2005 Abilene
External Survey
Technical Summary

Texas Department of Transportation

**Prepared by the
Texas Transportation Institute
May 2006**

2005 Abilene External Survey

TECHNICAL SUMMARY

Texas Department of Transportation Travel Survey Program

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INTRODUCTION

In 2005, the Transportation Planning and Programming (TPP) Division of the Texas Department of Transportation (TxDOT) funded an external station travel survey in the Abilene Metropolitan Planning Organization (MPO) study area. This survey measured and identified travel patterns into, within, and out of Abilene, which is in Jones and Taylor counties. This report presents a Technical Summary of the 2005 Abilene External Station Survey and documents the data collected and the analysis results for the study area.

EXTERNAL STATION SURVEY

An external station survey collects data through personal interviews to measure and identify travel patterns of vehicles and/or pedestrians entering and exiting a particular study area. Surveys are conducted during daylight hours for one day at each designated location. Additionally, 24-hour vehicle classification counts are performed on the same day as the survey at each survey location. These counts provide a basis for expanding the survey data to represent the average weekday movements into and out of the study area. Data are also collected on the movements of the vehicle during the survey day prior to the point at which the vehicle is surveyed. This data provides a basis for estimating the amount of travel occurring in the study area prior to the time of the survey.

ABILENE STUDY AREA

The study area, as shown in Figure 1, is located in Jones and Taylor counties, and it is approximately 150 miles west of Fort Worth. The two-county study area has a combined land area of nearly 1,850 square miles and a population density of approximately 80 persons per square mile. The population center of the two-county area is the city of Abilene, which according to the 2000 census had a population of approximately 116,000 persons. The boundary established for the Abilene external survey was determined by the local MPO.
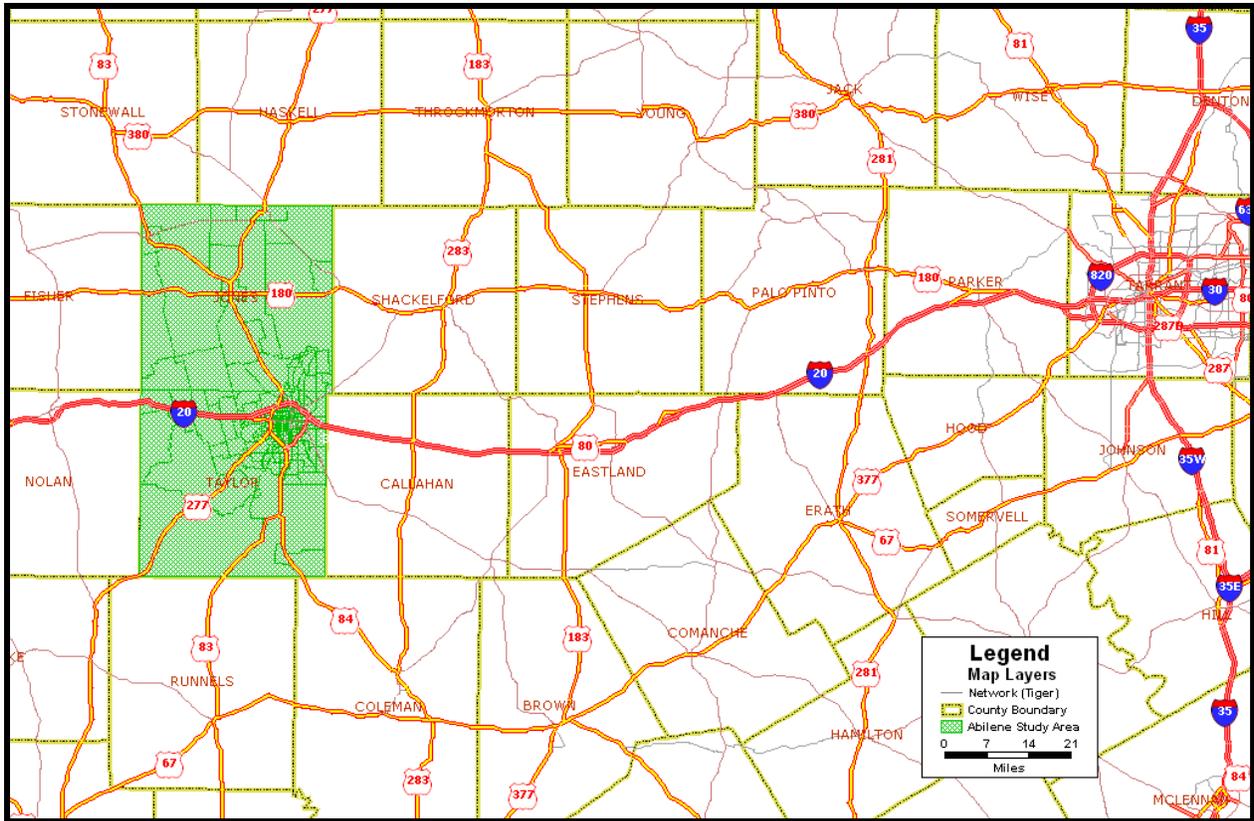
Figure 1. Abilene Study Area.

EXTERNAL STATIONS

There are 21 locations on the border of the Abilene study area identified as external stations. These locations are transportation facilities that cross the study area boundary and represent where travelers may enter and exit the study area. Of these 21 locations, 11 were selected for travel surveys. Figure 2 shows the location of the external stations in Abilene, and Table 1 identifies the external surveys, their general location, whether or not surveys were conducted, and the 24-hour traffic count at the location. Additionally, Table 1 groups the external station locations by direction. The location group aggregated data will be utilized to present external local and through trip information later in the summary.
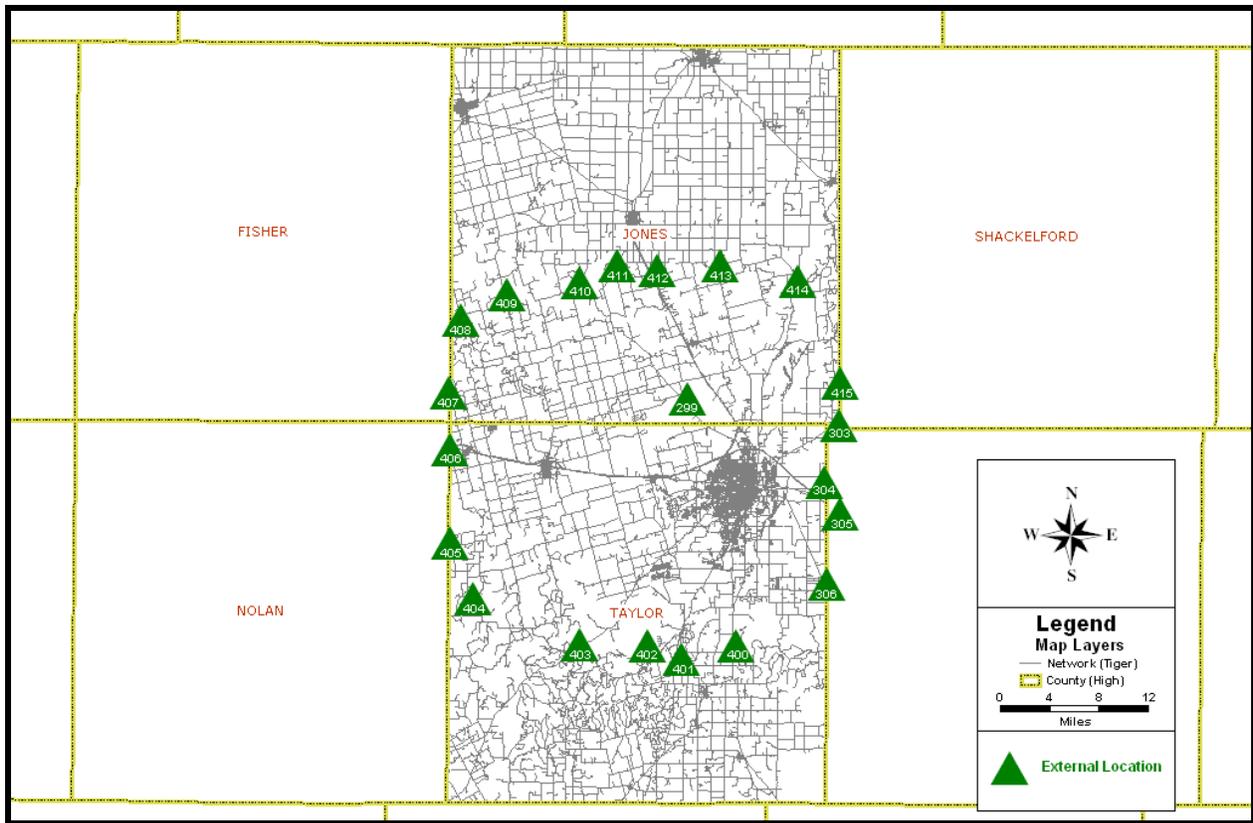
Figure 2. Abilene External Station Locations.

In addition to the 11 survey sites, two other locations were identified as high-volume sites. Non-commercial vehicles on high-volume roadways were not surveyed, but instead a license plate matching methodology was employed to provide information on the number of through and local trips. Commercial vehicles were surveyed at weigh stations, rest areas, and truck stops using an intercept interview method. More details on this methodology is provided later in the analysis

Table 1. Abilene External Stations.

Station Number	Facility	Location	Surveyed	24-Hour Vehicle Count		Location Group
				Inbound	Outbound	
299	FM 2404	at Taylor Co. Line	Yes	339	366	North
409	FM 126	North of FM 1812	No	122	138	
410	FM 3116	North of FM 1812	No	60	61	
411	FM 707	South of Anson	Yes	215	243	
412	US 83/277	South of Anson	Yes	4,825	3,824	
413	FM 1226	South of US 180	No	175	182	
414	FM 600	North of Nugent	Yes	329	324	
303	SH 351	at Shackelford Co. Line	Yes	2,512	2,394	East
304*	IH 20	at Callahan Co. Line	No	11,552	12,338	
305	FM 18	at Callahan Co. Line	Yes	1,713	1,552	
306	SH 36	at Callahan Co. Line	Yes	2,007	1,977	
415	FM 3522	at Shackelford Co. Line	No	740	769	
400	US 83/84	North of Tuscola	Yes	2,421	2,885	South
401	FM 613	South of Buffalo Gap	Yes	248	270	
402	FM 89	South of Buffalo Gap	Yes	437	429	
403	US 277	South of View	Yes	1,518	1,569	
404	FM 126	North of FM 89	No	73	131	
405	FM 2035	at Nolan Co. Line	No	31	28	West
406*	IH 20	at Nolan Co. Line	No	11,241	9,305	
407	FM 1085	at Fisher Co. Line	No	93	95	
408	FM 1812	near Fisher Co. Line	No	43	45	
		Total		40,694	38,925	

* High-volume location

SURVEY METHODOLOGY

Two methodologies were employed in the conduct of the survey. For roadways with low-to-moderate traffic volumes, a roadside intercept interview method was used. For external stations on high-volume roadways, non-commercial vehicles were surveyed using a license plate match method, and commercial vehicles were surveyed at weigh stations, rest areas, and truck stops using an intercept interview method. For the purpose of this study, roadways with traffic volumes in excess of 20,000 vehicles per day were considered high-volume.

