

TRUCK ROUTE ACCESS EVALUATION

Seaboard Farms
Graves County
Site #2623

Report Number KTC-99-12

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

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Table of Contents

| | |
|---|----|
| 1.0 Introduction | 1 |
| 2.0 Truck Routes in Use | 1 |
| 3.0 Route Data Collection and Evaluation | 4 |
| 3.1 Traffic Operations and Level of Service | 4 |
| 3.2 Accidents | 4 |
| 3.3 Cross Section Features | 7 |
| 3.4 Curvature Features | 7 |
| 3.5 Railroad Crossings | 10 |
| 3.6 Bridges | 10 |
| 3.7 Sight Distance | 12 |
| 3.8 Other Route Features | 12 |
| 4.0 Route Evaluation and Recommendations | 14 |
| 4.1 Problem Truck Miles and Truck Points | 14 |
| 4.2 Maintenance Improvement Locations | 14 |
| 4.3 Overall Route Rating | 15 |
| 4.4 Conclusions and Recommendations | 15 |

Appendices

| | |
|--|----|
| Appendix A: Phone Survey Conducted with Facility Manager | 17 |
|--|----|

List of Tables

| | |
|---|----|
| Table 1: Route Features and Method of Evaluation | 5 |
| Table 2: Accident Types Along Graves County Truck Route | 7 |
| Table 3: Summary of Problem Truck Miles and Points for Entire Route | 14 |
| Table 4: Interpretation of the Overall Route Rating | 15 |

List of Figures

| | |
|---|----|
| Figure 1: Location of Truck Generating Site | 2 |
| Figure 2: Entrance to US 45B (as seen from Macedonia Road) | 3 |
| Figure 3: US 45 Eastbound (as seen from southernmost intersection with US 45B) | 3 |
| Figure 4: Accident Locations (1995 – 1997) | 6 |
| Figure 5: Lane Widths | 8 |
| Figure 6: Shoulder Widths | 9 |
| Figure 7: Intersection of US 45 and Macedonia Road | 10 |
| Figure 8: Bridge Location | 11 |
| Figure 9: Turning Bay from US 45B onto Northbound US 45 | 12 |
| Figure 10: Turning Bay | 13 |
| Figure 11: "No Trucks" Sign as Seen from Southbound US 45 | 13 |

1.0 Introduction

The Freight Movement and Intermodal Access in Kentucky Study (SPR 98-189), undertaken by the Kentucky Transportation Center (KTC) on behalf of the Kentucky Transportation Cabinet (KYTC), has two main objectives: 1) the evaluation of 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 one facility located in Graves County in the Purchase Area Development District (ADD) and KYTC Highway District #1. The location of the site is 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 Kentucky Transportation Cabinet (KYTC) 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 facility for study is Seaboard Farms, and the initial trip to the site revealed that there were no other significant sources of truck traffic in the vicinity. The site was visited for route videotaping on January 15, 1998 and data collection on August 3, 1998. Phone surveys were conducted early into the study process so that facility managers could indicate the truck routes and provide insight into potential access-limiting issues. The phone survey, which is included in Appendix A, indicated that approximately 65 trucks per day (130 one-way trips) are accessing the site. The largest trucks using the access route are 58-foot semi-trailers with 42-foot semi-trailers being the most common.

2.0 Truck Routes in Use

There is one route used for access to the NHS, the Purchase Parkway in this case. Trucks leave the facility by Macedonia Road and travel west through the intersection of US 45 and Macedonia Road onto US 45B (bypass) as seen in Figure 2. Once on the bypass, the first ramp to the right allows trucks to proceed north to either the ramp for the westbound Purchase Parkway or US 45B runs directly into the eastbound Purchase Parkway at milepost 0.958. Trucks traveling to the facility can proceed directly south on the Purchase Parkway (turns into US 45B) if they are southbound, or remain on the parkway if they are eastbound. At the intersection of US 45B and US 45, trucks turn left and proceed northeast on US 45 for approximately 0.2 miles (as seen in Figure 3). US 45 is a two-lane, one-way road (from US 45B to the intersection of Macedonia Road). Trucks then turn right onto Macedonia Road, cross the railroad tracks, and then turn left into the Seaboard Farms entrance approximately 200 feet from the intersection. Total route length is approximately 0.5 miles for outgoing trucks and 0.65 miles for incoming trucks. The average daily traffic (ADT) on US 45 is 6,100 vehicles per day (from 1996 KYTC traffic counts) and the ADT on US 45B is 7,274 vehicles per day (from 1998 KYTC traffic counts).

