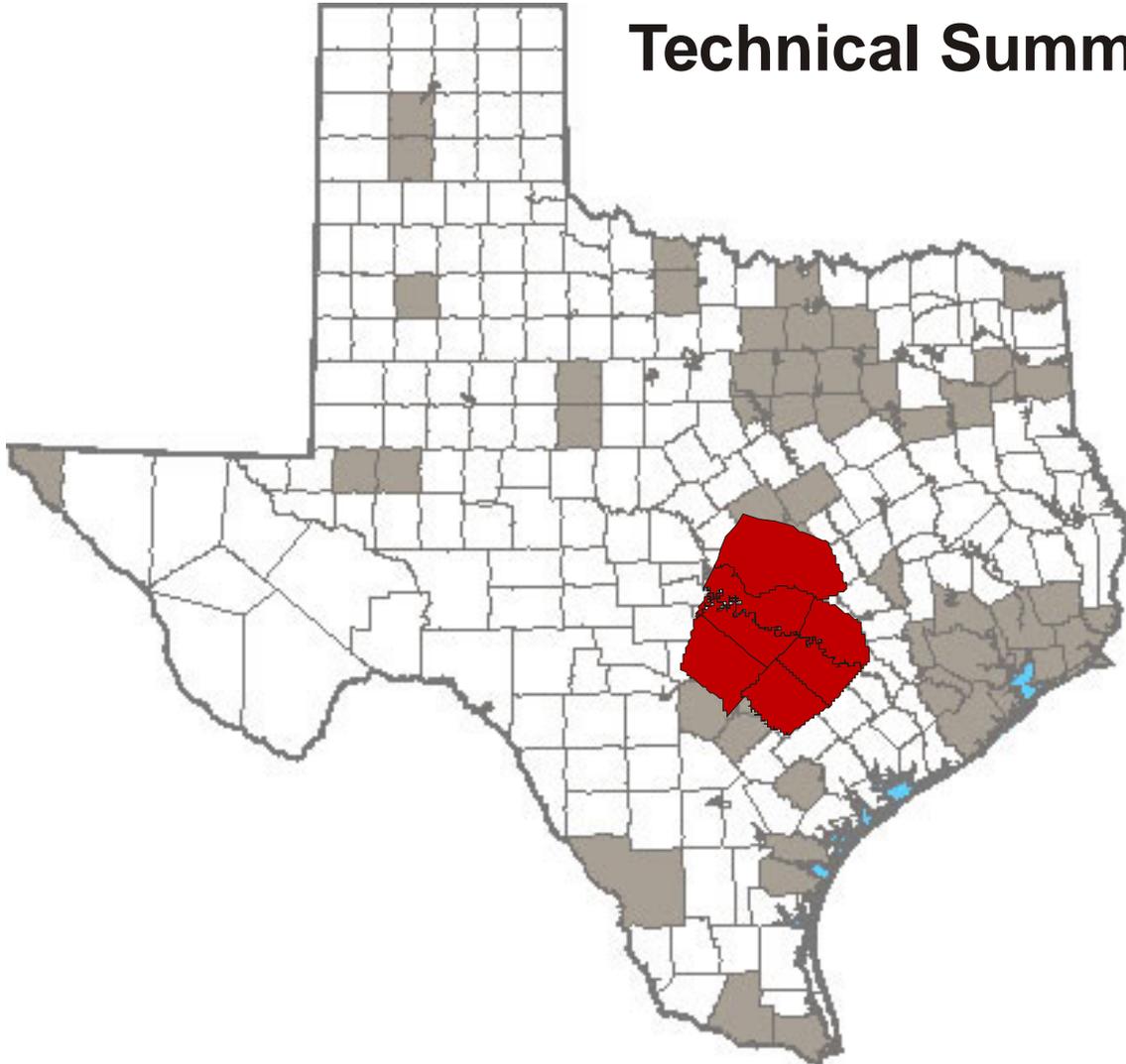


2005 Austin External Survey Technical Summary



Prepared by the
Texas Transportation Institute
December 2007

2005 Austin External Survey

TECHNICAL SUMMARY

Texas Department of Transportation Travel Survey Program

Prepared by

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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 Austin Metropolitan Planning Organization (MPO) study area. This survey measured and identified travel patterns into, within, and out of Austin metropolitan area, which is comprised of Bastrop, Caldwell, Hays, Travis, and Williamson counties. This report presents a Technical Summary of the 2005 Austin 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.

AUSTIN STUDY AREA

The study area, as shown in Figure 1, is comprised of Bastrop, Caldwell, Hays, Travis, and Williamson counties, and it is located in central Texas. The five-county region has a land area of over 4,200 square miles and a population density of approximately 296 persons per square mile. The population center of the study area is the city of Austin, which according to the 2000 census had a population of approximately 656,600 persons. The boundary established for the Austin external survey was determined by the local MPO.

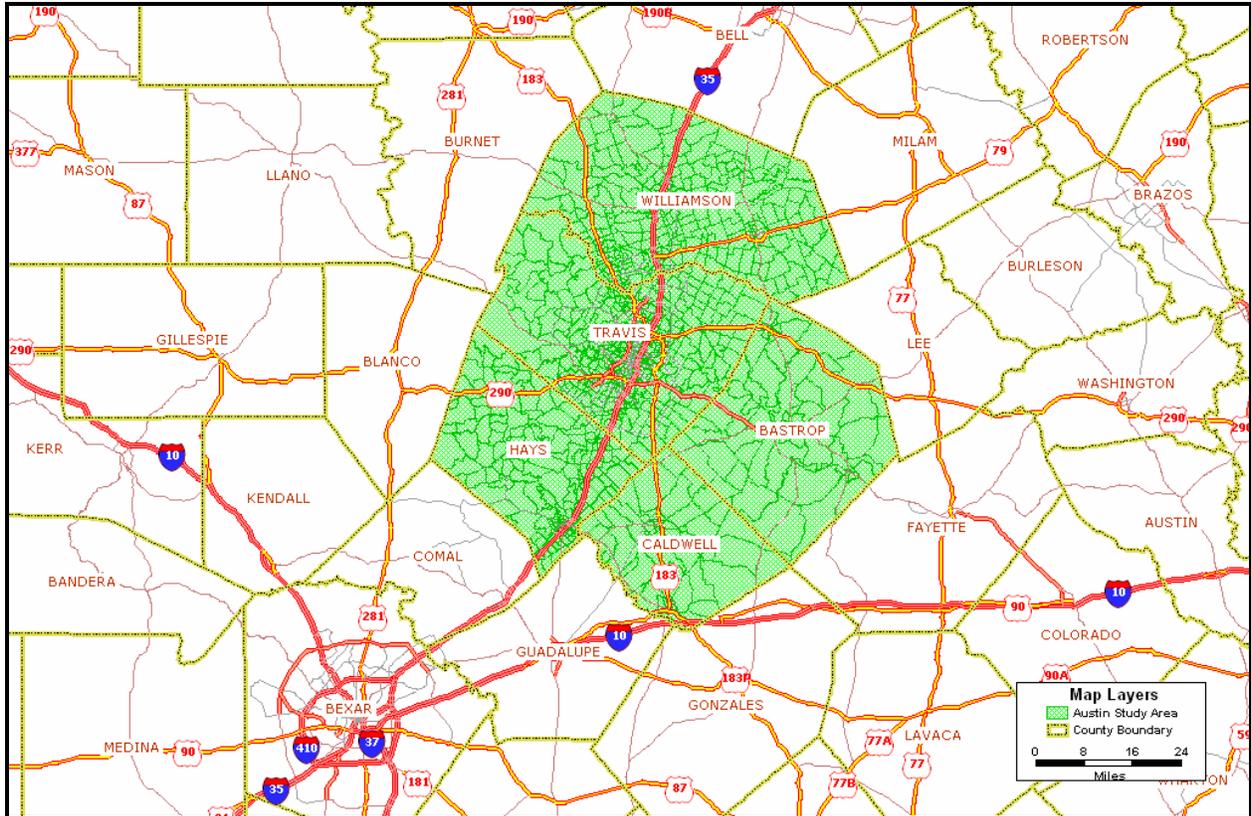


Figure 1. Austin Study Area.

EXTERNAL STATIONS

There are 42 locations on the border of the Austin 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 42 locations, 22 were selected for travel surveys. Five of the 22 survey locations bordered the San Antonio study area, and as a result, these locations were surveyed in both directions. Figure 2 shows the location of the external stations in Austin, 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.

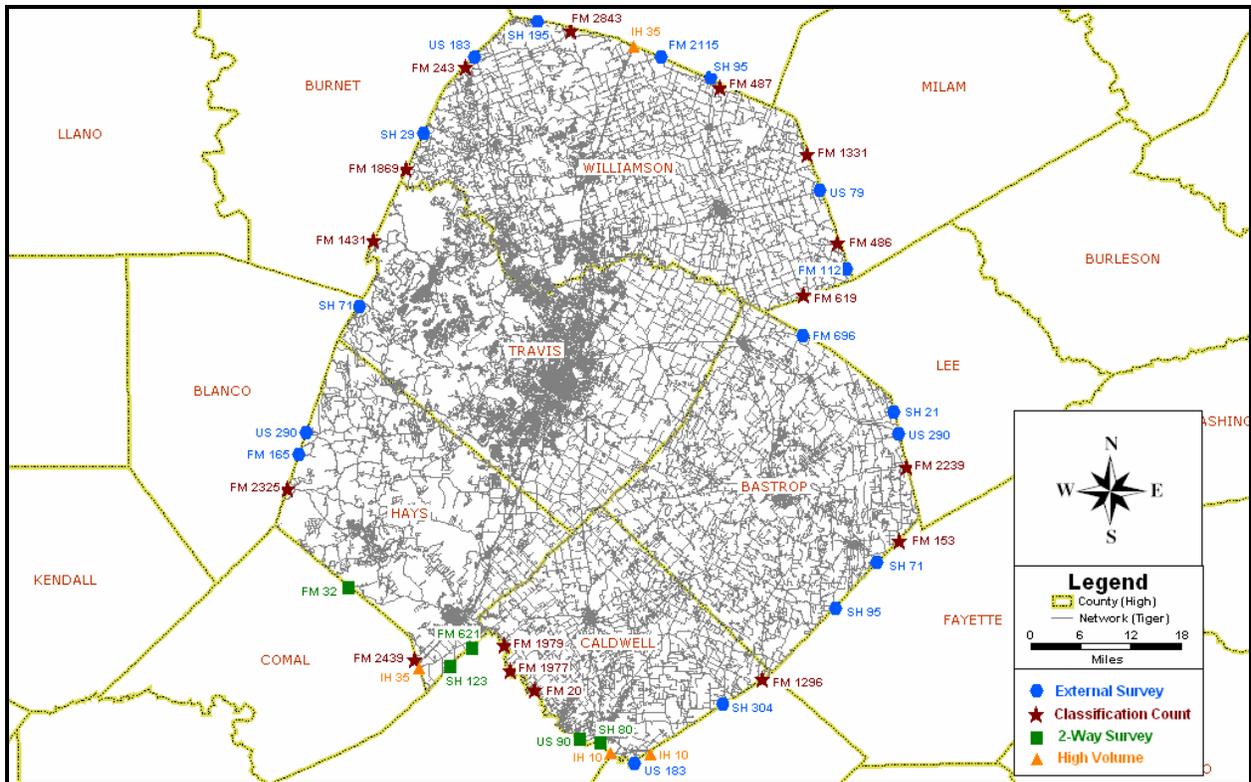


Figure 2. Austin External Station Locations.