For each external station surveyed using the roadside intercept interview method, traffic control plans were set up and vehicles in the outbound direction (i.e. leaving the study area) were directed into an area where trained survey personnel interviewed the drivers. Those declining

were allowed to continue on their trip. Drivers of commercial and non-commercial vehicles were interviewed using different survey instruments and those forms are provided in the Appendix. Figure 3 shows a typical intercept interview survey at an external station.

Figure 3. Typical External Survey Station.

The intercept interview method was also used to conduct commercial vehicle surveys at weigh stations, rest areas, and truck stops located along high-volume facilities. The surveys were conducted by interviewing drivers of commercial vehicles when the driver stopped for gas, to eat, or other personal reasons. Since this method involved surveying the drivers off of the roadways, there was no traffic control required.

Two external stations in the Abilene study area could not be surveyed using the intercept interview method because traffic volumes were too high to safely stop traffic and interview motorists. In lieu of intercept surveys at these two locations, a license plate match method was

used as a means to estimate the amount of non-commercial vehicles traveling through the study area on high-volume facilities.

For a more detailed discussion and description of the survey methodology, see the report, *Abilene External Station Travel Survey*, prepared by Gram Traffic Counting, Inc., the vendor selected to conduct the survey.

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.

The analysis is based on information obtained from completed interviews of motorists. In Abilene, the majority of vehicles surveyed were non-commercial. Approximately 85 percent of the surveys were for non-commercial vehicles. The number of surveys for commercial and non-commercial vehicles by station as well as the outbound traffic volume during the survey period is provided in Table 2. Approximately 30 percent of non-commercial vehicles and 12 percent of commercial vehicles that traveled through the external stations during survey hours were interviewed.

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 and the other trip end is outside the study area. A through trip is one traveling through the study area without stopping. Table 3 presents the survey data for non-commercial and commercial vehicles in terms of trips identified as local or through movements. Nearly 96 percent of non-commercial vehicle trips and nearly 41 percent of commercial vehicle trips were local trips. Approximately 77 percent of the commercial vehicle through trips were made on the two high-volume external sites.

Table 2. Number of Non-Commercial and Commercial Vehicle Surveys.

Station Number	Facility	Location	Non-Commercial		Commercial	
			Surveyed	Count*	Surveyed	Count*
299	FM 2404	at Taylor Co. Line	145	241	6	17
303	SH 351	at Shackelford Co. Line	321	1,296	52	415
304^	IH 20	at Callahan Co. Line	N/A	N/A	92	1,215
305	FM 18	at Callahan Co. Line	432	963	19	101
306	SH 36	at Callahan Co. Line	382	1,228	52	218
400	US 83/84	North of Tuscola	436	1,966	53	263
401	FM 613	South of Buffalo Gap	141	164	2	16
402	FM 89	South of Buffalo Gap	161	307	10	22
403	US 277	South of View	356	807	50	238
406^	IH 20	at Nolan Co. Line	N/A	N/A	96	1,347
411	FM 707	South of Anson	93	109	16	57
412	US 83/277	South of Anson	367	2,462	56	297
414	FM 600	North of Nugent	163	219	16	22
Total			2,997	9,762	520	4,228

* Outbound volumes during approximate time of survey (8 a.m. to 7 p.m.)

^ High-volume location. Commercial surveys only (both directions)

Table 3. Survey Results by Trip Type (Non-Commercial and Commercial Vehicles).

Station Number	Facility	Non-Commercial Vehicles			Commercial Vehicles		
		Local	Through	Total	Local	Through	Total
299	FM 2404	141	4	145	6	0	6
303	SH 351	314	7	321	48	4	52
304*	IH 20	N/A	N/A	N/A	10	82	92
305	FM 18	428	4	432	19	0	19
306	SH 36	349	33	382	45	7	52
400	US 83/84	418	18	436	42	11	53
401	FM 613	141	0	141	2	0	2
402	FM 89	160	1	161	10	0	10
403	US 277	338	18	356	41	9	50
406*	IH 20	N/A	N/A	N/A	15	81	96
411	FM 707	89	4	93	12	4	16
412	US 83/277	344	23	367	45	11	56
414	FM 600	159	4	163	14	2	16
Total		2,881	116	2,997	309	211	520

*High-volume location. Commercial vehicle surveys only.

The second type of trip identified in the survey is a sub-category of external local trips. These are reported as resident and non-resident trips. A resident is a survey respondent that reported they resided in the Abilene study area. A non-resident is a respondent that reported they lived outside of the Abilene study area. Table 4 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 the study area, made by non-residents. By measuring the number of non-residents that travel in and out of Abilene and the number of internal trips they make, an estimate of the total internal trips within the study area attributable to non-residents can be developed.

Table 4. Survey Results by Residency (Non-Commercial Vehicles Only).

Station Number	Facility	Number of Surveys	Residents	Percent	Non-Residents	Percent	Internal Trips (non-residents)
299	FM 2404	145	140	96.55	5	3.45	2
303	SH 351	321	204	63.55	117	36.45	79
305	FM 18	432	216	50.00	216	50.00	93
306	SH 36	382	224	58.64	158	41.36	58
400	US 83/84	436	297	68.12	139	31.88	57
401	FM 613	141	129	91.49	12	8.51	7
402	FM 89	161	158	98.14	3	1.86	2
403	US 277	356	239	67.13	117	32.87	56
411	FM 707	93	77	82.80	16	17.20	1
412	US 83/277	367	292	79.56	75	20.44	36
414	FM 600	163	139	85.28	24	14.72	7
Total		2,997	2,115	70.57	882	29.43	398

The residency questions were only asked of respondents in non-commercial vehicles. Table 4 illustrates that individuals who do not live in the study area make a sizeable proportion, 29 percent, of the non-commercial travel in and out of Abilene. The average number of internal trips made by those individuals is 0.45 trips per vehicle.

<u>Travel Purpose</u>

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 17 different purposes included on the survey instrument for non-commercial vehicles and nine purposes on the commercial vehicle survey. Table 5 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 5. Trip Purpose Categories.

Code	Non-Commercial Vehicle Trip Purpose	Code	Commercial Vehicle Trip Purpose
1	Home/Return Home	1	Base location/Return to Base location
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 (specify)
9	Buy Gas	9	Unknown/Refused
10	Personal Business		
11	Pick Up/Drop Off Passenger		
12	Change Travel Mode		
13	Delivery		
14	Recreation		
15	Overnight Stay		
16	Other		
99	Refused/Do Not Know		

For non-commercial vehicles, the trip purposes listed in Table 5 were combined into the following six categories:

Category	Trip Purpose Codes (from Table 5)
Home	1
Work	2 and 3
School	4
Personal	5, 6, 10, 11, and 14
Shop	7, 8, and 9
Other	12, 13, 15, 16, and 99

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 at the destination of the trip. Additionally, Table 6 provides the data shown in Figures 4 and 5 in tabular form for comparative purposes. The information is provided for residents, non-residents, and both groups combined. Resident origin purposes were evenly distributed among home, work, personal, and shopping trips (approximately 25 percent each), while the most common non-resident trip origin purpose (41 percent) was shopping. For both groups combined, the most common origin purposes were shopping (29 percent), work (26 percent), and personal (24 percent).
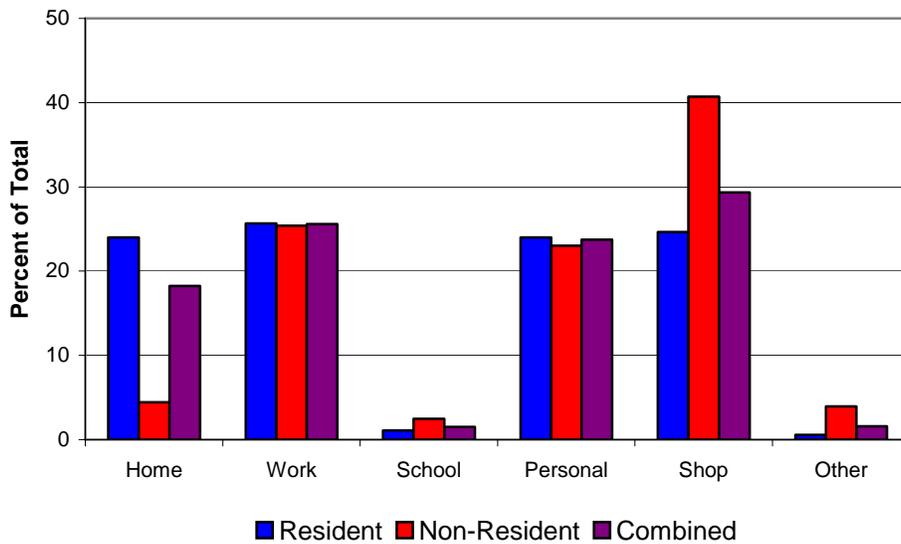
Figure 4. Trip Purpose at Origin for Non-Commercial Vehicles.

Figure 5 shows that the largest distribution of destination purpose for non-residents was home (62 percent). The trip purpose at the destination for residents was primarily comprised of personal (36 percent) and home-based (32 percent) trips. For both groups combined, home (41 percent), personal (31 percent), and work (24 percent) were the most common trip purposes.
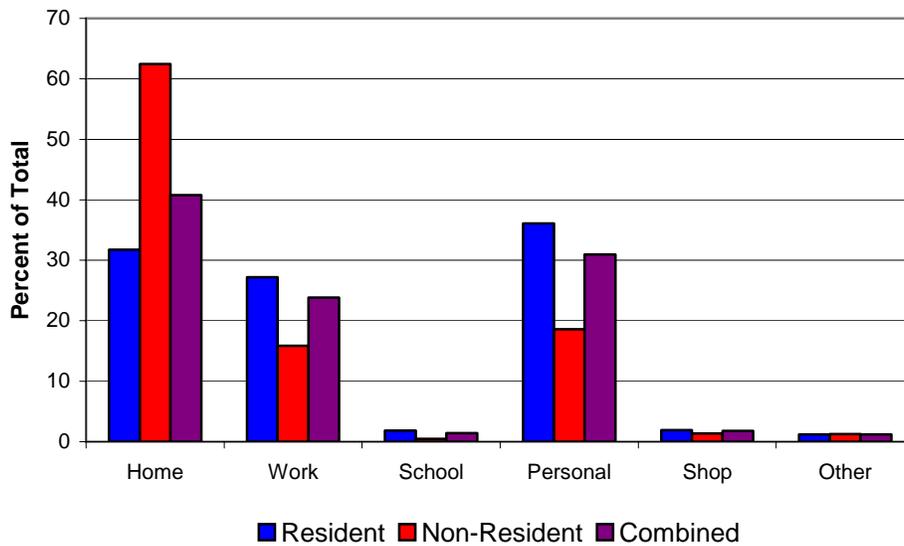
Figure 5. Trip Purpose to Destination for Non-Commercial Vehicles

Table 6. Non-Commercial Vehicle Trip Purpose at Origin and Destination.