Figure 1: Location of Truck Generating Site (Mayfield, KY)

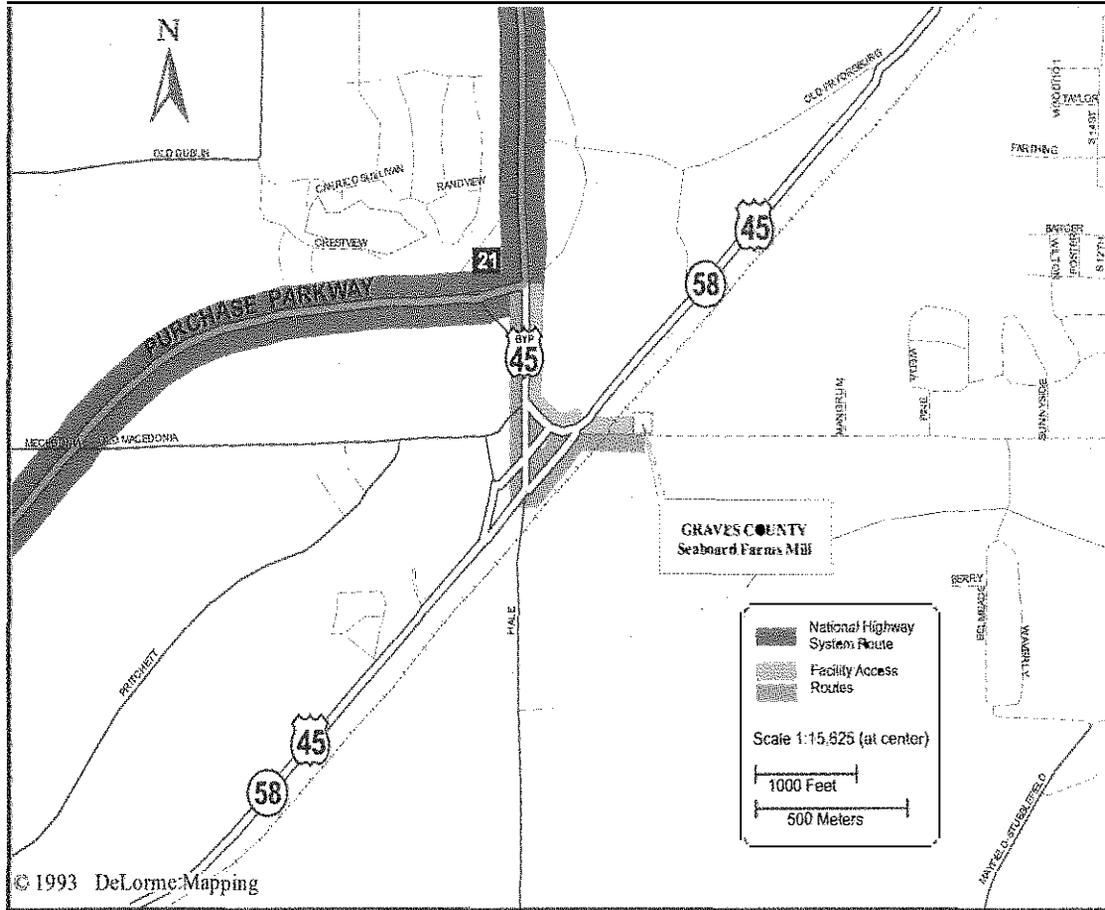


Figure 2: Entrance to US 45B (as seen from Macedonia Road)



Figure 3: US 45 Eastbound (as seen from southernmost intersection with US 45B)



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 phone survey for this site indicated that there were no operational problems or concerns for the access route to this site. The only congestion issues mentioned dealt with roadways beyond the study area. Traffic counts and level of service calculations were only to be conducted when facility managers indicated that there were congestion-related problems along the truck route. Thus, the route is assumed to operate at an acceptable level of service and no calculations were undertaken.

