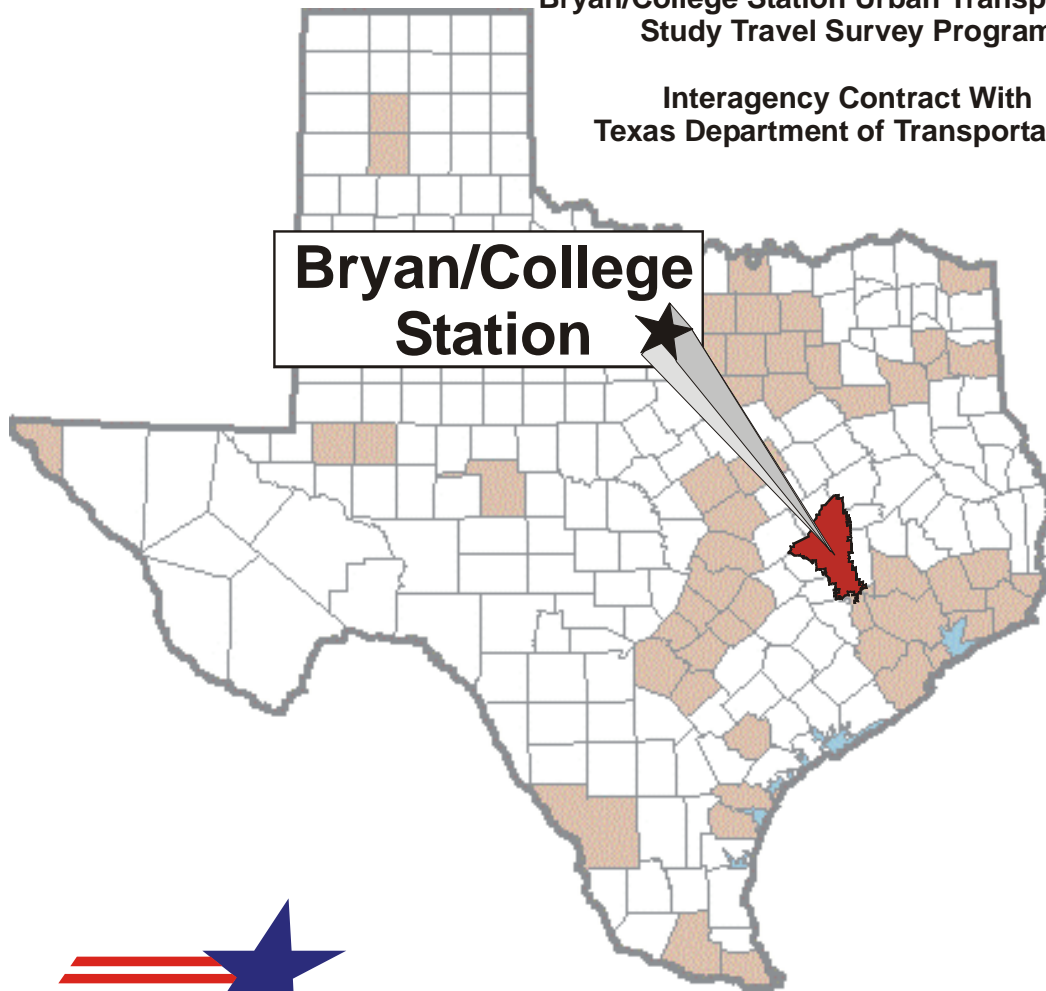


# Bryan/College Station External Survey Technical Summary

Bryan/College Station Urban Transportation  
Study Travel Survey Program

Interagency Contract With  
Texas Department of Transportation



Prepared by the  
Texas Transportation Institute  
November 2003



# **Bryan/College Station External Survey**

## **TECHNICAL SUMMARY**

**Prepared by**

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**November 2003**



## **INTRODUCTION**

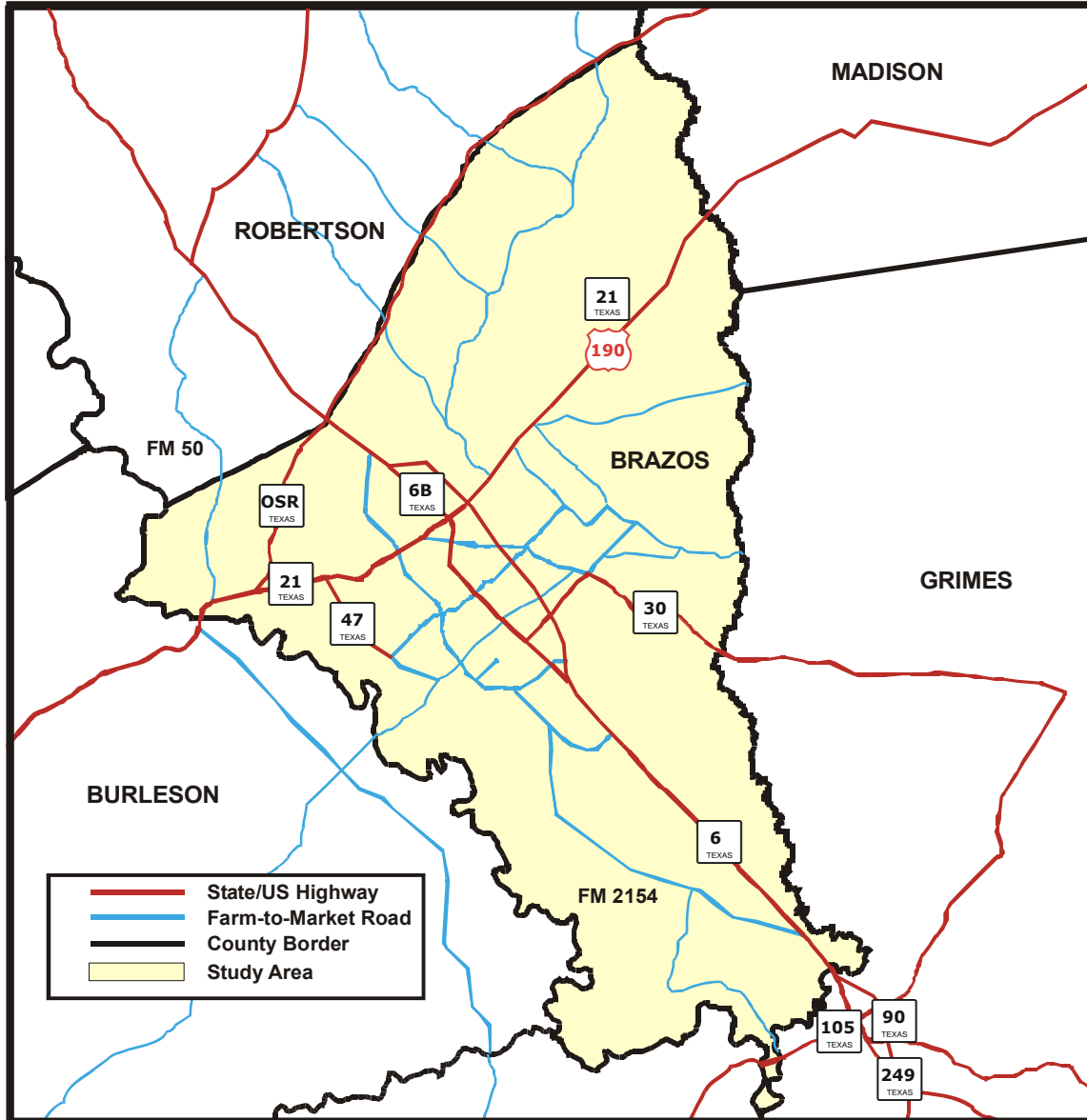
In 2001 the Transportation Planning and Programming (TPP) Division of the Texas Department of Transportation (TxDOT) funded an external station travel survey in Brazos County, the Bryan/College Station Transportation Study area. This survey measured and identified travel patterns into, within, and out of Brazos County. This report presents a Technical Summary of the 2001 Bryan/College Station External Station Survey and documents the data collected and the analysis results for the Brazos County area.

## **EXTERNAL STATION SURVEY**

An external station survey is essentially a survey of vehicles and/or pedestrians traversing the study area boundary. The survey identifies and measures the characteristics of travel in and out of the study area as well as the travel through the study area. Estimates of travel within the study area by individuals that do not live in the study area are also developed from the survey.

## **BRYAN/COLLEGE STATION STUDY AREA**

The boundary established for the Bryan/College Station external survey was Brazos County. Figure 1 shows the study area, located in the southeast portion of Texas. The population center of the county is comprised of the cities of Bryan and College Station, Texas.



**Figure 1. Brazos County Transportation Study Area.**

**EXTERNAL STATIONS**

There were 10 locations on the border of Brazos County identified as external stations. Of these 10 locations, eight were selected for travel surveys. Table 1 provides the location of external surveys, whether or not surveys were conducted, and the 24-hour traffic count at the location. Figure 2 shows the location of the external stations in Brazos County. Note that station number 505, Sulphur Springs Road, had been identified as an external station in past Bryan/College Station models. However, this road does not cross the county line and is not an external station. As a result, no data is presented for this station.

