

TRUCK ROUTE ACCESS EVALUATION

Industrial Park
Henderson County
Site # 2

Report No. KTC-99-10

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

by

Kenneth R. Agent

with

Brian Aldridge
Lisa Aultman-Hall
David Cain
Nikiforos Stamatiadis
Joel Weber



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

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1.0 Introduction

The Freight Movement and Intermodal Access in Kentucky Study (SPR 98-189) is being conducted on behalf of the Kentucky Transportation Cabinet (KYTC). There are two major objectives of the study: evaluation of the access for trucks between intermodal or other truck generating sites and the National Highway System (NHS); and furthering the understanding of freight commodity flows throughout the state. This report summarizes the access evaluation for several facilities located in Henderson County in the Green River Area Development District (ADD) and KYTC Highway District # 2. The locations of the sites are shown in Figure 1. Work on other specific sites as well as the freight commodity flow task are on-going and are 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. The Henderson County industrial area was recommended by the West Kentucky Corporation.

The initial site visit, facility identification, photographs, and videotaping was conducted on February 27, 1998. Data collection was conducted on three additional dates (July 9, September 29, and November 5, 1998). The following facilities are located in the area: Airgas, Consolidated Grain and Barge, Custom Resins, David Joseph Co., Henderson County Port Authority, Henderson Materials, Henderson Riverport, Henderson Terminaling, IMC Agrico, Millstone, Owensboro Grain, PB & S Chemical Co., Scott Mfg., Unison, and Valley Grain. Most of the facilities are located on Industrial Park Road and Riverport Road off KY 136. The surrounding area is at the edge of Henderson but is generally of a rural character.

A phone survey of a sample of the facility managers was conducted early in the study process. The phone survey did not include all the sites in the cluster so a traffic count was used to obtain the truck volume. Traffic counts for a 24-hour period taken in 1998 by KYTC found 602 trucks (8.4 percent of all vehicles) on KY 425 so this volume was used as a basis of estimating truck volume on the various roads. Truck volume counts were not available for the section of KY 136 used by the trucks but a 24-hour truck volume count of 350 was obtained for the major side road. These counts were used to estimate the volumes on the various roads. The site trucks are generally semi-tractor trailers. They were typically five axle trucks with a maximum 45-foot trailer. The phone survey information can be found in Appendix A.

2.0 Truck Routes in Use

There is one primary route for trucks to reach the National Highway System. The industrial park is located south of Henderson off KY 136. The facilities are located on three side roads off KY 136. Two of these roads are Industrial Park Road which has a length of about 1.3 miles from KY 136 to the last facility and Riverport Road which has a length of about 0.7 miles. Three of the facilities are located on another unnamed side road. The trucks travel a maximum of about one mile on KY 136 from Industrial Park Road to the intersection with KY 425 and US 60 and then follow KY 425 for about 5.5 miles to the Pennyriple Parkway (which is on the National Highway System). The location of the truck generating sites and the route used to travel to the National Highway System is shown in Figure 1. Most of KY 136 is a two lane rural roadway with 10-foot lanes and a two-foot shoulder (Figure 2). The lane and shoulder widths become wider near the US 60/KY425 intersection. KY 425 is a two lane road with 12-foot lanes and a 10-foot shoulder (Figure 3). The sites are located on the side roads such as Industrial Park Road (Figure 4) which are two lane roads with 10 to 11-foot lanes and no shoulder.

The average daily traffic (ADT) on KY 425 is 7,146 (based on 1998 KYTC traffic count). The ADT on KY 136 is about 3,600 (based on traffic volume data base). The functional classification of KY 425 is an urban principal arterial while KY 136 is an urban minor arterial. Both KY 425 and KY 136 are in the AAA weight class indicating they can carry 80,000 pounds (gross weight).

During non-peak hours, a few trucks turn from KY 136 onto US 60 and follow it eastbound to the Pennyriple Parkway. However, this route requires the trucks to travel through Henderson, which is a congested area, so it is not used frequently.

3.0 Route Data Collection and Evaluation

The route features that were evaluated in this study are shown in Table 1 along with a brief description of the evaluation method. While some of these features require 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.

3.1 Traffic Operations and Level of Service

The survey of the users of this site indicated that there were no operational problems or concerns along the KY 136/KY 425 route. Observations during the site visit confirmed this opinion. Thus, this route was considered to operate at an acceptable level. Congestion problems would be encountered if a truck traveled on US 60 through Henderson. However, this route is not used on a regular basis with its use limited primarily to non-peak hours.

