I-40 Trucking Operations and Safety Analyses

And

Strategic Planning Initiatives

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Introduction

Historical Background

In 1955, President Dwight D. Eisenhower proposed a federal super highway system that would transform our nation. This proposal estimated that over twenty-six billion dollars would be spent over a ten-year time span to make this vision a reality.[1] Tennessee has been an integral component of this interstate vision from the beginning. The bill that provided for the construction of the "National System of Interstate and Defense Highways" is often called the Fallon-Gore Act due to the bill being introduced by U.S. Senator Albert Gore, Sr. from Tennessee and Congressman George Fallon of Maryland. The web of federal roads with limited access now makes up a 46,567-mile network.

Interstate 40 composes a major link of this system. This highway is a major east-west freeway that spans a length of 2,559 miles. Interstate 40 originates near I-15 in Barstow, California and then passes through Arizona, New Mexico, Texas, Oklahoma, Arkansas and Tennessee before ending at US 117/NC 132 in Wilmington, North Carolina. Its cross-country journey includes major cities such as Albuquerque, Amarillo, Oklahoma City, Little Rock, Memphis, Nashville, Knoxville, Winston-Salem, Durham and Raleigh. The journey also includes interchanges with eight of the ten primary north-south interstates.

More of I-40 passes through Tennessee than any other state. The total length of I-40 is slightly over 451 miles within the borders of Tennessee as it travels across the plains of west Tennessee, through the rolling hills of middle Tennessee, and exits into North Carolina after traversing over the mountains of east Tennessee.

[1]Adam C. Doupé, "Challenging the Urban Lifestyle: Memphis, Overton Park, and the Interstate 40 Controversy." The Rhodes Journal of Regional Studies III (2006): 86-123.

Strategic Importance

Through a statewide planning effort, I-40 has been identified as a strategic statewide corridor and several projects along the corridor are included in the 10-Year Plan as a high priority[2].

This interstate is strategically crucial to Tennessee whether mobility, efficiency, safety or other factors are being considered. This interstate serves as a major corridor for goods movement within the state and is an integral route for freight movement to and from the state. I-40 connects Tennessee with markets on both the east and west coasts. The highway is a key part of the local, state and national economy. The Interstate Highway System has been called a "linear economy-on-wheels." America's economy has been greatly affected by the interstate highway system and the network has led to important improvements in areas such as economic efficiency and productivity. Interstate 40 increases the speed of travel for both people and freight.

Economic Benefits

In addition, the freeway expands access to all regions of the state. This increase in mobility and time efficiency has lead to large reductions in freight shipping costs.[3] These cost reductions are one of the prime reasons for trucks becoming such a prevalent method of transportation for goods. I-40 has also encouraged economic development throughout the state by making more affordable and developable land easier to access. Tennesseans are provided with lower prices on goods and a larger selection due to the increased retail competition and greater mobility that the interstate provides.

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[2] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies" (Tennessee Department of Transportation 2007) E1.

[3] Wendell Cox and Jean Love, "The US Interstate Highway System: 40 Year Report- Impact on the Economy," June 1996, The Public Purpose, 21 June 2009 < http://www.publicpurpose.com/freeway1.htm#econ>.

When traveling via I-40, the trip from Memphis to Knoxville is approximately 391 miles for a travel time of about 6 hours. If I-40 were not available, the next fastest route from Memphis to Knoxville would be to travel through Huntsville and then through Chattanooga to Knoxville via a multi-state route. This route is about 426 miles long and would take approximately 7 hours and 21 minutes. Likewise, traveling U.S. Highway 70 and other highways that closely parallel the existing I-40 route is a much different traveling experience. This route using only local Tennessee highways travels through many cities and towns. The somewhat similar local highway routing paralleling the current I-40 route from Memphis to Knoxville along Tennessee highways would result in a 410-mile journey taking approximately 8 hours and 17 minutes.

Trucking in Tennessee

Tennessee is bordered by more states, eight, than any other state in the United States. Nashville is within a 650-mile radius of half of the population in the nation. Truck deliveries are able to reach 65 percent of all U.S. markets within a one-day trip due to Tennessee's central location. This ability for reduced distribution times equals savings for shippers and is the reason that there are more than 70 large trucking facilities and freight forwarders in the middle Tennessee area. Tennessee is ranked 6th in the nation in ton-miles of freight carried by trucks and the value of commodities carried by truck[4]. Table 1 shows the six top ranking states in terms of ton miles shipped by truck.

[4]Tennessee, Department of Transportation, Long Range Planning Division, "Tennessee Long-Range Transportation Plan: Challenges and Opportunities Draft Report," 20 Aug. 2009 < http://www.tdot.state.tn.us/plango/pdfs/ChallengesOpportunities.pdf>.

Table 1: Ton Miles of Truck Shipments by State for 2002 (millions of ton miles)

Rank	State	Leaving	Entering	Within	Local	Through	**Total**
1	Texas	25,061	29,114	82,239	181	38,349	**174,944**
2	California	22,584	27,560	114,709	1,847	3,545	**170,246**
3	Ohio	20,485	16,249	27,478	618	39,260	**104,089**
4	Florida	10,371	15,835	74,428	936	905	**102,475**
5	Illinois	15,828	12,298	29,653	262	35,928	**93,969**
6	Tennessee	10,875	8,480	23,140	1,064	42,170	**85,729**

Source:http://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/tonmiletrckstat2002.htm

Note that of the top six states highlighted in Table 1, Tennessee would rank first in “Through” millions of ton miles.

Tennessee’s prime location as a hub for truck activity relates to Tennessee’s central geographic location illustrated in Figure 1. Trucking is an important industry to the state as over 10,600 for-hire and private interstate trucking businesses call Tennessee home and these businesses employ 4 percent of the state’s population. Trucking is also vital to the state as a means of providing supplies to 85 percent of the states’ communities that are only accessible via truck.

Figure 1: Map of Tennessee in Relation to Bordering States

Source: Google Maps

Despite the advantages afforded by a high level trucking route, the number of trucks on Tennessee's interstates is a growing concern. The amount of commercial trucks on the road has been increasing at a rate much more rapid than that of automobiles. Currently, multi-unit trucks make up anywhere from 4% to 38% of the total traffic on Interstate 40 in Tennessee based on TRIMS data. The Federal government has predicted that a doubling of freight flows is likely in the next twenty years. Estimates for I-40 have warranted similar results in terms of the growth in truck volumes. Ironically, our nation's highway system has fueled the growth of the trucking industry since it doubled the average distance trucks could travel in a day to approximately 500 miles.[5] Figure 2 shows the intensity of truck traffic traveling along the highways of Tennessee per an earlier 2003 transportation study.

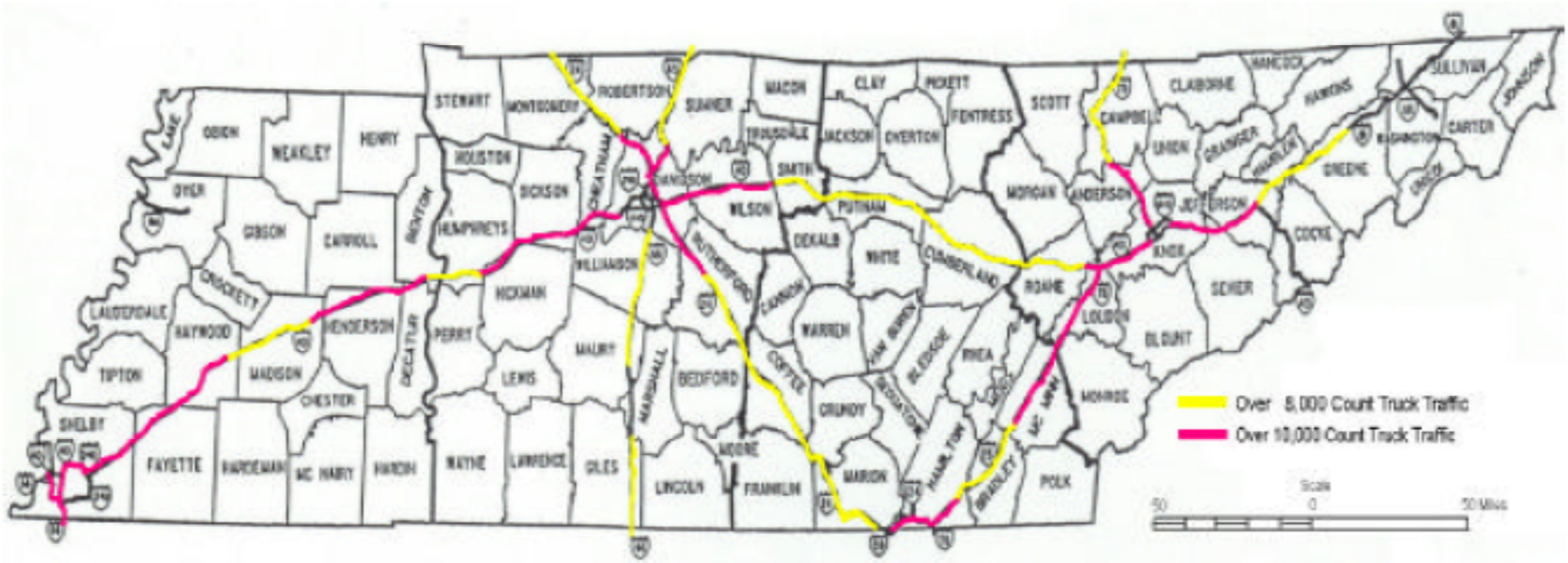
I-40 Truck Issues: Congestion, Safety, Air and Noise Pollution

Trucks are an important factor in transportation planning due to their resulting impacts on highways with regards to traffic volumes, safety, environmental impacts and roadway wear. The growing number of trucks on this interstate intensifies these impacts. The proven linkage between the number of trucks on the highway and traffic congestion makes trucks a major concern. This increase in congestion leads to delays and even breakdowns in the flow of traffic. Approximately 60 percent of I-40 is predicted to have a LOS D by 2020. This includes 149.66 miles of rural interstate and 89 miles of urban interstate for a total of 239 miles.[6]

[5] Joseph Bryan, Glen Weisbrod, Carl D. Martland, and Wilbur Smith Associates, NCHRP Report 586: Rail Freight Solutions to Roadway Congestion Final Report and Guidebook (Washington: Transportation research Board, 2007) 8.

[6] Don Breazale & Associates and Carter & Burgess, *Tennessee Rail System Plan Task 8: Evaluation of Rail Infrastructure Proposals-Basic Freight Rail Connection Project 1, Scenario A East-West Rail Connection,* Tennessee Department of Transportation, 2002, 4.

Figure 2: Daily Truck Traffic Flows on Tennessee Interstate Highways



Source: Tennessee Rail System Plan, Task 11, p. 1

Another reason trucks play a key role in planning is their involvement in a large percentage of fatal crashes. The recent tragic, multiple fatalities resulting from a tractor-trailer crashing through a cable barrier near Munfordville, Kentucky on I-65 north of Tennessee is a sobering reminder of this responsibility. What if this horrific crash had occurred in Tennessee? Safety along I-40, and all of Tennessee's interstates, is paramount.

Heavy duty, diesel-powered trucks also produce emissions of regulated pollutants at levels that vary from those of automobiles, but most people are surprised to learn that they are not always more taxing on the environment than automobiles. A 2005 model test run of the MOBILE6.2 Model for 2002 automobiles and heavy-duty trucks showed the Table 2 results for three critical pollutant emissions of volatile organic compounds (VOCs), nitrogen oxides (NO_x), and carbon monoxide (CO) in terms of grams emitted per mile for each vehicle type.

TABLE 2: Typical Vehicle Pollutant Levels

Pollutant	Grams/mi for Automobile	Grams/mi for Heavy Diesel truck
VOCs	1.4	0.9
NO_x	1.2	20.8
CO	14.2	5.0

Source: EPA MOBILE 6.2 runs reported by FHWA (http://www.fhwa.dot.gov/environment/aqfactbk/page15.htm)

Thus by this simple 2005 EPA test, heavy-duty trucks are major NO_x emitters over automobiles by a factor of about 17, but heavy-duty diesel trucks actually perform better than the automobile in the two other emission categories of VOCs and CO.

An additional issue is that trucks impart higher noise impacts to the surrounding environment. Noise levels to humans using the decibel-A weighting scale show sound energy levels in the ranges of 70 dBA for a passenger car, 80 dBA for a medium truck and 90 dBA for a heavy-duty truck. Each 10 dBA increase equates to an approximate doubling of the noise heard by the human ear. Thus a medium truck is approximately twice as loud as a passenger car and a heavy-duty truck is approximately four times as loud as a passenger car.

Trucks also take a toll on the roadway physically since they cause accelerated wear of the road's surface materials and additional stress on bridges because of their greater loadings. The force and number of axle loadings have a direct impact upon pavement and bridge life cycles. Equivalent single axle loads (ESALs) convert wheel loads of various magnitudes and repetitions to an equivalent or standard load. The commonly used standard load is the 18,000 pound equivalent single axle load (ESAL).

Over simplification of ESALs and their improper use can result in misleading conclusions. However, ESALs for automobiles are thought to be in the range of 0.0003-0.007 ESALs, while heavy duty, fully loaded trucks can have factors from 1.0-1.35 upward. Regardless of the exact order of magnitude of a truck's load imparted to pavements or bridges during loadings, both the size and volume of trucks traveling along a highway such as I-40 will significantly reduce the life of both pavements and bridges. Infrastructure wear and replacement costs are important factors that must be considered and monitored.

Evolution of I-40 Corridor in Tennessee

Construction of I-40 in Tennessee has spanned decades. The Mississippi River Bridge, which carries traffic from West Memphis, Arkansas to Memphis, Tennessee, opened for traffic in October of 1973.

Construction of I-40 in Tennessee also faced some challenges along the way. One of the major issues that arose during its construction was the routing concerns in Memphis regarding Overton Park. The issue polarized Memphis from the 1950s to the 1980s and caused a great delay in the construction of the interstate in that area. The debate led to a court case that went all the way to the Supreme Court and ended in an eight to zero decision in favor of the Citizens to Preserve Overton Park.[7] The result was that I-40 was rerouted onto the northern half of the Memphis beltway. The circuitry and geometric changes resulting from this Supreme Court decision are apparent today to I-40 motorists because of the geometric differences when compared to other nearby sections of I-40.

The National Environmental Policy Act of 1969 was passed during the time of the Overton Park dispute and had a definite bearing on the outcome of the decision to reroute I-40. This landmark legislature created new requirements that state agencies had to fulfill regarding environmental impact studies before beginning projects. The Federal Aid Highway Act of 1966 and the Department of Transportation Act also affected the outcome of this case.[8]

The Tennessee portion of I-40 spans approximately 451 miles. The highway passes through 24 of Tennessee's 95 counties and its route includes cities such as Jackson, Lebanon, Cookeville, Crossville and Newport in addition to the major cities of Memphis, Nashville and Knoxville. There are five interchanges with other interstates within the Tennessee borders. These intersections include I-55 in Memphis, I-24 and I-65 in Nashville, I-75 around Knoxville, and I-81 near Dandridge. Four major spur routes also occur in the state, which are as follows: I-240 in Memphis, I-440 in Nashville, I-140 in Farragut, and I-640 in Knoxville. Construction of I-840 in Nashville is currently under construction. I-40 begins in

[7] Doupé 86.
[8] Doupé 111.

Shelby County in the western part of the state and exits the state through Cocke County to the east.

Interstate 40 is the heaviest traveled interstate highway in the state. The title of heaviest traveled was derived from the fact that portions of I-40 have the heaviest AADT of any Tennessee interstate segment. There are multiple sections that experience AADTs of over 120,000 vehicles. Some of the most traveled segments of I-40 are shown in Table 3.

Table 3: Most Traveled Segments of I-40 in Tennessee

Location	County	2002 AADT
Fairfield Ave./ Hermitage Ave. to Fesslers Ln.	Davidson	167,990
I-24 to Fairfield Ave./Hermitage Ave.	Davidson	160,440
Papermill Rd. to I-75	Knox	150,020
Walker Springs Rd. to Papermill Rd.	Knox	150,020
Cedar Bluff Rd. to Walker Springs Rd.	Knox	144,110
Fesslers Ln. to I-24	Davidson	141,520
Pellissippi Pkwy, to Cedar Bluff Rd.	Knox	133,310
Sam Cooper Blvd. to Sycamore View Rd.	Shelby	130,190
Broadway to I-65 S.	Davidson	121,710

Source: Tennessee's Most Traveled Roadways: 2002

A large number of truck trips originating in Tennessee are heading for some of the state's top trading partners, which include the neighboring states of Kentucky, Mississippi, Georgia and Alabama. Increased truck traffic to the West coast has lead to predictions that California will become Tennessee's second most important trading partner, trailing only Kentucky. The 2035 prediction is that

Kentucky will represent ten percent of Tennessee's interstate trade, while California will represent nine percent[9].

Geometry

Interstate 40 ranges from a four-lane cross-section to an eight-lane cross section across the state of Tennessee. The general elevation trend for I-40 across the state is that it increases as you travel eastbound.

Segments of I-40 that do not meet the maximum steepness and minimum length of grade requirements, as set forth by *A Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway and Transportation Officials (AASHTO). These segments were identified in the previous Parsons` Brinckerhoff Study. Table 4 identifies mile marker locations from Appendix A of this research that equaled or exceeded 3 percent slope along Tennessee's segment of I-40.

Portions of I-40 include managed lanes. The first High Occupancy Vehicle (HOV) lane was opened in 1993 in the Nashville area and HOV lanes are now present on additional Nashville and Memphis sections of I-40. . In the Nashville area, HOV lanes are present in Davidson County beginning at the airport entrance and continuing to the Wilson County line. The HOV lanes then continue within Wilson County until the Mt. Juliet Interchange (SR177). The total length in both directions for these HOV lanes is 20.4 miles. In the Memphis area, the HOV lanes occur in Shelby County and begin at Sycamore View and end at US 64 for a total length of 13.0 miles.

[9] Office of Freight Management and Operations, *Freight Shipments To, From, and Within Tennessee*.

TABLE 4: I-40 Mile Segments with ≥ 3 Percent Slope*

Mile Marker	% Slope	County
145	+3.97	Humphreys
163	-3.10	Hickman/Dickson
184	-3.63	Williamson/Cheatham
219	+4.20	Davidson
289	+3.90	Putnam
290	+3.90	Putnam
291	+3.90	Putnam
292	+3.90	Putnam
322	-3.03	Cumberland
337	-4.50	Cumberland
349	+3.30	Roane
366	+3.46	Loudon

***NOTE: Negative or positive slope is representative of eastbound direction only since eastbound and westbound slopes are typically equal in magnitude, but opposite in slope direction.**

SOURCE: Compiled from Appendix A

Truck Volumes and Growth Rates

The 2002 Economic Census identified the following categories for trucks[10]:

- Light: average vehicle weight is 10,000 pounds or less
- Medium: average vehicle weight is 10,001 to 19,500 pounds

[10] United States, Department of Commerce, Bureau of the Census, *Vehicle Inventory and Use Survey: Tennessee,* (US Census Bureau, 1999).

- Light-Heavy: average vehicle weight is 19,501 to 26,000 pounds
- Heavy-heavy: average vehicle weight is 26,001 pounds or more.

Trucks move 90 percent of freight, in terms of shipment value, within the state of Tennessee and between 71 and 77 percent to and from the state.[11]

A study was conducted identifying the average speeds of trucks on Interstate highways based on data collected from January until March of 2008. I-40 was found to have a national average speed of 56.29 mph. This was the 5th highest average of the 25 Interstates that were studied. Average truck speeds for other interstates that had mileage in Tennessee are shown in Table 5.

Table 5: Average Trucks Speeds on United States Interstate Highways: January-March 2008

Interstate Route	Average Operating Speed (mph)
24	55.37
40	56.29
65	57.42
75	55.53
81	53.91

Source: Federal Highway Administration: Freight Management and Operations

Much of I-40 in Tennessee boasts speed limits of up to 70 mph, which is higher than a majority of states. The higher speed limit has the largest effects on trucks in the eastern part of the state due to the steeper grades. In these areas, trucks have a harder time maintaining the average speed, especially one that is so high.

[11] Office of Freight Management and Operations, *Freight Shipments To, From, and Within Tennessee*.

This then causes greater speed differentials between truck traffic and other vehicles.

Over the years, many capacity issues have arisen due to the importance of Interstate 40 as a transportation link. The interstate experiences complications in urban areas, at some interchanges, and on steep mountain grades.[12] Another critical issue is the scarcity of truck parking areas and spaces for overnight truck parking.[13] This lack of adequate parking has led to trucks parking alongside the highway overnight or in business parking lots. In some areas of I-40, the daily truck volumes are large enough to warrant the contemplation of truck lane provisions, which will be discussed further in the "Proposed Solutions" section later.

There are even more capacity problems predicted in the years to come based on predicted growth in truck volumes along the interstate. Estimates state that most locations on I-40 will see the doubling of truck volumes between 2003 and 2030.[14] This is consistent with projections from the FHWA Freight Analysis Framework (FAF) that have estimated that the next 20 years will see freight flows double. The growth along I-40 is predicted to be about even across the length of the interstate.[15] Excluding the two most eastern spots that were considered in the model, growth rates will average between 113 and 133 percent over the time span of 2003 to 2030.[16]

Changes in the trucking industry over the last two decades have influenced the increased volumes of trucks that have occurred. Two practices that have been a part of these changes are just-in-time inventory and centralized warehousing.

[12] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies" 3-1.
[13] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies" 3-2.
[14] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies," 5-1.
[15] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies," 5-1.
[16] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies," 5-1.

Just-in-time inventory involves maintaining minimum inventory levels and synchronizing the delivery of goods with production schedules. This practice leads to increases in the frequency of inbound deliveries and the reduction in the size of shipments. There is a heavy reliance on timely receipt of deliveries in this strategy.

Just-in-time inventory practices cause more truck trips to occur, which in turn adds to the congestion on interstates. Centralized warehousing reduces a company's need to maintain inventories and therefore space requirements, storage costs, and shelf loss are affected. This practice also leads to a greater transportation demand, which further taxes the capacity of interstates.

Commodities Transported and Trends

The major commodities being shipped within Tennessee, in terms of value, are machinery, pharmaceuticals and motor vehicles. If the top commodities by weight are also considered, gravel, cereal grains, and fuel oils are also major products being shipped within the state. Some of the top products whose destination is Tennessee are coal, gravel and electronics. Tennessee's major exports include coal, cereal grains and pharmaceuticals. Table 6 shows the ranking of top commodities when both value and weight are considered. Foreign trade makes up about 5 percent of Tennessee's commerce in terms of millions of dollars shipped.

Safety and Crash Issues

A majority of injuries due to the transportation of freight occur via highways or railroads. While the number of injuries has been decreasing over the last three decades, there is still ample room for improvement. Table 7 shows the trends in the number of injuries per year categorized by the mode choice.

Table 6: Top Commodities Transported in Tennessee by Value and Weight: 2002

	From State		To State		Within State	
	Tons (millions)	Value ($ millions)	Tons (millions)	Value ($ millions)	Tons (millions)	Value ($ millions)
Gravel	62.4	56,562.7	73.7	21,409.7	60.2	16,260.6
Nonmetallic mineral products	12.8	24,931.6	23.4	20,468.1	33.4	8,478.7
Cereal grains	12.1	23,773.2	13.4	19,014.9	18.0	6,229.9
Fuel oils	8.4	20,233.4	10.3	14,727.9	17.4	5,563.8
Waste/scrap	5.7	19,289.4	6.2	14,057.7	16.9	4,882.7

Source: Office of Freight Management and Operations

Table 7: Injured Persons by Freight Transportation Mode: 1980-2007

	1980	1990	2000	2006	2007
Highway (passenger and freight)	NA	3,230,666	3,188,750	2,575,00	2,491,000
Large truck occupants**	NA	41,822	30,832	23,000	23,000
Others injured in crashes involving large trucks	NA	108,000	109,000	83,000	NA
Railroad (passenger and freight)	62,246	25,143	11,643	8,630*	8,960
Total Injured persons for all freight modes (highway, railroad, waterborne and pipeline)	NA	NA	3,259,673	2,604,648	NA

NOTES: * Revised Value

** Large trucks are defined as trucks over the 100,000-pound gross vehicle weight rating, including single-unit trucks and truck tractors.

Source: Federal Highway Administration – Freight Management and Operations, http://ops.fhwa.dot.gov/freight/freight_analysis/natfreightstats/docs/04factsfigures/table5_2.htm)

Certain locations along I-40 have historically experienced higher rates of incidents. Some of these locations are near Silver Point, TN (approximately mile marker 275), southeast of Downing Creek (approximately mile marker 315), and just west of Sharon (approximately mile marker 104). Grade or vertical roadway slope might be a factor in contributing to the crashes in two of the above mentioned three locations. The section of Interstate 40 near Downing Creek has some of the steepest grades the interstate experiences in Tennessee and the section near Silver Point also has steeper than average grades.