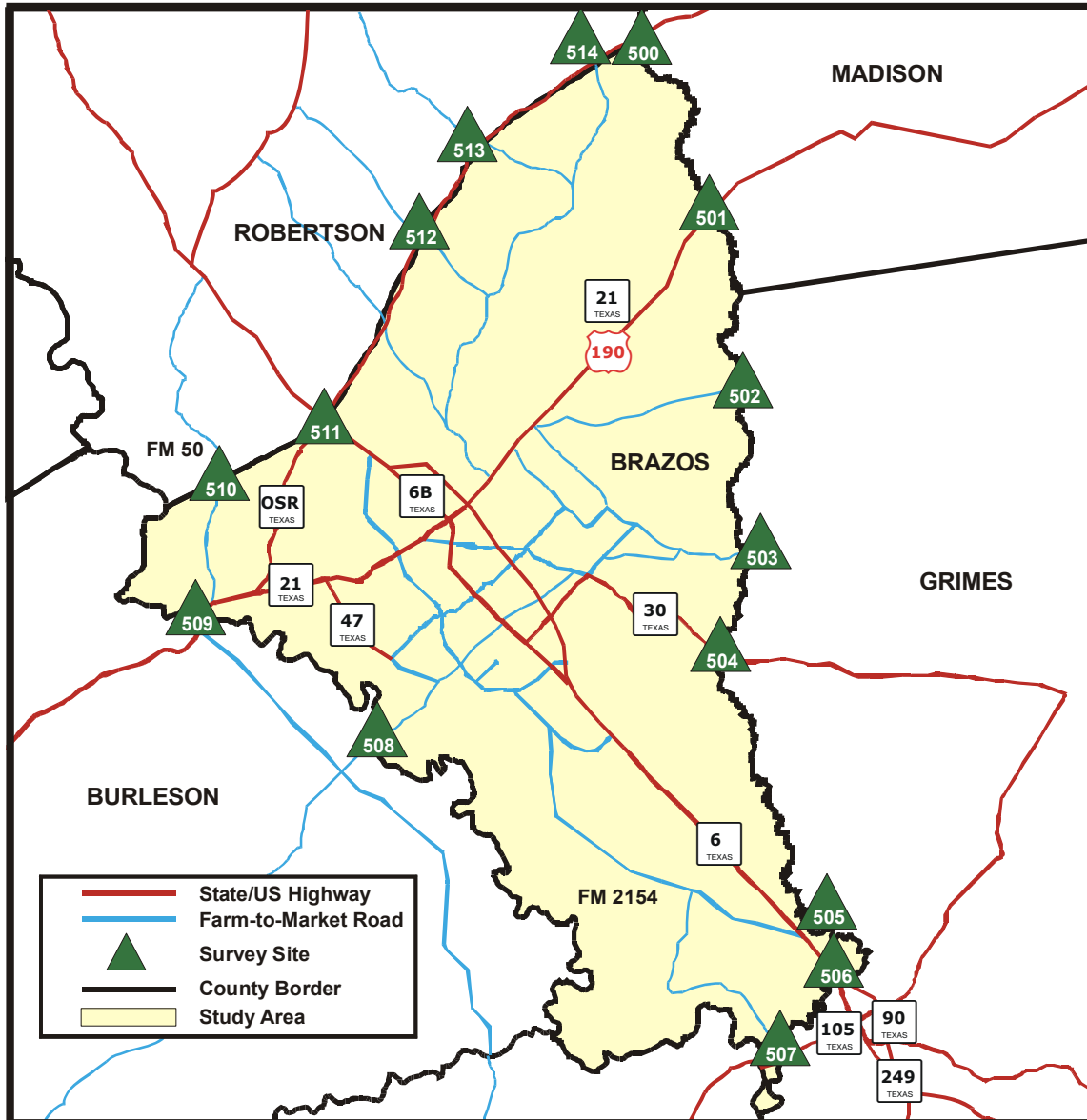


Figure 2. Brazos County External Station Locations.

**Table 1. Bryan/College Station External Stations.**

Station Number	Facility	Location	Surveyed	Number Surveyed	24-Hour Vehicle Count	
					Inbound	Outbound
500	Old San Antonio Road (OSR)	Madison County Line	Yes	111	538	540
501	State Highway (SH) 21	Madison County Line	Yes	299	2,659	2,836
502	Democrat Road	Grimes County Line	No	0	65	65
503	Farm-to-Market (FM) 2038	Grimes County Line	No	0	48	42
504	SH 30	Grimes County Line	Yes	341	2,857	2,891
505*	Sulphur Springs Road	Grimes County Line	No	0	0	0
506	SH 6	Grimes County Line	Yes	328	11,752	9,636
507	FM 159	At SH 105 near Grimes County	No	0	202	201
508	FM 60	Burleson County Line	Yes	307	4,101	4,055
509	SH 21	Burleson County Line	Yes	314	5,237	5,097
510	FM 50	Robertson County Line	Yes	120	467	475
511	SH 6	Robertson County Line	Yes	377	7,936	7,696
512	Unknown Road	Robertson County Line	No	0	60	60
513	FM 46	Robertson County Line	No	0	1,090	1,090
514	FM 1940	Burleson County Line	No	0	490	490

\*Station 505 is not an external station.



## **SURVEY METHODOLOGY**

The methodology employed in the survey was personal interview. For each external station surveyed, traffic control plans were set up and vehicles in the outbound direction were directed to the side of the road and the drivers were asked to participate in the survey. Those declining were allowed to continue on their trip. Trained personnel interviewed those agreeing to participate in the survey. Drivers of commercial and non-commercial vehicles were interviewed using different survey forms as shown in the Appendix. Figure 3 shows a typical traffic control plan at an external station.

For a more detailed discussion and description of the survey methodology, see the report, Bryan/College Station External Travel Survey prepared by Alliance-Texas Engineering, Inc.



**Figure 3. Traffic Control Plan on SH 6 at the Robertson County Line.**

## **DATA ANALYSIS**

Data analysis for non-commercial and commercial vehicles is developed separately and presented in this section. Non-commercial vehicles are typically personal use passenger cars, trucks, vans, and motorcycles. Commercial vehicles are those used for commercial purposes and, in most cases, consist of heavy-duty trucks.

### Trip Types

There are two types of trips identified as part of an external survey: external local trips and external through trips. A local trip is one where either the origin or destination of the trip is in the study area. A through trip is one traveling through the study area without stopping. Table 2 presents the survey data for non-commercial and commercial vehicles in terms of trips identified as local or through movements. It should be noted that for some stations, the sum of the local and through trips does not represent the total number of surveys. The difference represents surveys where the respondent refused to answer a question or where the trip data was not clear enough to determine the type of trip.

**Table 2. Survey Results by Trip Type (Commercial and Non-Commercial Vehicles).**

Station Number	Facility	Non-Commercial Vehicle Surveys			Commercial Vehicle Surveys		
		Local	Through	Total	Local	Through	Total
500	OSR	66	45	111			
501	SH 21 @ Madison County Line	262	36	299	34	20	54
502	Democrat Road	Not Surveyed					
503	FM 2038	Not Surveyed					
504	SH 30	307	34	341	28	22	50
505	Sulphur Springs Road	Not Surveyed					
506	SH 6 @ Grimes County Line	295	32	327	37	27	64
507	FM 159	Not Surveyed					
508	FM 60	290	14	304	41	5	46
509	SH 21 @ Burleson County Line	280	34	314	34	14	48
510	FM 50	40	80	120	9	8	17
511	SH 6 @ Robertson County Line	296	81	377	22	37	59
512	Unknown Road	Not Surveyed					
513	FM 46	Not Surveyed					
514	FM 1940	Not Surveyed					
<b>Totals</b>		<b>1,836</b>	<b>356</b>	<b>2,197</b>	<b>207</b>	<b>133</b>	<b>340</b>

The second type of trip identified in the survey is a sub-category of external local trips. These are reported as residential and non-residential trips. A resident is a survey respondent that reported they resided in Brazos County. A non-resident is a respondent that reported they lived outside of Brazos County. Table 3 presents the survey data by residents and non-residents as well as the number of trips made by non-residents within the study area. An important element of the trips reported by non-residents is the number of trips made prior to being surveyed. Based on the information provided in the survey, these trips are evaluated to estimate the number of internal trips, trips where both the origin and destination are within Brazos County, made by non-residents. By measuring the number of non-residents that travel in and out of Brazos County and the number of internal trips they make, an estimate of the total internal trips within Brazos County attributable to non-residents can be developed.

The residency questions were only asked of respondents in non-commercial vehicles. Table 3 indicates that individuals who do not live in the County make a high proportion, 68.5 percent, of the non-commercial travel in and out of Brazos County. The number of internal trips made by those individuals is very small (only 0.189 trips per vehicle).

**Table 3. Survey Results by Residency (Non-Commercial Vehicles Only).**

Station Number	Facility	Number of Surveys	Residents	Percent	Non-Residents	Percent	Internal Trips (non-residents)
500	OSR	111	42	37.8	69	62.2	9
501	SH 21 @ Madison County Line	299	72	24.1	227	75.9	62
502	Democrat Road	Not Surveyed					
503	FM 2038	Not Surveyed					
504	SH 30	341	103	30.2	238	69.8	141
505	Sulphur Springs Road	Not Surveyed					
506	SH 6 @ Grimes County Line	328	119	36.3	209	63.7	40
507	FM 159	Not Surveyed					
508	FM 60	307	84	27.4	223	72.6	99
509	SH 21 @ Burleson County Line	314	89	28.3	225	71.7	57
510	FM 50	120	53	44.2	67	65.8	4
511	SH 6 @ Robertson County Line	378	130	34.4	248	65.6	4
512	Unknown Road	Not Surveyed					
513	FM 46	Not Surveyed					
<b>Total</b>		<b>2,198</b>	<b>692</b>	<b>31.5</b>	<b>1,506</b>	<b>68.5</b>	<b>416</b>

**Travel Purpose**

To understand the reasons people travel, the survey included questions about the driver's purpose for being at the location where the trip began (i.e., trip origin) and the purpose for traveling to their destination. There were 15 different purposes included on the survey instrument for non-commercial vehicles and eight purposes on the commercial vehicle

survey. Table 4 provides the trip purposes for each survey. For the purpose of presenting survey results, the trip purpose categories are combined into a fewer number to reflect the primary purposes of travel.

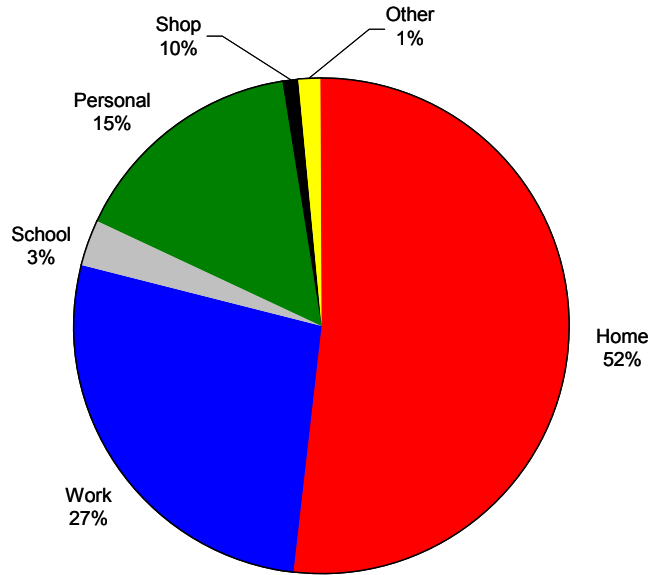
**Table 4. Trip Purpose Categories.**

<b>Code</b>	<b>Non-Commercial Vehicle Trip Purpose</b>	<b>Code</b>	<b>Commercial Vehicle Trip Purpose</b>
1	Home/Return Home	1	Base location/Return to Base
2	Go/Return to Work	2	Delivery
3	Work Related	3	Pick Up
4	School	4	Maintenance
5	Vacation	5	Driver Needs (lunch, etc.)
6	Visit Friends/Family	6	To Home
7	Eat Out	7	Buy Fuel
8	Shop	8	Other
9	Buy Gas	99	Refused/Unknown
10	Personal Business		
11	Pick Up/Drop Off Passenger		
12	Change Travel Mode		
13	Delivery		
14	Other		
15	Refused/Do Not Know		

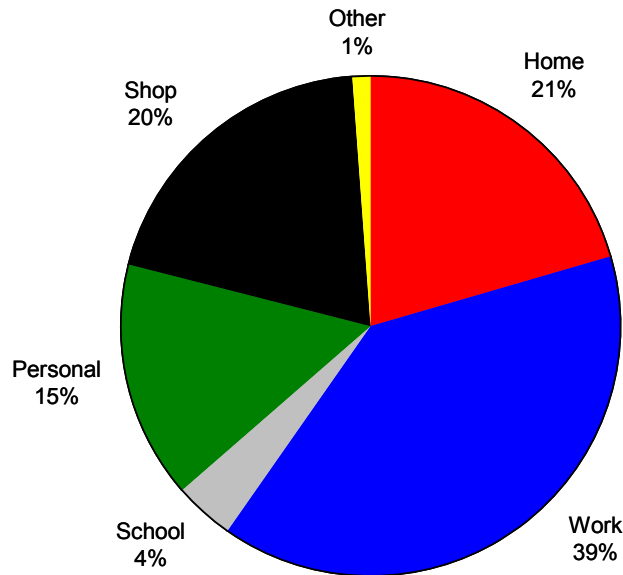
For non-commercial vehicles, the trip purposes listed in Table 4 were combined into the following six categories:

<u>Category</u>	<u>Trip Purpose Codes (from Table 4)</u>
Home	1
Work	2 and 3
School	4
Personal	5, 6, 10, and 11
Shop	7, 8, and 9
Other	12, 13, 14, and 15

Figure 4 presents the distribution of non-commercial vehicles by reported trip purpose at the origin of the trip and Figure 5 shows the distribution of non-commercial vehicles at the destination of the trip. The distribution for the origin purpose clearly shows that the majority of the trips began at home (52 percent), while 27 percent began at work and 15 percent were personal. The majority of the purposes for trip destination were for work (39 percent) followed by home (21 percent) and shopping (20 percent).