Figure 1: Location of Truck Generating Sites

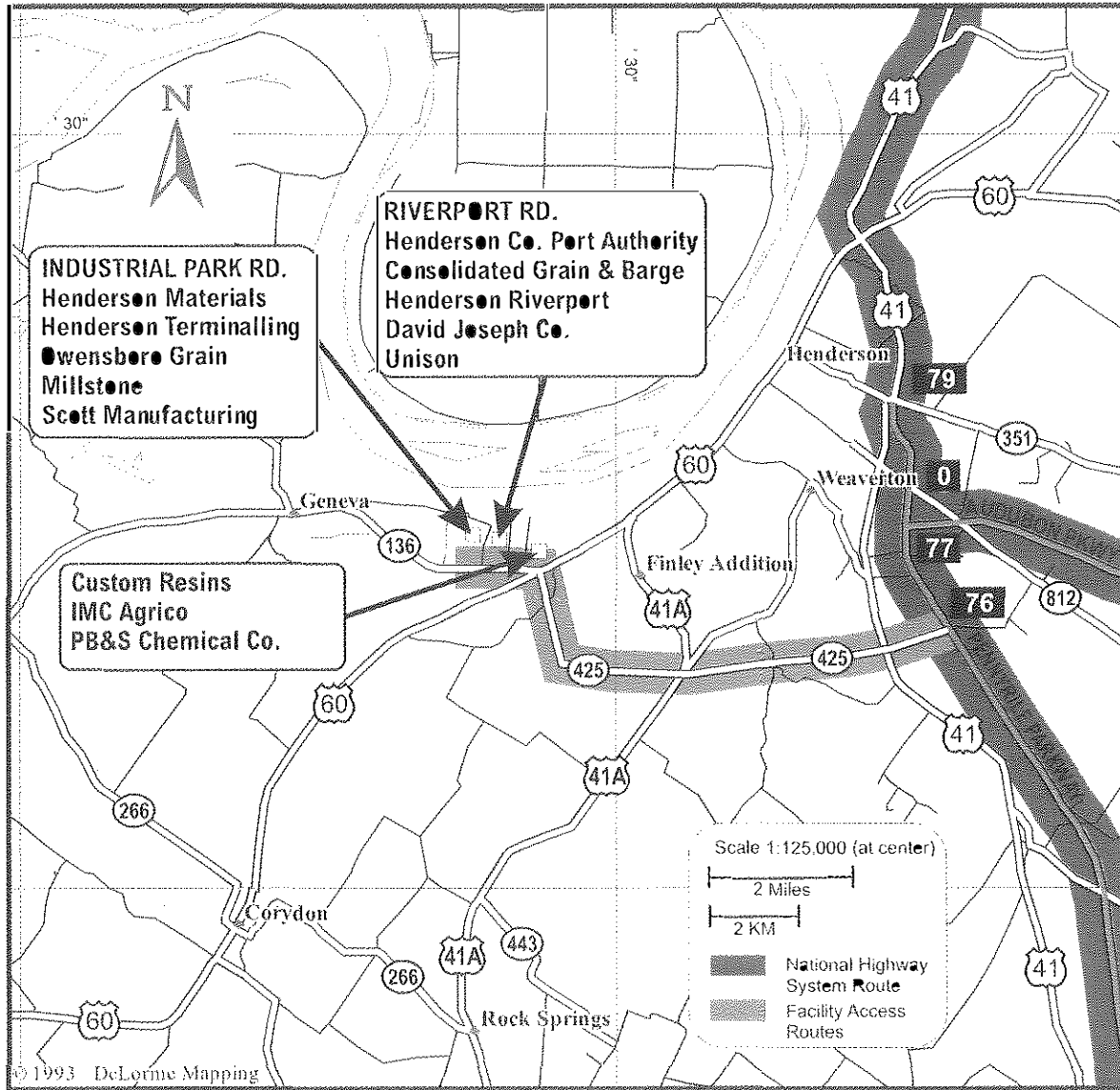


Figure 2. KY 136 (near Riverport Road)