3.2 Accidents

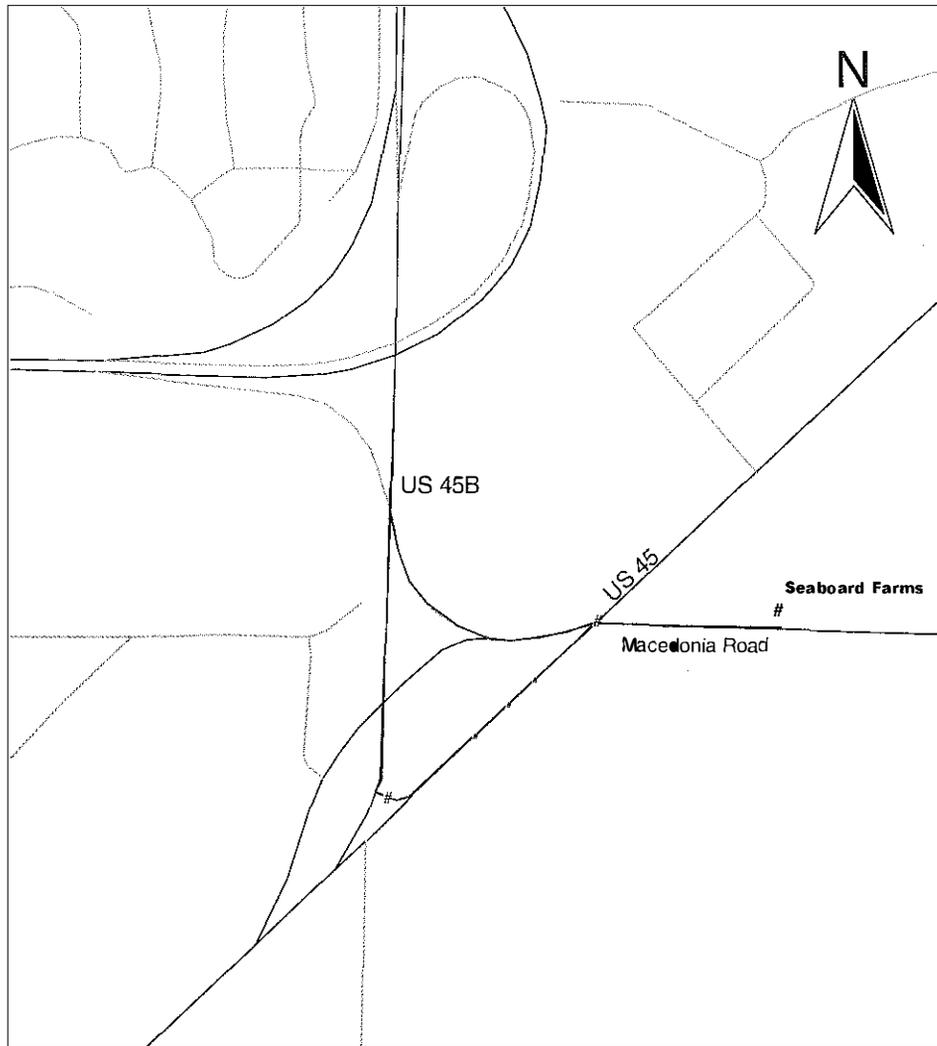
In 1997 the Kentucky Transportation Center studied all the state-maintained roads throughout Kentucky and determined average truck accident rates for different types of road sections. A critical accident rate was calculated using the average accident rate for a specific highway type along with an assumed level of statistical significance and exposure (vehicle miles traveled). There were no portions of this route with accident rates higher than the critical rate.

Figure 4 shows the locations of accidents during the years 1995, 1996, and 1997. A summary of the accidents along the truck route (for all roads, not just state-maintained roads) is shown in Table 2 for the same three-year period. Just 1 of 21 accidents on the route involved a truck. Thus, truck accidents are assumed to not be a problem for the route. However, the relatively high numbers of accidents occurring at the intersections of US 45 and US 45B (8 accidents) and US 45 and Macedonia Road (8 accidents) suggest that there are some concerns for these intersections from a recent accident history point of view. More discussion of the intersection of US 45 and Macedonia Road can be found in Section 3.4 and of the intersection of US 45 and US 45B in Section 3.8.

Table 1: Route Features and Method of Evaluation

| Feature | Methodology | Team Consensus based on Committee Meeting and Draft Report Feedback | Feature Type |
|-------------------------------|--|---|---------------------|
| ●fftracking | 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 4: Accident Locations (1995 - 1997)



LEGEND

- # Facility
- Accidents: 1
- # Accidents: 8

Scale - 1:8000

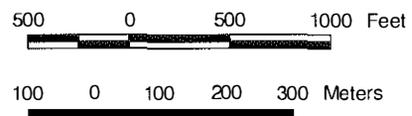


Table 2: Accident Types along Graves County Truck Route

| | <i>Non-Truck Accidents</i> | <i>Truck Accidents</i> | <i>Percent Trucks</i> |
|-----------------|----------------------------|------------------------|-----------------------|
| Total | 20 | 1 | 4.8 |
| Fatal Accidents | 0 | 0 | 0.0 |
| Injury | 7 | 0 | 0.0 |
| Intersection | 15 | 1 | 6.3 |

3.3 Cross Section Features

Figures 5 and 6 illustrate the sections of the route with different lane widths and shoulder types, respectively. Macedonia Road has only 10-foot lanes and 2- to 4-foot turf shoulders, both of which are “less than adequate”. US 45 has “adequate” 11-foot lanes and “less than adequate” 2- to 4-foot turf shoulders. US 45B has “preferred” 12-foot lanes (the ramp portions have 16-foot lanes) and the southern portion (milepost 0 – 0.69) has “less than adequate” 5-foot turf shoulders. The northern section (milepost 0.69 – 0.96) has “adequate” 10-foot turf shoulders.