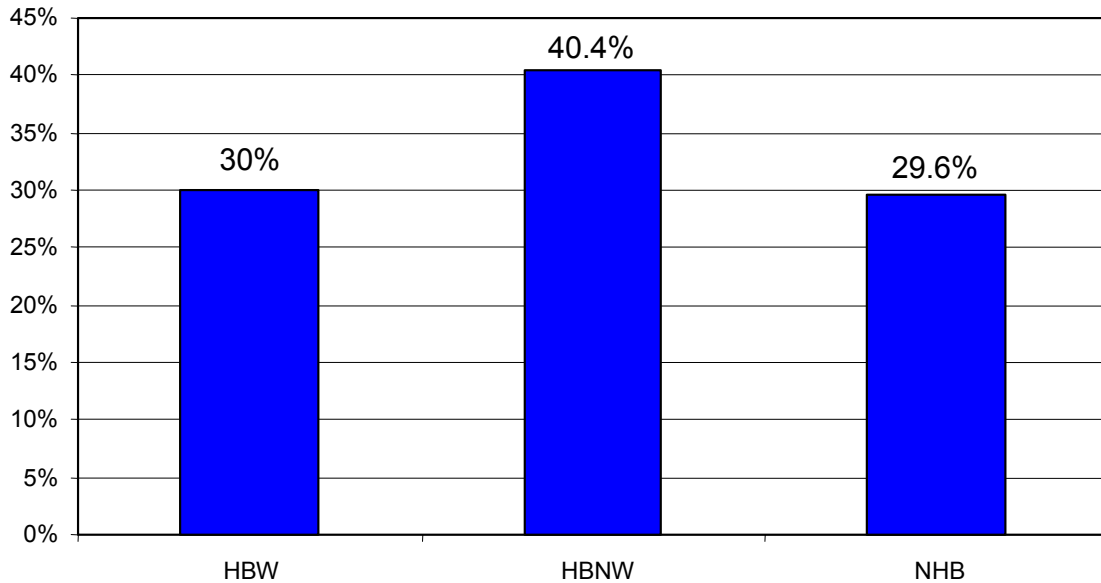


**Figure 4. Trip Purpose Origins for Non-Commercial Vehicles.**



**Figure 5. Trip Purpose Destinations for Non-Commercial Vehicles.**

Combining the trip purposes into categories typically used in travel demand modeling (home-based work [HBW], home-based non-work [HBNW], and non-home based [NHB]) and plotting the distribution yields the results in Figure 6. The majority of the trips, over 40 percent, were home-based non-work trips, which would include all trips with one trip end at home and the other trip end at some place other than work. Home-based work and non-home based trips comprised 30 percent and 29.6 percent of the trips, respectively.



**Figure 6. Distribution of Non-Commercial Vehicle Trips by Trip Purpose.**

For commercial vehicles, the trip purposes shown in Table 4 were combined into the following five categories:

<u>Category</u>	<u>Trip Purpose Codes</u>
Base Location	1
Delivery	2
Pick Up	3
Support Functions	4, 5, 6, and 7
Other	8 and 99

Figures 7 and 8 present the distribution of commercial vehicle trips by reported trip purpose at the origin and destination of the trips. The distribution of commercial trips by purpose at the trip origin shows an even split between picking up cargo (31 percent) and delivering cargo (31 percent). A total of 18 percent of the trips were for support functions (i.e., maintenance, purchase fuel, attend driver needs, or home) and 16 percent were to travel to their base location. The distribution for destination trip purpose shows that the

majority of the surveyed vehicles (44 percent) were destined for delivering cargo and another 29 percent were destined for picking up cargo.

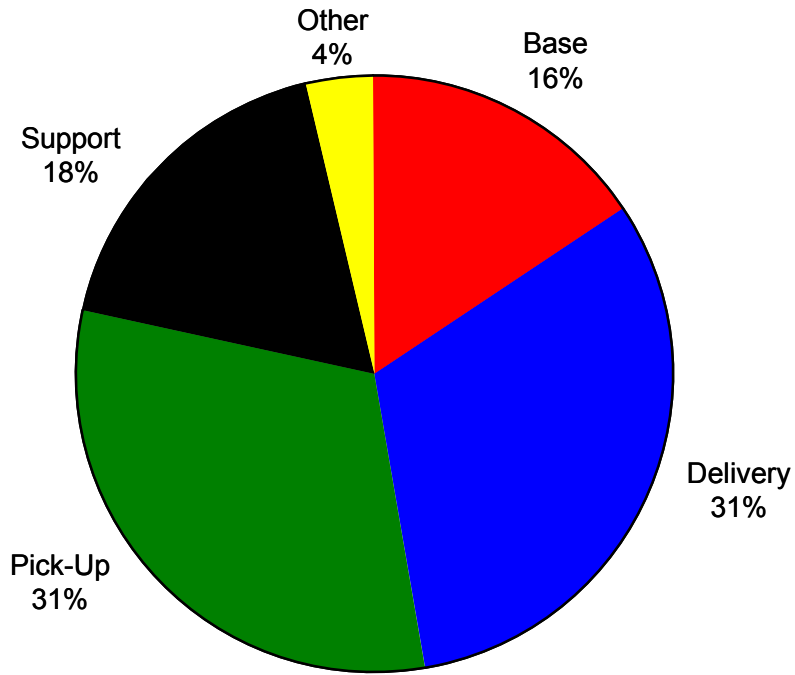


Figure 7. Trip Purpose Origins for Commercial Vehicles.

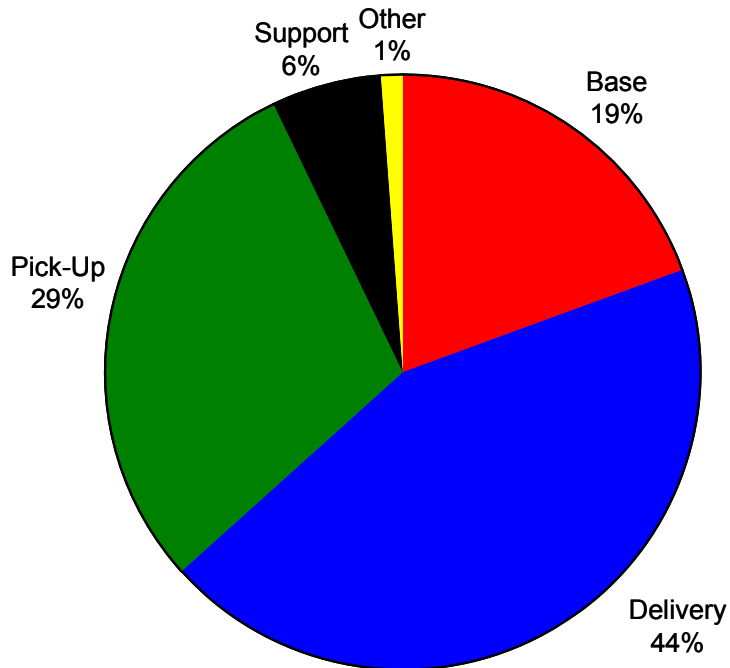
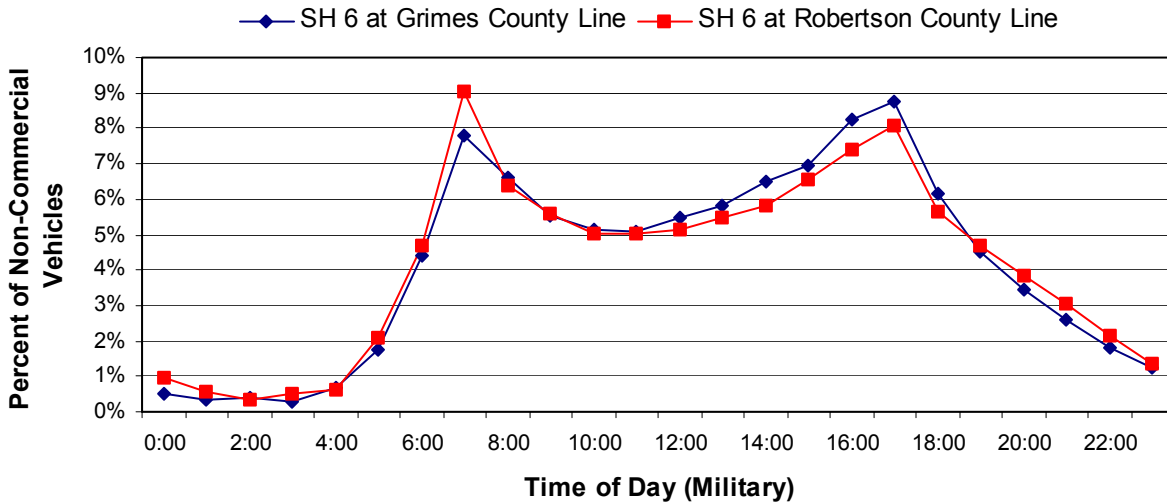


Figure 8. Trip Purpose Destinations for Commercial Vehicles.



**Time-of-Day**

Vehicle classification counts conducted at each external survey location provide information on the number and type of vehicles by direction for 24 hours. This information is primarily used for expansion of the survey data, but is also of interest to examine the distribution of vehicles by time-of-day. Table 1 provides the total vehicle counts for each location. Figures 9 through 12 provide the distribution of non-commercial vehicles by time-of-day for the external locations that were surveyed. Figures 13 through 16 provide this information for commercial vehicles.