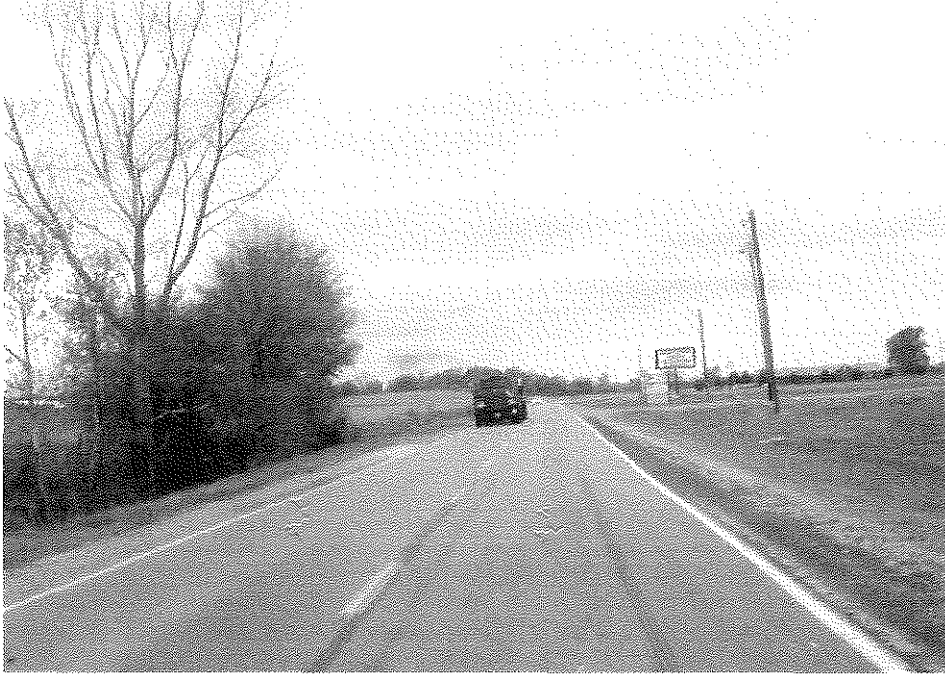


Figure 3. KY 425

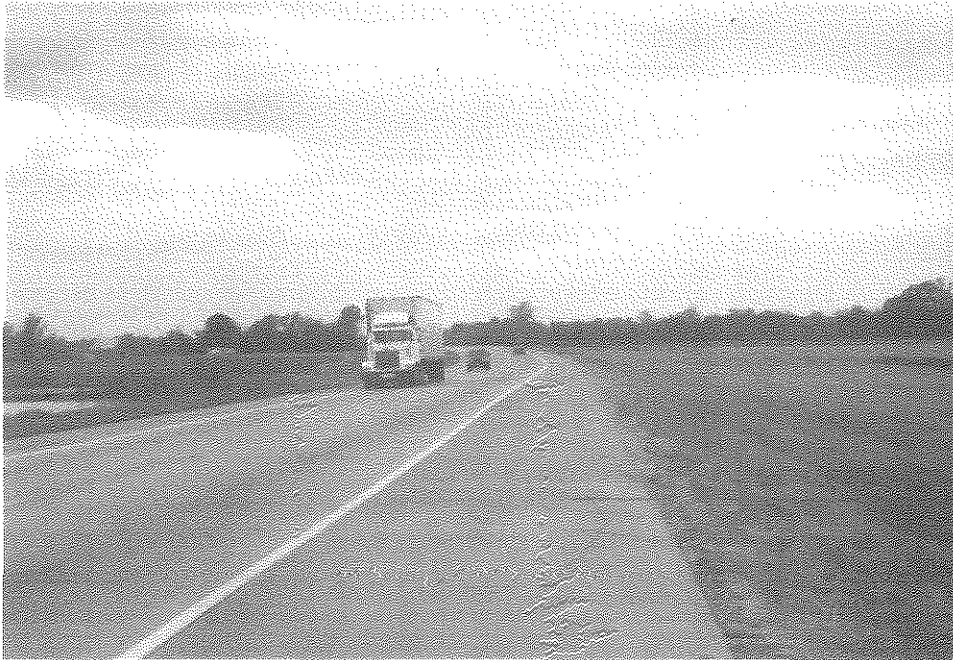


Figure 4. Industrial Park Road



3.2 Accident History

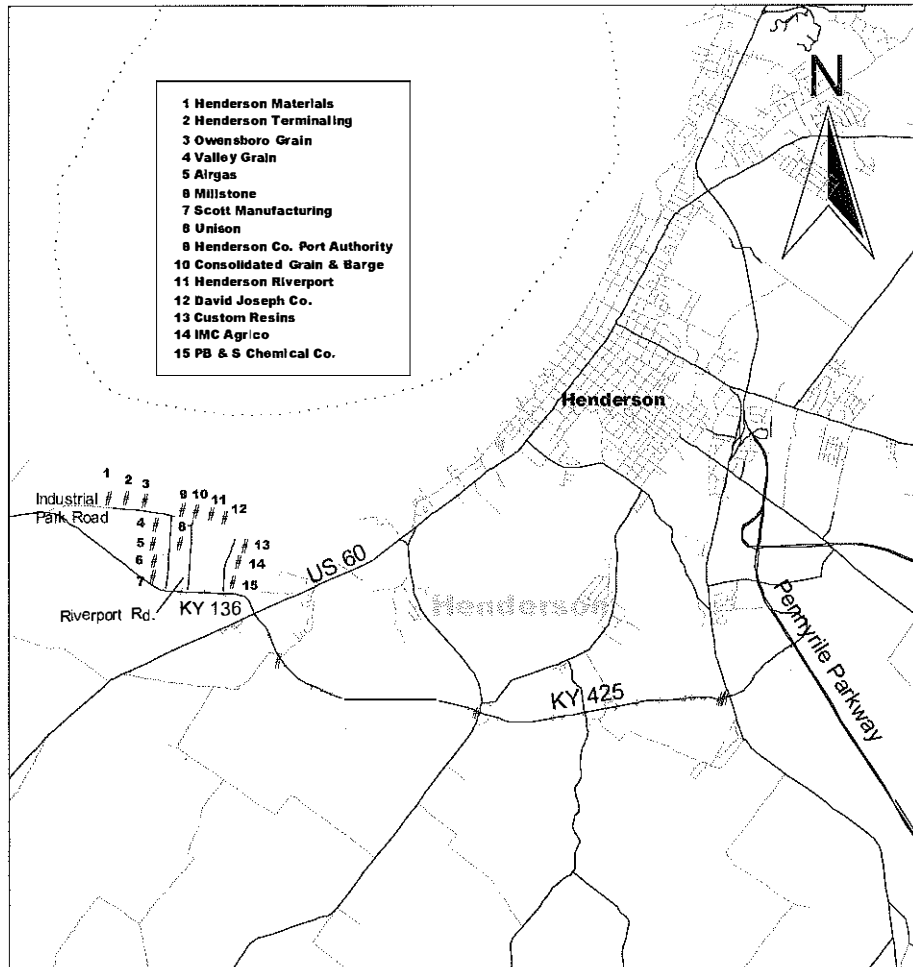
In 1997 the Kentucky Transportation Center studied all state-maintained roads throughout Kentucky and determined average truck accident rates for different types of road sections. A critical accident rate was then calculated using the average accident rate for a specific highway type along with an assumed level of statistical significance and exposure (vehicles miles traveled). No sections along the KY 136/KY 425 route were identified as having a truck accident rate higher than the critical rate for that particular highway type.

Figure 5 shows the locations of accidents during the years 1995, 1996, and 1997. A summary of the accidents along the entire truck route (considering all roads and not just state-maintained roads) is shown in Table 2 for the same three year period. All of the accidents which could be identified were on KY 136 or KY 425. Truck accidents represent a significant portion of the overall accidents along this route. The data showed that 19 percent of all accidents involved trucks which compares to 8.4 percent trucks along KY 425. Of the 15 truck accidents, four involved an angle collision at an intersection while three involved a rear end collision at an intersection. Three of the truck accidents were at the KY 136/KY 425/US 60 intersection.