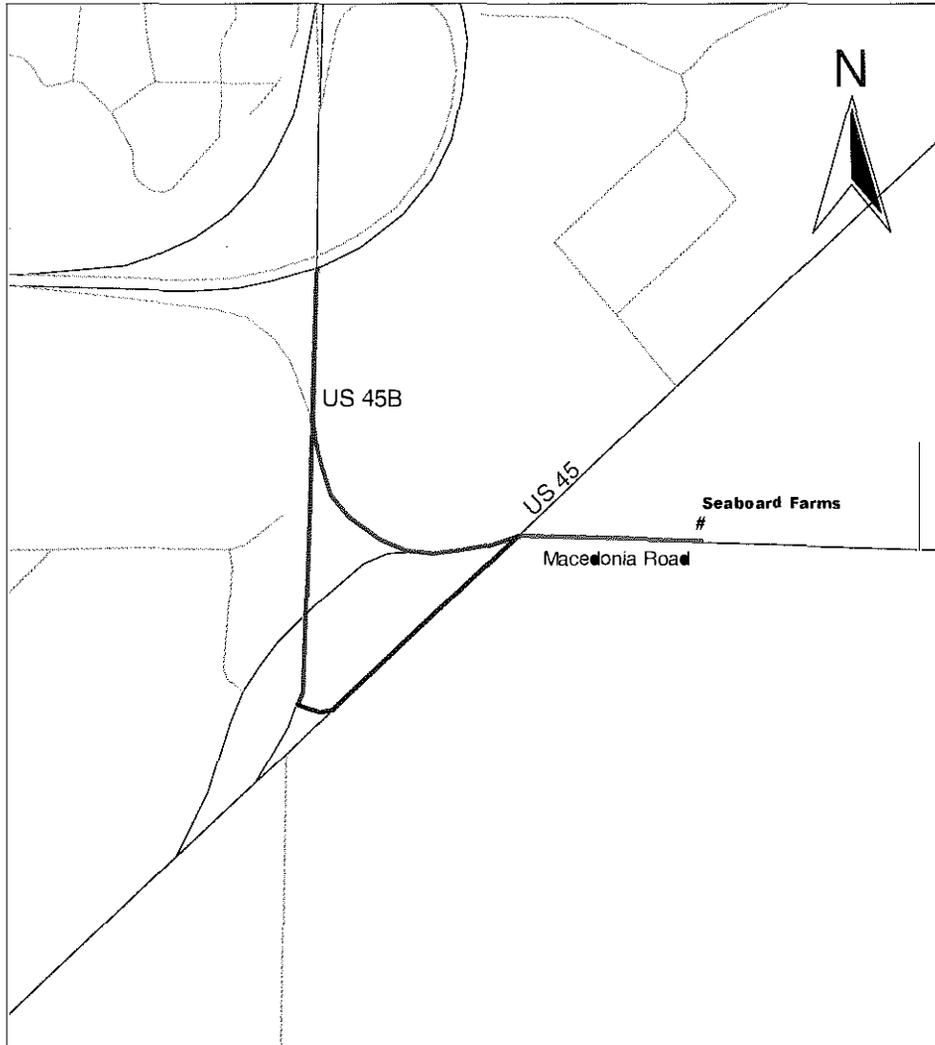
There are no inadequacies in clear zone along the route’s length. Pavement along all route sections was in good condition, with the exception of the turning bay from US 45B to US 45. Pavement along the northern side of the turning bay is in poor condition.

3.4 Curvature Features

If a truck is incapable of remaining in its own travel lane, then the roadway segment is “less than adequate”. There are no problems associated with offtracking along this route.

One left-turning radius (shown in Figure 7) was observed as being problematic for trucks. The intersection of US 45 and Macedonia Road has a sharp left-turning radius for trucks (turning left from southbound US 45). During the site visit for data collection, trucks were observed encroaching into opposing lanes in order to make the turn onto Macedonia. This intersection is not problematic for right-turning trucks. However, it is still “less than adequate” for the purposes of this study.

Figure 5: Lane Widths



LEGEND

| # | Facility |
|---|---------------------|
| — | Lane Width: 10 Feet |
| — | Lane Width: 11 Feet |
| — | Lane Width: 12 Feet |
| — | Lane Width: 16 Feet |