**Figure 9. Distribution of Non-Commercial Vehicles by Time-of-Day for SH 6 at the Grimes County Line and SH 6 at the Robertson County Line.**

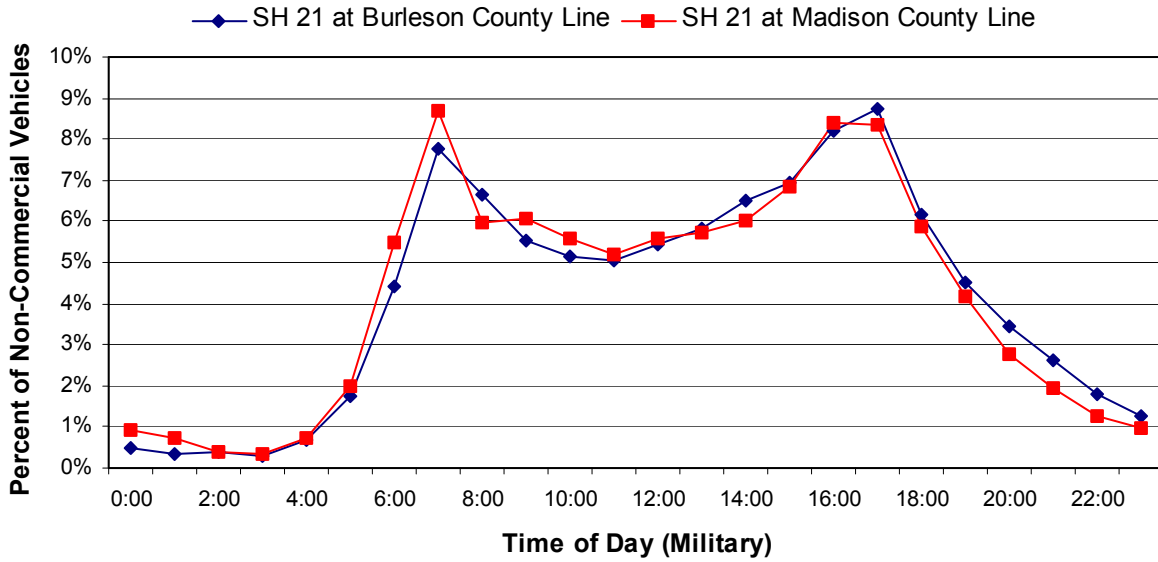


Figure 10. Distribution of Non-Commercial Vehicles by Time-of-Day for SH 21 at the Madison County Line and SH 21 at the Burleson County Line.

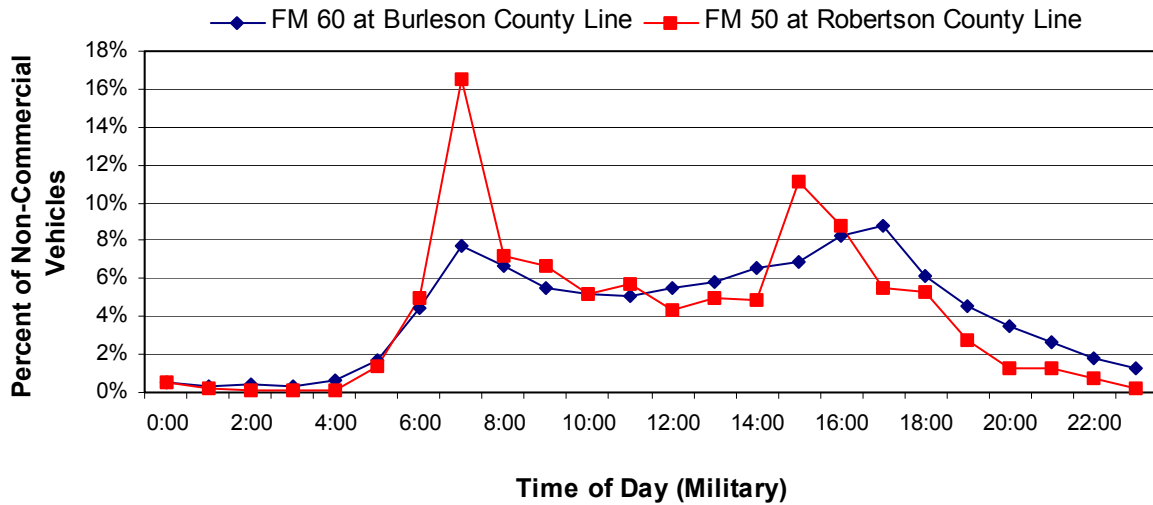


Figure 11. Distribution of Non-Commercial Vehicles by Time-of-Day for FM 60 at the Burleson County Line and FM 50 at the Robertson County Line.

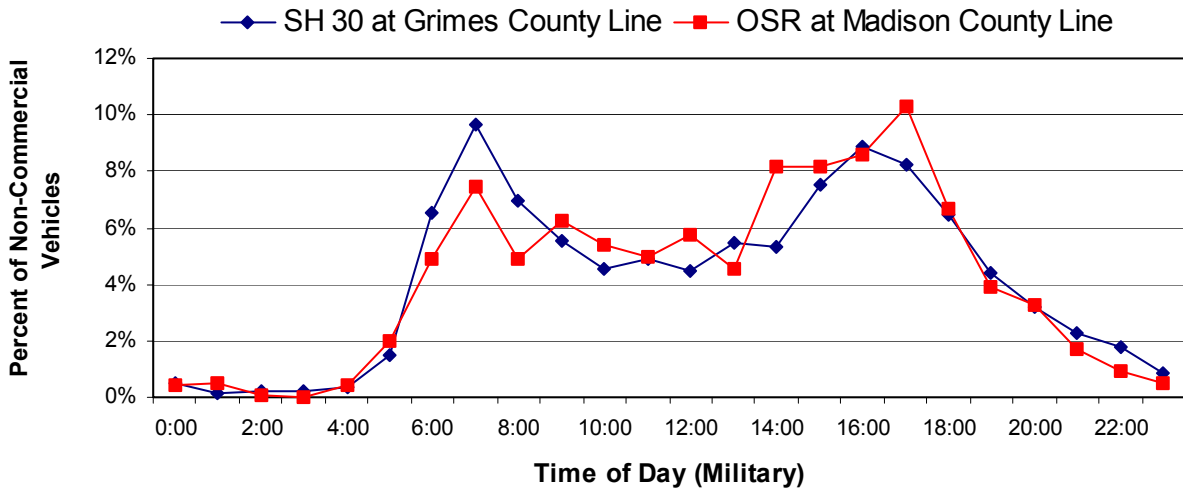


Figure 12. Distribution of Non-Commercial Vehicles by Time-of-Day for OSR at the Madison County Line and SH 30 at the Grimes County Line.

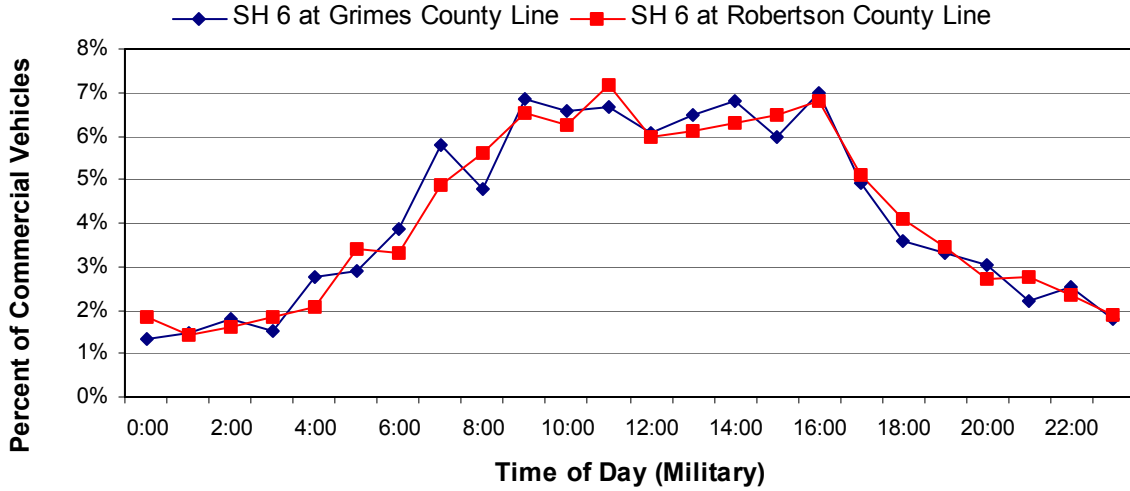


Figure 13. Distribution of Commercial Vehicles by Time-of-Day for SH 6 at the Grimes County Line and SH 6 at the Robertson County Line.

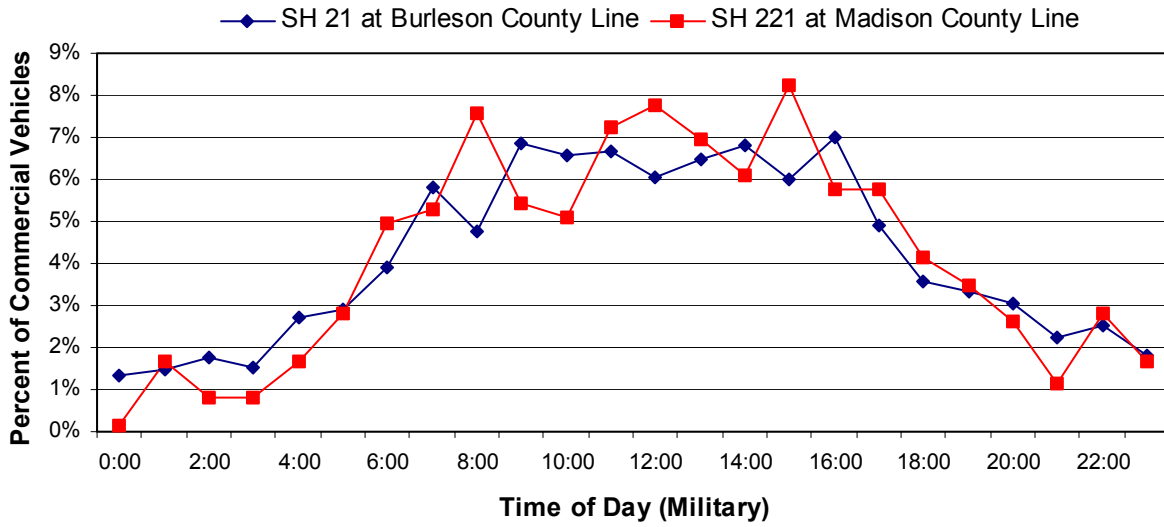


Figure 14. Distribution of Commercial Vehicles by Time-of-Day for SH 21 at the Madison County Line and SH 21 at the Burleson County Line.

