TRUCK ROUTE ACCESS EVALUATION

Bullitt County Stone
Shepherdsville
Site # 2031

KTC Report No. 99-26

"Freight Movement and Intermodal Access in Kentucky"
Project No. SPR 98-189

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1.0 Introduction

This is a study undertaken by the Kentucky Transportation Center on behalf of the Kentucky Transportation Cabinet (KYTC). There are two main objectives of the Freight Movement and Intermodal Access in Kentucky Study (SPR 98-189): 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 the Bullitt County Stone facility located in Bullitt County in the KIPDA Area Development District (ADD) and KYTC Highway District #5. 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 documented elsewhere.

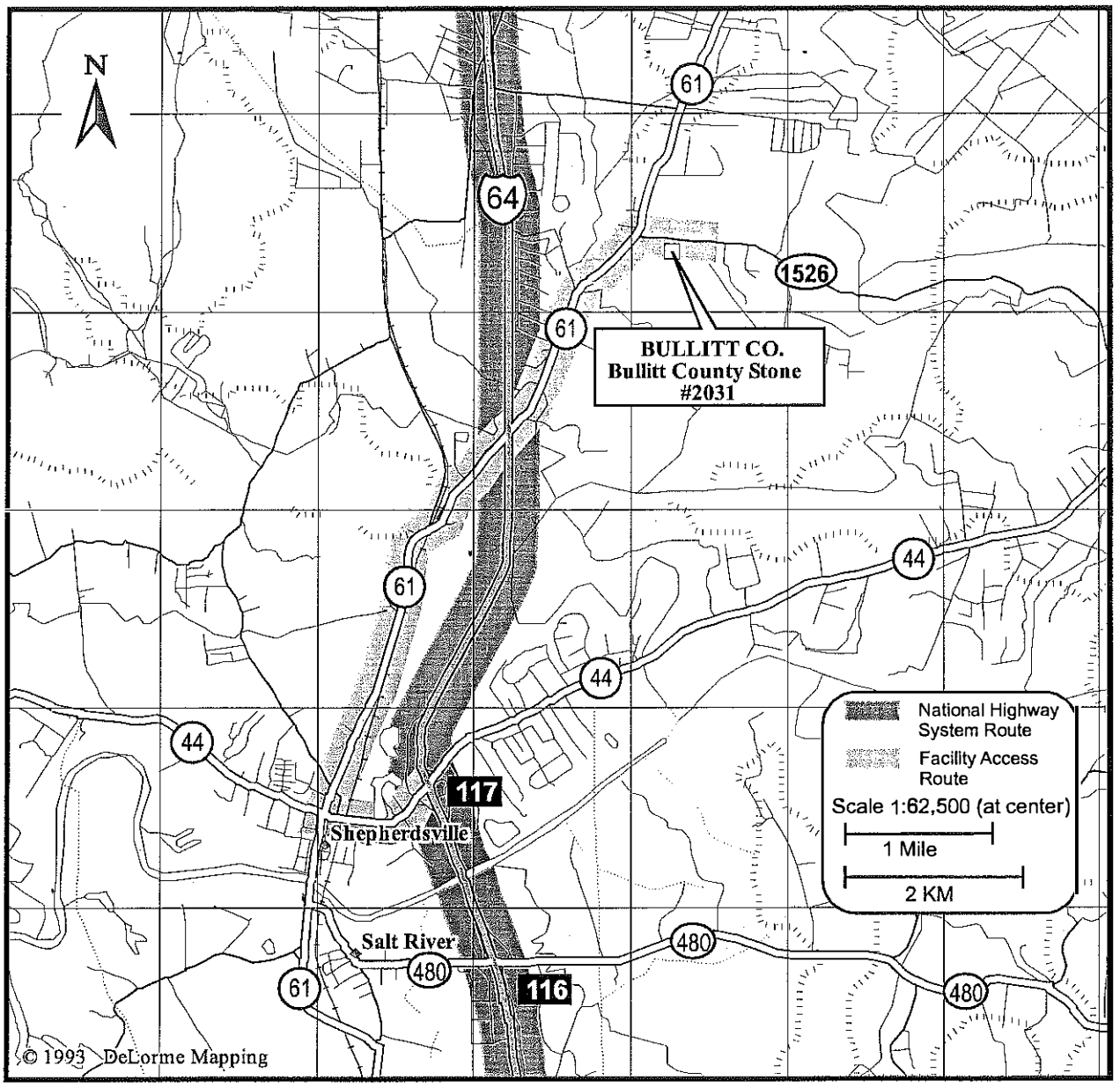
The sites to be evaluated in this study were selected from two existing databases (a truck facility survey from 1994 and the intermodal facility inventory) based on ADD and KYTC Highway District planner recommendations, geographic location, distance to the NHS, and the number of trucks accessing the site. Consideration was also made for the freight type handled and transportation modes used.

The site was visited for video recording on February 18, 1998. The field data were collected on September 1 and October 13, 1998. The facility is located on KY 1526 approximately 4 miles northeast of Shepherdsville. A phone survey was conducted with facility managers early in the study process. The phone survey conducted with Bullitt County Stone found that approximately 180 trucks per day access the site. The most common truck is a triaxle with the largest being a 48-foot semitrailer. The freight handled at this facility is primarily stone. The survey respondent did not indicate any problems along this route, and it was noted that a new bypass has alleviated some problems. The phone survey information can be found in Appendix A.