In addition to the 22 survey sites, four 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. Additionally, commercial vehicles were included in the license plate matching data collection effort. More details on this methodology is provided later in the analysis.

Table 1. Austin External Stations.

Station Number	Facility	Location	Surveyed	24-Hour Vehicle Count		Location Group
				Inbound	Outbound	
1324	SH 195	at Bell Co. line	Yes	3,910	3,784	North
1325	FM 2843	at Bell Co. line	No	344	307	
1326	IH 35	at Bell Co. line	High-Volume	23,424	21,629	
1327	FM 2115	at Bell Co. line	Yes	298	286	
1329	SH 95	at Bell Co. line	Yes	2,036	2,043	
1330	FM 487	at Bell Co. line	No	794	706	
1331	FM 1331	at Milam Co. line	No	352	386	
1332	US 79	at Milam Co. line	Yes	3,313	3,329	
1333	FM 486	at Milam Co. line	No	195	201	
1334	FM 112	at Milam Co. line	Yes	257	284	
1335	FM 619	at Lee Co. line	No	325	314	
1336	FM 696	at Lee Co. line	Yes	914	912	
1337	SH 21	at Lee Co. line	Yes	2,116	2,165	
1338	US 290	at Lee Co. line	Yes	7,455	7,114	
1339	FM 2239	at Lee Co. line	No	405	376	East
1340	FM 153	at Fayette Co. line	No	228	224	
1341	SH 71	at Fayette Co. line	Yes	3,936	4,426	
1342	SH 95	at Fayette Co. line	Yes	560	555	
1343	FM 1296	at Gonzales Co. line	No	92	92	
1344	SH 304	at Gonzales Co. line	Yes	608	462	
1346	IH 10	at Gonzales Co. line	High-Volume	12,437	13,456	
1347	US 183	at Gonzales Co. line	Yes	3,724	2,751	South
1348	IH 10	at Guadalupe Co. line	High-Volume	11,659	11,572	
1349	SH 80	at Guadalupe Co. line	Yes	1,818	1,904	
1350	US 90	at Guadalupe Co. line	Yes	982	986	
1352	FM 20	at Guadalupe Co. line	No	1,382	1,292	
1353	FM 1977	at Guadalupe Co. line	No	249	212	
1354	FM 1979	at Guadalupe Co. line	No	744	769	
1355	FM 621	at Guadalupe Co. line	Yes	2,560	2,404	
1357	SH 123	at Guadalupe Co. line	Yes	5,296	5,264	
1358	IH 35	at Comal Co. line	High-Volume	30,838	29,969	
1359	FM 2439	at Comal Co. line	No	1,556	1,550	
1360	FM 32	at Comal Co. line	Yes	1,309	1,373	

Table 1. Austin External Stations (cont.).

Station Number	Facility	Location	Surveyed	24-Hour Vehicle Count		Location Group
				Inbound	Outbound	
1362	FM 2325	at Blanco Co. line	No	448	442	West
1363	FM 165	at Blanco Co. line	Yes	806	853	
1364	US 290	at Blanco Co. line	Yes	3,699	2,911	
1367	SH 71	at Blanco Co. line	Yes	4,049	4,123	
1368	FM 1431	at Burnet Co. line	No	958	951	
1369	FM 1869	at Burnet Co. line	No	322	352	
1370	SH 29	at Burnet Co. line	Yes	4,305	4,298	
1371	US 183	at Burnet Co. line	Yes	2,770	2,165	
1372	FM 243	at Burnet Co. line	No	333	325	
		Total		143,806	139,517	

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, commercial and non-commercial vehicles were surveyed using a license plate match method. Commercial vehicles were also 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.

Four external stations in the Austin 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 four 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, *Austin/San Antonio 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 Austin, the majority of vehicles surveyed were non-commercial. Approximately 86 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 23 percent of non-commercial vehicles and 8 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 94 percent of non-commercial vehicle trips and nearly 76 percent of commercial vehicle trips were local trips. Approximately 36 percent of the commercial vehicle through trips were made on the four 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*
1324	SH 195	at Bell Co. line	399	2,165	57	233
1326^	IH 35	at Bell Co. line	N/A	N/A	63	2,622
1327	FM 2115	at Bell Co. line	140	171	13	44
1329	SH 95	at Bell Co. line	331	1,249	67	171
1332	US 79	at Milam Co. line	375	1,780	64	463
1334	FM 112	at Milam Co. line	144	153	6	41
1336	FM 696	at Lee Co. line	340	446	17	66
1337	SH 21	at Lee Co. line	344	1,245	62	215
1338	US 290	at Lee Co. line	404	3,753	77	840
1341	SH 71	at Fayette Co. line	452	2,917	50	389
1342	SH 95	at Fayette Co. line	215	264	26	113
1344	SH 304	at Gonzales Co. line	200	277	40	67
1346^	IH 10	at Gonzales Co. line	N/A	N/A	10	2,037
1347	US 183	at Gonzales Co. line	452	1,486	67	375
1348^	IH 10	at Guadalupe Co. line	N/A	N/A	3	1,787
1349	SH 80	at Guadalupe Co. line	358	1,078	65	250
1350	US 90	at Guadalupe Co. line	313	599	58	81
1355	FM 621	at Guadalupe Co. line	438	1,505	13	98
1357	SH 123	at Guadalupe Co. line	432	3,064	54	502
1358^	IH 35	at Comal Co. line	N/A	N/A	79	3,115
1360	FM 32	at Comal Co. line	331	864	56	140
1363	FM 165	at Blanco Co. line	253	448	7	76
1364	US 290	at Blanco Co. line	267	2,235	44	55
1367	SH 71	at Blanco Co. line	372	1,946	66	942
1370	SH 29	at Burnet Co. line	380	2,557	56	507
1371	US 183	at Burnet Co. line	337	1,319	56	161
Total			7,277	31,521	1,176	15,390

* Outbound volumes during approximate time of survey (7 a.m. to 6 p.m.)

^ High-volume location. Commercial Vehicle Surveys only.

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
1324	SH 195	375	24	399	48	9	57
1326*	IH 35	N/A	N/A	N/A	24	39	63
1327	FM 2115	114	26	140	11	2	13
1329	SH 95	314	17	331	59	8	67
1332	US 79	363	12	375	55	9	64
1334	FM 112	125	19	144	6	0	6
1336	FM 696	339	1	340	15	2	17
1337	SH 21	299	45	344	38	24	62
1338	US 290	387	17	404	71	6	77
1341	SH 71	445	7	452	41	9	50
1342	SH 95	204	11	215	19	7	26
1344	SH 304	191	9	200	29	11	40
1346*	IH 10	N/A	N/A	N/A	5	5	10
1347	US 183	351	101	452	32	35	67
1348*	IH 10	N/A	N/A	N/A	2	1	3
1349	SH 80	342	16	358	51	14	65
1350	US 90	292	21	313	45	13	58
1355	FM 621	430	8	438	13	0	13
1357	SH 123	422	10	432	48	6	54
1358*	IH 35	N/A	N/A	N/A	19	60	79
1360	FM 32	300	31	331	51	5	56
1363	FM 165	248	5	253	6	1	7
1364	US 290	265	2	267	39	5	44
1367	SH 71	369	3	372	61	5	66
1370	SH 29	346	34	380	45	11	56
1371	US 183	321	16	337	55	1	56
Total		6,842	435	7,277	888	288	1,176

*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 Austin study area. A non-resident is a respondent that reported they lived outside of the Austin 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 Austin 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)
1324	SH 195	399	219	54.89	180	45.11	58
1327	FM 2115	140	43	30.71	97	69.29	10
1329	SH 95	331	183	55.29	148	44.71	42
1332	US 79	375	161	42.93	214	57.07	77
1334	FM 112	144	55	38.19	89	61.81	36
1336	FM 696	340	102	30.00	238	70.00	85
1337	SH 21	344	141	40.99	203	59.01	96
1338	US 290	404	196	48.51	208	51.49	114
1341	SH 71	452	239	52.88	213	47.12	71
1342	SH 95	215	78	36.28	137	63.72	40
1344	SH 304	200	102	51.00	98	49.00	64
1347	US 183	452	176	38.94	276	61.06	73
1349	SH 80	358	185	51.68	173	48.32	71
1350	US 90	313	163	52.08	150	47.92	51
1355	FM 621	438	223	50.91	215	49.09	276
1357	SH 123	432	191	44.21	241	55.79	119
1360	FM 32	331	185	55.89	146	44.11	66
1363	FM 165	253	145	57.31	108	42.69	67
1364	US 290	267	141	52.81	126	47.19	48
1367	SH 71	372	232	62.37	140	37.63	66
1370	SH 29	380	204	53.68	176	46.32	59
1371	US 183	337	176	52.23	161	47.77	39
Total		7,277	3,540	48.65	3,737	51.35	1,628

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, 51 percent, of the non-commercial travel in and out of Austin. The average number of internal trips made by those individuals is 0.44 trips per vehicle.

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 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:

<u>Category</u>	<u>Trip Purpose Codes (from Table 5)</u>
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. The distribution for the origin purpose shows that the largest percentage of trips for residents (60 percent) began at home, while the most common non-resident trip origin purpose (33 percent) was work. For both groups combined, the most common origin purposes were home (32 percent), shopping (25 percent), and work (23 percent).

