

TRUCK ROUTE ACCESS EVALUATION

Dravo Lime Company
Maysville
Site # 30

KTC Report No.99-27

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

By

Joel Weber

KENTUCKY TRANSPORTATION CENTER
LIBRARY

with

Ken Agent
Brian Aldridge
Lisa Aultman-Hall
Dave Cain
Nick Stamatiadis



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

April 1999

Table of Contents

1.0 Introduction	1
2.0 Truck Routes in Use	1
3.0 Route Data Collection and Evaluation	3
3.1 Traffic Operations and Level of Service	3
3.2 Accident History	3
3.3 Cross Section Features	6
3.4 Curvature Features	9
3.5 Railroad Crossings	14
3.6 Bridges	14
3.7 Sight Distance	16
3.8 Other Route Features	16
4.0 Route Evaluation and Recommendations	17
4.1 Problem Truck Miles and Truck Points	17
4.2 Maintenance Improvement Locations	17
4.3 Overall Route Rating	17
4.4 Conclusions and Recommendations	20

Appendices

Appendix A: Phone Survey Conducted with Facility	22
Appendix B: Curve Data	23
Appendix C: Bridge Sufficiency Ratings	27

List of Tables

Table 1: Route Features and Method of Evaluation	4
Table 2: Accident Types along the Eastern Route	6
Table 3: Accident Types along the Western Route	6
Table 4: Summary of Curvature Features	9
Table 5: Summary of Problem Truck Miles and Points for Eastern Route	18
Table 6: Summary of Problem Truck Miles and Points for Western Route	19
Table 7: Interpretation of the Overall Route Rating	20

List of Figures

Figure 1: Location of Truck Generating Site	2
Figure 2: Accident Locations (1995 - 1997)	5
Figure 3: Lane Widths	7
Figure 4: Shoulder Widths	8
Figure 5: Grade Locations	10
Figure 6: Curves Where Offtracking Could Occur	11
Figure 7: Curves Where Safe Speed May be a Problem	12
Figure 8: Approximate Turning Radius at US 68 and KY 10	13
Figure 9: Damaged Sidewalk at the Intersection of KY 10 and US 68	14
Figure 10: Bridge Locations	15
Figure 11: Narrow Bridge on KY 1237	16

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 Dravo Lime Company facility located in Mason County in the Buffalo Trace Area Development District (ADD) and KYTC Highway District #9. 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.

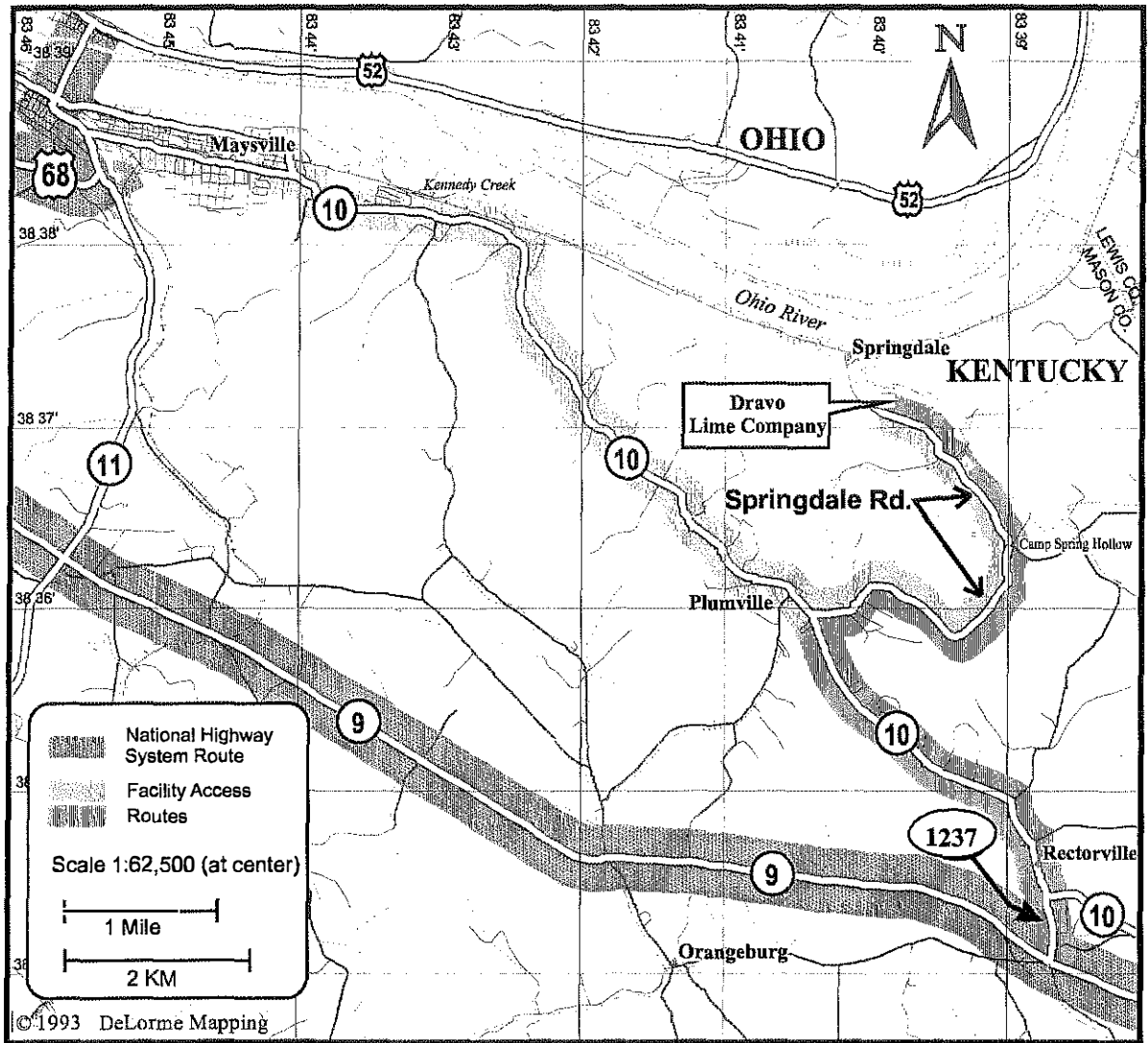
The sites to be evaluated in this study were selected from two existing databases (a truck facility survey from 1994 and the intermodal facility inventory) based on ADD and KYTC Highway District planner recommendations, geographic location, distance to the NHS, and the number of trucks accessing the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

The site was visited for video recording and data collection on November 11, 1998. The facility is located on Springdale Road east of KY 10. The surrounding area is generally rural. A phone survey was conducted with facility managers early in the study process. The survey found that approximately 50 trucks per day normally access the site with significantly higher numbers in the summer. The trucks are generally tri-axle single units or semitrailers with a maximum length of 48 feet. The freight handled at this facility is primarily limestone. The only problem mentioned in the survey was traffic at the intersection of Springdale Road and KY 10. The phone survey information can be found in Appendix A.