Trip Purpose	Origin			Destination		
	Resident	Non-Resident	Combined	Resident	Non-Resident	Combined
Home	24.02	4.42	18.25	31.73	62.47	40.77
Work	25.67	25.40	25.59	27.19	15.87	23.86
School	1.09	2.49	1.50	1.84	0.45	1.43
Personal	24.02	23.02	23.72	36.12	18.59	30.96
Shop	24.63	40.70	29.36	1.94	1.36	1.77
Other	0.57	3.97	1.57	1.18	1.25	1.20

A detailed analysis of specific subsets of the survey data was performed. Approximately 24 percent of the surveyed study area residents began their trip at home. Of that group of respondents, approximately 40 percent of those home-based trips had a destination purpose that was work or work-related. Since the survey was conducted in the outbound direction, this would indicate that a noticeable percentage of Abilene study area residents work outside of the Abilene study area.

Nearly 62 percent of the surveyed non-residents cited home as the trip purpose for traveling to their destination. Of that group of non-residents, nearly 67 percent of the trip origins were for

personal business or shopping purposes. Only 27 percent of non-residents traveling home cited an origin purpose that was work or work-related. This indicates that a majority of non-residents traveling within the Abilene study area are making trips for either non-work purposes or people are making personal or shopping trips after leaving work and prior to going home.

The trip purposes normally used in travel demand modeling are home-based work (HBW), home-based non-work (HBNW), and non-home based (NHB). HBW trips are those that have one end of the trip at home and the other end of the trip at work. Trips that begin at home and end at work or those that begin at work and end at home are HBW. A HBNW trip is one that one end of the trip is at home and the other trip end is any location other than work. A NHB trip is a trip that does not begin or end at home. A distribution of trips by trip purpose for residents, non-residents, and both groups combined is provided in Figure 6. For residents, NHB trips accounted for nearly 45 percent of the trips. For non-residents, HBNW trips accounted for nearly half (48 percent) of the trips. NHB trips were the most common trip purpose for residents and non-residents combined (42 percent).
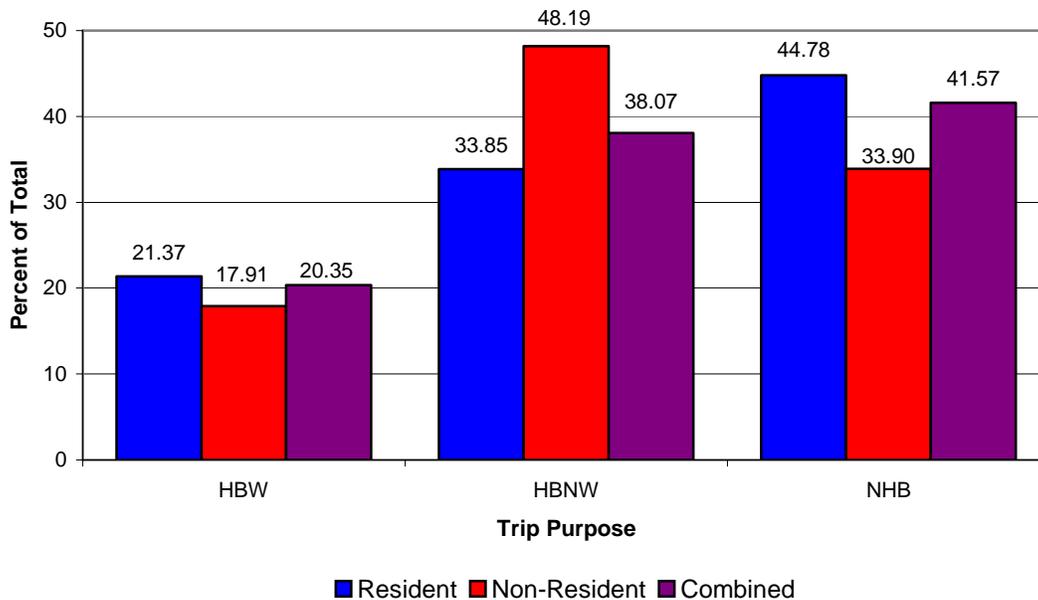

Figure 6. Distribution of Non-Commercial Vehicle Trips by Trip Purpose.

For commercial vehicles, the trip purposes shown in Table 5 were combined into the following five categories:

Category	Trip Purpose Codes
Base Location	1
Delivery	2
Pick Up	3
Support Functions	4, 5, 6, and 7
Other	8 and 9

Figures 7 and 8 present the distribution of commercial vehicle trips by reported trip purpose at the origin and destination of the trip. At the origin, support functions were the most common origin trip purpose (39 percent). Pick-up (28 percent), delivery (18 percent), and base (14 percent) were the other most commonly cited trip purposes at the origin. The distribution for destination trip purpose shows that 61 percent of the trips were destined for delivering cargo and another 18 percent were destined for picking up cargo. Only 13 percent of the trip destinations were for support functions and 8 percent of the destinations were for base operations.
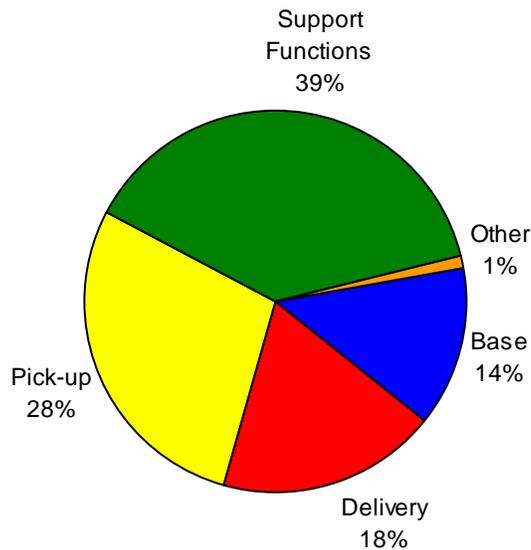
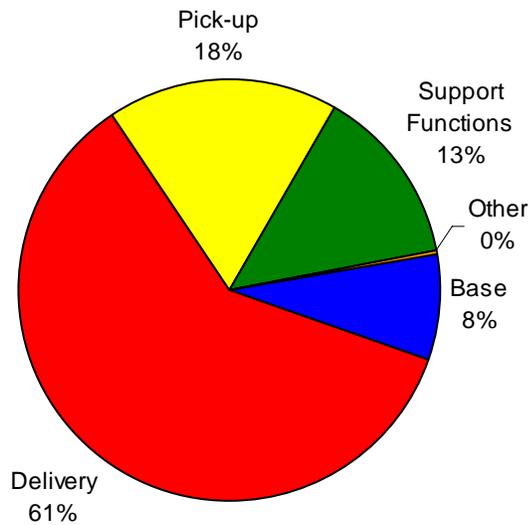**Figure 7. Trip Purpose at Origin for Commercial Vehicles.**

Figure 8. Trip Purpose to Destination for Commercial Vehicles.

In addition to obtaining information on the purpose of travel, questions were asked to identify the type of place associated with the origin of the trip. Table 7 provides the results of the responses provided for both commercial and non-commercial vehicles. For non-commercial vehicles, the largest percentage of respondents listed retail/shopping/gas (33 percent) as the type of place at the origin. An additional 26 percent of the non-commercial vehicles cited residentail as the type of place. For commercial vehicles, over half of the respondents (53 percent) listed industrial/manufacturing as the type of place at the origin. Retail/shopping/gas was the next largest percentage of type of place at the origin for commercial vehicles at 32 percent.

Table 7. Type of Place at Trip Origin.

Type of Place	Non-Commercial Vehicles		Commercial Vehicles	
	Number	Percent	Number	Percent
Office Building	410	13.68	6	1.15
Retail/Shopping/Gas	982	32.77	167	32.12
Industrial/Manufacturing	257	8.58	276	53.08
Medical	136	4.54	1	0.19
Educational	109	3.64	5	0.96
Government	57	1.90	1	0.19
Residential	794	26.49	19	3.65
Airport	20	0.67	1	0.19
Eating Establishment	152	5.07	22	4.23
Hotel/Motel	34	1.13	13	2.50
Other	46	1.53	9	1.73
Total	2,997	100.00	520	100.00

Time-of-Day

Vehicle classification counts were conducted at each external survey location on the same day as the survey. These counts were for a 24-hour period and they include data by time-of-day and by direction. 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. Figures 9 and 10 provide the distribution of non-commercial and commercial vehicles by time-of-day for all of the external locations by inbound and outbound direction, respectively.