Scale - 1:8000

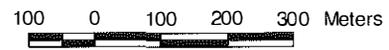
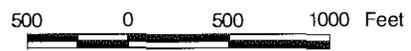
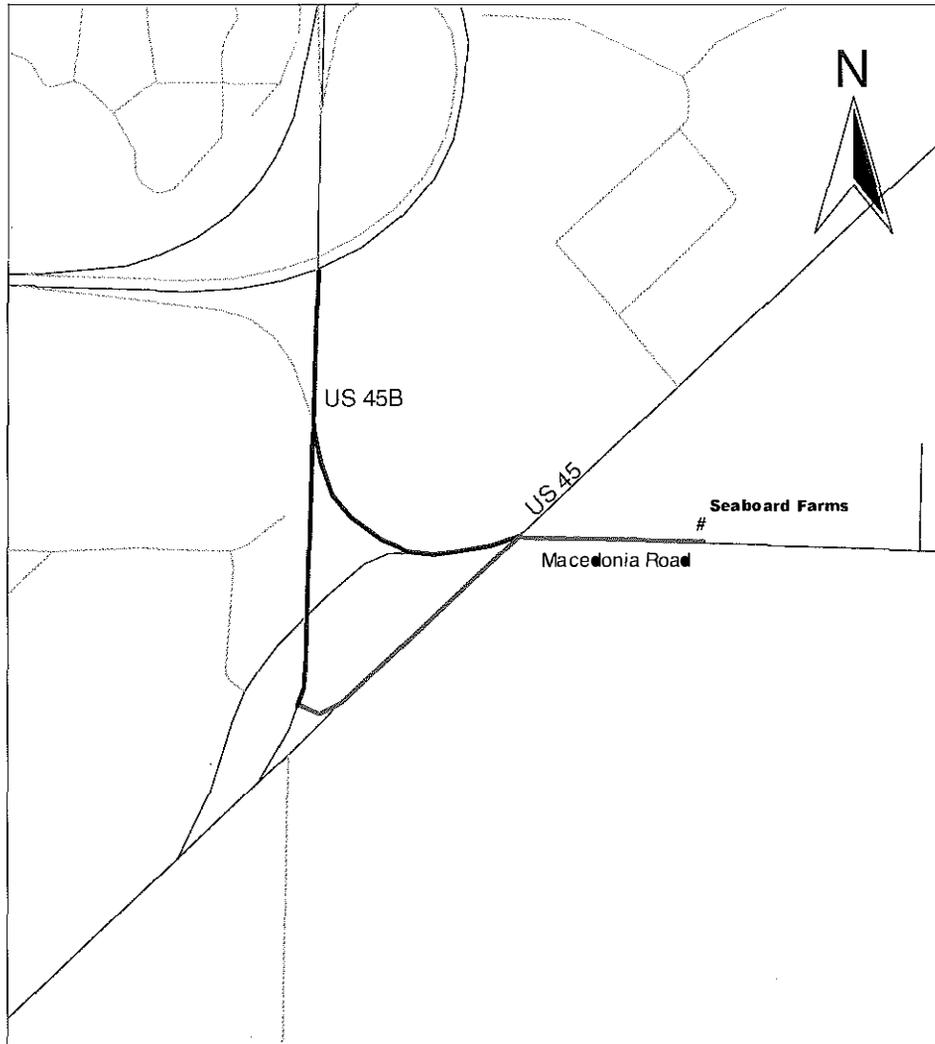


Figure 6: Shoulders



LEGEND

- # Facility
- Shoulder Width: 2-4 Feet
- Shoulder Width: 5 Feet

Scale - 1:8000

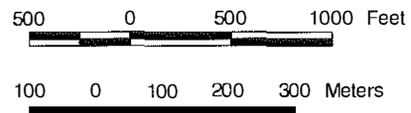
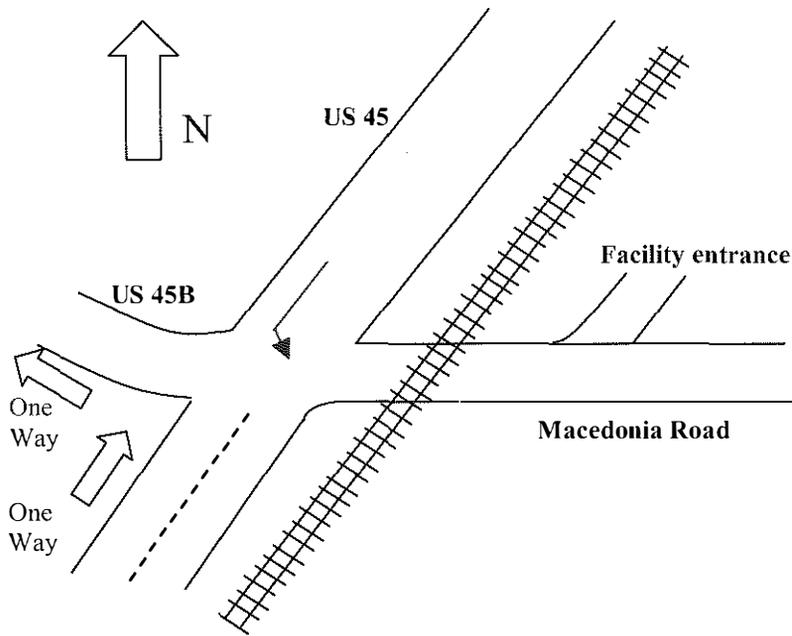