2.0 Truck Routes in Use

As shown in Figure 1, trucks use one of two routes to reach the NHS. Both routes follow Springdale Road to KY 10. The eastern route (shown in orange) is used by trucks traveling to KY 9 (AA Highway). The route follows KY 10 (ADT 1,589 1994) east to KY 1237 (ADT 1,152 1994) which connects with KY 9, a distance of approximately 5.5 miles. The western route (shown in green) is used by trucks traveling on KY 10 (ADT 11,169 1996) to US 68 in Maysville, a distance of approximately 9.0 miles. KY 10 passes through residential and commercial areas near US 68 in Maysville. All other route sections are rural. The western route has several traffic signals near the intersection with US 68. All roads except Springdale Road are state-maintained. If either of these routes were used by a 102 inch wide trailer they would be in violation of the STAA regulations.

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

Although the survey of this site noted that there are possible problems at the intersection of Springdale Road and KY 10, the site visit did not reveal any operational problems or concerns for this site. Thus, no traffic evaluations were performed.

3.2 Accident History

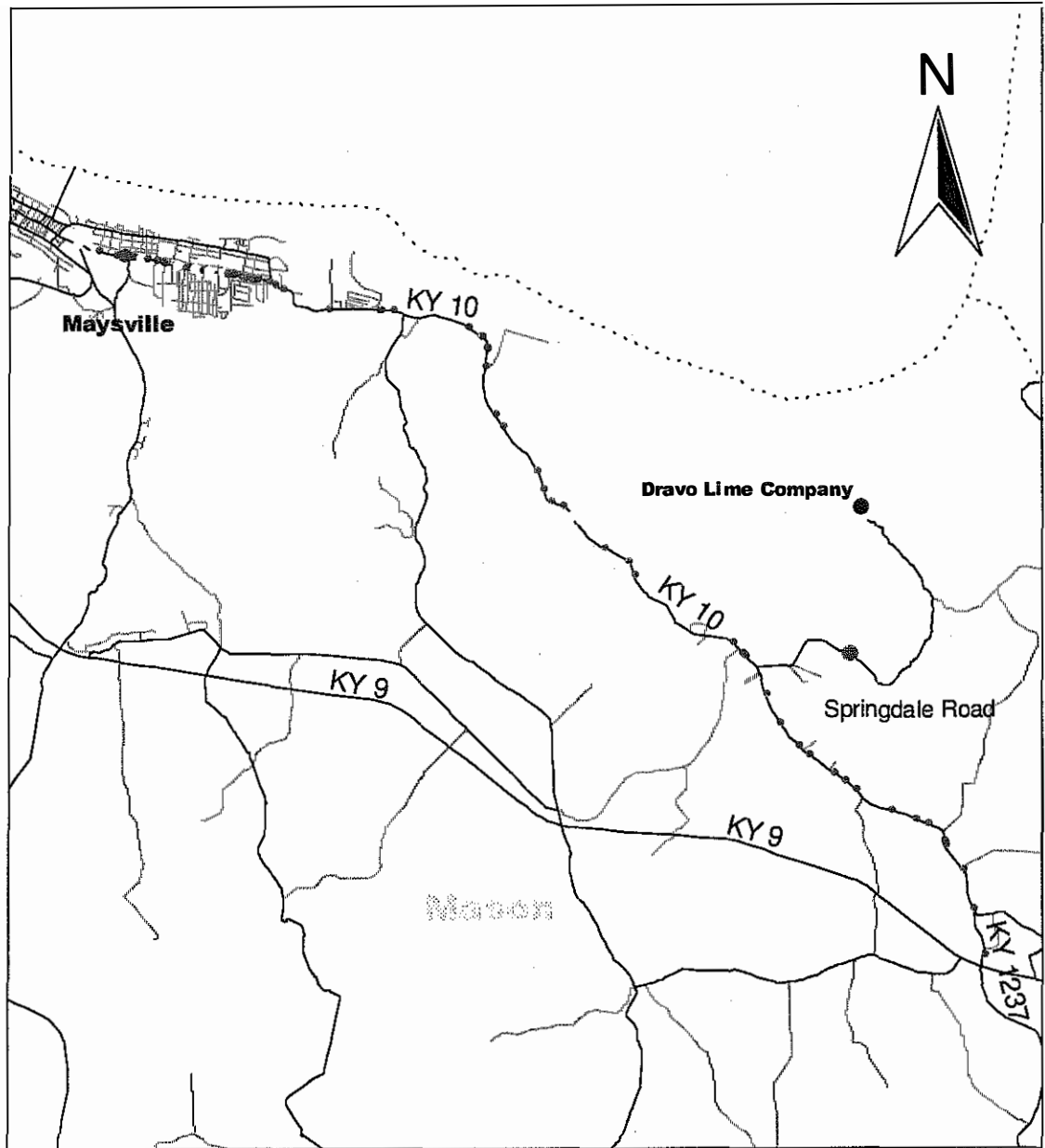
In 1997, the Kentucky Transportation Center studied all state-maintained roads throughout Kentucky and determined average truck accident rates for different types of road sections. A critical accident rate was then calculated using the average accident rate for a specific highway type along with an assumed level of statistical significance and exposure (vehicles miles traveled). There were no sections along these routes where the accident rate was as high as the critical rate for that particular highway type.

Figure 2 shows the locations of accidents during the years 1995, 1996 and 1997. The figure shows that a majority of the accidents were on KY 10, with a significant number occurring in Maysville. The accidents on Springdale Road are shown as a single cluster because the specific locations were not available for county roads.

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

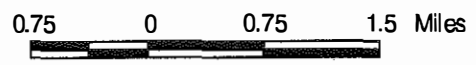
Figure 2: Accident Locations (1995-1997)



LEGEND

- Facility
- Accidents: 1-2
- Accidents: 3-5
- Accidents: 6-8
- Accidents: 20

Scale - 1:65000



A summary of the accidents along the truck routes is shown in Tables 2 and 3 for the same three year period. Truck accidents represent a significant portion of the overall accidents along both the routes. The 10.3% of accidents involving trucks on the eastern route is higher than the percentage of trucks along that route (9.1%). The 4.4% of accidents involving trucks on the western route is lower than the percentage of trucks along that route (6.4%). This suggests there may be some safety concerns from an accident history point of view that could be addressed along the Midway route. The percentage of trucks was obtained from 1996 and 1998 KYTC Vehicle Classification Counts and from HIS estimates.

Table 2: Accident Types along the Eastern Route

	<i>Non-Truck Accidents</i>	<i>Truck Accidents</i>	<i>Percent Trucks</i>
<i>Total</i>	26	3	10.3
Fatal Accidents	1	0	0.0
Injury	10	1	9.1
Intersection	0	0	0.0