For inbound vehicles (Figure 9), the morning peak occurs between 7:30 a.m. and 8:00 a.m. for non-commercial vehicles. There is an afternoon peak period for non-commercial vehicles between 4:30 p.m. and 5:30 p.m. Inbound commercial vehicle levels remain fairly constant from the morning peak (8:00 a.m.) through 5 p.m. when the amount of commercial vehicles begins to decline. For outbound traffic (Figure 10), the morning peak period for non-commercial vehicles is not as significant as the peak for the inbound direction, and it occurs between 7:30 a.m. and 8:30 a.m. The afternoon peak for non-commercial vehicles traveling outbound is larger and longer than the inbound afternoon peak. For outbound commercial vehicles, there appears to be no significant peak. The traffic levels remain fairly constant between 8:00 a.m. and 5:30 p.m., with the biggest peak occurring between 3:30 p.m. and 4:00 p.m.
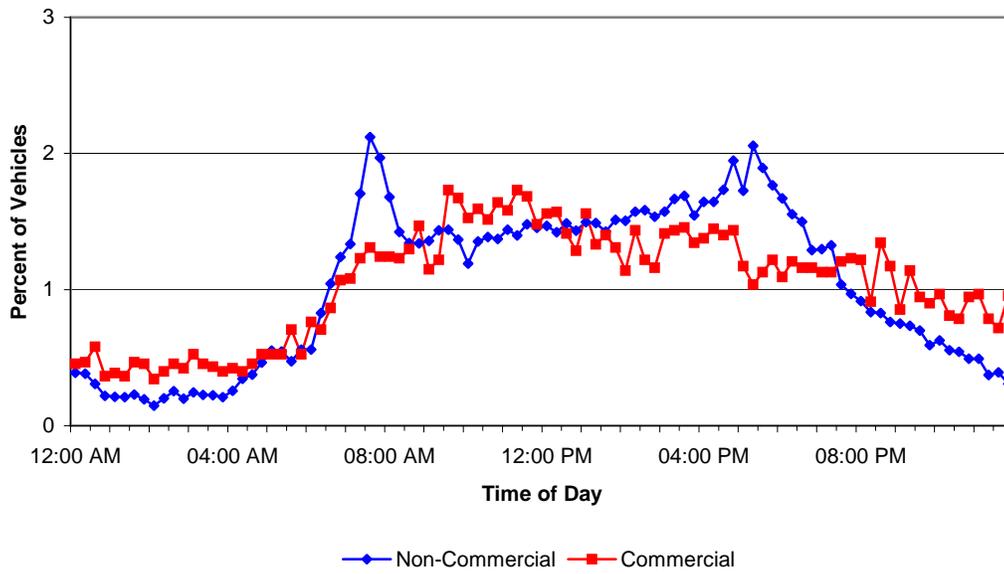
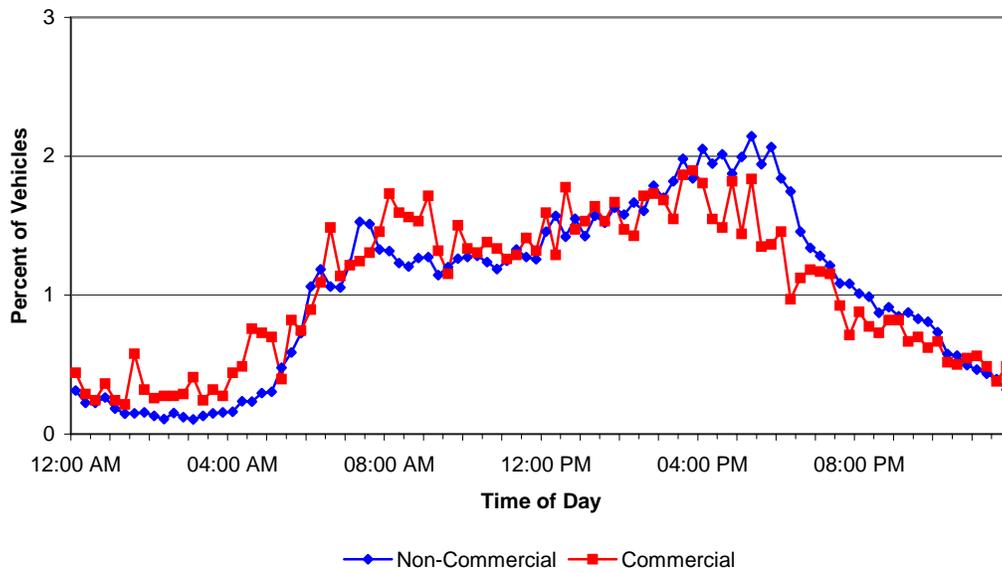**Figure 9. Distribution of Inbound Vehicles by Time-of-Day.**

Figure 10. Distribution of Outbound Vehicles by Time-of-Day.

An additional analysis that compared the number of surveys and vehicle counts by time of day was conducted. In this analysis, the percent of vehicles surveyed and the percent of outbound vehicles counted were grouped in hourly increments during the time period in which the survey was conducted. The results for non-commercial vehicles are provided in Figure 11 and commercial vehicles are shown in Figure 12.

For non-commercial vehicles, the percent of surveys completed each hour peaked in the afternoon between 3 p.m. and 5 p.m. The counts for non-commercial vehicles gradually increased throughout the day. Approximately 31 percent of the non-commercial vehicles that were traveling out of the study area (at surveyed external stations) were successfully interviewed during survey hours. For the 24-hour period, that number was 22 percent.
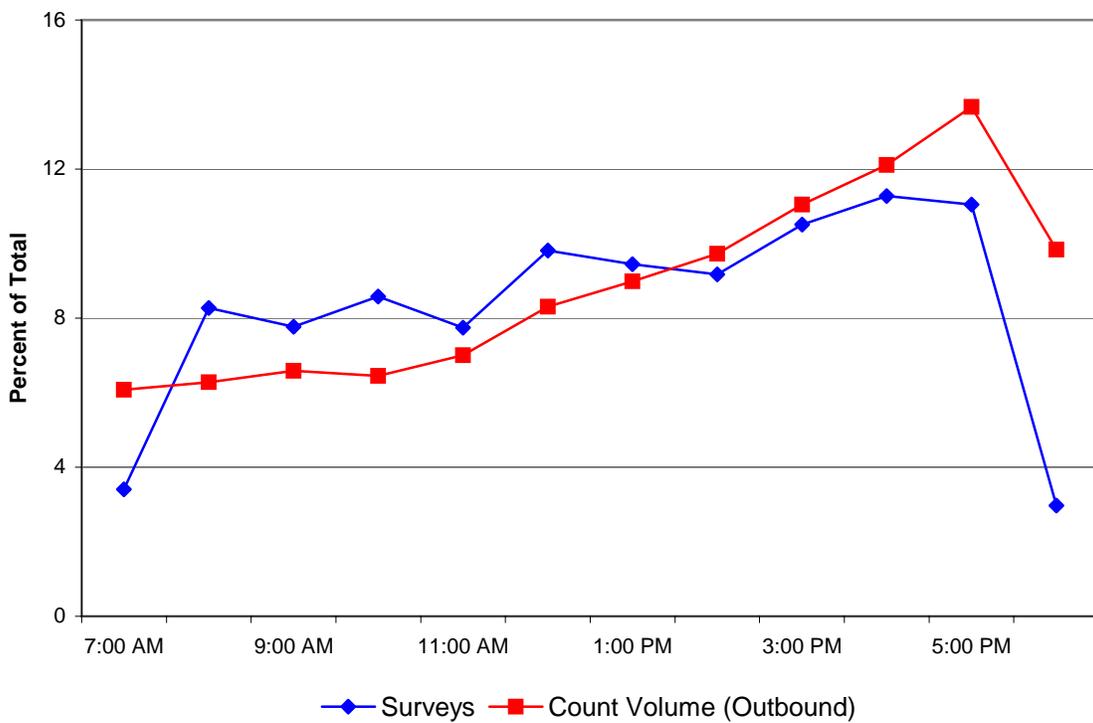
Figure 11. Distribution of Non-Commercial Vehicles and Surveys by Time-of-Day.

There trend among commercial vehicles was slightly different than the trend for non-commercial vehicles. The percent of vehicles counted was fairly constant throughout the day. However, there was a significant peak for the percent of completed surveys between 10:00 a.m. and 11:00 a.m. Overall, 12 percent of the commercial vehicles that were counted during the survey period were interviewed. For the 24-hour period, 7 percent of the commercial vehicles were surveyed.
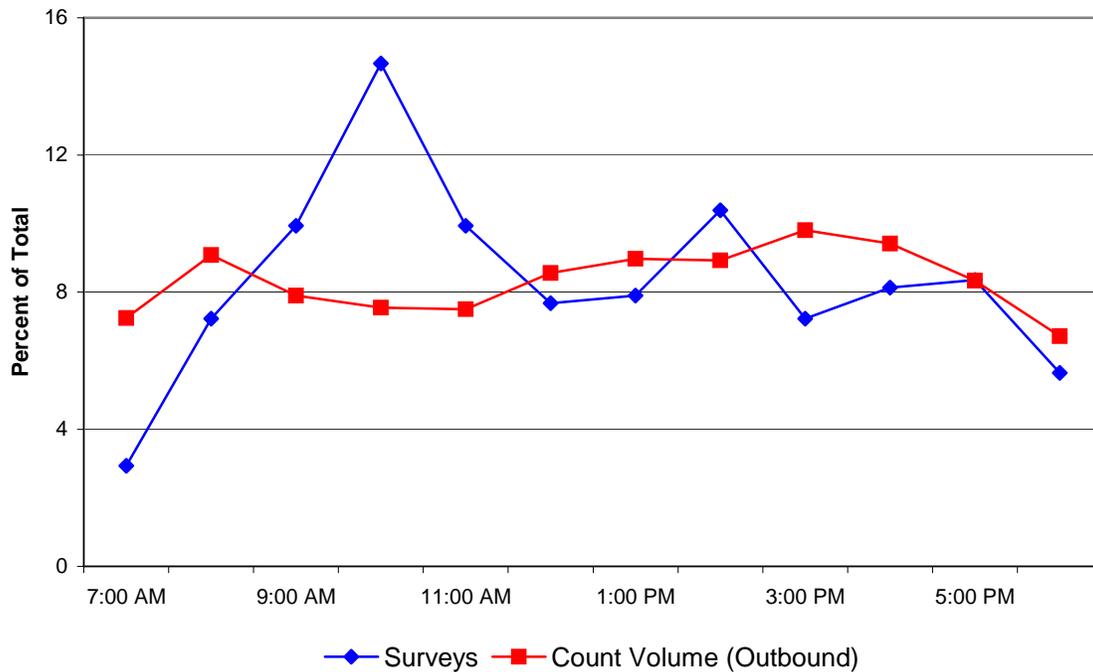

Figure 12. Distribution of Commercial Vehicles and Surveys by Time-of-Day.