However, grade is not a factor in the higher crash rate for the section of I-40 near Sharon, TN. This section has a grassy, unraised median, but no barrier separates the opposing lanes of traffic. This location is worthy of further investigation regarding the installation of a median barrier to reduce the possibility of head-on collisions. There is also limited or no guardrail in this section which might also be a factor in contributing to the higher crash rate.

The higher than normal incident rates in these areas are most likely attributable to the steep grades and curves present at these locations. The steep grades lead to greater speed differentials between trucks and autos, which has been shown to increase the likelihood of incidents. Couple greater speed differentials with large differentials in vehicle mass, and incidents involving both trucks and autos tend to be the most severe in terms of injury, fatalities and property damage.[17]

Wet and icy road conditions are also factors that lead to increased incidents. There are roadway sections with varying topography, especially in the Gorge area and Cumberland Plateau, which are more prone to incidents during wet or icy weather. Inclement weather also causes increased safety issues at many of

[17] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies," 5-2.

the major river crossings in the state, such as the Tennessee River, Percy Priest Dam, and the Holston River[18].

Table 8 indicates the growing number of large trucks involved in fatal crashes occurring in the state of Tennessee. This trend seems to mirror the growing number of trucks on the state's interstates. This is worrisome since one logical conclusion is that as the number of trucks on the interstates increase, so will the number of fatal crashes involving large trucks. This could also translate into a higher number of total fatalities per year.

Database

The purpose of the databases created for this study was to help analyze operational and safety characteristics that affect trucking and the general vehicle population on I-40. The database divides the interstate directionally in an effort to better understand the issues that are present and to also account for areas where I-40 does not follow adjacent or side by side alignment for both the eastbound and westbound directions.

The databases have been broken down into six appendices at the end of this research report and are labeled as follows:

A. Eastbound I-40 Geometry
B. Eastbound I-40 Operational Characteristics
C. Eastbound I-40 Safety
D. Westbound I-40 Geometry
E. Westbound I-40 Operational Characteristics
F. Westbound I-40 Safety.

[18] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies" 3-2.

Table 8: Large Trucks Involved in Fatal Crashes in Tennessee: 1995-2005

Year	Number of Large Trucks
1995	115
1996	165
1997	130
1998	133
1999	168
2000	157
2001	129
2002	130
2003	113
2004	141
2005	143

Source: National Highway Traffic Safety Administration, Fatality Analysis Reporting System (FARS).
http://www.fmcsa.dot.gov/facts-research/research-technology/report/Large-Truck-Crash-Facts-2005/tbl22.htm

This was done in order to look at the three major areas of geometry, operational characteristics, and geometry in both eastbound and westbound directions through the common denominator of mile marker. One mile increments were chosen due to the extensive length of the interstate and also the ease of comprehension. The categories of information to be included were decided based on the following inquiries:

1. What was thought to help users best understand the roadway at different locations?
2. What information seemed critical to properly evaluate the effect of trucks on the interstate?

3. What information would most aid planning decisions?
4. What data were available?

The database relied on TDOT TRIMS data and used a weighted average method to determine values for each one-mile increment. For example, if the following values existed for an area of I-40:

Beginning Log Mile	Ending Log Mile	Grade
0.00	0.33	+2.0
0.33	0.50	+3.0
0.50	2.00	+1.0

The calculation to determine the average reported grade for this one mile segment would be as follows:

$$(0.33 \times +2.0) + (0.17 \times +3.0) + (0.5 \times +1.0) = \textbf{+1.67 \% Grade}$$

Similar calculations were performed for each the 451 miles of I-40 within Tennessee.

Proposed Solutions

The following discussions highlight a host of strategies and improvements that may merit further study. Each section will attempt to provide some background information on the possible solution and implementation guidance.

Reduction of Weigh Station Truck Queues

One capacity issue that has been identified is the length of lines at weigh stations. This issue causes a safety hazard since trucks can back-up onto the interstate highway if the weigh station's off ramp is not long enough. This can

also lead to trucks getting to by-pass the weigh station due to long lines and thus possibly be more of a subsequent threat due to them being overweight or because of other unchecked, safety issues.

The earlier Parsons Brinckerhoff study cited two recommended improvements along I-40 involving weigh station locations. These included the lengthening of the acceleration/deceleration lanes near Exit 52 in Haywood County, and the extension of the weigh station ramps in Knoxville[19].

The installation of weigh-in-motion sensors at these weigh stations could be very beneficial. The weigh station in Knoxville has already started experimenting with this technology.

The use of WIM devices offers several potential advantages over static weighing. WIM devices decrease the time required to weigh trucks since reasonable highway speeds can be used to weigh a significantly higher number of vehicles in a given period of time. This improves safety by reducing truck lines. This reduction would increase safety for both truck drivers and other vehicles on the road, along with saving trucking companies money. Shorter lines at weigh stations equal less waste of fuel due to trucks waiting in line. Less time waiting to be weighed also translates into an overall reduction in total travel time.

WIM allows increased coverage at lower costs and scale avoidance is thus minimized. This technology would also allow weigh stations to better handle the trucking volumes on I-40 and thus not have to allow as many trucks to by-pass inspection points. Another benefit of WIMs could also be fewer delays on I-40 since there will be a reduction in trucks queuing onto the interstate from the off ramps. And unlike static weighing, WIM can record dynamic axle load information that offers more information than static load weighing.

[19] Parsons-Brinkerhoff, *I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions* (Tennessee Department of Transportation) 3-2.

But WIM does have its disadvantages, too. Slightly reduced accuracy in reported vehicle weights, the collection of less data relating to the reduced processing time, and greater susceptibility to electromagnetic transients (i.e., a fancy term for lightning strike disturbances) are three of these. However, the use of WIM devices appears to be growing in popularity.

For a WIM project in New Mexico, the initial cost of the WIM and installation cost was about $50,000.

Technology Improvements

Many of the safety issues throughout the state on I-40 could benefit from some type of ITS solution. Potential solutions could include traveler information, weather management systems, and variable message signs. The 511 Traveler Alert System is benefiting I-40 travelers, and all Tennessee motorists, by providing current roadway conditions for more informed driver decisions.

The Highway Patrol has also requested more cameras and signs in rural areas along I-40. The overall benefits of these ITS solutions are predicted to be minor. But due to their low cost and relative simplicity to implement, they have benefit-to cost (B/C) ratios that are acceptable. These ITS implementations can also be enacted rather quickly.[20]

Operational Improvements

There are many potential operational improvements that could be studied in more detain within future planning initiatives. These improvements would be more site specific, and could include modifications to interchanges, creation of

[20] Parsons-Brinkerhoff, *I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions* XX.

managed lanes including truck climbing lanes, truck escape ramps, and changes to existing HOV lanes.

Lane Management Techniques and Requirements

The Transportation Research Board Managed Lanes Committee defines managed lanes as "dedicated lanes or roadways that optimize performance and throughput by offering travel time savings and reliability through the application of management strategies including pricing, vehicle eligibility, and access control." In the past, managed lanes had been viewed from a passenger optimization standpoint, but there has been more consideration recently regarding the movement of freight[21].

There are a few different types of managed lanes, such as high occupancy vehicle (HOV) lanes, high occupancy toll (HOT) lane, truck-only lanes (TOL), or truck-only toll (TOT) lanes.[22] Operation choices for these lanes include full-time or part-time. If a managed lane is operated part-time, the lane becomes a general-purpose lane during non-peak demand times. The offering of more than one choice of service along a roadway is called multiclass service. This multiclass service usually entails the two types of services being separated by some sort of barrier and features limited access and outlet points.

Lane management by pricing

The idea of pricing as a method of congestion mitigation has been recommended for decades, but the actual implementation of this method has only occurred recently. This mitigation strategy is still considered an emerging policy due to the lack of application. Congestion pricing, or value pricing, strives to lessen the volume of vehicles on the road to an optimal level, typically considered LOS C,

[21] I Parsons-Brinkerhoff, *I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions* 3-5.
[22] Parsons-Brinkerhoff, *I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions* 3-6.

on each roadway. The pricing is evaluated on multiple factors including total travel demand on the segment and the quality of travel options.[23] There is currently a law in Tennessee prohibiting the tolling of motorists using existing interstate lanes. This law would make high occupancy toll (HOT) lanes and truck only toll (TOT) lanes illegal without a change to state law.[24]

Lane addition requirements

Managed lanes would require the widening of the roadway to add additional new lane(s) since existing general purpose lanes have never been converted to managed lanes successfully.[25] Past conversions of existing lanes have caused resultant decreases in levels-of-service for the remaining general-purpose lanes. This has incited resistance from both the public and political sectors. This reduction in level-of-service is due to the division of the original existing lanes into a multiclass service interstate. The reductions in levels-of-service accompany the reductions in flexibility, driver choices, and resulting restricted lane uses whereby all vehicles cannot use all existing lanes.

Level of service impacts

Another drawback of managed partitioning is that they tend to decrease the overall throughput of the highway due to two factors. The first is that lane changing is now somewhat restricted because of the partitioning and thus vehicle spacing increases creating lower vehicle densities and lower throughput capacities due to the greater spacing of vehicles. A second negative factor observed in the portioning is that the addition of the divided highway lanes has increased the susceptibility of the non-priced or free lanes to vehicle breakdowns

[23] Todd A. Litman and Erick Doherty, *Transportation Cost and Benefit Analysis: Techniques, Estimates and Implications,* 2nd ed., Victoria Transport Policy Institute.
[24] Parsons-Brinkerhoff, *I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions* 3-11.
[25] Parsons-Brinkerhoff, *I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions* 3-12.

since a vehicle breakdown is more difficult to bypass and more likely to inhibit the roadway capacity when fewer lanes are available.

High occupancy truck (HOT) lanes

For Memphis, the idea of HOT lanes has been considered in the past as a long-term strategy to address the growing amount of truck traffic on I-40. These managed lanes have been proposed as either two-separated directional lanes or two reversible lanes situated in the median.[26]

Truck only lanes (TOLs)

TOLs could be a good solution in areas where vehicle speed and weight differential pose a problem. The decision on whether to implement TOLs should be based on multiple factors, such as accessibility and mobility, safety impacts, regulatory concerns, cost-effectiveness, regional benefits, operational characteristics and environmental sensitivity. Truck lanes provide a capacity ranging from 800 to 1,000 trucks per hour.[27] These lanes can be at grade or above interstate grade, but the former is often preferred since at grade is more economical to construct and poses less safety issues.

Truck lane restrictions and truck climbing lanes

One specific application of a TOL is to implement truck climbing lanes. Rolling terrain, such as that seen in much of the eastern part of Tennessee, has a tendency to produce roadways with steeper grades. These steeper grades cause truck speeds to fall below the average speed of cars on the roadway and create an environment in which trucks operate at crawl speeds. When trucks are

[26] Parsons-Brinkerhoff, *I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions* 3-12.
[27] Source #3

traveling on roadway sections that are upgrades, their speeds usually decrease at least 7 percent compared to their operation speeds on level roadway sections.

The maximum speed that a truck can maintain while traveling on an upgrade is determined mostly by three factors relating to:

1. the length of the grade,
2. the steepness of the grade, and
3. the gross vehicle mass divided by the engine power.

Additional aspects that can effect a truck's average speed during the entirety of an uphill climb include:

1. entering speed,
2. wind resistance, and
3. skill of the operator.

The difference between truck and car speeds on upgrades is intensified by the speed difference of the two types of vehicles. A large truck occupies about 130 to 220 percent of the roadway space that the typical passenger car does depending on the average velocity of the car. The affect of trucks on roadway congestion can also be represented by Passenger Car Equivalents (PCEs). Under base case conditions (level, multi-lane highway) a large truck is equivalent to 1.7 PCEs. If the multi-lane highway has steep grades or grades for extended periods, the reduction in trucks' speeds will cause an increase in the factor to around 8 PCEs.[28]

Besides creating speed differentials that can lead to congestion problems, upgrades can also create unsafe environments. Multiple studies have proved that there is a correlation between how much a vehicle's speed varies from the

[28] Joseph Bryan, Glen Weisbrod, Carl D. Martland, and Wilbur Smith Associates, NCHRP Report 586: Rail Freight Solutions to Roadway Congestion Final Report and Guidebook (Washington: Transportation research Board, 2007) 12.

average vehicle speeds for that roadway segment and the vehicle's chances of becoming involved in a collision.

"Truck climbing lane(s)" is the more well known and common term for one type of truck lane restrictions used on upgrade roadway segments. Truck climbing lanes can provide a method to ease congestion and reduce safety risks on upgrades. Reasons to construct a truck climbing lane are based on certain criteria as follows:

- The upgrade traffic volumes are more than 200 vehicles per hour.
- The upgrade truck volumes are more than 20 trucks per hour.
- One of the three following issues are present:
    - A typical heavy truck is expected to experience a decrease in speed of at least 10 mph (15 kph).
    - The level of service for the upgrade section of the roadway is either E or F.
    - The level of service declines by two or more levels from the approach section to the upgrade portion.

If truck climbing lanes are found to be warranted and the choice is made to construct them, there are a few guidelines that should be followed. The truck climbing lane should optimally be the same width as the current through lanes available to all traffic. They should also be constructed as to be clearly identifiable as an extra lane in one direction. In order to ensure that the truck climbing lanes get utilized and thus provide a better driving environment for both trucks and cars, a satisfactory number of signs indicating the presence of a truck climbing lane should be installed. The signs can display messages such as "Slower Traffic Keep Right" or "Trucks Use Right Lane."

Improved Signing

Another proposed solution to combat safety issues with trucks would be to place more truck advisory signs and speed warning signs across the state.[29] Alerting truck drivers to potential hazards would aid in reducing incidents across the state. Another beneficial action would be to include signs pertaining to the reduction of truck speeds when roads are wet or icy. This could be in the form of a traditional sign or possibly an ITS message board.

Truck Escape Ramps (TERs)

Truck escape ramps (TERs) have been in use on the highway system for over 40 years.[30] The amount of runaway truck incidents per year is estimated at 2,450 in the U.S. These incidents cause more than $37 million in damages each year.

TERs can play a significant role in reducing the costs of these incidents in terms of injuries, fatalities and property damage. There are usually two different occasions in which TERs are utilized. These are on:

1. long, mountainous grades in more rural areas, and
2. short, steep hills that often tend to be locations with dense traffic and more development.

While there are not exact guidelines for determining if a TER is needed, many states agree that the following factors should play an important role in the determination. These factors are:

[29] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies," 3-3.
[30] "Truck Escape Ramps: Determining the Need and the Location," Road Management & Engineering Journal (1997).

1. runaway truck crash rate,
2. length of grade,
3. percent grade,
4. percent trucks, and
5. condition at bottom of grade. [31]

Lighting Considerations

Lighting at some of the more heavily traveled interchanges or developed interchanges is suggested in an effort to improve safety. These interchanges include the ones in Jackson.[32] Other interchanges that might benefit from improved lighting, as they are identified because of their high usage and/or higher crash experience perhaps, should be added to the list of those under consideration for lighting improvements. Interchanges that are susceptible to crashes, in addition to potential lighting needs, will likely be those where ramps are shorter and loops have tight or perhaps smaller radii that can prove problematic for larger vehicles.

Lane Additions

Many stakeholders in the PB study expressed a desire for the addition of lanes to I-40.[33] While more lanes might seem to provide the answer to meeting growing traffic, many studies have shown that adding lanes does not increase level-of-service for the roadway or even reduce travel times ultimately. Besides potentially not providing a solution to traffic issues, the addition of lanes is very costly. The right-of-way would cost a little under a million dollars per mile on average for rural segments of I-40. The cost is predicted to increase by a factor

[31] "Truck Escape Ramps: Determining the Need and the Location," Road Management & Engineering Journal (1997).
[32] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies," 3-3.
[33] Parsons-Brinkerhoff, "I-40/I-81 Corridor Feasibility Study: Task 2.0 Assessment of Deficiencies," 3-1.

of 1.75 for residential areas, 3.25 for commercial areas and 12.50 for Central Business District/Urbanized area. Most of the areas that have the greatest traffic volumes and are most likely to be considered for lane additions are in non-rural areas that would have high right of way procurement costs. The basic construction costs are estimated to be almost $3 million per mile. This estimate would increase for corridors in rolling and mountainous terrain. Other costs that would be incurred with the addition of lanes are shown in Table 9.[34]

Table 9: Additional Costs Associated with the Adding of Interstate Lanes

Major River Crossing	$16,500,000
Bridges (Overpass, Underpass)	$4,000,000
Interchanges	$8,000,000
Major Interstate Interchange	$12,000,000

Source: I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions, p. 2-4

In addition to the high costs, the construction of additional lanes would most likely draw strong opposition from residents and businesses across the state that would be adversely affected by the purchase of necessary right-of-way. These potential problems along with many unforeseen ones are why alternative methods to solving capacity problems would be better overall choices.

Benefits of Converting Truck Traffic to Rail

A prominent solution in helping alleviate the growing issue of truck traffic on Interstate 40 is mode conversion. The most promising mode is rail. Tennessee currently has six major rail lines[35]. The state is also served by 20 short-line

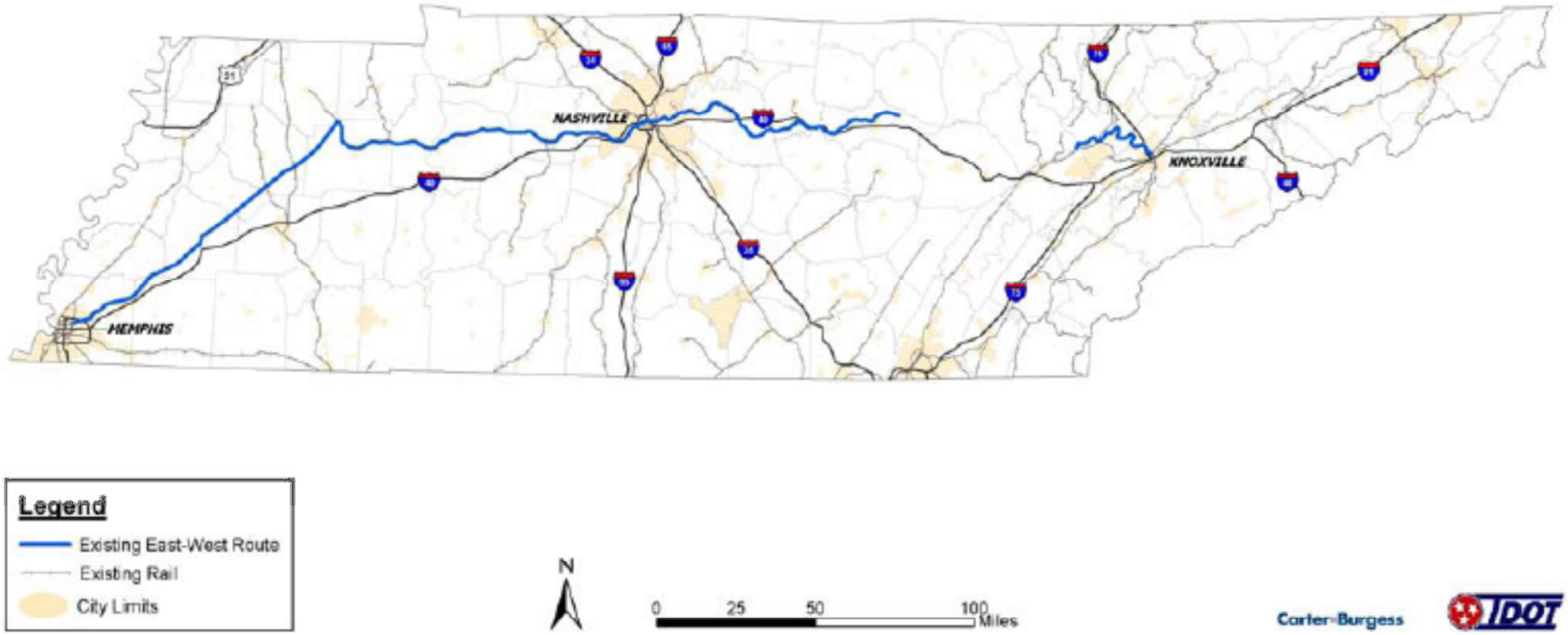
[34] Parsons-Brinkerhoff, *I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions* 2-4.
[35] Tennessee, advertisement, *Fortune* 5 May 2008: S1-S12.

railroads.[36] The existing East-West railway network in the state is shown in Figure 3. Norfolk Southern produced a preliminary estimate of over one million potentially divertible truckloads along the Crescent Corridor.[37] The major export via rail in Tennessee is coal followed by food products, chemicals and clay/glass/stone.[38] Besides reducing I-40 truck traffic, or at least not increasing truck traffic on this corridor, rail provides the potential for safety, economic, environmental and fuel efficiency benefits.

Note the non-continuous rail connection (i.e., the discontinuous or missing blue link) between Nashville and Knoxville shown in Figure 3. Figures 4, 5, and 6 also present other rail information pertaining to Tennessee rail shipments.

[36] Tennessee, Department of Transportation, Long Range Planning Division, "Tennessee Long-Range Transportation Plan: Challenges and Opportunities Draft Report," 6, 20 Aug. 2009 < http://www.tdot.state.tn.us/plango/pdfs/ChallengesOpportunities.pdf>.
[37] Parsons-Brinkerhoff, *I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions* 4-1.
[38] ARCADIS G&M, and Don Breazeale & Associates, *Tennessee Rail System Plan: Freight Movement Inventory and Future Demand Anaylsis,* Tennessee Department of Transportation, 2002, 15.

Figure 3: Existing East-West Rail Operations in Tennessee

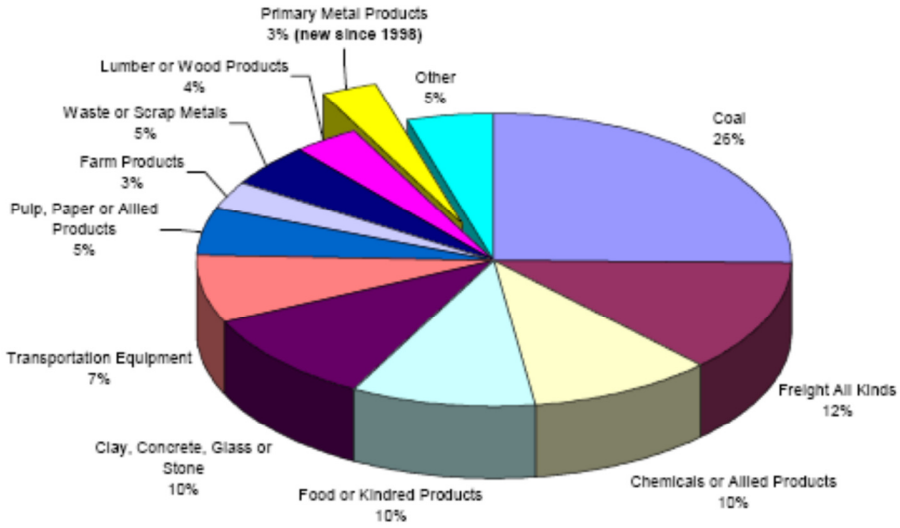


Source: Tennessee Rail System Plan, Task 8, p. 4

Figure 4: Tennessee Rail Flows

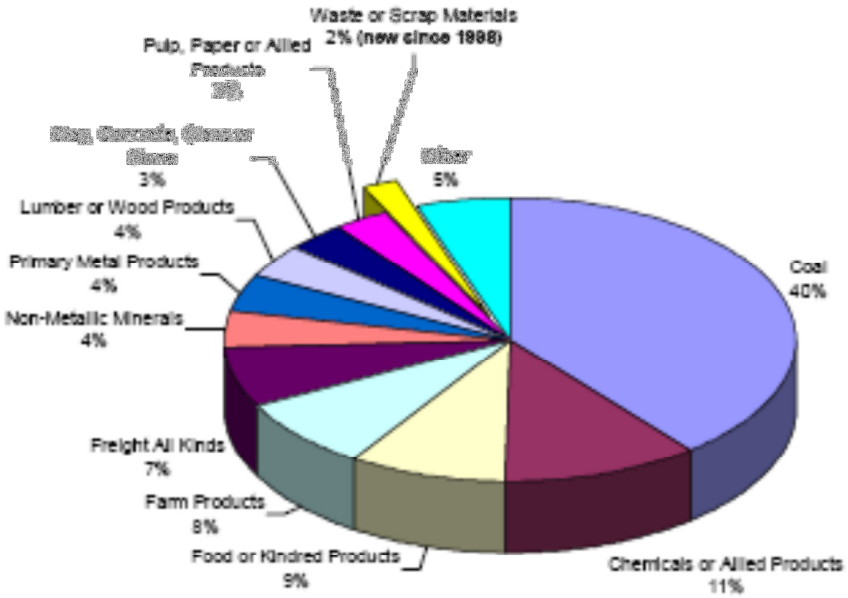
Source: http://www.tdot.state.tn.us/publictrans/RailPlan/tasks/task05.pdf

Figure 5: 2005 Outbound Rail Freight by Commodity (Over 1,000,000 Tons)



Source: http://www.tdot.state.tn.us/publictrans/RailPlan/tasks/task05.pdf; p. 18

Figure 6: Outbound Rail Freight by Commodity (Over 1,000,000 Tons)



Source: http://www.tdot.state.tn.us/publictrans/RailPlan/tasks/task05.pdf; p. 25

Factors in Shipping Decisions

Customers base their shipping mode decision on the direct cost of the transportation choice, the secondary costs related to the distribution system the mode must use and the amount of management the transportation choice entails.[39]

Rail is not currently a viable transportation choice for all market segments because O-D routes for some deliveries are not feasible or might not always be the cheaper or more fuel-efficient mode choice. For light-density lines, rail is not the most cost effective option. Much of the local and regional freight traffic in urban areas cannot benefit from utilizing rail because truck deliveries on the more prominent local road network are more cost-effective and typically timelier in their delivery schedules. There are exceptions, which include high volumes of sand, gravel, road salt, coal or oil products.[40]

Rail is also not the more fuel-efficient mode if very short trains are used, or burdensome switching is necessary.[41] Railroads need to work to increase their flexibility and also provide faster and more reliable service to compete with trucks. Truck shipments usually average less than 300 miles while shipments via rail tend to average over 500 miles in distance.[42] Table 10 shows what percentage of truck freight could be diverted to rail based on the distance that the freight is travelling. As expected, a higher percentage of freight could potentially be diverted to rail from truck as the distance the freight is traversing increases.