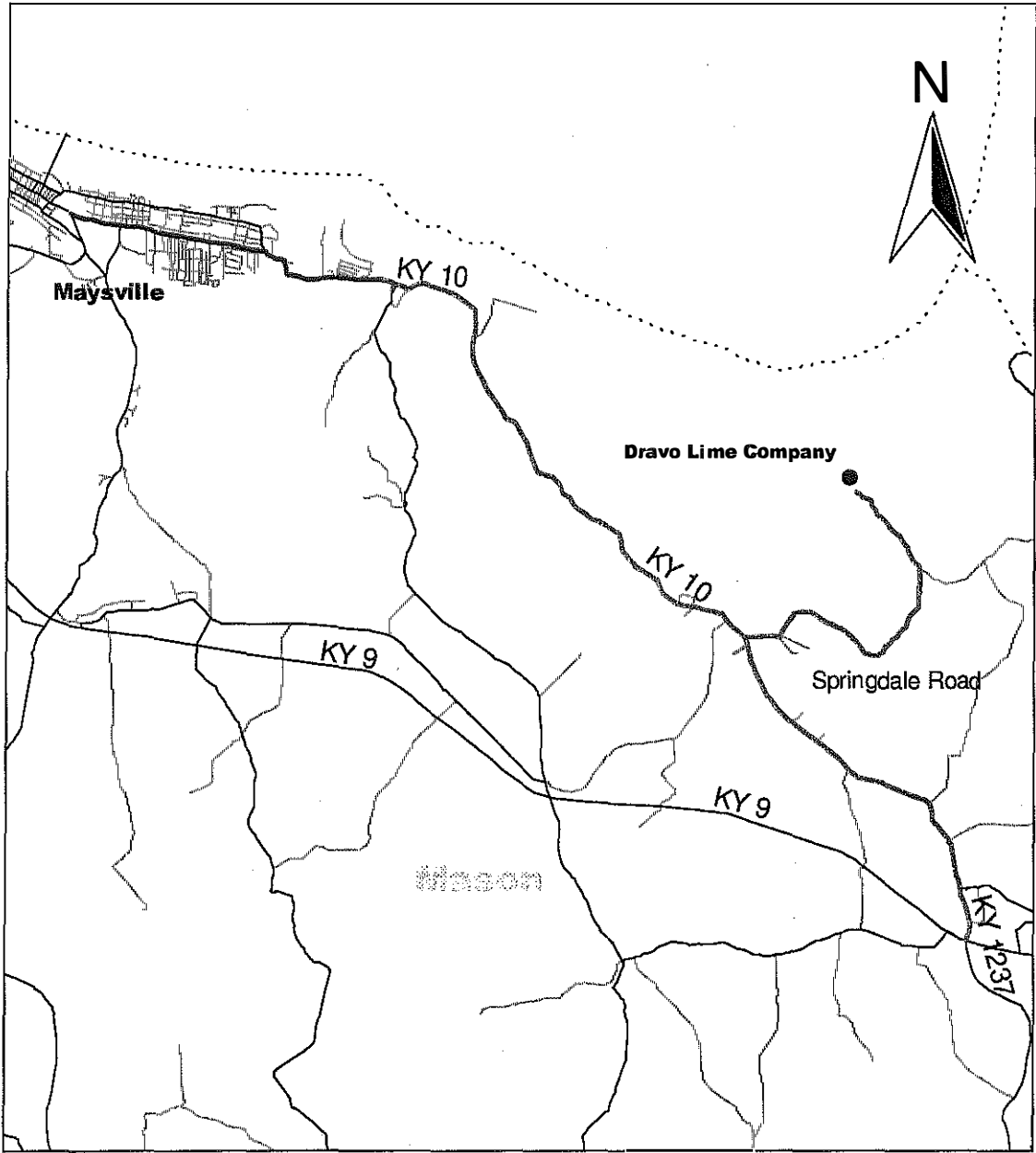
Table 3: Accident Types along the Western Route

	<i>Non-Truck Accidents</i>	<i>Truck Accidents</i>	<i>Percent Trucks</i>
<i>Total</i>	108	5	4.4
Fatal Accidents	0	0	0.0
Injury	31	1	3.1
Intersection	34	1	2.9

3.3 Cross Section Features

Figures 3 and 4 illustrate the sections of the routes having different widths of lanes and shoulders. KY 8 has “preferred” 12-foot lanes near US 68 in Maysville. All other route sections have “less than adequate” 9-foot lanes which are extremely narrow for large trucks. There are no shoulders on Springdale Road and the section of KY 10 in Maysville is curbed. All other roads have “less than adequate” 2-foot shoulders. Ditches and side slopes caused clear zone problems along most of the routes. The pavement was generally good on most of KY 10 and in fair condition on all other route sections.

Figure 3: Lane Widths



LEGEND

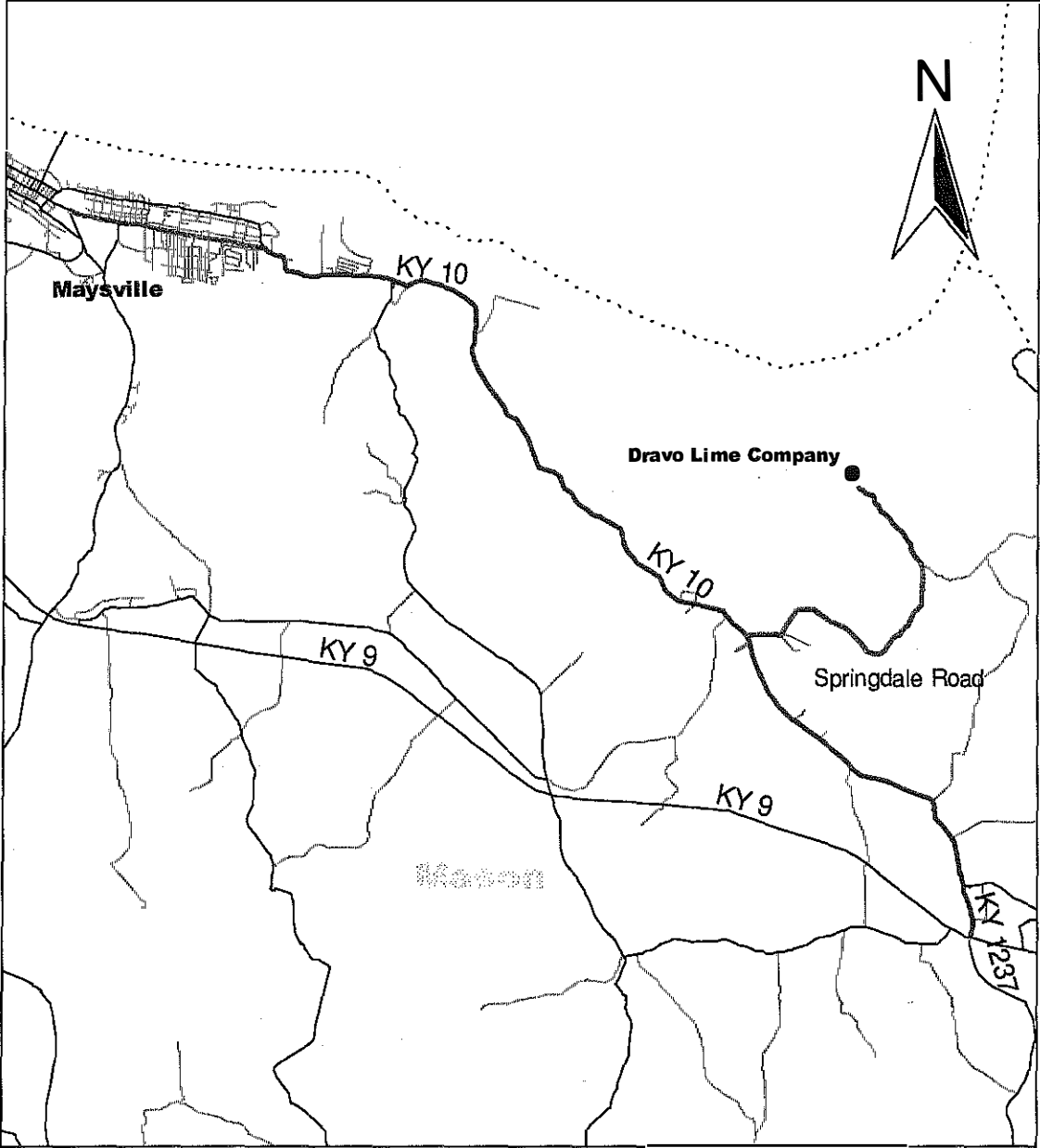
- Facility
- Lane Width - 9 Feet
- Lane Width - 12 Feet