A final comparison of the survey and count totals for the survey locations was conducted. In this analysis, the percent of counted vehicles that were surveyed per hour was determined for both non-commercial and commercial vehicles. This data was compared against the total count volumes for the survey period, and the results are provided in Figure 13. Generally, a larger percentage of non-commercial vehicles than commercial vehicles were surveyed throughout the course of the day. These trend lines compared against the total volumes illustrate that as the count volumes increase, the percentage of surveyed vehicles decrease. This is logical since the number of surveyors was constant during the survey period.
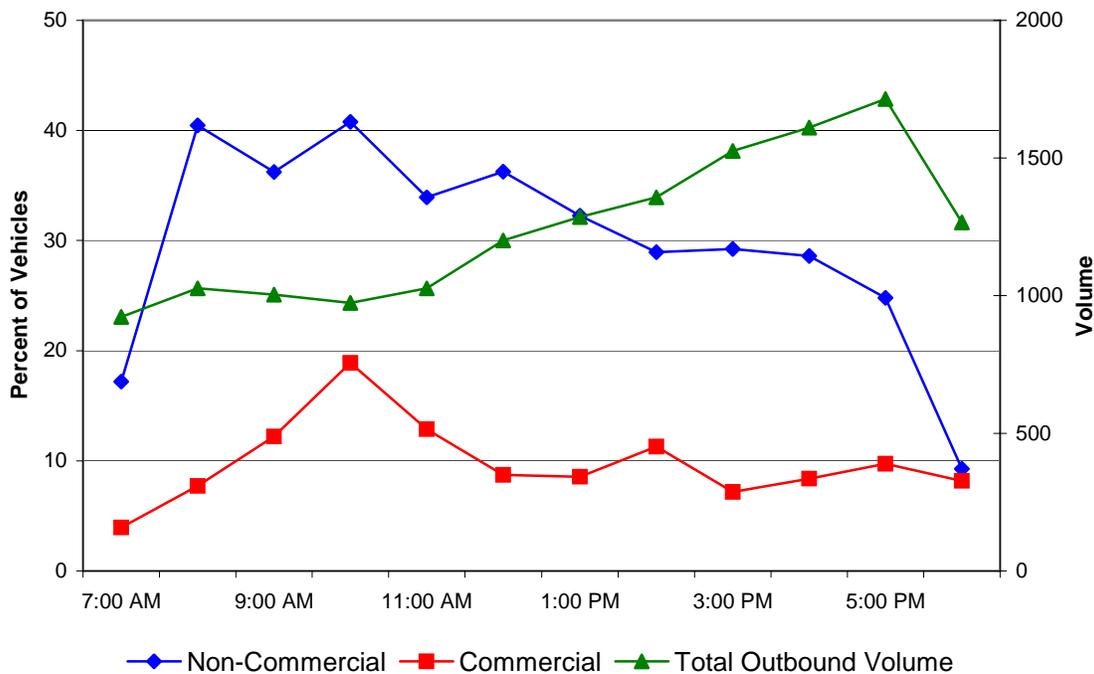
Figure 13. Distribution of Counted Vehicles That Were Surveyed.

<u>Vehicle Characteristics</u>

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 traveling through the external stations by type, age, and condition (as implied by the number of miles on the vehicle). Figure 14 represents the percent distribution of non-commercial and commercial vehicles by age as reported in the surveys. The average age for surveyed vehicles was approximately 5.7 years for non-commercial vehicles and 6.3 years for commercial vehicles. The median vehicle model year was 2000 for non-commercial and 1999 for commercial vehicles.

Figure 15 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. Unlike non-commercial vehicles, the data for commercial vehicles do not show smooth trends, especially for vehicles that are more than 12 years old. This is due in part to the total number of observations in the non-commercial and commercial surveys (2,997 and 519, respectively). One commercial vehicle was excluded from the analysis of age and odometer readings due to an invalid response that was provided by a survey respondent.
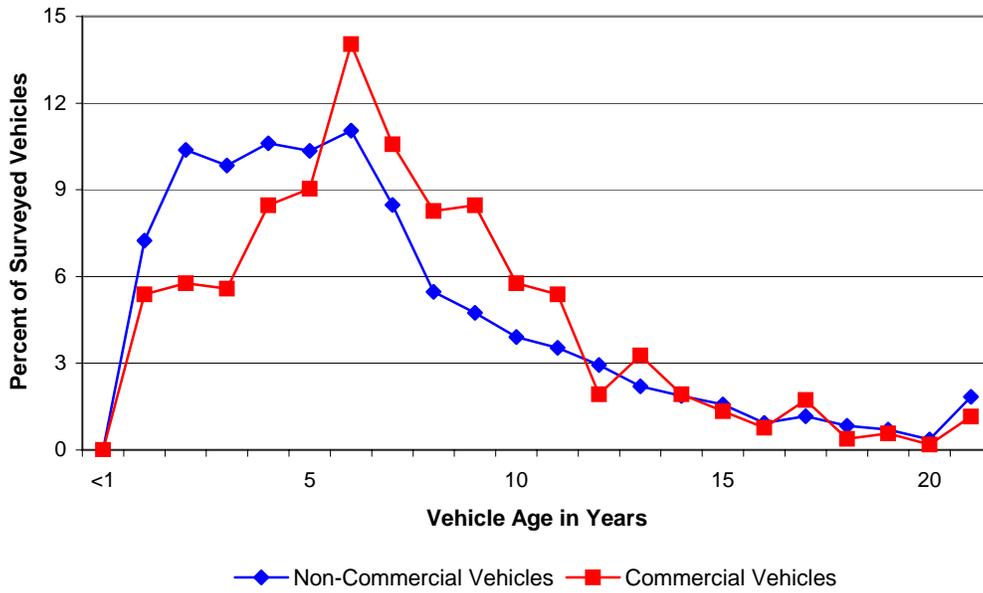
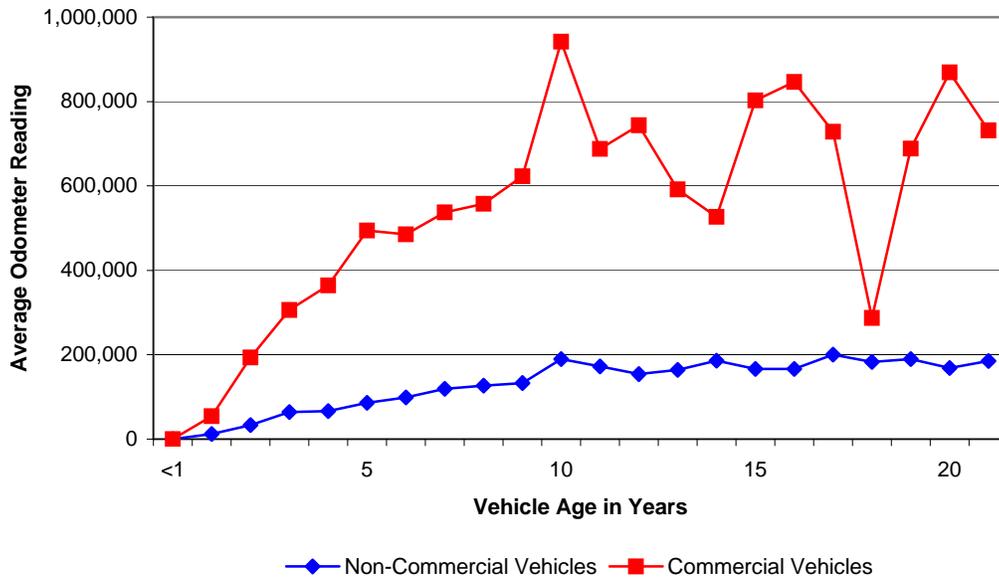**Figure 14. Distribution of Surveyed Vehicles by Age of Vehicle.**

Figure 15. Average Odometer Readings for Vehicles by Age of Vehicle.

The average odometer reading for non-commercial vehicles was 99,481 and the average commercial vehicle odometer reading was 510,717. This information indicates that commercial vehicles accumulated mileage at nearly five times the rate of non-commercial vehicles. For more

detailed information, Table 8 presents the numerical values for the non-commercial data plotted in Figures 13 and 14. Table 9 provides similar information for commercial vehicles.

Table 8. Distribution of Non-Commercial Vehicles by Age and Average Odometer Reading.

Age	Number of Vehicles	Percent of Total	Cumulative Percent of Total	Average Reported Odometer Value
<1	0	0.00	0.00	0
1	217	7.24	7.24	11,738
2	311	10.38	17.62	33,608
3	295	9.84	27.46	64,390
4	318	10.61	38.07	66,280
5	310	10.34	48.42	86,525
6	331	11.04	59.46	99,024
7	254	8.48	67.93	119,542
8	164	5.47	73.41	127,242
9	142	4.74	78.14	132,953
10	117	3.90	82.05	190,014
11	106	3.54	85.59	172,499
12	88	2.94	88.52	154,192
13	66	2.20	90.72	163,684
14	56	1.87	92.59	186,124
15	47	1.57	94.16	166,110
16	28	0.93	95.10	166,069
17	35	1.17	96.26	199,975
18	25	0.83	97.10	182,682
19	21	0.70	97.80	189,360
20	11	0.37	98.16	168,588
>20	55	1.84	100.00	185,413
Total	2997	100.00		

Table 9. Distribution of Commercial Vehicles by Age and Average Odometer Reading.

Age	Number of Vehicles	Percent of Total	Cumulative Percent of Total	Average Reported Odometer Value
<1	0	0.00	0.00	0
1	28	5.39	5.39	54,288
2	30	5.78	11.18	193,535
3	29	5.59	16.76	306,494
4	44	8.48	25.24	364,129
5	47	9.06	34.30	494,411
6	73	14.07	48.36	485,429
7	55	10.60	58.96	537,053
8	43	8.29	67.24	557,616
9	44	8.48	75.72	622,807
10	30	5.78	81.50	941,575
11	28	5.39	86.90	688,102
12	10	1.93	88.82	743,614
13	17	3.28	92.10	591,946
14	10	1.93	94.03	527,131
15	7	1.35	95.38	802,430
16	4	0.77	96.15	846,253
17	9	1.73	97.88	728,823
18	2	0.39	98.27	287,464
19	3	0.58	98.84	688,445
20	1	0.19	99.04	869,425
>20	5	0.96	100.00	731,408
Total	519	100.00		

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 into and out of the Abilene study area. Table 10 presents the number of observed non-commercial and commercial vehicles by class and average occupancy. Nearly all of the non-commercial vehicles (99 percent) were classified as passenger vehicles. The majority of commercial vehicles (87 percent) were semi/tractor-trailer combinations. The overall average occupancy for non-commercial vehicles was 1.31 and 1.08 for commercial vehicles.

Table 10. Distribution of Vehicles by Class and Average Occupancy.

Non-Commercial Vehicles	Observed Vehicles	Average Occupancy	Commercial Vehicles	Observed Vehicles	Average Occupancy
Passenger Vehicle	2973	1.31	Single Unit 2-axle (6 wheels)	39	1.05
Bus	2	9.00	Single Unit 3-axle (10 wheels)	17	1.12
Taxi/Paid Limo	1	1.00	Single Unit 4-axle (14 wheels)	14	1.14
School Bus	1	1.00	Semi (tractor-trailer)	450	1.08
Commercial Vehicle (over 1 ton)	0	—	Other	0	—
Motorcycle	18	1.20			
Recreational Vehicle	1	2.00			
Other	1	1.00			
Total	2997	1.31	Total	520	1.08

COMMERCIAL VEHICLE CARGO CHARACTERISTICS

Commercial vehicles represent a major component of travel into, out of, and through most study areas. 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 dropped off, and how the cargo was transported to the vehicle. Table 11 presents data on the number of commercial vehicles surveyed by external station, the number and percent of vehicles not transporting any cargo, and whether or not their cargo was from Mexico.

One-third of the vehicles (33 percent) reported not carrying any cargo. Of those vehicles transporting cargo, 98 percent of those cargos were not from or headed to Mexico. Only eight vehicles indicated that their cargo was from or destined to Mexico. For those vehicles carrying a cargo, only 5 percent reported picking their cargo up at an interposal transfer or custom brokerage facility and 3 percent indicated that they would be dropping their cargo off at the same type of facility. Interposal transfer or custom brokerage facilities are sites where cargo may be transferred between several different modes (e.g. rail to truck, ship to truck, etc.).