Table 1: 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

Figure 5: Accident Locations (1995-1997)



LEGEND

- # Facility
- / Accidents: 1-2
- # Accidents: 3-4
- ## Accidents: 5-7
- Freight Access Route
- County Boundary
- State Highway System
- Other Roads

Scale - 1:75000

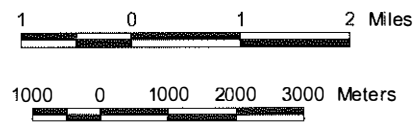


Table 2: Accident Types along Henderson County Truck Route

	<i>Non-Truck Accidents</i>	<i>Truck Accidents</i>	<i>Percent Trucks</i>
Total	62	15	19
Fatal Accidents	0	0	0
Injury	22	4	15
Intersection	23	9	28

3.3 Cross Section Features

Figures 6 and 7 illustrate the sections of the route having different widths of lanes and shoulders, respectively. While the 12-foot lanes on KY 425 and a portion of KY 136 are considered “preferred” for trucks, the 10-foot lanes on the remaining portion of KY 136 (MP 18.5-18.9) and one of the side streets are considered “less than adequate” and the 11-foot lanes on the other two side streets and short portion of KY 136 (MP 18.9-19.0) are only rated as “adequate”. Location of lane and shoulder deficiencies are listed in Table 3.