Scale - 1:65000

0.5 0 0.5 1 1.5 Miles

1 0 1 2 Kilometers

Figure 4: Shoulder Widths



LEGEND

- Facility
- Shoulder Width - Curbed
- Shoulder Width - 2 Feet
- Shoulder Width - No Shoulder

Scale - 1:65000

0.5 0 0.5 1 1.5 Miles

1 0 1 2 Kilometers

3.4 Curvature Features

Grades are considered problematic if they cause trucks to slow down excessively. Figure 5 shows the locations of six such grades. As listed in Table 4, there was one “adequate” and three “less than adequate” grades on the western route, while the eastern route and Springdale Road had one “less than adequate” grade each. The grades on KY 10 were evaluated using AASHTO speed reduction tables, and the grade on Springdale Road was rated by observation.

Offtracking is considered a problem where a truck cannot stay in its lane through a curve. As shown in Figure 6, the narrow lanes cause frequent offtracking problems on both routes (a total of 44 curves). The number of curves rated “adequate” or “less than adequate” on each route is listed in Table 4 and the milepoints are listed in Appendix B. The curves on Springdale Road were rated by observation of trucks traveling the route as curvature information was available for only state-maintained roads. The offtracking on state-maintained sections was calculated from lane width and degree of curvature.

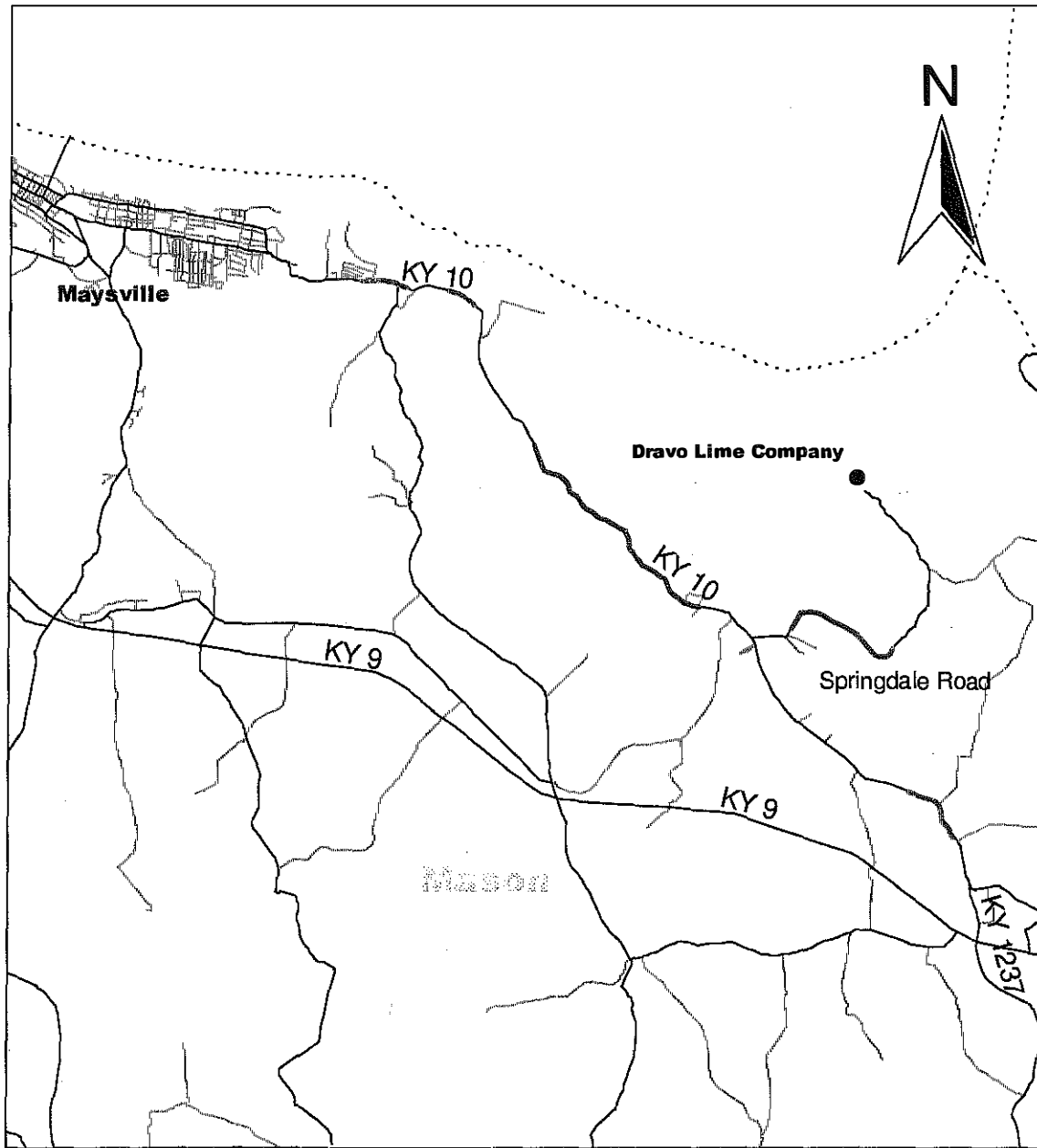
Figure 7 shows the locations of several curves where safe speed on the curve could be a problem as indicated by ball bank indicator readings or posted speed advisories. The number of curves rated “adequate” or “less than adequate” on each route is listed in Table 4 and the milepoints are listed in Appendix B.

Table 4: Summary of Curvature Features

	Grade		Offtracking		Safe Speed	
	Adequate	< Adequate	Adequate	< Adequate	Adequate	< Adequate
Springdale Road*	0	1	0	12	0	8
Eastern Route	0	1	3	6	2	1
Western Route	1	3	3	20	21	1

*Although Springdale Road is part of both routes, the features are listed separately in this table.