Table 11. Commercial Vehicles with Cargo from Mexico.

Station Number	Facility	Surveyed Vehicles	Empty Vehicles	Percent Empty	Vehicles with Mexico Cargo	Vehicles without Mexico Cargo
299	FM 2404	6	2	33.33	0	4
303	SH 351	52	15	28.85	0	37
304	IH 20	92	27	29.35	3	62
305	FM 18	19	8	42.11	0	11
306	SH 36	52	25	48.08	0	27
400	US 83/84	53	19	35.85	0	34
401	FM 613	2	0	0.00	0	2
402	FM 89	10	4	40.00	0	6
403	US 277	50	10	20.00	0	40
406	IH 20	96	26	27.08	3	67
411	FM 707	16	9	56.25	0	7
412	US 83/277	56	21	37.50	2	33
414	FM 600	16	6	37.50	0	10
Total		520	172	33.08	8	340

A detailed summary of cargo types reported for commercial vehicles is provided in Table 12. Empty vehicles comprised 33 percent of those surveyed. For vehicles with identified cargo types, 12 percent reported their cargo as manufactured goods/equipment, 12 percent reported a cargo of farm products, and 10 percent reported a cargo of food, health, and beauty products.

Table 12. Distribution of Commercial Vehicles by Type of Cargo.

		Cargo Description	Number of Vehicles	Percent of Vehicles
1	—	Farm Products	61	11.73
2	—	Forest Products	0	0.00
3	—	Marine Products	1	0.19
4	—	Metals and Minerals	40	7.69
5	—	Food, Health, and Beauty Products	53	10.19
6	—	Tobacco Products	0	0.00
7	—	Textiles	6	1.15
8	—	Wood Products	14	2.69
9	—	Printer Matter	0	0.00
10	—	Chemical Products	4	0.77
11	—	Refined Petroleum or Coal Products	10	1.92
12	—	Rubber, Plastic, and Styrofoam Products	19	3.65
13	—	Clay, Concrete, Glass, or Stone	21	4.04
14	—	Manufactured Goods/Equipment	63	12.12
15	—	Wastes	6	1.15
16	—	Miscellaneous Shipments	18	3.46
17	—	Hazardous Materials	4	0.77
18	—	Transportation	25	4.81
19	—	Unclassified Cargo	2	0.38
20	—	Driver Refused to Answer	1	0.19
21	—	Unknown to Driver	0	0.00
22	—	Empty	172	33.08
		Total	520	100.00

Figures 16 and 17 present the distribution of surveyed commercial vehicles by the type of cargo transfer at the origin (point of pick-up) and at the destination (point of delivery). Warehouse-to-truck and truck-to-truck accounted for the majority of cargo transfers at both the origin and destination. At the origin, 58 percent of the transfers were warehouse-to-truck and 26 percent were truck-to-truck. At the destination, warehouse-to-truck (53 percent) and truck-to-truck (32 percent) transfers accounted for the majority of the transfers.
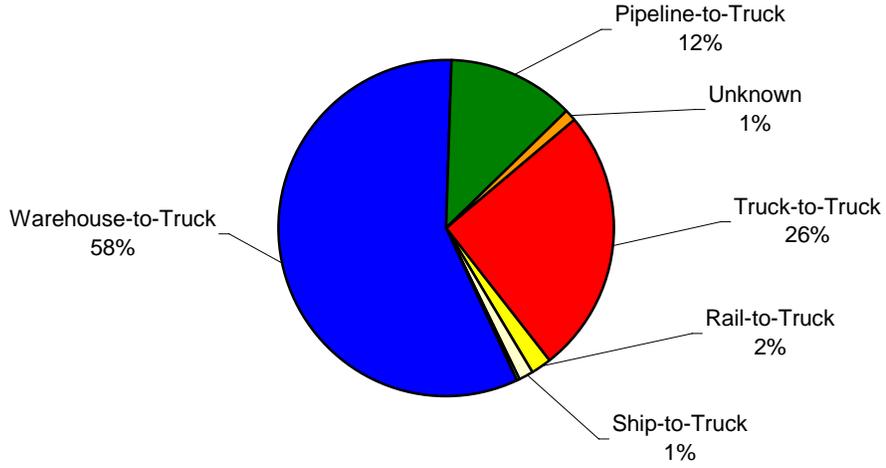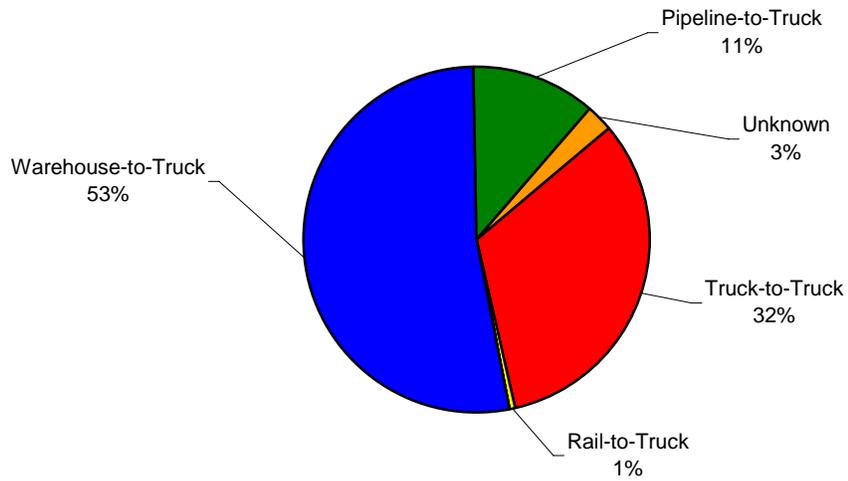
Figure 16. Cargo Transfer at Point of Pick-Up.

Figure 17. Cargo Transfer at Point of Drop-Off.

Hazardous Materials

In order to gain a better understanding of the types of hazardous materials being transported into, out of, and through the Abilene area, additional information was collected and analyzed. If commercial vehicles that were surveyed at external locations had a hazardous material placard, surveyors collected the identification number that was present on the placard. Additionally, placard identification numbers were also collected from the videotapes produced during the high-volume location data collection. All of the hazardous material placard identification numbers were compiled and the results are provided in Table 13.

Table 13. Hazardous Material Summary.

Hazardous Cargo			Number of Vehicles	Percent of Vehicles
Placard ID		Description		
1075	—	Butane	4	3.88
1203	—	Gasoline	27	26.21
1267	—	Petroleum crude oil	10	9.71
1268	—	Petroleum distillates and products	2	1.94
1325	—	Flammable solid	2	1.94
1789	—	Hydrochloric acid	4	3.88
1866	—	Resin Solution	3	2.91
1977	—	Nitrogen, refrigerated liquid	2	1.94
1993	—	Fuel oil, diesel fuel, flammable liquid, etc	15	14.56
2187	—	Carbon dioxide, refrigerated liquid	2	1.94
3082	—	Environmentally hazardous substance, liquid	6	5.83
3257	—	Elevated temperature liquid	14	13.59
Misc	—	IDs reported one time each	12	11.65
Total			103	100.00

Gasoline and fuel oil/diesel fuel were the most commonly identified hazardous cargo being transported (26 percent and 15 percent, respectively). Twelve other placard identification numbers were reported one time each. Those materials include ethylene (1038), hydrogen (1049), oxygen (1073), propylene (1077), hexaldehyde (1207), isopropanol (1219), titanium sulfate or ferrous chloride (1760), organic compound (2788), acetic acid (2789), sodium hydrosulfide (2922), corrosive acidic liquid (3265), and corrosive basic liquid (3267). In addition to the materials listed above, 81 vehicles had a placard number that was either recorded incorrectly or was not able to be transcribed from the videotapes.

HIGH VOLUME LICENSE PLATE MATCH SURVEYS

Two locations in the Abilene study area had traffic volumes that were too high to safely stop traffic and interview motorists. For these locations, a license plate match method was used as a means to estimate the number of external-local and external-through non-commercial trips. The license plate matching survey was conducted using high-speed digital cameras which recorded license plates of commercial and non-commercial vehicles entering and exiting the study area at each high-volume location. As previously mentioned, for the purpose of this study, any roadway that had more than 20,000 vehicles per day was considered high-volume. The license plate information for both locations was gathered on the same day. After the plate information was recorded, it was processed through a computer program that determined the number of license plate matches between each license plate survey location. The Abilene high-volume locations, the number of license plates matches by direction, and the 24-hour traffic counts for these locations are provided in Table 14.

Table 14. Abilene High-Volume Locations.

Non-Commercial Vehicles						
Station Number	Facility	Location	License Plates Recorded		24-Hour Vehicle Count	
			Inbound	Outbound	Inbound	Outbound
304	IH 20	at Callahan Co. Line	4,606	4,970	8,023	11,624
406	IH 20	at Nolan Co. Line	3,423	2,748	9,233	6,909
Commercial Vehicles						
Station Number	Facility	Location	License Plates Recorded		24-Hour Vehicle Count	
			Inbound	Outbound	Inbound	Outbound
304	IH 20	at Callahan Co. Line	1,516	1,712	3,529	714
406	IH 20	at Nolan Co. Line	1,597	1,107	2,008	2,396

Only matches meeting specified criteria that occurred within acceptable time limits between each survey location were considered valid matches. One criterion for license plate data was that at least five of the six characters (in consecutive order) match in order for the plate to be considered valid. Additionally, travel time runs were made for the peak and off-peak periods in order to establish reasonable time limits for an external-through vehicle to travel between license plate survey stations. The travel times were then increased by 10 percent for peak periods and off-peak periods to account for variation in travel speeds among motorists. Table 15 provides the travel times utilized for the analysis of license plate data.

Table 15. High-Volume Travel Times.

Movement	Travel Time in Minutes	
	Peak	Off-Peak
Westbound - IH 20 (304) to IH 20 (406)	33	32
Eastbound - IH 20 (406) to IH 20 (304)	31	32

Using the travel time estimates provided in Table 15, the total number of license plates determined to be traveling between the high-volume locations was ascertained. The results of the analysis for commercial and non-commercial vehicles are provided in Table 16 below.

Table 16. Results of License Plate Matching for High-Volume Locations.