The 10-foot shoulder on KY 425 and a portion of KY 136 is considered “preferred”. The two-foot shoulder on the remaining portion of KY 136 and the lack of shoulders on the side streets are considered “less than adequate”.

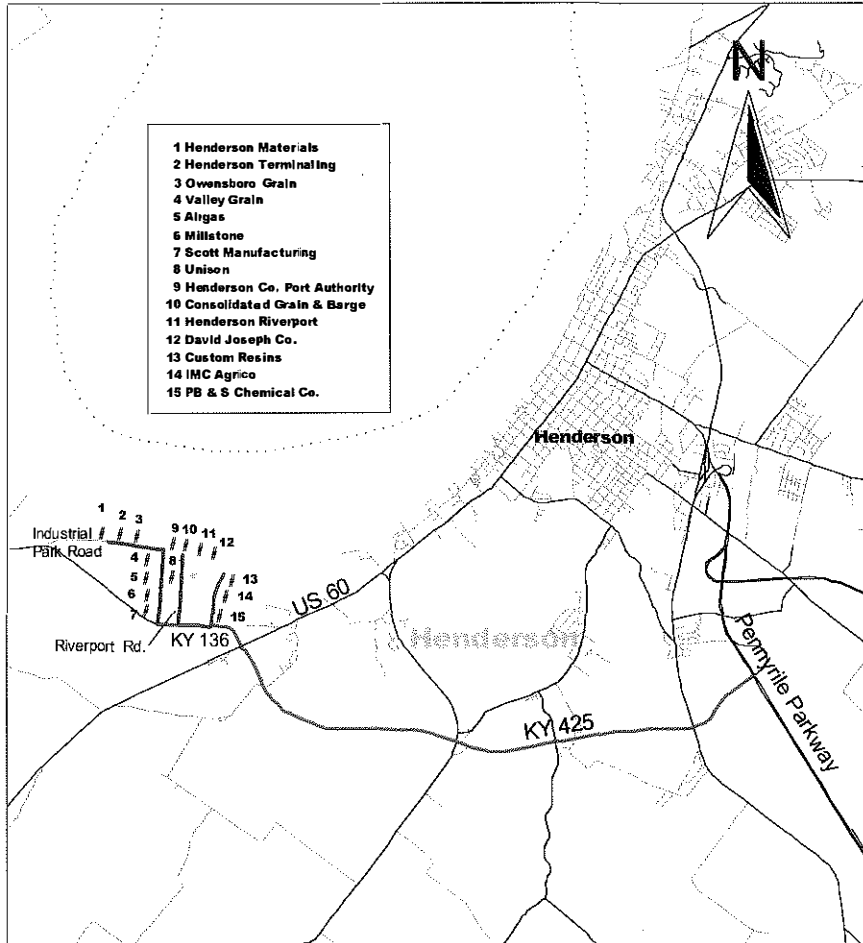
Although some of the roads did not have a paved shoulder, there were no substantial problems related to clear zones.

3.4 Curvature Features

There were no curves on the major roads in this route (KY 425 and KY 136) which would result in offtracking into the opposing lane. The only sharp curve is on Industrial Park Road (Figure 8) which does result in offtracking into the opposing lane. There is a turn warning sign in advance of this curve with no advisory speed. The speed limit on this road is 35 mph so this curve would have a “less than adequate” rating.

Grades are considered problematic if they cause trucks to slow excessively. Observations showed there was only one grade on this route which could cause trucks to slow. This grade is for a bridge over a railroad on KY 425 (milepoint 4.3). The grade could cause minor slowing (less than 5 mph), especially if a truck was accelerating from a stop at the traffic signal at the US 41 intersection (milepoint 4.7). However, no grades were sufficient to rate less than “preferred”.