Figure 7: Intersection of US 45 and Macedonia Road



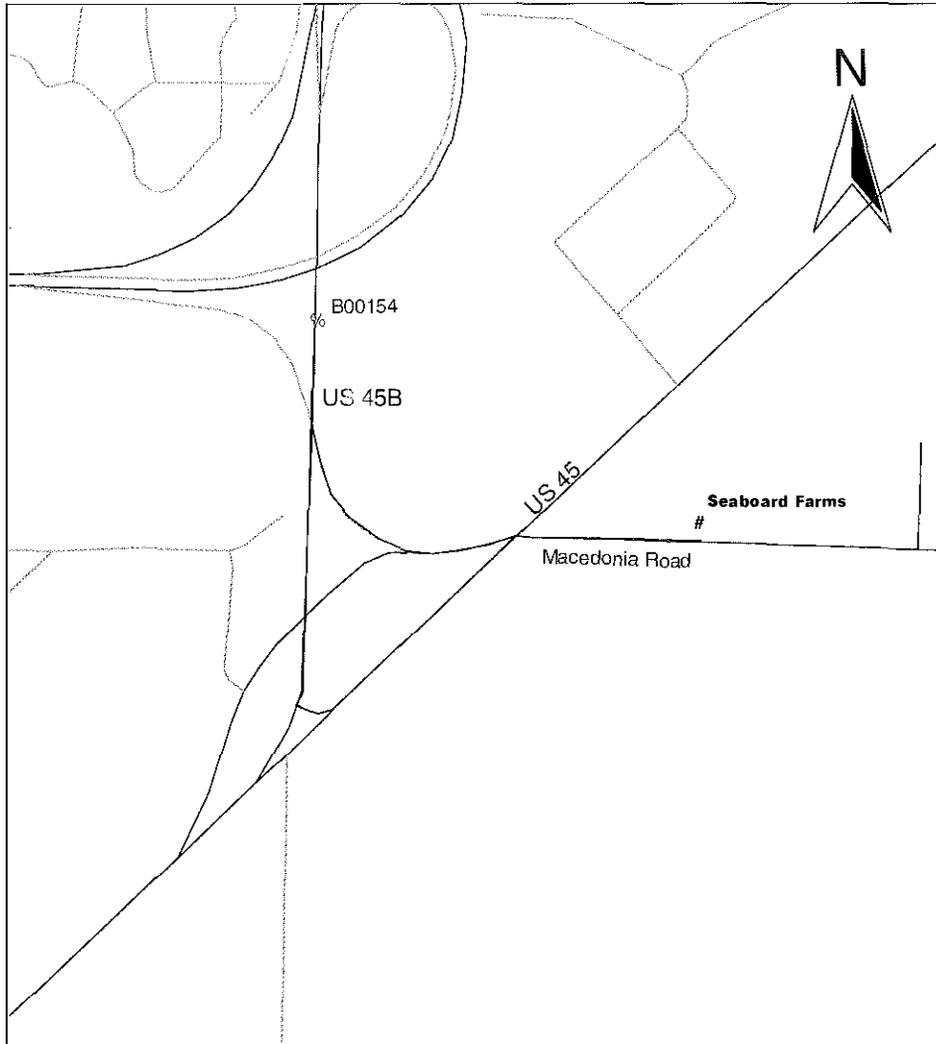
3.5 Railroad Crossings

There is one at-grade railroad crossing along this route. The crossing is on Macedonia Street immediately west of its intersection with US 45 (see Figure 7). There are no problems with sight distance at this crossing and warning lights (but no gates) are present. The crossing surface is in good condition. One potential problem with this crossing is its proximity to the stop-controlled intersection of US 45. When a train is passing over the crossing, traffic can back up on US 45 and/or Macedonia Road. A semi-trailer can not be waiting at the stop bar at the end of Macedonia because the trailer would back up onto the tracks. However, given the character of the area and the long tangent available for sight along the tracks, trucks should have adequate warning before a train enters into the area. Thus, the crossing is not problematic and is considered to be “preferred”.

3.6 Bridges

There is one bridge on US 45B, shown in Figure 8. The Kentucky Transportation Cabinet’s Division of Operations maintains a database of bridge sufficiency ratings that are based on the serviceability (as well as other factors) of the structure. This bridge, located just south of the Purchase Parkway, received a sufficiency rating of 76.1 which is considered “adequate”.

Figure 8: Bridge Location



LEGEND

| | |
|----------|---------------|
| # | Facility |
| % B00000 | Bridge Number |

Scale - 1:8000

500 0 500 1000 Feet



100 0 100 200 300 Meters



3.7 Sight Distance

There are no problems associated with sight distance along this route.

3.8 Other Route Features

The phone survey indicated that trucks sometimes miss the exit from US 45B onto the southbound Purchase Parkway and try to turn back northbound (back onto US 45B) at the intersection with US 45. The left turning bay (pictured in Figures 9 and 10) at this intersection requires very sharp turns to make such a maneuver. In addition, the turning bay does not provide adequate room for storage of trucks making left turns from US 45B onto US 45. The bay is approximately 45 feet in length, which requires that trucks have portions of their trailers remaining in the left lane of US 45B since there is no turn lane or storage queue.

Another route feature worthy of mention is shown in Figure 11. The “No Trucks” sign at the intersection of Macedonia Road and US 45 indicates that Macedonia is closed to through-truck traffic, but the sign can only be seen from southbound US 45. It is believed that the only trucks utilizing Macedonia are traveling to Seaboard Farms’ mill. Truck usage of the route should be clarified and appropriate signs should be installed.