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[39] Joseph Bryan, Glen Weisbrod, Carl D. Martland, and Wilbur Smith Associates, NCHRP Report 586: Rail Freight Solutions to Roadway Congestion Final Report and Guidebook (Washington: Transportation research Board, 2007) 5.
[40] Joseph Bryan, Glen Weisbrod, Carl D. Martland, and Wilbur Smith Associates, NCHRP Report 586: Rail Freight Solutions to Roadway Congestion Final Report and Guidebook (Washington: Transportation research Board, 2007) 7.
[41] Joseph Bryan, Glen Weisbrod, Carl D. Martland, and Wilbur Smith Associates, NCHRP Report 586: Rail Freight Solutions to Roadway Congestion Final Report and Guidebook (Washington: Transportation research Board, 2007) 5.
[42] Joseph Bryan, Glen Weisbrod, Carl D. Martland, and Wilbur Smith Associates, NCHRP Report 586: Rail Freight Solutions to Roadway Congestion Final Report and Guidebook (Washington: Transportation research Board, 2007) 7.

Table 10: Distance-Based Freight Diversion Lookup Table

Distance between Origin and Destination	% of Freight that could be Diverted
500-750 miles	10
750-1000 miles	15
1000-1250 miles	20
1250+ miles	25

Source: I-75 Corridor Feasibility Study: Multi-Modal Solutions, Kimley-Horn and Associates, p. 49

The first benefit of converting freight movement from truck to rail is increased safety. Accident rates for rail are much lower than those for trucks. The Federal Railroad Administration (FRA) Office of Safety Analysis has an informative chart where railroad statistics by state can be obtained. This site was queried as to railroad deaths in 2009 and for the previous 10 years.[43]

This investigation revealed that there were 6 fatalities related to railroad accidents/incidents in Tennessee in 2009 and the average for the 10-year prior to 2009 (1998-2008) averaged 19.9 deaths or approximately 20 deaths per year. This is very low compared to truck-vehicle collisions occurring on the state's highways. These FRA annually reported deaths also included work related fatalities, and not just train-pedestrian or train-motorized vehicle crashes.

Economic benefits of rail typically include a reduction in costs for shipping products via rail and a decrease in highway maintenance costs. The reduction in costs to shippers would occur due to the decrease in travel time, which in turn affects the opportunity cost of the freight travel. Another economic benefit would be the decreased infrastructure costs.

[43] http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/stchart.aspx

A majority of railroads own and maintain their own railway infrastructure, so increased rail traffic would not create more maintenance costs for government agencies.[44] A reduction in truck traffic would reduce the strain on our nation's already deteriorating roadways and bridges. This would also lessen the costs to maintain our current infrastructure and hopefully provide more funds for the replacement or rehabilitation of roadway infrastructure.

Another important aspect of diverting truck traffic to rail is the decrease in reliance on oil. Transportation is currently the most rapid growing greenhouse gas emissions source in the world. A large percentage of the fuel consumed by trucks is attributable to long-haul trucks. These vehicles traverse hundreds of miles each day and often travel a total of 100,000 miles or more each year.[45] Railroads are generally more fuel-efficient trucks due to the naturally more fuel-efficient nature of steel wheels on steel track with the resulting lower coefficient of friction. Railroads also must rely upon more gentle grades on their routes, which also help aid fuel-efficiency.

A majority of our current rail system was designed and constructed prior to 1925. The outdated design of the railway network means that the system is not efficiently serving the layout of the United States today. In some areas, the network is designed to serve markets that no longer exist or do not benefit from rail use. In other markets, the current system is not providing the potential service that could be utilized most competitively. Railways must realign their geometry, or more effectively interface with short-haul truck deliveries, to keep pace with the changing geometry and layout of today's markets.[46]

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[44] Joseph Bryan, Glen Weisbrod, Carl D. Martland, and Wilbur Smith Associates, NCHRP Report 586: Rail Freight Solutions to Roadway Congestion Final Report and Guidebook (Washington: Transportation research Board, 2007) 5.
[45] *Reducing Global Warming Pollution: Technology Options for Tractor-Trailers* (Union of Concerned Scientists 2008).
[46] Joseph Bryan, Glen Weisbrod, Carl D. Martland, and Wilbur Smith Associates, NCHRP Report 586: Rail Freight Solutions to Roadway Congestion Final Report and Guidebook (Washington: Transportation research Board, 2007) 6.

Necessary Rail Construction

The construction of a rail link between Algood, TN and Oliver Springs, TN is necessary In order for rail to be a viable alternative.[47] This would provide for a direct connection between Nashville and Knoxville instead of trains having to exit and re-enter the state, typically through Huntsville, Alabama, to use rail transportation between these two locales. Currently, trains traveling from Memphis to Knoxville typically follow a southern route through Corinth, Mississippi and Huntsville, Alabama and then up through Chattanooga due to the lack of a direct route from Nashville to Knoxville. (Earlier Figure 4 illustrated the prominence of this highly utilized rail shipping route.) Trains traveling from Knoxville to Memphis would reverse this route.

Norfolk Southern officials state the travel time along this multi-state rail route takes approximately 12 hours to travel from Memphis to Knoxville.[48] This makes rail a less attractive and more costly option when choosing a shipping method. When faced with how to transport goods through the supply chain, shippers are becoming more and more focused on the total logistics (transportation plus inventory) costs. There is the ability for a reduction in inventory requirements if faster and more reliable transportation can be obtained. A reduction in inventory can lead to decreases in logistics and production costs. With the completion of this missing link in the Trans-Tennessee Rail corridor, companies would have a more reliable and time efficient manner in which to ship goods. The connection also has the possibility of fueling economic growth in the Cumberland Plateau region over the long-term.[49]

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[47] Parsons-Brinkerhoff, *I-40/I-81 Corridor Feasibility Study: Task 3.0 Multi-Modal Solutions* 4-1.
[48] ARCADIS, Don Breazeale & Associates, and Carter & Burgess, *Tennessee Rail System Plan:East-West Rail Connection Alternative Alignments-Advanced Planning Report: Project 1, Scenario A, Oliver Springs, TN to Algood, TN* (Tennessee Department of Transportation 2002) 2.
[49] Don Breazale & Associates and Carter & Burgess, *Tennessee Rail System Plan Task 8: Evaluation of Rail Infrastructure Proposals-Basic Freight Rail Connection Project 1, Scenario A East-West Rail,* 5.

The current freight travel time via rail between Memphis and Nashville is 418 minutes, which equates to an average speed of 33 mph.[50] The route between these two important Tennessee cities is along a CSX Transportation mainline. (Note: The acronym CSXT is also used for this railroad company.) The track is classified as a Class 4 Railroad, which permits freight trains to travel at a maximum speed of 60 mph and passenger trains to travel at a maximum speed of 79 mph for current conditions. Note that these maximum speeds might be decreased due to signals, curvature, track conditions, and local operating conditions. (e.g., 79 mph recommended and not 80 mph for passenger trains as in Table 11. Similarly, various conditions can limit freight train operations to speed less that the optimal speed of 60 mph.) Potential upgrades to the rail corridor have been identified that would further decrease freight travel times.[51]

Table 11: Federal Railroad Administration Speed Limits per Class of Track

Class of Track	Max Allowable Operating Speed for Freight Trains (miles per hour)	Max Allowable Speed for Passenger Trains (miles per hour)
Excepted Track	10	N/A
Class 1	10	15
Class 2	25	30
Class 3	40	60
Class 4	60	80
Class 5	80	90

Source: Tennessee Rail System Plan, Task 2, p. 11

[50] ARCADIS, Don Breazeale & Associates, and Carter & Burgess, *Tennessee Rail System Plan:East-West Rail Connection Alternative Alignments-Advanced Planning Report: Project 1, Scenario A, Oliver Springs, TN to Algood, TN,* 8

[51] ARCADIS, Don Breazeale & Associates, and Carter & Burgess, *Tennessee Rail System Plan:East-West Rail Connection Alternative Alignments-Advanced Planning Report: Project 1, Scenario A, Oliver Springs, TN to Algood, TN,* 5

The current connection from Nashville to Algood is on a Nashville and Eastern Rail Corporation (NERR) mainline. The track is currently classified as a Class 2 Railroad, which allows for maximum freight train operating speed of 25 mph. The maximum speed for this route may be less in some areas due to the same conditions mentioned above for a Class 4 Railroad.

Traffic on the line usually consists of one daily train, or service as needed. The current freight travel time is approximately 208 minutes, which equates to an average speed of 28 mph. This time could be greatly reduced to 127 minutes with an average speed of 45 mph if modifications to the superelevation in the track's curvature were made.[52]

Norfolk Southern currently operates the primary route between Oliver Springs and Knoxville. The track for this route is classified as a Class 4 railroad and the traffic on the line is considered to be medium-density for a mainline. The current freight travel time along this route is about 82 minutes, which equates to an average speed of 26 mph.

The following excerpt from the Tennessee Rail Plan-Task 8 describes the horizontal alignment the connection would follow:

"The alignment for the Basic Freight Rail Connection begins just east of Algood, Tennessee. From Algood to Monterey the track has been removed, however, the existing roadbed would be utilized to reestablish the route with maximum horizontal curvature expected to be approximately 11 degrees. The proposed alignment continues running east for approximately 20 miles across abandoned track before reaching Crossville. At Crossville, the alignment follows the existing roadbed that presently has the rail out of service for approximately 11 miles to Crab Orchard with maximum horizontal curvature not exceeding 8

[52] ARCADIS, Don Breazeale & Associates, and Carter & Burgess, *Tennessee Rail System Plan:East-West Rail Connection Alternative Alignments-Advanced Planning Report: Project 1, Scenario A, Oliver Springs, TN to Algood, TN,* 9-10,14.

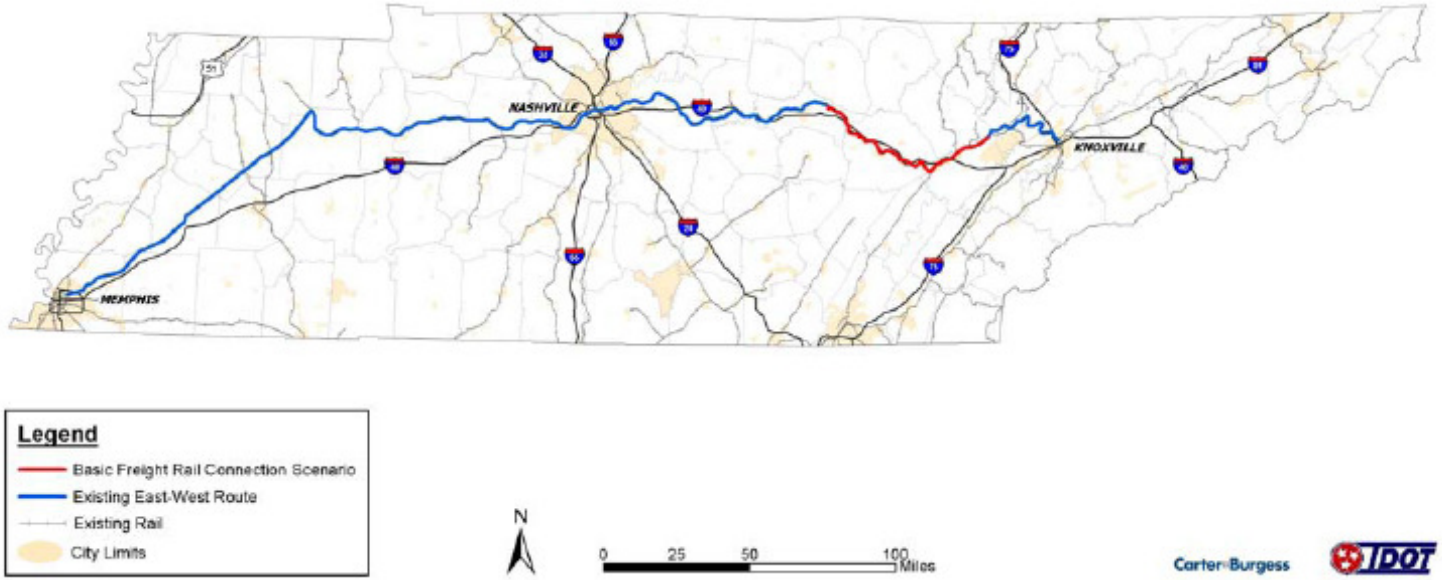
degrees. From Crab Orchard to Rockwood the alignment remains on existing rail presently owned and operated by Franklin Industries with a significant amount of curvature including curves up to 14 degrees. Cumberland County has formed a public railroad authority to oversee operations on this segment. The final segment from Rockwood to Oliver Springs is Norfolk Southern mainline track with maximum curvature less than 8 degrees. Major infrastructure upgrades on this segment would be unforeseeable because of freight traffic on the existing route. The alignment generally follows Interstate Highway 40 providing a west-east connection between the cities of Algood and Oliver Springs through Crossville. Most of the proposed track runs at less than 1.50 percent grade with many of the horizontal curves exceeding 5 degrees. The proposed design speed for the alignment is 60 mph for freight. However, 60 mph freight operations would only be attainable on 7.6 % of the proposed route using the existing roadbed."

Figure 7 presents the proposed better railroad linkage across Tennessee.

To build new freeway lanes is extremely costly at an average of $8 million per mile, compared to the relatively cheap cost of $1 million per mile to build new railroad track.[53] The estimated cost of the new rail connection is $118,041,839. This cost estimate includes the track, earthwork bridges, culverts, grade crossing surfaces, and warning devices. The average freight operation speed possible on the connection would be 35.2 mph.[54] Table 12 illustrates some possible changes in shipping modes should the currently missing rail link between Algood and Oliver Springs become reality. Table 13 presents economic considerations.

[53] Don Breazale & Associates and Carter & Burgess, *Tennessee Rail System Plan Task 8: Evaluation of Rail Infrastructure Proposals-Basic Freight Rail Connection Project 1, Scenario A East-West Rail* 5.
[54] ARCADIS, Don Breazeale & Associates, and Carter & Burgess, *Tennessee Rail System Plan:East-West Rail Connection Alternative Alignments-Advanced Planning Report: Project 1, Scenario A, Oliver Springs, TN to Algood, TN,* 29-30.

Figure 7: Proposed Basic Freight Rail Connection



Source: Tennessee Rail System Plan, Task 8, p. 6

Table 12: Summary of Cargo Potential for Basic Freight Rail Connection

	Eastbound		Westbound		Total
	Tons	**Truckloads**	**Tons**	**Truckloads**	**Truckloads**
Cargo Transiting TN					
Intrastate	373,228	18,629	349,161	17,696	
Interstate	903,470	68,022	413,617	28,009	
New Agricultural Products	None Identified		None Identified		
Total	1,276,698	86,651	762,778	45,705	132,356
Truckloads Diverted (25 percent of totals)	319,175	21,663	190,695	11,426	33,089
Rail Carloads					
Rail Carloads at 2.5 Truckloads per Rail Car		5,885		2,783	8,668
Rail Intermodal Units at 0.67 Truckloads per Intermodal Unit		10,372		6,668	17,040

Source: Tennessee Rail System Plan, Task 8, p.14

Table 13: Basic Freight Rail Connection Benefit-to-Cost Analysis

Truck Traffic Reduction (2010)		33,089
Intermodal Units		17,040
Rail Car Units		8,669
Annual Benefits		
Impact to Shipping Costs	$	5,779,323
Rail Operations Cost Differential	$	31,148
Highway Maintenance Reduction	$	1,741,474
Accident Savings	$	93,490
Highway Congestion Savings	$	1,123,709
State Fees/Revenues	$	266,422
TOTAL BENEFITS	$	9,035,566
Costs		
Total Capital Costs	$	118,041,839
Freight O&M Costs	$	541,392
TOTAL COSTS	$	118,583,231
Benefit:Cost Analysis		
NPV Benefits	$	147,356,883
NPV Costs	$	124,335,621
Total NPV	$	23,021,262
Benefit:Cost		1.19

Source: Tennessee Rail System Plan, Task 8, p. 19

An additional benefit for building the connection between Algood and Oliver Springs and making upgrades to existing track through the East-West route would be the potential to introduce passenger rail service. Four corridors were identified in a previous study as routes having the greatest potential for passenger service. These routes include: Nashville to Memphis, Chattanooga to Louisville, Bristol to Nashville, and Bristol to Chattanooga.[55]

[55] ARCADIS, and Don Breazeale & Associates, *Tennessee Rail System Plan: Summary, Funding Options, and Rail Program Recommendations* (Tennessee Department of Transportation 10 Oct. 2003) vii.

Conclusions

Overview

The 451 miles of Interstate 40, varying from 4 to 8 lanes, that wind through Tennessee are a vital transportation link providing both greater mobility and increased freight movement capabilities. Accommodating the current passenger and freight movements without the existence of I-40 is almost unimaginable. The contrast of travel times via other alternative routes presented in this research merely amplifies the importance of this critical highway link for both Tennessee and the nation's highway transportation network. Table 1 earlier showed how Tennessee is among the leading states in the U.S. in ton-miles of truck shipments.

The Tennessee Department of Transportation, and all Tennesseans, should take pride in the fact that truckers routinely rate the pavement conditions of I-40 in Tennessee as some of the best riding surfaces in the country. Drivers on I-40 are also consistently rated very highly for their courtesy and driving abilities by truck driver opinion polls.

But the fact that truck traffic is predicted to almost double by 2030 from 2003 levels and the continuing need to address other identified safety concerns will not allow TDOT to rest on its laurels. With or without the current heavy truck volumes, the mere aging of I-40 would be problematic. Considering that large, increasing volumes of trucks will continually be using an aging infrastructure exacerbates both the need for infrastructure improvements, and the need to plan strategically with limited resources.

A snapshot of the information presented in the Appendices shows that the percent of multi-unit trucks in the traffic stream in various counties across the state were:

a. 33-35% in Fayette and Haywood,
b. 34-36% in Dickson and Williamson,
c. 28% in Cumberland, and
d. 30-35% in Sevier and Cocke.

There can be no denying that these percents represent very heavy truck volumes causing associated infrastructure and safety concerns.

Safety Issues and Recommendations

The following section summarizes safety findings, draws some conclusions, and presents safety-related recommendations.

Detailed crash data that could have been studied more critically for causal factors was not available to Vanderbilt researchers. The sensitivity of such data is understood and well recognized. However, one safety recommendation for further research for those having access to this data base would be to study this historical data in greater detail to identify I-40 segments with a propensity for crashes. This is certainly being done now, but must be continuously monitored for trends.

One of the safety concerns that this current research did identify was increasing differentials in both vehicle sizes and vehicle speeds along I-40.

A second recommendation is to identify segments of I-40 having higher traffic speed percentiles for both the total vehicle stream and for truck speeds. Where typical speeds for all vehicles or solely for trucks are observed to be higher, increased enforcement would be the obvious recommendation. There is no debating that “SPEED kills!” The message is brief, but certainly to the point. Further TDOT and Department of Safety collaborations to reduce higher I-40 vehicle speeds and overall vehicle speed differentials are recommended.

A third recommendation is too reduce truck weigh station queues by expanding storage areas, and further utilization of newer technologies such as weigh-in-motion scales to reduce processing times, reduce truck queue lengths, and to reduce the percent of trucks that bypass the weighing process because the truck lines on ramps are infringing upon I-40 through lanes.

Improved signing, both static and dynamic, can be helpful in increasing safety and communicating problems to motorists. Knowledge is power. Better communication techniques impart valuable knowledge to drivers that then allow them to make wiser and more informed decisions.

Other Recommendations

This research has identified several areas that are particular in nature for some reason and that are deserving of special attention. These areas are:

1. The Tennessee River crossing,
2. Percy Priest Dam area,
3. Holston River crossing,
4. Gorge area,
5. Roane mountain area,
6. Monterey mountain area, and
7. Congested urban segments in Memphis, Nashville (e.g., Fesslers Lane area), and Knoxville were truck/passenger vehicle conflicts occur.

The water crossings are important because of road conditions and limited alternative routes. The areas with higher grades indicate areas where truck/passenger car speed differentials are likely to be greatest, and the

congested urban areas with heavy truck traffic represent areas where weaving and sudden stopping increase the probability of incidents occurring.

Earlier incident management work has identified incident location identification techniques and management strategies. Knowing the protocol for managing and when to re-route traffic along the entire length of I-40 is critical. For example, what happens if a multiple fatality crash involving multiple vehicles occurs on the Tennessee River westbound bridge and completely blocks all westbound lanes for hours? How will the eastbound bridge be used? And what if this restricted Tennessee River crossing, or any other location along I-40, experiences a serious hazardous materials spill with necessary immediate local area evacuations? How would I-40 traffic be impacted? Is there an automatic alternate routing plan available regarding detours and re-routing of all traffic that can be implemented rather routinely? These are questions to which the answers should be known.

The Tennessee Department of Transportation has been adding median barriers, primarily cable median barriers, systematically along many interstate segments. These barrier installations are apparent as one drives along I-40. Continuing, and even accelerating, this current safety program is mandatory.

The massive rock slide that occurred October 25, 2009 on I-40 in North Carolina, only a few miles east of the Tennessee border, is also a stark reminder of definite safety mandates. The concerns are twofold. The first is the disruption this rock slide has caused to Tennessee's I-40 traffic because of route diversion. The second concern is obviously to avoid such a safety, mobility, and economic mishap from occurring within Tennessee. A continuing geological and structural assessment of similar cut areas along Tennessee's I-40 route is necessary to detect weakened areas and correct them before a similar, massive slide occurs.

Finally, if the status quo is maintained over the next several decades, there appears to be nothing on the horizon for I-40 operations but more and more truck traffic and increasing congestion levels. Merely adding lanes and trying to maintain reasonable levels-of-service is not a viable or prudent strategy. Existing problems may grow exponentially to intolerable levels.

Therefore, a very strong final recommendation from this study would be to pursue an aggressive strategy to encourage public-private partnerships to re-establish a trans-Tennessee rail connection. This will not be accomplished in one project, but through a series of collective efforts between TDOT and the involved railroads. Negotiations will be required. The strong pursuit of making the I-40 corridor more truly a "multi-modal corridor" is premised upon:

1. The favorable 1.19 Benefit:Cost ratio for the project as stated in the Tennessee Rail System Plan and highlighted earlier in Table 13.
2. Railroads are interested currently in revitalizing lines due to favorable economic conditions, and increasing their market competitiveness.
3. Using 100% public monies would not be required as would be in adding highway lanes.
4. There is potential for completing phases over longer periods of time, and thus allowing "cost spreading" opportunities.
5. Once completed, continuing maintenance of the railroad rights-of-way would be with private funds and not with public funds or taxpayer dollars.

Besides reducing I-40 truck traffic, or at least lessening the need for further growth of truck traffic, rail provides the added potential for safety, economic, environmental, and fuel efficiency benefits.