Figure 6: Lane Widths



LEGEND

#	Facility
	Lane Width: 10 Feet
	Lane Width: 11 Feet
	Lane Width: 12 Feet

Scale - 1:75000

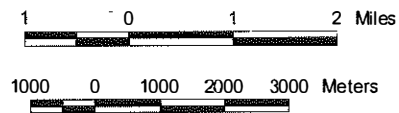
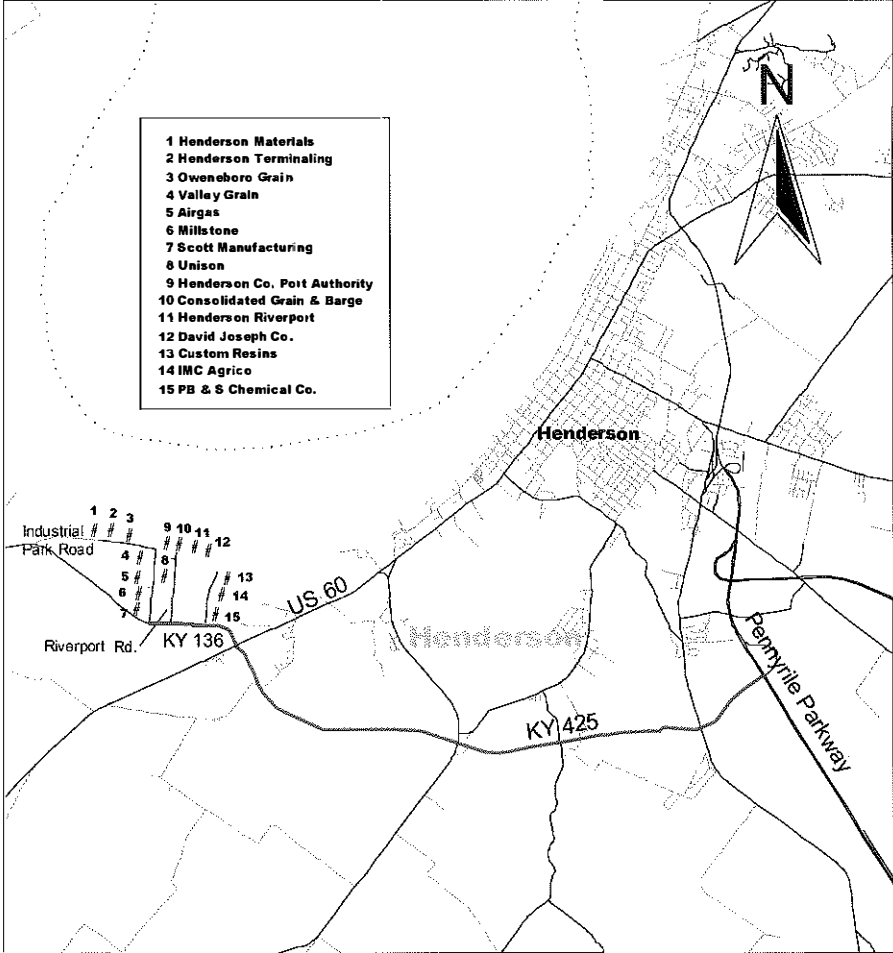


Figure 7: Shoulder Widths



LEGEND

- # Facility
- Shoulder Width: 2 Feet
- Shoulder Width: 10 Feet

Scale - 1:75000

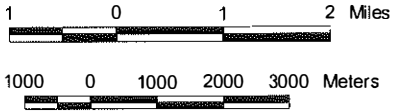


Figure 8: Curve on Industrial Park Road



3.5 Railroad Crossings

The only at-grade railroad crossings were on the side roads. The crossings on Riverport Road had signs but no pavement markings and did not have any active warning devices. The lack of warning devices would indicate a “less than adequate” rating. The side roads are not state maintained with responsibility with local government.

3.6 Bridges

The locations of the bridges are shown on Figure 9. All of the bridges are located on KY 425. All the bridges had a sufficiency rating (provided by the Division of Operations of the KYTC) of more than 90 (out of a possible 100 points) which is considered as “preferred”.

3.7 Sight Distance

There were no sight distance problems at the intersections of the side roads and KY 136. The major intersections on KY 425 were controlled by either a traffic signal or stop signs.

3.8 Other Route Features

The pavement condition on KY 425 and KY 136 was good. Sections of the pavement on a portion of the side roads (non-state maintained) would be described as poor.

4.0 Route Evaluation and Recommendations

4.1 Problem Truck Miles and Truck Points

In order to compare different routes to consider relative urgency of needed route improvements the features rated “preferred”, “adequate”, and “less than adequate” along a route have been normalized for the number of miles, number of points, and number of trucks using the route section. In the case of this Henderson County route, four features (lane width, shoulders, curvature, and railroad crossings) that were evaluated quantitatively had sections or points that were 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. Sections which are not rated as “preferred” are weighted using length as well as the number of trucks on the section.