Figure 9: Turning Bay from US 45B onto Northbound US 45

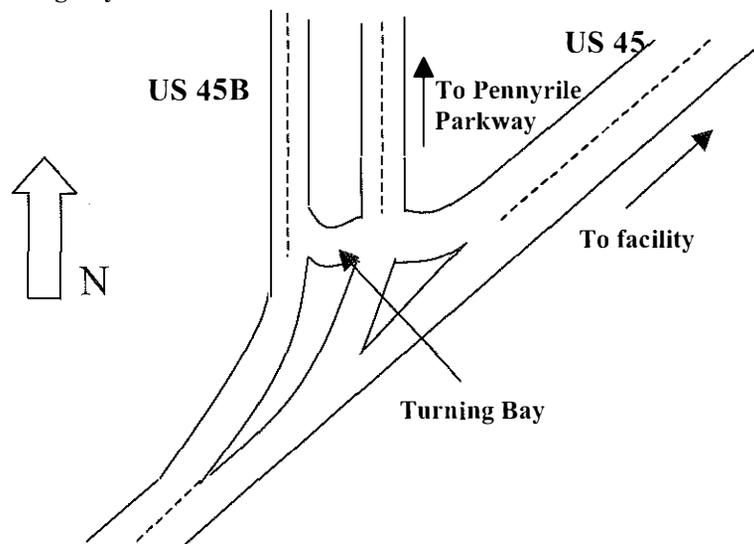


Figure 10: Turning Bay

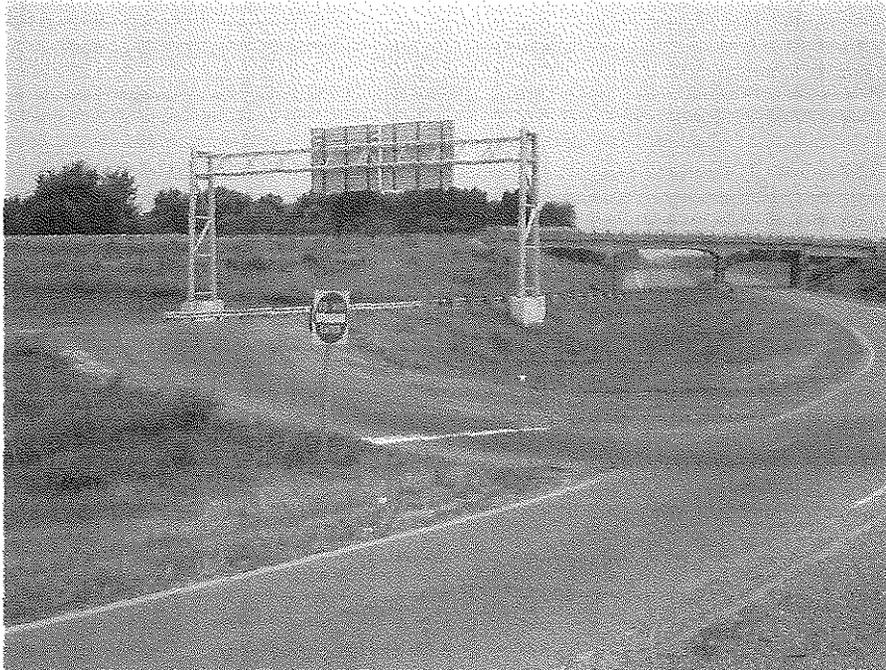
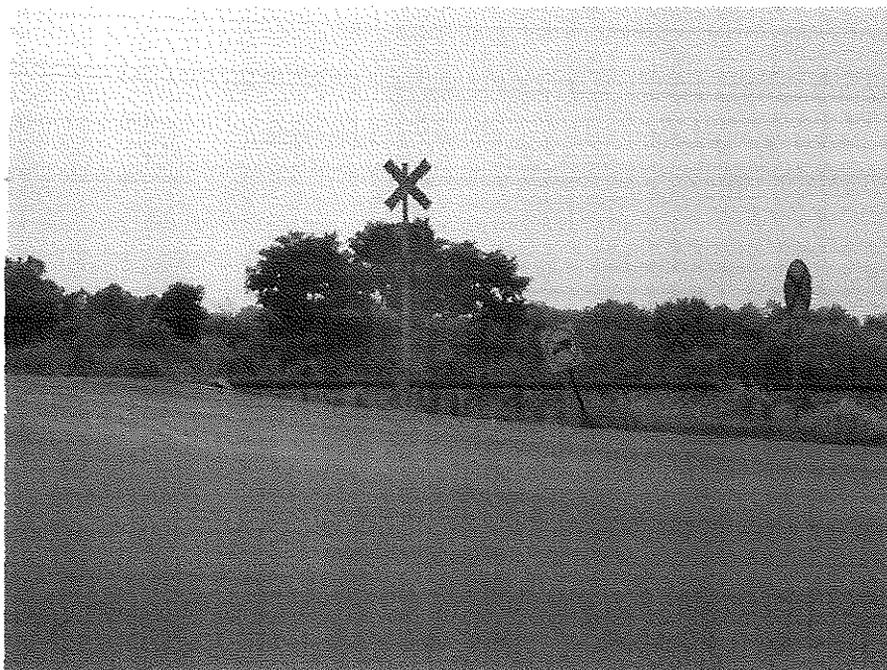


Figure 11: "No Trucks" Sign as Seen from Southbound US 45



4.0 Complete 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 section. In the case of this Graves County truck route, four features (lane width, shoulders, turning radii, and bridges) 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 (as opposed to points) are weighted by 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, turning radii, and bridges along this route. Truck volumes were extracted from classification counts conducted for the KYTC Division of Planning in the summer of 1998. The only exception is Macedonia Road where the truck count is what was indicated in the phone survey. The rating of this route relative to others evaluated will be reported in the final report.