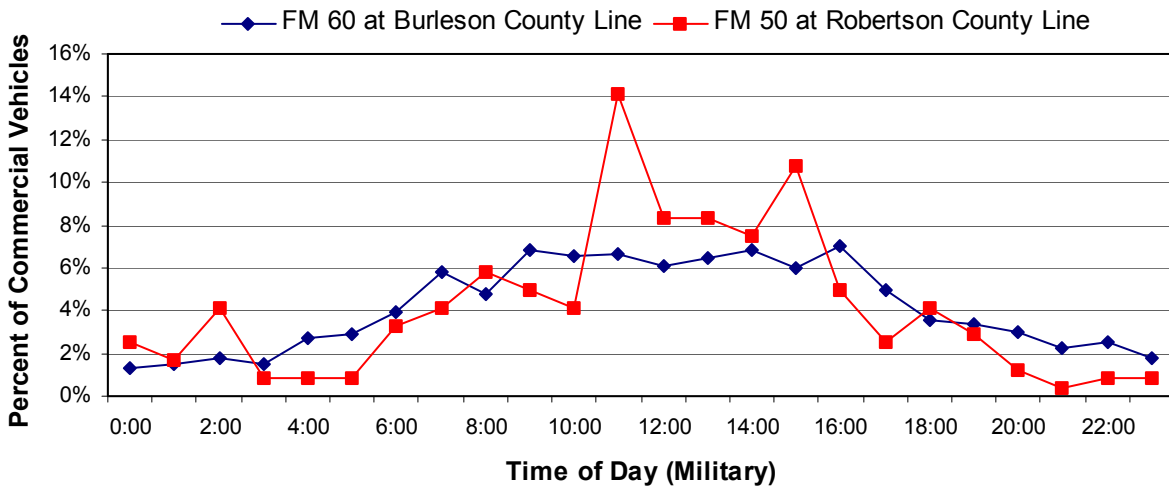
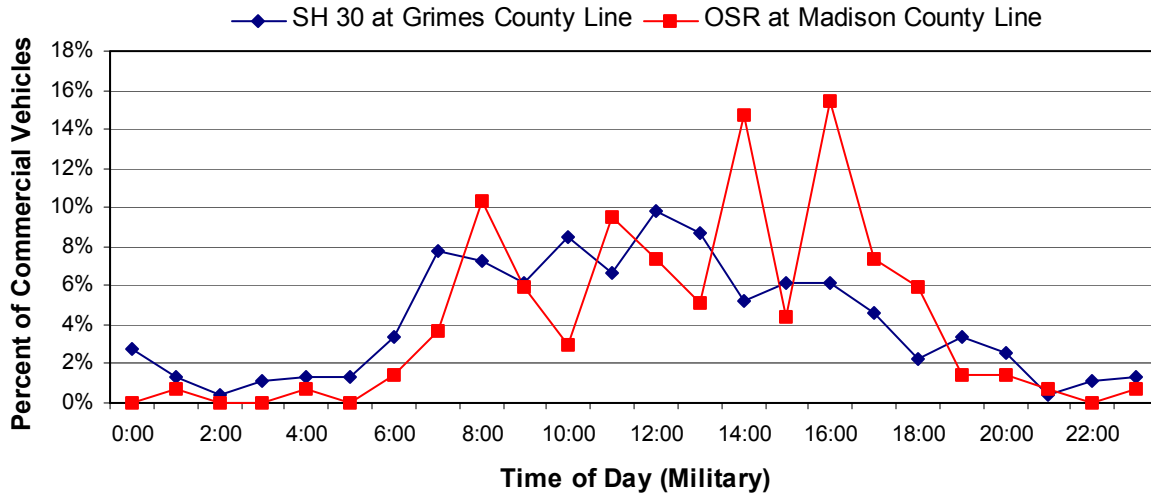


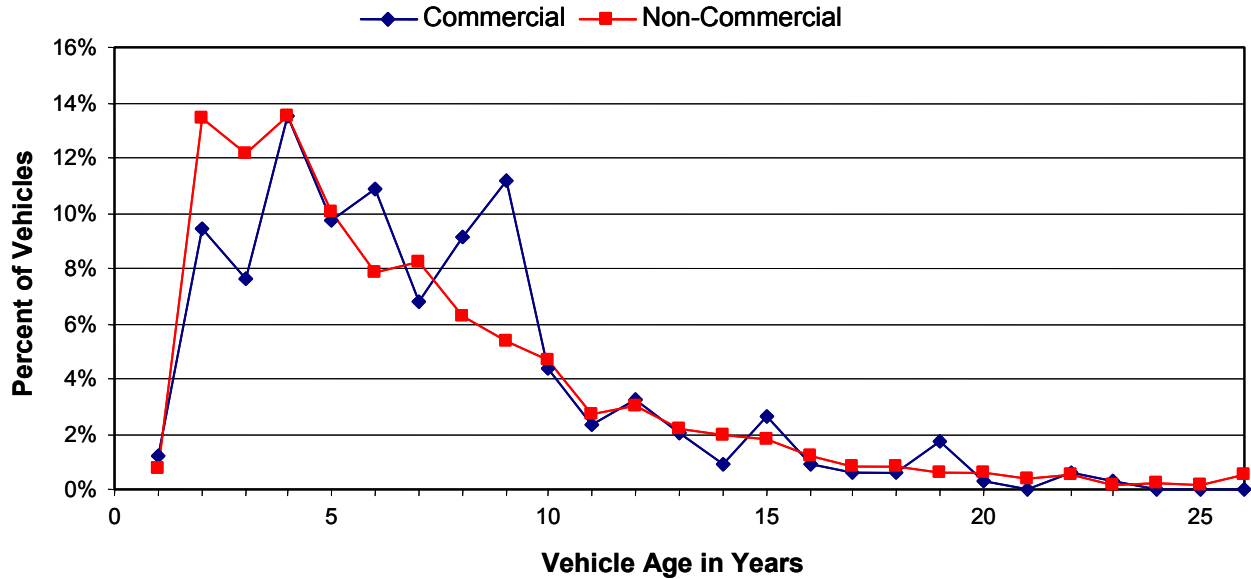
Figure 15. Distribution of Commercial Vehicles by Time-of-Day for FM 60 at the Burleson County Line and FM 50 at the Robertson County Line.



**Figure 16. Distribution of Commercial Vehicles by Time-of-Day for OSR at the Madison County Line and SH 30 at the Grimes County Line.**

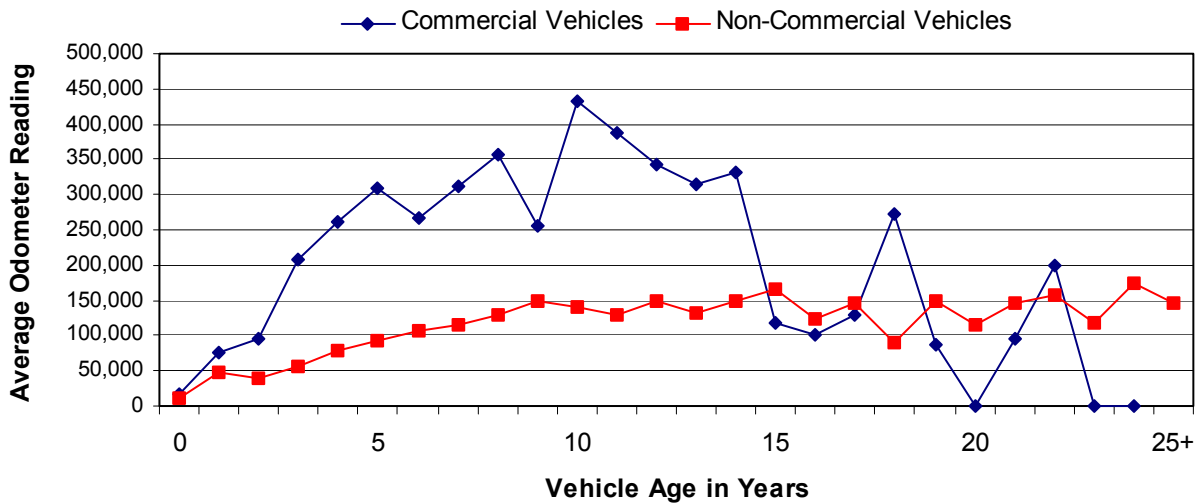
**Vehicle Characteristics**

As part of the survey, interviewers collected data on the year, make, odometer readings, and model of each vehicle surveyed. This provides an indication of the distribution of vehicles operating at the external stations by type, age, and condition (as implied by the number of miles on the vehicle). Figure 17 represents the distribution of non-commercial and commercial vehicles by age as reported in the surveys. The median age of the non-commercial vehicles was 5.08 years and 5.78 years for the commercial vehicles.



**Figure 17. Distribution of Surveyed Vehicles by Age of Vehicle.**

Figure 18 presents the average odometer reading for non-commercial and commercial vehicles by age. This data shows the difference in mileage accumulation rates of commercial vehicles as compared to non-commercial vehicles. The data for commercial vehicles do not show smooth trends. This is due in part to the number of observations in the survey. Table 5 presents the numerical values for the data plotted in Figure 17. The average odometer reading for commercial vehicles was almost three times greater than the average for non-commercial vehicles.



**Figure 18. Average Odometer Readings for Vehicles by Age of Vehicle.**

**Table 5. Distribution of Surveyed Vehicles by Age and Average Odometer Readings.**

<b>Vehicle Age</b>	<b>Non-Commercial Vehicles</b>	<b>Average Odometer Reading</b>	<b>Commercial Vehicles</b>	<b>Average Odometer Reading</b>
<1	17	10,529	4	17,250
1	295	48,929	32	76,250
2	267	39,768	26	96,615
3	297	56,092	46	207,674
4	221	78,145	33	260,182
5	173	94,098	37	310,285
6	181	105,912	23	267,261
7	137	115,869	31	312,806
8	117	128,829	38	358,105
9	102	150,010	15	254,267
10	60	141,300	8	431,500
11	66	129,576	11	386,727
12	48	148,008	7	343,571
13	43	132,814	3	313,667
14	39	147,718	9	332,667
15	27	165,185	3	117,333
16	19	124,631	2	100,500
17	18	146,056	2	128,000
18	14	90,000	6	273,667
19	13	147,539	1	88,000
20	8	113,875	0	0
21	11	145,182	2	96,000
22	4	156,750	1	200,000
23	5	118,600	0	0
24	3	173,000	0	0
25+	12	147,417	0	0
<b>Totals</b>	<b>2,197</b>	<b>88,810</b>	<b>340</b>	<b>249,657</b>

### Vehicle Occupancy

As vehicles were surveyed, one of the data items recorded was the class or type of vehicle and the number of persons in the vehicle. This information provides a means for estimating the number of persons traveling in and out of Brazos County. Table 6 presents the number of observed non-commercial and commercial vehicles by class and the average occupancy of each. The overall average occupancy for non-commercial vehicles was 1.42 and 1.09 for commercial vehicles.