Table 3 contains the total problem truck miles and total problem points for lane width, shoulders, and curvature along this route. Truck volumes were estimated using a truck volume count on KY 425 and information obtained from some of the facilities. The rating of this route relative to others evaluated will be reported in the final report.

Figure 9. Bridge Locations

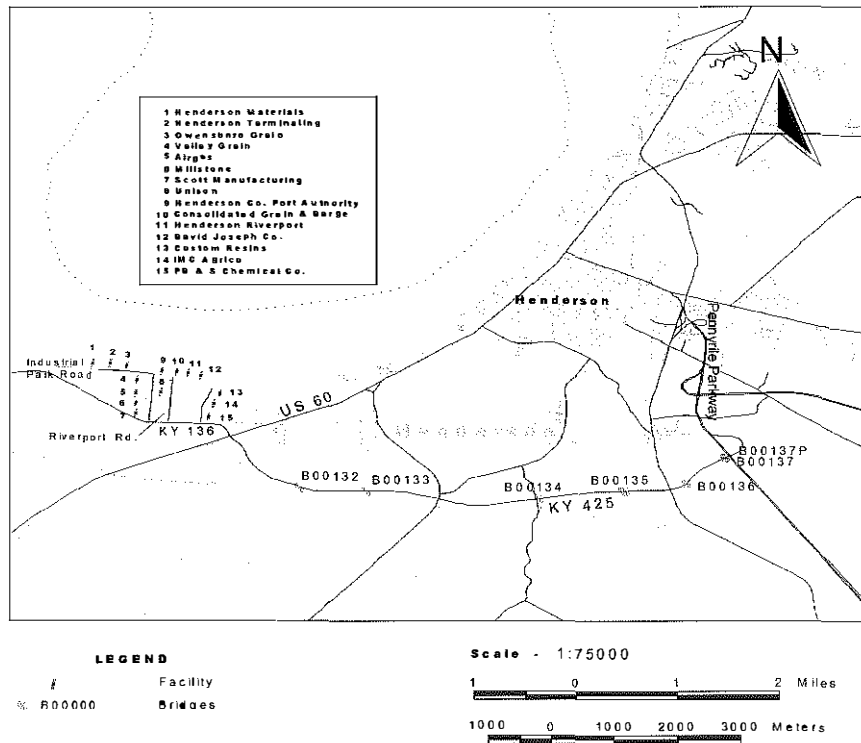


Table 3: Summary of Problem Truck Miles and Truck Points for Entire Route

Feature Truck-	Road	Location	Points*	Length (miles)	Trucks (/day)	Truck- points	miles
Lane Width	KY 136	MP 18.5-18.9	2	0.4	600		480
		MP 18.9-19.0	1	0.1	600		60
	Industrial Park	Length	1	1.3	350		455
	Riverport	Length	1	0.7	150		105
	Unnamed	Length	2	0.4	100		80
Total							1,180
Shoulders	KY 136	MP 18.5-19.1	2	0.6	600		720
	Industrial Park	Length	2	1.3	350		910
	Riverport	Length	2	0.7	150		210
	Unnamed	Length	2	0.4	100		80
Total							1,920
Curvature	Industrial		2		350	700	
Railroad Crossings	Riverport	Two Locations	2		100	400	
TOTAL						1,100	3,100

*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

This type of improvement could be addressed during routine maintenance programs by either the state or county and, therefore, could improve truck access without requiring major construction or expense. Some of this type of improvement were noted on the side roads. They would involve placing standard signs and pavement markings and performing some surface maintenance.

4.3 Overall Route Rating

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 rated the overall access on a scale of 1 through 10. They considered the various subjectively and objectively rated route features which were rated along the truck routes throughout the state. The interpretation for these ratings is shown in Table 4. The route in Henderson County, on KY 425 and KY 136, between the Pennyrile Parkway and the industrial park was given an overall rating of 7 indicating that minor improvements could improve the truck access along this route.

Table 4: Interpretation of the Overall Route Rating

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

4.4 Conclusions and Recommendations

The conclusion was that the roadways provided adequate access with possible minor improvements which could improve the route. The only substantial potential improvement on a state-maintained road was to widen the lanes and shoulders on a section of KY 136 east of US 60 in the area of the side roads. Improvements on the side roads would involve adding shoulders and placing standard signs and pavement markings and performing some surface maintenance. There was also one sharp curve on Industrial Park Road which resulted in offtracking into the opposing lane.