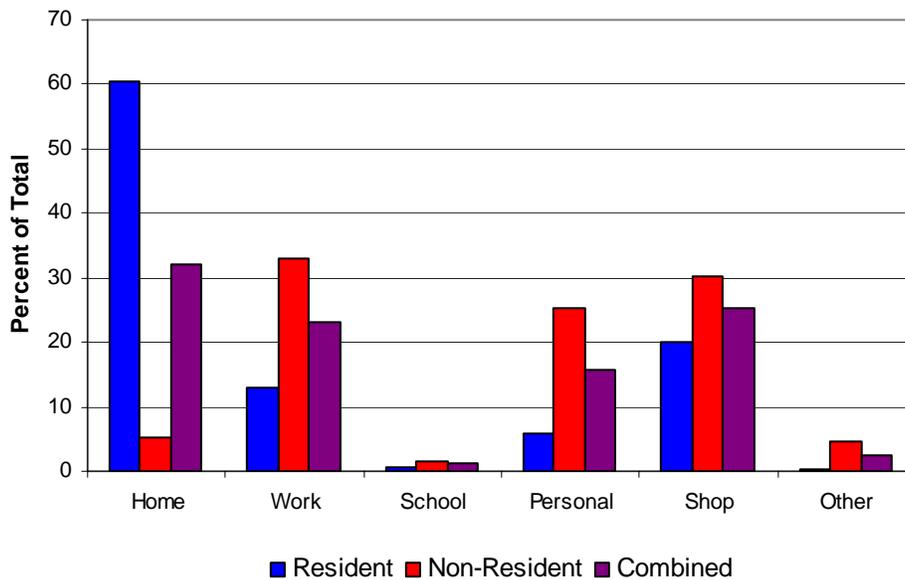


Figure 4. Trip Purpose at Origin for Non-Commercial Vehicles.

Figure 5 shows that the largest distribution of destination purpose for non-residents was home (69 percent). The trip purpose at the destination for residents was primarily comprised of work (48 percent) and personal (41 percent) trips. For both groups combined, home (37 percent), work (31 percent), and personal (27 percent) were the most common trip purposes.

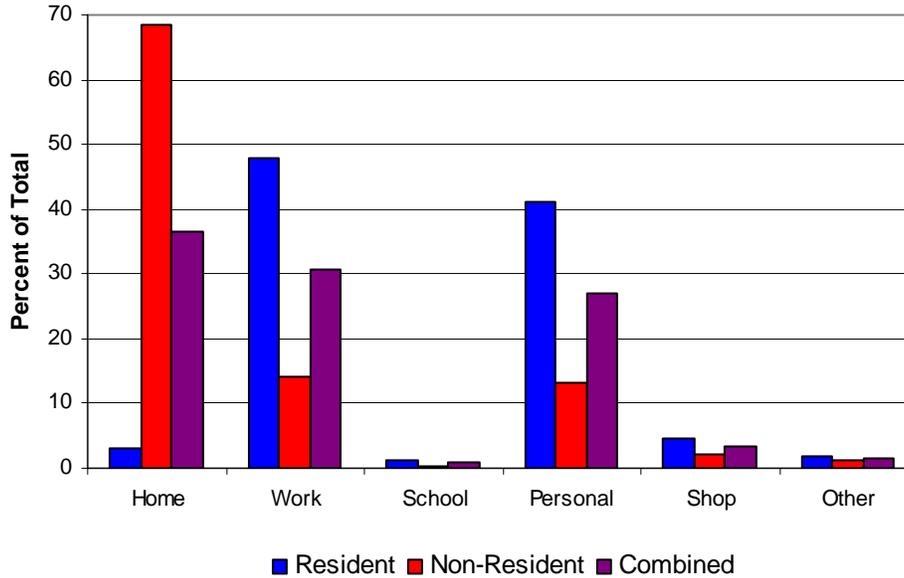


Figure 5. Trip Purpose to Destination for Non-Commercial Vehicles

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

Trip Purpose	Origin			Destination		
	Resident	Non-Resident	Combined	Resident	Non-Resident	Combined
Home	60.31	5.33	32.14	3.22	68.58	36.69
Work	12.85	33.02	23.14	48.02	14.26	30.68
School	0.68	1.47	1.10	1.13	0.40	0.77
Personal	5.74	25.37	15.83	41.24	13.25	26.89
Shop	20.17	30.16	25.30	4.69	2.30	3.50
Other	0.25	4.65	2.49	1.70	1.21	1.47

A detailed analysis of specific subsets of the survey data was performed. Approximately 60 percent of the surveyed study area residents began their trip at home. Of that group of respondents, approximately 47 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 significant percentage of Austin study area residents work outside of the Austin study area.

Nearly 70 percent of the surveyed non-residents cited home as the trip purpose for traveling to their destination. Of that group of non-residents, nearly 36 percent of the trip origins were work or work-related trips and approximately 21 percent of the trip origins were for personal business or shopping purposes. Since only one-third of the non-resident trip origins are work or work-related, this indicates that the majority of non-residents traveling within the Austin 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, the trips were fairly equally distributed among the three trip purposes, with NHB having the largest percentage (37 percent). For non-residents, HBNW trips accounted for nearly half (47 percent) of the trips. HBNW trips were the most common trip purpose for residents and non-residents combined (40 percent).

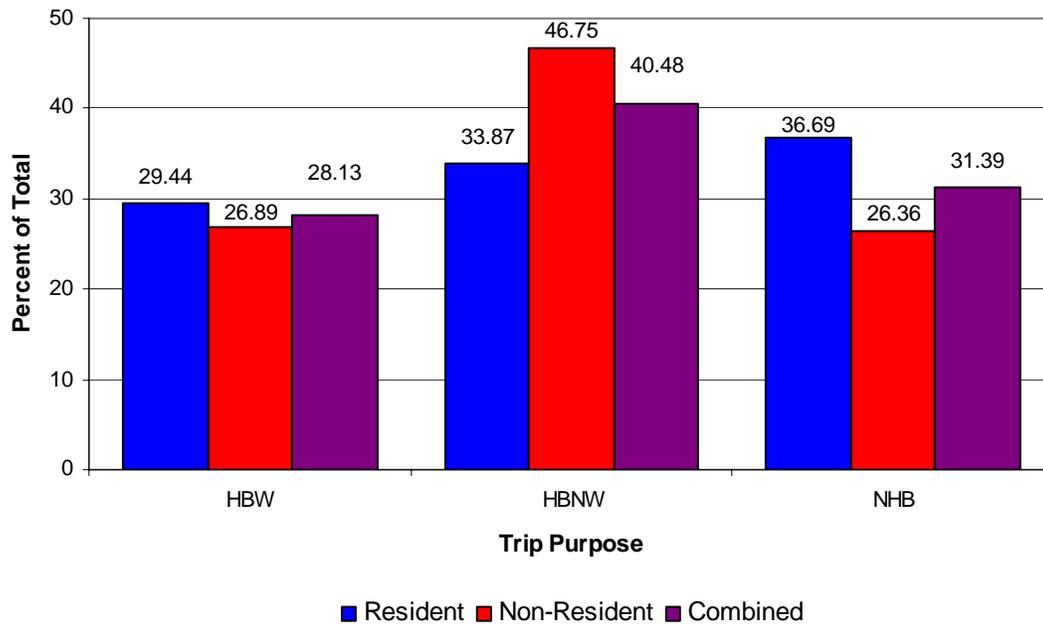


Figure 6. Distribution of Non-Commercial Vehicle Trips by Trip Purpose.

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

<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 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, delivery was the most common origin trip purpose (37 percent). Support functions (28 percent), pick-up (23 percent), and base (11 percent) were the other most commonly cited trip purposes at the origin. The distribution for destination trip purpose shows that 43 percent of the trips were destined for delivering cargo and another 27

percent were destined for picking up cargo. Only 14 percent of the trip destinations were for support functions and 14 percent of the destinations were for base operations.

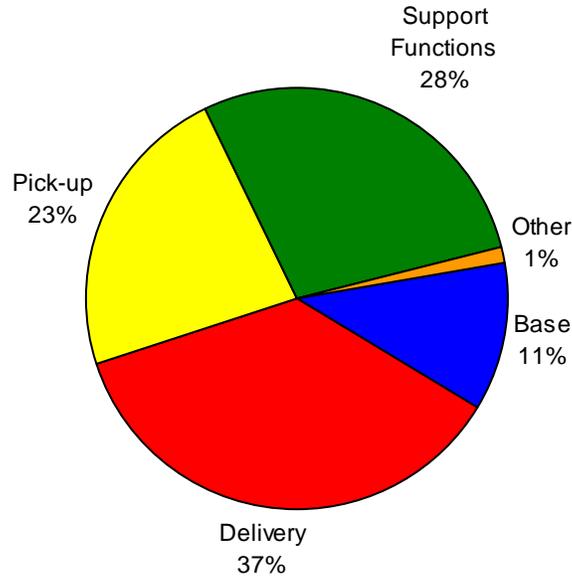


Figure 7. Trip Purpose at Origin for Commercial Vehicles.

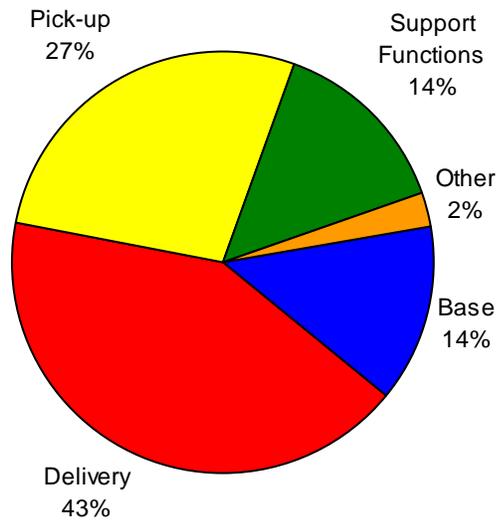


Figure 8. Trip Purpose to Destination for Commercial Vehicles.

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 residential (44 percent) as the type of place at the origin. An additional 23 percent of the non-commercial vehicles cited retail/shopping/gas as the type of place. For commercial vehicles, over half of the respondents (55 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 26 percent.

Table 7. Type of Place at Trip Origin.