**Table 6. Distribution of Vehicles by Class and Average Occupancy.**

<b>Non-Commercial Vehicle Classification</b>	<b>Observed Vehicles</b>	<b>Average Occupancy</b>	<b>Commercial Vehicle Classification</b>	<b>Observed Vehicles</b>	<b>Average Occupancy</b>
Passenger Vehicle	2170	1.41	Single Unit – 2 Axle 6 Wheels	56	1.27
Bus	10	2.00			
Taxi/Paid Limo	0	N/A	Single Unit – 3 Axle 10 Wheels	29	1.24
School Bus	0	N/A			
Motorcycle	4	1.0	Single Unit – 4 Axle 14 Wheels	9	1.11
Recreational Vehicle	2	1.0			
Other	0	N/A	Semi-Tractor Trailer Combinations	244	1.03
			Other	2	1.00

### COMMERCIAL VEHICLE CARGO CHARACTERISTICS

Commercial vehicles represent a major component of travel into, out of, and through Brazos County. Specific questions were included in the commercial vehicle survey to obtain information on the cargo being transported, the type of facility where it was picked up and its destination, and how the cargo was transported to the vehicle. Table 7 presents data on the number of commercial vehicles surveyed by survey site and whether their cargo was from Mexico.



**Table 7. Commercial Vehicles With Cargo from Mexico.**

<b>Station Number</b>	<b>Facility</b>	<b>Surveyed Vehicles</b>	<b>Empty Vehicles</b>	<b>Vehicles with Mexico Cargo</b>	<b>Vehicles Without Mexico Cargo</b>
500	OSR at Madison County Line	2	0	0	2
501	SH 21 at Madison County Line	54	28	1	24
502	Democrat Road	Not Surveyed			
503	FM 2038	Not Surveyed			
504	SH 30 at Grimes County Line	27	27	0	19
505	Sulphur Springs Road	Not Surveyed			
506	SH 6 at Grimes County Line	64	37	0	6
507	FM 159 at SH 105	Not Surveyed			
508	FM 60 at Burleson County Line	46	20	1	25
509	SH 21 at Burleson County Line	48	22	1	25
510	FM 50 at Robertson County Line	17	7	0	10
511	SH 6 at Robertson County Line	59	44	0	15
512	Unknown Road	Not Surveyed			
513	FM 46 at Robertson County Line	Not Surveyed			
514	SM 1940 at Burleson County Line	Not Surveyed			
<b>Totals</b>		<b>340</b>	<b>182</b>	<b>3</b>	<b>126</b>

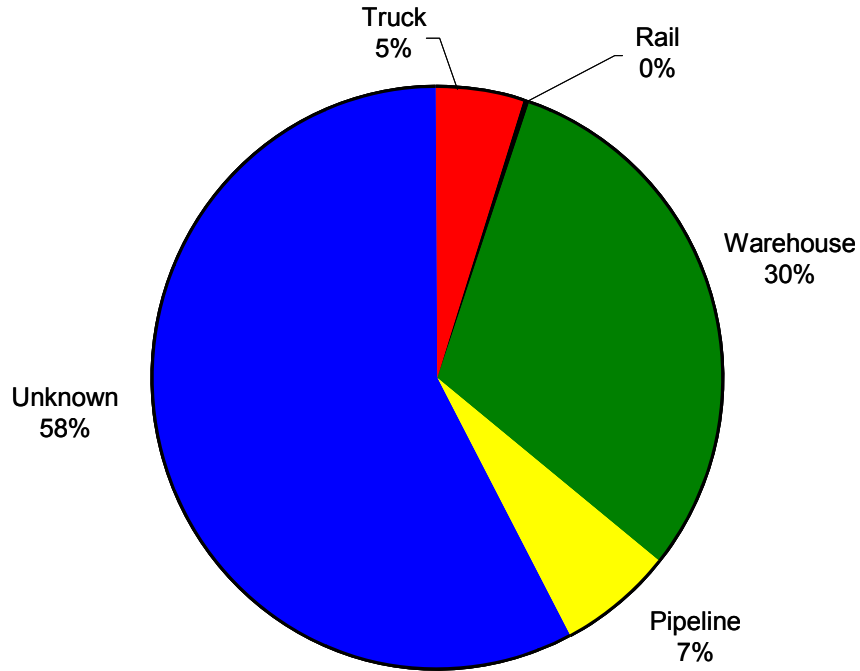
The values in Table 7 do not sum to the total number of vehicles surveyed. This is due to some respondents reporting that they did not know or refused to answer the question. More than half of the vehicles surveyed were empty or carrying no cargo. For those vehicles with cargo, 97 percent were carrying cargo that was not from Mexico.

Table 8 presents the data from surveyed commercial vehicles by their reported cargo. Empty vehicles comprise the majority of vehicles (54.7 percent). For those with identified cargo, most (6.47 percent) reported that their cargo was metals or minerals, and 5.88 percent reported carrying food, health, and beauty products.

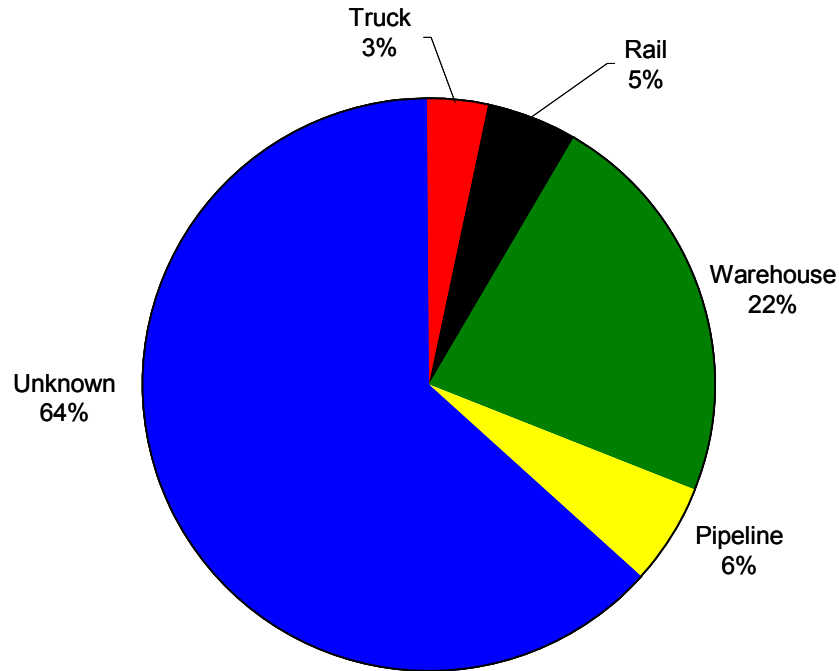
**Table 8. Distribution of Commercial Vehicles by Type of Cargo.**

<b>Type of Cargo</b>	<b>Number of Vehicles</b>	<b>Percent of Vehicles</b>
Farm products	14	4.12
Forest Products	5	1.47
Marine Products	0	0.00
Metals and Minerals	22	6.47
Food, Health, and Beauty Products	20	5.88
Tobacco Products	1	0.29
Textiles	1	0.29
Wood Products	8	2.35
Printed Matter	2	0.59
Chemical Products	4	1.18
Refined Petroleum or Coal Products	3	0.88
Rubber, Plastic, and Styrofoam Products	4	1.18
Clay, Concrete, Glass, or Stone Products	10	2.94
Manufactured Goods/Equipment Products	13	3.82
Wastes	0	0.00
Miscellaneous Shipments	5	1.47
Hazardous Materials	2	0.59
Transportation Products	11	3.24
Unclassified Cargo	23	6.76
Refused to Answer	0	0.00
Unknown to Driver	6	1.76
Empty	186	57.71
<b>Totals</b>	<b>340</b>	<b>100.00</b>

Figures 19 and 20 present the distribution of surveyed commercial vehicles by the type of transfer for their cargo at the origin (point of pick up) and at their destination (point of delivery). There were some vehicles that reported transferring their cargo from a ship or plane but these were so few they were not included in the plots shown. The majority of cargo transfers were reported as unknown. The second most reported transfer was from warehouse to truck and the third was pipeline to truck.



**Figure 19. Distribution of Commercial Vehicles by Transfer at Point of Cargo Pick-Up.**



**Figure 20. Distribution of Commercial Vehicles by Cargo Transfer at Point of Cargo Pick-Up.**

#### **EXPANDED VEHICLE SURVEY**

The vehicle survey data were expanded based on the 24-hour directional vehicle classification counts conducted at each survey site on the day the site was surveyed. The assumption is made that the traffic in the non-surveyed direction is a mirror image of the traffic in the surveyed direction. For example, if 10 percent of the surveyed outbound traffic was through trips, it is assumed that 10 percent of the inbound traffic will be through trips. Table 8 presents the expanded estimates of external local and through trips for non-commercial and commercial vehicles by site as well as the estimates of trips by residents and visitors (non-residents). It should be noted that estimates are included in Table 8 for the non-surveyed sites. These estimates are based on the 24-hour vehicle classification counts and three assumptions. The first is that for those sites for which no through trips were reported from the surveyed stations, all the trips are assumed to be local. The second assumption is that non-residents make all the trips, and the third is that non-commercial vehicles make all trips. Figure 21 shows the estimates of through trip movements by direction and location groups and Figure 22 shows the estimates of through trip movements by direction and location groups.

The expanded survey data were used to develop zone-to-zone estimates of non-commercial and commercial vehicle trips based on the geocoded origins and destinations for the surveyed trips. Trips for the non-surveyed sites were distributed to the destination zones observed from the surveyed sites on a proportional basis. It is assumed that the surveyed sites are representative of the most likely destination zones for the non-surveyed

sites. Since the volume of vehicle trips at the non-surveyed sites is low, the amount of error that may be generated by that assumption is believed to be small.