Figure 5: Grade Locations



LEGEND

- Facility
- Grade - Adequate
- Grade - Less than Adequate

Scale - 1:65000

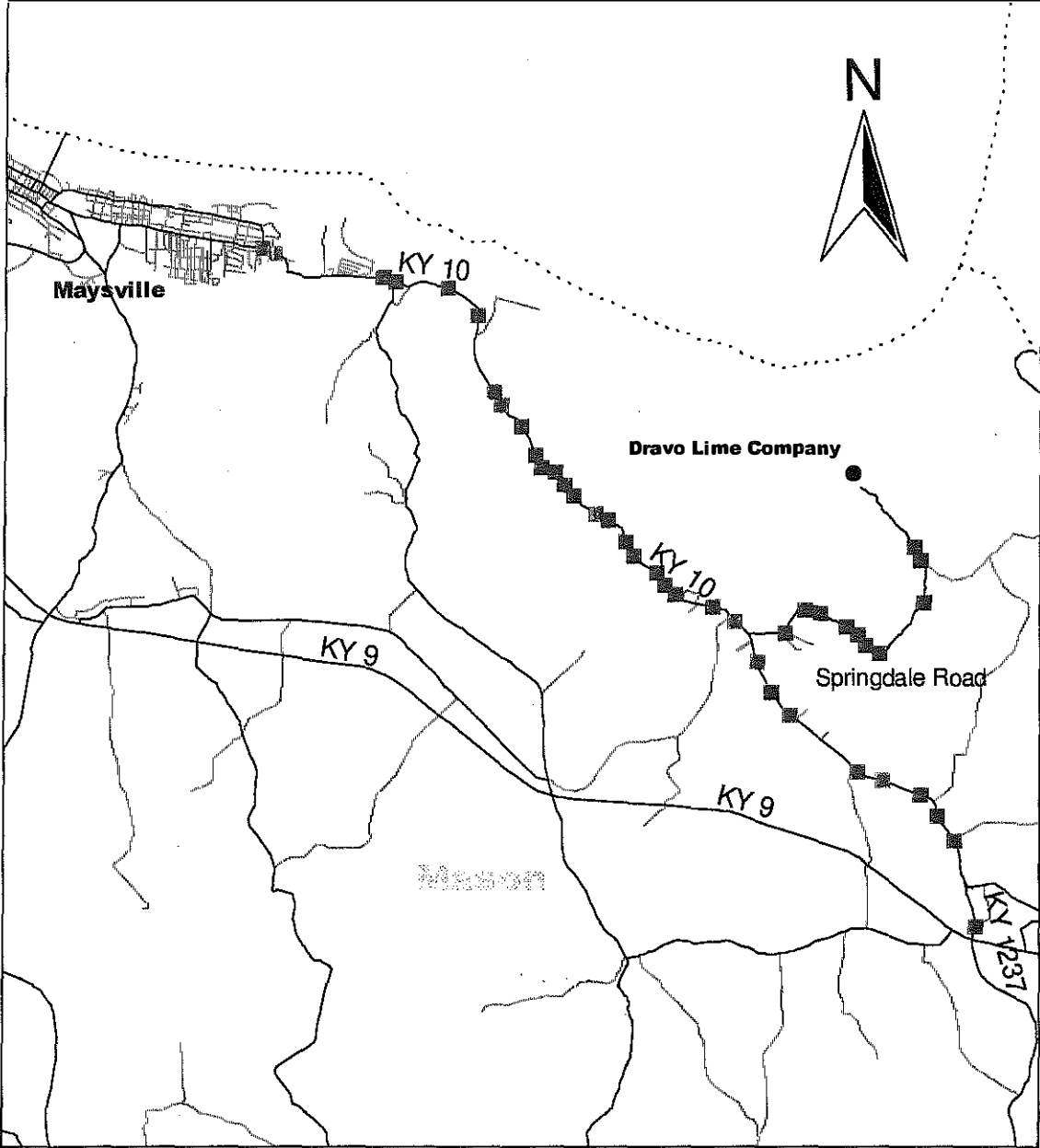
0.5 0 0.5 1 1.5 Miles



1 0 1 2 Kilometers



Figure 6: Curves Where Offtracking Could Occur



LEGEND

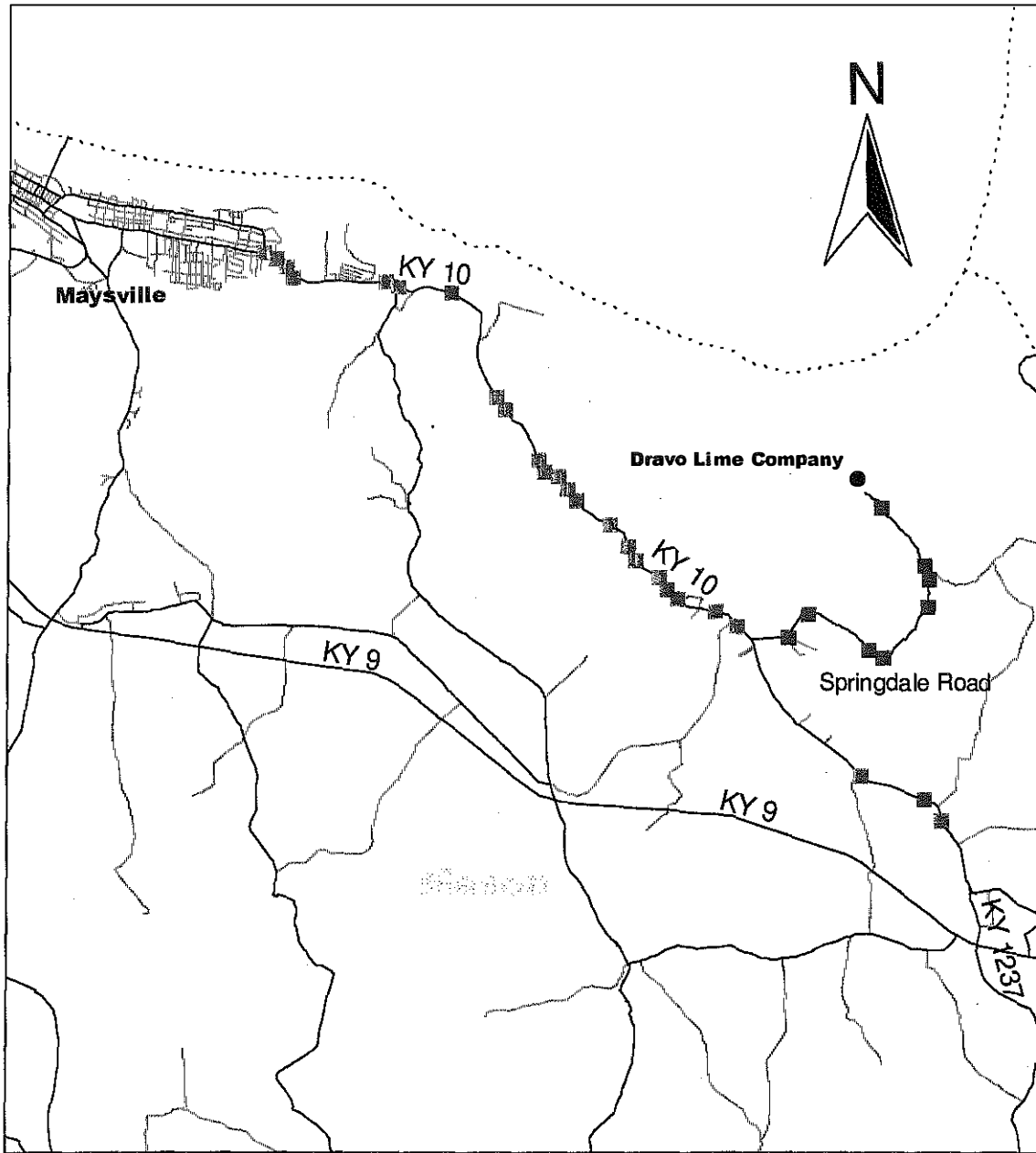
- Facility
- ▣ Offtracking - Adequate
- Offtracking - Less than Adequate

Scale - 1:65000

0.5 0 0.5 1 1.5 Miles

1 0 1 2 Kilometers

Figure 7: Curves Where Safe Speed May be a Problem



LEGEND

- Facility
- ▣ Curve Speed - Adequate
- Curve Speed - Less than Adequate

Scale - 1:65000



The turning radius at the intersection of KY 10 and US 68 was approximated in the field. The approximate layout of this intersection is shown in Figure 8. The angle at which KY 10 joins US 68 increases the required turning radius. The turn from US 68 onto KY 10 (60-foot radius) was rated "less than adequate" because trucks turn into opposing traffic or over a sidewalk. The resulting damage to the sidewalk is shown in Figure 9.