Type of Place	Non-Commercial Vehicles		Commercial Vehicles	
	Number	Percent	Number	Percent
Office Building	955	13.12	27	2.30
Retail/Shopping/Gas	1,681	23.10	301	25.60
Industrial/Manufacturing	339	4.66	643	54.68
Medical	128	1.76	1	0.09
Educational	179	2.46	6	0.51
Government	59	0.81	4	0.34
Residential	3,212	44.14	77	6.55
Airport	35	0.48	2	0.17
Eating Establishment	478	6.57	62	5.27
Hotel/Motel	133	1.83	11	0.94
Other	78	1.07	42	3.57
Total	7,277	100.00	1,176	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 8:30 a.m. for non-commercial vehicles. There is an afternoon peak period for non-commercial vehicles between 4:30 p.m. and 6 p.m. Inbound commercial vehicle levels remain fairly constant from the morning peak (9 a.m.) through 4 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 9 a.m. and 6 p.m.

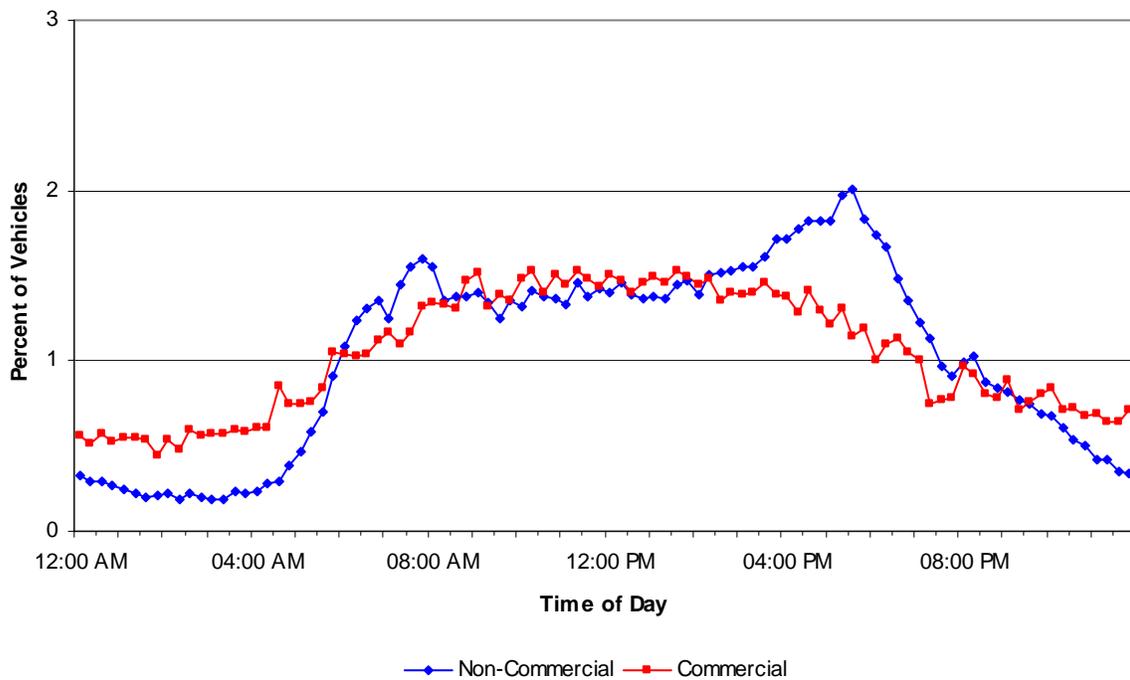


Figure 9. Distribution of Inbound Vehicles by Time-of-Day.

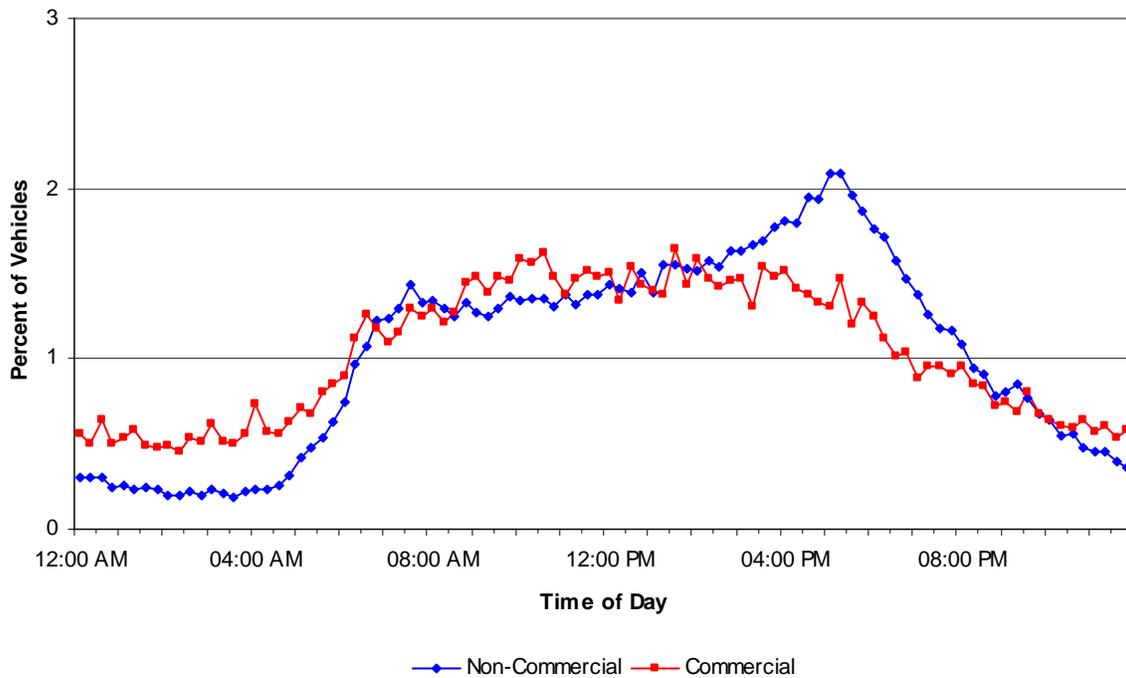


Figure 10. Distribution of Outbound Vehicles by Time-of-Day.

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 was fairly constant from 9 a.m. to 5 p.m. The counts for non-commercial vehicles gradually increased throughout the morning and then began a steady increase through the afternoon. Approximately 23 percent of the non-commercial vehicles that were traveling out of the study area (at surveyed external stations) were successfully interviewed during survey hours.

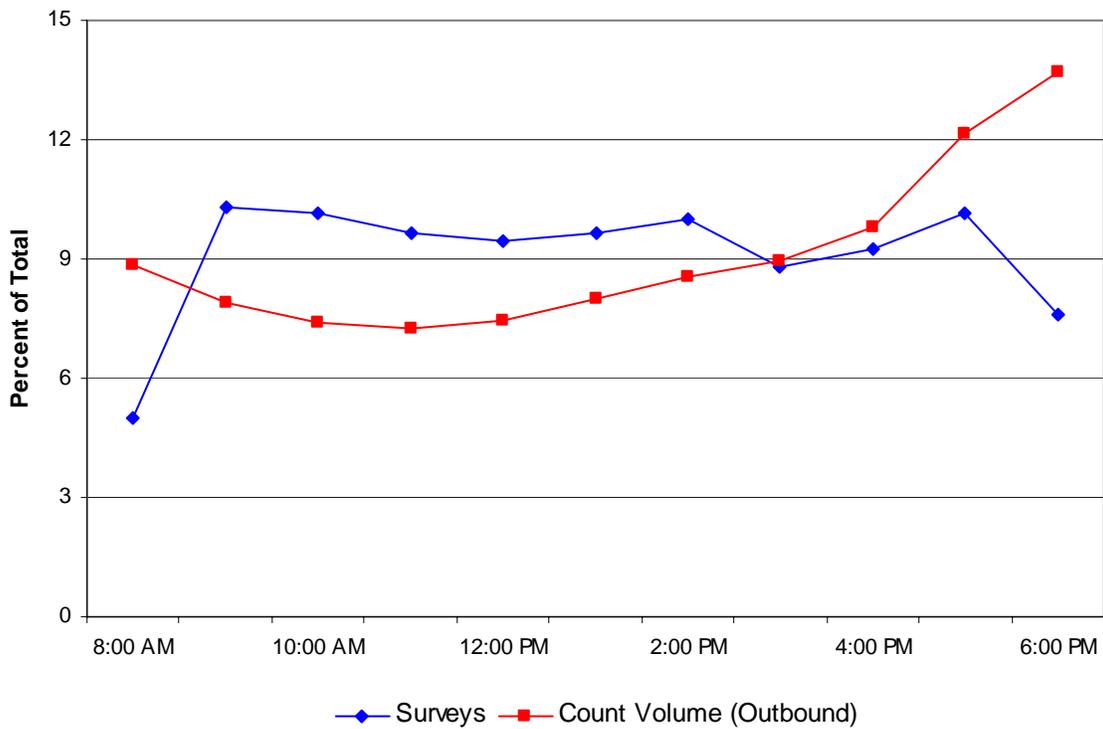


Figure 11. Distribution of Non-Commercial Vehicles and Surveys by Time-of-Day.

The 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, while the percent of completed surveys peaked in the late morning and again between 4 p.m. and 5 p.m. The largest peak of surveys completed occurred between 11 a.m. and noon. Overall, 8 percent of the commercial vehicles that were counted during the survey period were interviewed.

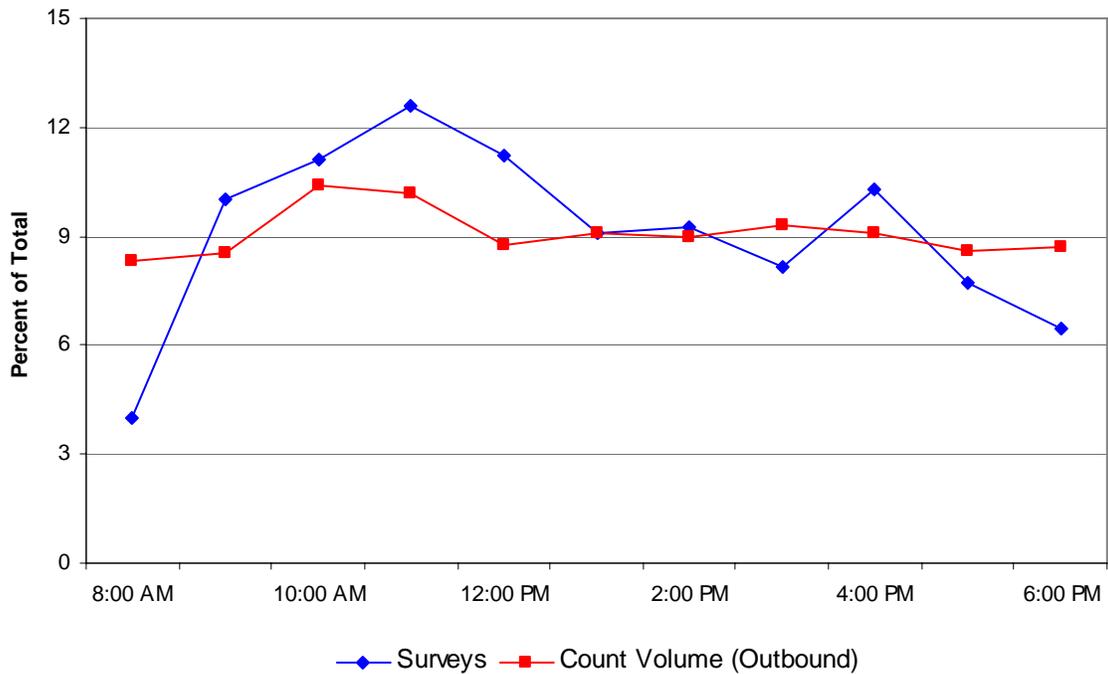


Figure 12. Distribution of Commercial Vehicles and Surveys by Time-of-Day.

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.

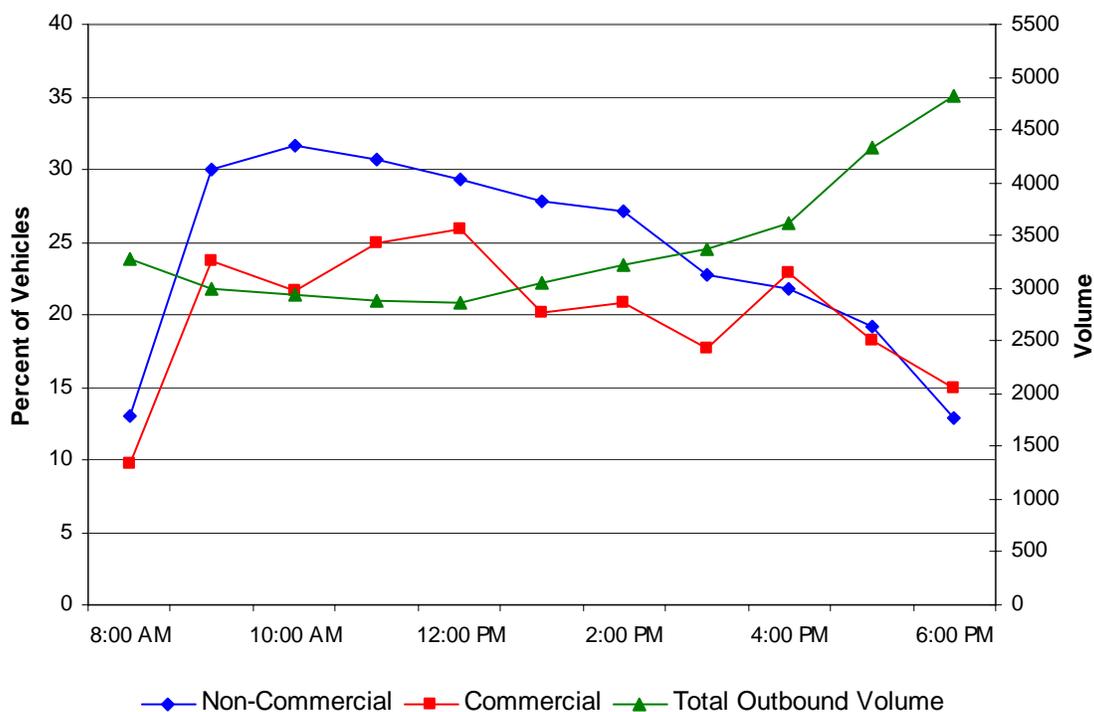


Figure 13. Distribution of Counted Vehicles That Were Surveyed.

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 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 5.9 years for non-commercial vehicles and 5.6 years for commercial vehicles. The median vehicle model year was 2001 for non-commercial vehicles and 2000 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 10 years old. This

is due in part to the total number of observations in the non-commercial and commercial surveys (7,277 and 1,176, respectively).

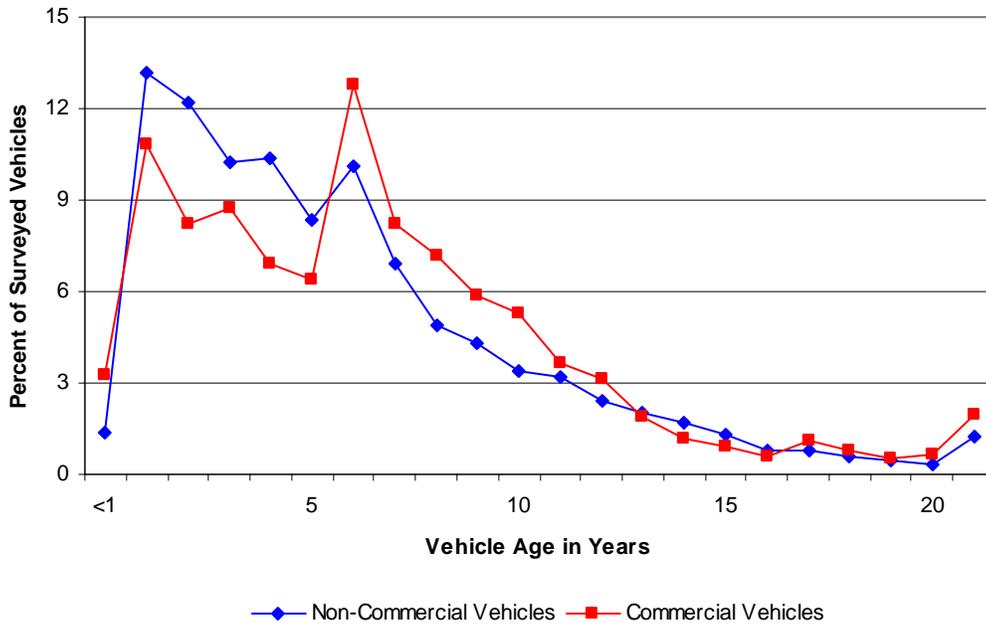


Figure 14. Distribution of Surveyed Vehicles by Age of Vehicle.

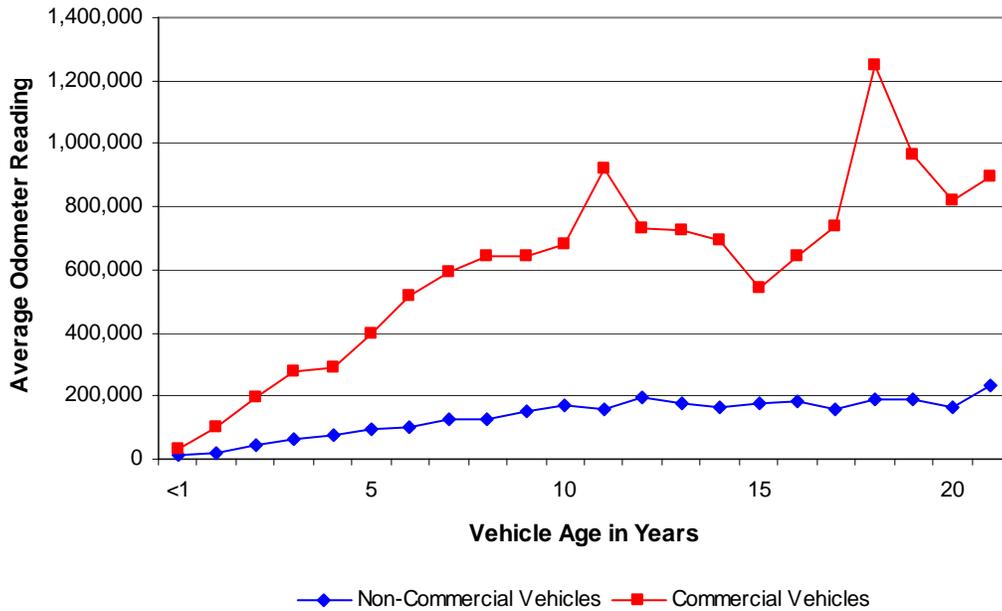


Figure 15. Average Odometer Readings for Vehicles by Age of Vehicle.

The average odometer reading for non-commercial vehicles was 93,476 and the average commercial vehicle odometer reading was 465,759. 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	100	1.37	1.37	9,523
1	958	13.16	14.54	18,982
2	889	12.22	26.76	41,682
3	743	10.21	36.97	61,587
4	753	10.35	47.31	77,125
5	609	8.37	55.68	94,808
6	736	10.11	65.80	100,754
7	504	6.93	72.72	125,534
8	356	4.89	77.61	127,062
9	311	4.27	81.89	150,610
10	245	3.37	85.25	170,619
11	233	3.20	88.46	155,682
12	174	2.39	90.85	193,885
13	145	1.99	92.84	179,249
14	125	1.72	94.56	164,726
15	95	1.31	95.86	178,122
16	55	0.76	96.62	180,207
17	59	0.81	97.43	158,386
18	42	0.58	98.01	188,348
19	32	0.44	98.45	186,955
20	23	0.32	98.76	161,207
>20	90	1.24	100.00	231,024
Total	7,277	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	38	3.23	3.23	34,212
1	127	10.80	14.03	103,429
2	97	8.25	22.28	195,751
3	103	8.76	31.04	278,712
4	81	6.89	37.93	287,229
5	75	6.38	44.30	394,483
6	150	12.76	57.06	517,206
7	97	8.25	65.31	593,183
8	84	7.14	72.45	644,444
9	69	5.87	78.32	643,649
10	62	5.27	83.59	683,962
11	43	3.66	87.24	921,262
12	37	3.15	90.39	731,122
13	22	1.87	92.26	724,156
14	14	1.19	93.45	696,096
15	11	0.94	94.39	543,533
16	7	0.60	94.98	645,952
17	13	1.11	96.09	739,375
18	9	0.77	96.85	1,247,111
19	6	0.51	97.36	964,500
20	8	0.68	98.04	820,865
>20	23	1.96	100.00	897,690
Total	1,176	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 Austin 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 (73 percent) were semi/tractor-trailer combinations. The overall average occupancy for non-commercial vehicles was 1.29 and 1.07 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	7,177	1.29	Single Unit 2-axle (6 wheels)	149	1.11
Bus	1	1.00	Single Unit 3-axle (10 wheels)	108	1.08
Taxi/Paid Limo	1	1.00	Single Unit 4-axle (14 wheels)	61	1.07
School Bus	0	—	Semi (tractor-trailer)	853	1.06
Commercial Vehicle (over 1 ton)	55	1.25	Other	5	1.20
Motorcycle	32	1.16			
Recreational Vehicle	11	1.82			
Other	0	—			
Total	7,277	1.29	Total	1,176	1.07

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.

Over one-half of the vehicles (52 percent) reported not carrying any cargo. Of those vehicles transporting cargo, 95 percent of those cargos were not from or headed to Mexico. Only twenty-seven vehicles indicated that their cargo was from or destined to Mexico. For those vehicles carrying a cargo, approximately 22 percent reported picking their cargo up at an interpositional transfer or custom brokerage facility and 19 percent indicated that they would be dropping their cargo off at the same type of facility. Interpositional 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
1324	SH 195	57	32	56.14	0	25
1326	IH 35	63	20	31.75	14	29
1327	FM 2115	13	9	69.23	0	4
1329	SH 95	67	44	65.67	0	23
1332	US 79	64	39	60.94	1	24
1334	FM 112	6	4	66.67	0	2
1336	FM 696	17	11	64.71	0	6
1337	SH 21	62	41	66.13	0	21
1338	US 290	77	41	53.25	0	36
1341	SH 71	50	29	58.00	0	21
1342	SH 95	26	13	50.00	0	13
1344	SH 304	40	26	65.00	1	13
1346	IH 10	10	4	40.00	0	6
1347	US 183	67	30	44.78	0	37
1348	IH 10	3	1	33.33	0	2
1349	SH 80	65	29	44.62	1	35
1350	US 90	58	20	34.48	2	36
1355	FM 621	13	8	61.54	0	5
1357	SH 123	54	21	38.89	2	31
1358	IH 35	79	14	17.72	5	60
1360	FM 32	56	29	51.79	0	27
1363	FM 165	7	5	71.43	0	2
1364	US 290	44	30	68.18	1	13
1367	SH 71	66	46	69.70	0	20
1370	SH 29	56	29	51.79	0	27
1371	US 183	56	31	55.36	0	25
Total		1,176	606	51.53	27	543

A detailed summary of cargo types reported for commercial vehicles is provided in Table 12. Empty vehicles comprised 52 percent of those surveyed. For vehicles with identified cargo types, 11 percent reported their cargo as manufactured goods/equipment, 7 percent were reported as clay, concrete, glass, or stone, and 6 percent reported the cargo as 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	71	6.04
2	—	Forest Products	2	0.17
3	—	Marine Products	0	0.00
4	—	Metals and Minerals	42	3.57
5	—	Food, Health, and Beauty Products	76	6.46
6	—	Tobacco Products	0	0.00
7	—	Textiles	8	0.68
8	—	Wood Products	42	3.57
9	—	Printer Matter	2	0.17
10	—	Chemical Products	13	1.11
11	—	Refined Petroleum or Coal Products	24	2.04
12	—	Rubber, Plastic, and Styrofoam Products	28	2.38
13	—	Clay, Concrete, Glass, or Stone	77	6.55
14	—	Manufactured Goods/Equipment	130	11.05
15	—	Wastes	8	0.68
16	—	Miscellaneous Shipments	25	2.13
17	—	Hazardous Materials	0	0.00
18	—	Transportation	18	1.53
19	—	Unclassified Cargo	1	0.09
20	—	Driver Refused to Answer	1	0.09
21	—	Unknown to Driver	2	0.17
22	—	Empty	606	51.53
Total			1,176	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, 72 percent of the transfers were warehouse-to-truck and 15 percent were truck-to-truck. At the destination, warehouse-to-truck (70 percent) and truck-to-truck (16 percent) transfers accounted for the majority of the transfers.

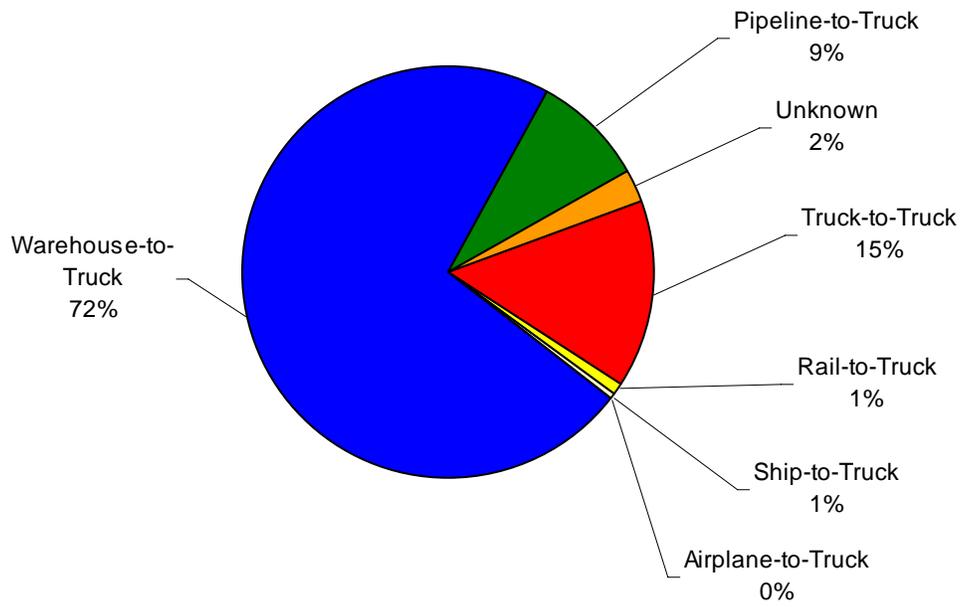


Figure 16. Cargo Transfer at Point of Pick-Up.

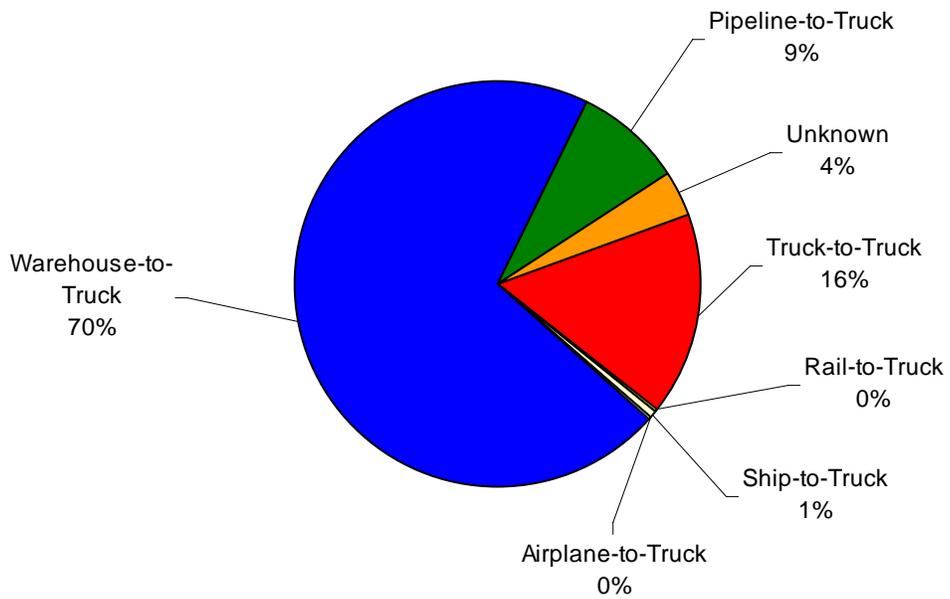


Figure 17. Cargo Transfer at Point of Drop-Off.

HIGH VOLUME LICENSE PLATE MATCH SURVEYS

Four locations in the Austin 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 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 all 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 Austin high-volume locations, the number of license plates recorded, and the 24-hour traffic counts for these locations are provided in Table 13.

Table 13. Austin High-Volume Locations.

Non-Commercial Vehicles						
Station Number	Facility	Location	License Plates Recorded		24-Hour Vehicle Count	
			Inbound	Outbound	Inbound	Outbound
1326	IH 35	at Bell Co. line	7,722	N/A	18,239	16,794
1346	IH 10	at Gonzales Co. line	2,544	N/A	9,390	9,848
1348	IH 10	at Guadalupe Co. line	2,913	N/A	8,649	8,623
1358	IH 35	at Comal Co. line	11,819	N/A	24,570	24,457
Commercial Vehicles						
Station Number	Facility	Location	License Plates Recorded		24-Hour Vehicle Count	
			Inbound	Outbound	Inbound	Outbound
1326	IH 35	at Bell Co. line	1,911	N/A	5,185	4,835
1346	IH 10	at Gonzales Co. line	1,259	N/A	3,047	3,608
1348	IH 10	at Guadalupe Co. line	1,488	N/A	3,010	2,949
1358	IH 35	at Comal Co. line	1,323	N/A	6,268	5,512

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 and positional 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 20 percent for peak periods and 10 percent for off-peak periods to account for variation in travel speeds among motorists. Table 14 provides the travel times utilized for the analysis of license plate data.

Table 14. High-Volume Travel Times.

Movement	Travel Time in Minutes	
	Peak	Off-Peak
Northbound IH 35 (1358) to IH 35 (1326)	120	101
Southbound IH 35 (1326) to IH 35 (1358)	104	88
Northbound IH 35 (1358) to IH 10 (1348)	60	77
Westbound IH 10 (1348) to IH 35 (1358)	43	55
Northbound IH 35 (1358) to IH 10 (1346)	67	83
Westbound IH 10 (1346) to IH 35 (1358)	76	62
Eastbound IH 10 (1348) to IH 35 (1326)	128	121
Southbound IH 35 (1326) to IH 10 (1348)	120	116
Eastbound IH 10 (1348) to IH 10 (1346)	18	18
Westbound IH 10 (1346) to IH 10 (1348)	40	18
Westbound IH 10 (1346) to IH 35 (1326)	132	169
Southbound IH 35 (1326) to IH 10 (1346)	161	118

* Station numbers are shown in ()

Using the travel time estimates provided in Table 14, the total number of license plate matches between the high-volume locations was ascertained. The results of this analysis for non-commercial and commercial vehicles are provided in Table 15. The table shows the location, the number of license plates recorded, the number of matches for each pair of sites, the inbound volume at the recording location, and the expanded number of through trips. The number of expanded through trips was determined by obtaining the percentage of recorded vehicles for a location that were matched at another location. This percentage was then multiplied by the total inbound volume for the recording location. For example, of the 11,819 inbound non-commercial vehicles recorded at IH 35 at the Comal County line, 953 (8.06 percent) were matched exiting the study area on IH 35 at the Bell County line. Therefore, the total inbound volume at the recording location (24,570 vehicles) multiplied by the percent matched (8.06 percent) equates to an estimated 1,980 through trips traveling on IH 35 from the Comal County line to the Bell County line.

Table 15. Results of License Plate Matching for High-Volume Locations.

Non-Commercial Vehicles					
From Location	To Location	License Plates Recorded		Expanded Total	
		Recorded	Matches	Inbound Volume	Through Trips
IH 35 at Comal Co. line	IH 10 at Guadalupe Co. line	11,819	61	24,570	128
	IH 10 at Gonzales Co. line	11,819	62	24,570	128
	IH 35 at Bell Co. line	11,819	953	24,570	1,980
IH 10 at Guadalupe Co. line	IH 35 at Comal Co. line	2,913	78	8,649	232
	IH 10 at Gonzales Co. line	2,913	959	8,649	2,847
	IH 35 at Bell Co. line	2,913	39	8,649	116
IH 10 at Gonzales Co. line	IH 35 at Comal Co. line	2,544	72	9,390	266
	IH 10 at Guadalupe Co. line	2,544	1,478	9,390	5,456
	IH 35 at Bell Co. line	2,544	39	9,390	144
IH 35 at Bell Co. line	IH 35 at Comal Co. line	7,722	872	18,239	2,059
	IH 10 at Guadalupe Co. line	7,722	34	18,239	80
	IH 10 at Gonzales Co. line	7,722	37	18,239	88
Commercial Vehicles					
From Location	To Location	License Plates Recorded		Expanded Match	
		Recorded	Matches	Inbound Volume	Through Trips
IH 35 at Comal Co. line	IH 10 at Guadalupe Co. line	1,323	15	6,268	71
	IH 10 at Gonzales Co. line	1,323	22	6,268	104
	IH 35 at Bell Co. line	1,323	528	6,268	2,502
IH 10 at Guadalupe Co. line	IH 35 at Comal Co. line	1,488	18	3,010	36
	IH 10 at Gonzales Co. line	1,488	442	3,010	894
	IH 35 at Bell Co. line	1,488	34	3,010	69
IH 10 at Gonzales Co. line	IH 35 at Comal Co. line	1,259	19	3,047	46
	IH 10 at Guadalupe Co. line	1,259	627	3,047	1,517
	IH 35 at Bell Co. line	1,259	30	3,047	73
IH 35 at Bell Co. line	IH 35 at Comal Co. line	1,911	427	5,185	1,158
	IH 10 at Guadalupe Co. line	1,911	27	5,185	73
	IH 10 at Gonzales Co. line	1,911	24	5,185	65

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 16 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 16 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 112 (station number 1334) was applied to the total number of trips for FM 486 (station number 1333), which was a non-surveyed location.

Table 16. Expanded Survey Results by Station.

Station Number	Facility	Non-Commercial Vehicles			Commercial Vehicles			Residents	Visitors
		Local	Through	Total	Local	Through	Total		
1324	SH 195	6,810	223	7,033	611	50	661	3,738	3,072
1325	FM 2843	550	0	550	101	0	101	302	248
1326	IH 35	30,269	4,764	35,033	5,478	4,542	10,020	12,985	17,284
1327	FM 2115	421	43	464	112	8	120	129	292
1329	SH 95	3,487	125	3,612	421	46	467	1,928	1,559
1330	FM 487	1,308	61	1,369	131	0	131	723	584
1331	FM 1331	639	0	639	99	0	99	274	365
1332	US 79	5,131	203	5,334	801	507	1,308	2,203	2,928
1333	FM 486	291	27	318	78	0	78	111	180
1334	FM 112	413	49	462	79	0	79	158	255
1335	FM 619	544	5	549	83	7	90	208	336
1336	FM 696	1,617	2	1,619	188	19	207	485	1,132
1337	SH 21	3,159	260	3,419	710	152	862	1,295	1,864
1338	US 290	11,908	350	12,258	2,147	164	2,311	5,777	6,131
1339	FM 2239	645	6	651	130	0	130	313	332
1340	FM 153	382	0	382	59	11	70	202	180
1341	SH 71	6,898	106	7,004	1,220	138	1,358	3,648	3,251
1342	SH 95	814	26	840	216	59	275	295	518
1343	FM 1296	143	2	145	33	6	39	73	70
1344	SH 304	901	38	939	109	22	131	459	441
1346	IH 10	10,241	8,997	19,238	2,841	3,814	6,655	4,394	5,848
1347	US 183	4,951	548	5,499	663	313	976	1,928	3,023

Table 16. Expanded Survey Results by Station (cont.).

Station Number	Facility	Non-Commercial Vehicles			Commercial Vehicles			Residents	Visitors
		Local	Through	Total	Local	Through	Total		
1348	IH 10	8,000	9,272	17,272	3,073	2,886	5,959	3,432	4,568
1349	SH 80	3,051	59	3,110	538	74	612	1,576	1,474
1350	US 90	1,543	107	1,650	0	318	318	803	739
1352	FM 20	1,957	5	1,962	712	0	712	1,020	937
1353	FM 1977	415	0	415	46	0	46	216	199
1354	FM 1979	1,394	0	1,394	119	0	119	726	668
1355	FM 621	4,685	49	4,734	230	0	230	2,386	2,300
1357	SH 123	9,266	156	9,422	965	173	1,138	4,097	5,169
1358	IH 35	43,642	5,385	49,027	7,233	4,547	11,780	18,737	24,905
1359	FM 2439	2,500	0	2,500	606	0	606	1,398	1,103
1360	FM 32	2,277	141	2,418	179	85	264	1,273	1,004
1362	FM 2325	795	3	798	92	0	92	456	339
1363	FM 165	1,497	15	1,512	131	16	147	858	639
1364	US 290	5,964	124	6,088	393	129	522	3,149	2,814
1367	SH 71	6,146	69	6,215	1,864	93	1,957	3,833	2,313
1368	FM 1431	1,698	23	1,721	188	0	188	912	786
1369	FM 1869	604	0	604	70	0	70	324	280
1370	SH 29	6,817	460	7,277	1,177	149	1,326	3,660	3,157
1371	US 183	4,287	118	4,405	145	385	530	2,239	2,048
1372	FM 243	555	17	572	86	0	86	298	257
Total		198,615	31,838	230,453	34,156	18,714	52,870	93,020	105,595

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.

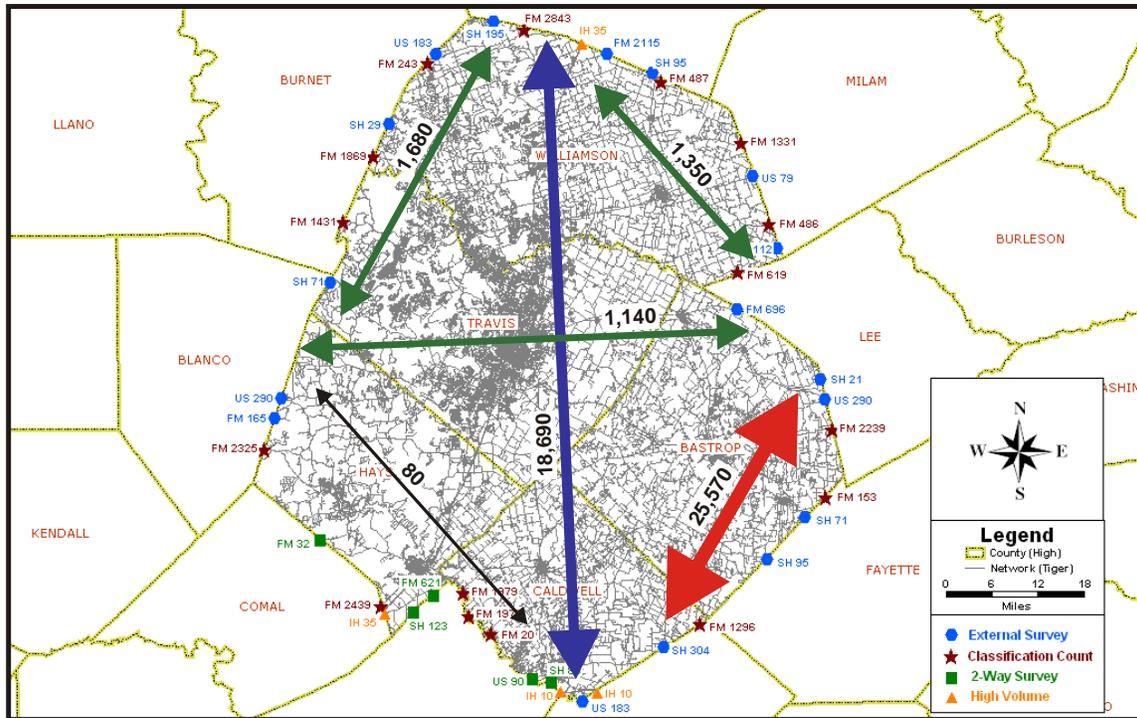


Figure 19. Estimates of External-Through Trip Movements by Location Group.

SURVEY SUMMARY

Nearly 284,000 vehicles enter and leave the Austin study area daily. Nearly 19 percent are commercial vehicles. Approximately 18 percent of the nearly 284,000 vehicles make through trips. Approximately 55 percent of the non-commercial and commercial vehicles enter or leave the Austin study area via the four high-volume locations (IH 35 and IH 10). Based on the average vehicle occupancy observed in the survey, an estimated 297,000 persons are entering and leaving the study area daily by non-commercial vehicle and nearly 56,600 persons are entering and leaving by commercial vehicle. The estimated number of non-residents (persons that do not live in the study area) in non-commercial vehicles that enter the study area daily is approximately 105,500. Non-residents account for approximately 46,400 internal trips within the study area.

Approximately 32 percent of non-commercial trip origins were leaving home and 37 percent of non-commercial trip destinations were returning to home. HBNW trips accounted for nearly 41 percent of the non-commercial trips. The percentage of trips that were NHB and HBW were 31 percent and 28 percent, respectively.