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>
2	Henderson Terminalling Dock	Henderson	Henderson	Green River
<u>Contact Name</u>	<u>Title</u>	<u>Phone</u>	<u>Fax</u>	
Don Reynolds	MGR.	502-827-1811	502-826-4169	

1. Is the location of your facility on the map correct? Yes
2. Our information shows about 20 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? Fuel Tanker
6. What is the largest truck operating at your facility?
7. What type of freight or commodity is shipped, and is incoming and outgoing freight different? *(one may be an empty truck)* Out - Gasoline, Diesel
8. Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon) No peak - vary according to price
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
 Green Street - US 60 two lane needs to be four lane.
10. Where do trucks at your facility go to and come from? (This may be an interstate, cities, general direction-N,S,E,W) Out US 60
11. Do you have any other problems or concerns along the route you would like us to consider?
 Old Geneva Rd. - Coffee business facility - potholes bad for two years or more.
12. Would you like a copy of the final report (roadway/route evaluation ???)

PHONE SURVEY RESULTS

<u>Facility ID</u>	<u>Facility Name</u>	<u>Location / City</u>	<u>County</u>	<u>ADD</u>
2	IMC AGRICO	Henderson	Henderson	Green River

Chemical Co.

<u>Contact Name</u>	<u>Title</u>	<u>Phone</u>	<u>Fax</u>
Chuck Fickle		502-826-6231	502-827-4825

1. **Is the location of your facility on the map correct?** Yes, KY 136 (GENEVA RD.)
P.O. BOX 1627, 42419
2. **Our information shows about 25 trucks per day access your facility. Is that correct?**
If not, fill in correct volume.
3. **Is the truck traffic to and from your facility seasonal or mostly constant?**
Seasonal; Spring-July, Oct./Nov.
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?** 48' Semitrailer
6. **What is the largest truck operating at your facility?**
7. **What type of freight or commodity is shipped, and is incoming and outgoing freight different? (one may be an empty truck)** In - River
Out - Dry/liquid fertilizer 8000 T hazardous
8. **Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon)** 4 A.M. to midnight
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
US 60 (KY 36-US 41A) two lane section congestion
10. **Where do trucks at your facility go to and come from? (This may be an interstate, cities, general direction-N,S,E,W)** TN, KY, Souther Illinois, MO
IN - Terre Haute, KY - Louisville
11. **Do you have any other problems or concerns along the route you would like us to consider?**
Some trucks go through town during non-peak traffic hours; most use KY 425 bypass with few on US 60.
12. **Would you like a copy of the final report (roadway/route evaluation ???)** Yes

PHONE SURVEY RESULTS

<u>Facility ID</u>	<u>Facility Name</u>	<u>Location / City</u>	<u>County</u>	<u>ADD</u>
2	Henderson Riverport Authority	Henderson	Henderson	Green River
<u>Contact Name</u>	<u>Title</u>	<u>Phone</u>	<u>Fax</u>	
Bill Howard	Port Director	502-826-1636	502-627-4523	

1. **Is the location of your facility on the map correct?**
2. **Our information shows about 40 trucks per day access your facility. Is that correct?**
If not, fill in correct volume.
3. **Is the truck traffic to and from your facility seasonal or mostly constant?**
Seasonal
4. **(If truck traffic is seasonal) Is the 60 trucks/day for the peak season?**
5. **What is the most common size truck operating at your facility?** 45' Semitrailer
6. **What is the largest truck operating at your facility?** 119' Semitrailer
7. **What type of freight or commodity is shipped, and is incoming and outgoing freight different? (one may be an empty truck)** Millstone coffee, acetylene gas
In - mfg. equipment-Link Belt, steel, grain, coal, bulk fertilizer, sand, light aggregate, concrete, shredder by products (40-50 trucks a day)
Out - fertilizer, coal, grain (40-50 a day), steel products, equipment (Toyota)
8. **Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon)** Constant
9. **What traffic congestion and delay problems along the routes are you aware of, or feel need improvement?**

<u>Location (route segment, intersection, etc.)</u>	<u>Time and Day of Week</u>
US 60 to port area - congestion	
10. **Where do trucks at your facility go to and come from? (This may be an interstate, cities, general direction-N,S,E,W)** Riverport Road to KY 136, across US 60 to KY 425 (Henderson bypass) to Pennyrile Parkway
11. **Do you have any other problems or concerns along the route you would like us to consider?**
12. **Would you like a copy of the final report (roadway/route evaluation ???)** Yes