**Table 8. Expanded Survey Results by Station.**

Station Number	Facility	Non-Commercial			Commercial			Residents	Visitors
		Local	Through	Total	Local	Through	Total		
500	OSR at Madison County Line	693	249	942	130	6	136	356	586
501	SH 21 at Madison County Line	4,286	554	4,840	503	211	714	1,166	3,674
502	Democrat Road at Grimes County Line	118	12	120	0	0	0	29	91
503	FM 2038 at Grimes County Line	84	6	90	0	0	0	22	68
504	SH 30 at Grimes County Line	4,929	381	5,310	276	162	438	1,604	3,706
505	Sulphur Springs Road	0	0	0	0	0	0	0	0
506	SH 6 at Grimes County Line	16,370	2,238	18,608	1,307	1,473	2,780	6,736	11,872
507	FM 159 at SH 105	403	0	403	0	0	0	146	257
508	FM 60	7,387	316	7,703	322	131	453	2,103	5,600
509	SH 21 at Burleson County Line	8,134	879	9,013	932	389	1,321	2,551	6,462
510	FM 50 at Robertson County Line	625	192	817	48	77	125	361	456
511	SH 6 at Robertson County Line	10,191	2,376	12,567	1,506	1,559	3,065	4,323	8,244
512	Unknown Road	120	0	120	0	0	0	45	75
513	FM 46 at Robertson County Line	2,071	109	2,180	0	0	0	824	1,356
514	FM 1940 at Burleson County Line	466	24	490	0	0	0	185	305
<b>Totals</b>		<b>55,877</b>	<b>7,336</b>	<b>63,213</b>	<b>5,024</b>	<b>4,008</b>	<b>9,032</b>	<b>20,451</b>	<b>42,752</b>

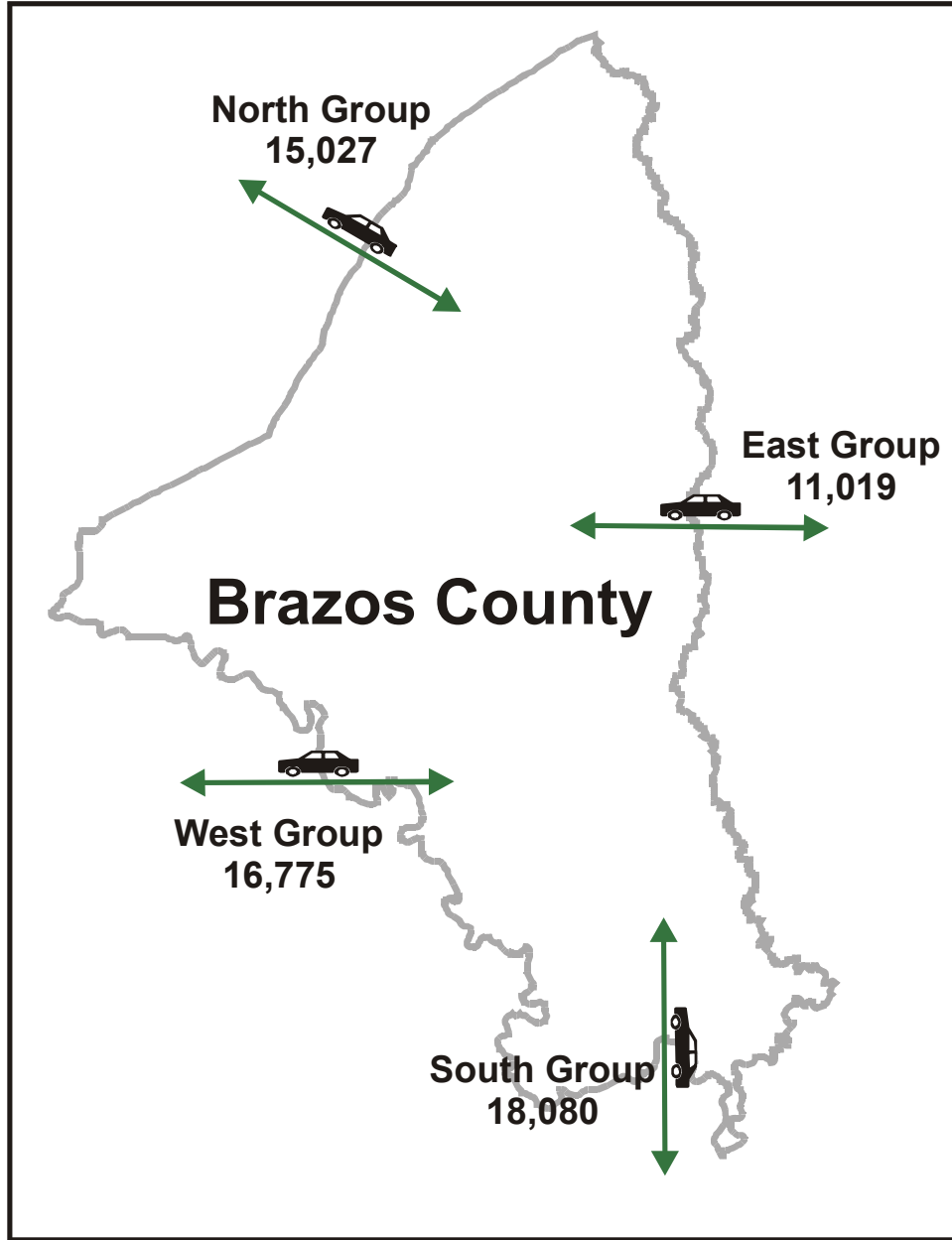
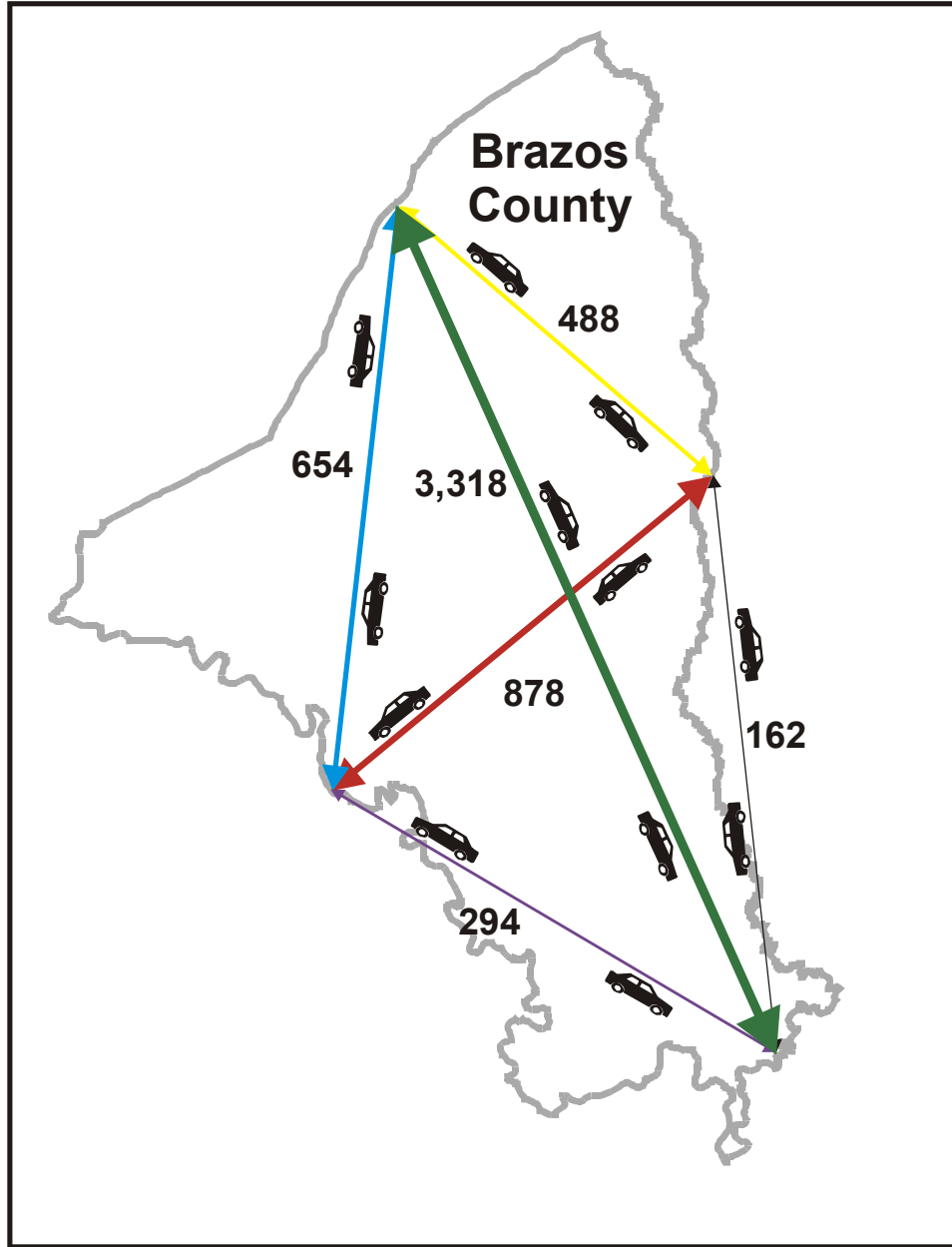


Figure 21. Estimates of External-Local Trip Movements by Location Group.



**Figure 22. Estimates of Through Trip Movements by Location Group.**

**SURVEY SUMMARY**

More than 72,000 vehicles enter and leave Brazos County daily. Nearly 13 percent are commercial vehicles. Only 15.7 percent of the 72,000 vehicles make through trips. Almost 31,200 vehicles, nearly 50 percent, of the non-commercial vehicles, and almost 65 percent of the commercial vehicles enter or leave Brazos County via SH 6. Individuals that do not live in Brazos County drive more than two thirds of the non-commercial vehicles entering and leaving the county.



Based on the average vehicle occupancy observed in the survey, an estimated 89,800 persons are entering and leaving Brazos County daily by non-commercial vehicle and nearly 10,000 persons are entering and leaving by commercial vehicle. The estimated number of non-residents (persons that do not live in Brazos County) that enter Brazos County daily is just over 60,700. Of these 60,700 persons, approximately 53,700 are making local trips within the county. This implies that the population of Brazos County increases by 33 percent daily due to local trips made by non-residents.

The majority of non-commercial trips were leaving home to go to work (32 percent) or to shop (20 percent). The percentage of trips that were HBW and NHB were nearly equal, 30 percent and 29.6 percent, respectively. HBNW trips accounted for more than 40 percent of the non-commercial trips.

Commercial vehicle drivers reported similar trip purposes at the origin and destination ends of their trip. Approximately 62 percent of the trip origin purposes were reported to be for picking up or delivering cargo. Picking up and delivering cargo was the stated purpose for 74 percent of the destination trips. Leaving base operations accounted for 16 percent of the commercial vehicle trip origins and 18 percent of the destination trips.

The distribution of non-commercial and commercial vehicles by time-of-day was similar between surveyed sites. The two lowest volume sites, OSR and FM 50 showed slightly greater peaking for commercial vehicles, but only at several different hour periods during the day.

There was little difference between the median age of non-commercial vehicles, 5.08 years, and commercial vehicles, 5.78 years. However, the average odometer reading for commercial vehicles was almost three times higher than that for non-commercial vehicles. Average vehicle occupancy for non-commercial vehicles was 1.42, or 30 percent greater than the 1.09 reported for commercial vehicles.

Commercial vehicles represent only 12 percent of the vehicles traveling into and out of Brazos County daily. More than 57 percent of the commercial vehicles are carrying no cargo. Of those carrying cargo, more than 97 percent are carrying cargo not of Mexico origin/destination.