Closing Remarks

In conclusion, Interstate 40 plays a vital role to Tennessee and thus places paramount importance upon accurately considering the effects of trucks within Tennessee's critical I-40 transportation corridor. Mobility, safety, and economic factors must all be considered when making strategic transportation planning decisions. However, making strategic transportation planning decisions within a multi-modal context, rather than in the current, essentially one mode context, would maximize the number and range of varying transportation strategies than could be considered in future years for the I-40 corridor.

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Appendices

Appendix A:

Eastbound I-40 Geometry

EB I-40 Geometry

Mile Marker	County	TDOT Region	Number of Lanes	Grade
0	Shelby	4	6/4	-0.72
1	Shelby	4	4/6	-0.41
2	Shelby	4	4/6	0.13
3	Shelby	4	6	0.38
4	Shelby	4	6	-0.49
5	Shelby	4	6	-0.04
6	Shelby	4	6	-0.11
7	Shelby	4	6	0.02
8	Shelby	4	6	-0.26
9	Shelby	4	6	0.06
10	Shelby	4	6	0.09
11	Shelby	4	6	0.11
12	Shelby	4	6	-0.02
13	Shelby	4	6	0.69
14	Shelby	4	8/6/4	-0.36
15	Shelby	4	8	0.60
16	Shelby	4	8	-0.44
17	Shelby	4	8	0.62
18	Shelby	4	8	0.45
19	Shelby	4	8	0.26
20	Shelby	4	8	0.83
21	Shelby	4	8/6	1.03
22	Shelby	4	6	0.36
23	Shelby	4	6	-0.63
24	Shelby	4	6	0.12
25	Shelby	4	6	-0.71
26	Shelby	4	6	-1.71
27	Shelby	4	6	0.25
28	Shelby	4	6	1.33
29	Shelby	4	6	1.07
30	Shelby/Fayette	4	6/4	-1.57
31	Fayette	4	4	-0.10
32	Fayette	4	4	-0.10

Mile Marker	County	TDOT Region	Number of Lanes	Grade
33	Fayette	4	4	0.42
34	Fayette	4	4	0.73
35	Fayette	4	4	0.32
36	Fayette	4	4	-0.54
37	Fayette	4	4	0.74
38	Fayette	4	4	-0.21
39	Fayette	4	4	0.34
40	Fayette	4	4	-0.26
41	Fayette	4	4	0.16
42	Fayette	4	4	-0.05
43	Fayette	4	4	0.40
44	Fayette	4	4	-0.27
45	Fayette	4	4	-0.05
46	Fayette/Haywood	4	4	0.29
47	Haywood	4	4	-1.15
48	Haywood	4	4	0.64
49	Haywood	4	4	-0.13
50	Haywood	4	4	0.05
51	Haywood	4	4	-0.43
52	Haywood	4	4	0.24
53	Haywood	4	4	0.05
54	Haywood	4	4	-0.61
55	Haywood	4	4	0.00
56	Haywood	4	4	0.00
57	Haywood	4	4	1.21
58	Haywood	4	4	0.66
59	Haywood	4	4	-0.13
60	Haywood	4	4	-0.77
61	Haywood	4	4	0.04
62	Haywood	4	4	0.44
63	Haywood	4	4	0.08
64	Haywood	4	4	0.15
65	Haywood	4	4	0.16
66	Haywood	4	4	0.43

Mile Marker	County	TDOT Region	Number of Lanes	Grade
67	Haywood	4	4	-0.55
68	Haywood	4	4	0.46
69	Haywood	4	4	-0.24
70	Haywood/Madison	4	4	0.45
71	Madison	4	4	-1.31
72	Madison	4	4	0.05
73	Madison	4	4	0.43
74	Madison	4	4	0.52
75	Madison	4	4	-0.61
76	Madison	4	4	-0.25
77	Madison	4	4	-0.10
78	Madison	4	4	-0.10
79	Madison	4	4	-0.28
80	Madison	4	4	0.52
81	Madison	4	4	0.72
82	Madison	4	4	1.01
83	Madison	4	4	0.59
84	Madison	4	4	-0.59
85	Madison	4	4	-0.12
86	Madison	4	4	0.76
87	Madison	4	4	0.74
88	Madison	4	4	-1.06
89	Madison	4	4	1.17
90	Madison	4	4	0.44
91	Madison	4	4	0.19
92	Madison	4	4	-0.56
93	Madison	4	4	0.01
94	Madison	4	4	0.42
95	Madison	4	4	-0.69
96	Madison	4	4	-0.49
97	Madison	4	4	0.24
98	Madison/Henderson	4	4	0.59
99	Henderson	4	4	-2.24
100	Henderson	4	4	0.41

Mile Marker	County	TDOT Region	Number of Lanes	Grade
101	Henderson	4	4	0.58
102	Henderson	4	4	0.12
103	Henderson	4	4	0.24
104	Henderson	4	4	0.30
105	Henderson	4	4	0.85
106	Henderson	4	4	-0.33
107	Henderson	4	4	0.11
108	Henderson	4	4	-0.37
109	Henderson	4	4	0.65
110	Henderson	4	4	0.22
111	Henderson	4	4	-0.38
112	Henderson	4	4	-0.30
113	Henderson	4	4	1.09
114	Henderson	4	4	-0.11
115	Henderson	4	4	0.94
116	Henderson	4	4	-0.17
117	Henderson	4	4	1.47
118	Henderson	4	4	-2.20
119	Henderson	4	4	0.78
120	Henderson	4	4	-0.07
121	Henderson	4	4	-2.19
122	Henderson	4	4	-2.36
123	Henderson/Carroll/Decatur	4	4	1.51
124	Decatur	4	4	-1.70
125	Decatur	4	4	-0.10
126	Decatur	4	4	-1.24
127	Decatur	4	4	1.07
128	Decatur	4	4	0.39
129	Decatur/Benton	4	4	-0.01
130	Benton	4	4	-1.41
131	Benton	4	4	-0.37
132	Benton	4	4	-0.02
133	Benton	4	4	1.99
134	Benton	4	4	-1.62

Mile Marker	County	TDOT Region	Number of Lanes	Grade
135	Benton	4	4	-2.76
136	Benton	4	4	-0.20
137	Benton	4	4	-0.20
138	Benton/Humphreys	4	4	-0.20
139	Humphreys	3	4	-0.20
140	Humphreys	3	4	2.63
141	Humphreys	3	4	-2.14
142	Humphreys	3	4	0.20
143	Humphreys	3	4	0.20
144	Humphreys	3	4	-0.51
145	Humphreys	3	4	3.97
146	Humphreys	3	4	-2.18
147	Humphreys	3	4	-0.61
148	Humphreys	3	4	0.10
149	Humphreys	3	4	0.10
150	Humphreys	3	4	0.10
151	Humphreys/Hickman	3	4	0.10
152	Hickman	3	4	0.10
153	Hickman	3	4	0.66
154	Hickman	3	4	0.81
155	Hickman	3	4	1.23
156	Hickman	3	4	2.45
157	Hickman	3	4	2.16
158	Hickman	3	4	0.26
159	Hickman	3	4	-2.52
160	Hickman	3	4	0.35
161	Hickman	3	4	0.97
162	Hickman	3	4	1.17
163	Hickman/Dickson	3	4	-3.10
164	Dickson	3	4	0.18
165	Dickson	3	4	1.38
166	Dickson	3	4	0.42
167	Dickson	3	4	0.65
168	Dickson	3	4	-0.41

Mile Marker	County	TDOT Region	Number of Lanes	Grade
169	Dickson	3	4	1.01
170	Dickson	3	4	0.58
171	Dickson	3	4	-0.68
172	Dickson	3	4	-0.28
173	Dickson	3	4	-0.67
174	Dickson	3	4	-1.53
175	Dickson	3	4	-1.05
176	Dickson	3	4	-0.43
177	Dickson	3	4	-0.48
178	Dickson	3	4	2.64
179	Dickson	3	4	1.16
180	Dickson/Williamson	3	4	0.42
181	Williamson	3	4	-0.42
182	Williamson	3	4	-0.32
183	Williamson	3	4	-0.47
184	Williamson/Cheatham	3	4	-3.63
185	Cheatham	3	4	-0.07
186	Cheatham	3	4	0.92
187	Cheatham	3	4	-1.99
188	Cheatham	3	4	1.44
189	Cheatham	3	4	
190	Cheatham	3	4	
191	Cheatham/Davidson	3	4	
192	Davidson	3	4	
193	Davidson	3	4	
194	Davidson	3	4	
195	Davidson	3	4	
196	Davidson	3	4/6	
197	Davidson	3	6	
198	Davidson	3	6	
199	Davidson	3	6	
200	Davidson	3	6	
201	Davidson	3	6	
202	Davidson	3	6	

Mile Marker	County	TDOT Region	Number of Lanes	Grade
203	Davidson	3	6	
204	Davidson	3	6	
205	Davidson	3	6	
206	Davidson	3	6	
207	Davidson	3	6/4	
208	Davidson	3	6	
209	Davidson	3	6/4/5	
210	Davidson	3	6/4/8	
211	Davidson	3	8	
212	Davidson	3	8/4	
213	Davidson	3	6/4	
214	Davidson	3	6/8	
215	Davidson	3	8	
216	Davidson	3	6/8	
217	Davidson	3	8	
218	Davidson	3	8	
219	Davidson	3	8	4.20
220	Davidson	3	8	0.85
221	Davidson	3	8	-0.60
222	Davidson	3	8	1.01
223	Davidson	3	8	-1.30
224	Davidson	3	8	1.26
225	Davidson/Wilson	3	6/8	-1.11
226	Wilson	3	6/4	-0.57
227	Wilson	3	4	0.38
228	Wilson	3	4	0.36
229	Wilson	3	4	0.73
230	Wilson	3	4	0.97
231	Wilson	3	4	-1.37
232	Wilson	3	4	-0.63
233	Wilson	3	4	0.21
234	Wilson	3	4	0.00
235	Wilson	3	4	0.00
236	Wilson	3	4	0.81

Mile Marker	County	TDOT Region	Number of Lanes	Grade
237	Wilson	3	4	-0.84
238	Wilson	3	4	0.77
239	Wilson	3	4	-0.17
240	Wilson	3	4	1.50
241	Wilson	3	4	-0.82
242	Wilson	3	4	1.92
243	Wilson	3	4	-1.11
244	Wilson	3	4	-1.22
245	Wilson	3	4	0.28
246	Wilson	3	4	-0.61
247	Wilson	3	4	2.10
248	Wilson	3	4	2.13
249	Wilson/Smith	3	4	-1.95
250	Smith	3	4	0.19
251	Smith	3	4	-2.10
252	Smith	3	4	-0.05
253	Smith	3	4	-0.98
254	Smith	3	4	0.34
255	Smith	3	4	0.02
256	Smith	3	4	-1.04
257	Smith	3	4	0.11
258	Smith	3	4	0.44
259	Smith	3	4	-0.50
260	Smith	3	4	0.81
261	Smith	3	4	-0.04
262	Smith	3	4	-0.79
263	Smith	3	4	0.43
264	Smith	3	4	0.88
265	Smith	3	4	2.01
266	Smith/Putnam	3	4	1.47
267	Putnam	2	4	2.90
268	Putnam	2	4	2.00
269	Putnam	2	4	0.18
270	Putnam	2	4	0.38

Mile Marker	County	TDOT Region	Number of Lanes	Grade
271	Putnam	2	4	0.34
272	Putnam	2	4	0.37
273	Putnam	2	4	-0.12
274	Putnam	2	4	0.12
275	Putnam	2	4	-1.03
276	Putnam	2	4	0.61
277	Putnam	2	4	0.83
278	Putnam	2	4	-0.52
279	Putnam	2	4	-0.61
280	Putnam	2	4	1.38
281	Putnam	2	4	-0.38
282	Putnam	2	4	0.84
283	Putnam	2	4	-0.45
284	Putnam	2	4	0.94
285	Putnam	2	4	-0.27
286	Putnam	2	4	-0.01
287	Putnam	2	4	-2.11
288	Putnam	2	4	0.31
289	Putnam	2	4	3.90
290	Putnam	2	4	3.90
291	Putnam	2	4	3.90
292	Putnam	2	4	3.90
293	Putnam	2	4	0.42
294	Putnam	2	4	-0.30
295	Putnam	2	4	-0.41
296	Putnam	2	4	1.72
297	Putnam	2	4	-0.40
298	Putnam	2	4	0.55
299	Putnam	2	4	0.97
300	Putnam	2	4	1.98
301	Putnam	2	4	-0.63
302	Putnam	2	4	-0.33
303	Putnam	2	4	-1.13
304	Putnam/Cumberland	2	4	0.81

Mile Marker	County	TDOT Region	Number of Lanes	Grade
305	Cumberland	2	4	0.26
306	Cumberland	2	4	0.34
307	Cumberland	2	4	-0.83
308	Cumberland	2	4	-1.14
309	Cumberland	2	4	-0.18
310	Cumberland	2	4	0.38
311	Cumberland	2	4	-1.73
312	Cumberland	2	4	-1.76
313	Cumberland	2	4	0.83
314	Cumberland	2	4	0.18
315	Cumberland	2	4	0.63
316	Cumberland	2	4	-0.39
317	Cumberland	2	4	1.61
318	Cumberland	2	4	-1.20
319	Cumberland	2	4	-0.88
320	Cumberland	2	4	0.72
321	Cumberland	2	4	-0.05
322	Cumberland	2	4	-3.03
323	Cumberland	2	4	1.92
324	Cumberland	2	4	0.18
325	Cumberland	2	4	-1.78
326	Cumberland	2	4	1.48
327	Cumberland	2	4	-0.06
328	Cumberland	2	4	-0.69
329	Cumberland	2	4	-0.34
330	Cumberland	2	4	-2.09
331	Cumberland	2	4	0.92
332	Cumberland	2	4	-1.10
333	Cumberland	2	4	-1.49
334	Cumberland	2	4	-1.18
335	Cumberland	2	4	1.08
336	Cumberland	2	4	1.13
337	Cumberland	2	4	-4.50
338	Cumberland	2	4	-1.93

Mile Marker	County	TDOT Region	Number of Lanes	Grade
339	Cumberland	2	4	-2.24
340	Cumberland/Roane	2	4	-1.53
341	Roane	1	4	-1.95
342	Roane	1	4	-1.18
343	Roane	1	4	-1.01
344	Roane	1	4	2.19
345	Roane	1	4	0.68
346	Roane	1	4	-2.36
347	Roane	1	4	-0.61
348	Roane	1	4	-0.31
349	Roane	1	4	3.30
350	Roane	1	4	-0.33
351	Roane	1	4	-2.30
352	Roane	1	4	1.41
353	Roane	1	4	1.85
354	Roane	1	4	0.06
355	Roane	1	4	-2.24
356	Roane	1	4	-0.77
357	Roane	1	4	1.02
358	Roane	1	4	-0.14
359	Roane	1	4	0.54
360	Roane	1	4	2.07
361	Roane	1	4	-0.88
362	Roane	1	4	0.68
363	Roane/Loudon	1	4	-2.22
364	Loudon	1	4	1.49
365	Loudon	1	4	-0.10
366	Loudon	1	4	3.46
367	Loudon	1	4/6	-0.92
368	Loudon/Knox	1	6/2	-1.82
369	Knox	1	6	0.07
370	Knox	1	6	-1.30
371	Knox	1	6	0.53
372	Knox	1	6	0.65

Mile Marker	County	TDOT Region	Number of Lanes	Grade
373	Knox	1	6	-0.46
374	Knox	1	6	-0.91
375	Knox	1	6	1.13
376	Knox	1	6/8	1.47
377	Knox	1	8	-1.69
378	Knox	1	6/8	-1.50
379	Knox	1	6	1.33
380	Knox	1	6	0.53
381	Knox	1	6	-0.28
382	Knox	1	6	-0.74
383	Knox	1	6	-0.19
384	Knox	1	6	0.93
385	Knox	1	6	1.17
386	Knox	1	6	-0.45
387	Knox	1	6/4	-0.29
388	Knox	1	4/6	-0.11
389	Knox	1	6	-0.80
390	Knox	1	6	-0.47
391	Knox	1	6	0.28
392	Knox	1	6	0.62
393	Knox	1	6	1.06
394	Knox	1	6	0.42
395	Knox	1	6	2.31
396	Knox	1	6	0.20
397	Knox	1	6	-1.75
398	Knox	1	6	0.14
399	Knox	1	6	-1.30
400	Knox	1	6	1.31
401	Knox	1	6	0.01
402	Knox	1	6	0.20
403	Knox	1	6	0.65
404	Knox/Jefferson	1	6	2.40
405	Jefferson	1	6	1.65
406	Jefferson	1	6	2.71

Mile Marker	County	TDOT Region	Number of Lanes	Grade
407	Jefferson	1	6	0.92
408	Jefferson	1	6	-1.22
409	Jefferson	1	6	-1.28
410	Jefferson	1	6	2.34
411	Jefferson	1	6	-1.17
412	Jefferson	1	6	-0.31
413	Jefferson	1	6	-2.11
414	Jefferson	1	6	-1.78
415	Jefferson	1	6	-0.95
416	Jefferson/Sevier	1	4/6	0.54
417	Sevier	1	6	-0.17
418	Sevier	1	6	0.31
419	Sevier	1	6	0.03
420	Sevier	1	6	1.38
421	Sevier/Cocke	1	6/4	0.64
422	Cocke	1	4	-1.12
423	Cocke	1	4	0.11
424	Cocke	1	4	-0.33
425	Cocke	1	4	-0.13
426	Cocke	1	4	1.96
427	Cocke	1	4	-0.43
428	Cocke	1	4	-2.25
429	Cocke	1	4	0.37
430	Cocke	1	4	1.91
431	Cocke	1	4	0.55
432	Cocke	1	4	-1.86
433	Cocke	1	4	-0.83
434	Cocke	1	4	-0.19
435	Cocke	1	4	1.72
436	Cocke	1	4	0.79
437	Cocke	1	4	0.48
438	Cocke	1	4	0.18
439	Cocke	1	4	0.39
440	Cocke	1	4	-0.27

Mile Marker	County	TDOT Region	Number of Lanes	Grade
441	Cocke	1	4	0.95
442	Cocke	1	4	-0.78
443	Cocke	1	4	0.81
444	Cocke	1	4	0.83
445	Cocke	1	4	1.82
446	Cocke	1	4	0.83
447	Cocke	1	4	0.31
448	Cocke	1	4	0.00
449	Cocke	1	4	0.00
450	Cocke	1	4	0.00
451	Cocke	1	4	0.00

Appendix B:

Eastbound I-40 Operational Characteristics

EB I-40 Operational

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
0	Shelby	65	56492	9	57.2	7	75.25	6.55	18.2
1	Shelby	55	70531	9.55	55	7.55	80.76	5.08	14.16
2	Shelby	55	83500	9.54	55	7.54	83.76	4.08	12.16
3	Shelby	55	92241	9	55	7	85.26	3.87	10.87
4	Shelby	55	91750	9	55	7	84	4	12
5	Shelby	55	90339	9.48	55	7.48	83.52	4.24	12.24
6	Shelby	55	85870	11	55	9	82	6	12
7	Shelby	55	87247	11	55	9	82.39	4.61	13
8	Shelby	55	88716	11.6	55	9.6	82.7	4	13.3
9	Shelby	55	87120	13	55	11	82	4	14
10	Shelby	55	89696	11.88	55	9.88	82	4	14
11	Shelby	55	91720	11	55	9	82	4	14
12	Shelby	55	95514	10.64	55	8.64	82.72	4	13.28
13	Shelby	55	102260	10	55	8	84	4	12
14	Shelby	55	145041	10	55	8	87.08	3.23	9.69
15	Shelby	55	152335	10	55	8	87.4	3.15	9.45
16	Shelby	55	121250	10	55	8	84	4	12
17	Shelby	55	113635	8.84	55	6.84	83.42	4	12.58
18	Shelby	60/55	106751	8	55	6	82.76	4.08	13.16
19	Shelby	60	91010	8	55	6	80	5	15
20	Shelby	60	76069	8	55	6	76.3	4.26	19.44
21	Shelby	60	63309	8.41	55.41	6.41	71.31	4.82	23.87
22	Shelby	70/60	52500	9	56	7	66	6	28
23	Shelby	70	52362	9	55.88	7	65.88	6.03	28.09

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
24	Shelby	70	47910	9	52	7	62	7	31
25	Shelby	70	47910	9	52	7	62	7	31
26	Shelby	70	47910	9	52	7	62	7	31
27	Shelby	70	47910	9	52	7	62	7	31
28	Shelby	70	46096	8.84	52.8	6.84	61.84	6.84	31.32
29	Shelby	70	36570	8	57	6	61	6	33
30	Shelby/Fayette	70	36570	8	57	6	61	6	33
31	Fayette	70	36570	8	57	6	61	6	33
32	Fayette	70	36570	8	57	6	61	6	33
33	Fayette	70	36570	8	57	6	61	6	33
34	Fayette	70	36570	8	57	6	61	6	33
35	Fayette	70	36570	8	57	6	61	6	33
36	Fayette	70	36570	8	57	6	61	6	33
37	Fayette	70	36570	8	57	6	61	6	33
38	Fayette	70	36570	8	57	6	61	6	33
39	Fayette	70	34412	8	55.14	6	59.14	6	34.86
40	Fayette	70	34250	8	55	6	59	6	35
41	Fayette	70	34250	8	55	6	59	6	35
42	Fayette	70	34250	8	55	6	59	6	35
43	Fayette	70	34250	8	55	6	59	6	35
44	Fayette	70	34250	8	55	6	59	6	35
45	Fayette	70	34098	8	54.68	6	58.68	6.16	35.16
46	Fayette/Haywood	70	33300	8	53	6	57.23	7	35.77
47	Haywood	70	33300	8	53	6	58	7	35
48	Haywood	70	33300	8	53	6	58	7	35
49	Haywood	70	33300	8	53	6	58	7	35

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
50	Haywood	70	33300	8	53	6	58	7	35
51	Haywood	70	36484	8	51.26	6	60.61	7	32.39
52	Haywood	70	36960	8	51	6	61	7	32
53	Haywood	70	36960	8	51	6	61	7	32
54	Haywood	70	36960	8	51	6	61	7	32
55	Haywood	70	36145	8	50.61	6	60.22	7	32.78
56	Haywood	70	34870	8	50	6	59	7	34
57	Haywood	70	34870	8	50	6	59	7	34
58	Haywood	70	34870	8	50	6	59	7	34
59	Haywood	70	34870	8	50	6	59	7	34
60	Haywood	70	35807	8	54.55	6	59.91	7	33.09
61	Haywood	70	35900	8	55	6	60	7	33
62	Haywood	70	35900	8	55	6	60	7	33
63	Haywood	70	35081	8	54.04	6	58.08	7.32	34.6
64	Haywood	70	33340	8	52	6	54	8	38
65	Haywood	70	33340	8	52	6	54	8	38
66	Haywood	70	33340	8	52	6	54	8	38
67	Haywood	70	33340	8	52	6	54	8	38
68	Haywood	70	33340	8	52	6	54	8	38
69	Haywood	70	35582	8	51.41	6	56.95	7.41	35.64
70	Haywood/Madison	70	37140	8	51	6	59	7	34
71	Madison	70	36982	8	51.48	6	60.2	6.76	33.04
72	Madison	70	36480	8	53	6	64	6	30
73	Madison	70	36480	8	53	6	64	6	30
74	Madison	70	36480	8	53	6	64	6	30
75	Madison	70	36480	8	53	6	64	6	30

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
76	Madison	70	36480	8	53	6	64	6	30
77	Madison	70	36480	8	53	6	64	6	30
78	Madison	70	38144	8	50.6	6	66.4	5.2	28.4
79	Madison	70	39063	8	50.2	6	67.4	5	27.6
80	Madison	70	43590	8	52	6	71	5	24
81	Madison	70	43590	8	52	6	71	5	24
82	Madison	70/65	43032	8.34	53.36	6.34	71	5	24
83	Madison	65	41919	9	55.64	7	71	5	24
84	Madison	65	41430	9	50	7	71	5	24
85	Madison	65/55/70	46426	9	51.22	7	71	5	24
86	Madison	70	48182	9	51.66	7	71	5	24
87	Madison	70	45390	9	51	7	71	5	24
88	Madison	70	39964	8.24	53.28	6.24	64.92	5.76	29.32
89	Madison	70	38250	8	54	6	63	6	31
90	Madison	70	35588	9.28	54.64	7.28	63	6	31
91	Madison	70	34090	10	55	8	63	6	31
92	Madison	70	34090	10	55	8	63	6	31
93	Madison	70	34090	10	55	8	63	6	31
94	Madison	70	34090	10	55	8	63	6	31
95	Madison	70	34090	10	55	8	63	6	31
96	Madison	70	34090	10	55	8	63	6	31
97	Madison	70	32984	8.06	51.12	6.06	59.12	6	34.88
98	Madison/Henderson	70	32950	8	51	6	59	6	35
99	Henderson	70	32950	8	51	6	59	6	35
100	Henderson	70	32950	8	51	6	59	6	35
101	Henderson	70	32950	8	51	6	59	6	35