Vehicle Type	License Recorded Route		Through Trips (Matched Licenses)	Local Trips (Unmatched Licenses)	Total Trips
	From	To			
Non-Commercial	IH 20 (304)	IH 20 (406)	475	4,131	4,606
	IH 20 (406)	IH 20 (304)	498	2,925	3,423
Commercial	IH 20 (304)	IH 20 (406)	354	1,162	1,516
	IH 20 (406)	IH 20 (304)	294	1,303	1,597

SURVEY DATA EXPANSION

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. It is also assumed that the surveyed vehicles are a representative sample of the vehicles at each site for a 24-hour period. Table 17 presents the expanded estimates of external-local and external-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 17 for the non-surveyed sites. For non-surveyed sites, it was assumed that all trips made were local trips. Additionally, the number of residents and visitors for the non-surveyed sites was determined using the percentage of residents and visitors from a proximal surveyed site. For example, the percentage of residents as determined from the survey for FM 600 (station number 414) was

applied to the total number of trips for FM 1226 (station number 413), which was a non-surveyed location.

Table 17. Expanded Survey Results by Station.

Station Number	Facility	Non-Commercial Vehicles			Commercial Vehicles			Residents	Visitors
		Local	Through	Total	Local	Through	Total		
299	FM 2404	619	10	629	76	0	76	598	21
303	SH 351	3,999	58	4,057	815	34	849	2,541	1,457
304	IH 20	17,276	2,371	19,647	684	3,559	4,243	10,987	6,288
305	FM 18	3,050	16	3,066	199	0	199	1,525	1,525
306	SH 36	2,890	158	3,048	888	48	936	1,694	1,195
400	US 83/84	4,470	191	4,661	562	83	645	3,045	1,425
401	FM 613	460	0	460	58	0	58	421	39
402	FM 89	810	2	812	54	0	54	794	15
403	US 277	2,193	87	2,280	675	132	807	1,472	721
404	FM 126	170	0	170	34	0	34	167	3
405	FM 2035	48	0	48	11	0	11	47	1
406	IH 20	13,747	2,395	16,142	862	3,542	4,404	8,743	5,004
407	FM 1085	173	0	173	15	0	15	53	11
408	FM 1812	64	0	64	24	0	24	66	14
409	FM 126	199	0	199	61	0	61	277	58
410	FM 3116	80	0	80	41	0	41	6,206	1,289
411	FM 707	335	7	342	95	21	116	277	58
412	US 83/277	7,495	236	7,731	772	146	918	5,963	1,532
413	FM 1226	333	0	333	24	0	24	284	49
414	FM 600	548	7	555	95	4	98	467	81
415	FM 3522	1,403	0	1,403	106	0	106	1,197	206
Total		60,360	5,539	65,900	6,150	7,569	13,719	46,827	20,992

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 typically low, the amount of error that may be generated by that assumption is believed to be small.

Figure 18 shows the estimates of external-local trip movements by direction and location group. The East group had the largest estimated number of external-local trip movements, with over 31,000 total daily trips. The West group had the second highest estimated number of external-local trip movements with nearly 15,000 daily trips.
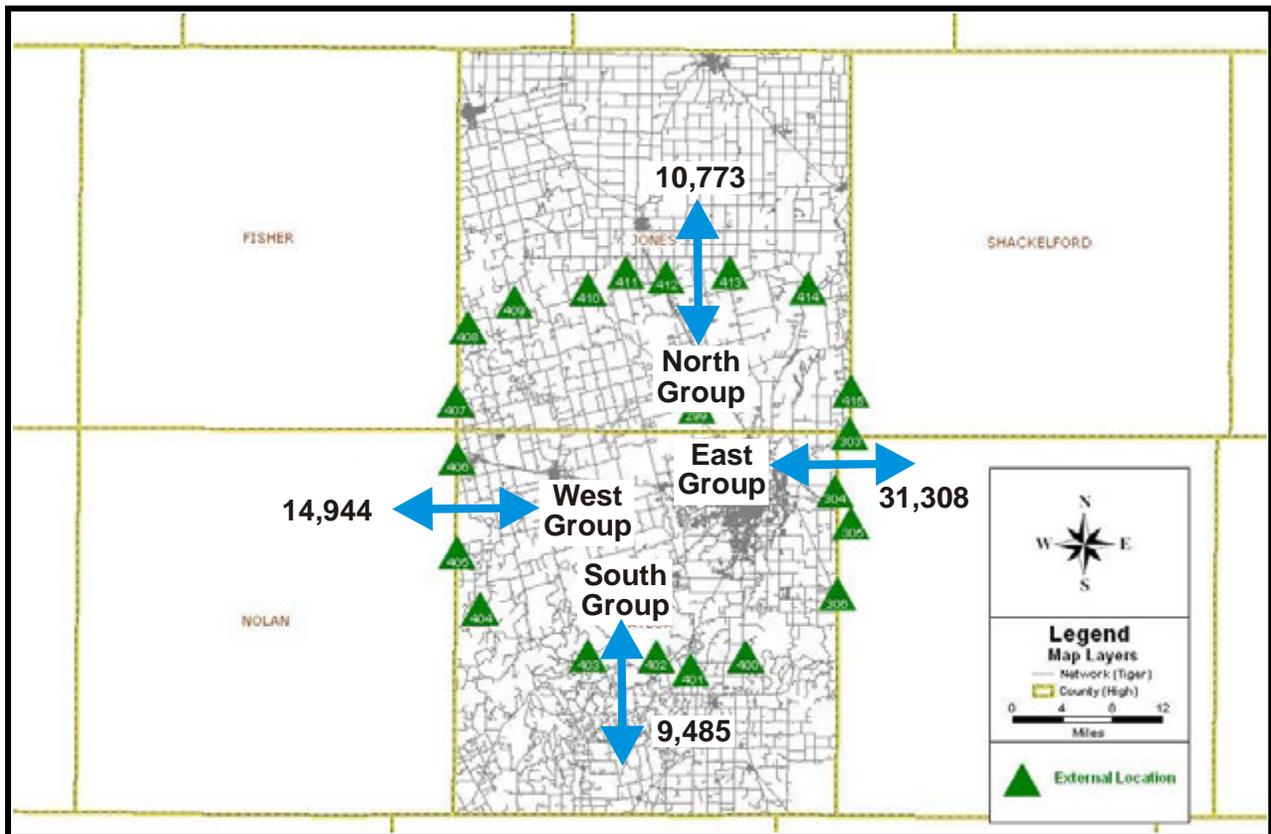

Figure 18. Estimates of External-Local Trip Movements by Location Group.

Figure 19 shows the estimates of external-through trip movements by direction and location group. The most common external-through movements were between the East and West groups. Nearly 5,800 external-through trips are estimated to be made on a daily basis between the east and west sides of the study area. This is logical due to IH 20 running East-West through the study area. East-South external-through trips were the second most common movement.
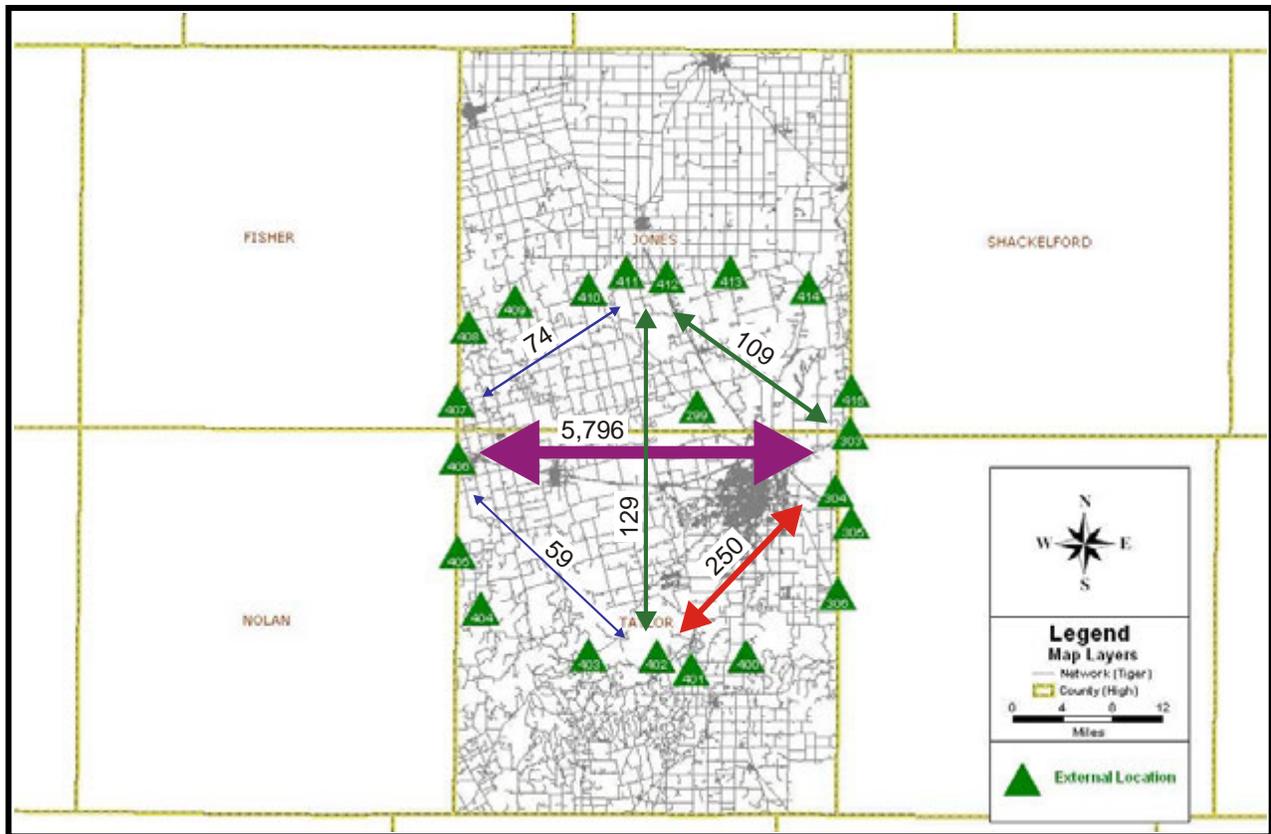
Figure 19. Estimates of External-Through Trip Movements by Location Group.

SURVEY SUMMARY

Nearly 80,000 vehicles enter and leave the Abilene study area daily. Nearly 17 percent are commercial vehicles. Approximately 16 percent of the nearly 80,000 vehicles make through trips. Additionally, nearly 56 percent of the non-commercial and commercial vehicles enter or leave the Abilene study area via IH 20. Based on the average vehicle occupancy observed in the survey, an estimated 86,300 persons are entering and leaving the study area daily by non-commercial vehicle and nearly 14,800 persons are entering and leaving by commercial vehicle. The estimated number of non-residents (persons that do not live in the two-county study area) in non-commercial vehicles that enter the study area daily is approximately 21,000. Non-residents account for approximately 9,600 internal trips within the study area.