Table 3: Summary of Problem Truck Miles and Points

| Feature | Road | Location | Points* | Length (Miles) | Trucks (/day) | Truck-points | Truck-miles |
|----------------|-----------|--------------------|---------|----------------|---------------|--------------|---------------|
| Lane width | Macedonia | Length | 2 | 0.1 | 130 | | 26.0 |
| | US 45 | MP 14.754 - 14.971 | 1 | 0.22 | 638 | | 140.4 |
| Total | | | | | | | 166.4 |
| Shoulders | Macedonia | Length | 2 | 0.10 | 130 | | 26.0 |
| | US 45B | MP 0 - 0.687 | 2 | 0.69 | 819 | | 1125.3 |
| | US 45B | MP 0.687 - 0.958 | 1 | 0.27 | 819 | | 221.9 |
| | US 45 | MP 14.754 - 14.971 | 2 | 0.22 | 1582 | | 686.6 |
| Total | | | | | | | 2059.8 |
| Turning radius | US 45 | Macedonia | 2 | | 65 | 130 | |
| Total | | | | | | 130 | |
| Bridge | US 45B | B00154 | 1 | | 819 | 819 | |
| Total | | | | | | 819 | |

*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

There are no problems along the route that could be addressed through routine maintenance.

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 Kentucky Transportation Center engineers who are responsible for studying the routes associated with this project devised a scale for quantitatively scoring the route from 1 to 10. The interpretation for this scale can be seen in Table 4. Based on the findings from the various site visits and information obtained from the HIS database, this route merits a score of 8, indicating that minor improvements could improve the route.

4.4 Conclusions and Recommendations

In conclusion, the following problems were identified along the truck access route to the Seaboard Farms mill in Mayfield:

- Less than "preferred" lane widths and shoulders;
- Turning bay deficiencies (southern intersection of US 45B and US 45);
- One less than "preferred" bridge sufficiency rating; and
- One problematic intersection (Macedonia Road with US 45) with problems for left turning trucks.

The intersection of US 45 and Macedonia Road could be improved by widening the lanes on Macedonia so that trucks have more space available to turn into. However, with the railroad crossing so close to the intersection, this may not be feasible. Consideration should be made for placing warning signs on US 45B so that drivers are aware of the turning bay deficiencies. In order to correct the lane width and shoulder problems along this route, complete reconstruction would be necessary. However, the problems associated with lane and shoulder widths are not severe enough to warrant such action.

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 to 5 | Minor improvements are required on this route |
| 6 to 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 |

Appendices

Appendix A: Phone Survey Conducted with Facility Manager

PHONE SURVEY RESULTS

| | | | | |
|---------------------|---------------------------------|------------------------|---------------|------------|
| <u>Facility ID</u> | <u>Facility Name</u> | <u>Location / City</u> | <u>County</u> | <u>ADD</u> |
| 2623 | SEABOARD FARMS KENTUCKY MILL | MAYFIELD | GRAVES | PURCHASE |
| <u>Contact Name</u> | <u>Title</u> | <u>Phone</u> | <u>Fax</u> | |
| DAVID MOORE | | 502-247-9457 | 502-247-9727 | |

1. Is the location of your facility on the map correct? YES
2. Our information shows about 65 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? 42' SEMITRAILER
6. What is the largest truck operating at your facility? 52'-58' SEMITRAILER
7. What type of freight or commodity is shipped, and is incoming and outgoing freight different? *(one may be an empty truck)* IN - BULK FEED INGREDIENTS, OUT - FEED
8. Does the truck traffic peak at specific times of the day? (e.g., out in the morning and return in the afternoon) NO
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 US 45 BYPASS AND US 45 - SB TRUCKS FREQUENTLY MISS EXIT TO PKWY SB AND TRY TO TURN BACK NB (VERY SHARP TURN.)
SB US 45 FROM MAYFIELD - SHARP TURN ONTO MACEDONIA EB TO FACILITY
INTERSECTION KY 121 - KY 440
10. Where do trucks at your facility go to and come from? (This may be an interstate, cities, general direction-N,S,E,W)
11. Do you have any other problems or concerns along the route you would like us to consider?
KY 121 7-8 MILES N OF MAYFIELD, INTERSECTION KY 440, DANGEROUS INTERSECTION, LIMITED SIGHT, AY@ INTERSECTION STOP SIGN ON KY 440
12. Would you like a copy of the final report (roadway/route evaluation ???)YES

NOTES/COMMENTS: