720	1440
Logan	US 431	MP 30.9	2	720	1440
Logan	US 431	MP 31.0	2	720	1440
Logan	US 431	MP 31.2	2	720	1440
Logan	US 431	MP 31.5	2	720	1440
Logan	US 431	MP 31.7	2	720	1440
Muhlenberg	US 431	MP 6.3	2	720	1440
Muhlenberg	US 431	MP 8.4	2	720	1440
Muhlenberg	US 431	MP 10.3	2	720	1440
<b>Total</b>					<b>40,990</b>

**Table B2: Potential Offtracking Locations for Route Two (US 431 to US 79 to Tennessee State Line)**

<b>County</b>	<b>Route</b>	<b>Location</b>	<b>Points</b>	<b>Trucks</b>	<b>Truck-Points</b>
Logan	US 431	MP 15.3	1	720	720
Logan	US 431	MP 15.9	2	720	1440
Logan	US 431	MP 16.1	2	720	1440
Logan	US 431	MP 16.2	2	720	1440
Logan	US 431	MP 16.6	1	720	720
Logan	US 431	MP 16.7	2	720	1440
Logan	US 431	MP 16.9	2	720	1440
Logan	US 431	MP 17.0	2	720	1440
Logan	US 431	MP 17.3	1	720	720
Logan	US 431	MP 17.4	1	720	720
Logan	US 431	MP 18.0	2	720	1440
Logan	US 431	MP 19.2	2	720	1440
Logan	US 431	MP 19.4	1	720	720
Logan	US 431	MP 19.9	1	720	720
Logan	US 431	MP 20.2	2	720	1440
Logan	US 431	MP 20.4	1	720	720
Logan	US 431	MP 20.7	2	720	1440
Logan	US 431	MP 20.8	2	720	1440
Logan	US 431	MP 21.2	1	720	720
Logan	US 431	MP 21.3	2	720	1440
Todd	US 79	MP 0.3	1	210	210
Todd	US 79	MP 2.0	2	210	420
Todd	US 79	MP 7.3	2	235	470
Todd	US 79	MP 9.0	2	210	420
Logan	US 79	MP 3.9	1	150	150
Logan	US 79	MP 4.1	2	245	490
Logan	US 79	MP 4.5	1	245	245
Logan	US 79	MP 5.9	2	245	490
Logan	US 79	MP 6.1	2	245	490
Logan	US 79	MP 6.8	2	245	490
Logan	US 79	MP 7.2	2	245	490
Logan	US 79	MP 7.5	2	245	490
Logan	US 79	MP 8.1	2	245	490
<b>Total</b>					<b>28,385</b>

**Table B3: Potential Offtracking Locations for Route Three (US 431 south to Tennessee State Line)**

<b>County</b>	<b>Route</b>	<b>Location</b>	<b>Points</b>	<b>Trucks</b>	<b>Truck-Points</b>
Logan	US 431	MP 0.1	2	566	1132
Logan	US 431	MP 0.7	2	566	1132
Logan	US 431	MP 0.8	2	566	1132
Logan	US 431	MP 1.1	2	566	1132
Logan	US 431	MP 1.2	2	566	1132
Logan	US 431	MP 6.7	2	566	1132
Logan	US 431	MP 7.2	1	566	566
Logan	US 431	MP 10.0	2	566	1132
Logan	US 431	MP 10.7	2	566	1132
Logan	US 431	MP 16.6	1	720	720
Logan	US 431	MP 16.7	2	720	1440
Logan	US 431	MP 16.9	2	720	1440
Logan	US 431	MP 17.0	2	720	1440
Logan	US 431	MP 17.3	1	720	720
Logan	US 431	MP 17.4	1	720	720
Logan	US 431	MP 18.0	2	720	1440
Logan	US 431	MP 19.2	2	720	1440
Logan	US 431	MP 19.4	1	720	720
Logan	US 431	MP 19.9	1	720	720
Logan	US 431	MP 20.2	2	720	1440
Logan	US 431	MP 20.4	1	720	720
Logan	US 431	MP 20.7	2	720	1440
Logan	US 431	MP 20.8	2	720	1440
Logan	US 431	MP 21.2	1	720	720
Logan	US 431	MP 21.3	2	720	1440
<b>Total</b>					<b>27,622</b>