Approximately 18 percent of non-commercial trip origins were leaving home and 41 percent of non-commercial trip destinations were returning to home. NHB trips accounted for nearly 42

percent of the non-commercial trips. The percentage of trips that were HBW and HBNW were 20 percent and 38 percent, respectively.

Commercial vehicle drivers reported varied trip purposes at the origin and destination ends of their trip. Approximately 28 percent of the trip origin purposes were reported to be picking up cargo. Delivering cargo accounted for an additional 18 percent of trip origins. Delivering cargo was the stated purpose for 60 percent of the destination trips, while picking up cargo accounted for 18 percent of the destinations. Leaving/returning to base operations accounted for 14 percent of the commercial vehicle trip origins and 8 percent of the trip destinations.

The percent distribution of non-commercial and commercial vehicles by time-of-day was similar between inbound and outbound directions for all the sites combined. The largest "spike" for non-commercial vehicles occurred during the morning peak for the inbound direction and the afternoon peak for the outbound direction. Commercial vehicle travel had no significant peak for either the inbound or the outbound directions.

The median vehicle year for non-commercial was 2000 and for commercial vehicles it was 1999. The average vehicle age for commercial vehicles was 6.3 years and for non-commercial vehicles it was 5.7 years. The average odometer reading for commercial vehicles was approximately five times higher than that for non-commercial vehicles. Average vehicle occupancy for non-commercial vehicles was 1.31, or nearly 20 percent greater than the 1.08 reported for commercial vehicles.

Commercial vehicles represent approximately 17 percent of the vehicles traveling into and out of the Abilene study area on a daily basis. Nearly 33 percent of the commercial vehicles are carrying no cargo. Of the commercial vehicles carrying cargo, 98 percent are carrying cargo that is not from or destined to Mexico.

APPENDIX

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)   99) Refused/Unknown

QUESTIONS:	Vehicle 1	Vehicle 2	Vehicle 3
1. What year, make, and model is this vehicle? Gas (leaded, unleaded), diesel, propane or other fuel?	_____ Year _____ Make _____ Model Leaded ☐ Unleaded ☐ Diesel ☐ Propane ☐ Other ☐ _____	_____ Year _____ Make _____ Model Leaded ☐ Unleaded ☐ Diesel ☐ Propane ☐ Other ☐ _____	_____ Year _____ Make _____ Model Leaded ☐ Unleaded ☐ Diesel ☐ Propane ☐ Other ☐ _____
2. What is the mileage on your odometer?			
3. What county do you live in? (If other, go to 4) 3a. What city do you live in?	☐Taylor ☐Jones ☐ Other (go to 5)	☐Taylor ☐Jones ☐ Other (go to 5)	☐Taylor ☐Jones ☐ Other (go to 5)
4. What city and state to you live in?	_____ _____ (city / state in US or Mexico) ☐ Refused	_____ _____ (city / state in US or Mexico) ☐ Refused	_____ _____ (city / state in US or Mexico) ☐ Refused
4a. Did you stay overnight as part of your travel?	☐ Yes ☐ Refused ☐ No (go to 4d)	☐ Yes ☐ Refused ☐ No (go to 4d)	☐ Yes ☐ Refused ☐ No (go to 4d)
4b. Where did you stay?	_____ _____ (city / state in US or Mexico) ☐ Refused	_____ _____ (city / state in US or Mexico) ☐ Refused	_____ _____ (city / state in US or Mexico) ☐ Refused
4c . How many nights have you stayed?			
4d. Did you enter Texas today?	☐ Yes ☐ Refused ☐ No (go to 5)	☐ Yes ☐ Refused ☐ No (go to 5)	☐ Yes ☐ Refused ☐ No (go to 5)

4e. Where outside of Texas did you travel from?	_____ _____ (city / state in US or Mexico) ☐ Refused	_____ _____ (city / state in US or Mexico) ☐ Refused	_____ _____ (city / state in US or Mexico) ☐ Refused
4f. What road or highway did you use to enter Texas?			
5. Where was the *last* place you got into your vehicle (place/address or nearest intersection/city)			
5a. What time did you leave that place?	_____a.m. _____p.m.	_____a.m. _____p.m.	_____a.m. _____p.m.
5b. What type of place was that? (choose from type of place options)			
5c. What was your purpose for being at your last location? (Choose from trip purpose options)			
5d. Was that location in the study area? (see Question 3 for study area counties)	☐ Yes ☐ No ☐ Refused (Yes go to 6)	☐ Yes ☐ No ☐ Refused (Yes go to 6)	☐ Yes ☐ No ☐ Refused (Yes go to 6)
5e What road did you use to enter the study area? (see Question 3 for study area counties)			

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

Trip Purpose Options:
1) Home/Return Home **2)** Go/Return to work **3)** Work-related **4)** School
5) Vacation **6)** Visit Family/Friends **7)** Eat out **8)** Shop
9) Buy gas **10)** Personal business **11)** Pick-up/Drop off Passenger
12) Change Travel Mode **13)** Delivery **14)** Recreation **15)** Overnight stay/sleep
16) Other (specify) **99)** Unknown/Refused

6. Where is your next destination? (place/address or nearest intersection/city)			
6a. What is your purpose for traveling to this destination? (Choose from trip purpose options)			
7.Are you going to a location out of Texas?	☐ Yes ☐ Refused ☐ No (go to 7d)	☐ Yes ☐ Refused ☐ No (go to 7d)	☐ Yes ☐ Refused ☐ No (go to 7d)
If Yes: 7a. What city and state are you going to?			
7b. What road / bridge will you use to leave Texas?			
7c. How many more days will you be in Texas?			
If No 7d. What city / county in Texas are you going to?			

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:

8. Where did your first trip today begin? (city/county/landmark))			
9. Where did you go from there? (city/county/landmark)			
10. Where did you go next? (city/county/landmark)			
11. Where did you go next? (city/county/landmark)			
12. Where did you go next? (city/county/landmark)			
13. How many more places did you stop today?			

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) 4a. If empty, what was the last cargo you delivered? 4b. Is your load full or partial? *determine 4a and 4b by observation* 4c. Is cargo being hauled using an multi-modal container/trailer or TEU? *If Yes* 4d Is the container a Reefer or Dry Box? 4e..Record the Hazardous Material Placard number (if applicable)	_____ ☐ Empty (no cargo) (go to 12) ☐ Full ☐ Partial ☐ Yes ☐ No (go to 5) ☐ Reefer ☐ Dry Box		
5. Did your cargo come from or is it going to Mexico?	☐ Yes ☐ No ☐ Refused / Unknown	☐ Yes ☐ No ☐ Refused / Unknown	☐ Yes ☐ No ☐ Refused / Unknown
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?	☐ Yes ☐ No ☐ Refused / Unknown	☐ Yes ☐ No ☐ Refused / Unknown	☐ Yes ☐ No ☐ Refused / 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?	☐ Yes ☐ No ☐ Refused / Unknown	☐ Yes ☐ No ☐ Refused / Unknown	☐ Yes ☐ No ☐ Refused / Unknown
11. How will the cargo be transferred at that site (choose from transfer codes)?			

Vehicle Classification   1) Single Unit 2-axle (6 wheels)   2) Single Unit 3-axle (10 wheels)   3) Single Unit 4-axle (14 wheels)
Options: 4) Semi (all tractor-trailer combinations)   5) Other (specify)   99) Refused / Unknown
Cargo Transfer   1) Truck-to/from-Truck   2) Rail-to/from-Truck   3) Ship-to/from-Truck   4) Airplane-to/from-Truck
Options: 5) Warehouse-to/from-Truck   6) Pipeline-to/from-Truck   99) Unknown / Refused
NOTE: All cargo transfer options are both ways (i.e., Truck-to-Warehouse should be coded same as Warehouse-to-Truck).

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 ☐ Unleaded ☐ Diesel ☐ Propane ☐ Other ☐ _____	_____ Year _____ Gross Weight Leaded ☐ Unleaded ☐ Diesel ☐ Propane ☐ Other ☐ _____	_____ Year _____ Gross Weight Leaded ☐ Unleaded ☐ Diesel ☐ Propane ☐ Other ☐ _____
13. What is the mileage on your odometer?			

14. Where are you coming from? (city / state in US or Mexico)			
14a. Is that location in Texas?	☐ Yes (go to 14d) ☐ No	☐ Yes (go to 14d) ☐ No	☐ Yes (go to 14d) ☐ No
14b. (*If not in Texas*) Did you enter Texas today?	☐ Yes ☐ No (go to 14d)	☐ Yes ☐ No (go to 14d)	☐ Yes ☐ No (go to 14d)
14c. What road or highway did you use to enter Texas?			
14d. Did you stay overnight as part of your travel?	☐ Yes ☐ No (go to 15)	☐ Yes ☐ No (go to 15)	☐ Yes ☐ No (go to 15)
14e. If yes, where did you stay? (city/county/state)			
14f. How many nights have you stayed?			
15. Where was the last place you got into your vehicle? (place/address or nearest intersection/city)			
15a. What time did you leave that place?	_____a.m. _____p.m.	_____a.m. _____p.m.	_____a.m. _____p.m.
15b. What type of place was this? (choose from type of place options).			
15c. What was your purpose for being at your last location?			
15d. Was that location in the study area?	☐ Yes (Go to 16) ☐ No ☐ Refused	☐ Yes (Go to 16) ☐ No ☐ Refused	☐ Yes (Go to 16) ☐ No ☐ Refused
15e. What road did you use to enter the study area?			
16. Where is your next destination? (place/address or nearest intersection/city)			
16a. What is your purpose for traveling to this destination?(Choose from trip purpose options.)			

17. Are you going to a location outside of Texas?	☐ Yes (Go to 17a) ☐ No (go to 17d) ☐ Refused	☐ Yes (Go to 17a) ☐ No (go to 17d) ☐ Refused	☐ Yes (Go to 17a) ☐ No (go to 17d) ☐ Refused
If Yes 17a. What city and state are you going to?			
17b. What road or highway will you use to leave Texas?			
17c. How many more days will you be in Texas?			
If No 17d. What city / county in Texas are you going to?			

Type of Place Options:

1) Office building **2)** Retail Shopping/Gas **3)** Industrial/Manufacturing/Warehouse
4) Medical **5)** Educational (12th grade or lower) **6)** Educational (college, trade, etc.)
7) Government **8)** Residential **9)** Airport **10)** Eating Establishment
11) Hotel/Motel **12)** Other (specify) **99)** Refused/Unknown

Trip Purpose Options:

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

18. Where did your first trip today begin? (city/county/landmark)			
19. Where did you go from there? (city/county/landmark)			
20. Where did you go next? (city/county/landmark)			
21. Where did you go next? (city/county/landmark)			
22. Where did you go next? (city/county/landmark)			
23. Where did you go next? (city/county/landmark)			
24. Where did you go next? (city/county/landmark)			
25. 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 (specify)	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