Figure 8: Approximate Turning Radius at US 68 and KY 10

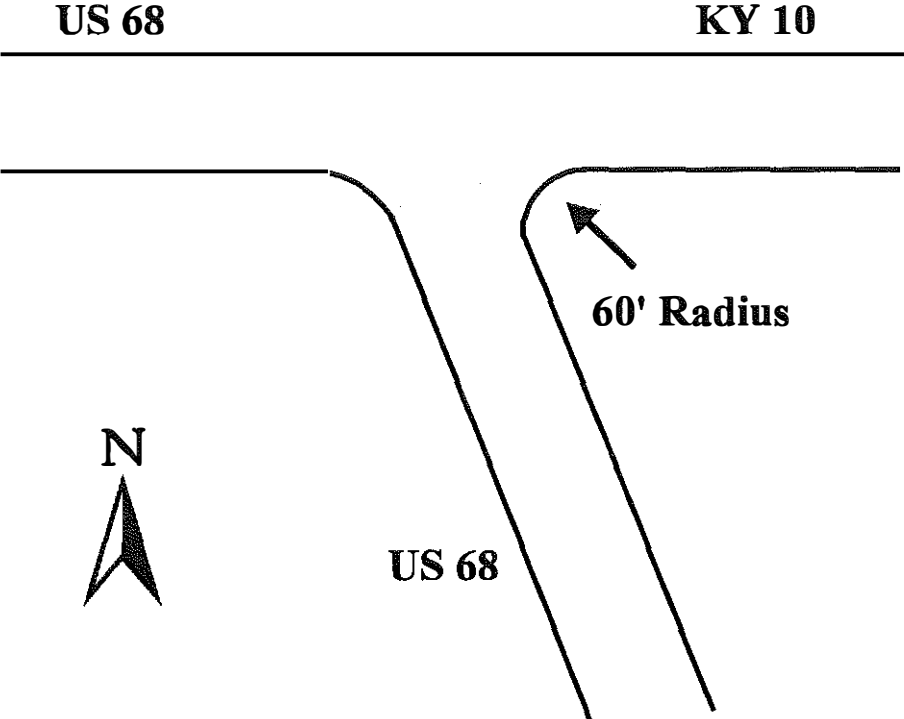


Figure 9: Damaged Sidewalk at the Intersection of KY 10 and US 68



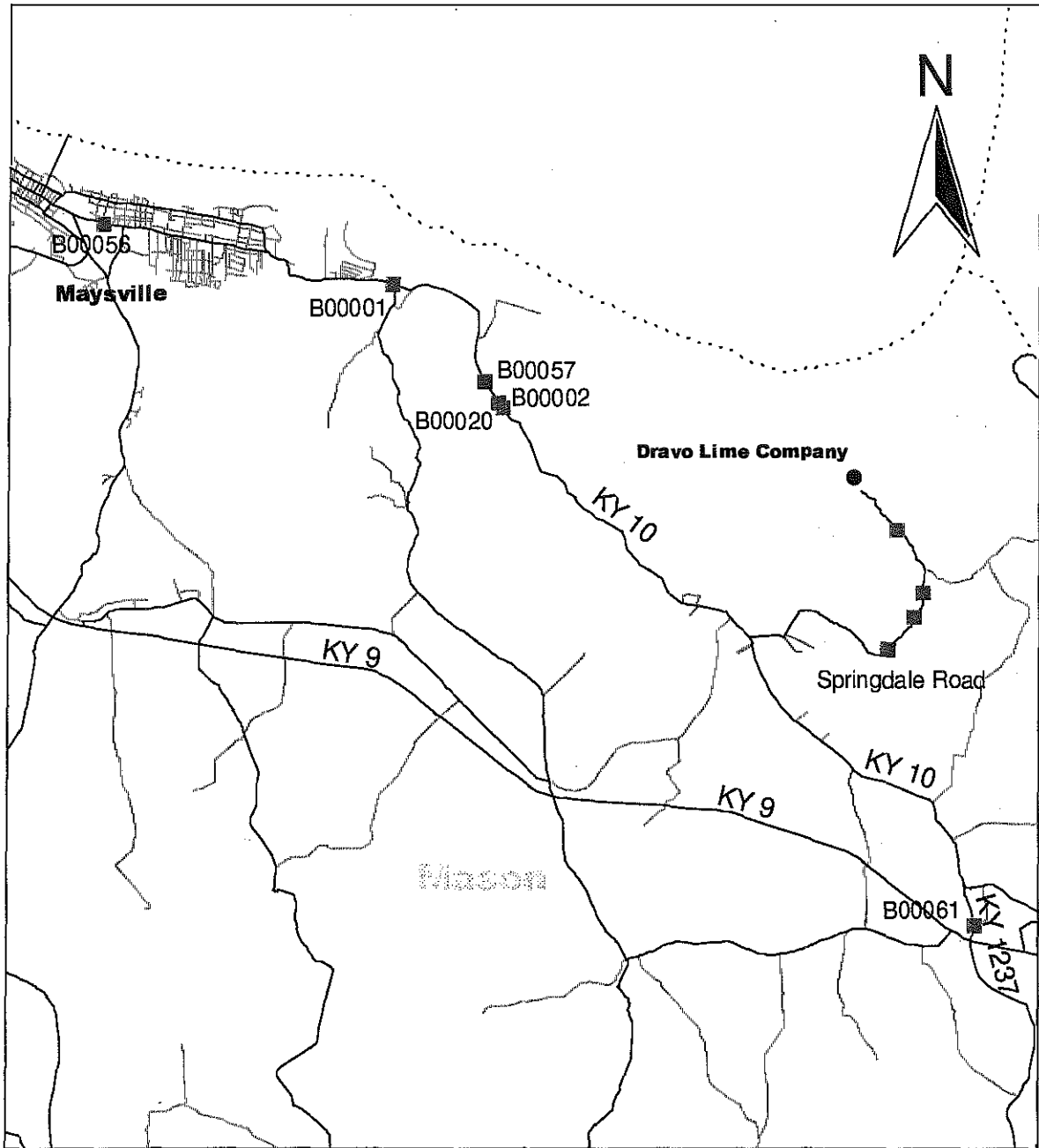
3.5 Railroad Crossings

There were no at-grade railroad crossings on these routes.