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
102	Henderson	70	32950	8	51	6	59	6	35
103	Henderson	70	32950	8	51	6	59	6	35
104	Henderson	70	32675	8	51	6	61.68	6	32.32
105	Henderson	70	32540	8	51	6	63	6	31
106	Henderson	70	32540	8	51	6	63	6	31
107	Henderson	70	32540	8	51	6	63	6	31
108	Henderson	70	32540	8	51	6	63	6	31
109	Henderson	70	32540	8	51	6	63	6	31
110	Henderson	70	32540	8	51	6	63	6	31
111	Henderson	70	33382	8	52.17	6	63	6	31
112	Henderson	70	34700	8	54	6	63	6	31
113	Henderson	70	34700	8	54	6	63	6	31
114	Henderson	70	34700	8	54	6	63	6	31
115	Henderson	70	34700	8	54	6	63	6	31
116	Henderson	70	34700	8	54	6	63	6	31
117	Henderson	70	34700	8	54	6	63	6	31
118	Henderson	70	34700	8	54	6	63	6	31
119	Henderson	70	34705	8	53.46	6	63.54	6	30.46
120	Henderson	70	34720	8	52	6	65	6	29
121	Henderson	70	34720	8	52	6	65	6	29
122	Henderson	70	34720	8	52	6	65	6	29
123	Henderson/Carroll/Decatur	70	34720	8	52	6	65	6	29
124	Decatur	70	34720	8	52	6	65	6	29
125	Decatur	70	34720	8	52	6	65	6	29
126	Decatur	70	34720	8	52	6	65	6	29

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
127	Decatur	70	34720	8	52	6	65	6	29
128	Decatur	70	34720	8	52	6	65	6	29
129	Decatur/Benton	70	35055	8.5	51.5	6.5	62.5	6.5	31
130	Benton	70	35390	9	51	7	60	7	33
131	Benton	70	35390	9	51	7	60	7	33
132	Benton	70	35390	9	51	7	60	7	33
133	Benton	70	35390	9	51	7	60	7	33
134	Benton	70	35390	9	51	7	60	7	33
135	Benton	70	35390	9	51	7	60	7	33
136	Benton	70	32938	9	50.61	7	59.61	7	33.39
137	Benton	70	29260	9	50	7	59	7	34
138	Benton/Humphreys	70	30865	8.34	52.36	6.41	59	7	34
139	Humphreys	70	29260	8.41	50	7	59	7	34
140	Humphreys	70	32223	8.34	51.98	6.34	59	7	34
141	Humphreys	70	33750	8	53	6	59	7	34
142	Humphreys	70	33750	8	53	6	59	7	34
143	Humphreys	70	33750	8	53	6	59	7	34
144	Humphreys	70	33750	8	53	6	59	7	34
145	Humphreys	70	33750	8	53	6	59	7	34
146	Humphreys	70	32549	8	51.96	6	59	7	34
147	Humphreys	70	31440	8	51	6	59	7	34
148	Humphreys	70	31440	8	51	6	59	7	34
149	Humphreys	70	31440	8	51	6	59	7	34
150	Humphreys	70	31440	8	51	6	59	7	34
151	Humphreys/Hickman	70	31607	8	51.42	6	59	7	34
152	Hickman	70	31980	8	54	6	59	7	34

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
153	Hickman	70	31980	8	54	6	59	7	34
154	Hickman	70	31591	8	51.84	6	59	7	34
155	Hickman	70	30864	8	53.1	6	59	7	34
156	Hickman	70	31980	8	54	6	59	7	34
157	Hickman	70	31980	8	54	6	59	7	34
158	Hickman	70	31980	8	54	6	59	7	34
159	Hickman	70	31980	8	54	6	59	7	34
160	Hickman	70	31980	8	54	6	59	7	34
161	Hickman	70	31980	8	54	6	59	7	34
162	Hickman	70	31980	8	54	6	59	7	34
163	Hickman/Dickson	70	29936	8	57.8	6	59	7	34
164	Dickson	70	29290	8	59	6	59	7	34
165	Dickson	70	29290	8	59	6	59	7	34
166	Dickson	70	29290	8	59	6	59	7	34
167	Dickson	70	29290	8	59	6	59	7	34
168	Dickson	70	29290	8	59	6	59	7	34
169	Dickson	70	29290	8	59	6	59	7	34
170	Dickson	70	29290	8	59	6	59	7	34
171	Dickson	70	29290	8	59	6	59	7	34
172	Dickson	70	32625	8	57.7	6	57.7	7	35.3
173	Dickson	70	34420	8	57	6	57	7	36
174	Dickson	70	34420	8	57	6	57	7	36
175	Dickson	70	34420	8	57	6	57	7	36
176	Dickson	70	39820	8	54.9	6	57	7	36
177	Dickson	70	39820	8	54	6	57	7	36
178	Dickson	70	39820	8	54	6	57	7	36

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
179	Dickson	70	39820	8	54	6	57	7	36
180	Dickson/Williamson	70	39820	8	54	6	57	7	36
181	Williamson	70	44311	8	55.98	6	62.28	6.67	31.05
182	Williamson	70	53430	8	60	6	73	6	21
183	Williamson	70	53430	8	60	6	73	6	21
184	Williamson/Cheatham	70	53430	8	60	6	73	6	21
185	Cheatham	70	53430	8	60	6	73	6	21
186	Cheatham	70	53430	8	60	6	73	6	21
187	Cheatham	70	54877	8.27	61.89	6.27	71.65	6.27	22.08
188	Cheatham	70	58790	9	67	7	68	7	25
189	Cheatham	70	58790	9	67	7	68	7	25
190	Cheatham	70	58790	9	67	7	68	7	25
191	Cheatham/Davidson	70	58790	9	67	7	68	7	25
192	Davidson	70	57391	8.29	71.26	6.29	69.42	7	23.58
193	Davidson	70	56820	8	73	6	70	7	23
194	Davidson	70	56820	8	73	6	70	7	23
195	Davidson	70	56820	8	73	6	70	7	23
196	Davidson	70	62929	10.85	65.4	8.85	73.8	6.05	20.15
197	Davidson	70	63250	11	65	9	74	6	20
198	Davidson	70	64310	11	65	9	74.35	5.93	19.72
199	Davidson	70	78390	11	65	9	79	5	16
200	Davidson	65/70	79493	11	65	9	79.51	4.83	15.66
201	Davidson	65	84880	11	65	9	82	4	14
202	Davidson	65/55	84880	11	65	9	82	4	14
203	Davidson	55	87698	11	65	9	82.31	4	13.69
204	Davidson	55	104487	11	65	9	84.8	3.55	11.65

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
205	Davidson	55	104488	11	65	9	84.9	3.42	11.68
206	Davidson	55	87177	11	65	9	82	4	14
207	Davidson	55	92822	11	65	9	81.52	4.48	14
208	Davidson	55	93938	11	61.55	9	77.47	5.43	17.1
209	Davidson	55	116699	11	60	9	80.24	4.69	15.07
210	Davidson	55	130564	11	60	9	84.44	3.64	11.92
211	Davidson	55	168889	11	60	9	86.31	3.23	10.46
212	Davidson	55	141342	11	61	9	85	3.6	11.4
213	Davidson	55	113390	11	65	9	89	2	9
214	Davidson	55	114410	11	65	9	89.47	1.53	9
215	Davidson	55	114268	11	65	9	89.67	1.11	9.22
216	Davidson	55	102413	11	65	9	87	2	11
217	Davidson	55/65	101870	11	65	9	87	2	11
218	Davidson	65	102092	11	65	9	87	2	11
219	Davidson	65/70	102610	11	65	9	87	2	11
220	Davidson	70	87746	11	62.9	9	84.06	2.42	13.52
221	Davidson	70	67220	11	60	9	80	3	17
222	Davidson	70	67220	11	60	9	80	3	17
223	Davidson	70	67220	11	60	9	80	3	17
224	Davidson	70	67220	11	60	9	80	3	17
225	Davidson/Wilson	70	63260	10.55	55.95	8.55	77.75	3	19.25
226	Wilson	70	58420	10	51	8	75	3	22
227	Wilson	70	58420	10	51	8	75	3	22
228	Wilson	70	58420	10	51	8	75	3	22
229	Wilson	70	58420	10	51	8	75	3	22
230	Wilson	70	58420	10	51	8	75	3	22

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
231	Wilson	70	53843	9.54	55.14	7.54	74.54	3	22.46
232	Wilson	70	48470	9	60	7	74	3	23
233	Wilson	70	48470	9	60	7	74	3	23
234	Wilson	70	52659	9	60	7	74.78	3	22.22
235	Wilson	70	59210	9	60	7	76	3	21
236	Wilson	70	58612	9	58.1	7	76	3	21
237	Wilson	70	56668	9	58.9	7	75.1	3	21.9
238	Wilson	70	54330	9	60	7	74	3	23
239	Wilson	70	44895	9	56.3	7	68.82	3.74	27.44
240	Wilson	70	41580	9	55	7	67	4	29
241	Wilson	70	41580	9	55	7	67	4	29
242	Wilson	70	41580	9	55	7	67	4	29
243	Wilson	70	41580	9	55	7	67	4	29
244	Wilson	70	40795	8.48	57.08	6.48	67.56	4.52	27.92
245	Wilson	70	40070	8	59	6	70	5	25
246	Wilson	70	40070	8	59	6	70	5	25
247	Wilson	70	40070	8	59	6	70	5	25
248	Wilson	70	40070	8	59	6	70	5	25
249	Wilson/Smith	70	40070	8	59	6	70	5	25
250	Smith	70	40070	8	59	6	70	5	25
251	Smith	70	40070	8	59	6	70	5	25
252	Smith	70	40070	8	59	6	70	5	25
253	Smith	70	39900	8	58.84	6	69.92	5.08	25
254	Smith	70	37940	8	57	6	68.68	6	25.32
255	Smith	70	37940	8	57	6	65	6	29
256	Smith	70	37940	8	57	6	65	6	29

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
257	Smith	70	37940	8	57	6	65	6	29
258	Smith	70	35809	8	55.68	6	68.84	5.04	26.12
259	Smith	70	35720	8	58	6	69	5	26
260	Smith	70	35720	8	58	6	69	5	26
261	Smith	70	35720	8	58	6	69	5	26
262	Smith	70	35720	8	58	6	69	5	26
263	Smith	70	35720	8	58	6	69	5	26
264	Smith	70	35720	8	58	6	69	5	26
265	Smith	70	35720	8	58	6	69	5	26
266	Smith/Putnam	70	35720	8	58	6	69	5	26
267	Putnam	70	35686	8	56.4	6	69.2	5	25.8
268	Putnam	70	35550	8	50	6	70	5	25
269	Putnam	70	35550	8	50	6	70	5	25
270	Putnam	70	35550	8	50	6	70	5	25
271	Putnam	70	35550	8	50	6	70	5	25
272	Putnam	70	35550	8	50	6	70	5	25
273	Putnam	70	37979	8	50.92	6	70	5	25
274	Putnam	70	38190	8	51	6	70	5	25
275	Putnam	70	38841	8.27	51.54	6.27	69.73	5	25.27
276	Putnam	70	40600	9	53	7	69	5	26
277	Putnam	70	40600	9	53	7	69	5	26
278	Putnam	70	40600	9	53	7	69	5	26
279	Putnam	70	40417	9	48.34	6.71	69.58	5	25.42
280	Putnam	70	39970	9	51	6	71	5	24
281	Putnam	70	39970	9	51	6	71	5	24
282	Putnam	70	39970	9	51	6	71	5	24

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
283	Putnam	70	39970	9	51	6	71	5	24
284	Putnam	70	39970	9	51	6	71	5	24
285	Putnam	70	39805	9	51	6.66	69.02	5	25.98
286	Putnam	70	39469	9	50.81	7	68	5	27
287	Putnam	70	38400	9	50	7	68	5	27
288	Putnam	70	38589	9	51.72	7	68	5	27
289	Putnam	70	39000	9	52	7	69.05	5	25.95
290	Putnam	70	40430	9	52	7	73	5	22
291	Putnam	70/65	40430	9	52	7	73	5	22
292	Putnam	65	40430	9	52	7	73	5	22
293	Putnam	65	40430	9	52	7	73	5	22
294	Putnam	65	40430	9	52	7	73	5	22
295	Putnam	65	40430	9	52	7	73	5	22
296	Putnam	65/70	40430	9	52	7	73	5	22
297	Putnam	70	40430	9	52	7	73	5	22
298	Putnam	70	40430	9	52	7	73	5	22
299	Putnam	70	40430	9	52	7	73	5	22
300	Putnam	70	39370	9	55.42	7	71.86	5	23.14
301	Putnam	70	35249	8.08	56.16	6.08	70.08	5.92	24
302	Putnam	70	34960	8	56	6	70	6	24
303	Putnam	70	34960	8	56	6	70	6	24
304	Putnam/Cumberland	70	34960	8	56	6	70	6	24
305	Cumberland	70	34960	8	56	6	70	6	24
306	Cumberland	70	34960	8	56	6	70	6	24
307	Cumberland	70	34960	8	56	6	70	6	24
308	Cumberland	70	34960	8	56	6	70	6	24

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
309	Cumberland	70	34960	8	56	6	70	6	24
310	Cumberland	70	36510	8.52	56	6.52	67.92	6.52	25.56
311	Cumberland	70	37940	9	56	7	66	7	27
312	Cumberland	70	37940	9	56	7	66	7	27
313	Cumberland	70	37940	9	56	7	66	7	27
314	Cumberland	70	37940	9	56	7	66	7	27
315	Cumberland	70	37940	9	56	7	66	7	27
316	Cumberland	70	37940	9	56	7	66	7	27
317	Cumberland	70	38844	9	52.6	7	68.04	7	24.96
318	Cumberland	70	39270	9	51	7	69	7	24
319	Cumberland	70	39964	9	53.04	7	69	7	24
320	Cumberland	70	40630	9	55	7	69	7	24
321	Cumberland	70	38110	9	53.88	7	67.88	7	25.12
322	Cumberland	70	31630	9	51	7	65	7	28
323	Cumberland	70	31630	9	51	7	65	7	28
324	Cumberland	70	31630	9	51	7	65	7	28
325	Cumberland	70	31630	9	51	7	65	7	28
326	Cumberland	70	31630	9	51	7	65	7	28
327	Cumberland	70	31630	9	51	7	65	7	28
328	Cumberland	70	31630	9	51	7	65	7	28
329	Cumberland	70	35392	9	51.95	7	65	7	28
330	Cumberland	70	35590	9	52	7	65	7	28
331	Cumberland	70	35590	9	52	7	65	7	28
332	Cumberland	70	35590	9	52	7	65	7	28
333	Cumberland	70	35590	9	52	7	65	7	28
334	Cumberland	70	35590	9	52	7	65	7	28

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
335	Cumberland	70	35590	9	52	7	65	7	28
336	Cumberland	70	35590	9	52	7	65	7	28
337	Cumberland	70	35590	9	52	7	65	7	28
338	Cumberland	70	37140	9	50.48	7	65.76	7	27.24
339	Cumberland	70	37630	9	50	7	66	7	27
340	Cumberland/Roane	70	35860	8.21	51.58	6.21	66.79	7	26.21
341	Roane	70	35390	8	52	6	67	7	26
342	Roane	70	35390	8	52	6	67	7	26
343	Roane	70	35390	8	52	6	67	7	26
344	Roane	70	35390	8	52	6	67	7	26
345	Roane	70	35390	8	52	6	67	7	26
346	Roane	70	35390	8	52	6	67	7	26
347	Roane	70	37659	8.57	52	6.57	69.85	6.43	23.72
348	Roane	70	39370	9	52	7	72	6	22
349	Roane	70	39370	9	52	7	72	6	22
350	Roane	70	43024	8.3	52	6.3	73.4	6	20.6
351	Roane	70	44590	8	52	6	74	6	20
352	Roane	70	43366	8.51	52.51	6.51	75.02	5.49	19.49
353	Roane	70	42190	9	53	7	76	5	19
354	Roane	70	42190	9	53	7	76	5	19
355	Roane	70	45186	9	54.32	7	76	5	19
356	Roane	70	41992	9	52.48	7	75.37	5	19.63
357	Roane	70	39210	9	51	7	75	5	20
358	Roane	70	39210	9	51	7	75	5	20
359	Roane	70	39210	9	51	7	75	5	20
360	Roane	70	42626	9	52.8	7	73.2	5.45	21.35

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
361	Roane	70	46800	9	55	7	71	6	23
362	Roane	70	46800	9	55	7	71	6	23
363	Roane/Loudon	70	45162	9	53.8	7	71.6	6	22.4
364	Loudon	70	41340	9	51	7	73	6	21
365	Loudon	70	41340	9	51	7	73	6	21
366	Loudon	70	41340	9	51	7	73	6	21
367	Loudon	70	43821	9	51.45	7	72.95	5.95	21.1
368	Loudon/Knox	70	91152	9	60	7	72	5	23
369	Knox	70	93090	9	60	7	72	5	23
370	Knox	70	93090	9	60	7	72	5	23
371	Knox	70	93090	9	60	7	72	5	23
372	Knox	60/70	95809	9	60	7	73.24	4.69	22.07
373	Knox	60	101860	9	60	7	76	4	20
374	Knox	60	108988	9	60	7	76.55	4	19.45
375	Knox	55/60	114820	9	60	7	77	4	19
376	Knox	55	140974	9	60	7	81.5	3.1	15.4
377	Knox	55	146357	9	60	7	82.39	3	14.61
378	Knox	55	150230	9	60	7	83	3	14
379	Knox	55	147065	9	60	7	83.92	3	13.08
380	Knox	55	146642	9	60	7	84	3	13
381	Knox	55	146430	9	60	7	84	3	13
382	Knox	55	147179	9	60	7	84.16	3	12.84
383	Knox	55	155790	9	60	7	86	3	11
384	Knox	55	155352	9	60.1	7	86.07	3	10.93
385	Knox	55	112030	9	70	7	93	3	4
386	Knox	55	113760	9	63.8	7	93	3	4

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
387	Knox	55	104202	9	60	7	93	3	4
388	Knox	55	93114	9	60	7	92.82	3	4.18
389	Knox	55	84160	9	60	7	91	3	6
390	Knox	55	76163	9	60	7	91.68	3.98	4.04
391	Knox	55	74907	9	60	7	91.68	4	4.32
392	Knox	55	75900	9	60	7	88.8	3.76	7.44
393	Knox	55	91600	9	60	7	83.4	3.4	13.2
394	Knox	60/55	69160	9	60	7	77	5	18
395	Knox	70/60	69160	9	60	7	77	5	18
396	Knox	70	69160	9	60	7	77	5	18
397	Knox	70	68289	9	58.2	7	76.64	5	18.36
398	Knox	70	66740	9	55	7	76	5	19
399	Knox	70	66740	9	55	7	76	5	19
400	Knox	70	66740	9	55	7	76	5	19
401	Knox	70	66740	9	55	7	76	5	19
402	Knox	70	66740	9	55	7	76	5	19
403	Knox	70	66740	9	55	7	76	5	19
404	Knox/Jefferson	70	65182	9	55	7	75.4	5.15	19.45
405	Jefferson	70	57800	9	55	7	72	6	22
406	Jefferson	70	57800	9	55	7	72	6	22
407	Jefferson	70	57921	9	55	7	72.71	6	21.29
408	Jefferson	70	57970	9	55	7	73	6	21
409	Jefferson	70	57970	9	55	7	73	6	21
410	Jefferson	70	57318	9	55	7	72.47	6	21.53
411	Jefferson	70	56740	9	55	7	72	6	22
412	Jefferson	70	56694	8.76	54.04	6.76	72	6	22

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
413	Jefferson	70	56550	8	51	6	72	6	22
414	Jefferson	70	56550	8	51	6	72	6	22
415	Jefferson	70	56550	8	51	6	72	6	22
416	Jefferson/Sevier	70	40687	8	50.42	6	72	4.26	23.74
417	Sevier	70	29200	8	50	6	72	3	25
418	Sevier	70	29200	8	50	6	72	3	25
419	Sevier	70	28874	8	52.04	6	65.2	3	31.8
420	Sevier	70	28720	8	53	6	62	3	35
421	Sevier/Cocke	70	28720	8	53	6	62	3	35
422	Cocke	70	28720	8	53	6	62	3	35
423	Cocke	70	28720	8	53	6	62	3	35
424	Cocke	70	29450	8	53.04	6	62.28	3.04	34.68
425	Cocke	70	65240	8	55	6	76	5	19
426	Cocke	70	65240	8	55	6	76	5	19
427	Cocke	70	61074	8.56	55	6.56	73.76	5.56	20.68
428	Cocke	70	57800	9	55	7	72	6	22
429	Cocke	70	50239	8.74	54.48	6.74	69.4	5.22	25.4
430	Cocke	70	28720	8	53	6	62	3	35
431	Cocke	70	27587	8	53.48	6	65.36	3	31.64
432	Cocke	70	26360	8	54	6	69	3	28
433	Cocke	70	26360	8	54	6	69	3	28
434	Cocke	70/60	26360	8	54	6	69	3	28
435	Cocke	55/60	25647	8.72	56.88	6.72	66.12	3	30.88
436	Cocke	55	26370	9	58	7	65	3	32
437	Cocke	55	26370	9	58	7	65	3	32
438	Cocke	55	26370	9	58	7	65	3	32

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
439	Cocke	55	26370	9	58	7	65	3	32
440	Cocke	55	24411	8.71	56.58	7	65.71	3	31.3
441	Cocke	55	25370	9	56	7	66	3	31
442	Cocke	55	25370	9	56	7	66	3	31
443	Cocke	55	25017	9	56.89	7	66	3	31
444	Cocke	55	24020	9	57	7	66	3	31
445	Cocke	55	24020	9	57	7	66	3	31
446	Cocke	55	24020	9	57	7	66	3	31
447	Cocke	55	23620	9	52.2	6.2	66	3	31
448	Cocke	55	25140	9	51	6	66	3	31
449	Cocke	55	25140	9	51	6	66	3	31
450	Cocke	55	23123	8.74	51	6	66	3	31
451	Cocke	55	22790	8	51	6	66	3	31

Appendix C:

Eastbound I-40 Safety

EB I-40 Safety

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
0	Shelby	3	5	1
1	Shelby	1	1	0
2	Shelby	1	1	0
3	Shelby	0	0	0
4	Shelby	1	1	0
5	Shelby	2	2	0
6	Shelby	0	0	0
7	Shelby	1	1	0
8	Shelby	1	1	0
9	Shelby	1	1	0
10	Shelby	0	0	0
11	Shelby	2	2	0
12	Shelby	1	1	0
13	Shelby	2	2	0
14	Shelby	2	2	1
15	Shelby	1	1	0
16	Shelby	0	0	0
17	Shelby	1	1	0
18	Shelby	1	1	0
19	Shelby	0	0	0
20	Shelby	0	0	0
21	Shelby	1	1	0
22	Shelby	0	0	0
23	Shelby	0	0	0
24	Shelby	0	0	0
25	Shelby	1	1	0
26	Shelby	1	1	0
27	Shelby	0	0	0
28	Shelby	0	0	0
29	Shelby	1	1	0
30	Shelby/Fayette	0	0	0
31	Fayette	0	0	0
32	Fayette	2	4	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
33	Fayette	0	0	0
34	Fayette	1	1	0
35	Fayette	0	0	0
36	Fayette	0	0	0
37	Fayette	0	0	0
38	Fayette	0	0	0
39	Fayette	1	1	0
40	Fayette	0	0	0
41	Fayette	1	1	1
42	Fayette	0	0	0
43	Fayette	0	0	0
44	Fayette	1	3	0
45	Fayette	0	0	0
46	Fayette/Haywood	0	0	0
47	Haywood	0	0	0
48	Haywood	0	0	0
49	Haywood	0	0	0
50	Haywood	1	1	2
51	Haywood	1	1	1
52	Haywood	0	0	0
53	Haywood	0	0	0
54	Haywood	1	1	1
55	Haywood	1	1	1
56	Haywood	1	1	0
57	Haywood	0	0	0
58	Haywood	0	0	0
59	Haywood	0	0	0
60	Haywood	1	1	0
61	Haywood	0	0	0
62	Haywood	0	0	0
63	Haywood	1	1	0
64	Haywood	1	1	0
65	Haywood	0	0	0
66	Haywood	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
67	Haywood	1	2	0
68	Haywood	0	0	0
69	Haywood	0	0	0
70	Haywood/Madison	3	3	4
71	Madison	0	0	0
72	Madison	1	1	0
73	Madison	0	0	0
74	Madison	1	1	1
75	Madison	2	3	1
76	Madison	2	3	1
77	Madison	2	3	1
78	Madison	3	6	2
79	Madison	0	0	0
80	Madison	3	5	2
81	Madison	1	1	0
82	Madison	0	0	0
83	Madison	1	1	0
84	Madison	1	1	0
85	Madison	0	0	0
86	Madison	1	1	0
87	Madison	1	3	2
88	Madison	0	0	4
89	Madison	0	0	0
90	Madison	2	2	0
91	Madison	1	1	0
92	Madison	1	1	0
93	Madison	0	0	0
94	Madison	0	0	0
95	Madison	0	0	0
96	Madison	0	0	0
97	Madison	0	0	0
98	Madison/Henderson	0	0	0
99	Henderson	1	1	1
100	Henderson	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
101	Henderson	0	0	0
102	Henderson	0	0	0
103	Henderson	1	4	0
104	Henderson	3	4	0
105	Henderson	0	0	0
106	Henderson	1	1	0
107	Henderson	0	0	0
108	Henderson	0	0	0
109	Henderson	2	2	1
110	Henderson	0	0	0
111	Henderson	0	0	0
112	Henderson	3	4	4
113	Henderson	2	2	3
114	Henderson	1	3	0
115	Henderson	1	1	0
116	Henderson	1	1	1
117	Henderson	0	0	0
118	Henderson	0	0	0
119	Henderson	1	1	0
120	Henderson	0	0	0
121	Henderson	1	1	0
122	Henderson	0	0	0
123	Henderson/Carroll/Decatur	0	0	0
124	Decatur	0	0	0
125	Decatur	0	0	0
126	Decatur	0	0	0
127	Decatur	0	0	0
128	Decatur	0	0	0
129	Decatur/Benton	0	0	0
130	Benton	0	0	0
131	Benton	1	2	3
132	Benton	0	0	0
133	Benton	0	0	0
134	Benton	1	1	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
135	Benton	0	0	0
136	Benton	1	1	0
137	Benton	0	0	0
138	Benton/Humphreys	1	1	0
139	Humphreys	1	1	0
140	Humphreys	3	3	1
141	Humphreys	0	0	0
142	Humphreys	0	0	0
143	Humphreys	0	0	0
144	Humphreys	0	0	0
145	Humphreys	1	2	0
146	Humphreys	1	1	0
147	Humphreys	0	0	0
148	Humphreys	0	0	0
149	Humphreys	0	0	0
150	Humphreys	1	1	2
151	Humphreys/Hickman	0	0	0
152	Hickman	0	0	0
153	Hickman	0	0	0
154	Hickman	0	0	0
155	Hickman	1	1	0
156	Hickman	0	0	0
157	Hickman	0	0	0
158	Hickman	0	0	0
159	Hickman	0	0	0
160	Hickman	0	0	0
161	Hickman	1	1	0
162	Hickman	1	1	1
163	Hickman/Dickson	0	0	0
164	Dickson	0	0	0
165	Dickson	0	0	0
166	Dickson	1	1	0
167	Dickson	0	0	0
168	Dickson	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
169	Dickson	0	0	0
170	Dickson	1	1	0
171	Dickson	0	0	0
172	Dickson	0	0	0
173	Dickson	0	0	0
174	Dickson	0	0	0
175	Dickson	0	0	0
176	Dickson	0	0	0
177	Dickson	1	1	0
178	Dickson	0	0	0
179	Dickson	1	1	0
180	Dickson/Williamson	1	1	1
181	Williamson	0	0	0
182	Williamson	1	1	0
183	Williamson	0	0	0
184	Williamson/Cheatham	1	1	0
185	Cheatham	0	0	0
186	Cheatham	1	1	3
187	Cheatham	1	2	0
188	Cheatham	1	1	0
189	Cheatham	1	1	0
190	Cheatham	0	0	0
191	Cheatham/Davidson	0	0	0
192	Davidson	2	2	2
193	Davidson	0	0	0
194	Davidson	0	0	0
195	Davidson	0	0	0
196	Davidson	0	0	0
197	Davidson	0	0	0
198	Davidson	0	0	0
199	Davidson	0	0	0
200	Davidson	5	5	4
201	Davidson	2	2	1
202	Davidson	2	2	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
203	Davidson	2	2	0
204	Davidson	3	3	0
205	Davidson	0	0	0
206	Davidson	1	1	0
207	Davidson	1	1	0
208	Davidson	0	0	0
209	Davidson	1	1	0
210	Davidson	2	2	0
211	Davidson	2	2	0
212	Davidson	0	0	0
213	Davidson	1	1	0
214	Davidson	1	1	0
215	Davidson	1	1	0
216	Davidson	0	0	0
217	Davidson	1	1	0
218	Davidson	2	2	2
219	Davidson	1	1	0
220	Davidson	1	2	0
221	Davidson	1	1	2
222	Davidson	0	0	0
223	Davidson	0	0	0
224	Davidson	1	1	0
225	Davidson/Wilson	1	2	1
226	Wilson	0	0	0
227	Wilson	1	1	5
228	Wilson	0	0	0
229	Wilson	1	1	0
230	Wilson	2	2	0
231	Wilson	0	0	0
232	Wilson	2	3	3
233	Wilson	2	2	0
234	Wilson	0	0	0
235	Wilson	1	1	0
236	Wilson	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
237	Wilson	0	0	0
238	Wilson	1	1	1
239	Wilson	1	1	0
240	Wilson	0	0	0
241	Wilson	0	0	0
242	Wilson	0	0	0
243	Wilson	0	0	0
244	Wilson	2	3	1
245	Wilson	1	1	0
246	Wilson	0	0	0
247	Wilson	2	2	5
248	Wilson	0	0	0
249	Wilson/Smith	0	0	0
250	Smith	1	1	0
251	Smith	1	1	0
252	Smith	1	1	0
253	Smith	0	0	0
254	Smith	1	2	2
255	Smith	0	0	0
256	Smith	0	0	0
257	Smith	1	1	0
258	Smith	0	0	0
259	Smith	0	0	0
260	Smith	0	0	0
261	Smith	1	1	0
262	Smith	1	2	0
263	Smith	0	0	0
264	Smith	2	3	0
265	Smith	0	0	0
266	Smith/Putnam	0	0	0
267	Putnam	0	0	0
268	Putnam	0	0	0
269	Putnam	0	0	0
270	Putnam	1	1	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
271	Putnam	1	1	0
272	Putnam	1	1	0
273	Putnam	0	0	0
274	Putnam	0	0	0
275	Putnam	2	4	4
276	Putnam	1	1	0
277	Putnam	1	1	0
278	Putnam	0	0	0
279	Putnam	1	1	0
280	Putnam	0	0	0
281	Putnam	0	0	0
282	Putnam	0	0	0
283	Putnam	1	1	0
284	Putnam	0	0	0
285	Putnam	2	2	1
286	Putnam	2	2	1
287	Putnam	0	0	0
288	Putnam	0	0	0
289	Putnam	0	0	0
290	Putnam	0	0	0
291	Putnam	0	0	0
292	Putnam	0	0	0
293	Putnam	0	0	0
294	Putnam	0	0	0
295	Putnam	0	0	0
296	Putnam	0	0	0
297	Putnam	0	0	0
298	Putnam	2	2	1
299	Putnam	1	1	0
300	Putnam	0	0	0
301	Putnam	1	1	0
302	Putnam	0	0	0
303	Putnam	2	2	0
304	Putnam/Cumberland	1	1	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
305	Cumberland	1	1	1
306	Cumberland	2	2	0
307	Cumberland	0	0	0
308	Cumberland	1	1	0
309	Cumberland	0	0	0
310	Cumberland	1	1	0
311	Cumberland	0	0	0
312	Cumberland	2	2	0
313	Cumberland	1	1	0
314	Cumberland	0	0	0
315	Cumberland	3	4	2
316	Cumberland	1	1	0
317	Cumberland	0	0	0
318	Cumberland	0	0	0
319	Cumberland	0	0	0
320	Cumberland	2	2	0
321	Cumberland	0	0	0
322	Cumberland	0	0	0
323	Cumberland	0	0	0
324	Cumberland	0	0	0
325	Cumberland	0	0	0
326	Cumberland	1	1	1
327	Cumberland	0	0	0
328	Cumberland	0	0	0
329	Cumberland	0	0	0
330	Cumberland	0	0	0
331	Cumberland	1	1	0
332	Cumberland	0	0	0
333	Cumberland	0	0	0
334	Cumberland	0	0	0
335	Cumberland	0	0	0
336	Cumberland	1	1	0
337	Cumberland	1	2	2
338	Cumberland	1	1	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
339	Cumberland	0	0	0
340	Cumberland/Roane	1	1	1
341	Roane	1	1	0
342	Roane	0	0	0
343	Roane	1	1	1
344	Roane	1	2	1
345	Roane	0	0	0
346	Roane	1	1	0
347	Roane	0	0	0
348	Roane	0	0	0
349	Roane	0	0	0
350	Roane	0	0	0
351	Roane	1	1	0
352	Roane	0	0	0
353	Roane	0	0	0
354	Roane	0	0	0
355	Roane	1	2	0
356	Roane	0	0	0
357	Roane	0	0	0
358	Roane	3	3	3
359	Roane	1	1	0
360	Roane	0	0	0
361	Roane	1	1	0
362	Roane	0	0	0
363	Roane/Loudon	0	0	0
364	Loudon	0	0	0
365	Loudon	0	0	0
366	Loudon	0	0	0
367	Loudon	0	0	0
368	Loudon/Knox	1	2	0
369	Knox	0	0	0
370	Knox	1	1	0
371	Knox	0	0	0
372	Knox	1	1	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
373	Knox	1	1	0
374	Knox	2	2	0
375	Knox	0	0	0
376	Knox	1	1	0
377	Knox	1	1	0
378	Knox	1	1	0
379	Knox	0	0	0
380	Knox	1	1	0
381	Knox	1	1	0
382	Knox	2	2	1
383	Knox	0	0	0
384	Knox	0	0	0
385	Knox	1	1	0
386	Knox	1	1	0
387	Knox	0	0	0
388	Knox	2	2	0
389	Knox	0	0	0
390	Knox	1	1	1
391	Knox	1	1	0
392	Knox	3	4	2
393	Knox	0	0	0
394	Knox	2	2	1
395	Knox	0	0	0
396	Knox	1	1	0
397	Knox	0	0	0
398	Knox	1	1	1
399	Knox	1	1	1
400	Knox	1	1	0
401	Knox	1	1	0
402	Knox	0	0	0
403	Knox	1	1	0
404	Knox/Jefferson	0	0	0
405	Jefferson	1	1	0
406	Jefferson	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
407	Jefferson	0	0	0
408	Jefferson	0	0	0
409	Jefferson	1	1	2
410	Jefferson	2	2	1
411	Jefferson	0	0	0
412	Jefferson	0	0	0
413	Jefferson	0	0	0
414	Jefferson	0	0	0
415	Jefferson	0	0	0
416	Jefferson/Sevier	0	0	0
417	Sevier	1	1	0
418	Sevier	1	1	0
419	Sevier	1	1	0
420	Sevier	0	0	0
421	Sevier/Cocke	0	0	0
422	Cocke	0	0	0
423	Cocke	1	1	0
424	Cocke	0	0	0
425	Cocke	0	0	0
426	Cocke	2	2	0
427	Cocke	1	1	3
428	Cocke	1	1	0
429	Cocke	0	0	0
430	Cocke	1	1	0
431	Cocke	0	0	0
432	Cocke	0	0	0
433	Cocke	1	1	1
434	Cocke	0	0	0
435	Cocke	0	0	0
436	Cocke	0	0	0
437	Cocke	1	1	2
438	Cocke	0	0	0
439	Cocke	0	0	0
440	Cocke	2	2	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
441	Cocke	1	1	0
442	Cocke	0	0	0
443	Cocke	0	0	0
444	Cocke	0	0	0
445	Cocke	0	0	0
446	Cocke	0	0	0
447	Cocke	0	0	0
448	Cocke	0	0	0
449	Cocke	0	0	0
450	Cocke	0	0	0
451	Cocke	0	0	0

Appendix D:

Westbound I-40 Geometry

WB I-40 Geometry

Mile Marker	County	TDOT Region	Number of Lanes	Grade
451	Cocke	1	4	0.00
450	Cocke	1	4	0.00
449	Cocke	1	4	0.00
448	Cocke	1	4	0.00
447	Cocke	1	4	-0.31
446	Cocke	1	4	-0.83
445	Cocke	1	4	-1.82
444	Cocke	1	4	-0.83
443	Cocke	1	4	-0.81
442	Cocke	1	4	0.78
441	Cocke	1	4	-0.95
440	Cocke	1	4	0.27
439	Cocke	1	4	-0.39
438	Cocke	1	4	-0.18
437	Cocke	1	4	-0.48
436	Cocke	1	4	-0.79
435	Cocke	1	4	-1.72
434	Cocke	1	4	0.19
433	Cocke	1	4	0.83
432	Cocke	1	4	1.86
431	Cocke	1	4	-0.55
430	Cocke	1	4	-1.91
429	Cocke	1	4	-0.37
428	Cocke	1	4	2.25
427	Cocke	1	4	0.43
426	Cocke	1	4	-1.96
425	Cocke	1	4	0.13
424	Cocke	1	4	0.33
423	Cocke	1	4	-0.11
422	Cocke	1	4	1.12
421	Sevier/Cocke	1	6/4	-0.64
420	Sevier	1	6	-1.38
419	Sevier	1	6	-0.03

Mile Marker	County	TDOT Region	Number of Lanes	Grade
418	Sevier	1	6	-0.31
417	Sevier	1	6	0.17
416	Jefferson/Sevier	1	4/6	-0.54
415	Jefferson	1	6	0.95
414	Jefferson	1	6	1.78
413	Jefferson	1	6	2.11
412	Jefferson	1	6	0.31
411	Jefferson	1	6	1.17
410	Jefferson	1	6	-2.34
409	Jefferson	1	6	1.28
408	Jefferson	1	6	1.22
407	Jefferson	1	6	-0.92
406	Jefferson	1	6	-2.71
405	Jefferson	1	6	-1.65
404	Knox/Jefferson	1	6	-2.40
403	Knox	1	6	-0.65
402	Knox	1	6	-0.20
401	Knox	1	6	-0.01
400	Knox	1	6	-1.31
399	Knox	1	6	1.30
398	Knox	1	6	-0.14
397	Knox	1	6	1.75
396	Knox	1	6	-0.20
395	Knox	1	6	-2.31
394	Knox	1	6	-0.42
393	Knox	1	6	-1.06
392	Knox	1	6	-0.62
391	Knox	1	6	-0.28
390	Knox	1	6	0.47
389	Knox	1	6	0.80
388	Knox	1	4/6	0.11
387	Knox	1	6/4	0.29
386	Knox	1	6	0.45
385	Knox	1	6	-1.17

Mile Marker	County	TDOT Region	Number of Lanes	Grade
384	Knox	1	6	-0.93
383	Knox	1	6	0.19
382	Knox	1	6	0.74
381	Knox	1	6	0.28
380	Knox	1	6	-0.53
379	Knox	1	6	-1.33
378	Knox	1	6/8	1.50
377	Knox	1	8	1.69
376	Knox	1	6/8	-1.47
375	Knox	1	6	-1.13
374	Knox	1	6	0.91
373	Knox	1	6	0.46
372	Knox	1	6	-0.65
371	Knox	1	6	-0.53
370	Knox	1	6	1.30
369	Knox	1	6	-0.07
368	Loudon/Knox	1	6/2	1.82
367	Loudon	1	4/6	0.92
366	Loudon	1	4	-3.46
365	Loudon	1	4	0.10
364	Loudon	1	4	-1.49
363	Roane/Loudon	1	4	2.22
362	Roane	1	4	-0.68
361	Roane	1	4	0.88
360	Roane	1	4	-2.07
359	Roane	1	4	-0.54
358	Roane	1	4	0.14
357	Roane	1	4	-1.02
356	Roane	1	4	0.77
355	Roane	1	4	2.24
354	Roane	1	4	-0.06
353	Roane	1	4	-1.85
352	Roane	1	4	-1.41
351	Roane	1	4	2.30

Mile Marker	County	TDOT Region	Number of Lanes	Grade
350	Roane	1	4	0.33
349	Roane	1	4	-3.30
348	Roane	1	4	0.31
347	Roane	1	4	0.61
346	Roane	1	4	2.36
345	Roane	1	4	-0.68
344	Roane	1	4	-2.19
343	Roane	1	4	1.01
342	Roane	1	4	1.18
341	Roane	1	4	1.95
340	Cumberland/Roane	2	4	1.53
339	Cumberland	2	4	2.24
338	Cumberland	2	4	1.93
337	Cumberland	2	4	4.50
336	Cumberland	2	4	-1.13
335	Cumberland	2	4	-1.08
334	Cumberland	2	4	1.18
333	Cumberland	2	4	1.49
332	Cumberland	2	4	1.10
331	Cumberland	2	4	-0.92
330	Cumberland	2	4	2.09
329	Cumberland	2	4	0.34
328	Cumberland	2	4	0.69
327	Cumberland	2	4	0.06
326	Cumberland	2	4	-1.48
325	Cumberland	2	4	1.78
324	Cumberland	2	4	-0.18
323	Cumberland	2	4	-1.92
322	Cumberland	2	4	3.03
321	Cumberland	2	4	0.05
320	Cumberland	2	4	-0.72
319	Cumberland	2	4	0.88
318	Cumberland	2	4	1.20
317	Cumberland	2	4	-1.61

Mile Marker	County	TDOT Region	Number of Lanes	Grade
316	Cumberland	2	4	0.39
315	Cumberland	2	4	-0.63
314	Cumberland	2	4	-0.18
313	Cumberland	2	4	-0.83
312	Cumberland	2	4	1.76
311	Cumberland	2	4	1.73
310	Cumberland	2	4	-0.38
309	Cumberland	2	4	0.18
308	Cumberland	2	4	1.14
307	Cumberland	2	4	0.83
306	Cumberland	2	4	-0.34
305	Cumberland	2	4	-0.26
304	Putnam/Cumberland	2	4	-0.81
303	Putnam	2	4	1.13
302	Putnam	2	4	0.33
301	Putnam	2	4	0.63
300	Putnam	2	4	-1.98
299	Putnam	2	4	-0.97
298	Putnam	2	4	-0.55
297	Putnam	2	4	0.40
296	Putnam	2	4	-1.72
295	Putnam	2	4	0.41
294	Putnam	2	4	0.30
293	Putnam	2	4	-0.42
292	Putnam	2	4	-3.90
291	Putnam	2	4	-3.90
290	Putnam	2	4	-3.90
289	Putnam	2	4	-3.90
288	Putnam	2	4	-0.31
287	Putnam	2	4	2.11
286	Putnam	2	4	0.01
285	Putnam	2	4	0.27
284	Putnam	2	4	-0.94
283	Putnam	2	4	0.45

Mile Marker	County	TDOT Region	Number of Lanes	Grade
282	Putnam	2	4	-0.84
281	Putnam	2	4	0.38
280	Putnam	2	4	-1.38
279	Putnam	2	4	0.61
278	Putnam	2	4	0.52
277	Putnam	2	4	-0.83
276	Putnam	2	4	-0.61
275	Putnam	2	4	1.03
274	Putnam	2	4	-0.12
273	Putnam	2	4	0.12
272	Putnam	2	4	-0.37
271	Putnam	2	4	-0.34
270	Putnam	2	4	-0.38
269	Putnam	2	4	-0.18
268	Putnam	2	4	-2.00
267	Putnam	2	4	-2.90
266	Smith/Putnam	3	4	-1.47
265	Smith	3	4	-2.01
264	Smith	3	4	-0.88
263	Smith	3	4	-0.43
262	Smith	3	4	0.79
261	Smith	3	4	0.04
260	Smith	3	4	-0.81
259	Smith	3	4	0.50
258	Smith	3	4	-0.44
257	Smith	3	4	-0.11
256	Smith	3	4	1.04
255	Smith	3	4	-0.02
254	Smith	3	4	-0.34
253	Smith	3	4	0.98
252	Smith	3	4	0.05
251	Smith	3	4	2.10
250	Smith	3	4	-0.19
249	Wilson/Smith	3	4	1.95

Mile Marker	County	TDOT Region	Number of Lanes	Grade
248	Wilson	3	4	-2.13
247	Wilson	3	4	-2.10
246	Wilson	3	4	0.61
245	Wilson	3	4	-0.28
244	Wilson	3	4	1.22
243	Wilson	3	4	1.11
242	Wilson	3	4	-1.92
241	Wilson	3	4	0.82
240	Wilson	3	4	-1.50
239	Wilson	3	4	0.17
238	Wilson	3	4	-0.77
237	Wilson	3	4	0.84
236	Wilson	3	4	-0.81
235	Wilson	3	4	0.00
234	Wilson	3	4	0.00
233	Wilson	3	4	-0.21
232	Wilson	3	4	0.63
231	Wilson	3	4	1.37
230	Wilson	3	4	-0.97
229	Wilson	3	4	-0.73
228	Wilson	3	4	-0.36
227	Wilson	3	4	-0.38
226	Wilson	3	6/4	0.57
225	Davidson/Wilson	3	6/8	1.11
224	Davidson	3	8	-1.26
223	Davidson	3	8	1.30
222	Davidson	3	8	-1.01
221	Davidson	3	8	0.60
220	Davidson	3	8	-0.85
219	Davidson	3	8	-4.20
218	Davidson	3	8	0.00
217	Davidson	3	8	0.00
216	Davidson	3	6/8	0.00
215	Davidson	3	8	0.00

Mile Marker	County	TDOT Region	Number of Lanes	Grade
214	Davidson	3	6/8	0.00
213	Davidson	3	6/4	0.00
212	Davidson	3	8/4	0.00
211	Davidson	3	8	0.00
210	Davidson	3	6/4/8	0.00
209	Davidson	3	6/4/5	0.00
208	Davidson	3	6	0.00
207	Davidson	3	6/4	0.00
206	Davidson	3	6	0.00
205	Davidson	3	6	0.00
204	Davidson	3	6	0.00
203	Davidson	3	6	0.00
202	Davidson	3	6	0.00
201	Davidson	3	6	0.00
200	Davidson	3	6	0.00
199	Davidson	3	6	0.00
198	Davidson	3	6	0.00
197	Davidson	3	6	0.00
196	Davidson	3	4/6	0.00
195	Davidson	3	4	0.00
194	Davidson	3	4	0.00
193	Davidson	3	4	0.00
192	Davidson	3	4	0.00
191	Cheatham/Davidson	3	4	0.00
190	Cheatham	3	4	0.00
189	Cheatham	3	4	0.00
188	Cheatham	3	4	-1.44
187	Cheatham	3	4	1.99
186	Cheatham	3	4	-0.92
185	Cheatham	3	4	0.07
184	Williamson/Cheatham	3	4	3.63
183	Williamson	3	4	0.47
182	Williamson	3	4	0.32
181	Williamson	3	4	0.42

Mile Marker	County	TDOT Region	Number of Lanes	Grade
180	Dickson/Williamson	3	4	-0.42
179	Dickson	3	4	-1.16
178	Dickson	3	4	-2.64
177	Dickson	3	4	0.48
176	Dickson	3	4	0.43
175	Dickson	3	4	1.05
174	Dickson	3	4	1.53
173	Dickson	3	4	0.67
172	Dickson	3	4	0.28
171	Dickson	3	4	0.68
170	Dickson	3	4	-0.58
169	Dickson	3	4	-1.01
168	Dickson	3	4	0.41
167	Dickson	3	4	-0.65
166	Dickson	3	4	-0.42
165	Dickson	3	4	-1.38
164	Dickson	3	4	-0.18
163	Hickman/Dickson	3	4	3.10
162	Hickman	3	4	-1.17
161	Hickman	3	4	-0.97
160	Hickman	3	4	-0.35
159	Hickman	3	4	2.52
158	Hickman	3	4	-0.26
157	Hickman	3	4	-2.16
156	Hickman	3	4	-2.45
155	Hickman	3	4	-1.23
154	Hickman	3	4	-0.81
153	Hickman	3	4	-0.66
152	Hickman	3	4	-0.10
151	Humphreys/Hickman	3	4	-0.10
150	Humphreys	3	4	-0.10
149	Humphreys	3	4	-0.10
148	Humphreys	3	4	-0.10
147	Humphreys	3	4	0.61