2.0 Truck Route in Use

Figure 1 shows the primary route used to reach the National Highway System from the facility on KY 1526. Trucks travel south on KY 61 then east on KY 44 to reach exit 117 of I-65. This is a total route length of 4.3 miles. KY 61 and KY 1526 are rural highways with 1998 ADTs of 17,156 and 6,593 respectively. KY 44 has significant commercial development. KY 44 is divided by a center turn lane, has four traffic signals and an 1998 ADT of 18,194. All of the roads are state-maintained.

Figure 1: Location of Truck Generating Site



3.0 Route Data Collection and Evaluation

The route features that are to be evaluated in this study are shown in Table 1 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.

3.1 Traffic Operations and Level of Service

The survey of this site indicated that there were no operational problems or concerns for this site. Thus, no traffic evaluations were performed.

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). There were no sections of this route with a truck accident rate as high as the critical rate for the particular highway type.

Figure 2 shows the locations of accidents during the years 1995, 1996 and 1997. The figure shows that the locations with the highest number of accidents were in Shepherdsville and near the I-65 interchange. It is not un expected for intersection accidents to be common in higher traffic areas. However, as indicated in a summary of the types of accidents along the truck route in Table 2 for the same three year period, the percentage of these accidents involving trucks is very low. The percentage of accidents involving trucks (3.7%) is lower than the percentage trucks on the route (5.9%). This suggests there are no apparent truck related safety concerns along this route from an accident history point of view. The percentage trucks was obtained from a 1993 KYTC Vehicle Classification Count on KY 61.

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 2: Accident Locations (1995 - 1997)

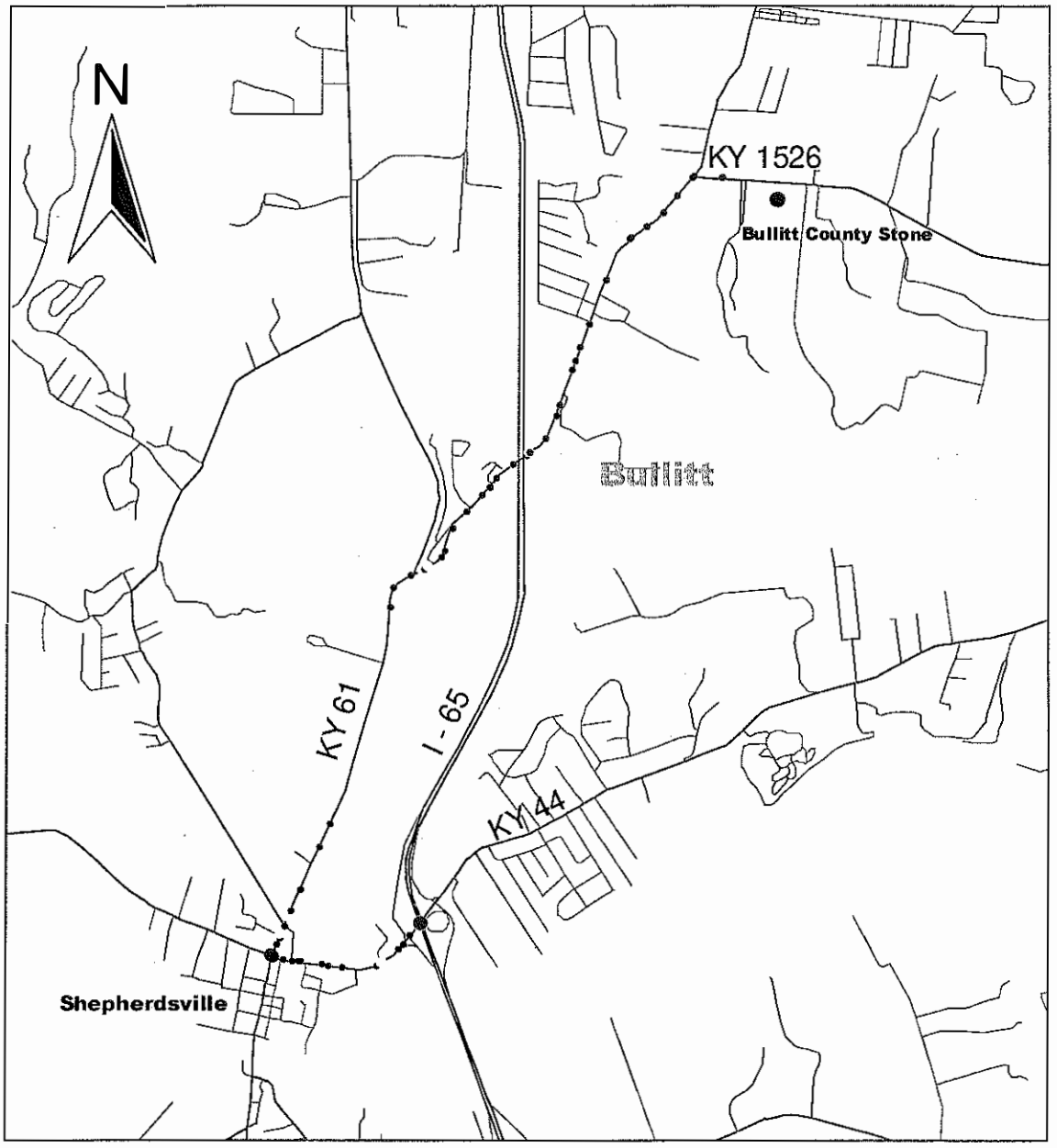


Table 2: Accident Types along Truck Route

	Non-Truck Accidents	*Truck Accidents*	*Percent Trucks*
Total	208	8	3.7
Fatal Accidents	2	1	33.3
Injury	59	2	3.3
Intersection	94	4	4.1

3.3 Cross Section Features

Figures 3 and 4 illustrate the sections of the route having different widths of lanes and shoulders. KY 1526 has "adequate" 11-foot lanes and KY 44 has "preferred" 12-foot lanes. The lane width on KY 44 varies from a "less than adequate" 10 feet to a "preferred" 12 feet. A short section of KY 61 had an "adequate" 10-foot stabilized shoulder and part of KY 44 had a "preferred" 10-foot paved shoulder. The curbed section of KY 61 had a paved parking lane which could be used as a shoulder. All other route sections had "less than adequate" shoulders of various widths. As shown in Figure 5, the section of KY 61 just north of Shepherdsville had utility poles close to the roadway. No other significant clear zone problems were found on the route. The pavement was in generally good condition.

Figure 3: Lane Widths

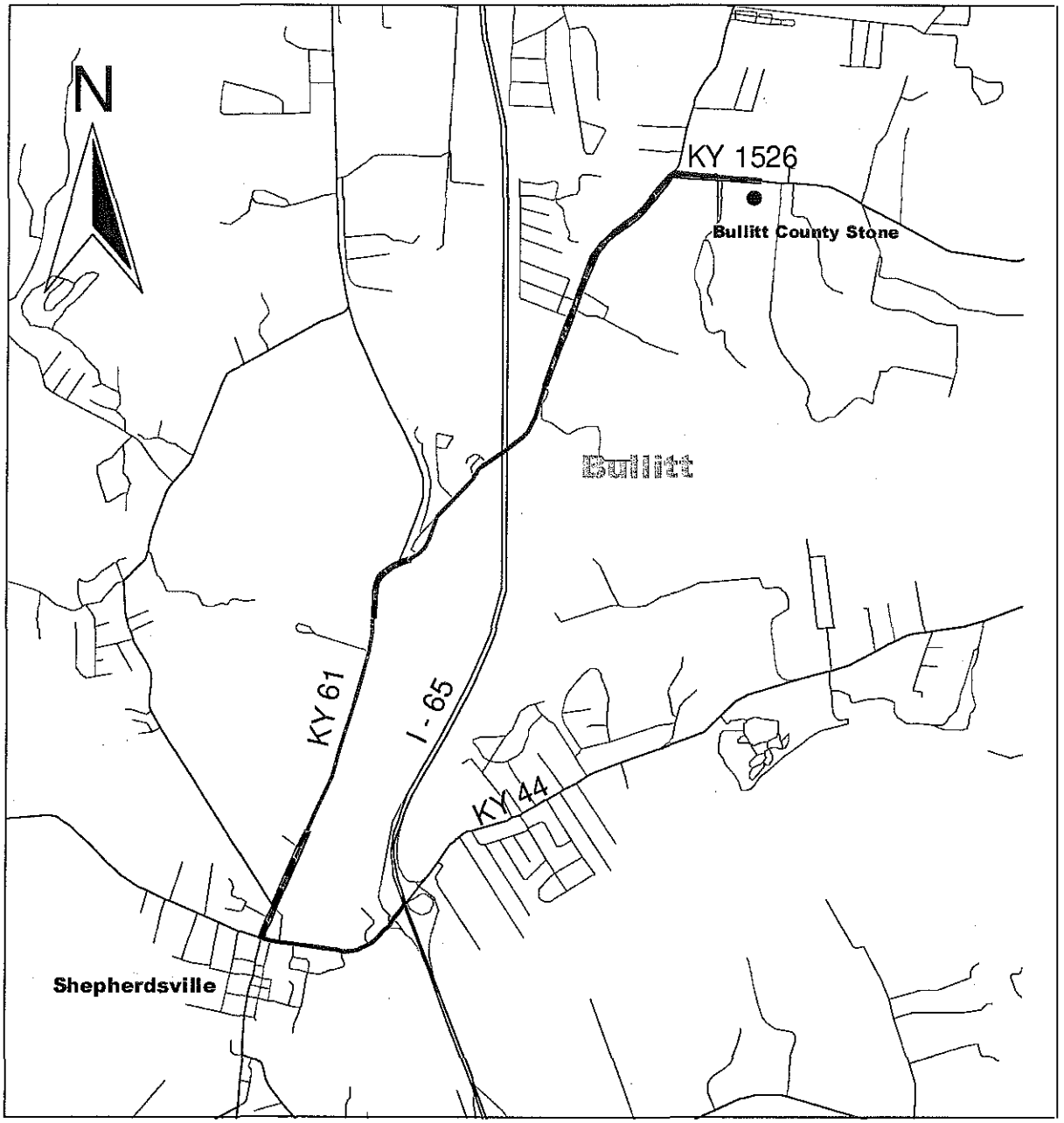
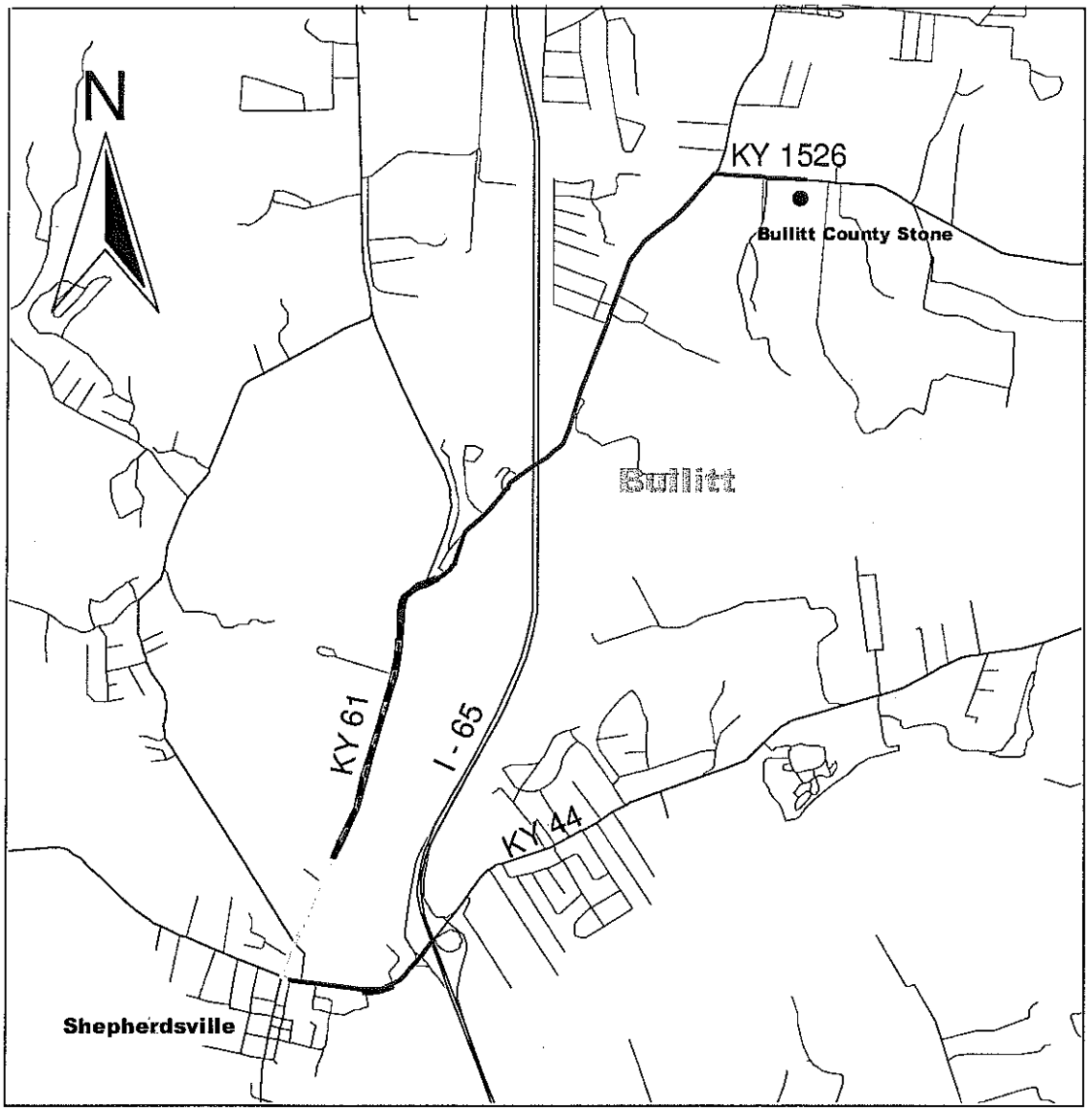


Figure 4: Shoulder Widths



LEGEND

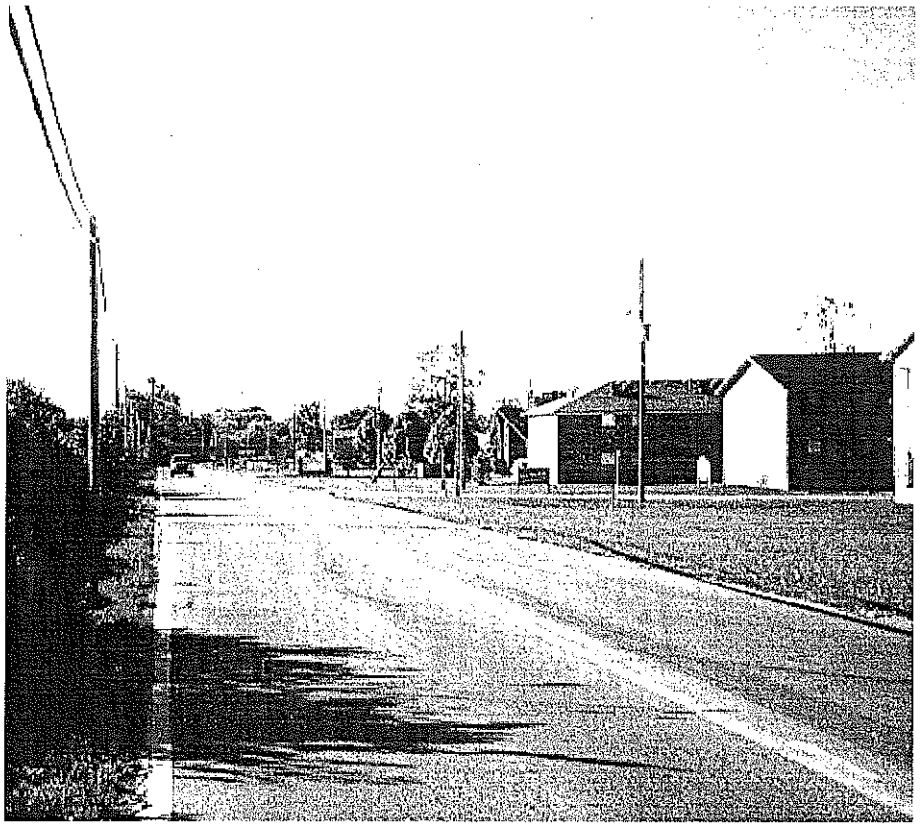
- Facility
- Shoulder Width - 1 Foot
- Shoulder Width - 2 Feet
- Shoulder Width - 4 Feet
- Shoulder Width - 5 Feet
- Shoulder Width - 6 Feet
- Shoulder Width - 8 Feet
- Shoulder Width - 10 Feet
- Shoulder Width - Curb

Scale - 1:40000

0.4 0 0.4 0.8 1.2 Miles

700 0 700 1400 2100 Meters

Figure 5: Poles in Clear Zone Along KY 61



3.4 Curvature Features

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

Offtracking is considered a problem where a truck cannot stay in its lane through a curve. Three curves near the bridge over I-65 were rated "adequate" for offtracking as calculated from lane width and degree of curvature. The curve locations are shown in Figure 6. Two of those curves were rated "less than adequate" for safe speed on a curve as indicated by ball bank indicator readings (see Figure 7).

The turning radius from KY 44 onto KY 61 was approximated in the field. The approximate layout of this intersection is shown in Figure 8. The 35-foot radius was rated "less than adequate" because trucks must turn into opposing traffic.

Figure 6: Curves Where Offtracking Could Occur

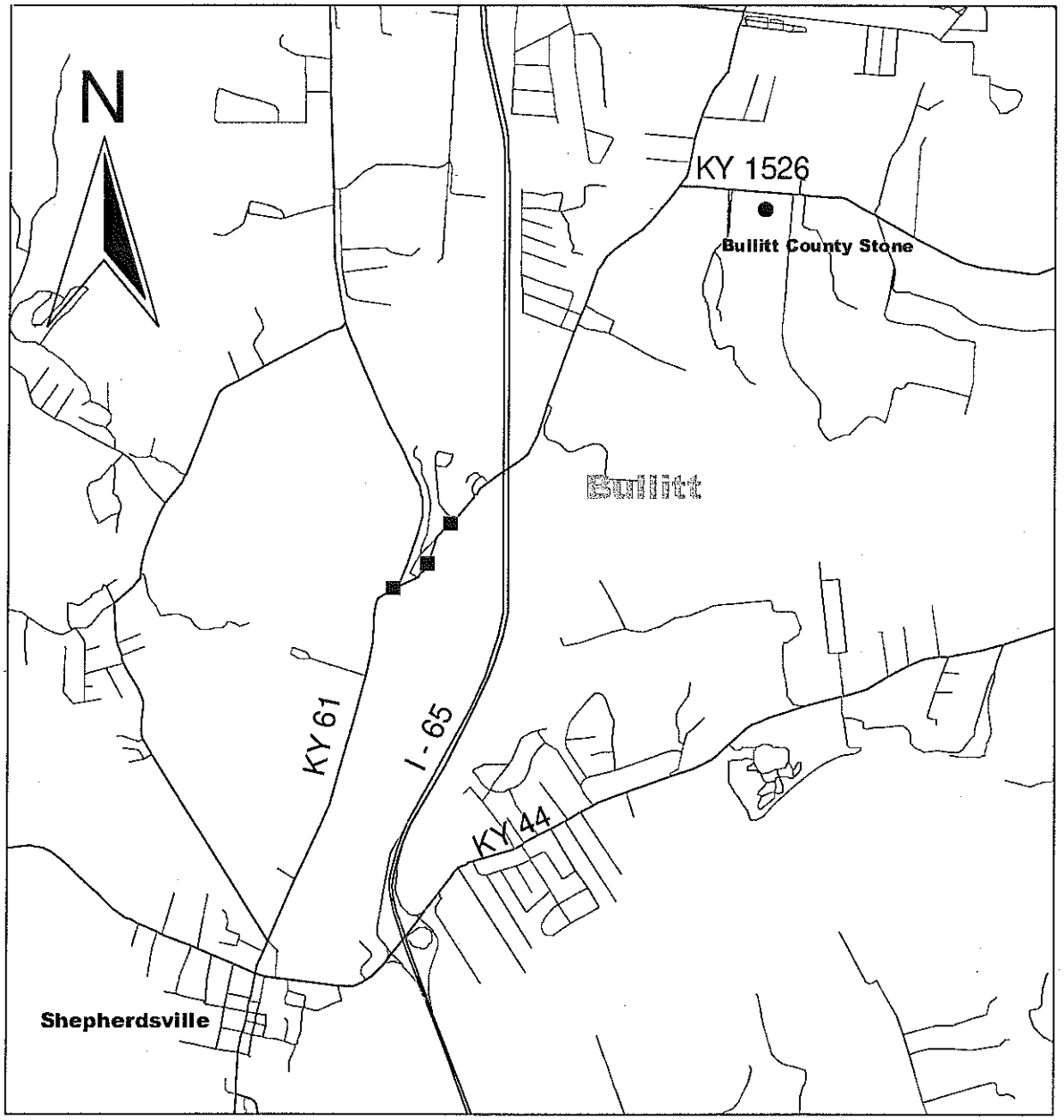


Figure 7: Curves Where Safe Speed May be a Problem

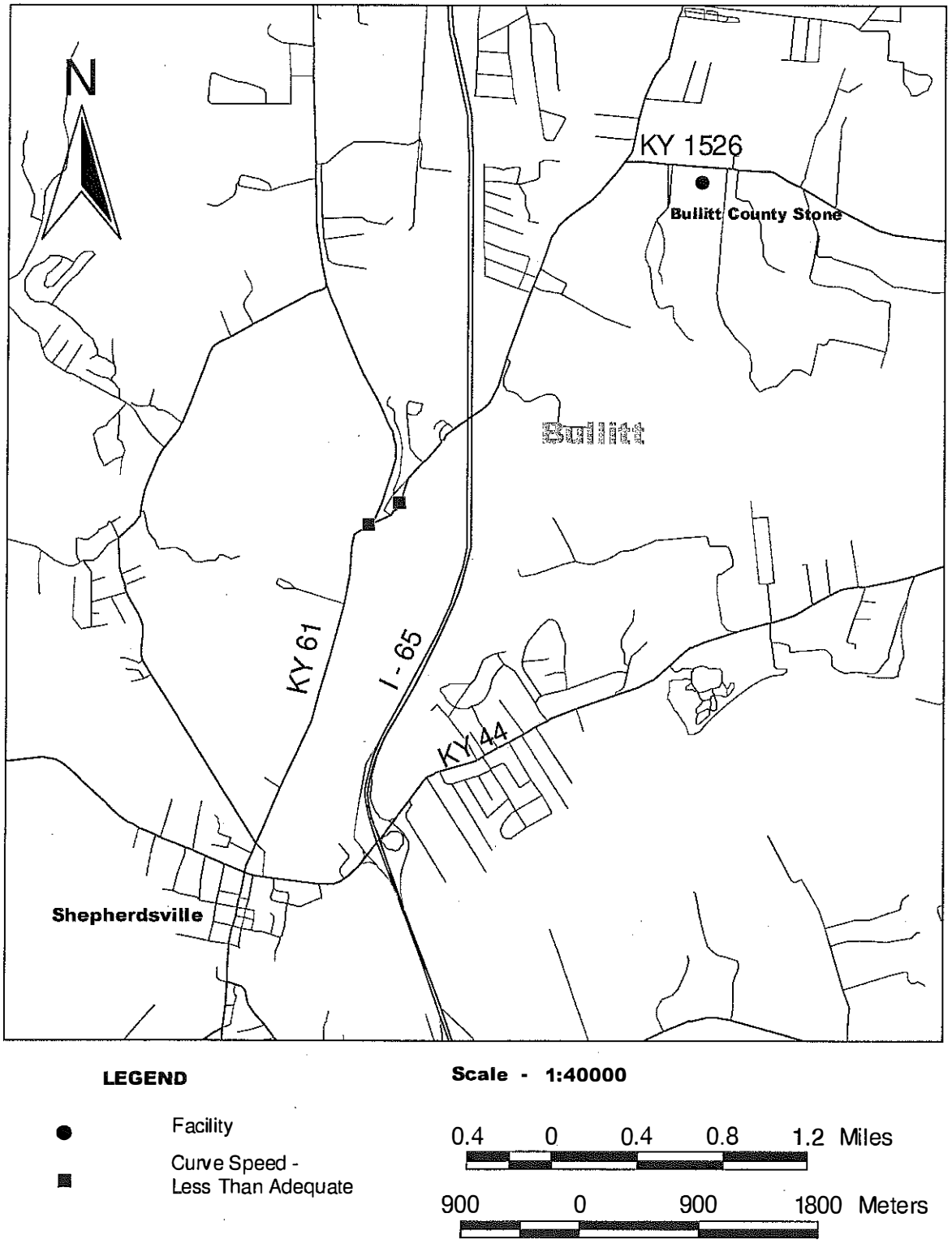
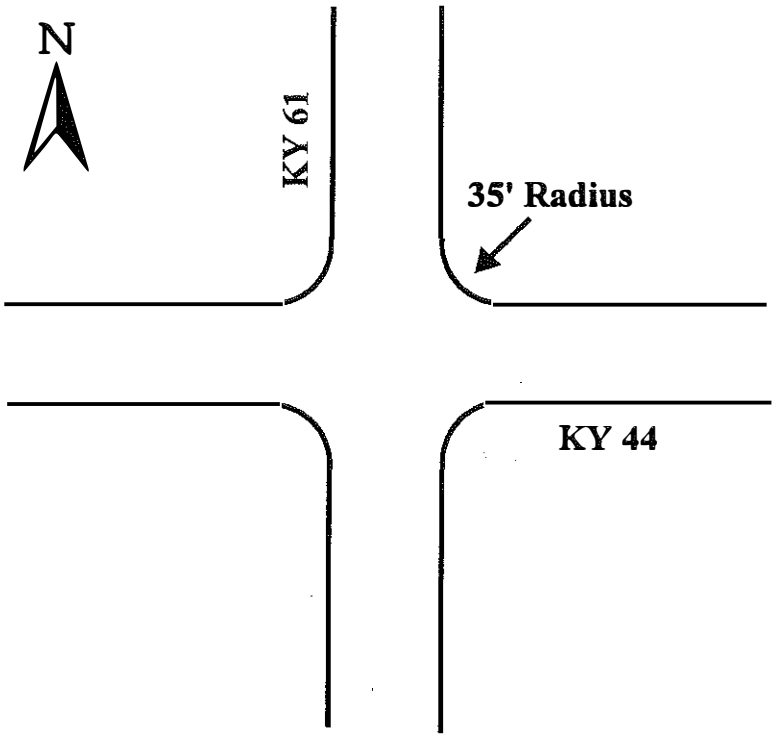