**APPENDIX**



**Bryan/College Station External Station  
NON-COMMERCIAL VEHICLE SURVEY INTERVIEW FORM – A**

**(Outbound Direction From Brazos County)**

Station # \_\_\_\_\_ Survey Date \_\_\_\_\_  
 Station Name/Location \_\_\_\_\_ Interviewer \_\_\_\_\_

**For each vehicle you collect:**

	Vehicle 1	Vehicle 2	Vehicle 3
Time	_____ a.m. _____ p.m.	_____ a.m. _____ p.m.	_____ a.m. _____ p.m.
Number of people in vehicle			
Vehicle Type			

**Vehicle Type Options:** 1) Passenger (car/truck/van) 2) Bus 3) Taxi/Paid Limo 4) School Bus  
 5) Commercial Vehicle (over 1 ton) 6) Motorcycle 7) Recreational Vehicle 8) Other (specify in block)

**QUESTIONS:**

1. What year, make, and model is this vehicle?  Gas (leaded, unleaded), diesel, propane or other fuel?	_____ Year _____ Make _____ Model Leaded <input type="checkbox"/> Unleaded <input type="checkbox"/> Diesel <input type="checkbox"/> Propane <input type="checkbox"/> Other <input type="checkbox"/> _____	_____ Year _____ Make _____ Model Leaded <input type="checkbox"/> Unleaded <input type="checkbox"/> Diesel <input type="checkbox"/> Propane <input type="checkbox"/> Other <input type="checkbox"/> _____	_____ Year _____ Make _____ Model Leaded <input type="checkbox"/> Unleaded <input type="checkbox"/> Diesel <input type="checkbox"/> Propane <input type="checkbox"/> Other <input type="checkbox"/> _____
2. What is the mileage on your odometer?			
3. Where are you coming from? (city / state)			
4. Where was the last place you got into your vehicle? (place/address or nearest intersection/city)			
5. What type of place was this? (Choose from type of place options)			
6. Was that location in Bryan /College Station / Brazos County?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (If Yes, go to 7)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (If Yes, go to 7)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (If Yes, go to 7)
6a. If not in Bryan/College Station, in what city and state is that location?			
6b. If not in Bryan/College Station, what road/highway did you use to enter Brazos County?			
7. What time did you leave that location?	_____ a.m. _____ p.m.	_____ a.m. _____ p.m.	_____ a.m. _____ p.m.
8. What was your purpose for being at that location? (Choose from trip purpose options)			
9. What is your next destination? (place/address or nearest intersection/city)			
10. Is that location in Texas?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 11)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 11)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 11)
10a. If not in Texas, what road/highway will you use to leave Texas?			

**Type of Place Options:** 1) Office Building 2) Retail/Shopping/Gas 3) Industrial/Manufacturing/Warehouse 4) Medical  
 5) Educational (12<sup>th</sup> grade or lower) 6) Educational (college, trade, etc.) 7) Government 8) Residential  
 9) Airport 10) Other (specify) 99) Refused/Unknown

11. What is your purpose for traveling to your next destination? (Choose from trip purpose options)			
12. Do you live in Bryan/College Station/Brazos County ?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 14)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 14)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 14)
12a. If No, where do you live? (city or county / state)			
13. Did you stay in Bryan/College Station/Brazos County overnight?	<input type="checkbox"/> Yes <input type="checkbox"/> No (If No go to 14)	<input type="checkbox"/> Yes <input type="checkbox"/> No (If No go to 14)	<input type="checkbox"/> Yes <input type="checkbox"/> No (If No go to 14)
13a. How many nights have you stayed in Bryan/College Station/Brazos County?			

- Trip Purpose Options:**
- |                                |                        |                 |                    |                       |
|--------------------------------|------------------------|-----------------|--------------------|-----------------------|
| 1) Home/Return home            | 2) Go/Return to work   | 3) Work-related | 4) School          | 5) Vacation           |
| 6) Visit Friends/Family        | 7) Eat out             | 8) Shop         | 9) Buy gas         | 10) Personal business |
| 11) Pick-up/Drop-off passenger | 12) Change travel mode | 13) Delivery    | 14) Other (specify |                       |
| 99) Refused/Unknown            |                        |                 |                    |                       |

To measure the amount of travel you made today, we need to know the number of places you have gone today. Would you please tell us

14. Where did your first trip today begin? (address, nearest intersection, city, state)			
15. Where did you go from there? (city/county/landmark)			
16. Where did you go next? (city/county/landmark)			
17. Where did you go next? (city/county/landmark)			
18. Where did you go next? (city/county/landmark)			
19. Where did you go next? (city/county/landmark)			
20. Where did you go next? (city/county/landmark)			
21. How many more places did you stop today?			

**Bryan/College Station External Station  
COMMERCIAL VEHICLE SURVEY INTERVIEW FORM – B**

**(Outbound Direction From Brazos County)**

Station # \_\_\_\_\_ Survey Date \_\_\_\_\_

Station Name/Location \_\_\_\_\_ Interviewer \_\_\_\_\_

**For each vehicle you collect:**

	Vehicle 1	Vehicle 2	Vehicle 3
1. Time	_____ a.m. _____ p.m.	_____ a.m. _____ p.m.	_____ a.m. _____ p.m.
2. Number of people in vehicle			
3. Vehicle Classification			
4. What is the cargo (choose from vehicle cargo codes, if empty go to 12)			
5. Did your cargo originate in Mexico?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
6. Where did you pick up your load? (Place/Address or nearest intersection and City)			
7. Was that location an inter-modal transfer or custom brokerage site?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused or Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused or Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused or Unknown
8. How was your load transferred at that site (choose from transfer codes)?			
9. Where will you drop your cargo off? (Place/Address or nearest intersection and City)			
10. Is that location an inter-modal transfer or custom brokerage site?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused or Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused or Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused or Unknown
11. How will the cargo be transferred at that site (choose from transfer codes)?			

**Vehicle Classification Options:**    1) Single Unit 2-axle (6 wheels)    2) Single Unit 3-axle (10 wheels)    3) Single Unit 4-axel (14 wheels)  
4) Semi (all tractor-trailer combinations)    5) Other (specify)    99) Unknown

**Cargo Transfer Options:**    1) Truck-to-Truck    2) Rail-to-Truck    3) Ship-to-Truck    4) Airplane-to-Truck  
5) Warehouse-to-Truck    6) Pipeline-to-Truck    7) Unknown    99) Refused

**QUESTIONS:**

12. What is the year and gross weight rating of this vehicle?  Gas (leaded, unleaded), diesel, propane or other fuel?	_____ Year  _____ Gross Weight Leaded <input type="checkbox"/> Unleaded <input type="checkbox"/> Diesel <input type="checkbox"/> Propane <input type="checkbox"/> Other <input type="checkbox"/> _____	_____ Year  _____ Gross Weight Leaded <input type="checkbox"/> Unleaded <input type="checkbox"/> Diesel <input type="checkbox"/> Propane <input type="checkbox"/> Other <input type="checkbox"/> _____	_____ Year  _____ Gross Weight Leaded <input type="checkbox"/> Unleaded <input type="checkbox"/> Diesel <input type="checkbox"/> Propane <input type="checkbox"/> Other <input type="checkbox"/> _____
13. What is the mileage on your odometer?			
14. Where are you coming from? (city / state)			
15. Where was the last place you got into your vehicle? (place/address or nearest intersection/city)			

16. What type of place was this? (Choose from type of place options?)			
17. Was that location in Bryan/College Station / Brazos County?	<input type="checkbox"/> Yes (Yes go to 18)	<input type="checkbox"/> No	<input type="checkbox"/> Yes (Yes go to 18)
17a. If not in Bryan/College Station, in what city and state is that location?			
17b. If not in Bryan/College Station, what road did you use to enter Brazos County?			
18. What time did you leave that location?	_____ a.m. _____ p.m.	_____ a.m. _____ p.m.	_____ a.m. _____ p.m.
19. What was your purpose for being at that location? (Choose from trip purpose options)			
20. What is your next destination? (place/address or nearest intersection/city)			
21. Is that location in Texas?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 22)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 22)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 22)
21a. <i>If no</i> , what road/bridge will you use to leave Texas?			
22. What is your purpose for traveling to your next destination? (Choose from trip purpose options)			

**Trip Purpose Options:**

- |                    |  |             |             |
|--------------------|--|-------------|-------------|
| 4) Maintenance     | 1) Base location/return to base location | 2) Delivery | 3) Pick-up  |
| 8) Other (specify) | 5) Driver needs (lunch, etc.)            | 6) To Home  | 7) Buy fuel |
|                    | 99) Refused/Unknown                      |             |             |

**Type of Place Options:**

- |  |                                       |                                       |                |
|--|---------------------------------------|---------------------------------------|----------------|
| 1) Office Building                               | 2) Retail/Shopping/Gas                | 3) Industrial/Manufacturing/Warehouse | 4) Medical     |
| 5) Educational (12 <sup>th</sup> grade or lower) | 6) Educational (college, trade, etc.) | 7) Government                         | 8) Residential |
| 9) Airport                                       | 10) Other (specify)                   | 99) Refused/Unknown                   |                |

**To measure the amount of travel you made today, we need to know the places you have gone today. Would you please tell us:**

23. Where did your first trip today begin? (address, nearest intersection, city, state)			
24. Where did you go from there? (city/county/landmark)			
25. Where did you go next? (city/county/landmark)			
26. Where did you go next? (city/county/landmark)			
27. Where did you go next? (city/county/landmark)			
28. Where did you go next? (city/county/landmark)			
29. Where did you go next? (city/county/landmark)			
30. How many more places did you stop today?			



**Vehicle Cargo Codes**

1 – Farm Products	Livestock, fertilizer, dirt, landscaping, etc.
2 – Forest Products	Trees, sod, etc.
3 – Marine Products	Fresh fish, seafood, etc.
4 – Metals and Minerals	Crude petroleum, natural gas, propane, metals, gypsum, etc.
5 – Food, Health, Beauty Products	Assorted food products, cosmetics, etc.
6 – Tobacco Products	Cigarettes, cigars, and chewing tobacco
7 – Textiles	Clothing, lines, etc
8 – Wood Products	Lumber, paper, cardboard, wood pulp, etc
9 – Printed Matter	Newspapers, magazines, books, etc.
10 – Chemical Products	Soaps, paints, household or industrial chemicals, etc
11 – Refined Petroleum or Coal Products	Gasoline, etc.
12 – Rubber, Plastic, Styrofoam Products	Finished products of rubber, plastic, or Styrofoam
13 – Clay, Concrete, Glass, or Stone	Finished products of clay, concrete, glass, or stone
14 – Manufactured Goods/Equipment	Miscellaneous products such as machinery, appliances, etc
15 – Wastes	Waste products, including scrap and recyclable materials
16 – Miscellaneous Shipments	U.S. Mail, U.P.S., Federal Express, and other mixed cargo
17 – Hazardous Materials	Hazardous chemicals and substances
18 – Transportation	Automobiles, Heavy Equipment, etc.
19 – Unclassified Cargo	Cargo not falling within one of the above categories
20 – Driver Refused to Answer	Driver refused to answer
21 – Unknown to Driver	Unknown to driver
22 – Empty	Empty