Mile Marker	County	TDOT Region	Number of Lanes	Grade
146	Humphreys	3	4	2.18
145	Humphreys	3	4	-3.97
144	Humphreys	3	4	0.51
143	Humphreys	3	4	-0.20
142	Humphreys	3	4	-0.20
141	Humphreys	3	4	2.14
140	Humphreys	3	4	-2.63
139	Humphreys	3	4	0.20
138	Benton/Humphreys	4	4	0.20
137	Benton	4	4	0.20
136	Benton	4	4	0.20
135	Benton	4	4	2.76
134	Benton	4	4	1.62
133	Benton	4	4	-1.99
132	Benton	4	4	0.02
131	Benton	4	4	0.37
130	Benton	4	4	1.41
129	Decatur/Benton	4	4	0.01
128	Decatur	4	4	-0.39
127	Decatur	4	4	-1.07
126	Decatur	4	4	1.24
125	Decatur	4	4	0.10
124	Decatur	4	4	1.70
123	Henderson/Carroll/Decatur	4	4	-1.51
122	Henderson	4	4	2.36
121	Henderson	4	4	2.19
120	Henderson	4	4	0.07
119	Henderson	4	4	-0.78
118	Henderson	4	4	2.20
117	Henderson	4	4	-1.47
116	Henderson	4	4	0.17
115	Henderson	4	4	-0.94
114	Henderson	4	4	0.11
113	Henderson	4	4	-1.09

Mile Marker	County	TDOT Region	Number of Lanes	Grade
112	Henderson	4	4	0.30
111	Henderson	4	4	0.38
110	Henderson	4	4	-0.22
109	Henderson	4	4	-0.65
108	Henderson	4	4	0.37
107	Henderson	4	4	-0.11
106	Henderson	4	4	0.33
105	Henderson	4	4	-0.85
104	Henderson	4	4	-0.30
103	Henderson	4	4	-0.24
102	Henderson	4	4	-0.12
101	Henderson	4	4	-0.58
100	Henderson	4	4	-0.41
99	Henderson	4	4	2.24
98	Madison/Henderson	4	4	-0.59
97	Madison	4	4	-0.24
96	Madison	4	4	0.49
95	Madison	4	4	0.69
94	Madison	4	4	-0.42
93	Madison	4	4	-0.01
92	Madison	4	4	0.56
91	Madison	4	4	-0.19
90	Madison	4	4	-0.44
89	Madison	4	4	-1.17
88	Madison	4	4	1.06
87	Madison	4	4	-0.74
86	Madison	4	4	-0.76
85	Madison	4	4	0.12
84	Madison	4	4	0.59
83	Madison	4	4	-0.59
82	Madison	4	4	-1.01
81	Madison	4	4	-0.72
80	Madison	4	4	-0.52
79	Madison	4	4	0.28

Mile Marker	County	TDOT Region	Number of Lanes	Grade
78	Madison	4	4	0.10
77	Madison	4	4	0.10
76	Madison	4	4	0.25
75	Madison	4	4	0.61
74	Madison	4	4	-0.52
73	Madison	4	4	-0.43
72	Madison	4	4	-0.05
71	Madison	4	4	1.31
70	Haywood/Madison	4	4	-0.45
69	Haywood	4	4	0.24
68	Haywood	4	4	-0.46
67	Haywood	4	4	0.55
66	Haywood	4	4	-0.43
65	Haywood	4	4	-0.16
64	Haywood	4	4	-0.15
63	Haywood	4	4	-0.08
62	Haywood	4	4	-0.44
61	Haywood	4	4	-0.04
60	Haywood	4	4	0.77
59	Haywood	4	4	0.13
58	Haywood	4	4	-0.66
57	Haywood	4	4	-1.21
56	Haywood	4	4	0.00
55	Haywood	4	4	0.00
54	Haywood	4	4	0.61
53	Haywood	4	4	-0.05
52	Haywood	4	4	-0.24
51	Haywood	4	4	0.43
50	Haywood	4	4	-0.05
49	Haywood	4	4	0.13
48	Haywood	4	4	-0.64
47	Haywood	4	4	1.15
46	Fayette/Haywood	4	4	-0.29
45	Fayette	4	4	0.05

Mile Marker	County	TDOT Region	Number of Lanes	Grade
44	Fayette	4	4	0.27
43	Fayette	4	4	-0.40
42	Fayette	4	4	0.05
41	Fayette	4	4	-0.16
40	Fayette	4	4	0.26
39	Fayette	4	4	-0.34
38	Fayette	4	4	0.21
37	Fayette	4	4	-0.74
36	Fayette	4	4	0.54
35	Fayette	4	4	-0.32
34	Fayette	4	4	-0.73
33	Fayette	4	4	-0.42
32	Fayette	4	4	0.10
31	Fayette	4	4	0.10
30	Shelby/Fayette	4	6/4	1.57
29	Shelby	4	6	-1.07
28	Shelby	4	6	-1.33
27	Shelby	4	6	-0.25
26	Shelby	4	6	1.71
25	Shelby	4	6	0.71
24	Shelby	4	6	-0.12
23	Shelby	4	6	0.63
22	Shelby	4	6	-0.36
21	Shelby	4	8/6	-1.03
20	Shelby	4	8	-0.83
19	Shelby	4	8	-0.26
18	Shelby	4	8	-0.45
17	Shelby	4	8	-0.62
16	Shelby	4	8	0.44
15	Shelby	4	8	-0.60
14	Shelby	4	8/6/4	0.36
13	Shelby	4	6	-0.69
12	Shelby	4	6	0.02
11	Shelby	4	6	-0.11

Mile Marker	County	TDOT Region	Number of Lanes	Grade
10	Shelby	4	6	-0.09
9	Shelby	4	6	-0.06
8	Shelby	4	6	0.26
7	Shelby	4	6	-0.02
6	Shelby	4	6	0.11
5	Shelby	4	6	0.04
4	Shelby	4	6	0.49
3	Shelby	4	6	-0.38
2	Shelby	4	4/6	-0.13
1	Shelby	4	4/6	0.41
0	Shelby	4	6/4	0.72

Appendix E:

Westbound I-40 Operational Characteristics

WB I-40 Operational

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
451	Cocke	55	22790	8	51	6	66	3	31
450	Cocke	55	23123	8.74	51	6	66	3	31
449	Cocke	55	25140	9	51	6	66	3	31
448	Cocke	55	25140	9	51	6	66	3	31
447	Cocke	55	23620	9	52.2	6.2	66	3	31
446	Cocke	55	24020	9	57	7	66	3	31
445	Cocke	55	24020	9	57	7	66	3	31
444	Cocke	55	24020	9	57	7	66	3	31
443	Cocke	55	25017	9	56.89	7	66	3	31
442	Cocke	55	25370	9	56	7	66	3	31
441	Cocke	55	25370	9	56	7	66	3	31
440	Cocke	55	24411	8.71	56.58	7	65.71	3	31.29
439	Cocke	55	26370	9	58	7	65	3	32
438	Cocke	55	26370	9	58	7	65	3	32
437	Cocke	55	26370	9	58	7	65	3	32
436	Cocke	55	26370	9	58	7	65	3	32
435	Cocke	55/60	25647	8.72	56.88	6.72	66.12	3	30.88
434	Cocke	70/60	26360	8	54	6	69	3	28
433	Cocke	70	26360	8	54	6	69	3	28
432	Cocke	70	26360	8	54	6	69	3	28
431	Cocke	70	27587	8	53.48	6	65.36	3	31.64
430	Cocke	70	28720	8	53	6	62	3	35
429	Cocke	70	50239	8.74	54.48	6.74	69.4	5.22	25.38
428	Cocke	70	57800	9	55	7	72	6	22

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
427	Cocke	70	61074	8.56	55	6.56	73.76	5.56	20.68
426	Cocke	70	65240	8	55	6	76	5	19
425	Cocke	70	65240	8	55	6	76	5	19
424	Cocke	70	29450	8	53.04	6	62.28	3.04	34.68
423	Cocke	70	28720	8	53	6	62	3	35
422	Cocke	70	28720	8	53	6	62	3	35
421	Sevier/Cocke	70	28720	8	53	6	62	3	35
420	Sevier	70	28720	8	53	6	62	3	35
419	Sevier	70	28874	8	52.04	6	65.2	3	31.8
418	Sevier	70	29200	8	50	6	72	3	25
417	Sevier	70	29200	8	50	6	72	3	25
416	Jefferson/Sevier	70	40687	8	50.42	6	95.74	4.26	23.74
415	Jefferson	70	56550	8	51	6	94	6	22
414	Jefferson	70	56550	8	51	6	94	6	22
413	Jefferson	70	56550	8	51	6	94	6	22
412	Jefferson	70	56694	8.76	54.04	6.76	94	6	22
411	Jefferson	70	56740	9	55	7	72	6	22
410	Jefferson	70	57318	9	55	7	72.47	6	21.53
409	Jefferson	70	57970	9	55	7	73	6	21
408	Jefferson	70	57970	9	55	7	73	6	21
407	Jefferson	70	57921	9	55	7	72.71	6	21.29
406	Jefferson	70	57800	9	55	7	72	6	22
405	Jefferson	70	57800	9	55	7	72	6	22
404	Knox/Jefferson	70	65182	9	55	7	75.4	5.15	19.45
403	Knox	70	66740	9	55	7	76	5	19
402	Knox	70	66740	9	55	7	76	5	19

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
401	Knox	70	66740	9	55	7	76	5	19
400	Knox	70	66740	9	55	7	76	5	19
399	Knox	70	66740	9	55	7	76	5	19
398	Knox	70	66740	9	55	7	76	5	19
397	Knox	70	68289	9	58.2	7	76.64	5	18.36
396	Knox	70	69160	9	60	7	77	5	18
395	Knox	70/60	69160	9	60	7	77	5	18
394	Knox	60/55	69160	9	60	7	77	5	18
393	Knox	55	91600	9	60	7	83.4	3.4	13.2
392	Knox	55	75900	9	60	7	88.8	3.76	7.44
391	Knox	55	74907	9	60	7	91.68	4	4.32
390	Knox	55	76163	9	60	7	91.68	3.98	4.04
389	Knox	55	84160	9	60	7	91	3	6
388	Knox	55	93114	9	60	7	92.82	3	4.18
387	Knox	55	104202	9	60	7	93	3	4
386	Knox	55	113760	9	63.8	7	93	3	4
385	Knox	55	112030	9	70	7	93	3	4
384	Knox	55	155352	9	60.1	7	86.07	3	10.93
383	Knox	55	155790	9	60	7	86	3	11
382	Knox	55	147179	9	60	7	84.16	3	12.84
381	Knox	55	146430	9	60	7	84	3	13
380	Knox	55	146642	9	60	7	84	3	13
379	Knox	55	147065	9	60	7	83.92	3	13.08
378	Knox	55	150230	9	60	7	83	3	14
377	Knox	55	146357	9	60	7	82.39	3	14.61
376	Knox	55	140974	9	60	7	81.5	3.1	15.4

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
375	Knox	55/60	114820	9	60	7	77	4	19
374	Knox	60	108988	9	60	7	76.55	4	19.45
373	Knox	60	101860	9	60	7	76	4	20
372	Knox	60/70	95809	9	60	7	73.24	4.69	22.07
371	Knox	70	93090	9	60	7	72	5	23
370	Knox	70	93090	9	60	7	72	5	23
369	Knox	70	93090	9	60	7	72	5	23
368	Loudon/Knox	70	91152	9	60	7	72	5	23
367	Loudon	70	43821	9	51.45	7	72.95	5.95	21.1
366	Loudon	70	41340	9	51	7	73	6	21
365	Loudon	70	41340	9	51	7	73	6	21
364	Loudon	70	41340	9	51	7	73	6	21
363	Roane/Loudon	70	45162	9	53.8	7	71.6	6	22.4
362	Roane	70	46800	9	55	7	71	6	23
361	Roane	70	46800	9	55	7	71	6	23
360	Roane	70	42626	9	52.8	7	73.2	5.45	21.35
359	Roane	70	39210	9	51	7	75	5	20
358	Roane	70	39210	9	51	7	75	5	20
357	Roane	70	39210	9	51	7	75	5	20
356	Roane	70	41992	9	52.48	7	75.37	5	19.63
355	Roane	70	45186	9	54.32	7	76	5	19
354	Roane	70	42190	9	53	7	76	5	19
353	Roane	70	42190	9	53	7	76	5	19
352	Roane	70	43366	8.51	52.51	6.51	75.02	5.49	19.49
351	Roane	70	44590	8	52	6	74	6	20
350	Roane	70	43024	8.3	52	6.3	73.4	6	20.6

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
349	Roane	70	39370	9	52	7	72	6	22
348	Roane	70	39370	9	52	7	72	6	22
347	Roane	70	37659	8.57	52	6.57	69.85	6.43	23.72
346	Roane	70	35390	8	52	6	67	7	26
345	Roane	70	35390	8	52	6	67	7	26
344	Roane	70	35390	8	52	6	67	7	26
343	Roane	70	35390	8	52	6	67	7	26
342	Roane	70	35390	8	52	6	67	7	26
341	Roane	70	35390	8	52	6	67	7	26
340	Cumberland/Roane	70	35860	8.21	51.58	6.21	66.79	7	26.21
339	Cumberland	70	37630	9	50	7	66	7	27
338	Cumberland	70	37140	9	50.48	7	65.76	7	27.24
337	Cumberland	70	35590	9	52	7	65	7	28
336	Cumberland	70	35590	9	52	7	65	7	28
335	Cumberland	70	35590	9	52	7	65	7	28
334	Cumberland	70	35590	9	52	7	65	7	28
333	Cumberland	70	35590	9	52	7	65	7	28
332	Cumberland	70	35590	9	52	7	65	7	28
331	Cumberland	70	35590	9	52	7	65	7	28
330	Cumberland	70	35590	9	52	7	65	7	28
329	Cumberland	70	35392	9	51.95	7	65	7	28
328	Cumberland	70	31630	9	51	7	65	7	28
327	Cumberland	70	31630	9	51	7	65	7	28
326	Cumberland	70	31630	9	51	7	65	7	28
325	Cumberland	70	31630	9	51	7	65	7	28
324	Cumberland	70	31630	9	51	7	65	7	28

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
323	Cumberland	70	31630	9	51	7	65	7	28
322	Cumberland	70	31630	9	51	7	65	7	28
321	Cumberland	70	38110	9	53.88	7	67.88	7	25.12
320	Cumberland	70	40630	9	55	7	69	7	24
319	Cumberland	70	39964	9	53.04	7	69	7	24
318	Cumberland	70	39270	9	51	7	69	7	24
317	Cumberland	70	38844	9	52.6	7	68.04	7	24.96
316	Cumberland	70	37940	9	56	7	66	7	27
315	Cumberland	70	37940	9	56	7	66	7	27
314	Cumberland	70	37940	9	56	7	66	7	27
313	Cumberland	70	37940	9	56	7	66	7	27
312	Cumberland	70	37940	9	56	7	66	7	27
311	Cumberland	70	37940	9	56	7	66	7	27
310	Cumberland	70	36510	8.52	56	6.52	67.92	6.52	25.56
309	Cumberland	70	34960	8	56	6	70	6	24
308	Cumberland	70	34960	8	56	6	70	6	24
307	Cumberland	70	34960	8	56	6	70	6	24
306	Cumberland	70	34960	8	56	6	70	6	24
305	Cumberland	70	34960	8	56	6	70	6	24
304	Putnam/Cumberland	70	34960	8	56	6	70	6	24
303	Putnam	70	34960	8	56	6	70	6	24
302	Putnam	70	34960	8	56	6	70	6	24
301	Putnam	70	35249	8.08	56.16	6.08	70.08	5.92	24
300	Putnam	70	39370	9	55.42	7	71.86	5	23.14
299	Putnam	70	40430	9	52	7	73	5	22
298	Putnam	70	40430	9	52	7	73	5	22

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
297	Putnam	70	40430	9	52	7	73	5	22
296	Putnam	65/70	40430	9	52	7	73	5	22
295	Putnam	65	40430	9	52	7	73	5	22
294	Putnam	65	40430	9	52	7	73	5	22
293	Putnam	65	40430	9	52	7	73	5	22
292	Putnam	65	40430	9	52	7	73	5	22
291	Putnam	70/65	40430	9	52	7	73	5	22
290	Putnam	70	40430	9	52	7	73	5	22
289	Putnam	70	39000	9	52	7	69.05	5	25.95
288	Putnam	70	38589	9	51.72	7	68	5	27
287	Putnam	70	38400	9	50	7	68	5	27
286	Putnam	70	39469	9	50.81	7	68	5	27
285	Putnam	70	39805	9	51	6.66	69.02	5	25.98
284	Putnam	70	39970	9	51	6	71	5	24
283	Putnam	70	39970	9	51	6	71	5	24
282	Putnam	70	39970	9	51	6	71	5	24
281	Putnam	70	39970	9	51	6	71	5	24
280	Putnam	70	39970	9	51	6	71	5	24
279	Putnam	70	40417	9	48.34	6.71	69.58	5	25.42
278	Putnam	70	40600	9	53	7	69	5	26
277	Putnam	70	40600	9	53	7	69	5	26
276	Putnam	70	40600	9	53	7	69	5	26
275	Putnam	70	38841	8.27	51.54	6.27	69.73	5	25.27
274	Putnam	70	38190	8	51	6	70	5	25
273	Putnam	70	37979	8	50.92	6	70	5	25
272	Putnam	70	35550	8	50	6	70	5	25

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
271	Putnam	70	35550	8	50	6	70	5	25
270	Putnam	70	35550	8	50	6	70	5	25
269	Putnam	70	35550	8	50	6	70	5	25
268	Putnam	70	35550	8	50	6	70	5	25
267	Putnam	70	35686	8	56.4	6	69.2	5	25.8
266	Smith/Putnam	70	35720	8	58	6	69	5	26
265	Smith	70	35720	8	58	6	69	5	26
264	Smith	70	35720	8	58	6	69	5	26
263	Smith	70	35720	8	58	6	69	5	26
262	Smith	70	35720	8	58	6	69	5	26
261	Smith	70	35720	8	58	6	69	5	26
260	Smith	70	35720	8	58	6	69	5	26
259	Smith	70	35720	8	58	6	69	5	26
258	Smith	70	35809	8	55.68	6	68.84	5.04	26.12
257	Smith	70	37940	8	57	6	65	6	29
256	Smith	70	37940	8	57	6	65	6	29
255	Smith	70	37940	8	57	6	65	6	29
254	Smith	70	37940	8	57	6	68.68	6	25.32
253	Smith	70	39900	8	58.84	6	69.92	5.08	25
252	Smith	70	40070	8	59	6	70	5	25
251	Smith	70	40070	8	59	6	70	5	25
250	Smith	70	40070	8	59	6	70	5	25
249	Wilson/Smith	70	40070	8	59	6	70	5	25
248	Wilson	70	40070	8	59	6	70	5	25
247	Wilson	70	40070	8	59	6	70	5	25
246	Wilson	70	40070	8	59	6	70	5	25

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
245	Wilson	70	40070	8	59	6	70	5	25
244	Wilson	70	40795	8.48	57.08	6.48	67.56	4.52	27.92
243	Wilson	70	41580	9	55	7	67	4	29
242	Wilson	70	41580	9	55	7	67	4	29
241	Wilson	70	41580	9	55	7	67	4	29
240	Wilson	70	41580	9	55	7	67	4	29
239	Wilson	70	44895	9	56.3	7	68.82	3.74	27.44
238	Wilson	70	54330	9	60	7	74	3	23
237	Wilson	70	56668	9	58.9	7	75.1	3	21.9
236	Wilson	70	58612	9	58.1	7	76	3	21
235	Wilson	70	59210	9	60	7	76	3	21
234	Wilson	70	52659	9	60	7	74.78	3	22.22
233	Wilson	70	48470	9	60	7	74	3	23
232	Wilson	70	48470	9	60	7	74	3	23
231	Wilson	70	53843	9.54	55.14	7.54	74.54	3	22.46
230	Wilson	70	58420	10	51	8	75	3	22
229	Wilson	70	58420	10	51	8	75	3	22
228	Wilson	70	58420	10	51	8	75	3	22
227	Wilson	70	58420	10	51	8	75	3	22
226	Wilson	70	58420	10	51	8	75	3	22
225	Davidson/Wilson	70	63260	10.55	55.95	8.55	77.75	3	19.25
224	Davidson	70	67220	11	60	9	80	3	17
223	Davidson	70	67220	11	60	9	80	3	17
222	Davidson	70	67220	11	60	9	80	3	17
221	Davidson	70	67220	11	60	9	80	3	17
220	Davidson	70	87746	11	62.9	9	84.06	2.42	13.52

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
219	Davidson	65/70	102610	11	65	9	87	2	11
218	Davidson	65	102092	11	65	9	87	2	11
217	Davidson	55/65	101870	11	65	9	87	2	11
216	Davidson	55	102413	11	65	9	87	2	11
215	Davidson	55	114268	11	65	9	89.67	1.11	9.22
214	Davidson	55	114410	11	65	9	89.47	1.53	9
213	Davidson	55	113390	11	65	9	89	2	9
212	Davidson	55	141342	11	61	9	85	3.6	11.4
211	Davidson	55	168889	11	60	9	86.31	3.23	10.46
210	Davidson	55	130564	11	60	9	84.44	3.64	11.92
209	Davidson	55	116699	11	60	9	80.24	4.69	15.07
208	Davidson	55	93938	11	61.55	9	77.47	5.43	17.1
207	Davidson	55	92822	11	65	9	81.52	4.48	14
206	Davidson	55	87177	11	65	9	82	4	14
205	Davidson	55	104488	11	65	9	84.9	3.42	11.68
204	Davidson	55	104487	11	65	9	84.8	3.55	11.65
203	Davidson	55	87698	11	65	9	82.31	4	13.69
202	Davidson	65/55	84880	11	65	9	82	4	14
201	Davidson	65	84880	11	65	9	82	4	14
200	Davidson	65/70	79493	11	65	9	79.51	4.83	15.66
199	Davidson	70	78390	11	65	9	79	5	16
198	Davidson	70	64310	11	65	9	74.35	5.93	19.72
197	Davidson	70	63250	11	65	9	74	6	20
196	Davidson	70	62929	10.85	65.4	8.85	73.8	6.05	20.15
195	Davidson	70	56820	8	73	6	70	7	23
194	Davidson	70	56820	8	73	6	70	7	23

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
193	Davidson	70	56820	8	73	6	70	7	23
192	Davidson	70	57391	8.29	71.26	6.29	69.42	7	23.58
191	Cheatham/Davidson	70	58790	9	67	7	68	7	25
190	Cheatham	70	58790	9	67	7	68	7	25
189	Cheatham	70	58790	9	67	7	68	7	25
188	Cheatham	70	58790	9	67	7	68	7	25
187	Cheatham	70	54877	8.27	61.89	6.27	71.65	6.27	22.08
186	Cheatham	70	53430	8	60	6	73	6	21
185	Cheatham	70	53430	8	60	6	73	6	21
184	Williamson/Cheatham	70	53430	8	60	6	73	6	21
183	Williamson	70	53430	8	60	6	73	6	21
182	Williamson	70	53430	8	60	6	73	6	21
181	Williamson	70	44311	8	55.98	6	62.28	6.67	31.05
180	Dickson/Williamson	70	39820	8	54	6	57	7	36
179	Dickson	70	39820	8	54	6	57	7	36
178	Dickson	70	39820	8	54	6	57	7	36
177	Dickson	70	39820	8	54	6	57	7	36
176	Dickson	70	39820	8	54.9	6	57	7	36
175	Dickson	70	34420	8	57	6	57	7	36
174	Dickson	70	34420	8	57	6	57	7	36
173	Dickson	70	34420	8	57	6	57	7	36
172	Dickson	70	32625	8	57.7	6	57.7	7	35.3
171	Dickson	70	29290	8	59	6	59	7	34
170	Dickson	70	29290	8	59	6	59	7	34
169	Dickson	70	29290	8	59	6	59	7	34
168	Dickson	70	29290	8	59	6	59	7	34