Commercial vehicle drivers reported varied trip purposes at the origin and destination ends of their trip. Approximately 23 percent of the trip origin purposes were reported to be picking up cargo. Delivering cargo accounted for an additional 37 percent of trip origins. Delivering cargo was the stated purpose for 43 percent of the destination trips, while picking up cargo accounted for 27 percent of the destinations. Leaving/returning to base operations accounted for 11 percent of the commercial vehicle trip origins and 14 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 afternoon peak for both the inbound direction and outbound directions. Commercial vehicle travel peaked in the middle of the day (around noon) for both the inbound and the outbound directions.

The median vehicle year for non-commercial vehicles was 2001 and for commercial vehicles it was 2000. The average vehicle age for commercial vehicles was 5.6 years and for non-commercial vehicles it was 5.9 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 1.29, or nearly 20 percent greater than the 1.07 reported for commercial vehicles.

Commercial vehicles represent approximately 19 percent of the vehicles traveling into and out of the Austin study area on a daily basis. Over half (52 percent) of the commercial vehicles surveyed were carrying no cargo. Of those surveyed commercial vehicles that were carrying cargo, 95 percent were carrying cargo that is not from or destined to Mexico.

APPENDIX

AUSTIN / SAN ANTONIO EXTERNAL STATION

NON-COMMERCIAL VEHICLE SURVEY FORM - A

(Outbound Direction)

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 <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. What county do you live in? (If other, go to 4)	<input type="checkbox"/> Bastrop <input type="checkbox"/> Bexar <input type="checkbox"/> Caldwell <input type="checkbox"/> Comal <input type="checkbox"/> Hays <input type="checkbox"/> Guadalupe <input type="checkbox"/> Kendall <input type="checkbox"/> Travis <input type="checkbox"/> Williamson <input type="checkbox"/> Wilson <input type="checkbox"/> OTHER <input type="checkbox"/> Refused	<input type="checkbox"/> Bastrop <input type="checkbox"/> Bexar <input type="checkbox"/> Caldwell <input type="checkbox"/> Comal <input type="checkbox"/> Hays <input type="checkbox"/> Guadalupe <input type="checkbox"/> Kendall <input type="checkbox"/> Travis <input type="checkbox"/> Williamson <input type="checkbox"/> Wilson <input type="checkbox"/> OTHER <input type="checkbox"/> Refused	<input type="checkbox"/> Bastrop <input type="checkbox"/> Bexar <input type="checkbox"/> Caldwell <input type="checkbox"/> Comal <input type="checkbox"/> Hays <input type="checkbox"/> Guadalupe <input type="checkbox"/> Kendall <input type="checkbox"/> Travis <input type="checkbox"/> Williamson <input type="checkbox"/> Wilson <input type="checkbox"/> OTHER <input type="checkbox"/> Refused
3a. What city do you live in?	(go to 5)	(go to 5)	(go to 5)
4. What city and state to you live in?	_____ _____ (city / state in US or Mexico) <input type="checkbox"/> Refused	_____ _____ (city / state in US or Mexico) <input type="checkbox"/> Refused	_____ _____ (city / state in US or Mexico) <input type="checkbox"/> Refused
4a. Did you stay overnight as part of your travel?	<input type="checkbox"/> Yes <input type="checkbox"/> Refused <input type="checkbox"/> No (go to 4d)	<input type="checkbox"/> Yes <input type="checkbox"/> Refused <input type="checkbox"/> No (go to 4d)	<input type="checkbox"/> Yes <input type="checkbox"/> Refused <input type="checkbox"/> No (go to 4d)
4b. Where did you stay?	_____ _____ (city / state in US or Mexico) <input type="checkbox"/> Refused	_____ _____ (city / state in US or Mexico) <input type="checkbox"/> Refused	_____ _____ (city / state in US or Mexico) <input type="checkbox"/> Refused
4c. How many nights have you stayed?			
4d. Did you enter Texas today?	<input type="checkbox"/> Yes <input type="checkbox"/> Refused <input type="checkbox"/> No (go to 5)	<input type="checkbox"/> Yes <input type="checkbox"/> Refused <input type="checkbox"/> No (go to 5)	<input type="checkbox"/> Yes <input type="checkbox"/> Refused <input type="checkbox"/> No (go to 5)

4e. Where outside of Texas did you travel from?	_____	_____	_____
	(city / state in US or Mexico)	(city / state in US or Mexico)	(city / state in US or Mexico)
	<input type="checkbox"/> Refused	<input type="checkbox"/> Refused	<input type="checkbox"/> Refused
4f. What road or highway did you use to enter Texas?			
5. Where was the <i>last</i> 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)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 6)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused (Yes go to 6)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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?	<input type="checkbox"/> Yes <input type="checkbox"/> Refused <input type="checkbox"/> No (go to 7d)	<input type="checkbox"/> Yes <input type="checkbox"/> Refused <input type="checkbox"/> No (go to 7d)	<input type="checkbox"/> Yes <input type="checkbox"/> Refused <input type="checkbox"/> No (go to 7d)
<i>If Yes:</i> 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?			
<i>If No</i> 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?			

**AUSTIN / SAN ANTONIO EXTERNAL STATION
COMMERCIAL VEHICLE SURVEY FORM B**
(Outbound Direction)

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)	<input type="checkbox"/> Empty (no cargo)	<input type="checkbox"/> Empty (no cargo)	<input type="checkbox"/> Empty (no cargo)
4a. If empty, what was the last cargo you delivered?			
4b. (To be completed by surveyor) Is vehicle type cargo/freight transport or for service/delivery?	<input type="checkbox"/> Cargo Transport <input type="checkbox"/> Service	<input type="checkbox"/> Cargo Transport <input type="checkbox"/> Service	<input type="checkbox"/> Cargo Transport <input type="checkbox"/> Service
4c. What is the weight of your cargo? <i>* determine 4a and 4b by observation *</i>	(lbs)	(lbs)	(lbs)
4d. Is cargo being hauled using an multi-modal container/trailer or TEU?	<input type="checkbox"/> Yes <input type="checkbox"/> No (go to 5) <input type="checkbox"/> Neither	<input type="checkbox"/> Yes <input type="checkbox"/> No (go to 5) <input type="checkbox"/> Neither	<input type="checkbox"/> Yes <input type="checkbox"/> No (go to 5) <input type="checkbox"/> Neither
<i>If Yes</i> 4e. Is the container a Reefer or Dry Box?	<input type="checkbox"/> Reefer <input type="checkbox"/> Dry Box	<input type="checkbox"/> Reefer <input type="checkbox"/> Dry Box	<input type="checkbox"/> Reefer <input type="checkbox"/> Dry Box
4f. Record the hazardous material placard (if applicable)			
5. Did your cargo come from or is it going to Mexico?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused / Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused / Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused / Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused / Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> 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?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused / Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused / Unknown	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Refused / 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-axle (14 wheels)
4) Semi (all tractor-trailer combinations) 5) Other (specify) 99) Refused / Unknown

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

NOTE: All cargo transfer options are both ways (i.e., Truck-to-Warehouse should be coded same as Warehouse-to-Truck).

QUESTIONS:

<p>12. What is the year and gross weight rating of this vehicle ?</p> <p>Gas (leaded, unleaded), diesel, propane or other fuel?</p>	<p>_____</p> <p>Year</p> <p>_____</p> <p>Gross Weight</p> <p>Leaded <input type="checkbox"/> Unleaded <input type="checkbox"/></p> <p>Diesel <input type="checkbox"/> Propane <input type="checkbox"/></p> <p>Other <input type="checkbox"/> _____</p>	<p>_____</p> <p>Year</p> <p>_____</p> <p>Gross Weight</p> <p>Leaded <input type="checkbox"/> Unleaded <input type="checkbox"/></p> <p>Diesel <input type="checkbox"/> Propane <input type="checkbox"/></p> <p>Other <input type="checkbox"/> _____</p>	<p>_____</p> <p>Year</p> <p>_____</p> <p>Gross Weight</p> <p>Leaded <input type="checkbox"/> Unleaded <input type="checkbox"/></p> <p>Diesel <input type="checkbox"/> Propane <input type="checkbox"/></p> <p>Other <input type="checkbox"/> _____</p>
<p>13. What is the mileage on your odometer?</p>			
<p>14. Where are you coming from? (city / state in US or Mexico)</p>			
<p>14a. Is that location in Texas?</p>	<p><input type="checkbox"/> Yes (go to 14d)</p> <p><input type="checkbox"/> No</p>	<p><input type="checkbox"/> Yes (go to 14d)</p> <p><input type="checkbox"/> No</p>	<p><input type="checkbox"/> Yes (go to 14d)</p> <p><input type="checkbox"/> No</p>
<p>14b. (If not in Texas) Did you enter Texas today?</p>	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No (go to 14d)</p>	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No (go to 14d)</p>	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No (go to 14d)</p>
<p>14c. What road or highway did you use to enter Texas?</p>			
<p>14d. Did you stay overnight as part of your travel?</p>	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No (go to 15)</p>	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No (go to 15)</p>	<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No (go to 15)</p>
<p>14e. If yes, where did you stay? (city/county/state)</p>			
<p>14f. How many nights have you stayed?</p>			
<p>15. Where was the last place you got into your vehicle? (place/address or nearest intersection/city)</p>			
<p>15a. What time did you leave that place?</p>	<p>_____ a.m. _____ p.m.</p>	<p>_____ a.m. _____ p.m.</p>	<p>_____ a.m. _____ p.m.</p>
<p>15b. What type of place was this? (choose from type of place options).</p>			
<p>15c. What was your purpose for being at your last location?</p>			
<p>15d. Was that location in the study area?</p>	<p><input type="checkbox"/> Yes (Go to 16)</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Refused</p>	<p><input type="checkbox"/> Yes (Go to 16)</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Refused</p>	<p><input type="checkbox"/> Yes (Go to 16)</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Refused</p>
<p>15e. What road did you use to enter the study area?</p>			
<p>16. Where is your next destination? (place/address or nearest intersection/city)</p>			
<p>16a. What is your purpose for traveling to this destination? (Choose from trip purpose options.)</p>			

17. Are you going to a location outside of Texas?	<input type="checkbox"/> Yes (Go to 17a) <input type="checkbox"/> No (go to 17d) <input type="checkbox"/> Refused	<input type="checkbox"/> Yes (Go to 17a) <input type="checkbox"/> No (go to 17d) <input type="checkbox"/> Refused	<input type="checkbox"/> Yes (Go to 17a) <input type="checkbox"/> No (go to 17d) <input type="checkbox"/> Refused
<i>If Yes</i>			
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?			
<i>If No</i>			
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