Figure 8: Approximate Turning Radius at KY 44 and KY 61



3.5 Railroad Crossings

There was one at-grade railroad crossing on KY 44 approximately 600 feet east of KY 61. The crossing received an "adequate" rating because it was humped. This crossing can cause traffic problems by causing traffic to back up into the nearby intersection.

3.6 Bridges

As shown in Figure 9, there were five bridges on this route. The bridge sufficiency ratings (provided by the Division of Operations at the KYTC) for those bridges is listed in Table 3. A sufficiency rating of 80 or higher (out of a possible 100) is considered "preferred," and a rating of at least 50 is "adequate." Two of the bridges received an "adequate" rating.

Figure 9: Bridge Locations

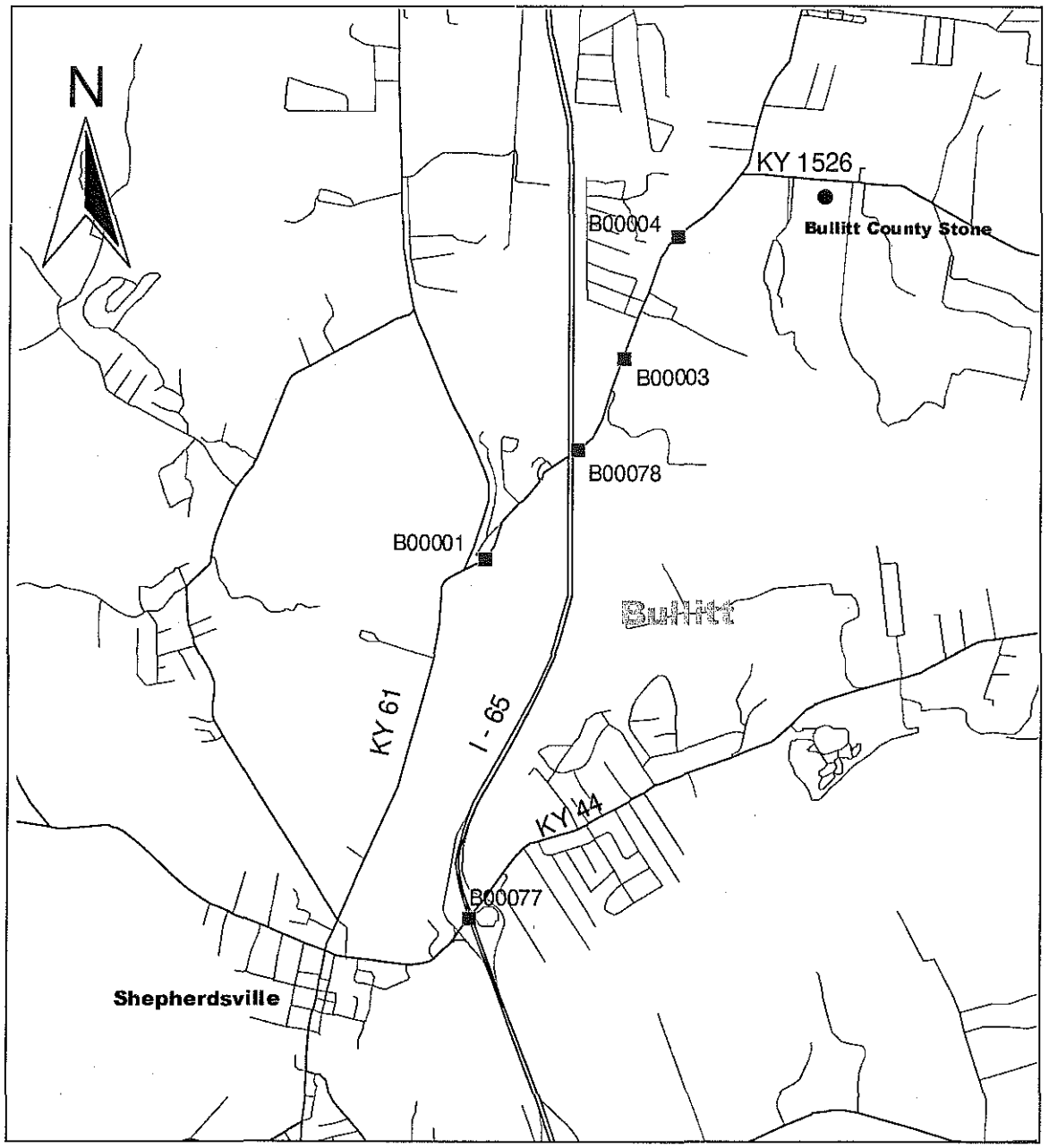


Table 3: Bridge Sufficiency Ratings

Route	Milepoint	Sufficiency Rating
KY 44	13.1	65.0
KY 61	16.3	73.8
KY 61	17.0	90.2
KY 61	17.4	83.7
KY 61	18.0	93.9

3.7 Sight Distance

There were no sight distance problems observed on this route.