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
167	Dickson	70	29290	8	59	6	59	7	34
166	Dickson	70	29290	8	59	6	59	7	34
165	Dickson	70	29290	8	59	6	59	7	34
164	Dickson	70	29290	8	59	6	59	7	34
163	Hickman/Dickson	70	29936	8	57.8	6	59	7	34
162	Hickman	70	31980	8	54	6	59	7	34
161	Hickman	70	31980	8	54	6	59	7	34
160	Hickman	70	31980	8	54	6	59	7	34
159	Hickman	70	31980	8	54	6	59	7	34
158	Hickman	70	31980	8	54	6	59	7	34
157	Hickman	70	31980	8	54	6	59	7	34
156	Hickman	70	31980	8	54	6	59	7	34
155	Hickman	70	30864	8	53.1	6	59	7	34
154	Hickman	70	31591	8	51.84	6	59	7	34
153	Hickman	70	31980	8	54	6	59	7	34
152	Hickman	70	31980	8	54	6	59	7	34
151	Humphreys/Hickman	70	31607	8	51.42	6	59	7	34
150	Humphreys	70	31440	8	51	6	59	7	34
149	Humphreys	70	31440	8	51	6	59	7	34
148	Humphreys	70	31440	8	51	6	59	7	34
147	Humphreys	70	31440	8	51	6	59	7	34
146	Humphreys	70	32549	8	51.96	6	59	7	34
145	Humphreys	70	33750	8	53	6	59	7	34
144	Humphreys	70	33750	8	53	6	59	7	34
143	Humphreys	70	33750	8	53	6	59	7	34
142	Humphreys	70	33750	8	53	6	59	7	34

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
141	Humphreys	70	33750	8	53	6	59	7	34
140	Humphreys	70	32223	8.34	51.98	6.34	59	7	34
139	Humphreys	70	29260	8.41	50	7	59	7	34
138	Benton/Humphreys	70	30865	8.34	52.36	6.41	59	7	34
137	Benton	70	29260	9	50	7	59	7	34
136	Benton	70	32938	9	50.61	7	59.61	7	33.39
135	Benton	70	35390	9	51	7	60	7	33
134	Benton	70	35390	9	51	7	60	7	33
133	Benton	70	35390	9	51	7	60	7	33
132	Benton	70	35390	9	51	7	60	7	33
131	Benton	70	35390	9	51	7	60	7	33
130	Benton	70	35390	9	51	7	60	7	33
129	Decatur/Benton	70	35055	8.5	51.5	6.5	62.5	6.5	31
128	Decatur	70	34720	8	52	6	65	6	29
127	Decatur	70	34720	8	52	6	65	6	29
126	Decatur	70	34720	8	52	6	65	6	29
125	Decatur	70	34720	8	52	6	65	6	29
124	Decatur	70	34720	8	52	6	65	6	29
123	Henderson/Carroll/Decatur	70	34720	8	52	6	65	6	29
122	Henderson	70	34720	8	52	6	65	6	29
121	Henderson	70	34720	8	52	6	65	6	29
120	Henderson	70	34720	8	52	6	65	6	29
119	Henderson	70	34705	8	53.46	6	63.54	6	30.46
118	Henderson	70	34700	8	54	6	63	6	31
117	Henderson	70	34700	8	54	6	63	6	31
116	Henderson	70	34700	8	54	6	63	6	31

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
115	Henderson	70	34700	8	54	6	63	6	31
114	Henderson	70	34700	8	54	6	63	6	31
113	Henderson	70	34700	8	54	6	63	6	31
112	Henderson	70	34700	8	54	6	63	6	31
111	Henderson	70	33382	8	52.17	6	63	6	31
110	Henderson	70	32540	8	51	6	63	6	31
109	Henderson	70	32540	8	51	6	63	6	31
108	Henderson	70	32540	8	51	6	63	6	31
107	Henderson	70	32540	8	51	6	63	6	31
106	Henderson	70	32540	8	51	6	63	6	31
105	Henderson	70	32540	8	51	6	63	6	31
104	Henderson	70	32675	8	51	6	61.68	6	32.32
103	Henderson	70	32950	8	51	6	59	6	35
102	Henderson	70	32950	8	51	6	59	6	35
101	Henderson	70	32950	8	51	6	59	6	35
100	Henderson	70	32950	8	51	6	59	6	35
99	Henderson	70	32950	8	51	6	59	6	35
98	Madison/Henderson	70	32950	8	51	6	59	6	35
97	Madison	70	32984	8.06	51.12	6.06	59.12	6	34.88
96	Madison	70	34090	10	55	8	63	6	31
95	Madison	70	34090	10	55	8	63	6	31
94	Madison	70	34090	10	55	8	63	6	31
93	Madison	70	34090	10	55	8	63	6	31
92	Madison	70	34090	10	55	8	63	6	31
91	Madison	70	34090	10	55	8	63	6	31
90	Madison	70	35588	9.28	54.64	7.28	63	6	31

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
89	Madison	70	38250	8	54	6	63	6	31
88	Madison	70	39964	8.24	53.28	6.24	64.92	5.76	29.32
87	Madison	70	45390	9	51	7	71	5	24
86	Madison	70	48182	9	51.66	7	71	5	24
85	Madison	65/55/70	46426	9	51.22	7	71	5	24
84	Madison	65	41430	9	50	7	71	5	24
83	Madison	65	41919	9	55.64	7	71	5	24
82	Madison	70/65	43032	8.34	53.36	6.34	71	5	24
81	Madison	70	43590	8	52	6	71	5	24
80	Madison	70	43590	8	52	6	71	5	24
79	Madison	70	39063	8	50.2	6	67.4	5	27.6
78	Madison	70	38144	8	50.6	6	66.4	5.2	28.4
77	Madison	70	36480	8	53	6	64	6	30
76	Madison	70	36480	8	53	6	64	6	30
75	Madison	70	36480	8	53	6	64	6	30
74	Madison	70	36480	8	53	6	64	6	30
73	Madison	70	36480	8	53	6	64	6	30
72	Madison	70	36480	8	53	6	64	6	30
71	Madison	70	36982	8	51.48	6	60.2	6.76	33.04
70	Haywood/Madison	70	37140	8	51	6	59	7	34
69	Haywood	70	35582	8	51.41	6	56.95	7.41	35.64
68	Haywood	70	33340	8	52	6	54	8	38
67	Haywood	70	33340	8	52	6	54	8	38
66	Haywood	70	33340	8	52	6	54	8	38
65	Haywood	70	33340	8	52	6	54	8	38
64	Haywood	70	33340	8	52	6	54	8	38

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
63	Haywood	70	35081	8	54.04	6	58.08	7.32	34.6
62	Haywood	70	35900	8	55	6	60	7	33
61	Haywood	70	35900	8	55	6	60	7	33
60	Haywood	70	35807	8	54.55	6	59.91	7	33.09
59	Haywood	70	34870	8	50	6	59	7	34
58	Haywood	70	34870	8	50	6	59	7	34
57	Haywood	70	34870	8	50	6	59	7	34
56	Haywood	70	34870	8	50	6	59	7	34
55	Haywood	70	36145	8	50.61	6	60.22	7	32.78
54	Haywood	70	36960	8	51	6	61	7	32
53	Haywood	70	36960	8	51	6	61	7	32
52	Haywood	70	36960	8	51	6	61	7	32
51	Haywood	70	36484	8	51.26	6	60.61	7	32.39
50	Haywood	70	33300	8	53	6	58	7	35
49	Haywood	70	33300	8	53	6	58	7	35
48	Haywood	70	33300	8	53	6	58	7	35
47	Haywood	70	33300	8	53	6	58	7	35
46	Fayette/Haywood	70	33300	8	53	6	57.23	7	35.77
45	Fayette	70	34098	8	54.68	6	58.68	6.16	35.16
44	Fayette	70	34250	8	55	6	59	6	35
43	Fayette	70	34250	8	55	6	59	6	35
42	Fayette	70	34250	8	55	6	59	6	35
41	Fayette	70	34250	8	55	6	59	6	35
40	Fayette	70	34250	8	55	6	59	6	35
39	Fayette	70	34412	8	55.14	6	59.14	6	34.86
38	Fayette	70	36570	8	57	6	61	6	33

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
37	Fayette	70	36570	8	57	6	61	6	33
36	Fayette	70	36570	8	57	6	61	6	33
35	Fayette	70	36570	8	57	6	61	6	33
34	Fayette	70	36570	8	57	6	61	6	33
33	Fayette	70	36570	8	57	6	61	6	33
32	Fayette	70	36570	8	57	6	61	6	33
31	Fayette	70	36570	8	57	6	61	6	33
30	Shelby/Fayette	70	36570	8	57	6	61	6	33
29	Shelby	70	36570	8	57	6	61	6	33
28	Shelby	70	46096	8.84	52.8	6.84	61.84	6.84	31.32
27	Shelby	70	47910	9	52	7	62	7	31
26	Shelby	70	47910	9	52	7	62	7	31
25	Shelby	70	47910	9	52	7	62	7	31
24	Shelby	70	47910	9	52	7	62	7	31
23	Shelby	70	52362	9	55.88	7	65.88	6.03	28.09
22	Shelby	70/60	52500	9	56	7	66	6	28
21	Shelby	60	63309	8.41	55.41	6.41	71.31	4.82	23.87
20	Shelby	60	76069	8	55	6	76.3	4.26	19.44
19	Shelby	60	91010	8	55	6	80	5	15
18	Shelby	60/55	106751	8	55	6	82.76	4.08	13.16
17	Shelby	55	113635	8.84	55	6.84	83.42	4	12.58
16	Shelby	55	121250	10	55	8	84	4	12
15	Shelby	55	152335	10	55	8	87.4	3.15	9.45
14	Shelby	55	145041	10	55	8	87.08	3.23	9.69
13	Shelby	55	102260	10	55	8	84	4	12
12	Shelby	55	95514	10.64	55	8.64	82.72	4	13.28

M.M.	County	Speed Limit	AADT	DHV %	Dir. Distribution	% Peak Hour	% Passenger Veh.	% Single Unit Trucks	% Multi Unit Trucks
11	Shelby	55	91720	11	55	9	82	4	14
10	Shelby	55	89696	11.88	55	9.88	82	4	14
9	Shelby	55	87120	13	55	11	82	4	14
8	Shelby	55	88716	11.6	55	9.6	82.7	4	13.3
7	Shelby	55	87247	11	55	9	82.39	4.61	13
6	Shelby	55	85870	11	55	9	82	6	12
5	Shelby	55	90339	9.48	55	7.48	83.52	4.24	12.24
4	Shelby	55	91750	9	55	7	84	4	12
3	Shelby	55	92241	9	55	7	85.26	3.87	10.87
2	Shelby	55	83500	9.54	55	7.54	83.76	4.08	12.16
1	Shelby	55	70531	9.55	55	7.55	80.76	5.08	14.16
0	Shelby	65	56492	9	57.2	7	75.25	6.55	18.2

Appendix F:

Westbound I-40 Safety

WB I-40 Safety

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
451	Cocke	0	0	0
450	Cocke	0	0	0
449	Cocke	0	0	0
448	Cocke	0	0	0
447	Cocke	0	0	0
446	Cocke	0	0	0
445	Cocke	0	0	0
444	Cocke	0	0	0
443	Cocke	0	0	0
442	Cocke	0	0	0
441	Cocke	1	1	0
440	Cocke	2	2	0
439	Cocke	0	0	0
438	Cocke	0	0	0
437	Cocke	1	1	2
436	Cocke	0	0	0
435	Cocke	0	0	0
434	Cocke	0	0	0
433	Cocke	1	1	1
432	Cocke	0	0	0
431	Cocke	0	0	0
430	Cocke	1	1	0
429	Cocke	0	0	0
428	Cocke	1	1	0
427	Cocke	1	1	3
426	Cocke	2	2	0
425	Cocke	0	0	0
424	Cocke	0	0	0
423	Cocke	1	1	0
422	Cocke	0	0	0
421	Sevier/Cocke	0	0	0
420	Sevier	0	0	0
419	Sevier	1	1	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
418	Sevier	1	1	0
417	Sevier	1	1	0
416	Jefferson/Sevier	0	0	0
415	Jefferson	0	0	0
414	Jefferson	0	0	0
413	Jefferson	0	0	0
412	Jefferson	0	0	0
411	Jefferson	0	0	0
410	Jefferson	2	2	1
409	Jefferson	1	1	2
408	Jefferson	0	0	0
407	Jefferson	0	0	0
406	Jefferson	0	0	0
405	Jefferson	1	1	0
404	Knox/Jefferson	0	0	0
403	Knox	1	1	0
402	Knox	0	0	0
401	Knox	1	1	0
400	Knox	1	1	0
399	Knox	1	1	1
398	Knox	1	1	1
397	Knox	0	0	0
396	Knox	1	1	0
395	Knox	0	0	0
394	Knox	2	2	1
393	Knox	0	0	0
392	Knox	3	4	2
391	Knox	1	1	0
390	Knox	1	1	1
389	Knox	0	0	0
388	Knox	2	2	0
387	Knox	0	0	0
386	Knox	1	1	0
385	Knox	1	1	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
384	Knox	0	0	0
383	Knox	0	0	0
382	Knox	2	2	1
381	Knox	1	1	0
380	Knox	1	1	0
379	Knox	0	0	0
378	Knox	1	1	0
377	Knox	1	1	0
376	Knox	1	1	0
375	Knox	0	0	0
374	Knox	2	2	0
373	Knox	1	1	0
372	Knox	1	1	0
371	Knox	0	0	0
370	Knox	1	1	0
369	Knox	0	0	0
368	Loudon/Knox	1	2	0
367	Loudon	0	0	0
366	Loudon	0	0	0
365	Loudon	0	0	0
364	Loudon	0	0	0
363	Roane/Loudon	0	0	0
362	Roane	0	0	0
361	Roane	1	1	0
360	Roane	0	0	0
359	Roane	1	1	0
358	Roane	3	3	3
357	Roane	0	0	0
356	Roane	0	0	0
355	Roane	1	2	0
354	Roane	0	0	0
353	Roane	0	0	0
352	Roane	0	0	0
351	Roane	1	1	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
350	Roane	0	0	0
349	Roane	0	0	0
348	Roane	0	0	0
347	Roane	0	0	0
346	Roane	1	1	0
345	Roane	0	0	0
344	Roane	1	2	1
343	Roane	1	1	1
342	Roane	0	0	0
341	Roane	1	1	0
340	Cumberland/Roane	1	1	1
339	Cumberland	0	0	0
338	Cumberland	1	1	0
337	Cumberland	1	2	2
336	Cumberland	1	1	0
335	Cumberland	0	0	0
334	Cumberland	0	0	0
333	Cumberland	0	0	0
332	Cumberland	0	0	0
331	Cumberland	1	1	0
330	Cumberland	0	0	0
329	Cumberland	0	0	0
328	Cumberland	0	0	0
327	Cumberland	0	0	0
326	Cumberland	1	1	1
325	Cumberland	0	0	0
324	Cumberland	0	0	0
323	Cumberland	0	0	0
322	Cumberland	0	0	0
321	Cumberland	0	0	0
320	Cumberland	2	2	0
319	Cumberland	0	0	0
318	Cumberland	0	0	0
317	Cumberland	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
316	Cumberland	1	1	0
315	Cumberland	3	4	2
314	Cumberland	0	0	0
313	Cumberland	1	1	0
312	Cumberland	2	2	0
311	Cumberland	0	0	0
310	Cumberland	1	1	0
309	Cumberland	0	0	0
308	Cumberland	1	1	0
307	Cumberland	0	0	0
306	Cumberland	2	2	0
305	Cumberland	1	1	1
304	Putnam/Cumberland	1	1	0
303	Putnam	2	2	0
302	Putnam	0	0	0
301	Putnam	1	1	0
300	Putnam	0	0	0
299	Putnam	1	1	0
298	Putnam	2	2	1
297	Putnam	0	0	0
296	Putnam	0	0	0
295	Putnam	0	0	0
294	Putnam	0	0	0
293	Putnam	0	0	0
292	Putnam	0	0	0
291	Putnam	0	0	0
290	Putnam	0	0	0
289	Putnam	0	0	0
288	Putnam	0	0	0
287	Putnam	0	0	0
286	Putnam	2	2	1
285	Putnam	2	2	1
284	Putnam	0	0	0
283	Putnam	1	1	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
282	Putnam	0	0	0
281	Putnam	0	0	0
280	Putnam	0	0	0
279	Putnam	1	1	0
278	Putnam	0	0	0
277	Putnam	1	1	0
276	Putnam	1	1	0
275	Putnam	2	4	4
274	Putnam	0	0	0
273	Putnam	0	0	0
272	Putnam	1	1	0
271	Putnam	1	1	0
270	Putnam	1	1	0
269	Putnam	0	0	0
268	Putnam	0	0	0
267	Putnam	0	0	0
266	Smith/Putnam	0	0	0
265	Smith	0	0	0
264	Smith	2	3	0
263	Smith	0	0	0
262	Smith	1	2	0
261	Smith	1	1	0
260	Smith	0	0	0
259	Smith	0	0	0
258	Smith	0	0	0
257	Smith	1	1	0
256	Smith	0	0	0
255	Smith	0	0	0
254	Smith	1	2	2
253	Smith	0	0	0
252	Smith	1	1	0
251	Smith	1	1	0
250	Smith	1	1	0
249	Wilson/Smith	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
248	Wilson	0	0	0
247	Wilson	2	2	5
246	Wilson	0	0	0
245	Wilson	1	1	0
244	Wilson	2	3	1
243	Wilson	0	0	0
242	Wilson	0	0	0
241	Wilson	0	0	0
240	Wilson	0	0	0
239	Wilson	1	1	0
238	Wilson	1	1	1
237	Wilson	0	0	0
236	Wilson	0	0	0
235	Wilson	1	1	0
234	Wilson	0	0	0
233	Wilson	2	2	0
232	Wilson	2	3	3
231	Wilson	0	0	0
230	Wilson	2	2	0
229	Wilson	1	1	0
228	Wilson	0	0	0
227	Wilson	1	1	5
226	Wilson	0	0	0
225	Davidson/Wilson	1	2	1
224	Davidson	1	1	0
223	Davidson	0	0	0
222	Davidson	0	0	0
221	Davidson	1	1	2
220	Davidson	1	2	0
219	Davidson	1	1	0
218	Davidson	2	2	2
217	Davidson	1	1	0
216	Davidson	0	0	0
215	Davidson	1	1	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
214	Davidson	1	1	0
213	Davidson	1	1	0
212	Davidson	0	0	0
211	Davidson	2	2	0
210	Davidson	2	2	0
209	Davidson	1	1	0
208	Davidson	0	0	0
207	Davidson	1	1	0
206	Davidson	1	1	0
205	Davidson	0	0	0
204	Davidson	3	3	0
203	Davidson	2	2	0
202	Davidson	2	2	0
201	Davidson	2	2	1
200	Davidson	5	5	4
199	Davidson	0	0	0
198	Davidson	0	0	0
197	Davidson	0	0	0
196	Davidson	0	0	0
195	Davidson	0	0	0
194	Davidson	0	0	0
193	Davidson	0	0	0
192	Davidson	2	2	2
191	Cheatham/Davidson	0	0	0
190	Cheatham	0	0	0
189	Cheatham	1	1	0
188	Cheatham	1	1	0
187	Cheatham	1	2	0
186	Cheatham	1	1	3
185	Cheatham	0	0	0
184	Williamson/Cheatham	1	1	0
183	Williamson	0	0	0
182	Williamson	1	1	0
181	Williamson	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
180	Dickson/Williamson	1	1	1
179	Dickson	1	1	0
178	Dickson	0	0	0
177	Dickson	1	1	0
176	Dickson	0	0	0
175	Dickson	0	0	0
174	Dickson	0	0	0
173	Dickson	0	0	0
172	Dickson	0	0	0
171	Dickson	0	0	0
170	Dickson	1	1	0
169	Dickson	0	0	0
168	Dickson	0	0	0
167	Dickson	0	0	0
166	Dickson	1	1	0
165	Dickson	0	0	0
164	Dickson	0	0	0
163	Hickman/Dickson	0	0	0
162	Hickman	1	1	1
161	Hickman	1	1	0
160	Hickman	0	0	0
159	Hickman	0	0	0
158	Hickman	0	0	0
157	Hickman	0	0	0
156	Hickman	0	0	0
155	Hickman	1	1	0
154	Hickman	0	0	0
153	Hickman	0	0	0
152	Hickman	0	0	0
151	Humphreys/Hickman	0	0	0
150	Humphreys	1	1	2
149	Humphreys	0	0	0
148	Humphreys	0	0	0
147	Humphreys	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
146	Humphreys	1	1	0
145	Humphreys	1	2	0
144	Humphreys	0	0	0
143	Humphreys	0	0	0
142	Humphreys	0	0	0
141	Humphreys	0	0	0
140	Humphreys	3	3	1
139	Humphreys	1	1	0
138	Benton/Humphreys	1	1	0
137	Benton	0	0	0
136	Benton	1	1	0
135	Benton	0	0	0
134	Benton	1	1	0
133	Benton	0	0	0
132	Benton	0	0	0
131	Benton	1	2	3
130	Benton	0	0	0
129	Decatur/Benton	0	0	0
128	Decatur	0	0	0
127	Decatur	0	0	0
126	Decatur	0	0	0
125	Decatur	0	0	0
124	Decatur	0	0	0
123	Henderson/Carroll/Decatur	0	0	0
122	Henderson	0	0	0
121	Henderson	1	1	0
120	Henderson	0	0	0
119	Henderson	1	1	0
118	Henderson	0	0	0
117	Henderson	0	0	0
116	Henderson	1	1	1
115	Henderson	1	1	0
114	Henderson	1	3	0
113	Henderson	2	2	3

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
112	Henderson	3	4	4
111	Henderson	0	0	0
110	Henderson	0	0	0
109	Henderson	2	2	1
108	Henderson	0	0	0
107	Henderson	0	0	0
106	Henderson	1	1	0
105	Henderson	0	0	0
104	Henderson	3	4	0
103	Henderson	1	4	0
102	Henderson	0	0	0
101	Henderson	0	0	0
100	Henderson	0	0	0
99	Henderson	1	1	1
98	Madison/Henderson	0	0	0
97	Madison	0	0	0
96	Madison	0	0	0
95	Madison	0	0	0
94	Madison	0	0	0
93	Madison	0	0	0
92	Madison	1	1	0
91	Madison	1	1	0
90	Madison	2	2	0
89	Madison	0	0	0
88	Madison	0	0	4
87	Madison	1	3	2
86	Madison	1	1	0
85	Madison	0	0	0
84	Madison	1	1	0
83	Madison	1	1	0
82	Madison	0	0	0
81	Madison	1	1	0
80	Madison	3	5	2
79	Madison	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
78	Madison	3	6	2
77	Madison	2	3	1
76	Madison	2	3	1
75	Madison	2	3	1
74	Madison	1	1	1
73	Madison	0	0	0
72	Madison	1	1	0
71	Madison	0	0	0
70	Haywood/Madison	3	3	4
69	Haywood	0	0	0
68	Haywood	0	0	0
67	Haywood	1	2	0
66	Haywood	0	0	0
65	Haywood	0	0	0
64	Haywood	1	1	0
63	Haywood	1	1	0
62	Haywood	0	0	0
61	Haywood	0	0	0
60	Haywood	1	1	0
59	Haywood	0	0	0
58	Haywood	0	0	0
57	Haywood	0	0	0
56	Haywood	1	1	0
55	Haywood	1	1	1
54	Haywood	1	1	1
53	Haywood	0	0	0
52	Haywood	0	0	0
51	Haywood	1	1	1
50	Haywood	1	1	2
49	Haywood	0	0	0
48	Haywood	0	0	0
47	Haywood	0	0	0
46	Fayette/Haywood	0	0	0
45	Fayette	0	0	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
44	Fayette	1	3	0
43	Fayette	0	0	0
42	Fayette	0	0	0
41	Fayette	1	1	1
40	Fayette	0	0	0
39	Fayette	1	1	0
38	Fayette	0	0	0
37	Fayette	0	0	0
36	Fayette	0	0	0
35	Fayette	0	0	0
34	Fayette	1	1	0
33	Fayette	0	0	0
32	Fayette	2	4	0
31	Fayette	0	0	0
30	Shelby/Fayette	0	0	0
29	Shelby	1	1	0
28	Shelby	0	0	0
27	Shelby	0	0	0
26	Shelby	1	1	0
25	Shelby	1	1	0
24	Shelby	0	0	0
23	Shelby	0	0	0
22	Shelby	0	0	0
21	Shelby	1	1	0
20	Shelby	0	0	0
19	Shelby	0	0	0
18	Shelby	1	1	0
17	Shelby	1	1	0
16	Shelby	0	0	0
15	Shelby	1	1	0
14	Shelby	2	2	1
13	Shelby	2	2	0
12	Shelby	1	1	0
11	Shelby	2	2	0

Mile Marker	County	Crashes	Number of Fatalities	Number of Incapacitating Injuries
10	Shelby	0	0	0
9	Shelby	1	1	0
8	Shelby	1	1	0
7	Shelby	1	1	0
6	Shelby	0	0	0
5	Shelby	2	2	0
4	Shelby	1	1	0
3	Shelby	0	0	0
2	Shelby	1	1	0
1	Shelby	1	1	0
0	Shelby	3	5	1