3.6 Bridges

Figure 10 shows the location of four bridges on these routes. The location and bridge sufficiency rating (provided by the KYTC Division of Operations) for each bridge is listed in Appendix C. A sufficiency rating of 80 or higher (out of a possible 100) is considered “preferred,” and a rating of at least 50 is “adequate.” Six of the bridges received an “adequate” rating. As shown in Figure 11, the bridge on KY 1237 is narrow enough to cause a reduction in the usable lane width.

Figure 10: Bridge Locations



LEGEND

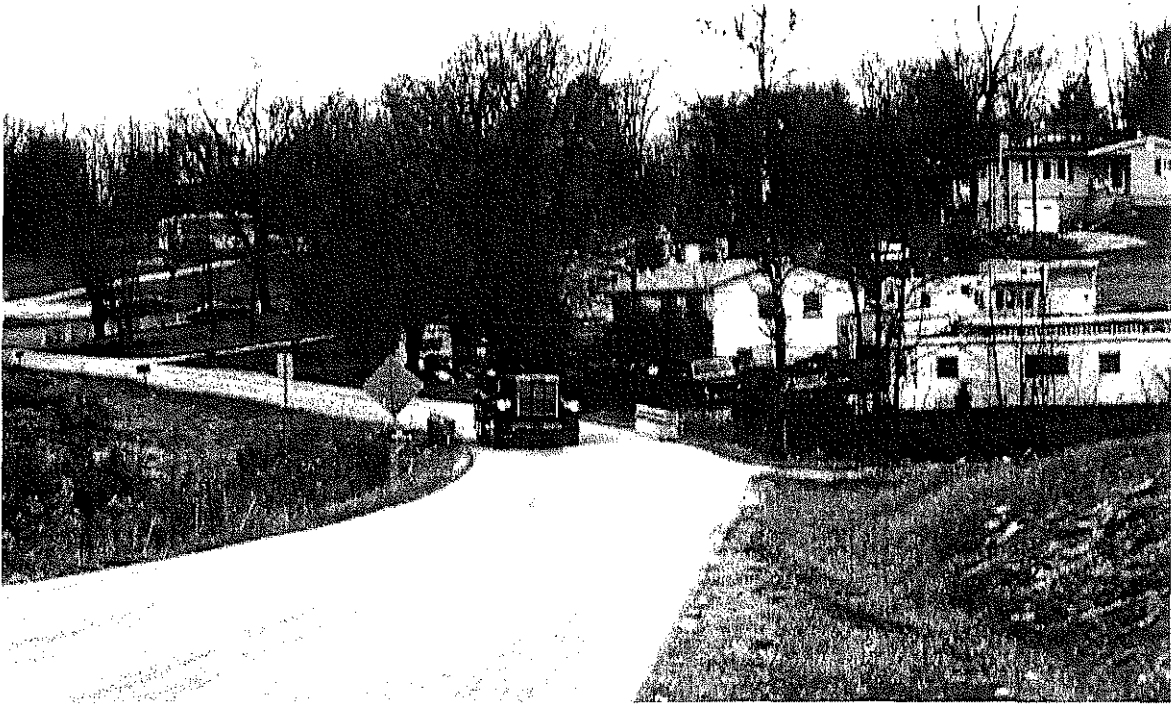
- Facility
- B00000 Bridge Number

Scale - 1:65000

0.5 0 0.5 1 1.5 Miles

1 0 1 2 Kilometers

Figure 11: Narrow Bridge on KY 1237



3.7 Sight Distance

A curve limits the sight distance for trucks turning west from KY 1237 onto KY 10. The 280-foot sight distance is sufficient for the 35 mph speed limit at the intersection. Some higher speeds may be experienced due to the type of roadway and a nearby 55 mph speed limit.

3.8 Other Route Features

“Cattle Crossing” signs are posted along the road where Springdale Road passes through a small farm. The pavement markings on Springdale Road are faded and difficult to see in many places.

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 these Mason County routes, 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 was obtained from 1996 and 1998 KYTC Vehicle Classification Counts and from HIS data.

Tables 5 and 6 contain the total problem truck miles and total problem points for lane width, shoulders, grade, offtracking, curve speed, turning radius and bridges which apply to these routes. The rating of these routes 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 changed to improve truck access without requiring major construction or expense. Warning signs could be considered on KY 10 at the intersection with KY 1237. The centerline of Springdale Road could be repainted.

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 have rated the overall access on a scale of 1 through 10. The interpretation for these ratings is shown in Table 7. The eastern route received an overall rating of 5, indicating that minor improvements are required on the route. The western route was given a rating of 3, because minor improvements are required to improve access.

Table 5: Summary of Problem Truck Miles and Points for Eastern Route

Feature	Road	Location	Points*	Length (miles)	Trucks (/day)	Truck-points	Truck-miles
Lane Width	Springdale	Length	2	2.5	137		685.0
	KY 10	Length	2	2.4	138		662.4
	KY 1237	Length	2	0.4	59		47.2
Total							1,394.6
Shoulders	Springdale	Length	2	2.5	137		685.0
	KY 10	Length	1	2.4	138		662.4
	KY 1237	Length	2	0.4	59		47.2
Total							1,394.6
Grade	Springdale	East of KY 10	2	0.9	137		246.6
	KY 10	MP 11.69 - 12.16	2	0.47	138		129.7
Total							376.3
Offtracking		See App B				5,200	
Curve Speed		See App B				2,744	
Bridges	Springdale	1.2 mi from KY 10	1		137	137	
	Springdale	2.2 mi from KY 10	1		137	137	
	KY 1237	MP 2.1	1		138	138	
Total						412	

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

Table 6: Summary of Problem Truck Miles and Points for Western Route

Feature	Road	Location	Points*	Length (miles)	Trucks (/day)	Truck-points	Truck-miles	
Lane Width	Springdale	Length	2	2.5	137		685.0	
	KY 10	East of town	2	3.7	138		1021.2	
Total							1,706.2	
Shoulders	Springdale	Length	2	2.5	137		685.0	
	KY 10	In town	2	2.5	474		2370.0	
	KY 10	East of town	2	3.7	138		1021.2	
Total							4,076.2	
Grade	Springdale	East of KY 10	2	0.9	68		122.4	
	KY 10	MP 6.10 - 6.27	1	0.17	69		11.7	
	KY 10	MP 6.27 - 6.45	2	0.18	69		24.8	
	KY 10	MP 6.78 - 6.98	2	0.20	69		27.6	
	KY 10	MP 8.01 - 9.67	2	1.66	69		229.1	
Total							415.6	
Offtracking		See App B					9,222	
Curve Speed		See App B					5,366	
Turning Radius	US 68	KY 10	2		237	474		
Bridges	Springdale	1.2 mi from KY 10	1		137	137		
	Springdale	2.2 mi from KY 10	1		137	137		
	KY 10	MP 4.1	1		474	474		
	KY 10	MP 6.3	1		138	138		
	KY 10	MP 7.6	1		138	138		
Total							1,024	

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

Table 7: 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

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

- Narrow lanes and shoulders,
- Problematic grades,
- Problematic horizontal curves,
- Poor turning radius from US 68 onto KY 10,
- A narrow bridge on KY 1237, and
- Faded pavement markings on Springdale Road.

The recommended improvements are repainting the center line of Springdale Road and improving the intersection of US 68 and KY 10 to eliminate turning radius problems. Rebuilding sections of KY 10 to address lane width and curvature problems could be considered if traffic volumes increase.

Appendices

Appendix A: Phone Survey Conducted with Facility

<u>Facility ID</u>	<u>Facility Name</u>	<u>Location / City</u>	<u>County</u>	<u>ADD</u>
30	Dravo Lime	Maysville	Mason	Buffalo Trace
<u>Contact Name</u>	<u>Title</u>	<u>Phone</u>	<u>Fax</u>	
Jim McCann		606-564-9600	606-564-9673	

1. **Is the location of your facility on the map correct?** No, on Ohio River at mouth of Cabin Creek
2. **Our information shows about 50 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?**
Higher in summer
4. **(If truck traffic is seasonal) Is the 50 trucks/day for the peak season?** No, possibly 150
5. **What is the most common size truck operating at your facility?** Triaxle single unit
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)**
Stone out
8. **Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon)** 7:00 a.m.- 2:00 p.m.
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>
Route 10 at Springdale Road	All day
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 AA Highway and to Ashland
To Maysville on KY 10
11. **Do you have any other problems or concerns along the route you would like us to consider?**
None
12. **Would you like a copy of the final report (roadway/route evaluation ???)** Yes

Appendix B: Curve Data

Table B1: Offtracking on Eastern Route

Road	Location	Points	Trucks	Truck-points	Total
Springdale	0.2 mi from KY 10	2	137	274	
Springdale	0.4 mi from KY 10	2	137	274	
Springdale	0.6 mi from KY 10	2	137	274	
Springdale	0.8 mi from KY 10	2	137	274	
Springdale	0.9 mi from KY 10	2	137	274	
Springdale	1.0 mi from KY 10	2	137	274	
Springdale	1.1 mi from KY 10	2	137	274	
Springdale	1.3 mi from KY 10	2	137	274	
Springdale	1.6 mi from KY 10	2	137	274	
Springdale	1.8 mi from KY 10	2	137	274	
Springdale	1.9 mi from KY 10	2	137	274	
Springdale	2.0 mi from KY 10	2	137	274	
KY 10	MP 10.3	1	138	138	
KY 10	MP 10.5	2	138	276	
KY 10	MP 10.7	1	138	138	
KY 10	MP 11.3	2	138	276	
KY 10	MP 11.5	1	138	138	
KY 10	MP 11.8	2	138	276	
KY 10	MP 12.0	2	138	276	
KY 10	MP 12.2	2	138	276	
KY 1237	MP 2.1	2	59	118	5,200

Table B2: Offtracking on Western Route

Road	Location	Points	Trucks	Truck-points	Total
Springdale	0.2 mi from KY 10	2	137	274	
Springdale	0.4 mi from KY 10	2	137	274	
Springdale	0.6 mi from KY 10	2	137	274	
Springdale	0.8 mi from KY 10	2	137	274	
Springdale	0.9 mi from KY 10	2	137	274	
Springdale	1.0 mi from KY 10	2	137	274	
Springdale	1.1 mi from KY 10	2	137	274	
Springdale	1.3 mi from KY 10	2	137	274	
Springdale	1.6 mi from KY 10	2	137	274	
Springdale	1.8 mi from KY 10	2	137	274	
Springdale	1.9 mi from KY 10	2	137	274	
Springdale	2.0 mi from KY 10	2	137	274	
KY 10	MP 5.3	1	138	138	
KY 10	MP 5.4	2	138	276	
KY 10	MP 6.3	2	138	276	
KY 10	MP 6.4	2	138	276	
KY 10	MP 6.8	2	138	276	
KY 10	MP 7.1	2	138	276	
KY 10	MP 7.6	2	138	276	
KY 10	MP 7.7	2	138	276	
KY 10	MP 7.9	2	138	276	
KY 10	MP 8.1	2	138	276	
KY 10	MP 8.2	2	138	276	
KY 10	MP 8.3	2	138	276	
KY 10	MP 8.4	2	138	276	
KY 10	MP 8.5	2	138	276	
KY 10	MP 8.7	1	138	138	
KY 10	MP 8.8	2	138	276	
KY 10	MP 9.0	2	138	276	
KY 10	MP 9.1	2	138	276	
KY 10	MP 9.3	2	138	276	
KY 10	MP 9.4	2	138	276	
KY 10	MP 9.5	2	138	276	
KY 10	MP 9.8	2	138	276	
KY 10	MP 10.0	1	138	138	9,222

Table B3: Curve Speed on Eastern Route

Road	Location	Points	Trucks	Truck-points	Total
Springdale	0.2 mi from KY 10	2	137	274	
Springdale	0.4 mi from KY 10	2	137	274	
Springdale	1.0 mi from KY 10	2	137	274	
Springdale	1.1 mi from KY 10	2	137	274	
Springdale	1.6 mi from KY 10	2	137	274	
Springdale	1.8 mi from KY 10	2	137	274	
Springdale	1.9 mi from KY 10	2	137	274	
Springdale	2.4 mi from KY 10	2	137	274	
KY 10	MP 11.3	1	138	138	
KY 10	MP 11.8	2	138	276	
KY 10	MP 12.0	1	138	138	2,744

Table B4: Curve Speed on Western Route

Road	Location	Points	Trucks	Truck-points	Total
Springdale	0.2 mi from KY 10	2	137	274	
Springdale	0.4 mi from KY 10	2	137	274	
Springdale	1.0 mi from KY 10	2	137	274	
Springdale	1.1 mi from KY 10	2	137	274	
Springdale	1.6 mi from KY 10	2	137	274	
Springdale	1.8 mi from KY 10	2	137	274	
Springdale	1.9 mi from KY 10	2	137	274	
Springdale	2.4 mi from KY 10	2	137	274	
KY 10	MP 5.3	1	138	138	
KY 10	MP 5.4	1	138	138	
KY 10	MP 5.5	1	138	138	
KY 10	MP 5.6	1	138	138	
KY 10	MP 6.3	1	138	138	
KY 10	MP 6.4	1	138	138	
KY 10	MP 6.8	2	138	276	
KY 10	MP 7.6	1	138	138	
KY 10	MP 7.7	1	138	138	
KY 10	MP 8.1	1	138	138	
KY 10	MP 8.2	1	138	138	
KY 10	MP 8.3	1	138	138	
KY 10	MP 8.4	1	138	138	
KY 10	MP 8.5	1	138	138	
KY 10	MP 8.8	1	138	138	
KY 10	MP 9.0	1	138	138	
KY 10	MP 9.1	1	138	138	
KY 10	MP 9.3	1	138	138	
KY 10	MP 9.4	1	138	138	
KY 10	MP 9.5	1	138	138	
KY 10	MP 9.8	1	138	138	
KY 10	MP 10.0	1	138	138	5,366

Appendix C: Bridge Sufficiency Ratings

Road	Location	Sufficiency Rating
Springdale	1.2 mi from KY 10	68.8
Springdale	1.5 mi from KY 10	82.4
Springdale	1.7 mi from KY 10	87.1
Springdale	2.2 mi from KY 10	65.4
KY 10	MP 4.1	55.1
KY 10	MP 6.3	79.0
KY 10	MP 7.5	94.5
KY 10	MP 7.6	74.7
KY 10	MP 7.7	83.2
KY 1237	MP 2.1	78.9