3.8 Other Route Features

KY 44 has four lanes at the I-65 interchange and soon narrows to two lanes. The right westbound lane ends in the intersection shown in Figure 10. Two through lanes enter the intersection with a one departure lane. Vehicles were observed traveling on the shoulder attempting to merge after the intersection.

Figure 10: Lane Drop on KY 44 (Looking East)

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 were normalized for the number of miles, number of points and number of trucks using the route section. In the case of this Bullitt County route, seven 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 on KY 61 was obtained from a 1993 KYTC Vehicle Classification Count. The percentage trucks was not available for KY 44, so it was assumed that the truck percentage is similar to that on KY 61. The survey information was used to estimate the number of trucks on KY 1526.

Table 4 contains the total problem truck miles and total problem points for lane width, shoulder, offtracking, curve speed, turning radius, railroad and bridges along this route. The rating of this route relative to others evaluated will be reported in the final report.

4.2 Maintenance Improvement Locations

Some features noted during the site work 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. The merge area on KY 44 westbound could be shifted so that it does not occur in the intersection.

Table 4: Summary of Problem Truck Miles and Points for Entire Route

Feature	Road	Location	Points*	Length (miles)	Trucks (/day)	Truck-points	Truck-miles
Lane Width	KY 61	10' Sections	2	1.5	664		1992.0
	KY 61	11' Sections	1	1.9	664		1261.6
	KY 1526	Length	1	0.2	360		72.0
Total							**3,325.6**
Shoulders	KY 44	West of I-64	2	0.5	1410		1410.0
	KY 61	Near town	2	1.8	664		2390.4
	KY 61	Middle section	1	0.5	664		332.0
	KY 61	Near KY 1526	2	1.1	664		1460.8
	KY 1526	Length	2	0.2	360		144.0
Total							**5,737.2**
Offtracking	KY 61	MP 16.2	1		664	664	
	KY 61	MP 16.4	1		664	664	
	KY 61	MP 16.6	1		664	664	
Total						**1,992**	
Curve Speed	KY 61	MP 16.2	2		664	1328	
	KY 61	MP 16.4	2		664	1328	
Total						**2,656**	
Turning Radius	KY 44	KY 61	2		705	705	
Railroad	KY 61	East of KY 61	1		664	664	
Bridges	KY 44	MP 13.1	1		1410	1410	
	KY 61	MP 16.3	1		664	664	
Total						**2,074**	

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

4.3 Overall Route Rating

In order to account for both the subjectively and objectively evaluated route features along truck routes throughout the state, UK engineers who studied the route and its features (either during a site visit or by viewing a video of trucks using the routes) have rated the overall access on a scale of 1 through 10. The interpretation for these ratings is shown in Table 5. The route to Bullitt County Stone was given an overall rating of 7 indicating that minor improvements could improve truck access along the route.

Table 5: 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 required on this route
6-8	Minor improvements could improve 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

In conclusion, the following problems were identified along the truck route:

- Narrow lanes and shoulders on KY 61,
- Problematic horizontal curves on KY 61,
- Inadequate turning radius at the intersection of KY 44 and KY 61,
- A humped railroad crossing on KY 44, and
- An intersection in the merge area of a lane drop on KY 44.

The recommended improvements are:

- The intersection of KY 44 and KY 61 could be rebuilt,
- The humped railroad crossing could be improved, and
- The merge area on KY 44 could be moved away from the intersection.

Appendices

Appendix A: Phone Survey Conducted with Facility

Facility ID	*Facility Name*	*Location / City*	*County*	*ADD*
2031	Bullitt County Stone	Shepherdsville	Bullitt	KIPDA

Contact Name	*Title*	*Phone*	*Fax*
Tommy Jewell		502-957-5180	502-957-5394

1. **Is the location of your facility on the map correct?** Yes

2. **Our information shows about** 180 **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?**
   Peak in August and September

4. ***(If truck traffic is seasonal)*** **Is the** 180 **trucks/day for the peak season?** No, 250 peak

5. **What is the most common size truck operating at your facility?** Triaxle

6. **What is the largest truck operating at your facility?** 48' Semitrailer

7. **What type of freight or commodity is shipped, and is incoming and outgoing freight different?** ***(one may be an empty truck)***

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?**

Location (route segment, intersection, etc.)	*Time and Day of Week*
None	

10. **Where do trucks at your facility go to and come from? (This may be an interstate, cities, general direction-N,S,E,W)** To South End

11. **Do you have any other problems or concerns along the route you would like us to consider?**
    No - New bypass opened last spring that has helped alleviate problems.

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