Findings of the 1984 Regional Travel Survey

North Central Texas Council of Governments

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The North Central Texas Council of Governments is a voluntary association of cities, counties, school districts, and special districts — established in January 1966, to assist local governments in planning for common needs, cooperating for mutual benefit, and coordinating for sound regional development.

The Council of Governments is an organization of, by, and for local governments. Its purpose is to strengthen both the individual and collective power of local governments — and to help them recognize regional opportunities, resolve regional problems, eliminate unnecessary duplication, and make joint regional decisions. NCTCOG also assists in developing the means to implement those decisions.

North Central Texas is a 16-county metropolitan region centered around Dallas and Fort Worth. Currently the Council has 202 members, including 16 counties, 149 cities, 21 independent school districts, and 16 special districts. The area of the region is approximately 12,800 square miles, which is larger than nine states, and the population of the region is over 4.0 million, which is larger than 29 states.

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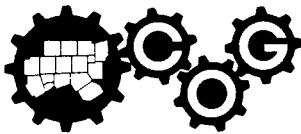
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Since 1974 NCTCOG has served as the Metropolitan Planning Organization (MPO) for transportation for the Dallas-Fort Worth area. NCTCOG's Department of Transportation and Energy is responsible for the regional planning process for all modes of transportation. The department provides technical support and staff assistance to the Regional Transportation Council and its technical committees, which compose the MPO policy-making structure. In addition the department provides technical assistance to the local governments of North Central Texas in planning, coordinating, and implementing transportation decisions.

Abstract

TITLE: <u>Findings of the 1984 Regional Travel Survey</u>

AUTHOR: North Central Texas Council of Governments

SUBJECT: A summary of the findings from an analysis of travel in the Dallas-Fort Worth area.

SOURCE OF COPIES: Regional Data Center
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NUMBER OF PAGES: 276

ABSTRACT: This report summarizes the results of the three components of the 1984 NCTCOG Regional Travel Survey. Where possible, the data is compared to results from the 1964 Survey to examine the changes in travel patterns and trip characteristics over the past 20 years. The results of the Regional Travel Survey have implications on both the amount and pattern of travel in the Dallas-Fort Worth area. The Survey indicated that over the past 20 years, the number of person trips per person has substantially increased. At the same time, auto occupancy in the region has declined causing an even greater increase in the number of vehicle trips per person. The average trip length has also increased for all trip purposes. All of these factors have contributed to the increase in vehicle miles of travel in the region.

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REGIONAL TRAVEL SURVEY ANALYSIS

INTRODUCTION

In 1984 the North Central Texas Council of Governments (NCTCOG) conducted a Regional Travel Survey to update information on travel patterns and trip characteristics in the Dallas-Fort Worth area. The Survey was the first such comprehensive effort since a Home Interview Survey was conducted by the Texas Highway Department (now the State Department of Highways and Public Transportation) in 1964. A small telephone survey was conducted in 1977, but it was considered out of date and inadequate for travel model validation purposes because of the small sample size and the method of data collection.

The economy, life-style, population, and development characteristics of the region changed considerably between 1964 and 1984. Those changes argued strongly for a careful reexamination of NCTCOG's travel forecasting procedures. Such an analysis should have good, representative data that could be cited with confidence as the basis for up-to-date travel models. A well-designed survey would also serve to update models for other areas in the state as well.

The 1984 Survey included three components: the Home Interview Survey, which gathered data on household travel patterns; the Workplace Survey, which collected both employee and nonemployee trip data at the workplace; and the On-Board Transit Survey, which provided information on trips using transit. Samples of the survey forms for each component are included in Appendix A.

The Survey yielded data on a variety of travel characteristics including trip length, auto occupancy, daily trips per household, daily trips per employee, percentage of trips using transit, and trip purpose.

Barton-Aschman Associates, Inc. conducted the Home Interview and Workplace Surveys, and Booz-Allen & Hamilton, Inc. conducted the On-Board Transit Survey. Separate reports, prepared by the consultants, document the design, procedures, and implementation of each of the three components.

This report summarizes the results of the three Surveys. Where possible, the data is compared to results from the 1964 Survey to examine the changes in travel patterns over the past 20 years.

Throughout this report, trip purposes are defined in one of three ways: home-based work (HBW) trips, which include trips from home to work or work to home; home-based nonwork (HNW) trips, including all nonwork trips beginning or ending at home; or nonhome-based (NHB) trips, which include all trips where home is neither the origin nor the destination.

Data from the Home Interview and Workplace Surveys has been used to project the number of daily trips that will occur in the Dallas-Fort Worth region in a particular horizon year. The information has also been used to predict the origins and destinations of those trips. Data from the On-Board Transit Survey has been used in conjunction with Home Interview data to predict travel mode choice. Information from the Regional Travel Survey has also provided a rich data base for traffic impact assessments and other short-range transportation planning activities in the region.

HOME INTERVIEW SURVEY

During the spring and summer of 1984, 2,471 households were interviewed at their place of residence, and demographic and travel information for household members five years or older was recorded. Approximately 20,200 person trip records were created for all the vehicular trips made by 6,403 persons residing in the sample households. Walk trips to work were also included in the Survey. (See Appendices B, C, and D for more information on sample size, household characteristics, incomplete interviews, and comparisons with 1980 Census data.) The Survey was originally designed to be completed by Memorial Day, before schools closed; however, personnel problems as well as a high household refusal rate prolonged the Survey through the first half of July. In analyzing the data, a statistically significant difference was found between the pre- and post-Memorial Day trips rates. Since the rates were intended to represent school year travel patterns, the post-Memorial Day trip records were deleted, and all trip rates were developed from pre-Memorial Day interviews. (See Appendix E for the results of the tests of significance.)

Changes in Volume and Purpose of Trips

The surveyed households, weighted by the total number of households in the NCTCOG Transportation Study Area, represented over one million households and approximately 10 million trips in 1984. Appendix F describes the procedure used to factor the sample to the regional population.

The changes in travel patterns between 1964 and 1984 occurred both in the volume and purpose of trips. The total number of trips in the region doubled from 4.9 million in 1964 to 9.8 million in 1984, reflecting an average annual increase of 5 percent. Broken down by purpose, the trips showed different

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patterns of change. The steepest increase occurred in HBW work and NHB trips, with each increasing by over 150 percent during the 20-year period. HNW trips grew at a slower rate reducing the HNW share of total trips from 59 percent to 48 percent of all person trips. The combined share of HBW and NHB trips increased from 41 percent to over 52 percent of all person trips (Figure 1).

FIGURE 1

PURPOSE OF PERSON TRIPS

SDHPT 1964 SURVEY

NHB (19.7%) HBW (20.9%)

HNW (59.4%)

NCTCOG 1984 SURVEY

NHB (25.2%) HBW (27.0%)

HNW (47.5%)
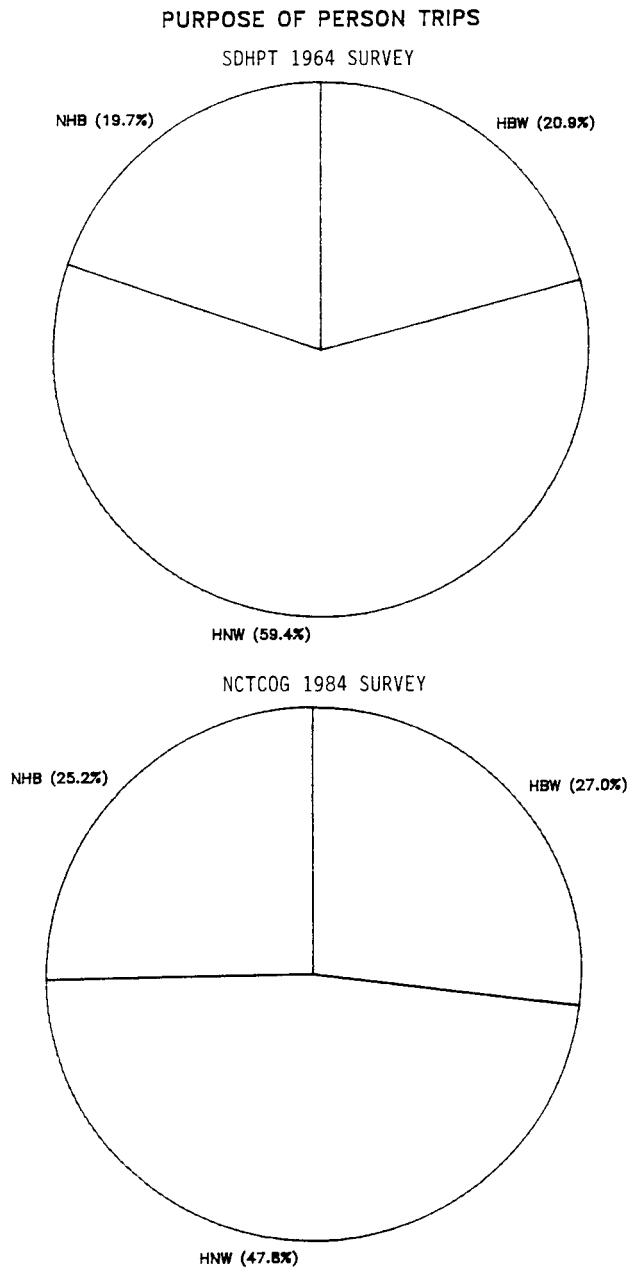
The changes in trip purpose can be attributed, in part, to changes in work habits and household size. As a result of those changes, it appears that household members took many more HBW trips but also tried to economize in travel time by combining work and nonwork trips. Overall, the average number of person trips per household in 1984 was 8.68 compared to 9.12 trips in 1964. This change was due, not to a decrease in travel, but rather to a decrease in household size which went from 3.22 persons per household in 1964 to 2.55 persons per household in 1984. HBW and NHB trips per household increased from fewer than two trips in 1964 to more than two trips in 1984. The average number of HNW trips, on the other hand, declined from 5.42 to 4.32 (Figure 2). (See Appendix G for a statistical test of difference of means in the 1964 and

FIGURE 2
PERSON TRIPS PER HOUSEHOLD
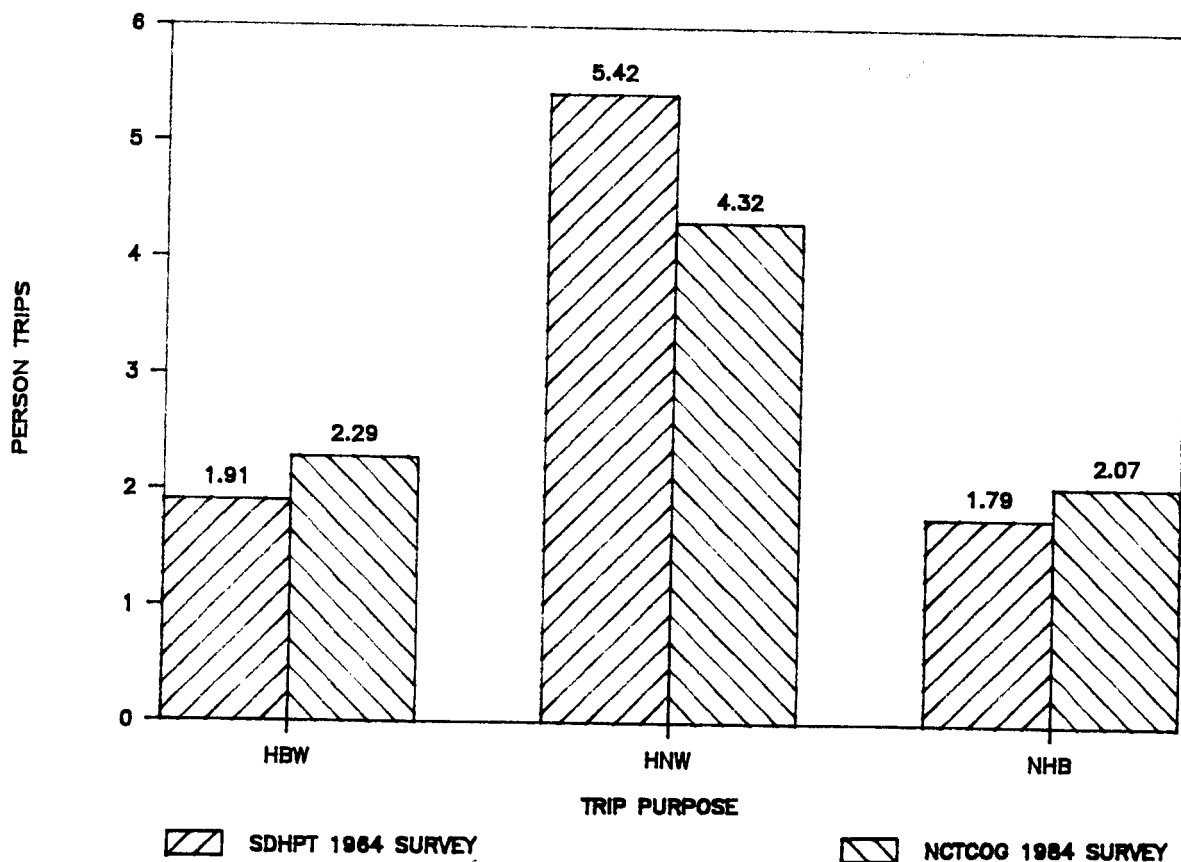
1984 trip rates.) Trip purpose was also influenced by a trip-linking method which was designed to generate a more accurate distribution of trips by purpose. The impact of trip linking on the final distribution of trips was that more trips were allocated to HBW and HNW purposes, at the expense of linking out some percentage of NHB trips. (See Appendix H for details on the purpose, methodology, and implications of trip linking.)

Changes in Demographic and Household Characteristics

Underlying the changes in travel characteristics of the region were the transformations in labor force participation rates, household size, and income. Increased participation of women in the labor force was one of the reasons for the higher rate of HBW trips. In 1960 less than 40 percent of the region's female population over 14 years of age were active in the labor force; by 1980 this percentage had increased to 58 percent.

A decline in average household size also contributed to changing trip patterns. Census-based estimates for the Dallas-Fort Worth Consolidated Metropolitan Statistical Area (CMSA) indicated that the average household size declined from 3.22 persons in 1964 to 2.55 in 1984. The 1984 Home Interview Survey data indicated that households of six or more members made an average of 15 trips per day, while single-member households made fewer than four trips per day. Trips per person, however, declined as household size increased, reflecting the economies of scale in trip making which accrued to larger households. This was illustrated by the decline in the per person trips from 3.25 trips for single member households to less than 2.5 trips for households of six or more members. The aggregate effect of the declining household size was a decrease in average trips per household and an increase in trips per

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person (Figure 3). (See Appendix B for a demographic profile of the Survey households.)

FIGURE 3
PERSON TRIPS PER PERSON
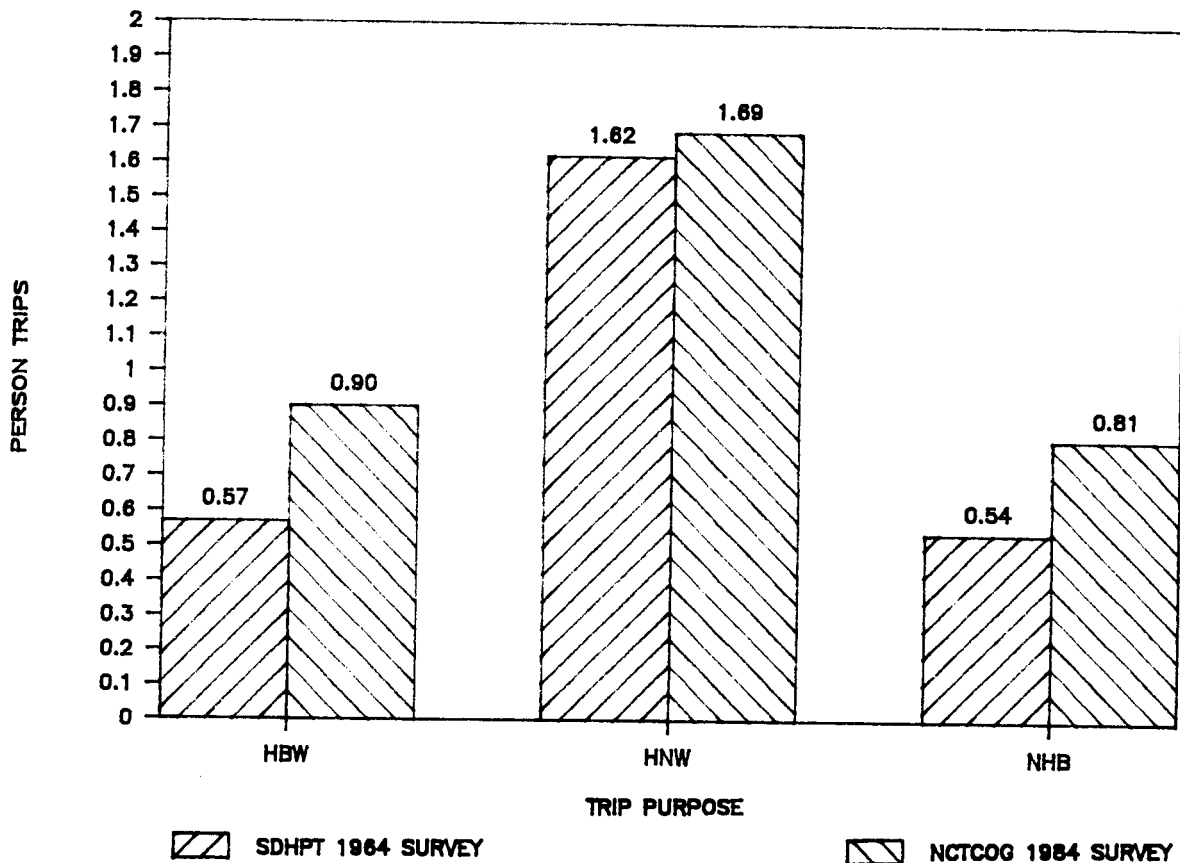
Trip rates were also influenced by rising real incomes in the region, which allowed increased auto availability and, consequently, lower auto occupancy rates. The 1984 Survey indicated the average number of automobiles available to households was 1.84, an increase of 38 percent over the 1964 figure of 1.33. The number of automobiles per person had a steeper increase of 76 percent from 0.41 automobiles per person in 1964 to 0.72 in 1984. The greater availability of automobiles reduced the number of zero-car households and allowed those car owners to make more trips. (See Appendix I for an analysis of zero-trip households and the adjustments which were made in the household

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base.) Figure 4 shows that since 1964, the average auto occupancy for all trip purposes declined from 1.52 persons per auto to 1.36. An increase in the number of vehicle trips was a direct outcome of this declining occupancy rate.

FIGURE 4

AUTO OCCUPANCY
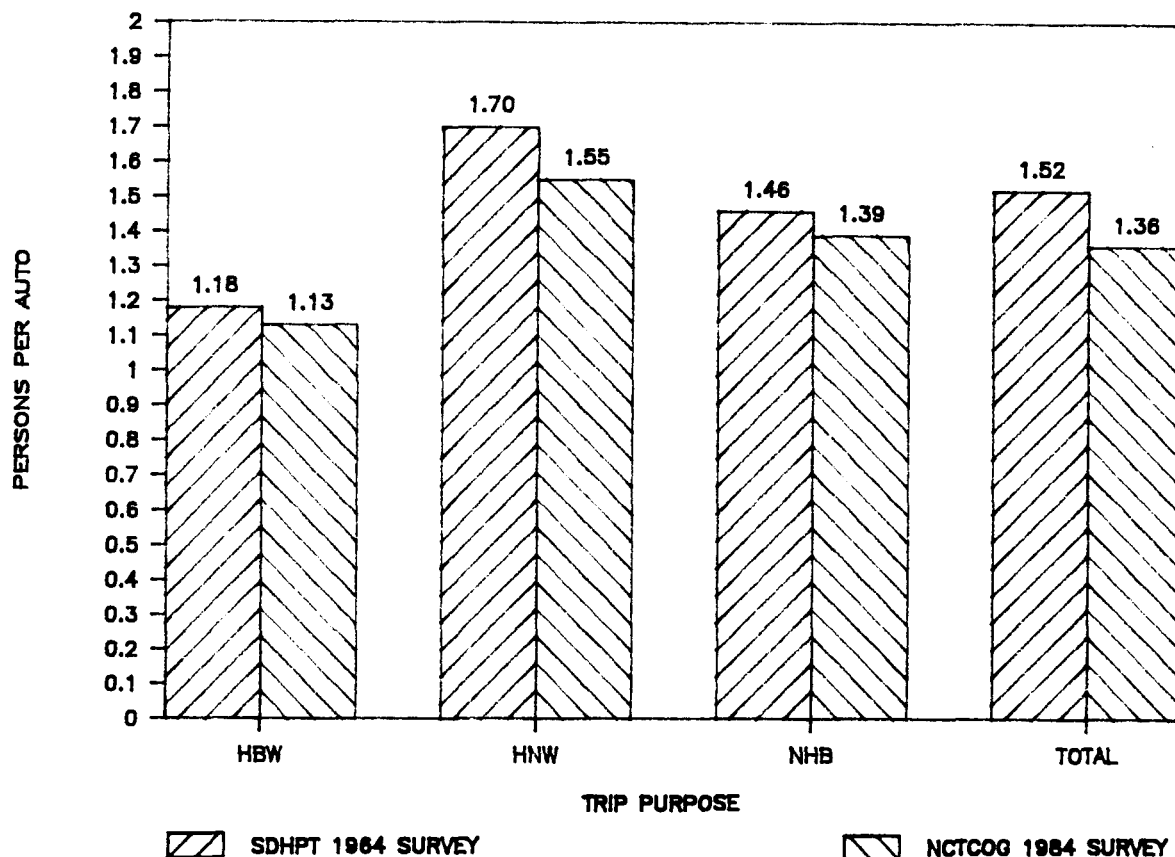
Changes in the Frequency of Trips Per Person

The smaller household size resulted in a higher rate of trips per person. The average number of person trips per person increased from 2.73 in 1964 to 3.40 in 1984. This increase occurred not only in HBW and NHB trips (which increased by over 50 percent each from 0.57 and 0.54 trips in 1964 for HBW and NHB, respectively, to 0.90 and 0.81 trips in 1984), but also in HNW trips (which increased from 1.62 to 1.69). Vehicle trips per person also increased for all

trip purposes.   Figure 5 shows that vehicle trips per person rose for all trip
purposes between 1964 and 1984.   HBW trips had the sharpest increase (from 0.48
to 0.80).   NHB trips increased from 0.37 to 0.60, and HNW trips rose from 0.95
to 1.10.

FIGURE 5

VEHICLE TRIPS PER PERSON
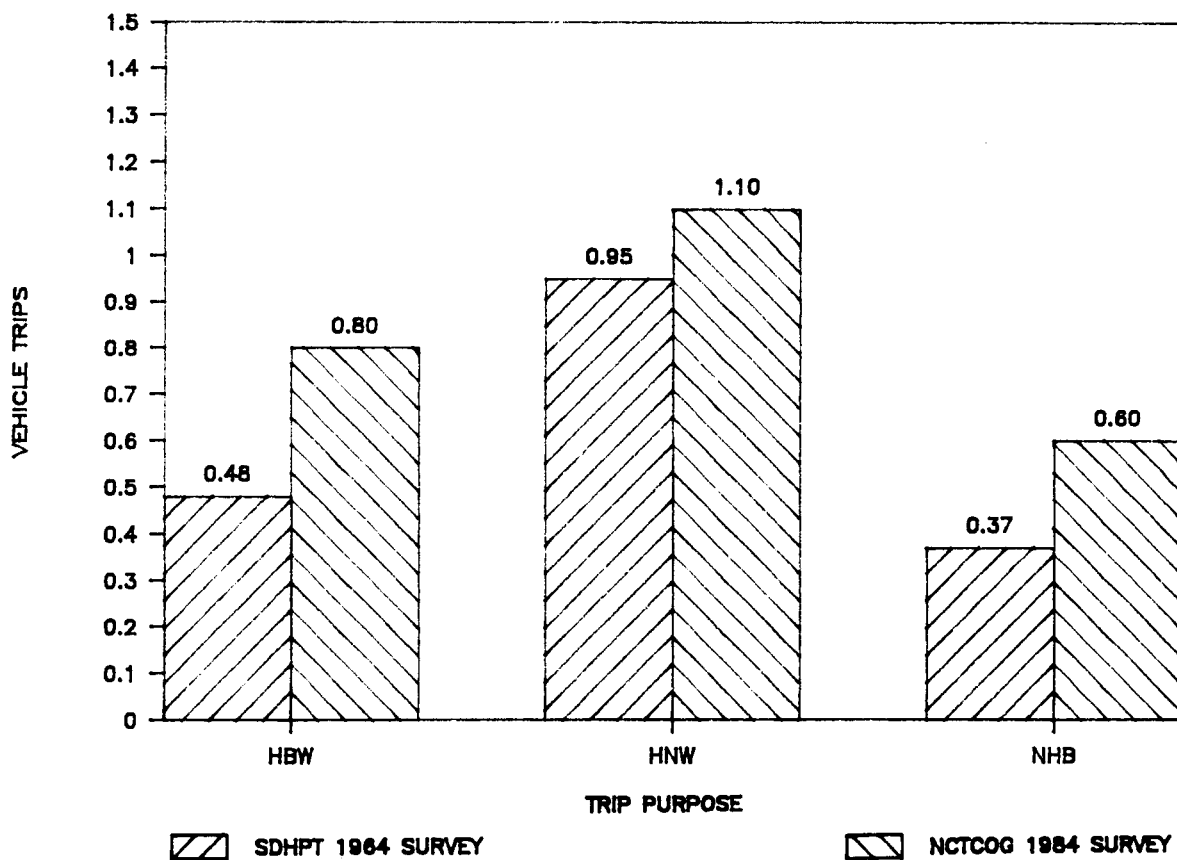
Peak-Hour Travel

An important product of the Survey was the identification of peak hours of travel. The morning peak hour was 7-8 a.m., and the afternoon peak occurred between 5-6 p.m. Figure 6 shows that the peak hour in the region varied widely by trip purpose. The peak hour for HBW trips coincided with that for total trips (7-8 a.m. and 5-6 p.m.), and the peaks for HNW trips occurred later (8-9 a.m. and 6-7 p.m.). NHB trips, on the other hand, peaked between 12 noon and 1 p.m. (See Appendix J for a more detailed discussion of distribution of trips by time of day.)

FIGURE 6

TRIPS BY TIME OF DAY
NCTCOG 1984 SURVEY
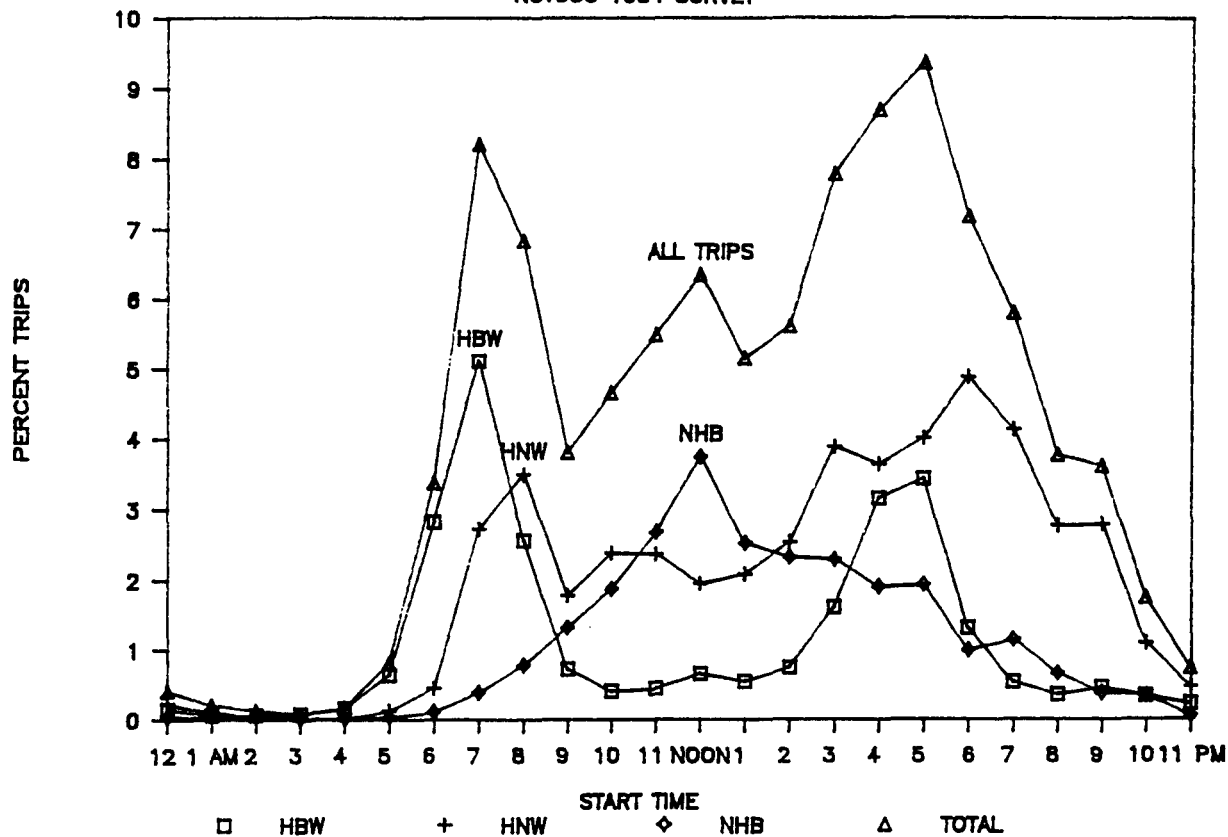
Travel Mode

In 1984, 78.3 percent of all person trips were made by auto drivers, 20.1 percent by auto passengers, and 1.6 percent by transit riders. In 1964 those proportions were 63.9 percent for auto drivers, 33.0 percent for auto passengers, and 3.1 percent for transit passengers (Figure 7). The increase in the proportion of auto driver trips and the declines in auto passenger and transit trips were consistent for all trip purposes.

FIGURE 7

TRAVEL MODE OF TRIPS

SDHPT 1964 SURVEY

AUTO PASSENGER (33.0%)

AUTO DRIVER (63.9%)

TRANSIT (3.1%)

NCTCOG 1984 SURVEY

AUTO PASSENGER (20.1%)

TRANSIT (1.6%)

AUTO DRIVER (78.3%)

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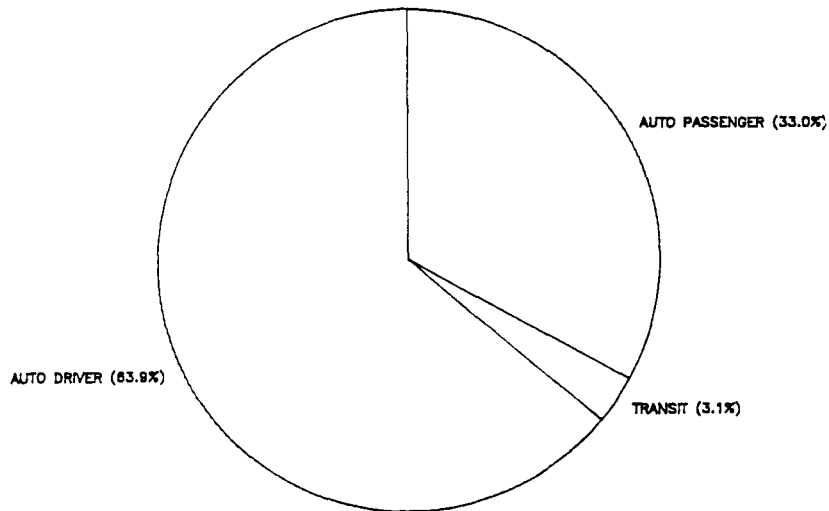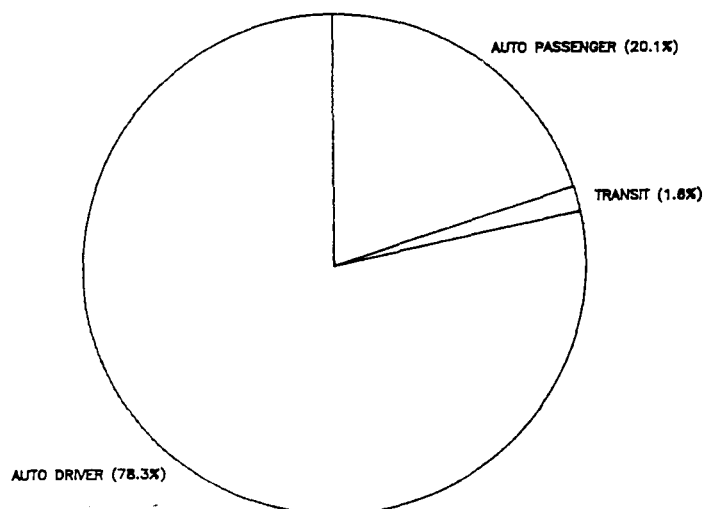
WORKPLACE SURVEY

Conducted for the first time in the Dallas-Fort Worth area, the Workplace Survey was designed to supplement the Home Interview Survey. The main objective of the Survey was to improve the estimation of trips attracted to various land uses for NCTCOG's travel demand forecasting process as well as to obtain additional information on travel patterns in the region. The improved attraction information is needed for use in the large number of traffic impact studies prepared by NCTCOG and local governments. The Survey provides the analyst with a source of local data on trip generation characteristics of various land uses much needed in assessing the impacts of a development on the surrounding roadway traffic.

A total of 474 establishments and 7 special generators were surveyed, and arrival data for each establishment was collected. Arrival count information was not available for 120 of the surveyed establishments, 19 of which were airline offices located at D/FW Airport. Because arrival count data was vital in processing the Workplace Survey, establishments lacking this information were not taken into account in the estimation of the attraction rates. Trip attraction rates for an establishment were determined using the ratio of employee and nonemployee trips to the total employment for each trip purpose.

Results of the Workplace Survey were based on an expanded sample, using linked trips. The reason behind trip linking is to more accurately account for the purpose of reported trips. Linking is the combination of two or more trips into a single trip. The linking process combined a driver's trip to his passenger's destination with his next trip to his own final destination. For example, if a person left home in the morning and dropped off his child at

school on his way to work, the Survey recorded a home-to-serve passenger trip and a serve passenger-to-work trip for that trip maker. From a trip generation standpoint, only one home-based trip to work occurred in that hypothetical situation. If both trips were kept, the analyst and the Model would have to generate and process home-based, serve passenger productions and attractions. The situation was even more complicated in the Home Interview Survey where trips involving travel mode change and those with the mere purpose of providing a ride for a passenger were also recorded. The partition of trips into two or more pieces in the Survey was only an accounting measure aimed at a more accurate enumeration of trips. (See Appendix L for a discussion on the trip-linking methodology.)

Expansion of the Survey

The expansion of the Workplace Survey was a two-step process. First, the number of reported trips was expanded to the arrival count at the surveyed establishments. This step accounted for absent employees, employees who were not surveyed due to the size of the establishment, and employees and nonemployees who received a questionnaire but failed to return it. The second phase involved expanding the sample to the total employment of the NCTCOG Transportation Study Area. Appendix M contains detailed information on the derivation and use of the expansion factors in analyzing the results of the Workplace Survey.

Trip Attraction Rates: Person Trips Per Employee

Person trip attraction rates expressed as trips per employee were the primary results of the Workplace Survey. A cross-classification of such rates by purpose, employment type, income quartile, and area type was developed to serve

as the attraction model of the trip generation component of NCTCOG's travel demand forecasting process (see Appendix N). The employment establishments were grouped into three industry types: basic, retail, and service, based on U.S. Department of Commerce Standard Industrial Classification (SIC) Codes (basic: 0-5,199; service: 5,200-5,999; retail: 6,000 and above). Figure 8 shows the number of person trips per employee when classified by industry type.

FIGURE 8

PERSON TRIPS PER EMPLOYEE BY INDUSTRY
1984 WORKPLACE SURVEY
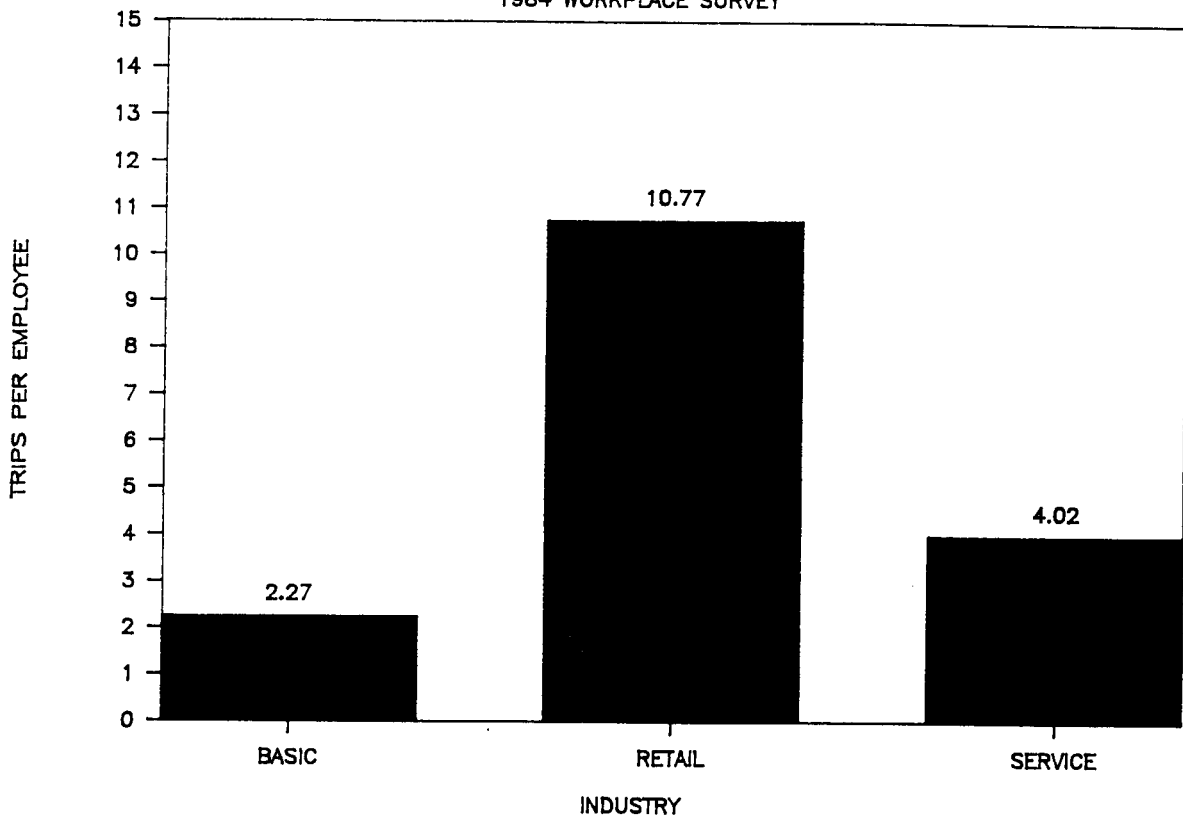
Since 1964, HBW person trips per employee increased for basic industries and decreased for the retail and service employment categories. The increase in the basic employment trip attraction rates was especially noticeable in the central business districts (CBDs). Attraction rates for service establishments remained more or less constant in the CBD. The faster rate of growth in

attraction rates for basic industries compared to service industries was attributed to the following factors:

- Relocation of manufacturing plants from the CBDs to suburban areas

- An increase in the relocation of basic industry office headquarters in the Dallas and Fort Worth CBDs. Even though those offices truly functioned as service employment, use of the SIC codes as the employment grouping technique was responsible for their inclusion in the basic industry employment category.

- Increased automation in labor-intensive service employment, such as banks and insurance offices, produced a decrease in employment or the relocation of employees to smaller suburban offices.

A decrease in the HNW attractions and an increase in the NHB attractions per employee were also observed over the past 20 years. These were mainly due to the increased trip-linking behavior of households.

Several shortcomings of the Survey, with regard to the derivation of trip attraction rates, were identified:

- Definition Discrepancy. There was no distinction made between work trips and work-related trips in the Home Interview Survey. The two purposes were clearly defined in the Workplace Survey. For consistency purposes, work-related trips made by nonemployees to the surveyed establishments of a stratum were added to the total work trips made by the employees of those establishments. The resulting total was then divided by the total employment of that stratum to derive the corresponding HBW attraction rates. Furthermore, nonemployee expansion factors were used to expand the work-related trips made to an establishment, whereas the work trips were factored by employee expansion factors. The work-related trips truly belonged to the HNW trip category, and their inclusion in the HBW trip purpose overestimated trip productions and attractions of some cells.

- Underestimated Trips. Because the Survey was conducted at the place of employment, the employee's trip home following an NHB trip was not accounted for in the Survey. An analysis of the Home Interview Survey revealed that 25.3 percent of the surveyed trips were nonwork trips which ended at home. Of those trips, 31 percent had basic industries as their origin; retail and service industries served as the origin of 37 percent and 60 percent of such trips, respectively. The average number of person trips per employee for the HBW trip purpose was 1.31, whereas the NHB purpose had an average of 1.50 in 1984. The result obtained from the Survey for the HNW trip purpose was an underestimated 1.72 trips per employee due to the observed bias of the Survey (Figure 9).

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FIGURE 9

PERSON TRIPS PER EMPLOYEE
BY TRIP PURPOSE
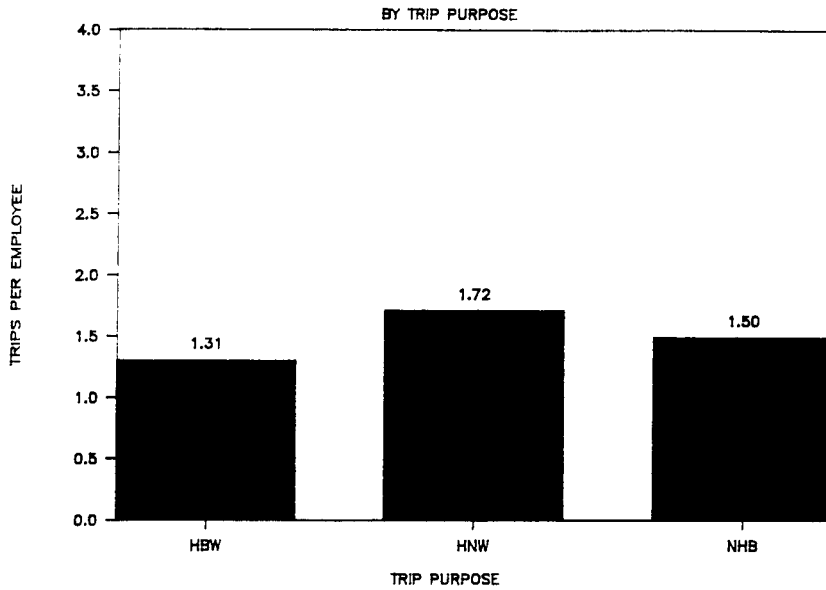
Trip Length

The expansion of the Dallas-Fort Worth metropolitan area was reflected by an increase in the trip length. Trip length increased by 22 percent for HBW trips, 18 percent for HNW trips, and 17 percent for NHB trips since 1964. The average trip length in 1984 was 7.1 miles for all purposes, an increase of 25 percent since 1964 (Figure 10).

FIGURE 10

PERSON TRIP LENGTH
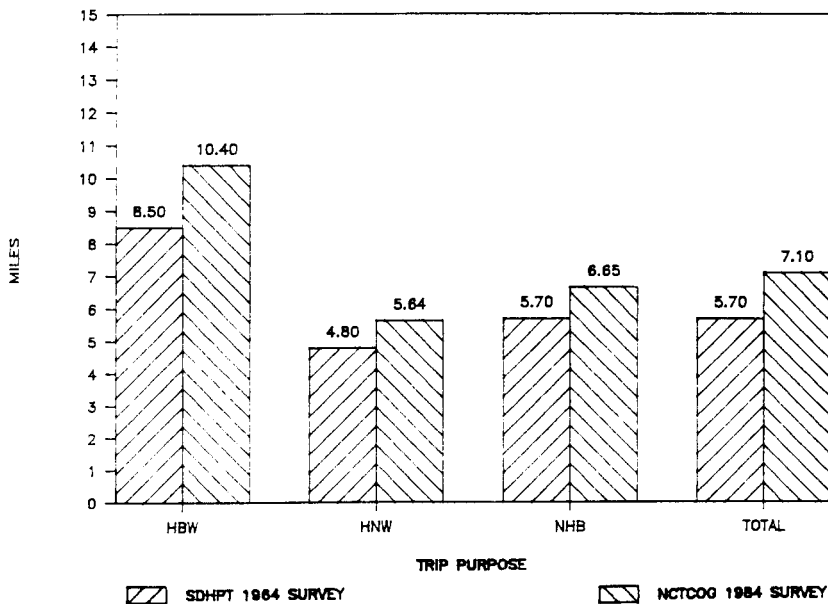
The HBW trip-length data was also obtained by four income quartiles with one being the lowest and four the highest. (See Appendix O for a discussion on income quartiles used in the analysis of the Survey.) The breakdown of trip length by purpose and income is presented in Table 1.

TABLE 1

PERSON TRIP LENGTH

	Average Trip Length	
Trip Purpose	1964	1984
HBW1	N/A	8.18
HBW2	N/A	9.87
HBW3	N/A	10.77
HBW4	N/A	11.56
Average HBW	8.50	10.40
HNW	4.80	5.64
NHB	5.70	6.65
Average	5.70	7.10

Special Generators

Among the Workplace Survey's sampled establishments were seven "Special Generators" which received particular attention. These included a hospital, a high school, an amusement park, a truck terminal, a shopping mall, a university, and an airport. Traditional travel demand forecasting models often erroneously estimate the trips generated by such activities mainly due to the discrepancy in trip rates and the relatively high employment at such facilities. Table 2 summarizes the average number of trips per employee for the surveyed special generator activities and their breakdown by trip purpose.

TABLE 2

SPECIAL GENERATOR TRIP RATES

Special Generator	Person Trips per Employee			Total Person Trips Per Employee*	Percent HBW	Percent HNW	Percent NHB
	HBW	HNW	NHB				
Hospital	1.23	2.30	1.17	4.70	26.0	49.0	25.0
High School	1.10	11.95	1.63	14.68	7.0	81.0	12.0
Amusement Park	1.24	5.52	1.39	8.15	15.0	66.0	19.0
Truck Terminal	1.39	0.00	0.54	1.93	72.0	0.0	28.0
Mall	1.36	12.76	6.19	20.31	7.0	63.0	30.0
University	1.28	0.22	0.82	2.33	55.0	9.0	36.0
Airport				3.90**			

  * Results are based on one sample in each category.
 ** Seven percent pass-through traffic and employment of 20,000 was used
     towards the derivation of this figure. Refer to Appendix N for a
     detailed analysis of the D/FW Airport survey results.

In the case of the airport, a total of 1,596 nonemployees entering the D/FW Airport via the toll gates were surveyed. Appendix P contains the detailed results of this Survey. When appropriate, results of the Survey were tabulated based on a sample of 1,477 trips. (The latter does not include 119 nonstop trips through the Airport.)

Trip Rates By Land Use

At the time of the Survey analysis, the Institute of Transportation Engineers' (ITE) land-use codes were assigned to the surveyed establishments. When the specific land-use category was unclear, the ITE general category codes were used (e.g., restaurants as opposed to drive-through restaurants or quality restaurants).

The land-use codes of the surveyed establishments were used to obtain trip rates by land-use categories. The information obtained was compared with ITE trip generation rates when such data was available. This comparison is presented in Table 3.

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TABLE 3

AVERAGE DAILY VEHICLE TRIP RATES BY LAND-USE CATEGORY:
LOCAL AND NATIONAL DATA

ITE Land-Use Code	Description	Vehicle Trips Per 1,000 Sq. Ft.		Vehicle Trips Per Employee		Sample Size	
		NCTCOG WPS	ITE	NCTCOG WPS	ITE	NCTCOG WPS	ITE
100	Industrial	4.43	5.43	2.70	3.00	6	98
110	General Light Industrial	10.94	12.84* (5.46)	2.72	3.20	10	13
140	Manufacturing	8.22	7.50* (3.86)	2.22	2.01	27	60
150	Warehousing	3.88	4.88	2.82	3.89	2	15
170	Utilities	15.48	NA	3.90	NA	5	NA
310	Hotel	3.10	NA	6.20	11.30	3	4
320	Motel	5.41	NA	12.40	12.80	1	10
400	Recreational	8.14	NA	19.80	22.80	1	11
560	Church	7.76	NA	6.00	NA	6	NA
610	Hospital	13.25	16.70	6.20	4.90	3	15
620	Nursing Home	6.20	NA	3.40	4.00	3	18
630	Medical Clinic	11.64	9.30* (23.80)	7.40	5.90	3	1
711	Office (Less than 100,000 sq. ft.)	10.23	12.30* (17.70)	3.10	3.70	44	20
712	Office (100,000-200,000 sq. ft.)	6.64	11.00* (14.30)	2.30	3.80	2	10
713	Office (Greater than 200,000 sq. ft.)	9.35	NA	2.80	2.90	1	2
730	Government Office Building	85.10	91.50* (68.93)	11.00	12.00	7	1
760	Research Center	7.20	5.30	2.60	2.40	3	8
810	Retail - General	27.12	NA	18.40	NA	15	NA
811	Merchandise - Specialty Store	21.45	NA	12.60	NA	51	NA
830	Restaurant	94.83	NA	19.50	NA	8	NA
850	Supermarket	91.30	125.50	NA	NA	7	3
870	Apparel	17.84	NA	8.80	NA	10	NA
930	Insurance	8.98	11.50	2.23	2.45	9	1

* Indicates an adjusted ITE trip rate to reflect the employment density of specific land use-codes for the Dallas-Fort Worth area. The adjustments were based on the employment density of the establishments sampled in the Survey. Original values are shown in parenthesis.

ITE: Institute of Transportation Engineers

NCTCOG WPS: North Central Texas Council of Governments, Work Place Survey, 1984

ON-BOARD TRANSIT SURVEY

The On-Board Transit Survey was conducted to determine various ridership characteristics including trip purpose, mode of access, and percentage of trips made by transit. Approximately 10,000 riders were surveyed on the four fixed-route transit systems operating in the region in 1984:

- Dallas Area Rapid Transit (DART) local bus service, operated by the Dallas Transit System

- DART commuter service, operated by Trailways

- City Transit Services of Fort Worth (CITRAN, now The T)

- Texas Bus Lines, a private carrier operating commuter bus service from Arlington and Grand Prairie to downtown Dallas

The data presented below is based on linked transit trips and represents the region as a whole. A linked trip includes the entire transit trip regardless of whether a person made a transfer to complete it. An unlinked trip, on the other hand, is a trip made on a particular bus, from the boarding point to the alighting point. Data on unlinked trips and a breakdown of data by transit system are provided in Appendix R. An explanation of the transit trip-linking process is contained in Appendix S.

Transit Mode Share

Between 1964 and 1984 the share of person trips using transit decreased from 3.1 percent to 1.6 percent. Figure 11 shows that this decline occurred in two of the three trip purposes; the share of HBW trips by transit decreased by more than 40 percent, and transit's share of HNW trips declined by 77 percent. The share of NHB trips by transit remained constant (1.0 percent) over the 20-year time period.

FIGURE 11

TRIPS BY TRANSIT
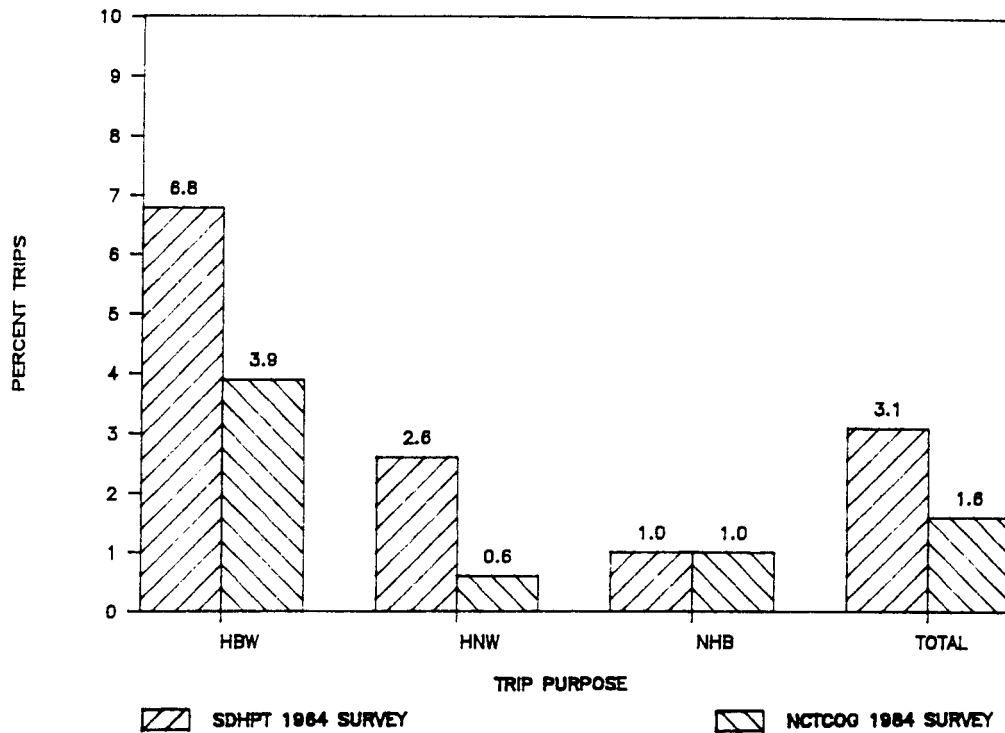
The decline in transit mode share was due to an increase in total trips rather than a decline in transit trips. Total bus ridership remained essentially the same over the 20-year time span with 154,900 trips in 1964 and 154,600 trips in 1984.

Transit Trip Purpose

While the number of transit trips remained relatively the same between 1964 and 1984, the purpose of those trips changed. Figure 12 shows that in 1964 HBW and HNW purposes had almost an equal proportion of transit trips (45.2 percent for HBW and 48.3 percent for HNW) while NHB trips accounted for only 6.5 percent. By 1984 those percentages had shifted significantly. HBW trips accounted for 66.1 percent of all transit trips, and NHB trips increased to 15.3 percent. HNW trips, which formerly accounted for the highest share of transit trips, dropped by more than half to 18.6 percent.

FIGURE 12

PURPOSE OF TRANSIT TRIPS

SDHPT 1964 SURVEY

NHB (6.5%)

HBW (45.2%)

HNW (48.3%)

NCTCOG 1984 SURVEY

NHB (15.3%)

HNW (18.6%)

HBW (66.1%)
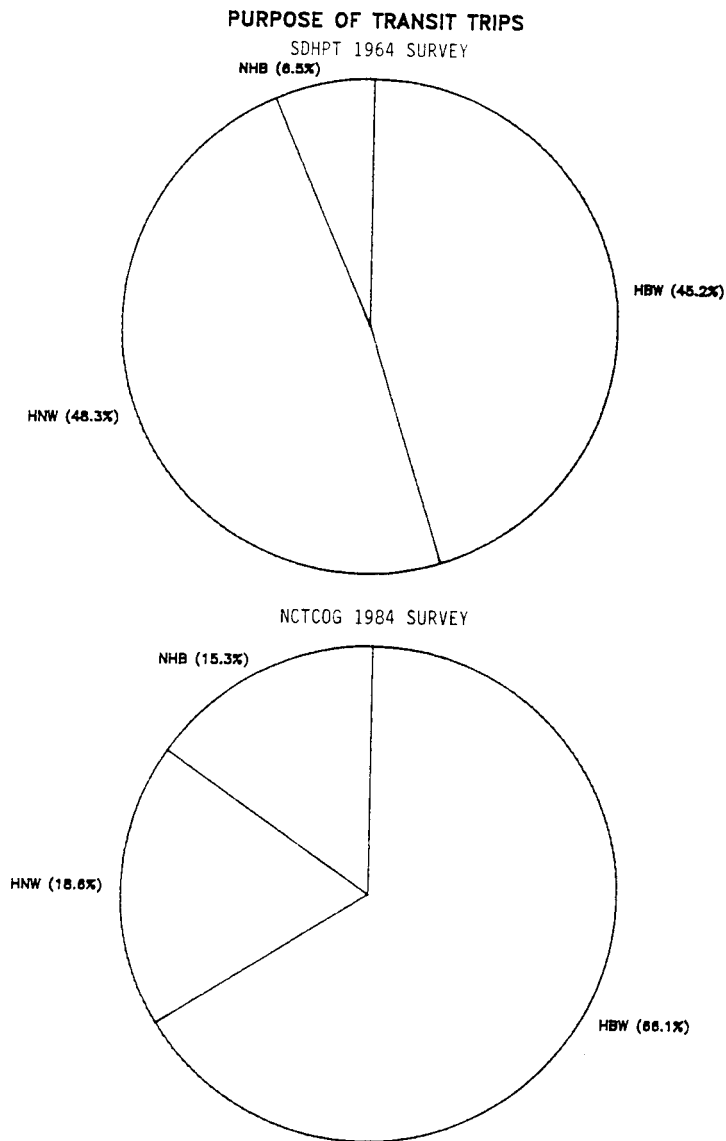
The shift in trip purpose from HNW to HBW and NHB was also observed in person trip data from the Home Interview Survey and may be attributable to the same causes--increased participation of women in the work force and the linking of work trips with nonwork trips. Some of this shift in transit trip purpose also may have been due to a reduction in the number of "captive" transit riders (those who have no alternative means of transportation). As income and auto availability in the region increased, it is likely that the number of transit captives was reduced, and more people were opting to use transit for work trips only.

Figure 13 shows the 1984 distribution of transit trips among morning access modes. Walking was the primary mode of access, accounting for 81.6 percent of transit boardings. Approximately 18.1 percent of all transit riders used an automobile to get to transit.

FIGURE 13

AM MODE OF ACCESS FOR TRANSIT TRIPS
NCTCOG 1984 SURVEY
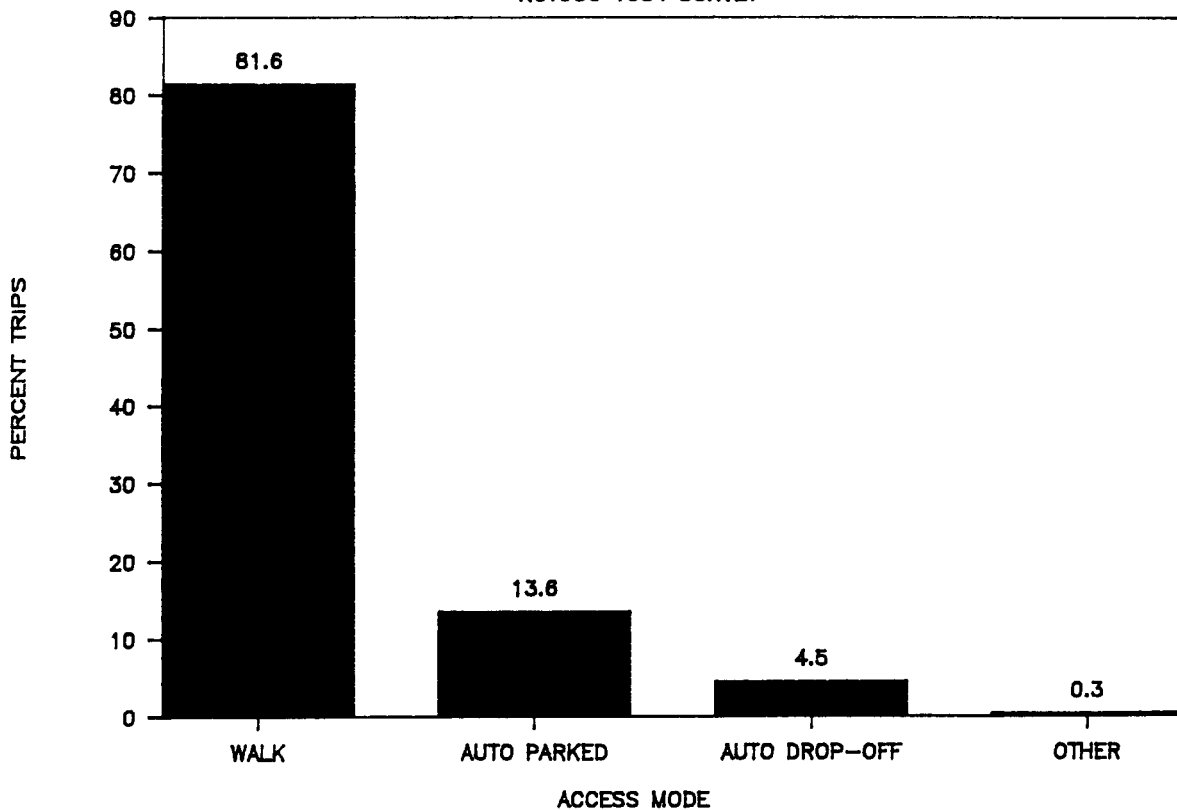
The Survey also indicated that over 14 percent of all transit riders made at least one transfer to reach their final destination. Transfers occurred most frequently on HNW trips with 17 percent of the riders changing buses during their trip. Approximately 14 percent of HBW and NHB trips required a transfer.

Transit Trip Length

The average transit trip length in the region in 1984 was 6.87 miles. Figure 14 shows the variation in trip length among the three trip purposes with HBW trips having the greatest length and HNW trips having a slightly longer length than NHB trips. These lengths are for linked transit trips. Data on unlinked transit trip length, as well as data by individual transit system, is provided in Appendix R.

FIGURE 14
TRANSIT TRIP LENGTH
NCTCOG 1984 SURVEY
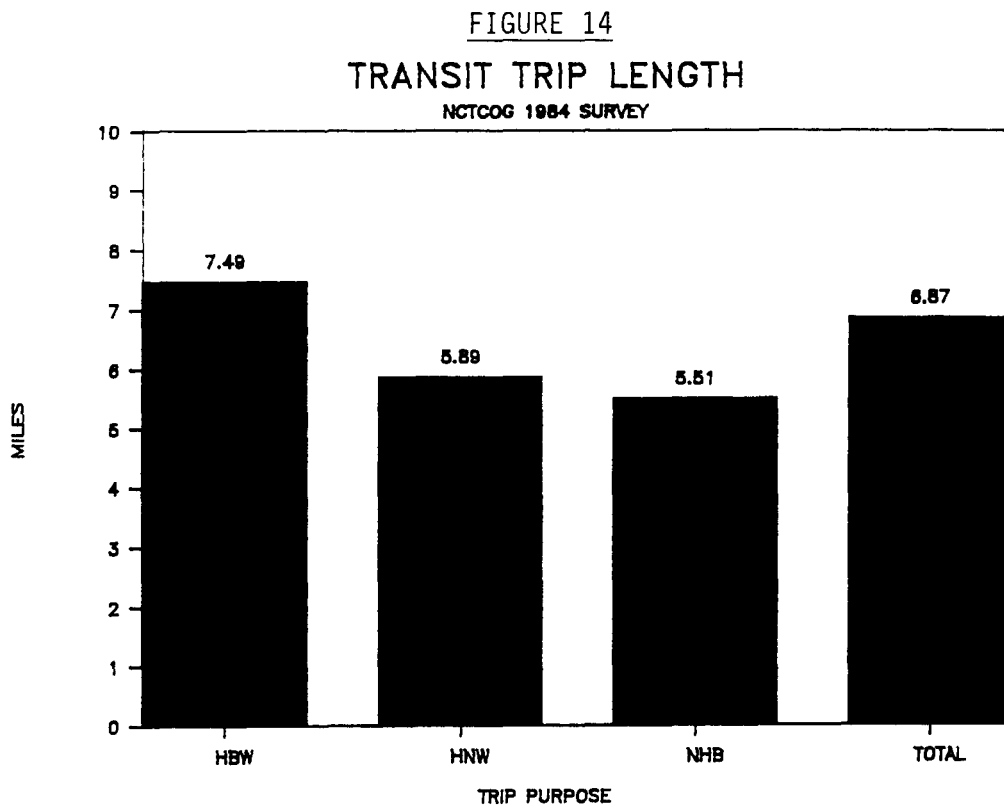
Origin/Destination Patterns

The predominant destinations of 1984 transit trips were the Dallas and Fort Worth CBDs. Approximately 52 percent of the trips on the CITRAN system were destined for the Fort Worth CBD. In Dallas the CBD orientation was even stronger. Roughly 62 percent of the trips on DTS were destined for the Dallas CBD along with 85 percent of DART commuter bus trips and all trips on Texas Bus Lines.

Much of this CBD orientation may be due to the radial nature of the 1984 transit networks, which made the CBDs the most easily accessible destinations for transit trips. Figures 15 through 18 show the origin and magnitude of those transit trips destined for the Dallas and Fort Worth CBDs.

Fare Payment

In 1984, 47.6 percent of transit fares were paid in cash while an additional 47.5 percent of the transit riders used monthly passes or punch cards. The remainder paid by special fare (token, handicapped, or senior citizen).

The type of fare payment varied widely with income. Of the transit riders in the lowest income group (under $5,000), 61.7 percent paid cash while 30.8 percent used a pass or punch card. The percentages were reversed for those in the highest income group (over $50,000) with 29.9 percent paying cash and 65.7 percent using a monthly pass or punch card.

Interestingly, 42 percent of all riders who made five or more round trips per week paid in cash. This seems to indicate a need for better marketing of the monthly passes. Appendix R provides a detailed breakdown of fare type for each transit system.

Transit Rider Characteristics

The 1984 socioeconomic characteristics of transit riders in the region are shown in Table 4. A profile of the average rider is as follows:

Age	30
Sex	Female
Annual Income	$15,000-$19,999
Ethnic Group	Black
Autos Available to Household	1.2
Household Size	3.1
Round Trips Per Week	5-7

FIGURE 15

TRANSIT TRIP ATTRACTIONS TO FORT WORTH CBD - CITRAN

Daily Transit Trips

- Less than 500
- 501 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- over   10,000
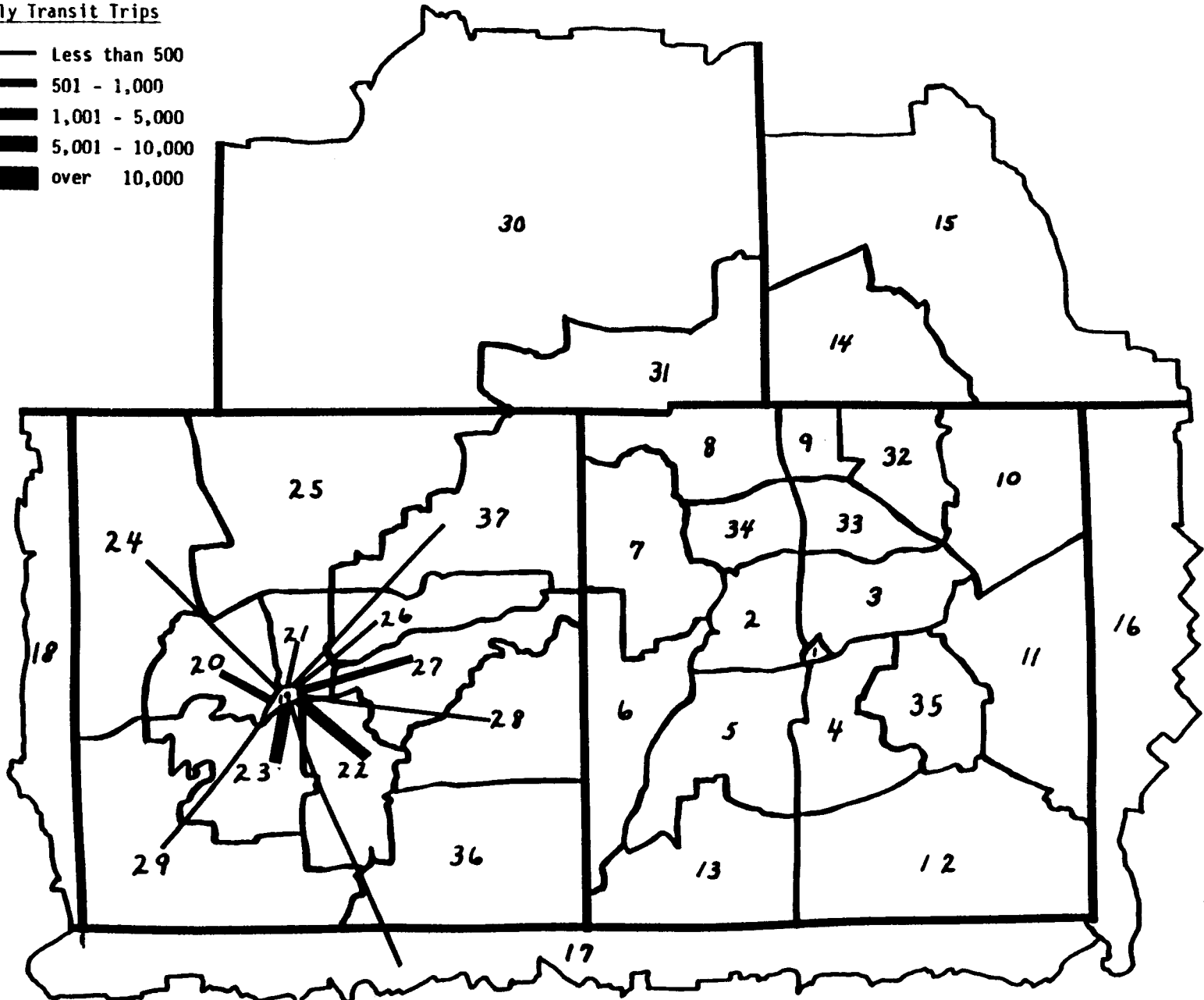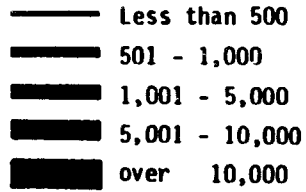
FIGURE 16

TRANSIT TRIP ATTRACTIONS TO DALLAS CBD - DTS

Daily Transit Trips

- Less than 500
- 501 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- over 10,000
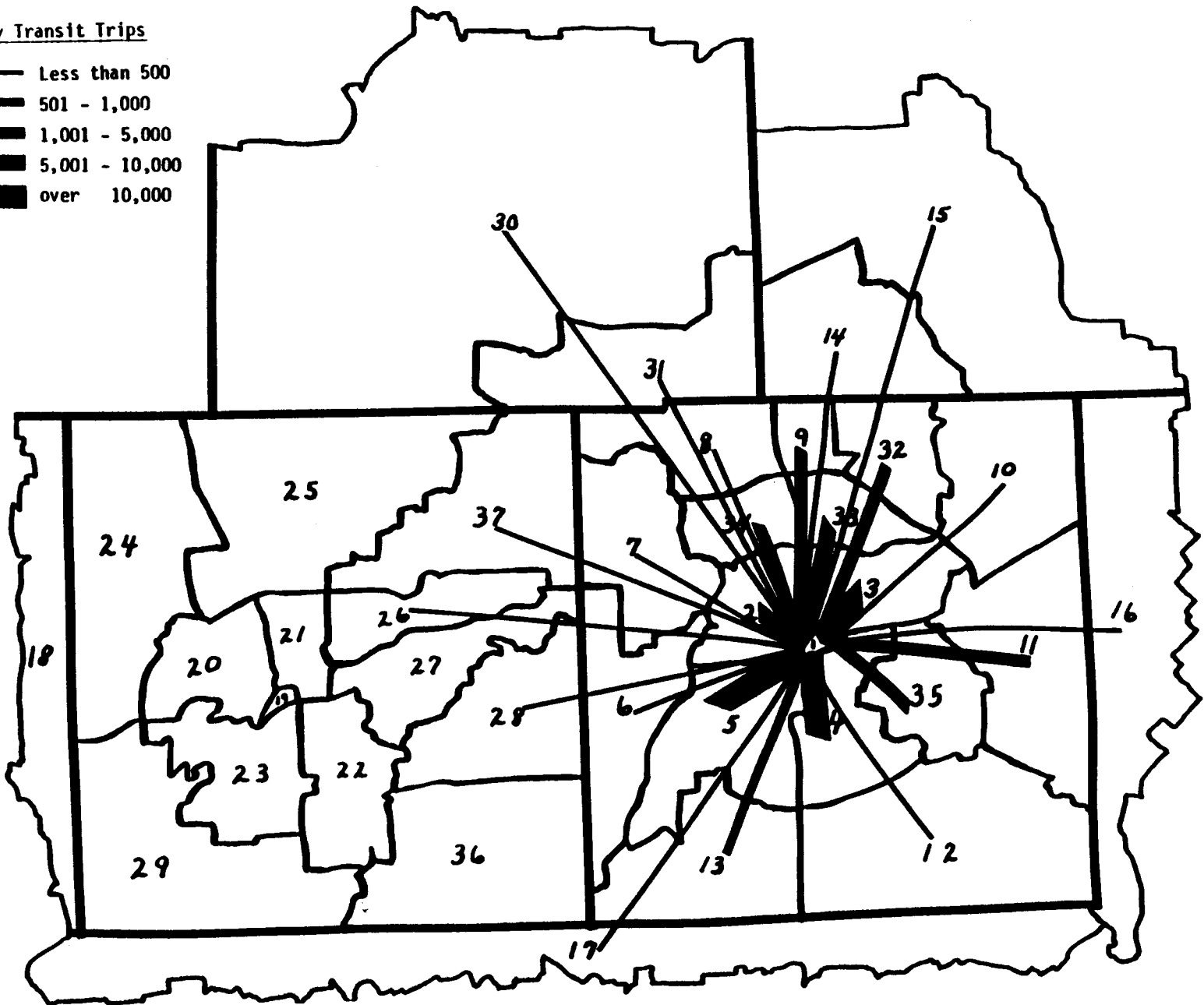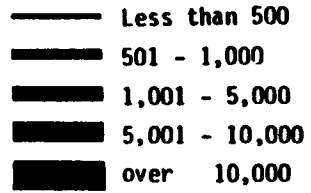
FIGURE 17

TRANSIT TRIP ATTRACTIONS TO DALLAS CBD - TRAILWAYS

Daily Transit Trips

— Less than 500
— 501 - 1,000
— 1,001 - 5,000
— 5,001 - 10,000
— over 10,000
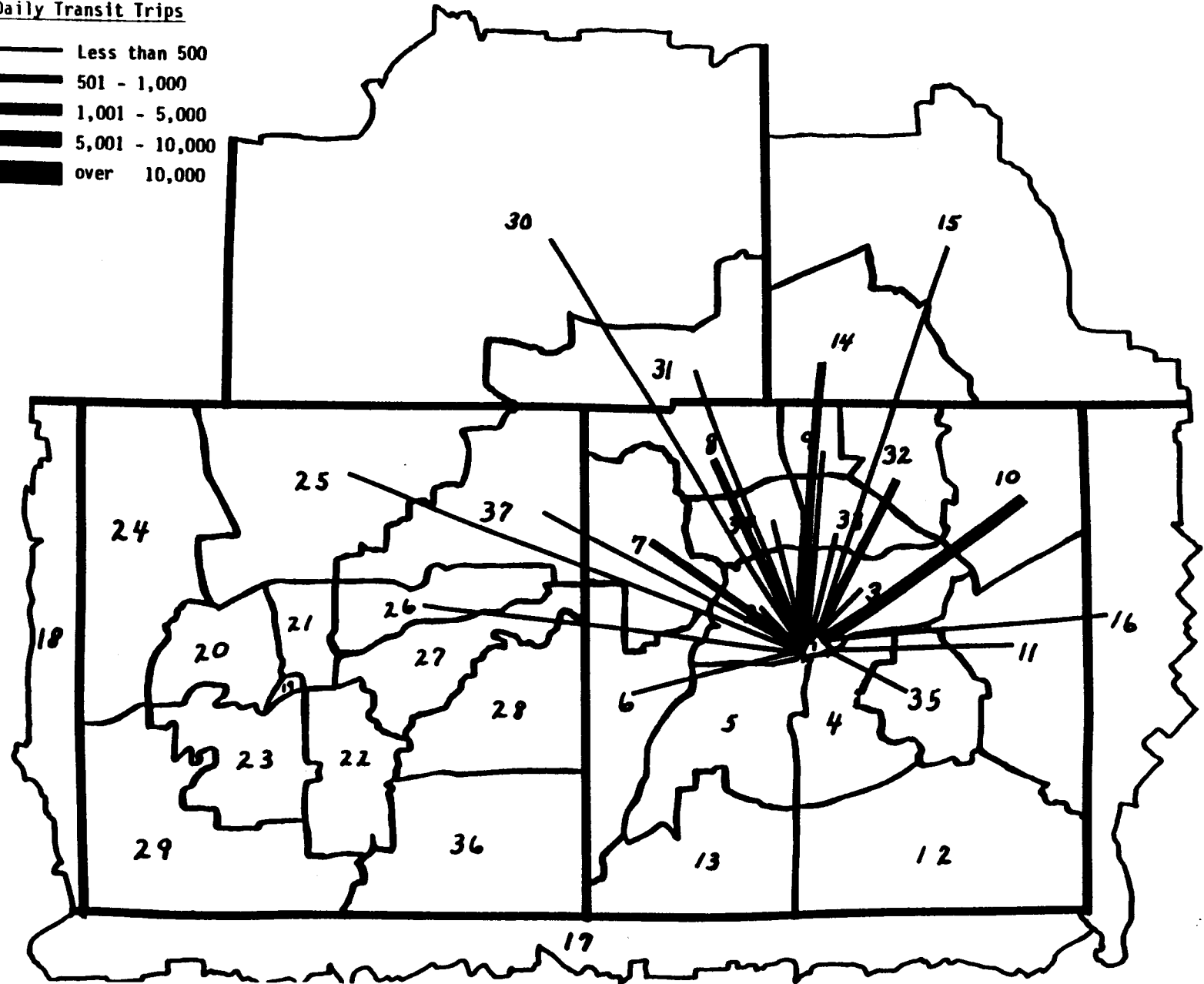
FIGURE 18

TRANSIT TRIP ATTRACTIONS TO DALLAS CBD - TEXAS BUS LINES
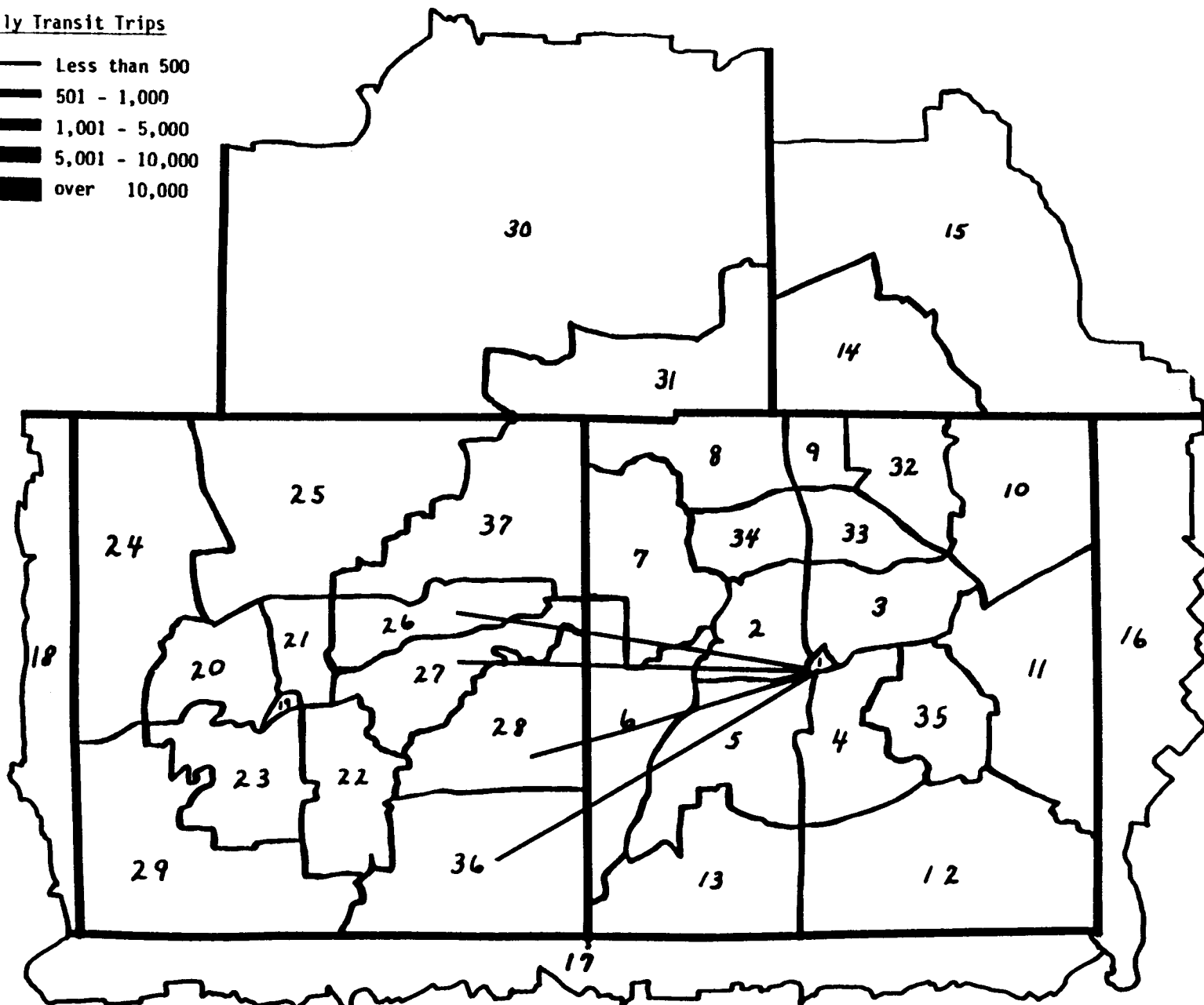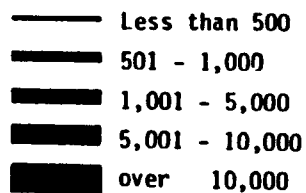
TABLE 4

NCTCOG 1984 ON-BOARD TRANSIT SURVEY
SOCIOECONOMIC CHARACTERISTICS OF RIDERS

Age		Sex		Ethnic Group		Annual Income		Household Size		Autos Available In Household		Round Trips Per Week	
1-18	8.9%	Male	36.4%	White	43.3%	Under $5,000	14.8%	1	17.2%	0	30.2%	0	3.4%
19-24	22.4%	Female	63.6%	Black	46.3%	$ 5,000- 9,999	12.5%	2	27.9%	1	35.6%	1	5.3%
25-34	32.3%			Hispanic	7.9%	$10,000-14,999	10.3%	3	18.8%	2	24.9%	2-4	17.4%
35-44	17.2%			Asian	1.3%	$15,000-19,999	19.4%	4	16.8%	3	6.8%	5-7	41.2%
45-54	8.6%			Native	0.2%	$20,000-24,999	12.0%	5	10.5%	4+	2.5%	8+	32.7%
55-64	6.7%			Other	0.6%	$25,000-29,999	4.7%	6	4.7%				
65+	3.9%					$30,000-34,999	6.4%	7	1.8%				
						$35,000-39,999	7.9%	8+	2.3%				
						$40,000-50,000	5.7%						
						Over $50,000	6.3%						

Approximately 72 percent of all riders were between the ages of 19 and 44, and 74 percent made five or more round trips per week. Roughly 70 percent of the transit users had annual household incomes under $25,000; 27 percent had incomes under $10,000. Over 30 percent of the riders had no cars available to their household, and an additional 36 percent had only one. This indicates a transit ridership that is largely captive.

Appendix R contains detailed socioeconomic data from the Survey including cross-tabulations and breakdowns by transit system.

CONCLUSION

The results of the Regional Travel Survey have implications on both the amount and pattern of travel in the Dallas-Fort Worth area. The Survey indicated that over the past 20 years, the number of person trips per person has substantially increased. At the same time, auto occupancy in the region has declined causing an even greater increase in the number of vehicle trips per person. The average trip length has also increased for all trip purposes. All of these factors have contributed to the increase in vehicle miles of travel in the region.

While travel has been increasing, total transit ridership has remained the same. This has led to a significant decrease in transit's mode share. In addition, the trip purpose of transit riders has shifted from a basically equal distribution between HBW and HNW trips in 1964 to a majority of HBW trips in 1984.

The Survey also revealed changes in travel patterns. In 1984 HBW trips made up a larger share of all trips in comparison with 1964. This was true for NHB trips as well. The amount of trip linking also increased over this period. Both of these phenomena seem to be related to the increased participation of women in the work force. Households now have less time to make nonwork trips and are linking those trips to trips to and from the workplace. People are also making more trips over the lunch hour which was evidenced by a visible 1984 noon-hour travel peak.

The data from the Regional Travel Survey has been used extensively in the validation of the NCTCOG travel forecasting process. Trip rates from both the Home Interview and Workplace Surveys were used to update the Trip Generation Model, and trip length and origin-destination data were used in Trip Distribution. Transit mode share and access/egress information has been incorporated into the Mode Split Model along with data on auto occupancy. Information on trips by time-of-day was also be used to develop peak-hour traffic assignments. All of the above have assisted in producing more accurate travel forecasts for the Dallas-Fort Worth area.

APPENDIX A

REGIONAL TRAVEL SURVEY QUESTIONNAIRES

NCTCOG HOME INTERVIEW
SURVEY FORM

NORTH CENTRAL TEXAS
COUNCIL OF GOVERNMENTS
HOME INTERVIEW SURVEY

Travel Day _____ and Date _____

Sample Number

HIS-1

Section I: Household Data

A. Sample Address _____

House Number, Street Name, Apt. No. _____ City/Town _____ County _____ Zip Code _____

B. Structure Type _____

C. Number of People Living at this Address _____

D. Number of People Age 5 and Over Living at this Address _____

E. Number of Out-of-Area Visitors Staying at this Address _____

F. Number of Passenger Cars, Vans, and Pickups Available for Use _____

G. Household Income: (Do Not Ask Until Interview is Complete)

Section II: Data on Persons Age 5 and Over

A Person Number	B ✓ If Interviewed	C Relation To Head	D Age	E Sex	F Licensed to Drive?	G Occupation	H Industry	I Worked on Travel Day?	J Made Trips While at Work?	K Made Other Trips on Travel Day?
01		Head		1 M 2 F	1 YES 2 NO			1 YES 2 NO 3 Worked at Home	1 YES 2 NO	1 YES 2 NO
02				1 M 2 F	1 YES 2 NO			1 YES 2 NO 3 Worked at Home	1 YES 2 NO	1 YES 2 NO
03				1 M 2 F	1 YES 2 NO			1 YES 2 NO 3 Worked at Home	1 YES 2 NO	1 YES 2 NO
04				1 M 2 F	1 YES 2 NO			1 YES 2 NO 3 Worked at Home	1 YES 2 NO	1 YES 2 NO
05				1 M 2 F	1 YES 2 NO			1 YES 2 NO 3 Worked at Home	1 YES 2 NO	1 YES 2 NO
06				1 M 2 F	1 YES 2 NO			1 YES 2 NO 3 Worked at Home	1 YES 2 NO	1 YES 2 NO
07				1 M 2 F	1 YES 2 NO			1 YES 2 NO 3 Worked at Home	1 YES 2 NO	1 YES 2 NO
08				1 M 2 F	1 YES 2 NO			1 YES 2 NO 3 Worked at Home	1 YES 2 NO	1 YES 2 NO
09				1 M 2 F	1 YES 2 NO			1 YES 2 NO 3 Worked at Home	1 YES 2 NO	1 YES 2 NO
10				1 M 2 F	1 YES 2 NO			1 YES 2 NO 3 Worked at Home	1 YES 2 NO	1 YES 2 NO

Age Codes

1 5-10
2 11-15
3 16-20
4 21-25
5 26-35
6 36-45
7 46-55
8 56-65
9 66-OVER
0 UNKNOWN

Relation Codes

1 HEAD
2 SPOUSE
3 SON
4 DAUGHTER
5 GRANDPARENT
6 GRANDCHILD
7 OTHER RELATIVE
8 UNRELATED
9 OUT-OF-AREA VISITORS
0 UNKNOWN

Section III: Trip Summary

A. Total Vehicular Trips Reported _____

B. Persons Age 5 and Over Making Trips _____

C. Persons Age 5 and Over Not Making Trips _____

D. Complete or Incomplete Interview Code _____

Section IV: Administrative

A. Household Telephone Number _____

B. Interviewer _____

C. Telephone Contacts (If Any) :

Date	Time	Talked To/Comments	Purpose/Outcome

D. Personal Contacts in Household:

Date	Time	Talked To/Comments

E. Completed Interview Submitted:

Date: _____ By: _____

I Certify That All Information On This Form Is Correct And True.

_____ Signature of Interviewer

F. If Interview Submitted Incomplete

Interviewer's Reason: _____

_____ Initials

Supervisor's Comments _____

Date _____

G. First Edit: Fail Pass

Date _____ Initials _____

H. Final Edit: Fail Pass

Date _____ Initials _____

I. Coding Complete

Date _____ Initials _____

A.1

NCTCOG HOME INTERVIEW SURVEY
TRIP DIARY
(Completed by Interviewer)

TRAVEL DIARY

NORTH CENTRAL TEXAS
COUNCIL OF GOVERNMENTS
HOME INTERVIEW SURVEY

NAME _____

I AM _____ YEARS OLD   I AM ☐ MALE ☐ FEMALE

TRAVEL DAY _____   TRAVEL DATE _____

SAMPLE NUMBER ☐☐☐

INSTRUCTIONS:
PLEASE CARRY THIS DIARY WITH YOU THROUGHOUT THE TRAVEL DATE SHOWN AT THE LEFT. PLEASE USE IT TO RECORD EACH TRIP YOU MAKE INCLUDING THE ITEMS SPECIFIED BELOW. DO NOT RECORD WALKING OR BICYCLE TRIPS UNLESS TO GO TO WORK. PLEASE LEAVE THE FILLED IN CARD IN A CONVENIENT PLACE AT HOME SO IT WILL BE AVAILABLE WHEN OUR INTERVIEWER CALLS. USE THE BACK OF THIS CARD AND AN EXTRA CARD IF NECESSARY

HIS - 3

First diary section (left block)

WHERE DID THIS TRIP BEGIN?	WHERE DID THIS TRIP END?	TRIP PURPOSE (Enter Number)	DESTINATION ACTIVITY: Restaurant, Auto Repair, Office, etc.	TRIP TIME (Circle AM or PM) BEGIN / END	MODE OF TRAVEL (Enter Number)	IF AUTO DRIVER (No. in Car, Include Driver)	IF CAR OR VANPOOL (No. in Car, Include Driver)	IF BUS HOW DID YOU GET TO BUS STOP? (Enter Number)	TRANSIT FARE/ PARKING COST

Trip Purpose list:
1 Home
2 Work
3 Shop
4 School
5 Social/ Recreation
6 Personal Business
7 Eat Meal
8 Serve Pasgr.
9 Change Mode (e.g., Auto to Bus)

Mode of Travel list:
1 Auto Driver
2 Auto Pasgr.
3 Bus
4 School Bus
5 Taxi
6 Motorcycle
7 Car Van Pool
8 Walk Bike to Work
9 Other

If Bus How list:
1 Walk
2 Drove Auto and Parked
3 Auto But Not Parked
4 Car Pool
5 Other

Address _____ Zip _____   City _____
Address _____ Zip _____   City _____
Address _____ Zip _____   City _____

Second diary section (right block)

WHERE DID THIS TRIP BEGIN?	WHERE DID THIS TRIP END?	TRIP PURPOSE (Enter Number)	DESTINATION ACTIVITY: Restaurant, Auto Repair, Office, etc.	TRIP TIME (Circle AM or PM) BEGIN / END	MODE OF TRAVEL (Enter Number)	IF AUTO DRIVER (No. in Car, Include Driver)	IF CAR OR VANPOOL (No. in Car, Include Driver)	IF BUS HOW DID YOU GET TO BUS STOP? (Enter Number)	TRANSIT FARE/ PARKING COST

Trip Purpose list:
1 Home
2 Work
3 Shop
4 School
5 Social/ Recreation
6 Personal Business
7 Eat Meal
8 Serve Passenger
9 Change Mode (e.g., Auto to Bus)

Mode of Travel list:
1 Auto Driver
2 Auto Passenger
3 Bus
4 School Bus
5 Taxi
6 Motorcycle
7 Car/Van Pool
8 Walk/Bike to Work
9 Other

If Bus How list:
1 Walk
2 Drove Auto and Parked
3 Auto But Not Parked
4 Car Pool
5 Other

Address _____ Zip _____   City _____
Address _____ Zip _____   City _____
Address _____ Zip _____   City _____

NCTCOG HOME INTERVIEW SURVEY
TRIP REPORT
(Completed by Interviewer)

Trip Report

NORTH CENTRAL TEXAS
COUNCIL OF GOVERNMENTS

Section V: Trip Report

CONFIDENTIAL
The information obtained in this survey will be accorded confidential treatment, and will be used for statistical purposes only.

Travel Day _____ and Date _____   Sheet ____ of ____

PURPOSE CODES:
1 HOME
2 WORK
3 SHOP
4 SCHOOL
5 SOCIAL/REC
6 PERSONAL BUS
7 EAT MEAL
8 SERVE PASSENGER
9 CHANGE MODE
0 RIDE

MODE OF TRAVEL CODES:
1 AUTO DRIVER
2 AUTO PASSENGER
3 BUS TROLLEY
4 SCHOOL BUS
5 TAXI
6 MOTORCYCLE
7 CAR/VAN POOL
8 WALK/BICYCLE
9 OTHER

TRANSIT ACCESS CODES:
1 WALK
2 DROVE AUTO & PARKED
3 AUTO, BUT NOT PARKED
4 CAR POOL
5 OTHER

HIS - 2

A.3

NCTCOG WORKPLACE SURVEY
EMPLOYEE QUESTIONNAIRE

North Central Texas Council of Governments
1994 EMPLOYEE TRAVEL SURVEY

The North Central Texas Council of Governments is sponsoring a survey of travel in the Dallas-Fort Worth area. We ask your cooperation by answering each of the questions below. If possible, please return this questionnaire to the person who gave it to you.

YOUR ANSWERS WILL BE KEPT CONFIDENTIAL AND WILL ONLY BE USED TO PRODUCE STATISTICAL DATA NEEDED TO IMPROVE TRANSPORTATION SERVICES IN THE AREA.

A. At what TIME do you usually arrive at work?
_____:_____ A.M. P.M. (write time and circle A.M. or P.M.)

B. HOW did you travel to work this morning? (Circle number)
1. I drove by myself.
2. I drove a car with others as passenger.
3. I was a passenger in a car driven by someone else.
4. I walked or bicycled.
5. I rode a motorcycle.
6. I rode in a vanpool.
7. I rode in a taxi.
8. I rode a bus.

C. If you traveled to work by auto, truck, or van, HOW MANY PERSONS were in the vehicle, including yourself? _____ (enter number of persons)

D. If you were the DRIVER today, how much did you PAY TO PARK?
☐ Free   (I paid $ _____)

E. If you were the DRIVER today, how many BLOCKS away from work did you park?
☐ 1 or less   ☐ 2   ☐ 3   ☐ 4   ☐ more than 4

F. If you traveled BY BUS to get to work today, how did you get to your first bus stop? (Circle number)
1. I drove by myself.
2. I drove a car with others as passenger.
3. I was a passenger in a car driven by someone else.
4. I walked or bicycled.
5. I rode a motorcycle.
6. I rode in a vanpool.
7. I rode in a taxi.

G. Did you make any STOPS on your way TO work today? (Check yes or no)
☐ No, I traveled directly to work.
☐ Yes, I made the following stops:
IF YES, please check the purpose for EACH stop

PURPOSE OF STOP	STOP MADE			
	1st Stop	2nd Stop	3rd Stop	4th Stop
Work Related	☐	☐	☐	☐
Shopping	☐	☐	☐	☐
School	☐	☐	☐	☐
Social/Recreational	☐	☐	☐	☐
Personal Business	☐	☐	☐	☐
Eat a Meal	☐	☐	☐	☐
Pick-Up or Drop Off a Passenger	☐	☐	☐	☐

H. Did you make any STOPS on your way home FROM work yesterday (or your last workday at work)?
☐ No, I traveled directly home.
☐ Yes, I made the following stops:
IF YES, please check the purpose for EACH stop

PURPOSE OF STOP	STOP MADE			
	1st Stop	2nd Stop	3rd Stop	4th Stop
Work Related	☐	☐	☐	☐
Shopping	☐	☐	☐	☐
School	☐	☐	☐	☐
Social/Recreational	☐	☐	☐	☐
Personal Business	☐	☐	☐	☐
Eat a Meal	☐	☐	☐	☐
Pick-Up or Drop Off a Passenger	☐	☐	☐	☐

I. Did you make a trip(s) during working hours yesterday (or your last workday at work)?
☐ No   ☐ Yes   If yes, please check purpose for each trip.

	1ST TRIP PURPOSE	2ND TRIP PURPOSE	3RD TRIP PURPOSE	4TH TRIP PURPOSE
1. Work Related	☐	☐	☐	☐
2. Shopping	☐	☐	☐	☐
3. School	☐	☐	☐	☐
4. Social/Recreational	☐	☐	☐	☐
5. Personal Business	☐	☐	☐	☐
6. Eat a Meal	☐	☐	☐	☐
7. Pick-Up/Drop Off a Passenger	☐	☐	☐	☐
8. Home	☐	☐	☐	☐

MEANS OF TRAVEL
1. Auto   2. Bus   3. Other
AND THEN:
1. Back to work   2. To the trip

J. How many AUTOS, PICKUPS, and VANS are available for use by members of your household? _____ (enter number)

K. What is your OCCUPATION? _____

L. What is your home ADDRESS?
_____ _____ _____
Number and Street   City   Zip Code

M. What is your annual HOUSEHOLD INCOME? (Circle number)
1. Less than $5,000
2. $5,000-$9,999
3. $10,000-$14,999
4. $15,000-$19,999
5. $20,000-$24,999
6. $25,000-$29,999
7. $30,000-$34,999
8. $35,000-$39,999
9. $40,000-$50,000
10. More than $50,000

NCTCOG WORKPLACE SURVEY
NONEMPLOYEE QUESTIONNAIRE

North Central Texas Council of Governments
1984 NON-EMPLOYEE TRAVEL SURVEY

The North Central Texas Council of Governments is sponsoring a survey of travel in the Dallas-Fort Worth area. We ask your cooperation by answering each of the questions below. If possible, please return this questionnaire to the person who gave it to you. If not, just place it in any mailbox.

YOUR ANSWERS WILL BE KEPT CONFIDENTIAL AND WILL ONLY BE USED TO PRODUCE STATISTICAL DATA TO IMPROVE TRANSPORTATION SERVICES IN THE AREA.

A. Is your regular place of employment at this address? (Circle number)

1. Yes
2. No

IF YOU ANSWERED "YES" TO QUESTION A, DO NOT ANSWER THE REMAINING QUESTIONS AND PLEASE RETURN THIS FORM TO THE PERSON WHO GAVE IT TO YOU.

IF YOU ANSWERED "NO," PLEASE CONTINUE.

B. At what TIME did you arrive here today? (Circle number)

1. Before 7:00 A.M.
2. 7:00 A.M. to 9:00 A.M.
3. 9:00 A.M. to 3:00 P.M.
4. 3:00 P.M. to 6:00 P.M.
5. After 6:00 P.M.

C. Where did you START the trip that brought you to this address?

☐ _____ _____ _____

Street Address (or nearest intersection or place name)   City   Zip Code

Is this your home?   ☐ Yes   ☐ No

D. HOW did you get here? (Circle number)

1. I drove by myself.
2. I drove a car with others as passengers.
3. I was a passenger in a car driven by someone else.
4. I walked or bicycled.
5. I rode a motorcycle.
6. I rode in a vanpool.
7. I rode in a taxi.
8. I rode a bus.

E. If you traveled to this place by auto, truck, or van, HOW MANY PERSONS were in the vehicle, including yourself? _____ (enter number of persons)

F. If you were the driver today, how many BLOCKS away from here did you park?

☐ 1 or less   ☐ 2   ☐ 3   ☐ 4   ☐ more than 4

G. If you traveled BY BUS to get to this place, how did you get to your first bus stop? (Circle number)

1. I drove by myself.
2. I drove a car with others as passengers.
3. I was a passenger in a car driven by someone else.
4. I walked or bicycled.
5. I rode a motorcycle.
6. I rode in a vanpool.
7. I rode in a taxi.

H. What is the REASON for your trip here? (Circle number)

1. I work here
2. Work related
3. Shopping
4. School
5. Social/recreational
6. Personal business
7. Eat a meal
8. Pick up or drop off a passenger

WPS-2

NCTCOG WORKPLACE SURVEY
NONEMPLOYEE AIRPORT QUESTIONNAIRE

N⁰ 109550

North Central Texas Council of Governments
1984 NON-EMPLOYEE TRAVEL SURVEY

The North Central Texas Council of Governments is sponsoring a survey of travel in the Dallas-Fort Worth area. We ask your cooperation by answering each of the questions below. If possible, please return this questionnaire to collection boxes located in the airport terminals or as you pass through the airport exit toll booth. If not, just place it in any mailbox.

YOUR ANSWERS WILL BE KEPT CONFIDENTIAL AND WILL ONLY BE USED TO PRODUCE STATISTICAL DATA TO IMPROVE TRANSPORTATION SERVICES IN THE AREA.

PLEASE FILL OUT ONLY ONE OF THESE QUESTIONNAIRES TODAY.

A. Is your regular place of employment at the airport? (Circle number)

1. Yes
2. No

IF YOU ANSWERED "YES" TO QUESTION A, DO NOT ANSWER THE REMAINING QUESTIONS.

IF YOU ANSWERED "NO," PLEASE CONTINUE.

B. At what TIME did you arrive here today? (Circle number)

1. Before 7:00 A.M.	3. 9:00 A.M. to 3:00 P.M.	5. After 6:00 P.M.
2. 7:00 A.M. to 9:00 A.M.	4. 3:00 P.M. to 6:00 P.M.	

C. Where did you START the trip that brought you to the Dallas-Fort Worth airport?

☐ _____ _____ _____

Street Address (or nearest intersection or place name)   City   Zip Code

Is this your home?   ₁ ☐ Yes   ₂ ☐ No

D. How did you get here?   1. Private auto, truck, or van   4. Limousine

(Circle number)   2. Rental car   5. Courtesy van

3. Taxi   6. Other _____

E. If you traveled to the airport by auto, truck, or van, HOW MANY PERSONS were in the vehicle, including yourself?   _____ (enter number of persons)

F. Where will you be parking at the airport today?

₁ ☐ North Reduced Rate (Lot 1W)	₅ ☐ Terminal 2E	₉ ☐ Amfac Hotel West
₂ ☐ South Reduced Rate (Lot 5E)	₆ ☐ Terminal 3E	₁₀ ☐ Rental Car Return
₃ ☐ West Reduced Rate (Lot 4W)	₇ ☐ Terminal 4E	₁₁ ☐ Did Not Park
₄ ☐ Terminal 2W	₈ ☐ Amfac Hotel East	

G. How long will your car be parked at the airport?

1. Less than one hour
2. One to five hours
3. Five to 15 hours
4. More than 15 hours
5. Will not be parked

H. What is the REASON for your trip here?

₁ ☐ I am DEPARTING on a flight for BUSINESS reasons.

₂ ☐ I am DEPARTING on a flight for PERSONAL reasons.

If you are NOT DEPARTING on a flight from DFW today, what is the reason for your trip here? (Check one box and fill in blanks, if appropriate.)

₃ ☐ I work here.

₄ ☐ Work related

₅ ☐ Pick up _____ arriving passenger(s).

₆ ☐ Drop off _____ departing passenger(s).

₇ ☐ Eat a meal.

₈ ☐ Driving through airport without stopping.

₉ ☐ Other _____

North Central Texas Council of Governments
1984 Workplace Survey

EMPLOYER INTERVIEW

Interview: Date _____ Day _____ Time _____

1. Name, address, and telephone number of establishment

   Name _____ Telephone _____

   Address _____

   City _____ Zip Code _____

2. Name, title, department, and telephone number of contact person

   Name _____ Department _____

   Title _____ Telephone _____

3. Number of employees by shift

   _____ : _____ A.M./P.M. to _____ : _____ A.M./P.M.   Employees _____

   _____ : _____ A.M./P.M. to _____ : _____ A.M./P.M.   Employees _____

   _____ : _____ A.M./P.M. to _____ : _____ A.M./P.M.   Employees _____

4. Attendance on survey day: _____ (to be filled in following survey day)

5. Survey day _____ Date _____

6. Employee questionnaires delivered _____ to _____ .

7. Non-employee questionnaires delivered _____ to _____ .

8. Location of site entrances:
   - Draw diagram of site or building; show entrances and surrounding streets and landmarks. If truck counts are being conducted here, note loading docks and delivery areas on diagram.
   - Estimate number of surveyors needed: _____

Transit Rider Survey

A.8

TO TRANSIT RIDERS: In order to better plan transit services, we need to learn more about your travel patterns. Please answer the following questions about the trip you are now making. Please complete this questionnaire, even if you have already filled one out in the last 8 weeks. Thank you for your help.

1. I got on this bus at _____ & _____
   Nearest Street Intersection

2. The place I have come from is _____ Is this home? ☐ Yes ☐ No
   Address or Street Intersection

3. I am getting off this bus at _____ & _____
   Nearest Street Intersection

4. The place I am going to is _____ Is this home? ☐ Yes ☐ No
   Address or Street Intersection

5. The reason for this trip is: ☐ Work related ☐ Shopping ☐ School ☐ Social/Recreational
   ☐ Personal Business ☐ Eat a Meal ☐ Other

6. How did you get to this bus? ☐ By Auto/Parked ☐ By Auto/Dropped Off
   ☐ Transfer from Another Bus(es) _____ ☐ Walk ☐ Other
   Route Name(s)

7. After leaving this bus, how will you get to your final destination?
   ☐ By Auto/Parked ☐ By Auto/Picked Up
   ☐ Transfer to Another Bus(es) _____ ☐ Walk ☐ Other
   Route Name(s)

8. How did you pay for this bus ride?

		Type	Zone (Dallas Only)
☐ Cash _____ *How much?*	☐ Monthly Pass *(Please circle type and zone)*	Adult Senior Citizen Handicapped	1 2 3
☐ Token (Citran Only)			
☐ Transfer	☐ Punch Card *(Please circle type and zone)*	Type Adult Student	Zone (Dallas Only) 1 2 3
☐ Other _____ *Please specify*			

9. How many round trips do you take by bus during a typical week (Monday through Friday)?
   ☐ 1 ☐ 2-4 ☐ 5-7 ☐ 8-10 ☐ 10 or More

10. How many cars, pickups, and vans are available to your household?
    ☐ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 or More   11. Sex: ☐ M ☐ F

12. What is your age? _____   13. How many persons in your household? _____

14. To which major ethnic group do you belong:
    ☐ White ☐ Black American ☐ Hispanic-American ☐ Other _____
    Please specify

15. What is your annual HOUSEHOLD income?
    ☐ Less than $ 5,000   ☐ $ 5,000 - $ 9,999   ☐ $10,000 - $14,999
    ☐ $15,000 - $19,999   ☐ $20,000 - $24,999   ☐ $25,000 - $29,999
    ☐ $30,000 - $34,999   ☐ $35,000 - $39,999   ☐ $40,000 - $50,000
       ☐ More than $50,000

If you have additional comments about transit service in your area or any suggestions on new services you would like to see, please write them on the back of this card.

After completing this card, please fold and return it to the survey worker on the bus or drop it in any mail box postage-free. Thank You.

Preguntas Para Personas Que Usan El Autobús

PARA PERSONAS QUE USAN EL AUTOBÚS: Necesitamos saber mas de sus viajes en los autobúses para poder darles mejor servicio. Por favor conteste las siguientes preguntas en relacion a este viaje. Por favor llene este questionario aunque ya siga llenado uno en las ultimas ocho (8) semanas. Gracias por su ayuda.

1. Yo bordé este autobús en: _____ y _____
   Calle   *Esquina*

2. El lugar de donde va es: _____ ¿Es este lugar su casa? ☐ Si ☐ No
   (Dirección o Esquina)

3. ¿Donde se va abajar de este autobús? _____ y _____
   Calle   *Esquina*

4. El lugar abonde Ud. va es: _____ ¿Es este lugar su casa? ☐ Si ☐ No
   (Dirección o Esquina)

5. El proposito de su viaje es: ☐ Trabajo ☐ De Compras ☐ Escuela ☐ Social/Recreacion
   ☐ Negocio Personal ☐ Ir a Comer ☐ Otro

6. ¿Como llego Ud. a este autobús? ☐ Automovil y lo estaciono ☐ Pasajero de Automovil
   ☐ Transbordo a otro Autobus _____ ☐ En Pie ☐ Otro Modo
   Nombre de la ruta

7. Despues de que abaje este autobús, ¿como va Ud. terminar su viaje?
   ☐ Automovil y lo estaciono ☐ Pasajero de Automovil
   ☐ Transbordare a otro Autobus _____ ☐ En Pie ☐ Otro Modo
   Nombre de la ruta

8. ¿Como pago Ud. por este autobús?

		Tipo	Zona (Dallas solamente)
☐ En Efectivo _____ *Cuanto*	☐ Pase de un mes *(Marque el tipo y la zona)*	Adulto Anciano Desabilitado	1 2 3
☐ Ficha (Citran solamente)			
☐ Transborde	☐ Tarjeta de ponchar *(Marque el tipo y la zona)*	Tipo Adulto Estudiante	Zona (Dallas solamente) 1 2 3
☐ Otro Modo _____ *Explique*			

9. ¿Cuantos viajes por volver usa el autobús en una semana (Lunes a Viernes)?
   ☐ 1 ☐ 2-4 ☐ 5-7 ☐ 8-10 ☐ 10 o Mas

10. ¿Cuantos Carros, Trocas, o Vans tiene en su familia?   11. Sexo: ☐ Hombre ☐ Mujer
    ☐ Ninguno ☐ 1 ☐ 2 ☐ 3 ☐ 4 o Mas

12. ¿Que es su edad? _____   13. ¿Cuantas personas hay en su familia? _____

14. ¿Qual es su grupo ethnico? ☐ Hispano ☐ Otro _____
    Explique

15. ¿Que es su ingreso por año de la familia?
    ☐ Menos de $ 5,000   ☐ $ 5,000 - $ 9,999   ☐ $10,000 - $14,999
    ☐ $15,000 - $19,999   ☐ $20,000 - $24,999   ☐ $25,000 - $29,999
    ☐ $30,000 - $34,999   ☐ $35,000 - $39,999   ☐ $40,000 - $50,000
       ☐ $50,000 o Mas

Si Ud tiene comentarios adicionales sobre el servicio de transito en su area o sujestiones en otros servicios que desea, por favor escribalos atras de esta tarjeta.

Despues de que llene esta tarjeta, doble la tarjeta y regresca a la persona tomando o puede poner en cualquier caja de correo, no necesita estampilla. Gracias.

APPENDIX B

HOME INTERVIEW SURVEY
COMPLETED INTERVIEWS: A DEMOGRAPHIC PROFILE

APPENDIX B

HOME INTERVIEW SURVEY
COMPLETED INTERVIEWS: A DEMOGRAPHIC PROFILE

The first stage of the processing of the Home Interview Survey (HIS) was
completed in March 1985, resulting in 2,471 valid interviews and 6,403
household records (indicating one record for each household member or visitor
five years of age or older). There were 20,218 trip records for the
individuals in the sample. This included walk and bicycle trips to and from
work and vehicular trips of all purposes.

This Appendix provides a brief demographic profile of the sample households, a
review of the trip characteristics, and an examination of some factors, such as
school closing dates and car ownership, which are considered important in the
estimation of trip rates.

I. The demographic profile

   A. Household size - The average sample household size was 2.71. Figure
      B-1 shows that 21.7 percent of the sample households had a single
      member, 29.7 percent two persons, 20.3 percent three persons, 16.8
      percent four persons, 7.4 percent five persons, and 4.1 percent six or
      more persons.

   B. Type of structure - Some 80.4 percent of the households in the
      Transportation Study Area lived in single-family structures, 16.4
      percent in multifamily units, 2.1 percent in town houses and duplexes,
      and 1.1 percent in trailers (Figure B-2).
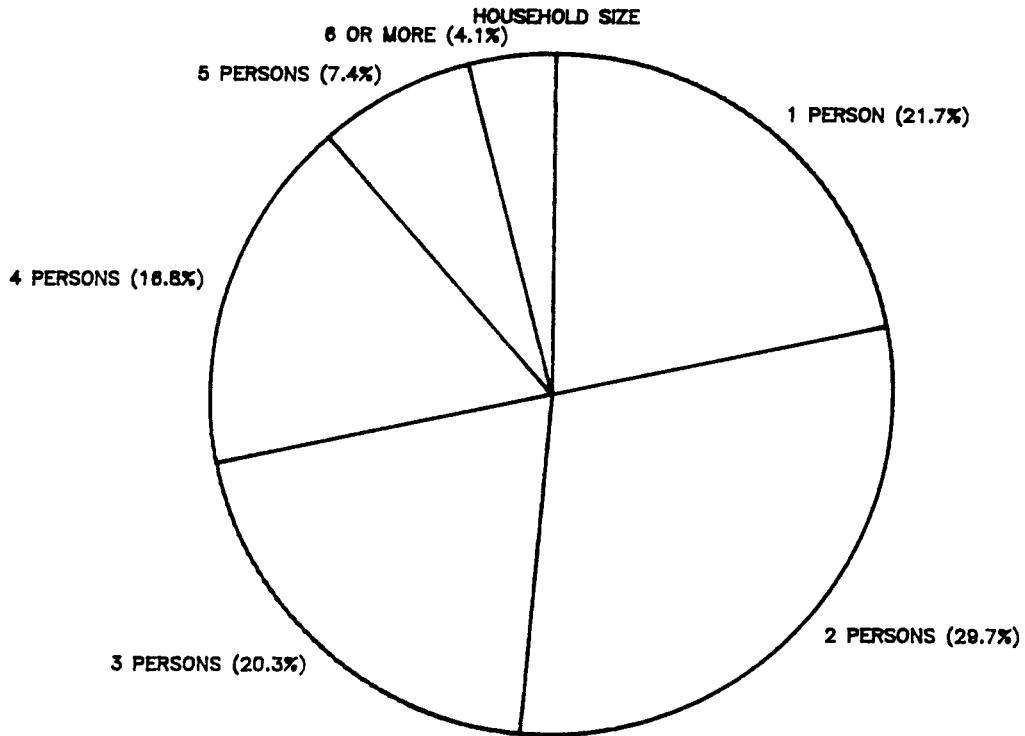
1984 HOME INTERVIEW SURVEY

HOUSEHOLD SIZE

6 OR MORE (4.1%)

5 PERSONS (7.4%)

1 PERSON (21.7%)

4 PERSONS (16.8%)

2 PERSONS (29.7%)

3 PERSONS (20.3%)

1984 HOME INTERVIEW SURVEY

TYPES OF RESIDENTIAL STRUCTURE

TRAILER (1.1%)

MULTIFAMILY (16.4%)

TOWN HOUSE (2.1%)

SINGLE FAMILY (80.4%)
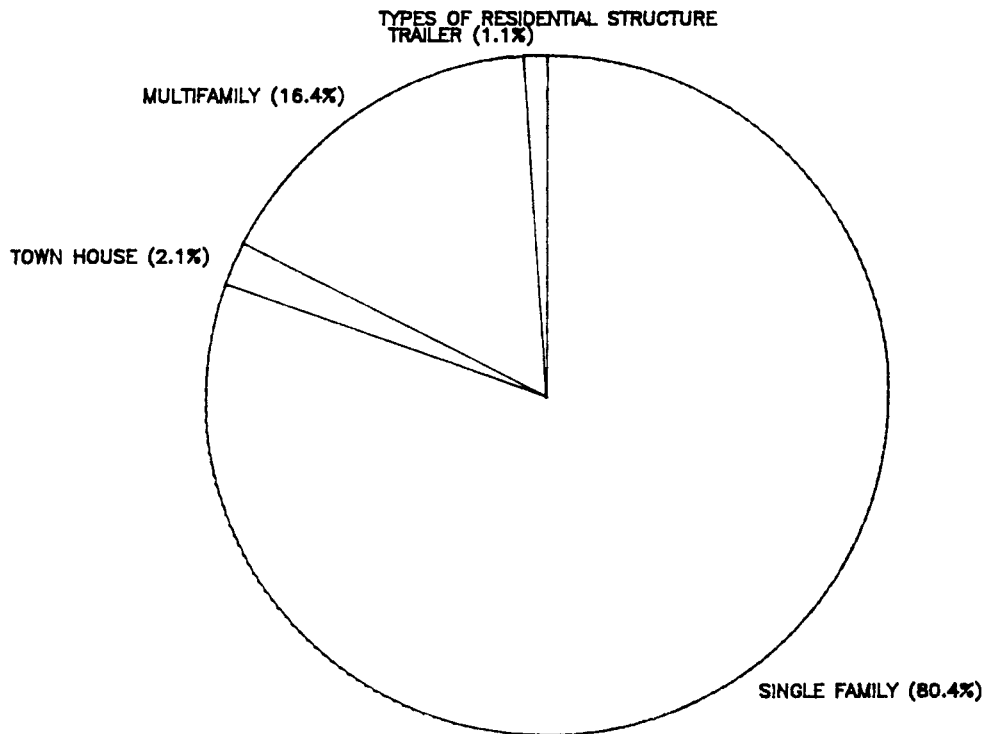
C. Income distribution - About 20.5 percent of the households in the Survey had an annual income below $15,000; 23.3 percent had an income of $15,000-$29,999; 16.3 percent had an income of $30,000-$39,999; 21.2 percent had an income of over $40,000; and 18.8 percent failed to report the household income (Figure B-3).

FIGURE B-3
1984 HOME INTERVIEW SURVEY
HOUSEHOLD INCOME

NOT REPORTED (18.8%)

BELOW $15,000 (20.5%)

OVER $40,000 (21.2%)

$15,000-$29,999 (23.3%)

$30,000-$39,999 (16.3%)
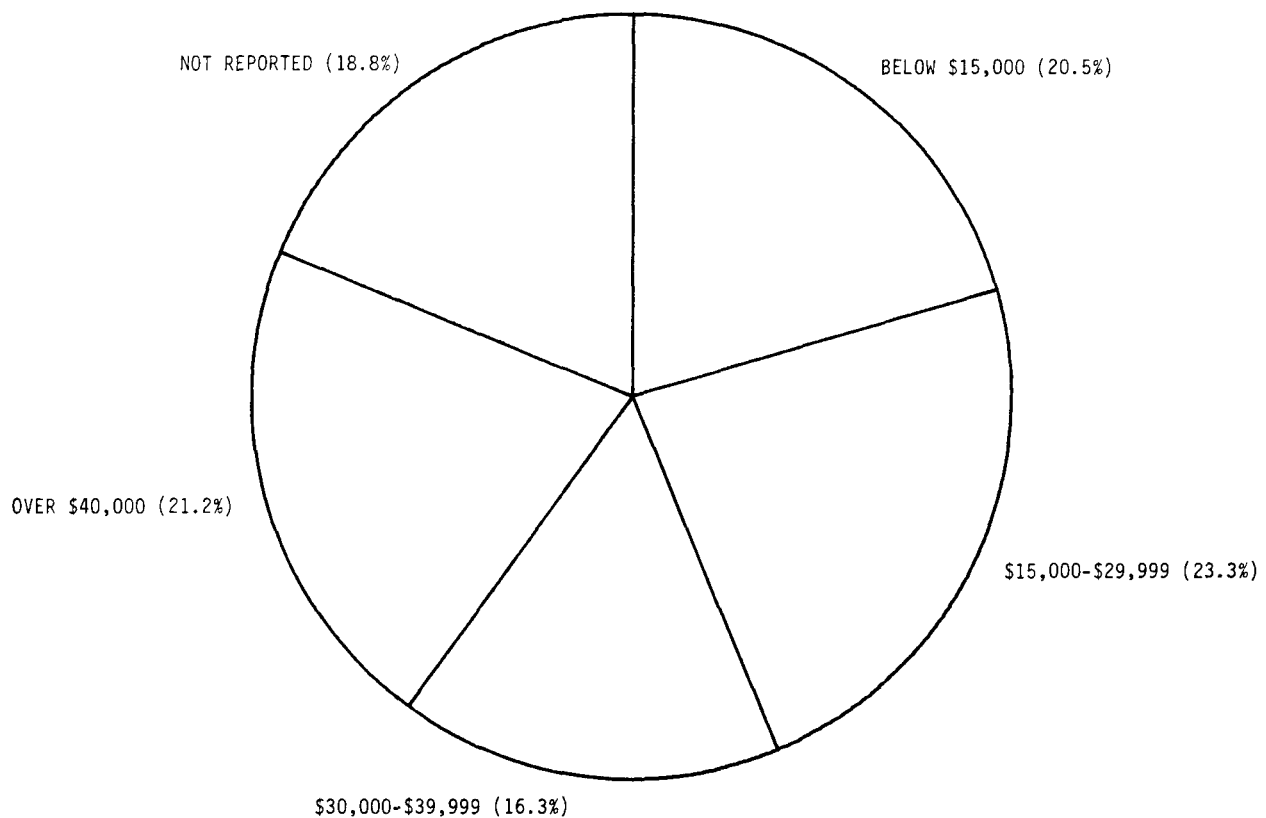
D. Auto availability - Some 8.3 percent of the sample households owned no cars; nearly 34.6 percent owned one car; 32.5 percent owned two cars; and 24.6 percent owned three or more cars. The average number of automobiles per household was 1.84, and the average number of cars per person was 0.72 (Figure B-4).

B.3

1984 HOME INTERVIEW SURVEY

CARS AVAILABLE PER HOUSEHOLD

THREE OR MORE (24.6%)

NO CARS (8.3%)

ONE CAR (34.6%)

TWO CARS (32.5%)
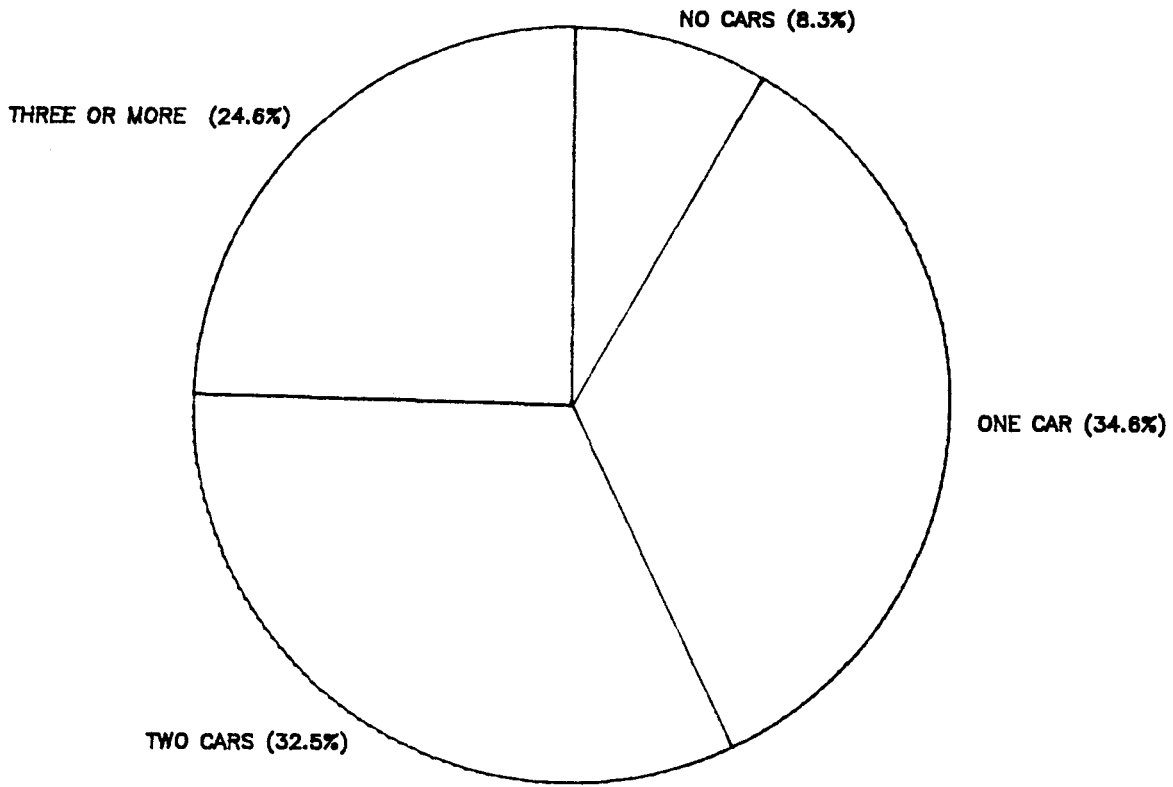
E. Sex of the household head - Approximately 72.3 percent of the heads of the sample households were male and the other 27.7 percent female. Females, however, constituted 53 percent of the total household members (Figure B-5).

F. Occupational classification of the household heads - Twenty-three percent of the household heads were in professional services, 13 percent in management, 15 percent in sales and clerical occupations, 12 percent in skilled manual jobs, and 6 percent in semiskilled or unskilled manual jobs. About 20 percent of the heads were retired and 2 percent unemployed.

1984 HOME INTERVIEW SURVEY

SEX OF HOUSEHOLD HEAD

FEMALE (27.7%)

MALE (72.3%)
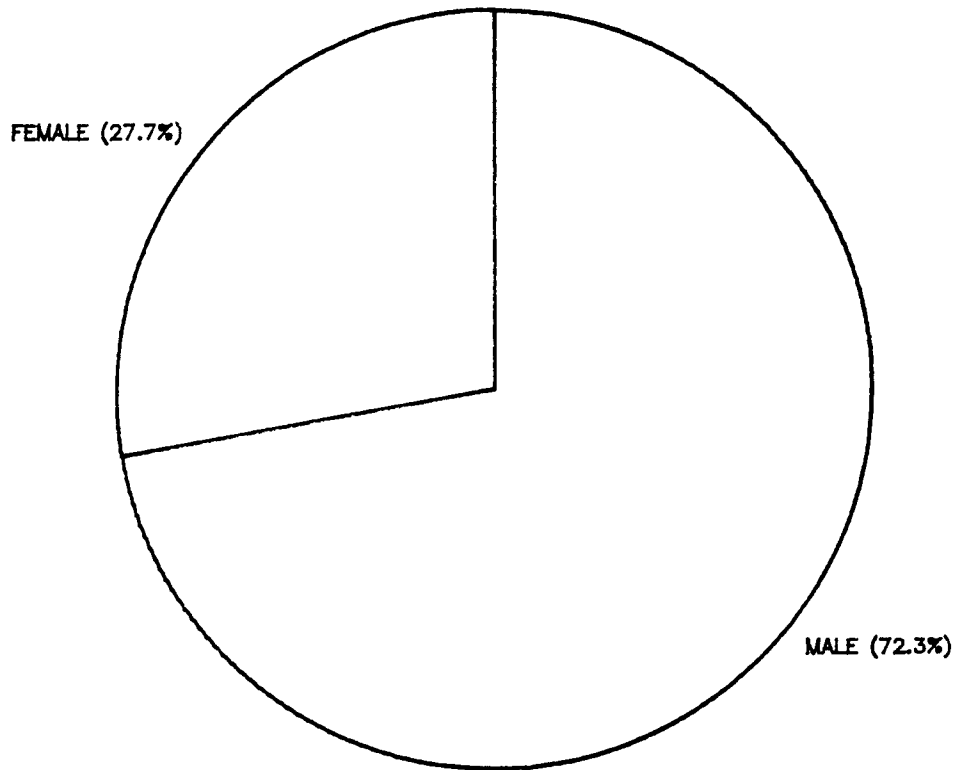
G. Driver's license - Ninety-one percent of the heads of the surveyed households had a driver's license.

H. Employment status - Some 61 percent of the household heads worked on the travel day; 37 percent did not work; and 1.7 percent worked at home. Note that these figures are not comparable with Census data. They refer only to the household heads and the proportion employed among them by including only those who worked on the day of travel.

I. Use of trip diary - All household members, five years of age and older, were asked to keep a diary of all their vehicular trips as well as any bicycle or walk trips to work. The purpose of the diary was to ensure accuracy of trip recording. Figure B-6 shows that in 74.4 percent of the households, none of the members kept a diary; in 21.4 percent, all members kept a diary; and the remaining 4.2 percent of the households had some members who kept a diary.

FIGURE B-6

1984 HOME INTERVIEW SURVEY

TRIP DIARY USE BY HOUSEHOLD MEMBERS

NOT KNOWN (0.7%)

ALL KEPT (21.4%)

SOME KEPT (3.5%)

NONE KEPT (74.4%)
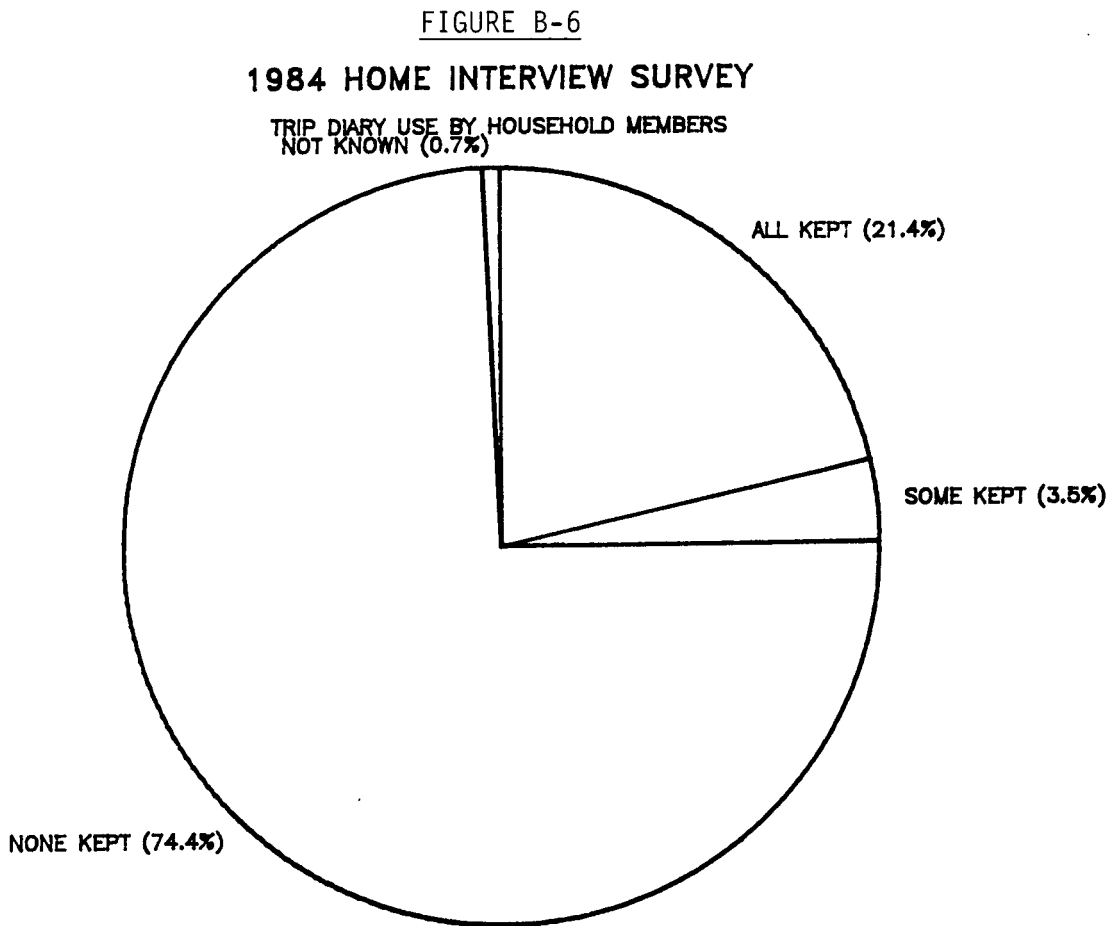
J. Completion date of interviews - The original Survey timetable aimed for completing all interviews before Memorial Day 1984, while schools were still open. However, due to a high refusal rate, this timetable had to

be revised, and the sample households were interviewed over a period of four months starting on April 23 and ending on July 13, 1984. School districts spread out their school closing dates between May 25 and June 1. The closing dates of the largest Independent School Districts (ISDs) in the study area were categorized into before and after school closing periods. Figure B-7 shows that 62 percent of the households were interviewed before the date of public school closing in the city in which the household resided and 38 percent after the city's school district closed.

FIGURE B-7

1984 HOME INTERVIEW SURVEY

COMPLETION DATE OF THE INTERVIEW

POST-MEMORIAL DAY (38.0%)

PRE-MEMORIAL DAY (62.0%)
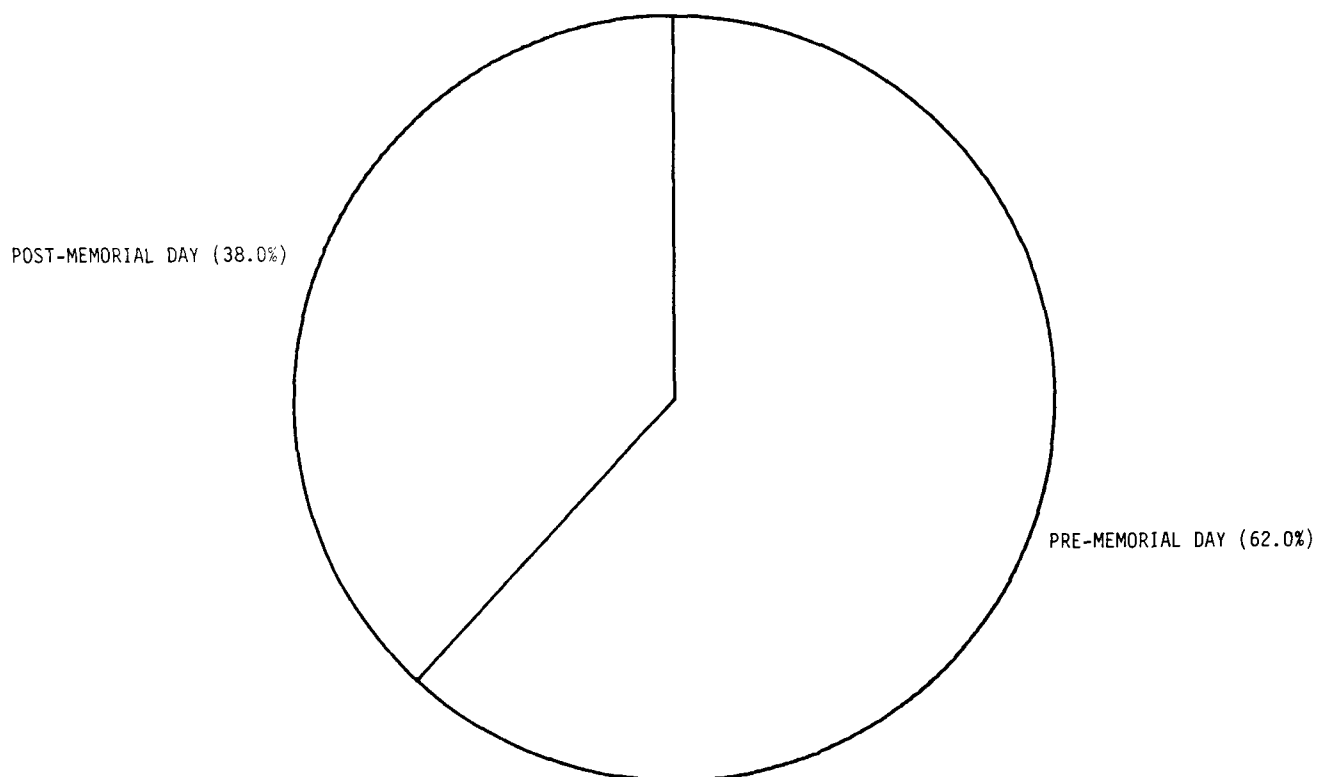
K. Average number of trips per household - On average, the surveyed
    households took 8.2 trips per day. Single-member households took an
    average of 3.25 trips; and as household size increased, the number of
    trips increased steadily until reaching five-person households, at
    which point trips stabilized at 14.25 trips per day. Trips per person,
    however, showed a fairly steady downward decline as household size
    increased. The average number of trips per person, therefore, declined
    from 3.25 for single-member households to 2.8 trips per person for
    households of six or more members (Figure B-8).

FIGURE B-8

1984 HOME INTERVIEW SURVEY
AVERAGE PERSON TRIPS

□ TRIPS/HOUSEHOLD   +   TRIPS/PERSON
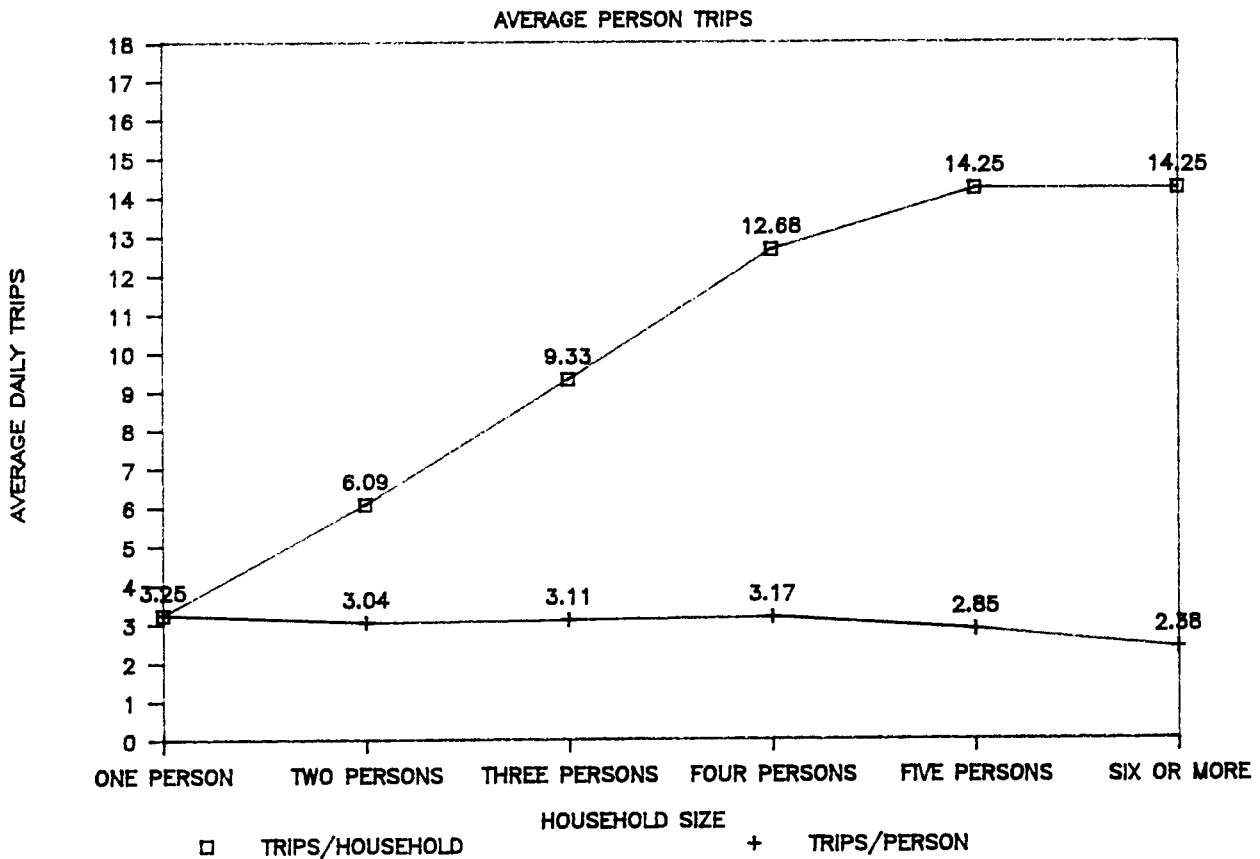
APPENDIX C

HOME INTERVIEW SURVEY
INCOMPLETE INTERVIEWS:
AN ANALYSIS OF THE "REFUSALS" AND "REJECTS"

HOME INTERVIEW SURVEY
INCOMPLETE INTERVIEWS:
AN ANALYSIS OF THE "REFUSALS" AND "REJECTS"

The purpose of this Appendix is to analyze the size and composition of the sample households who either refused to be interviewed or had been interviewed but their questionnaires were rejected. Among the initial sample of 3,050 households, 579 (19 percent of the prescreened sample) interviews were left incomplete. Of those, 7 percent refused to be interviewed after having consented to participate initially. Another 5 percent of the sample households were not interviewed because they could not be located or contacted, and another 3 percent were interviewed but were eliminated from the sample because the interviews were unverifiable or incomplete. The first section of this Appendix reviews the sample selection and screening procedures; the second examines the reasons why an interview did not take place; the third section examines the reasons for the rejection of the interviews which had taken place; and the fourth evaluates the overall impact on the sample.

I. Sample selection and screening

   During the period of March 26 - April 27, 3,050 households consented to participate in the Travel Survey. Those consenting households constituted 18 percent of the random list of 16,766 households which were initially screened in order to arrive at a representative sample stratified by household size and car ownership. Of the initial sample, 25 percent refused outright to participate, 22 percent could not be contacted, and 35 percent were eliminated from the sample for reasons relating to quota requirements.

The 3,050 households which remained in the sample were recontacted in April and May to arrange for a travel date and, subsequently, an interview date. Only 2,471 of these households (81 percent), however, comprised the final list of completed interviews. Most of the eliminated samples were kept in a "dead-end" file. This file contained a total of 456 questionnaires pertaining to two groups of households: a) those which were not interviewed because the households had either refused to participate or could not be contacted, and b) households which were interviewed but were rejected because the interviews were incomplete or unverifiable. The following is an analysis of the reasons for those refusals or rejections.

II. Noninterviews

Table C-1 shows that 11.7 percent (a total of 357) of the 3,050 households which had initially consented to be interviewed were not interviewed. Column 2 shows that in 59 percent of the cases, the reason for this noninterview was the refusal of an adult member of the household to participate. The majority of those refusals (about 90 percent) were based on the outright refusal of one or more adult members of the family to participate, while the other 10 percent of the refusals were due to extenuating circumstances such as a death or sickness in the family or other personal problems. Some of the refusing households denied that an initial agreement had ever been made; some denied that an adult had agreed to participate; and in some cases, the male adult in the household had the overriding veto over the initial agreement of the female member. Some of the households expressed reluctance to divulge personal information, and some expressed doubts that a given household's travel

TABLE C-1

HOUSEHOLDS EXCLUDED FROM THE FINAL SAMPLE
DUE TO REFUSALS OR INVALID INTERVIEWS

Reasons For:	Number of Households	Percent	Percent Total Sample
(1) No interview			
Refusal	212	59.4	7.0
Absolute refusal	(190)*	(89.6)	---
Extenuating circumstances	(22)	(10.4)	---
Contact impossible	88	24.6	2.9
Moved	47	13.2	1.5
Couldn't Locate	10	2.8	0.3
Total	357	100.0	(11.7)
(2) Interview rejected			
Completion impossible	42	42.4	1.4
Verifiability problem	26	26.3	0.8
Partial cooperation	17	17.2	0.6
Other	14	14.2	0.5
Total	99	100.0	(3.3)
(3) Other reasons for elimination	123	21.2	4.0
(4) Total dead-end (Sum 1, 2, and 3)	579	19.0	19.0
(5) Total valid interviews	2,471	81.0	81.0
(6) Total sample (Sum 4 and 5)	3,050	100.0	100.0

Source: 1984 Household Interview Survey - The Dead-End File

* Figures in parentheses indicate frequencies and percentages for subgroups and are not included in the totals.

plan would benefit anyone in any way. One common refusal reason given was the lack of time for the interview. Many other refusals occurred because the original interview was postponed, the travel diaries were thrown away, and the trips forgotten. Those interviews could not take place, and rescheduling and setting new travel dates would be too inconvenient or too late.

The reason for the other 40 percent of the noninterviews was the difficulty of contacting or locating the households. In 25 percent of those cases, the interviewer failed to reach the households after repeated tries; and in 13 percent of the cases, the households had moved, and the residence was either vacant or occupied by new residents who would not agree to participate.

III. Rejected interviews

A total of 99 households were eliminated from the final sample after the interviews had taken place. Forty-two percent of these households were rejected because their interviews could not be completed. Those were the interviews which were partially completed but were classified as "dead-ends" because the additional information needed for their completion could not be obtained within the specified time frame. Another 26 percent of the interviews were rejected because the information on them could not be verified. The verification problems occurred in the process of checking the factual pieces of information or checking the consistency among the trips and their stated modes, origin, destination, and purpose. Another 17 percent of the interviews were rejected because not all the household members cooperated with respect to

their trip information. In addition, 14 percent of the interviews were rejected because the households were located outside the TSA, belonged to an inadmissible sample (e.g., an institution or a business premise), or were simply duplicated interviews.

IV. Assessment of the impact

The 81 percent completion rate for the final sample was high relative to the 18 percent completion rate for the pre-qualification stage. The reject and refusal rate of 19 percent was not particularly high considering the high residential mobility of the TSA households and the detailed nature of the interview. The time lapse between the date of the initial contact with the household, the follow-up contact to arrange the travel day, and the date the actual interview took place may also have contributed to the refusal rate. The largest portion of the entire dead-end file was made up of absolute refusals and incomplete or unverifiable ones. The question is whether there was any consistent pattern among the refusals or rejects which could introduce systematic biases in the sample.

Were the dead-end file households likely to have come disproportionately from among groups with particularly high or low trip patterns? A thorough examination of such a bias was not feasible--for the obvious reason that, in most cases, no interview had taken place. A review of the screening information suggests that the refusing households might have been self-selected from the following groups:

- smaller households
- apartment dwellers
- low-income households.

Eliminating those households from the sample raised concern over introducing a bias factor which would lead to overestimating trip rates. An overall evaluation of the sampling procedures suggested that such an upward bias could have been cancelled out by the downward bias introduced by the oversampling of zero-car households--a procedure which was adopted in order to meet the sample's quota requirements.

On the whole, the 19 percent refusal/rejection rate did not raise an overriding concern over biases in the sample. Though higher response rates could have been obtained by following a more rigorous screening program, the increased costs of the screening would have diluted the benefits of lower rejection rates.

APPENDIX D

HOME INTERVIEW SURVEY
COMPARISON OF THE 1984 HOME INTERVIEW SAMPLE DATA
WITH THE 1980 CMSA CENSUS DATA

HOME INTERVIEW SURVEY
COMPARISON OF THE 1984 HOME INTERVIEW SAMPLE DATA
WITH THE 1980 CMSA CENSUS DATA

This Appendix compares the demographic profile of the 1984 Home Interview Survey sample with data provided in the 1980 Census of the Dallas-Fort Worth Consolidated Metropolitan Statistical Area (CMSA).[1] The comparison serves several purposes:

- It provides a frame of reference for the entire Survey by showing how closely the sample households mirror the population of the CMSA;

- It identifies several travel demand and supply characteristics of the population (e.g., household size, income, employment status, and auto availability), some of which are useful for calibrating travel demand models; and

- It produces confidence intervals for the Survey means.

In the first part of this Appendix, the 1980 CMSA Census and the 1984 Survey data are compared with respect to household size, auto availability, type of residential structure, employment status, and income. Next, confidence intervals for the sample means are calculated so that the boundaries within which the population means are expected to fall can be established.

I. Comparison of the demographic profiles of the Census and Survey populations

    A. Household size - The mean household size for the 1984 Survey sample was 2.71 compared to the mean of 2.70 persons per household for the 1980 Census of the CMSA.[2] Table D-1 compares the size distributions of the sample and Census households, suggesting that the sample underrepresents the one- and two-person households and overrepresents the three- and four-person households.

TABLE D-1

COMPARISONS OF HOUSEHOLD SIZE

Household Size	1980 Households[a]		1984 Households[b]	
	Frequency	Percent	Frequency	Percent
One person	240,630	22.7	536	21.7
Two persons	329,524	31.7	733	29.7
Three persons	192,149	18.1	502	20.3
Four persons	168,224	15.9	415	16.8
Five persons	78,618	7.4	183	7.4
Six+ persons	51,270	4.8	102	4.1
Total	1,060,415	100.0	2,471	100.0

[a]Source: 1980 Census for the Dallas-Fort Worth CMSA

[b]Source: NCTCOG 1984 Home Interview Survey

B. Auto availability - The average number of vehicles per household in the Survey was 1.73 cars compared to 1.76 for the Census households.[3] The Census figures systematically understated the number of automobiles available to households by excluding pickups and vans. This suggests that the reason for the lower average for the Survey is that the survey design called for an oversampling of zero-car households in order to ensure sufficient observations in all cells of the cross-classification matrix. This oversampling lowered the average number of cars per household, as shown in Table D-2. The discrepancies shown suggest that both sources had a downward bias in their reporting of the average number of cars per household, and that the average was more likely closer to 1.9 cars per household as shown in the Bureau of Labor Statistics for 1984.[4]

C. Incomes - The 1980 mean household income for the CMSA in 1980 was $21,567.60, while the sample average was $27,927.50. If we adjust the 1984 average to 1980 dollars, the average income from the Survey becomes $21,816.22. Thus, the incomes from the two sources compare very well.

D. Type of residential structure - Table D-3 indicates discrepancies between the sample and the Census population in terms of residential structures. While over 80 percent of the 1984 sample households resided in single-family dwellings and 16 percent in multifamily structures, only 70 percent of the 1980 Census households resided in single-family dwellings and 25 percent in multifamily structures. The explanation for the discrepancy may partly lie in the smaller size of

TABLE D-2

AUTO AVAILABILITY BY HOUSEHOLD

Cars Owned	1980 Households[a]		1984 Households[b]	
	Frequency	Percent	Frequency	Percent
Zero	69,896	6.6	204	8.3
One	354,042	33.4	856	34.6
Two	394,760	37.2	803	32.5
Three +	241,717	22.8	608	24.6
Total	1,060,415	100.0	2,471	100.0

[a]Source: 1980 Census for the Dallas-Fort Worth CMSA

[b]Source: NCTCOG 1984 Home Interview Survey

TABLE D-3

DISTRIBUTION OF OCCUPIED HOUSING UNITS BY TYPE OF STRUCTURE

Type of Structure	1980 Households[a]		1984 Households[b]	
	Frequency	Percent	Frequency	Percent
Single-family*	738,613	69.7	1,986	80.4
Two-family	28,812	2.7	51	2.1
Multifamily	265,928	25.1	405	16.4
Mobile home	26,774	2.5	28	1.1
Total	1,060,127	100.0	2,470	100.0

[a]Source: 1980 Census for the Dallas-Fort Worth CMSA

[b]Source: NCTCOG 1984 Home Interview Survey

* Includes attached and detached one-unit structures and town houses. Condominiums are included if in detached units.

households residing in multifamily structures, a fact which makes these households less likely to be contacted by the interviewer.

II. Confidence intervals for the sample means

Confidence intervals assign upper and lower bounds to each estimate and specify the chances that the true means lie outside the boundaries. The notion behind Confidence Intervals is the Central Limit Theorem which maintains that as the sample size gets larger, the distribution of the sample means approaches normality, with means and variances equal to those of the population.[5]

A. Confidence intervals for the sample household size - Table D-4 shows that chances were 95 in 100 that the true average household size in the study area was between 2.652 and 2.768 persons per household. The table also shows the 1980 CMSA Census average of 2.70, which was well within our intervals.

B. Confidence intervals for car availability - Table D-4 shows that the chances were 95 in 100 that the true average for the number of cars available to each household was between 1.685 and 1.775 cars. Those intervals covered the average 1980 CMSA cars per household of 1.76.

C. Confidence intervals for average household incomes - Table D-4 shows that the sample mean for household incomes in 1984 dollars was higher than the CMSA Census mean income in 1980. Correcting for inflation greatly reduced the gap between the two, bringing the 1984 average income to $21,816 in 1980 dollars. This puts it well within the 95 percent confidence interval.

TABLE D-4

CONFIDENCE INTERVALS
FOR THE SAMPLE MEANS FOR HOUSEHOLD SIZE, CARS PER HOUSEHOLD, 1984 AND CONSTANT DOLLAR INCOMES, AND HOUSEHOLD TRIP RATES

	Sample Mean (1984)	CMSA Census (1980)	Standard Error	95% Confidence Interval
Household Size	2.71	2.70	.0296	1.96*.0296 = < 2.652 < 2.768
Cars	1.73	1.76	.0229	1.96*.0229 = > 1.685 < 1.775
Income - 1984 $	27,927.5	21,567.6	348.19	1.96*348.2 = > 27,245 < 28,610
Income - Constant $	21,816.2	21,567.6	276.23	1.96*276.23 = > 21,614 < 22,697

Confidence Interval = Sample Mean   1.96 x Standard Error Mean
 Probability of error = .05

1 The Dallas-Fort Worth CMSA in 1980 included the nine counties of Dallas, Tarrant, Denton, Collin, Rockwall, Kaufman, Ellis, Johnson, and Parker. The boundaries of the CMSA were broader than the Transportation Study Area (TSA), which was the basis for the Travel Survey. The TSA included all nine counties of the CMSA, but covered only small parts of some of those counties (i.e., Rockwall, Kaufman, Ellis, Johnson, and Parker). It was decided to make the comparisons on the basis of those approximate boundaries since the purpose was a comparison of percentages and not absolute frequencies and since the distribution of population characteristics was assumed to remain constant between the TSA and CMSA.

2 The sample average of 2.71 was obtained by dividing the weighted sum of all the people living at the residences on the day of the interview by the number of households. It excluded visitors and other family members who were not residing at the address at the time. Including those visitors would have increased the average to 2.74. The Census average of 2.70 excluded visitors but included all nonrelated residents in the households.

3 The Census and sample definitions of cars per household differed. Whereas, both the Census and the Survey enumerated the number of cars "available" to the household, the 1980 Census included only automobiles (including station wagons), and <u>excluded</u> vans, pickups, or larger trucks. The Survey <u>included</u> vans and pickup trucks. The Census Bureau's test surveys pointed out that the 1980 Census understated the percent of households with three or more cars. (Source - <u>Users' Guide: 1980 Census of Population and Housing</u>, Part B, Glossary, Bureau of the Census, 1982.)

4 The sample's per household average of 1.73 was obtained by dividing the weighted sum of all the cars, vans, and pickups available to the household (ranging from 0 to 6) by the total number of households. If the upper bracket was raised to 7 cars, the average for the sample and the Census would have been 1.84 and 1.87, respectively. Those averages more closely match the U.S. Bureau of Labor Statistics' average of 1.9 cars per-urban-consumer unit for 1980-81. (Source: U.S. Bureau of Labor Statistics, <u>Consumer Expenditure Survey</u>, Washington, D.C., December 1984.)

5 Confidence Intervals for the sample means were calculated as follows:

$$CI = (\bar{x}_1 - \bar{x}_2) \pm 1.96 s_{\bar{x}_1 - \bar{x}_2}$$

$$\alpha = .05$$

Where:

$\bar{x}_1$ $\bar{x}_2$ = the sample means

s = standard deviation for the means

n = sample size

1.96 = number of standard deviations around the means for a 95 percent level of confidence

α = probability of error

APPENDIX E

HOME INTERVIEW SURVEY
TRIP RATE DIFFERENCES BY INTERVIEW DATE:
TESTS OF STATISTICAL SIGNIFICANCE FOR THE
PRE- AND POST-MEMORIAL DAY RATES

APPENDIX E

HOME INTERVIEW SURVEY
TRIP RATE DIFFERENCES BY INTERVIEW DATE:
TESTS OF STATISTICAL SIGNIFICANCE FOR THE
PRE- AND POST-MEMORIAL DAY RATES

This Appendix outlines the differences between the trip tables which are based on the entire Survey records and those which are based on the subsets of pre- and post-Memorial Day interviews. The comparison serves as justification for adopting the pre-Memorial Day subsample as the one on which the final trip rates were based. Section I presents the trip tables based on the entire Survey sample. Section II shows the results of the tests of statistical significance of the difference between means of the pre- and post-Memorial Day trip rates (t-test), and Section III presents the final trip tables which were based on the pre-Memorial Day subset and adjusts for the number of households which made zero trips.

I. The 1984 HIS trip tables based on the entire sample

The 1984 Home Interview Survey person trip rates were based on 18,798 linked trips made by 2,471 sample households. This household base contained all the completed interviews, including the households which made no trips on the day of the interview.

Tables E-1, E-2, and E-3 show the full sample trip tables cross-classified by income quartile and household size for three purposes--HBW, HNW, and NHB, respectively.

PERSON TRIPS PER HOUSEHOLD BY PURPOSE
ALL TRIPS*
HBW

Income Quartile	Household Size	1	2	3	4	5	6+
1	Mean	.462	.847	1.661	1.606	1.474	2.143
	SD	(.84)	(1.19)	(1.59)	(1.27)	(1.65)	(1.62)
	CV	(1.82)	(1.40)	(.96)	(.79)	(1.12)	(.76)
	N	(238)	(236)	(59)	(33)	(19)	(21)
2	Mean	1.031	1.933	2.380	2.712	2.851	3.610
	SD	(.91)	(1.68)	(1.68)	(1.85)	(1.63)	(1.90)
	CV	(.89)	(.87)	(.70)	(.68)	(.57)	(.53)
	N	(225)	(255)	(158)	(125)	(47)	(41)
3	Mean	1.415	2.364	2.935	2.832	3.356	4.263
	SD	(1.06)	(1.46)	(1.92)	(1.83)	(2.53)	(2.23)
	CV	(.75)	(.62)	(.66)	(.65)	(.75)	(.52)
	N	(53)	(129)	(124)	(107)	(59)	(19)
4	Mean	1.050	2.549	2.863	3.453	3.586	4.810
	SD	(.89)	(1.51)	(1.76)	(2.40)	(2.84)	(3.17)
	CV	(.84)	(.59)	(.62)	(.75)	(.79)	(.66)
	N	(20)	(113)	(161)	(150)	(58)	(21)

* Includes both pre- and post-Memorial Day trips

Notes: SD = Standard Deviation
       CV = Coefficient of Variation (SD/Mean)
       N = Number of Households

Source: NCTCOG 1984 Home Interview Survey

PERSON TRIPS PER HOUSEHOLD BY PURPOSE
ALL TRIPS*
HNW

Income Quartile	Household Size	1	2	3	4	5	6+
1	Mean	1.235	2.140	2.915	3.242	5.263	4.952
	SD	(1.77)	(2.54)	(3.46)	(5.58)	(4.68)	(5.38)
	CV	(1.43)	(1.19)	(1.19)	(1.72)	(.89)	(1.09)
	N	(238)	(236)	(59)	(33)	(19)	(21)
2	Mean	1.347	2.482	3.601	5.528	6.110	5.660
	SD	(1.44)	(2.50)	(3.43)	(5.02)	(5.13)	(5.63)
	CV	(1.07)	(1.00)	(.95)	(.91)	(.84)	(1.00)
	N	(225)	(255)	(158)	(125)	(47)	(41)
3	Mean	1.283	2.659	4.774	7.477	7.831	7.895
	SD	(1.41)	(2.76)	(4.28)	(5.92)	(6.39)	(7.19)
	CV	(1.10)	(1.04)	(.90)	(.79)	(.82)	(.91)
	N	(53)	(129)	(124)	(107)	(59)	(19)
4	Mean	1.850	2.823	4.040	6.720	7.948	12.619
	SD	(2.68)	(3.06)	(3.19)	(4.78)	(5.33)	(11.66)
	CV	(1.45)	(1.08)	(.79)	(.72)	(.67)	(.93)
	N	(20)	(113)	(161)	(150)	(58)	(21)

* Includes both pre- and post-Memorial Day trips

Notes: SD = Standard Deviation
        CV = Coefficient of Variation (SD/Mean)
        N = Number of Households

Source: NCTCOG 1984 Home Interview Survey

TABLE E-3

PERSON TRIPS PER HOUSEHOLD BY PURPOSE
ALL TRIPS*
NHB

Income Quartile	Household Size	1	2	3	4	5	6+
1	Mean	.487	.691	.983	0.999	1.000	.952
	SD	(1.31)	(1.48)	(2.56)	(.94)	(1.41)	(1.98)
	CV	(2.70)	(2.15)	(2.61)	(3.46)	(1.41)	(2.08)
	N	(238)	(236)	(59)	(33)	(19)	(21)
2	Mean	1.271	1.624	1.633	1.808	2.000	1.098
	SD	(1.81)	(2.53)	(2.06)	(2.64)	(2.34)	(2.10)
	CV	(1.42)	(1.56)	(1.26)	(1.46)	(1.17)	(1.93)
	N	(225)	(255)	(158)	(125)	(47)	(41)
3	Mean	1.792	2.140	2.524	2.720	3.102	2.684
	SD	(2.12)	(2.79)	(3.36)	(3.33)	(4.31)	(3.84)
	CV	(1.19)	(1.31)	(1.37)	(1.22)	(1.16)	(1.43)
	N	(53)	(129)	(124)	(107)	(59)	(19)
4	Mean	2.650	2.991	2.677	3.160	3.000	3.762
	SD	(3.10)	(3.97)	(3.29)	(3.38)	(3.28)	(3.99)
	CV	(1.17)	(1.33)	(1.23)	(1.07)	(1.09)	(1.06)
	N	(20)	(113)	(161)	(150)	(58)	(21)

* Includes both pre- and post-Memorial Day trips

Notes: SD = Standard Deviation
CV = Coefficient of Variation (SD/Mean)
N = Number of Households

Source: NCTCOG 1984 Home Interview Survey

II. Tests of the difference of means (t-test) between the pre- and post-Memorial Day trip rates

Tables E-4, E-5, and E-6 show the means for each period, the standard deviation of the trip means in each cell, the sample size, the t-statistic, the degree of freedom (DF), and the probability of error (PROB>T).

The means were calculated using all the households in each period, including the zero-trip households. The t-statistic produced a measure for testing the null hypothesis that the means of the pre- and post-Memorial Day trips were equal. It assumed that the variances of the two groups were unequal. The DF was computed through the Satterthwaite method and was smaller than the (N1+N2-2) estimate of DF. PROB>T indicated the probability of obtaining a greater absolute value of T. The smaller values of PROB>T, therefore, indicated a lower probability of error in rejecting the null hypothesis. The level of significance is $P \leq 0.1$ which indicated that in instances where the null hypothesis was rejected, there was less than 10 percent probability that the differences between the two-period trip rates were in fact 0. The PROB>T cells marked with an asterisk are the ones for which the null hypothesis was rejected with $P \leq 0.1$.

A total of 13 cells showed significant differences (at $P \leq 0.1$) between the two periods, indicating that the pre-Memorial Day rates in 10 cells were significantly higher than the post-Memorial Day rates (positive t-statistics); while in three cells, post-Memorial Day rates were significantly higher (negative t-statistics). As a consequence of these

TABLE E-4

T-STATISTICS
PRE- AND POST-MEMORIAL DAY DIFFERENCES
NCTCOG 1984 HOME INTERVIEW SURVEY
PERSON TRIPS PER HOUSEHOLD

HBW

Quartile	Household Size	Before			After			T	DF[a]	PROB>T[b]
		MEAN	SD	N	MEAN	SD	N			
Q1	1	0.38	0.81	111	0.54	0.86	127	-1.45	235	0.149
	2	0.80	1.16	125	0.90	1.21	111	0.65	228	0.516
	3	2.19	1.77	26	1.24	1.32	33	2.28	45	0.027
	4	1.85	1.28	13	1.45	1.28	20	0.87	26	0.393
	5	1.00	1.10	6	1.69	1.84	13	-1.02	16	0.324
	6+	2.88	1.80	8	1.70	1.38	13	1.59	12	0.138
Q2	1	1.04	0.93	125	1.02	0.90	100	0.16	215	0.870
	2	1.97	1.66	179	1.84	1.74	76	0.55	136	0.581
	3	2.48	1.71	99	2.20	1.61	59	1.04	128	0.302
	4	2.73	1.84	89	2.67	1.90	36	0.17	63	0.865
	5	2.77	1.67	31	3.00	1.59	16	-0.45	32	0.653
	6+	3.17	1.74	24	4.24	1.99	17	-1.79	32	0.083
Q3	1	1.50	1.11	30	1.30	1.02	23	0.67	49	0.508
	2	2.35	1.48	88	2.39	1.45	41	-0.14	80	0.890
	3	2.77	1.64	92	3.41	2.55	32	-1.32	40	0.196
	4	2.86	1.89	71	2.78	1.73	36	0.22	77	0.824
	5	3.70	2.75	40	2.63	1.86	19	1.75	50	0.086
	6+	4.00	2.26	10	4.56	2.30	9	-0.53	17	0.603
Q4	1	0.85	0.90	13	1.43	0.79	7	-1.50	14	0.156
	2	2.64	1.58	73	2.38	1.39	40	0.94	89	0.351
	3	2.77	1.66	115	3.09	2.00	46	-0.94	71	0.350
	4	3.20	2.38	106	4.07	2.36	44	-2.05	81	0.043
	5	3.28	2.63	43	4.47	3.31	15	-1.26	21	0.223
	6+	5.29	3.27	14	3.86	2.97	7	1.00	13	0.333

a   DF is based on the assumption of unequal variance, so it is smaller than the conventional DF which equals (N1+N2-2).

b   PROB>T indicates the probability of obtaining a greater absolute value of T. The smaller the PROB>T, the greater the chances that the differences between the means of the two periods are significantly greater than zero (i.e., the null hypothesis is rejected). For the cells marked with an asterisk, the null hypothesis is rejected with the probability of error of P > 0.1.

E.6

TABLE E-5

T-STATISTICS
PRE- AND POST-MEMORIAL DAY DIFFERENCES
NCTCOG 1984 HOME INTERVIEW SURVEY
PERSON TRIPS PER HOUSEHOLD

HNW

Quartile	Household Size	Before			After			T	DF[a]	PROB>T[b]
		MEAN	SD	N	MEAN	SD	N			
Q1	1	1.28	1.82	111	1.20	1.73	127	0.36	228	0.722
	2	2.16	2.67	125	2.12	2.39	111	0.13	234	0.897
	3	2.85	4.02	26	2.97	3.01	33	-0.13	45	0.897
	4	6.38	7.83	13	1.20	1.61	20	2.36	13	0.040
	5	4.83	2.86	6	5.46	5.41	13	-0.33	17	0.745
	6+	6.88	6.71	8	3.77	4.25	13	1.17	11	0.267
Q2	1	1.45	1.52	125	1.22	1.33	100	1.20	221	0.231
	2	2.55	2.49	179	2.33	2.52	76	0.64	140	0.527
	3	3.64	3.43	99	3.54	3.46	59	0.17	121	0.869
	4	5.83	4.90	89	4.78	5.29	36	1.03	61	0.307
	5	7.90	5.13	31	2.63	2.90	16	4.51	45	0.000
	6+	7.33	6.37	24	3.29	3.29	17	2.65	36	0.010
Q3	1	1.47	1.53	30	1.04	1.22	23	1.12	51	0.268
	2	2.83	2.87	88	2.29	2.50	41	1.08	89	0.282
	3	4.54	3.91	92	5.43	5.22	32	-0.89	44	0.381
	4	7.94	6.05	71	6.56	5.62	36	1.18	75	0.243
	5	8.43	6.27	40	6.58	6.63	19	1.02	34	0.316
	6+	8.70	8.65	10	7.00	5.52	9	0.52	15	0.614
Q4	1	2.08	3.20	13	1.43	1.40	7	0.63	18	0.538
	2	2.97	3.10	73	2.55	3.02	40	0.70	82	0.483
	3	4.41	3.28	115	3.13	2.79	46	2.49	97	0.014
	4	6.84	4.70	106	6.43	4.99	44	0.46	76	0.644
	5	8.51	5.47	43	6.33	4.70	15	1.48	28	0.150
	6+	14.14	13.81	14	9.57	4.83	7	1.11	18	0.282

[a] DF is based on the assumption of unequal variance, so it is smaller than the conventional DF which equals (N1+N2-2).

[b] PROB>T indicates the probability of obtaining a greater absolute value of T. The smaller the PROB>T, the greater the chances that the differences between the means of the two periods are significantly greater than zero (i.e., the null hypothesis is rejected). For the cells marked with an asterisk, the null hypothesis is rejected with the probability of error of P > 0.1.

E.7

TABLE E-6

T-STATISTICS
PRE- AND POST-MEMORIAL DAY DIFFERENCES
NCTCOG 1984 HOME INTERVIEW SURVEY
PERSON TRIPS PER HOUSEHOLD

NHB

Quartile	Household Size	Before			After			T	DF[a]	PROB>T[b]
		MEAN	SD	N	MEAN	SD	N			
Q1	1	0.42	1.04	111	0.54	1.52	127	-0.72	224	0.473
	2	0.65	1.28	125	0.74	1.69	111	-0.46	204	0.645
	3	1.38	3.66	26	0.67	1.11	33	0.97	29	0.342
	4	0.46	1.39	13	0.15	0.49	20	0.78	14	0.450
	5	1.50	1.76	6	0.77	1.24	13	0.92	7	0.388
	6+	0.75	1.49	8	1.08	2.29	13	-0.40	19	0.696
Q2	1	1.38	2.01	125	1.13	1.52	100	1.08	222	0.282
	2	1.64	2.35	179	1.58	2.91	76	0.17	119	0.867
	3	1.73	1.96	99	1.47	2.23	59	0.72	110	0.473
	4	1.65	2.17	89	2.19	3.55	36	-0.85	46	0.397
	5	2.10	2.15	31	1.81	2.74	16	0.36	25	0.721
	6+	1.54	2.59	24	0.47	0.94	17	1.86	31	0.072
Q3	1	1.63	2.06	30	2.00	2.24	23	-0.61	45	0.543
	2	2.40	3.01	88	1.59	2.20	41	1.73	104	0.087
	3	2.42	3.34	92	2.81	3.82	32	-0.51	49	0.616
	4	3.08	2.68	71	2.00	2.39	36	1.84	99	0.069
	5	3.73	4.30	40	1.79	2.55	19	2.15	54	0.036
	6+	2.60	3.47	10	2.78	4.44	9	-0.10	15	0.924
Q4	1	2.85	3.10	13	2.29	3.30	7	0.37	12	0.718
	2	3.10	4.28	73	2.80	3.38	40	0.40	97	0.687
	3	2.79	3.46	115	2.39	2.82	46	0.76	101	0.449
	4	2.81	2.99	106	4.00	4.09	44	-1.74	63	0.086
	5	3.28	3.45	43	2.20	2.65	15	1.25	32	0.221
	6+	3.36	4.14	14	4.57	3.87	7	-0.66	13	0.520

a   DF is based on the assumption of unequal variance, so it is smaller than the conventional DF which equals (N1+N2-2).

b   PROB>T indicates the probability of obtaining a greater absolute value of T. The smaller the PROB>T, the greater the chances that the differences between the means of the two periods are significantly greater than zero (i.e., the null hypothesis is rejected). For the cells marked with an asterisk, the null hypothesis is rejected with the probability of error of P > 0.1.

tests, the pre-Memorial Day subsample was used for analyzing trip rates and transportation characteristics of the region; the entire set of completed interviews was maintained for future reference.

III. Pre-Memorial Day trip tables adjusted for zero-trip households

Tables E-7, E-8, and E-9 show the means, standard deviation (SD), coefficient of variation (CV), standard error (SE), and sample size (N) for each cell of the pre-Memorial Day cross-classification tables. The adjustments for zero-trip households were made based on the principle discussed in Appendix I.

TRIP PRODUCTIONS
PRE-MEMORIAL DAY RATES
PERSON TRIPS PER HOUSEHOLD
NCTCOG 1984 HOME INTERVIEW SURVEY

HBW

Quartile		1 Person	2 Persons	3 Persons	4 Persons	5 Persons	6+ Persons
		Household Size					
Q1	Mean	0.646	0.950	2.714	1.846	1.000	2.875
	SD	0.975	1.254	1.554	1.281	1.095	1.808
	CV	1.509	1.320	0.573	0.694	1.095	0.629
	SE	0.121	0.162	0.339	0.355	0.447	0.639
	N	65	60	21	13	6	8
Q2	Mean	1.204	1.970	2.423	2.864	2.667	3.300
	SD	0.894	1.517	1.729	1.796	1.810	1.720
	CV	0.743	0.770	0.714	0.627	0.679	0.521
	SE	0.086	0.131	0.205	0.221	0.369	0.369
	N	108	134	71	66	24	20
Q3	Mean	1.552	2.267	2.812	2.824	3.696	3.846
	SD	1.088	1.591	1.602	1.871	2.537	2.035
	CV	0.701	0.702	0.510	0.663	0.687	0.529
	SE	0.202	0.130	0.148	0.196	0.374	0.564
	N	29	150	112	91	46	13
Q4	Mean	1.000	2.800	2.848	3.198	3.439	5.286
	SD	0.894	1.481	1.618	2.380	2.589	3.268
	CV	0.894	0.529	0.568	0.744	0.753	0.618
	SE	0.270	0.178	0.153	0.231	0.404	0.873
	N	11	69	117	106	41	14

Notes: SD = Standard Deviation
        CV = Coefficient of Variation (SD/Mean)
        SE = Standard Error
        N = Number of Households

E.10

TRIP PRODUCTIONS
PRE-MEMORIAL DAY RATES
PERSON TRIPS PER HOUSEHOLD
NCTCOG 1984 HOME INTERVIEW SURVEY

HNW

Household Size						
Quartile		1 Person	2 Persons	3 Persons	4 Persons	5 Persons	6+ Persons
Q1	Mean	2.185	3.167	3.524	6.385	4.833	6.875
	SD	1.919	2.787	4.203	7.827	2.858	6.707
	CV	0.878	0.880	1.193	1.226	0.591	0.976
	SE	0.238	0.360	0.917	2.171	1.167	2.371
	N	65	60	21	13	6	8
Q2	Mean	1.620	2.791	4.028	5.682	8.000	7.700
	SD	1.458	2.684	3.355	4.531	5.517	5.777
	CV	0.900	0.962	0.833	0.797	0.690	0.750
	SE	0.140	0.232	0.398	0.558	1.126	1.292
	N	108	134	71	66	24	20
Q3	Mean	1.724	2.740	4.205	7.780	8.478	8.385
	SD	1.709	2.547	3.881	5.968	5.876	8.761
	CV	0.991	0.565	0.923	0.767	0.693	1.045
	SE	0.317	0.208	0.359	0.626	0.866	2.340
	N	29	150	117	91	46	13
Q4	Mean	2.455	3.145	4.527	6.840	8.927	14.143
	SD	3.357	3.098	3.244	4.703	5.261	13.811
	CV	1.367	0.985	0.717	0.688	0.589	0.977
	SE	1.012	0.373	0.307	0.457	0.822	3.691
	N	11	69	112	106	41	14

Notes: SD = Standard Deviation
        CV = Coefficient of Variation (SD/Mean)
        SE = Standard Error
        N = Number of Households

TRIP PRODUCTIONS
PRE-MEMORIAL DAY RATES
PERSON TRIPS PER HOUSEHOLD
NCTCOG 1984 HOME INTERVIEW SURVEY

NHB

Quartile		Household Size					
		1 Person	2 Persons	3 Persons	4 Persons	5 Persons	6+ Persons
Q1	Mean	0.739	0.883	1.714	0.462	1.500	0.750
	SD	1.290	1.530	4.014	1.391	1.761	1.488
	CV	1.746	1.733	2.342	3.011	1.174	1.984
	SE	0.160	0.198	0.876	0.386	0.719	0.526
	N	65	60	21	13	6	8
Q2	Mean	1.611	1.657	2.014	1.500	2.208	1.800
	SD	2.113	2.413	2.101	2.040	2.245	2.746
	CV	1.312	1.456	1.043	1.360	1.017	1.536
	SE	0.203	0.208	0.249	0.251	0.458	0.618
	N	108	134	71	66	24	20
Q3	Mean	1.690	2.093	2.188	2.989	3.522	2.077
	SD	2.072	2.681	3.135	3.542	4.135	3.174
	CV	1.226	1.281	1.433	1.185	1.174	1.528
	SE	0.385	0.219	0.290	0.371	0.610	0.880
	N	29	150	117	91	46	13
Q4	Mean	3.364	3.275	2.866	2.821	3.463	3.357
	SD	3.107	4.335	3.478	3.004	3.508	4.144
	CV	0.924	1.324	1.213	1.065	1.013	1.234
	SE	0.937	0.522	0.329	0.292	0.548	1.107
	N	11	69	112	106	41	14

Notes: SD = Standard Deviation
      CV = Coefficient of Variation (SD/Mean)
      SE = Standard Error
      N = Number of Households

APPENDIX F

HOME INTERVIEW SURVEY
DATA SET EXPANSION

APPENDIX F

HOME INTERVIEW SURVEY
DATA SET EXPANSION

This Appendix documents the procedures by which the Home Interview Survey sample was factored to the population. Part of this process involved distributing Transportation Study Area (TSA) households in accordance with a targeted marginal distribution of households (cross-classified by household size and income quartile) using the Iterative Proportional Fitting (IPF) technique. This weighting does not influence trip rates, but rather provides a more accurately weighted distribution of other survey data such as trip length or auto occupancy. The following steps were involved in the procedure:

Step 1 - Cross-tabulate the TSA households by household size and income quartile: The latest year for which such a cross-classification could be obtained was 1980. Table F-1 shows the 1980 Census distribution of the TSA households by income quartile (in 1979 dollars) and household size.

Step 2 - Adjust the 1980 household size distribution to the targeted 1984 distribution: This adjustment was needed so that the decline in the average household size in the CMSA from 2.74 in 1980 to 2.55 in 1984 would be reflected in the cross-classification of Table 1. Since no micro-level data was available beyond 1980, the 1984 household size distribution was extrapolated using the existing 1985 and 1980 data.[1] The extrapolation produced the marginal row percentages shown in Table F-2. The marginal column percentages in Table F-2 are uniformly 25 percentage points, which is based on a grouping of households into income quartile.

TABLE F-1

1980 TSA HOUSEHOLDS BY HOUSEHOLD SIZE
AND INCOME QUARTILE

Household Size FREQUENCY PERCENT ROW PCT COL PCT	Income Quartile				
	1	2	3	4	Total
1	6802 12.64 56.09 47.83	3447 6.40 28.42 25.75	1281 2.38 10.56 9.74	598 1.11 4.93 4.57	12128 22.53
2	3937 7.31 23.34 27.69	4461 8.29 26.44 33.33	4363 8.10 25.86 33.17	4108 7.63 24.35 31.42	16869 31.34
3	1543 2.87 15.86 10.85	2323 4.32 23.87 17.35	2887 5.36 29.67 21.95	2978 5.53 30.60 22.77	9731 18.08
4	966 1.79 11.26 6.79	1754 3.26 20.44 13.10	2662 4.94 31.02 20.24	3199 5.94 37.28 24.46	8581 15.94
5	522 0.97 13.21 3.67	820 1.52 20.75 6.13	1239 2.30 31.35 9.42	1371 2.55 34.69 10.48	3952 7.34
6	450 0.84 17.49 3.16	581 1.08 22.58 4.34	720 1.34 27.98 5.47	822 1.53 31.95 6.29	2573 4.78
Total	14220 26.41	13386 24.87	13152 24.43	13076 24.29	53834 100.00

Source: Public-Use Micro Data Sample, 1980 Census, NCTCOG

PERCENT DISTRIBUTION OF HOUSEHOLDS
BY SIZE AND INCOME QUARTILES
ITERATIVE PROPORTIONAL FITTING TECHNIQUE
1984 TSA HOUSEHOLDS

Household \ Quartile	Q1	Q2	Q3	Q4	Total
1	12.396	7.061	2.804	1.338	23.600
2	7.419	9.238	9.438	9.306	35.400
3	2.382	4.042	5.450	5.636	17.510
4	1.517	3.023	4.848	5.942	15.330
5	0.864	1.075	1.661	1.850	5.450
6+	0.422	0.560	0.799	0.929	2.710
Total	25.000	25.000	25.000	25.000	100.000

Note: Household size distribution was adjusted to reflect changes between the 1980 Census distribution and 1985.

Step 3 - Estimate the total 1984 TSA households: The number of households in the TSA in 1984 was estimated to be 1,187,400. This figure was based on the revised NCTCOG population estimate of 3,452,000 for the region in 1984 and assumed that the average household size was 2.55 and that the TSA was 14 percent smaller than the NCTCOG region.

Step 4 - Through the IPF technique,[2] obtain the 1984 distribution of households among the standard cross-classification cells: The IPF technique involved the redistribution of the 1,187,400 TSA households among the 24 cells of the cross-classification matrix of households by size and income quartile. This redistribution was done in such a manner that the targeted row and column marginals in Step 2 were maintained and produced cell distributions which conformed to them. IPF involved a weighting process that assigned a weight to each individual cell which was the product of the factors for each characteristic (Tables F-2 and F-3).

Step 5 - Calculate the weights for factoring the sample to the 1984 TSA level: The weights were obtained by dividing the cell frequencies of Table F-3 by the corresponding cell frequencies from the sample (which in this case was the pre-Memorial Day subset) cross-classification (Table F-4). Table F-5 contains the set of weights used to multiply the sample trip frequencies so that an estimate of the total volume of trips for the TSA was obtained.

TABLE F-3

FREQUENCY DISTRIBUTION OF THE TSA HOUSEHOLDS
ITERATIVE PROPORTIONAL FITTING
1984 ESTIMATES

Income Quartile \ Household Size	1	2	3	4	5	6+	Total
Q1	147,189	88,094	28,285	18,017	10,257	5,009	296,851
Q2	83,847	109,686	48,001	35,893	12,770	6,653	296,850
Q3	33,299	112,066	64,712	57,567	19,723	9,484	296,851
Q4	15,892	110,494	66,916	70,551	21,964	11,033	296,850
Total	280,227	420,340	207,914	182,028	64,714	32,179	1,187,402

Note: The cell frequencies were based on the distribution generated using the Iterative Proportional Fitting Technique (Table F-2).

TABLE F-4

DISTRIBUTION OF THE SURVEY HOUSEHOLDS
BY SIZE AND INCOME QUARTILES
PRE-MEMORIAL DAY SUBSET
1984 HOME INTERVIEW SURVEY

Income Quartile / Household Size	1	2	3	4	5	6+	Total
Q1	87	107	24	13	6	8	245
Q2	117	173	98	88	31	24	531
Q3	29	87	93	72	40	10	331
Q4	11	72	114	106	42	14	359
Total	244	439	329	279	119	56	1,466

Note: The number of households reflects cell-by-cell adjustments for the number of zero-trip households.

F.6

TABLE F-5

1984 HOME INTERVIEW SURVEY
PRE-MEMORIAL DAY SUBSET
WEIGHTING FACTORS

Income Quartile \ Household Size	1	2	3	4	5	6+
1	1,692	823	1,179	1,386	1,710	626
2	717	634	490	408	412	277
3	1,148	1,288	696	800	493	948
4	1,445	1,535	587	666	523	788

Notes

[1] Extrapolation of the 1984 household size distribution was based on the results of the 1985 surveys by Dallas Power and Light, Texas Power and Light, and the 1980 Census.

[2] Richard M. Johnson's documentation of the techniques referred to as "Marginal Weighting Program," published by Market Facts, Inc., 1972.

APPENDIX G

HOME INTERVIEW SURVEY
DIFFERENCE OF MEANS TESTS ON PERSON TRIP RATES:
THE SDHPT 1964 AND NCTCOG 1984 HOME INTERVIEW SURVEY TRIP TABLES

APPENDIX G

HOME INTERVIEW SURVEY
DIFFERENCE OF MEANS TESTS ON PERSON TRIP RATES:
THE SDHPT 1964 AND NCTCOG 1984 HOME INTERVIEW SURVEY TRIP TABLES

Many regional transportation models are constructed on the assumption that trip rates are stable over time and that the likelihood of significant changes in trip rates are small enough so that the results of a given survey can be used over an extended period of time without any need for repeated surveys.

The purpose of this Appendix is to test this assumption by running cell-by-cell tests of the Difference of Means for average trip rates per household in 1964 and 1984. The results of the tests of significance indicated that the 1984 rates were significantly different from the 1964 rates in 21 out of the 24 cells for the HBW rates, in 17 of the 24 cells for the HNW rates, and 18 of the 24 cells for NHB trips. Changing composition of trips was the primary reason for the large number of significant cell differences.

I. Assumptions and procedures

   A. Hypothesis: The null hypothesis maintained that the differences between the means in each pair of cells in the 1964 and 1984 trip tables were zero.

   B. T-Test: The t-statistic provided a measure for testing the null hypothesis. The larger the t-statistic, the greater the probability of rejecting the null hypothesis. Since the cell-by-cell standard deviation of the means for 1964 was not available, the following

formula which assumes equal dispersion around the means for the two
samples was used:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\widehat{\mathbb{G}} \bar{x}_1 - \bar{x}_2}$$

$$\widehat{\mathbb{G}} \bar{x}_1 - \bar{x}_2 = \mathbb{G} \sqrt{\frac{1}{N_1} + \frac{1}{N_2}}$$

$\bar{X}_1$ = Mean trip for cell i for 1984

$\bar{X}_2$ = Mean trip for cell i for 1964

$\mathbb{G}$ = Known Standard Error of the mean for 1984

$N_1 - N_2$ = Cell sample size for the 1984 survey - Assumed to be the same for 1964

$\widehat{\mathbb{G}} \bar{X}_1 - \bar{X}_2$ = Estimated Standard Error of the difference between the two means

Degrees of Freedom (DF) = $N_1 + N_2 - 2$

C. Conditions for Accepting or Rejecting the Test Statistics: The null
hypothesis was rejected if the calculated t-statistic was greater than
the t-value in the Student-t distribution table. This assumed that
DF = $N_1 + N_2 - 2$ with the probability of error for a two-tailed
test of 0.05.

D. Test Results: Tables G-1, G-2, and G-3 show the mean, standard
deviation, coefficient of variation, standard error of the trips per
household, and the sample size in each cell for the 1984 Survey.
Tables G-4, G-5, and G-6 show the 1964 trip rates. Table G-7 shows the
t-statistics for the difference between the 1964 and 1984 means. The

TRIP PRODUCTIONS
PRE-MEMORIAL DAY RATES
PERSON TRIPS PER HOUSEHOLD
NCTCOG 1984 HOME INTERVIEW SURVEY

HBW

Quartile		Household Size					
		1 Person	2 Persons	3 Persons	4 Persons	5 Persons	6+ Persons
Q1	Mean	0.646	0.950	2.714	1.846	1.000	2.875
	SD	0.975	1.254	1.554	1.281	1.095	1.808
	CV	1.509	1.320	0.573	0.694	1.095	0.629
	SE	0.121	0.162	0.339	0.355	0.447	0.639
	N	65	60	21	13	6	8
Q2	Mean	1.204	1.970	2.423	2.864	2.667	3.300
	SD	0.894	1.517	1.729	1.796	1.810	1.720
	CV	0.743	0.770	0.714	0.627	0.679	0.521
	SE	0.086	0.131	0.205	0.221	0.369	0.369
	N	108	134	71	66	24	20
Q3	Mean	1.552	2.267	2.812	2.824	3.696	3.846
	SD	1.088	1.591	1.602	1.871	2.537	2.035
	CV	0.701	0.702	0.510	0.663	0.687	0.529
	SE	0.202	0.130	0.148	0.196	0.374	0.564
	N	29	150	112	91	46	13
Q4	Mean	1.000	2.800	2.848	3.198	3.439	5.286
	SD	0.894	1.481	1.618	2.380	2.589	3.268
	CV	0.894	0.529	0.568	0.744	0.753	0.618
	SE	0.270	0.178	0.153	0.231	0.404	0.873
	N	11	69	117	106	41	14

Notes: SD = Standard Deviation
CV = Coefficient of Variation (SD/Mean)
SE = Standard Error
N = Number of Households

TRIP PRODUCTIONS
PRE-MEMORIAL DAY RATES
PERSON TRIPS PER HOUSEHOLD
NCTCOG 1984 HOME INTERVIEW SURVEY

HNW

Household Size						
Quartile	1 Person	2 Persons	3 Persons	4 Persons	5 Persons	6+ Persons
Q1 Mean	2.185	3.167	3.524	6.385	4.833	6.875
SD	1.919	2.787	4.203	7.827	2.858	6.707
CV	0.878	0.880	1.193	1.226	0.591	0.976
SE	0.238	0.360	0.917	2.171	1.167	2.371
N	65	60	21	13	6	8
Q2 Mean	1.620	2.791	4.028	5.682	8.000	7.700
SD	1.458	2.684	3.355	4.531	5.517	5.777
CV	0.900	0.962	0.833	0.797	0.690	0.750
SE	0.140	0.232	0.398	0.558	1.126	1.292
N	108	134	71	66	24	20
Q3 Mean	1.724	2.740	4.205	7.780	8.478	8.385
SD	1.709	2.547	3.881	5.968	5.876	8.761
CV	0.991	0.565	0.923	0.767	0.693	1.045
SE	0.317	0.208	0.359	0.626	0.866	2.340
N	29	150	117	91	46	13
Q4 Mean	2.455	3.145	4.527	6.840	8.927	14.143
SD	3.357	3.098	3.244	4.703	5.261	13.811
CV	1.367	0.985	0.717	0.688	0.589	0.977
SE	1.012	0.373	0.307	0.457	0.822	3.691
N	11	69	112	106	41	14

Notes: SD = Standard Deviation
CV = Coefficient of Variation (SD/Mean)
SE = Standard Error
N = Number of Households

TABLE G-3

TRIP PRODUCTIONS
PRE-MEMORIAL DAY RATES
PERSON TRIPS PER HOUSEHOLD
NCTCOG 1984 HOME INTERVIEW SURVEY

NHB

Household Size							
Quartile		1 Person	2 Persons	3 Persons	4 Persons	5 Persons	6+ Persons
Q1	Mean	0.739	0.883	1.714	0.462	1.500	0.750
	SD	1.290	1.530	4.014	1.391	1.761	1.488
	CV	1.746	1.733	2.342	3.011	1.174	1.984
	SE	0.160	0.198	0.876	0.386	0.719	0.526
	N	65	60	21	13	6	8
Q2	Mean	1.611	1.657	2.014	1.500	2.208	1.800
	SD	2.113	2.413	2.101	2.040	2.245	2.746
	CV	1.312	1.456	1.043	1.360	1.017	1.536
	SE	0.203	0.208	0.249	0.251	0.458	0.618
	N	108	134	71	66	24	20
Q3	Mean	1.690	2.093	2.188	2.989	3.522	2.077
	SD	2.072	2.681	3.135	3.542	4.135	3.174
	CV	1.226	1.281	1.433	1.185	1.174	1.528
	SE	0.385	0.219	0.290	0.371	0.610	0.880
	N	29	150	117	91	46	13
Q4	Mean	3.364	3.275	2.866	2.821	3.463	3.357
	SD	3.107	4.335	3.478	3.004	3.508	4.144
	CV	0.924	1.324	1.213	1.065	1.013	1.234
	SE	0.937	0.522	0.329	0.292	0.548	1.107
	N	11	69	112	106	41	14

Notes: SD = Standard Deviation
         CV = Coefficient of Variation (SD/Mean)
         SE = Standard Error
         N = Number of Households

G.5

TABLE G-4

HOME-BASED WORK TRIP PRODUCTIONS
(Person Trips per Household)

Income Quartile	Household Size			
	1	2	3-5	6+
1	0.588	1.443	1.942	2.256
2	0.743	1.565	2.043	2.347
3	0.930	1.730	2.197	2.491
4	1.131	1.904	2.355	2.639

TABLE G-5

HOME-BASED NONWORK TRIP PRODUCTIONS
(Person Trips per Household)

Income Quartile	Household Size					
	1	2	3	4	5	6+
1	1.470	3.008	4.266	5.590	6.407	7.056
2	1.852	3.376	4.848	6.261	7.886	8.761
3	1.845	3.528	5.441	7.072	8.789	9.975
4	1.588	3.664	5.694	7.992	9.934	11.211

Correction -.0000392 -.0000728 -.0000383 -.0000473 -.0002007 -.0003379
(Coeff *HH75)
HH75 = Households within 0.75 miles (average = 1085)

TABLE G-6

NONHOME-BASED TRIP PRODUCTIONS
(Person Trips per Household)

Income Quartile	Household Size				
	1	2	3	4	5+
1	.588	.963	1.423	1.502	1.203
2	.755	1.265	1.797	1.821	1.846
3	1.195	1.555	2.084	2.383	2.322
4	0.731	1.732	2.352	2.606	3.043

TABLE G-7

TESTS OF DIFFERENCE OF MEANS
T-STATISTICS
1964 & 1984 TRIP TABLES

			HBW			
INCOME QUARTILES	1 Person	2 Persons	HOUSEHOLD SIZE 3 Persons	4 Persons	5 Persons	6+ Persons
Q1	2.76*	-16.71*	7.35*	-0.69	-3.65*	1.94
Q2	39.40*	25.31	11.05*	21.32*	5.83*	8.15*
Q3	11.74*	35.80*	32.37*	21.62*	19.22*	6.13
Q4	-1.139	29.87*	24.65*	26.34*	12.18*	8.02*
			HNW			
INCOME QUARTILES	1 Person	2 Persons	HOUSEHOLD SIZE 3 Persons	4 Persons	5 Persons	6+ Persons
Q1	17.02*	2.42*	-2.61*	0.93	-2.34*	-0.15
Q2	12.21*	-20.89*	-12.24*	-5.97*	0.35	-2.60*
Q3	1.46	-32.83*	26.30*	7.61*	-1.71	-1.67
Q4	2.01	-9.44*	-28.46*	18.29*	-5.53*	2.10*
			NHB			
INCOME QUARTILES	1 Person	2 Persons	HOUSEHOLD SIZE 3 Persons	4 Persons	5 Persons	6+ Persons
Q1	5.39*	-2.22*	1.07	-6.89*	.716	-1.72
Q2	30.57*	15.68*	5.17*	7.29*	2.74*	-0.24
Q3	4.90*	21.52*	2.74*	11.02*	9.38*	-0.71
Q4	6.58*	17.34*	11.68*	5.38*	3.47*	0.75

asterisks identify the cells for which the null hypothesis was rejected. For HBW trips, the null hypothesis was rejected in 21 out of 24 cells. This suggests that in 21 cells, the differences were greater than what could be attributed to random variations. The negative signs of the t-statistics indicated that only in two cells were the 1964 rates significantly higher than 1984. The direction of change in the other 19 cells had been toward higher rates in 1984.

For HNW trips, Table G-7 suggests that the null hypothesis was rejected in 17 out of 24 cells. Thirteen of the 17 significant cells showed a negative t-statistic, which indicated that the 1984 rates in those cells were significantly lower than 1964. This result was consistent with the overall trend in the Survey in the direction of reduced frequency of HNW trips per household.

For NHB trips, Table G-7 suggests that the null hypothesis was rejected in 18 out of 24 cells. Sixteen of the significant cells showed a positive sign, indicating that the 1984 NHB trip averages were higher than 1964. In two other cells, the 1964 averages were significantly higher than the 1984 averages.

E. Evaluation: The changing composition of trips in the Dallas-Fort Worth area led to significant statistical differences in trip rates when comparing the disaggregated 1984 and 1964 trip tables. Tests of differences of means on the disaggregated trip tables suggested that in four out of five HBW rates, the 1984 rates were higher than 1964, that in over two out of three of the HNW rates, the 1984 rates were lower

than 1964; and that in two out of three of the NHB rates, the 1984 rates were higher than 1964.

APPENDIX H

HOME INTERVIEW SURVEY
TRIP-LINKING PROCEDURES AND IMPACT

APPENDIX H

HOME INTERVIEW SURVEY
TRIP-LINKING PROCEDURES AND IMPACT

The NCTCOG trip rates were based on linked trips. The software used for this purpose was "TRIPLINK" which was documented in the MTAP program files. The trip-linking method was designed to produce a more accurate account of trips by purpose. The purpose of this Appendix is to: 1) outline the linking processes which were followed in the analysis of the 1984 Survey results and, 2) discuss changes in trip records and trip rates subsequent to linking to see the overall impact of linking on the frequency and composition of trips.

I. Linking process

There were three types of trips which were candidates for linking:

1) Trips which ended with a purpose of serving a passenger,

2) Trips which ended with a purpose of changing mode, and

3) Trips which ended with a purpose of ride.

Only trips which were home-based work or home-based nonwork were linked. The first candidate for trip linking was a trip made for the purpose of serving a passenger. From a trip generation standpoint, better trip purposes were obtained if, for instance, the trip a person made from home to drop off his/her spouse at the bus stop (before going to work) was designated as a home-based work trip rather than a home-based nonwork trip and a nonhome-based trip. Trip-linking procedures arrived at the principal purpose of this trip by linking out the intermediate trip to

H.1

the bus stop. The unlinked trips generated from the two trips above were coded as follows:

1) Home to serve passenger

2) Serve passenger to work

Trip linking yielded a single trip coded as "home to work" and created a new field ("Link Flag") which had a "2" in it, indicating the number of trips which were combined to form the final single trip.

The second candidate for trip linking was a ride trip. To illustrate, if the above driver had, in addition to the first passenger, a school-age child who needed to be driven to school, the driver and the school-age child recorded the following six trips:

Driver: 1) Home to serve passenger

                  2) Serve passenger to serve passenger

                  3) Serve passenger to work

School-age Child: 1) Home to ride

                  2) Ride to ride

                  3) Ride to school

Trip linking reduced the above six trips to two single trips: one home-to-work trip for the driver and one home-to-school trip for the school-age child. The Link Flag for each trip was a "3," indicating the number of trips that had been combined.

The third candidate for linking was a trip made to change mode. To illustrate, a person who drove from home to the bus stop where he/she caught a bus to work reported the following trips:

1) Home to change mode

2) Change mode to work

Trip linking combined the above two trips into a single home-to-work trip, and the Link Flag indicated that two trips had been combined.

An exception to the above rules was when linking resulted in a home-to-home trip. A person who drove a passenger to the bus stop and then drove back home, for instance, would record the following trips:

1) Home to serve passenger

2) Serve passenger to home

The above trips were not linked since doing so would have obscured the principal purpose of the trip. In a case such as above where the driver's "serve passenger" trips were not linked but the passenger's "change-mode" trips were, adjustments needed to be made on the travel mode and auto occupancy of the automobile trips made by the driver and the passenger. Initially, the following trips were recorded by the driver and the passenger:

	Purpose From	Purpose To	Travel Mode	Occupancy (if Auto Driver)
Driver	Home	Serve Passenger	Auto (Driver)	2
	Serve Passenger	Home	Auto (Driver)	1
Passenger	Home	Work	Auto (Passenger)	X (not a driver)

II. Changes in trip records subsequent to linking

After the "change-mode" trips of the passenger were linked to form a single "home-to-work" trip, the auto occupancy and travel mode of the trips with identical start/arrival times and origin/destination codes were switched. The purpose of the switch was to record the true purpose of the vehicle trip (i.e., home-to-work). The coding changes after linking were as follows:

	Purpose From	Purpose To	Travel Mode	Occupancy (if Auto Driver)
Driver	Home	Serve Passenger	Auto (Passenger)	X (not a driver)
	Serve Passenger	Home	Auto (Driver)	1
Passenger	Home	Work	Auto (Driver)	

In essence, the above coding changes imparted the same information on auto occupancy and travel mode but on different travelers.

The linking process resulted in the following changes in the trip records:

a) Added a new field ("Link Flag") to identify the number of combined trip records

b) From the first trip record, the following information was kept on the new linked trip:

● TSZ of origin

● Trip purpose of the origin (i.e., the trip purpose from)

● Land use of origin

● Trip start time

● Mode of travel

H.4

- Transit fare/parking cost

- Mode of access

c) From the last trip record, the following information was kept on the new linked trip:

- TSZ of destination

- Trip purpose of the destination (i.e., the trip purpose to)

- Land use at destination

- Trip arrival time

d) For auto and carpool/vanpool occupancy information, the largest number found in the linked trip segments was used.

III. Effects of trip linking

Table H-1 shows the results of the trip-linking process performed on 20,209 trip records with which the Home Interview Survey began. A total of 1,381 trips (6.38 percent of total trips) were linked, the majority of which (63 percent) were "serve passenger" linkages. Not all trip purposes were affected equally by the linking. There were net gains of 9.26 percent in HBW trips, 5.31 percent in home-based shop trips, and 9.58 percent in home-based school trips. Other HNW trips, however, suffered a net decline due to the predominance of the linkable trips among this residual group of trips. Nonhome-based trips experienced the largest percentage decline of 23.5 percent.

To conclude, trip linking generated a more accurate picture of the composition of trips in a region by eliminating the intermediate trips which would distort the principal purpose of a trip. Linked trips, therefore, were more suitable for forecasting a region's transportation

needs and especially public transit ridership. Because linking shifted the share of each trip purpose, it was important that linked survey results be compared with comparably linked surveys, with care taken when linked and unlinked trips were compared.

TABLE H-1

1984 HOME INTERVIEW SURVEY
TRIP RECORDS BY PURPOSE, BEFORE AND AFTER LINKING

	Before Linking		After Linking		Percent Change After Linking
	Trips	Percent	Trips	Percent	
Home-based work	4,741	23.46	5,180	27.51	+ 9.26
Home-based nonwork	9,592	47.46	9,153	48.61	- 4.58
Shop	(2,022)	(10.01)	(2,130)	(11.31)	+ 5.34
School	(1,191)	(5.89)	(1,304)	(6.93)	+ 9.58
Other	(6,379)	(31.57)	(5,719)	(30.37)	-10.35
Nonhome-based	5,876	29.08	4,495	23.87	-23.50
Total	20,209	100.00	18,828	100.00	- 6.83

Note: Of the total of 1,381 trips which were linked, 868 (63 percent) were serve passenger linkages, 106 trips (7.68 percent) were change-mode linkages, and 407 (29.47 percent) were ride linkages.

APPENDIX I

HOME INTERVIEW SURVEY
ADJUSTMENT FOR ZERO-TRIP HOUSEHOLDS

HOME INTERVIEW SURVEY
ADJUSTMENT FOR ZERO-TRIP HOUSEHOLDS

The 1984 Survey overestimated the number of zero-car and zero-trip households because the original sample design called for an oversampling of households which had no cars. The purpose of this Appendix is to, first, arrive at a closer approximation of the "true" proportion of households which would make no trips during an average day and, second, suggest adjustments in the household base for calculating trip rates. Though the adjustments which are suggested here are for the entire sample, similar principles apply to adjustments to the pre-Memorial Day sample.

I. The "true" proportion of zero-trip households

Since the 1984 Survey overestimated the proportion of zero-trip households, the figures in Table I-1 were used to suggest ways of correcting the bias. Table I-1 shows that in 1964, 10 percent of all households were without cars and 7 percent took no trips. This suggested that in 1964, 70 percent of the households with no cars made no trips. The 1980 Census of the CMSA showed that only 3.7 percent of the households made zero-vehicular work trips, indicating that for all trip purposes, this proportion would be higher. If the 1964 ratio was assumed to be correct and stayed constant over time, the downward bias in the percentage of zero-trip households in 1980 could be corrected by maintaining that in 1980, too, 70 percent of the zero-car households made no trips (i.e., 6.6 * .7 = 4.62). The corrected 1980 rate for zero-trip households, then, was 4.62 which could be used to correct for the bias in the 1984 sample. Applying this rate to the sample allowed for the reestimation of the

proportion of the households that were likely to fall in the zero-trip category.

TABLE I-1

RELATIONSHIP OF ZERO-CAR AND ZERO-TRIP HOUSEHOLDS

	1964 Survey	1980 CMSA Census	1984 Survey
Percent Zero-Trip Households	7%	3.7% *	10%
Percent Zero-Car Households	10%	6.6%	8.3%

* The 1980 figure refers to the percent of households which made no vehicular trips to work. It, therefore, underestimates the percent of zero-trip households in 1980.

II. Adjustments in the sample households

Table I-2 shows the actual distribution of the original zero-trip households by size and income quartile. By applying the correction factor, 4.62 percent of the households (i.e., 114 instead of the original 242 households) were left in the base (in cells marked) as zero-trip households. The remaining 128 households were subtracted from the base in order to correct for the oversampling of zero-trip households. Tables I-3 and I-4 show the new household base (adjusted total for the sample households = 2,343) used for calculating trip rates and the old base before the adjustment. The tables refer to the entire HIS sample, though the same principles apply to the pre-Memorial Day subset.

TABLE I-2

DISTRIBUTION OF THE ORIGINAL ZERO-TRIP HOUSEHOLDS
1984 HIS SAMPLE

H O U S E H O L D   S I Z E

Income Quartile	1	2	3	4	5	6+	Total
1	89 (36.78)	59 (24.38)	8 (3.31)	3 (1.24)	0 (0.00)	1 (0.41)	160 66.12
2	26 (10.74)	19 (7.85)	7 (2.89)	4 (1.65)	0 (0.00)	1 (0.41)	57 23.55
3	4 (1.65)	5 (2.07)	0 (0.00)	1 (0.41)	2 (0.83)	0 (0.00)	12 4.96
4	3 (1.24)	4 (1.65)	4 (1.65)	0 (0.00)	2 (0.83)	0 (0.00)	13 5.37
Total	122 50.41	87 35.95	19 7.85	8 3.31	4 1.65	2 0.83	242* 100.00

Source: NCTCOG 1984 Home Interview Survey

Note: Figures in parentheses are each cell's percentage of the total number of households.

*   The adjusted number of zero-trip households is 114 (i.e., total households multiplied by the adjustment factor, or 2471 * 0.0462).

TABLE I-3

DISTRIBUTION OF THE 1984 HIS SAMPLE HOUSEHOLDS
ADJUSTED FOR ZERO-TRIP HOUSEHOLDS

H O U S E H O L D   S I Z E

Income Quartile	1	2	3	4	5	6+	Total
1	238 (10.16)	202 (8.62)	51 (2.18)	30 (3.33)	19 (0.81)	20 (0.85)	560 23.90
2	199 (8.49)	236 (10.07)	151 (6.44)	121 (5.16)	47 (2.01)	40 (1.71)	794 33.89
3	49 (2.4)	124 (5.29)	124 (5.29)	106 (4.52)	57 (2.43)	19 (0.81)	479 20.44
4	17 (0.73)	109 (4.65)	157 (6.70)	150 (6.40)	56 (1.79)	21 (0.90)	510 21.77
Total	503 21.47	671 28.64	483 20.61	407 17.37	179 7.64	100 4.27	2,343 100.00

Source: NCTCOG 1984 Home Interview Survey.

Note: Figures in parentheses are each cell's percentage of the total number
         of households.

TABLE I-4

DISTRIBUTION OF THE ORIGINAL 1984 HIS SAMPLE HOUSEHOLDS
BEFORE ADJUSTMENT FOR ZERO-TRIP HOUSEHOLDS

H O U S E H O L D   S I Z E

Income Quartile	1	2	3	4	5	6+	Total
1	238 (9.63)	236 (9.55)	59 (2.39)	33 (1.34)	19 (0.77)	21 (0.85)	606 24.52
2	225 (9.11)	255 (10.32)	158 (6.39)	125 (5.06)	47 (1.90)	41 (1.66)	851 34.44
3	53 (2.14)	129 (5.22)	124 (5.02)	107 (4.33)	59 (2.39)	19 (0.77)	491 19.87
4	20 (0.81)	113 (4.57)	161 (6.52)	150 (6.07)	58 (2.35)	21 (0.85)	523 21.17
Total	536 21.69	733 29.66	502 20.32	415 16.79	183 7.41	102 4.13	2471 100.00

Source: NCTCOG 1984 Home Interview Survey

Note: Figures in parentheses are each cell's percentage of the total number of households.

APPENDIX J

HOME INTERVIEW SURVEY
DISTRIBUTION OF PERSON TRIPS BY TIME OF DAY

HOME INTERVIEW SURVEY
DISTRIBUTION OF PERSON TRIPS BY TIME OF DAY

This Appendix identifies peak-hour travel times by showing the distribution of person trips by time of day for each trip purpose. The data is based on the weighted pre-Memorial Day subset of the 1984 Home Interview Survey.

Table J-1 shows the percent distribution of travel start times over an average survey day for each trip purpose. Figure J-1 shows a graph of these travel times by individual purpose as well as all trip purposes combined.

Figure J-1 indicates that, for all trips combined, the morning peak is between 7-8 a.m., and the afternoon peak is between 5-6 p.m. The peaks of home-based work (HBW) trips coincided with those of total trips, while peaks for home-based nonwork (HNW) trips occurred later at 8-9 a.m. and 6-7 p.m. Nonhome-based (NHB) trips had a single peak which occurred between 12 noon and 1 p.m.

TABLE J-1

PERCENTAGE DISTRIBUTION OF THE TRIP START TIMES
1984 HOME INTERVIEW SURVEY

A.M. TRIPS

TIME	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
HBW	0.58	0.22	0.21	0.28	0.59	2.40	10.66	19.27	9.64	2.70	1.49	1.67
HNW	0.46	0.21	0.09	0.00	0.03	0.28	0.93	5.70	7.29	3.71	4.99	4.94
NHB	0.15	0.15	0.10	0.02	0.02	0.15	0.42	1.48	3.04	5.16	7.31	10.50
TOTAL	0.41	0.20	0.13	0.08	0.17	0.81	3.38	8.22	6.83	3.81	4.66	5.49

P.M. TRIPS

TIME	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
HBW	2.45	2.04	2.80	6.08	11.94	12.94	4.94	2.00	1.33	1.69	1.24	0.82
HNW	4.06	4.36	5.30	8.10	7.59	8.36	10.17	8.62	5.77	5.82	2.28	0.97
NHB	14.68	9.88	9.10	8.98	7.43	7.56	3.88	4.47	2.55	1.45	1.29	0.20
TOTAL	6.35	5.15	5.61	7.79	8.70	9.37	7.18	5.80	3.77	3.61	1.75	0.73

FIGURE J-1

TRIPS BY TIME OF DAY
NCTCOG 1984 SURVEY
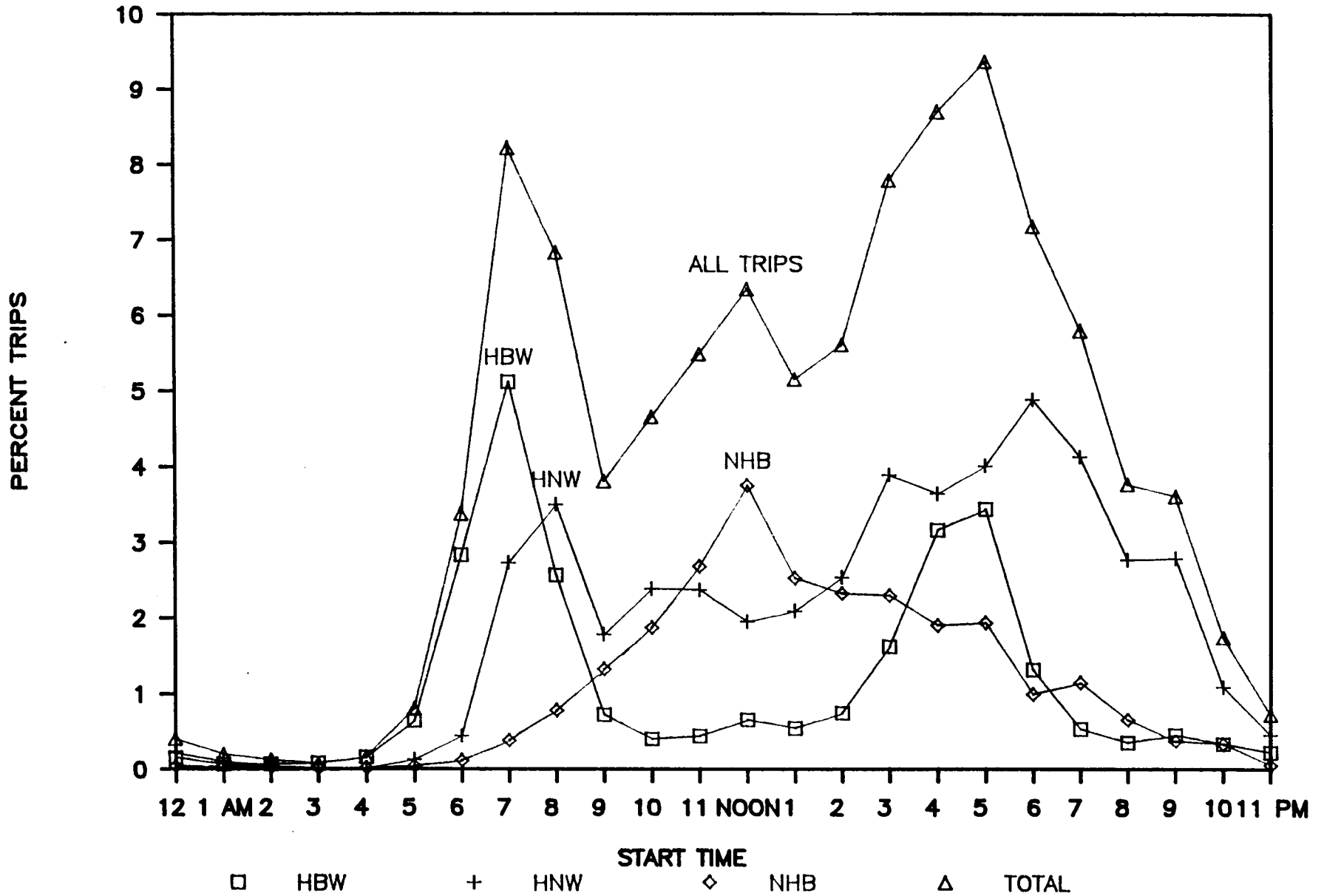
J.3

<u>APPENDIX K</u>

HOME INTERVIEW SURVEY
DATA FILE DOCUMENTATION

1984 HOME INTERVIEW SURVEY

HIS DATA FILE FORMAT DESCRIPTION

1. File Description: <u>A new merge of the entire trip file with the household records. In addition to</u> <u>the customary household variables, the file contains a field for occupation of the trip maker to</u> <u>identify captive auto drivers; does not reflect the latest geocoding corrections.</u>

2. DS Name: <u>@TS.HISLINKED.NEW.COMBINED.JUNE03 OBS = 20,342</u>

3. Tape Number: <u>VOL = SER = 008529, LABEL = 33</u>

4. Blocksize: <u>BLKSIZE = 6,400, LRECL = 64, RECFM = FB</u>

Var #	Columns	Width	Type	Unit	Range	Symbol	Variable Description
1	1	1	I	----	2	RECTYPE	Trip Record
2	2-5	4	I	----	1-19040	SAMP_NUM	Sample Number
3	6-7	2	I	----	1-99	PER_NUM	Personal Number
4	8-9	2	I	----	1-99	TRIP_NUM	Trip Number
5	10	1	I	----	1-6	TRIPORCD	Trip Origin Address Code
6	11-15	5	I	CODE	1-9999	TSZ_OR	Trip Origin TSZ
7	16	1	I	CODE	1-6	TRIPDSCD	Trip Destination Code
8	17-21	5	I	CODE	1-9999	TSZ_DS	Trip Destination TSZ
9	22	1	I	CODE	0-9	TRIPPUFR	Trip Purpose - From
10	23	1	I	CODE	0-9	TRIPPUTO	Trip Purpose - To
11	24-25	2	C	CODE	00-9x	LANDUSOR	Land Use at Trip Origin
12	26-27	2	C	CODE	00-9x	LANDUSDS	Land Use at Destination
13	28-32	5	I	TIME	---	START	Trip Start Time
14	33-37	5	I	TIME	---	ARRIVE	Trip Arrival Time
15	38	1	I	MODE	1-9	TRAVMODE	Mode of Travel
16	39	1	C	PERSONS	0-9,x	ADNOCAR	If Auto Driver, # in Car
17	40	1	C	PERSONS	0-9,x	CVNOCAR	If Car/Vanpool, # in Vehicle
18	41	1	C	CODE	1-5,x	ACCESS	If Mode is Transit, Means of Access
19	42-45	4.2	R	$	01.00-99.99	FRPKCOST	Fare or Parking Cost
20	46	1	I	CODE	0-1	FLAG	0=Not Linked, 1=Linked
21	47	1	I	CODE	0-6	LINKS	0=Trip not Linked, 1-6=# of Trips Linked into 1
22	48-49	2	I	PEOPLE	1-19	PEOPLE	Number of People in Household

Var #	Columns	Width	Type	Unit	Range	Symbol	Variable Description
23	50	1	I	CARS	0-9	CARS	Cars Available to Household
24	51	1	C	CODE	A-J	INCOME	Household Income
25	52	1	C	CODE	1-9,A-F	OCCUP	Occupation of Trip Maker
26	53-56	4	I	CODE	1-9999	CITYCD	City Code
27	57	1	I	CODE	1-2	BA_SCH	Before/After Memorial Day
28	58-62	5	I	CODE	1-9999	TSZ_H	Home TSZ
29	63-64	2	I	TRIPS	0-99	TOTVTRIP	Total Vehicular Trips

I = Integer, C = Character, R = Real

TABLE K-2

1984 HOME INTERVIEW SURVEY

HIS DATA FILE FORMAT DESCRIPTION

1. File Description: The most recent pre-Memorial Day file containing both the household and trip records reflects the June 1987 geocoding corrections. New field for occupation contains only the pre-Memorial Day subset with the expansion weights.

2. DS Name: @TS.HIS.PREMEM.CLEAN.JULY87   OBS = 12,740

3. Tape Number: VOL = SER = 008529, LABEL = 43

4. Blocksize: BLKSIZE = 7,000, LRECL = 70, RECFM = FB

Var #	Columns	Width	Type	Unit	Range	Symbol	Variable Description
1	1	1	I	----	2	RECTYPE	Trip Record
2	2-5	4	I	----	1-19040	SAMP_NUM	Sample Number
3	6-7	2	I	----	1-99	PER_NUM	Personal Number
4	8-9	2	I	----	1-99	TRIP_NUM	Trip Number
5	10	1	I	----	1-6	TRIPORCD	Trip Origin Address Code
6	11-15	5	I	CODE	1-9999	TSZ_OR	Trip Origin TSZ
7	16	1	I	CODE	1-6	TRIPDSCD	Trip Destination Code
8	17-21	5	I	CODE	1-9999	TSZ_DS	Trip Destination TSZ
9	22	1	I	CODE	0-9	TRIPPUFR	Trip Purpose - From
10	23	1	I	CODE	0-9	TRIPPUTO	Trip Purpose - To
11	24-25	2	C	CODE	00-9x	LANDUSOR	Land Use at Trip Origin
12	26-27	2	C	CODE	00-9x	LANDUSDS	Land Use at Destination
13	28-32	5	I	TIME	---	START	Trip Start Time
14	33-37	5	I	TIME	---	ARRIVE	Trip Arrival Time
15	38	1	I	MODE	1-9	TRAVMODE	Mode of Travel
16	39	1	C	PERSONS	0-9,x	ADNOCAR	If Auto Drive, # in Car
17	40	1	C	PERSONS	0-9,x	CVNOCAR	If Car/Vanpool, # in Vehicle
18	41	1	C	CODE	1-5,x	ACCESS	If Mode is Transit, Means of Access
19	42-45	4.2	R	$	01.00-99.99	FRPKCOST	Fare or Parking Cost
20	46	1	I	CODE	0-1	FLAG	0=No Linking, 1=Linked Trip
21	47	1	I	CODE	0-6	LINKS	0=No Linking, 1-6=# of Trips Linked
22	48-49	2	C	PEOPLE	1-6	PEOPLE	People in Household

Var #	Columns	Width	Type	Unit	Range	Symbol	Variable Description
23	50	1	I	CARS	0-3	CARS	Cars Available to Household
24	51	1	C	CODE	A-J	INCOME	Household Income
25	52	1	C	CODE	1-9,A-F	OCCUP	Occupation of Trip Maker
26	53-56	4	I	CODE	1-9999	CITYCD	City Code
27	57	1	I	CODE	1-2	BA_SCH	Before/After Memorial Day
28	58-62	5	I	CODE	1-9999	TSZ_H	Home TSZ
29	63-64	2	I	TRIPS	0-99	TOTVTRIP	Total Vehicular Trips
30	65	1	I	CODE	1-4	QUARTILE	Household Income Quartile
31	66	1	I	CODE	1-3	PURPOSE	Purpose of the Trip
32	67	4	I	CODE	400-692	FACTOR	Weights for Expanding Pre-Memorial Day Sample

I = Integer, C = Character, R = Real

TABLE K-3

1984 HOME INTERVIEW SURVEY

HIS DATA FILE FORMAT DESCRIPTION

1. File Description: <u>The most recent file containing both the household and trip records reflects the June87 geocoding corrections. New field for occupation. Variable "factor" represents weights for expanding pre-Memorial Day subfile.</u>

2. DS Name: <u>@TS.HIS.TOTAL.CLEAN.JULY87   OBS = 18,840</u>

3. Tape Number: <u>VOL = SER = 008529, LABEL = 44</u>

4. Blocksize: <u>BLKSIZE = 7,000, LRECL = 70, RECFM = FB</u>

Var #	Columns	Width	Type	Unit	Range	Symbol	Variable Description
1	1	1	I	----	2	RECTYPE	Trip Record
2	2-5	4	I	----	1-19040	SAMP_NUM	Sample Number
3	6-7	2	I	----	1-99	PER_NUM	Personal Number
4	8-9	2	I	----	1-99	TRIP_NUM	Trip Number
5	10	1	I	----	1-6	TRIPORCD	Trip Origin Address Code
6	11-15	5	I	CODE	1-9999	TSZ_OR	Trip Origin TSZ
7	16	1	I	CODE	1-6	TRIPDSCD	Trip Destination Code
8	17-21	5	I	CODE	1-9999	TSZ_DS	Trip Destination TSZ
9	22	1	I	CODE	0-9	TRIPPUFR	Trip Purpose - From
10	23	1	I	CODE	0-9	TRIPPUTO	Trip Purpose - To
11	24-25	2	C	CODE	00-9x	LANDUSOR	Land Use at Trip Origin
12	26-27	2	C	CODE	00-9x	LANDUSDS	Land Use at Destination
13	28-32	5	I	TIME	---	START	Trip Start Time
14	33-37	5	I	TIME	---	ARRIVE	Trip Arrival Time
15	38	1	I	MODE	1-9	TRAVMODE	Mode of Travel
16	39	1	C	PERSONS	0-9,x	ADNOCAR	If Auto Driver, # in Car
17	40	1	C	PERSONS	0-9,x	CVNOCAR	If Car/Vanpool, # in Vehicle
18	41	1	C	CODE	1-5,x	ACCESS	If Mode is Transit, Means of Access
19	42-45	4.2	R	$	01.00 - 99.99	FRPKCOST	Fare or Parking Cost
20	46	1	I	CODE	0-1	FLAG	0=No Linking, 1=Linked Trip
21	47	1	I	CODE	0-6	LINKS	0=No Linking, 1-6=Trips Linked
22	48-49	2	C	PEOPLE	1-6	PEOPLE	People in Household

Var #	Columns	Width	Type	Unit	Range	Symbol	Variable Description
23	50	1	I	CARS	0-3	CARS	Cars Available to Household
24	51	1	C	CODE	A-J	INCOME	Household Income
25	52	1	C	CODE	1-9,A-F	OCCUP	Occupation of Trip Maker
26	53-56	4	I	CODE	1-9999	CITYCD	City Code
27	57	1	I	CODE	1-2	BA_SCH	Before/After Memorial Day
28	58-62	5	I	CODE	1-9999	TSZ_H	Home TSZ
29	63-64	2	I	TRIPS	0-99	TOTVTRIP	Total Vehicular Trips
30	65	1	I	CODE	1-4	QUARTILE	Household Income Quartile
31	66	1	I	CODE	1-3	PURPOSE	Purpose of the Trip
32	67	4	I	CODE	400-692	FACTOR	Weights for Expanding Pre-Memorial Day Sample

I = Integer, C = Character, R = Real

TABLE K-4

1984 HOME INTERVIEW SURVEY

HIS DATA FILE FORMAT DESCRIPTION

1. File Description: <u>Original Household Records: contains the original 2,471 households and 6,403</u> <u>person records.</u>

2. DS Name: <u>@TS.HIS.RECTYPE1.FINAL1, RECORDS = 6,403</u>

3. Tape Number: <u>VOL = SER = 006937, LABEL = 8</u>

4. Blocksize: <u>BLKSIZE = 18,000, LRECL = 40, RECFM = FB</u>

Var #	Columns	Bytes	Type	Unit	Range	Symbol	Variable Description
1	1	1	I	----	1	RECTYPE	Person Record
2	2-4	3	I	----	423-713	TRAVDATE	Travel Date
3	5-8	4	I	----	1-9999	SAMP_NUM	Sample Number
4	9-13	5	I	----	1-9999	TSZ_H	Valid TSZ
5	14	1	I	----	0-5	STRUCT	Structure Type
6	15-16	2	I	PERSONS	1-99	PEOPLE	Number of People Living at HH Address
7	17-18	2	I	PERSONS	1-99	PEOPLE_5	Number of People Age 5+ Living at HH Address
8	19	1	I	PERSONS	1-9	VISITORS	Number of Out-of-Area Visitors
9	20	1	I	CARS	1-9	CARS	Autos, Vans, Pickups available
10	21	1	C	CODE	A-J,0	INCOME	Household Income
11	22-23	2	I	----	1-99	PER_NUM	Person Number
12	24	1	I	CODE	1-2	INTERV	Was This Person Interviewed?
13	25	1	I	CODE	1-9	RELATION	Relation to Head of HH
14	26	1	I	CODE	0-9	AGE	Person's Age
15	27	1	I	CODE	1-2	SEX	Person's Sex
16	28		I	CODE	1-2	LICENSE	Is Person Licensed to Drive?
17	29	1	C	CODE	1-9 A-F	OCCUP	Occupation
18	30	1	C	CODE	1-9 A-x	INDUS	Industry
19	31	1	C	CODE	1-3	WORKED	Worked on Travel Day?
20	32	1	C	CODE	1-2	WORKTRIP	Made Trips While at Work?
21	33	1	C	CODE	1-2	OTHRTRP	Made Other Trips?
22	34-35	2	I	TRIPS	0-99	TOTVTRIP	Total Vehicular Trips

Var #	Columns	Width	Type	Unit	Range	Symbol	Variable Description
23	36-37	2	I	PERSONS	0-99	PPL5TRP	Persons Age 5+ Making Trips
24	38-39	2	I	PERSONS	0-99	PPL5NTRIP	Persons Age 5+ Not Making Trips
25	40	1	C	CODE	1-6,x	INTERVCD	Interview Code

I = Integer, C = Character, R = Real

TABLE K-5

1984 HOME INTERVIEW SURVEY

HIS DATA FILE FORMAT DESCRIPTION

1. File Description: <u>Original trip records: contains the 20,209 original Type 2 records after all the initial contingency checks were made.</u>

2. DS Name: <u>@TS.HIS.RECTYPE2.FINAL2, RECORDS = 20,209</u>

3. Tape Number: <u>VOL = SER = 006937, LABEL = 10</u>

4. Blocksize: <u>BLKSIZE = 19,035, LRECL = 47, RECFM = FB</u>

Var #	Columns	Bytes	Type	Unit	Range	Symbol	Variable Description
1	1	1	I	----	2	RECTYPE	Trip Record
2	2-5	4	I	----	1-19040	SAMP_NUM	Sample Number
3	6-7	2	I	----	1-99	PER_NUM	Personal Number
4	8-9	2	I	----	1-99	TRIP_NUM	Trip Number
5	10	1	I	----	1-6	TRIPORCD	Trip Origin Address Code
6	11-15	5	I	CODE	1-9999	TSZ_OR	Trip Origin TSZ
7	16	1	I	CODE	1-6	TRIPDSCD	Trip Destination Code
8	17-21	5	I	CODE	1-9999	TSZ_DS	Trip Destination TSZ
9	22	1	I	CODE	0-9	TRIPPUFR	Trip Purpose - From
10	23	1	I	CODE	0-9	TRIPPUTO	Trip Purpose - To
11	24-25	2	C	CODE	00-9x	LANDUSOR	Land Use at Trip Origin
12	26-27	2	C	CODE	00-9x	LANDUSDS	Land Use at Destination
13	28-32	5	I	TIME	---	START	Trip Start Time
14	33-37	5	I	TIME	---	ARRIVE	Trip Arrival Time
15	38	1	I	MODE	1-9	TRAVMODE	Mode of Travel
16	39	1	C	PERSONS	0-9,x	ADNOCAR	If Auto Driver, # in Car
17	40	1	C	PERSONS	0-9,x	CVNOCAR	If Car/Vanpool, # in Vehicle
18	41	1	C	CODE	1-5,x	ACCESS	If Mode is Transit, Means of Access
19	42-45	4.2	R	$	01.00 - 99.99	FRPKCOST	Fare or Parking Cost
20	46-47	2	I	----	---	---	Miscellaneous Codes - Ignore

1984 HOME INTERVIEW SURVEY

HIS DATA FILE FORMAT DESCRIPTION

1. File Description: <u>New linked trip records merged with household records. Pre-Memorial Day subset uses new linking rules; creates dummy records for households which made no trips; includes new columns for area type, linkflag, trip purpose, income quartile, and weighting factor.</u>

2. DS Name: <u>@TS.HIS.PREMEM.FACTOR.NEW.LINKED, RECORDS = 12,864</u>

3. Tape Number: <u>VOL = SER = 006937, LABEL = 12</u>

4. Blocksize: <u>BLKSIZE = 6,210, LRECL = 69, RECFM = FB</u>

Var #	Columns	Bytes	Type	Unit	Range	Symbol	Variable Description
1	1	1	I	----	2	RECTYPE	Trip Record
2	2-5	4	I	----	1-19040	SAMP_NUM	Sample Number
3	6-7	2	I	----	1-99	PER_NUM	Personal Number
4	8-9	2	I	----	1-99	TRIP_NUM	Trip Number
5	10	1	I	----	1-6	TRIPORCD	Trip Origin Address Code
6	11-15	5	I	CODE	1-9999	TSZ_OR	Trip Origin TSZ
7	16	1	I	CODE	1-6	TRIPDSCD	Trip Destination Code
8	17-21	5	I	CODE	1-9999	TSZ_DS	Trip Destination TSZ
9	22	1	I	CODE	0-9	TRIPPUFR	Trip Purpose - From
10	23	1	I	CODE	0-9	TRIPPUTO	Trip Purpose - To
11	24-25	2	C	CODE	00-9x	LANDUSOR	Land Use at Trip Origin
12	26-27	2	C	CODE	00-9x	LANDUSDS	Land Use at Destination
13	28-32	5	I	TIME	---	START	Trip Start Time
14	33-37	5	I	TIME	---	ARRIVE	Trip Arrival Time
15	38	1	I	MODE	1-9	TRAVMODE	Mode of Travel
16	39	1	C	PERSONS	0-9,x	ADNOCAR	If Auto Driver, # in Car
17	40	1	C	PERSONS	0-9,x	CVNOCAR	If Car/Vanpool, # in Vehicle
18	41	1	C	CODE	1-5,x	ACCESS	If Mode is Transit, Means of Access
19	42-45	4.2	R	$	01.00 - 99.99	FRPKCOST	Fare or Parking Cost
20	46-47	2	I	PERSONS	1-99	PEOPLE	Persons in Household
21	48	1	I	CARS	0-9+	CARS	# Vehicles Available
22	49	1	C	CODE	A-J,0	INCOME	Household Income

Var #	Columns	Width	Type	Unit	Range	Symbol	Variable Description
23	50-54	5	I	CODE	1-9999	TSZ_H	Home TSZ
24	55	1	I	CODE	1-5	AREATP	Area Type
25	56-57	2	I	TRIPS	0-99	TOTVTRIP	Total Vehicular Trips
26	58-61	4	I	CODE	0-9999	CITYCD	City Code
27	62	1	I	CODE	1-2	BA_SCH	Before/After School Closing[1]
28	63	1	I	CODE	1-3	PURPOSE	Trip Purpose[2]
29	64	1	I	CODE	0-1	LINK	Link Flag[3]
30	65-68	4	I	CODE	0-9999	FACTOR	Weighting Factors
31	69	1	I	CODE	1-4	QUARTILE	Income Quartile[4]

I = Integer, C = Character, R = Real

[1] In this file all the BA_SCH codes are 1 indicating the pre-Memorial Day sample subset.

[2] Purpose Code: 1 = Home-Based Work
                    2 = Home-Based Nonwork
                    3 = Nonhome-Based

[3] Link Flag: 1 = Linked Trip
                 0 = Not Linked

[4] Income Quartiles: 1 = under $15,000
                        2 = $15,000-$29,000
                        3 = $30,000-$39,000
                        4 = $40,000-$50,000

TABLE K-7
1984 HOME INTERVIEW SURVEY

HIS DATA FILE FORMAT DESCRIPTION

1. File Description: Home Interview Survey's Household Records: Contains data on 6,403 persons (5 Years and Older) belonging to 2,471 households.

2. DS Name: @TS.HIS.RECTYPE1.NEWVARS1

3. Tape Number: VOL= SER = 012011, LABEL = 112

4. Blocksize: BLKSIZE = 19,027, LRECL = 53, RECFM = FB

Var #	Columns	Bytes	Type	Unit	Range	Symbol	Variable Description
1	1	1	I	----	1	RECTYPE	Person Record
2	2-4	3	I	----	423-713	TRAVDATE	Travel Date
3	5-8	4	I	----	1-9999	SAMP_NUM	Sample Number
4	9-13	5	I	CODE	1-9999	TSZ_H	Valid TSZ
5	14	1	I	CODE	0-5	STRUCT	Structure Type
6	15-16	2	I	PERSONS	1-99	PEOPLE	Number of People Living at HH Address
7	17-18	2	I	PERSONS	1-99	PEOPLE_5	Number of People Age 5+ Living at HH Address
8	19	1	I	PERSONS	1-9	VISITORS	Number of Out-of-Area Visitors
9	20	1	I	CARS	1-9	CARS	Autos, Vans, Pickups available
10	21	1	C	CODE	A-J,0	INCOME	Household Income
11	22-23	2	I	----	1-99	PER_NUM	Person Number
12	24	1	I	CODE	1-2	INTERV	Was This Person Interviewed?
13	25	1	I	CODE	1-9	RELATION	Relation to Head of HH
14	26	1	I	CODE	0-9	AGE	Person's Age
15	27	1	I	CODE	1-2	SEX	Person's Sex
16	28		I	CODE	1-2	LICENSE	Is Person Licensed to Drive?
17	29	1	C	CODE	1-9 A-F	OCCUP	Occupation
18	30	1	C	CODE	1-9 A-x	INDUS	Industry
19	31	1	C	CODE	1-3	WORKED	Worked on Travel Day?
20	32	1	C	CODE	1-2	WORKTRIP	Made Trips While at Work?
21	33	1	C	CODE	1-2	OTHRTRP	Made Other Trips?
22	34-35	2	I	TRIPS	0-99	TOTVTRIP	Total Vehicular Trips

Var #	Columns	Width	Type	Unit	Range	Symbol	Variable Description
23	36-37	2	I	PERSONS	0-99	PPL5TRP	Persons Age 5+ Making Trips
24	38-39	3	I	PERSONS	0-99	PPL5NTRIP	Persons Age 5+ Not Making Trips
25	40	1	C	CODE	1-6,x	INTERVCD	Interview Code
26	41-44	4	I	CODE	1-9999	CITYCD	City Code
27	45	1	I	CODE	1-2	BA_SCH	1984 School - Closing Date (1=before, 2=after)
28	46	1	I	CODE	1-5	DAYWK	Day of the Week (Monday - Friday)
29	47-53	7	I	CODE	---	---	Miscellaneous Dummy Variables- Ignore

I = Integer, C = Character, R = Real

1984 HOME INTERVIEW SURVEY

HIS DATA FILE FORMAT DESCRIPTION

1. File Description: <u>Linked trips: output file from trip link program uses new linking rules</u>

<u>regarding NHB trips. It converts the original 20,209 trip records to 18,798 linked trips. It writes</u>

<u>out some of the character variables of the original trip records as numeric.</u>

2. DS Name: <u>@Q949.TS.HIS.RECTYPE2.NEW.LINKED</u>

3. Tape Number: <u>VOL = SER = 006937, LABEL = 13</u>

4. Blocksize: <u>BLKSIZE = 6,195, LRECL = 59, RECFM = FB</u>

Var #	Columns	Bytes	Type	Unit	Range	Symbol	Variable Description
1	1	1	I	----	2	RECTYPE	Trip Record
2	2-5	4	I	----	1-19040	SAMP_NUM	Sample Number
3	6-7	2	I	----	1-99	PER_NUM	Personal Number
4	8-9	2	I	----	1-99	TRIP_NUM	Trip Number
5	10	1	I	----	1-6	TRIPORCD	Trip Origin Address Code
6	11-15	5	I	CODE	1-9999	TSZ_OR	Trip Origin TSZ
7	16	1	I	CODE	1-6	TRIPDSCD	Trip Destination Code
8	17-21	5	I	CODE	1-9999	TSZ_DS	Trip Destination TSZ
9	22	1	I	CODE	0-9	TRIPPUFR	Trip Purpose - From
10	23	1	I	CODE	0-9	TRIPPUTO	Trip Purpose - To
11	24-25	2	C	CODE	00-9x	LANDUSOR	Land Use at Trip Origin
12	26-27	2	C	CODE	00-9x	LANDUSDS	Land Use at Destination
13	28-32	5	I	TIME	---	START	Trip Start Time
14	33-37	5	I	TIME	---	ARRIVE	Trip Arrival Time
15	38	1	I	MODE	1-9	TRAVMODE	Mode of Travel
16	39-40	2	I	PERSONS	0-99	ADNOCAR	If Auto Driver, # in Car
17	41-42	2	I	PERSONS	0-99	CVNOCAR	If Car/Vanpool, # in Vehicle
18	43	1	C	CODE	1-5,x	ACCESS	If Mode is Transit, Means of Access
19	44-47	4.2	R	$	01.00 - 99.99	FRPKCOST	Fare or Parking Cost
20	48	1	I	CODE	1-3	PURPOSE1	Trip Purpose 1[1]
21	49	1	I	CODE	1-5	PURPOSE2	Trip Purpose 2[2]
22	50-57	8	I	CODE	---	KEY	Key (Sort Key)

Var #	Columns	Bytes	Type	Unit	Range	Symbol	Variable Description
23	58	1	I	CODE	---	FLAG	Link Flag[3]
24	59	1	I	CODE	0-9	LINKED	Number of Records Linked

I = Integer, C = Character, R = Real

[1] Trip Purpose 1: 1 = Home-Based Work
                     2 = Home-Based Nonwork
                     3 = Nonhome-Based

[2] Trip Purpose 2: 1 = Home-Based Work
                     2 = Home-Based Shop
                     3 = Home-Based School
                     4 = Home-Based Other
                     5 = Nonhome-Based

[3] Link Flag: 1 = Linked Trip
                0 = Not Linked

NOTE: Variables "ADNOCAR" and "CVNOCAR" have been converted to numeric variables occupying two fields. The code "99" is substituted for "x."

1984 HOME INTERVIEW SURVEY

HIS DATA FILE FORMAT DESCRIPTION

1. File Description: Unlinked trip records: input file for trip length program for unlinked trip length.

2. DS Name: @TS.HIS.RECTYPE2.UNLINK

3. Number: VOL = SER = 012011, LABEL = 115

4. Blocksize: BLKSIZE = 18,000, LREC = 45, RECFM = FB

Var #	Columns	Bytes	Type	Unit	Range	Symbol	Variable Description
1	1	1	I	----	2	RECTYPE	Trip Record
2	2-5	4	I	----	1-19040	SAMP_NUM	Sample Number
3	6-7	2	I	----	1-99	PER_NUM	Personal Number
4	8-9	2	I	----	1-99	TRIP_NUM	Trip Number
5	10	1	I	----	1-6	TRIPORCD	Trip Origin Address Code
6	11-15	5	I	CODE	1-9999	TSZ_OR	Trip Origin TSZ
7	16	1	I	CODE	1-6	TRIPDSCD	Trip Destination Code
8	17-21	5	I	CODE	1-9999	TSZ_DS	Trip Destination TSZ
9	22	1	I	CODE	0-9	TRIPPUFR	Trip Purpose - From
10	23	1	I	CODE	0-9	TRIPPUTO	Trip Purpose - To
11	24-25	2	C	CODE	00-9x	LANDUSOR	Land Use at Trip Origin
12	26-27	2	C	CODE	00-9x	LANDUSDS	Land Use at Destination
13	28-32	5	I	TIME	---	START	Trip Start Time
14	33-37	5	I	TIME	---	ARRIVE	Trip Arrival Time
15	38	1	I	MODE	1-9	TRAVMODE	Mode of Travel
16	39	1	C	PERSONS	0-9,x	ADNOCAR	If Auto Driver, # in Car
17	40	1	C	PERSONS	0-9,x	CVNOCAR	If Car/Vanpool, # in Vehicle
18	41	1	C	CODE	1-5,x	ACCESS	If Mode is Transit, Means of Access
19	42-45	4.2	R	$	01.00 - 99.99	FRPKCOST	Fare or Parking Cost

I = Integer, C = Character, R = Real

TABLE K-10

HOME INTERVIEW SURVEY
TRIP RECORDS (TYPE I) FILE FORMAT

Variable	Type	Description	Bytes	Valid Codes
REC_TYPE	I	Record Type	1	1-Household/Person Record
TRAVDATE	I	Travel Date	3	423 (April 23) - 713 (July 13)
SAMP_NUM	I	Sample Number	4	1-9999
TSZ_H	I	TSZ of Household	5	Valid TSZ
STRUCT	I	Structure Type	1	1-Single Family 2-Two Family 3-Multifamily 4-Trailer 5-Other 0-Not Known
PEOPLE	I	Number of People Living at Household Address	2	1-99
PEOPLE5	I	Number of People Age 5 and Over Living at Household Address	2	1-99
VISITORS	I	Number of Out-of-Area Visitors at Household Address	1	0-8,9 for Nine or More
CARS	I	Autos, Vans, Pickups Available	1	0-8,9 for Nine or More

Notes: I = Integer
       C = Character
       R = Real

Variable	Type	Description	Bytes	Valid Codes
INCOME	C	Household Income	1	A-Below $5,000 B-$5,000-9,999 C-$10,000-14,999 D-$15,000-19,999 E-$20,000-24,999 F-$25,000-29,999 G-$30,000-34,999 H-$35,000-39,999 I-$40,000-49,999 J-Over $50,000 0-Not Reported
PER.NUM	I	Person Number	2	1-99
INTERV	I	Was This Person Interviewed?	1	1-Yes 2-No
RELATION	I	Relation to Head of HH	1	1-Head 2-Spouse 3-Son 4-Daughter 5-Grandparent 6-Grandchild 7-Other Relative 8-Unrelated 9-Out-of-Area Visitor 0-Not Reported
AGE	I	Person's Age	1	1-(5-10) 6-(36-45) 2-(11-15) 7-(46-55) 3-(16-20) 8-(56-65) 4-(21-25) 9-(66 or Over) 5-(26-35) 0-(Not Reported)
SEX	I	Person's Sex	1	1-Male 2-Female
LICENSE	I	Is Person Licensed to Drive?		1-Yes 2-No

Variable	Type	Description	Bytes	Valid Codes
OCCUP	C	Occupation	1	1-Professional/Semi-Professional 2-Proprietors, Managers, Officials, Self-Employed 3-Store and Office Clerks, Sales Persons (Excluding Traveling) 4-Traveling Sales Persons/Agents 5-Craftsmen, Foremen, Skilled Laborers, Etc. 6-Operatives and Semi-Skilled Workers 7-Laborers and Unskilled Workers 8-Protective Services 9-Personal Service Workers A-Not Elsewhere Classified B-Unemployed (Able to Work) C-Not Gainfully Employed/Housewife D-Retired or Incapacitated E-Student F-Not Reported

Variable	Type	Description	Bytes	Valid Codes
INDUS	C	Industry	1	1-Agriculture, Forestry (Except Logging), Fishing 2-Mining/Mineral Extraction 3-Construction and Related Maintenance 4-Manufacturing and Processing 5-Transportation, Communication, and Public Utilities 6-Wholesale & Retail Trade (Including Finance, Insurance, Real Estate) 7-Personal Service 8-Amusement/Recreation & Related Services 9-Professional & Related Services A-Government B-Not Elsewhere Classified C-Not Reported (Unknown) X-Not Applicable (Where Occupation Code=B, C, D, E)
WORKED	C	Worked on Travel Day	1	1-Yes 2-No 3-Worked at Home
WORKTRIP	C	Made Trips While at Work	1	1-Yes 2-No
OTHRTRIP	C	Made Other Trips on Travel Day	1	1-Yes 2-No
TOTVTRIP	I	Total Vehicle Trips	2	0-99

Variable	Type	Description	Bytes	Valid Codes
PPL5TRP	I	Persons Age 5 and Over Making Trips	2	0-99
PPL5NTRP	I	Persons Age 5 and Over Not Making Trips	2	0-99
INTERVCD	C	Interview Code	1	1-Complete, No Travel Diary Used 5-Complete, All Used Travel Diary 6-Complete, Some Used Travel Diary X-Complete, Diary Use Unknown

HOME INTERVIEW SURVEY
TRIP RECORDS (TYPE II) FILE FORMAT

Variable	Type	Description	Bytes	Valid Codes
REC_TYPE	I	Record Type	1	2-Trip Record
SAMP_NUM	I	Sample Number	4	1-9999
PER_NUM	I	Personal Number	2	1-99
TRIP_NUM	I	Trip Number	2	1-99
TRIPORCD	I	Trip Origin Address Code	1	1-Street Address 2-Intersection 3-Place Name 5-Home 6-Other
TSZ_OR	I	Trip Origin TSZ	5	Valid TSZ or 09999 - Out of TSA
TRIPDSCD	I	Trip Destination Address Code	1	Same as Trip Origin Address Code
TSZ_DS	I	Trip Destination TSZ	5	Valid TSZ
TRIPPUFR	I	Trip Purpose-From	1	1-Home 2-Work 3-Shop 4-School 5-Social/Recreational 6-Personal Business 7-Eat Meal 8-Serve Passenger 9-Change Mode 0-Ride
TRIPPUTO	I	Trip Purpose-To		Same as Trip Purpose-From

Notes: I = Integer
      C = Character
      R = Real

Variable	Type	Description	Bytes	Valid Codes
LANDUSOR	C	Land Use at Trip Origin	2	0X-Residential, Type Unknown 00-Residential, Single-Family Dwelling 01-Residential, Two-Family Dwelling 02-Residential, Multi-Family Dwelling 03-Rooming House 04-Dormitory 05-Hotel 06-Motel 07-Rest Home 08-Trailer Park 09-Boatels 10-19 Agriculture, Forestry 20-29 Manufacturing, Durable Items 30-39 Manufacturing, Nondurable Items 40-49 Transportation, Communication, and Other Industrial Nonmanufacturing 50-59 Commercial Retail 60-69 Commercial Services 70-79 Wholesale Trade and Contracting 80-89 Public and Quasi-Public Buildings 90-98 Public and Quasi-Public Open Spaces 99 Land Use Unknown 1X-9X Nonresidential, Type Unknown
LANDUSDS	C	Land Use at Trip Destination	2	Same as Land Use at Trip Origin

Variable	Type	Description	Bytes	Valid Codes
START	I	Trip Start Time	5	First Digit 1=am 2=pm 3=noon 4=midnight 2nd-5th Digits Time of Day (Nonmilitary)
ARRIVE	I	Trip Arrival Time	5	Same as Trip Start Time
TRAVMODE	I	Mode of Travel	1	1-Auto Driver 2-Auto Passenger 3-Bus/Trolley 4-School Bus 5-Taxi 6-Motorcycle 7-Carpool/Vanpool 8-Walk/Bicycle 9-Other
ADNOCAR	C	If Auto Driver, Number in Car	1	If TRAVMODE = 1 ADNOCAR = 1-9 If TRAVMODE = 1 But No Response ADNOCAR = 0 If TRAVMODE = 1 ADNOCAR = X
CVNOCAR	C	If Car/Vanpool, Number in Vehicle	1	If TRAVMODE = 7 CVNOCAR = 1-9 If TRAVMODE = 7 But no Response ADNOCAR = 0 If TRAVMODE = 7 CVNOCAR = X

Variable	Type	Description	Bytes	Valid Codes
ACCESS	C	If TRAVMODE is Transit, Means of Transit Access	1	If TRAVMODE = 3 then Transit Access = 1-Walked 2-Drove Auto and Parked 3-Auto, But Not Parked 4-Carpool 5-Other If TRAVMODE = 3 then Transit Access = X
FRPKCOST	R	Fare or Parking Cost	4.2	If TRAVMODE = 1 or 3 then FRPKCOST = 0.00 - 9.99 Else Leave Blank
PEOPLE	I	Number of People in Household	2	1-99
CARNUM	I	Number of Cars, Vans, Pickups	1	1-4+
INCOME	C	Household Income	1	Same as Type 1 Household Record File
TOTVTRIP	I	Total Vehicular Trips	2	0-99
CITYCD	I	City Code	4	1-9999 (see attached codes)
BA_SCH	I	Before-After School Closing	1	1=Before School Closing 2=After School Closing
DAY	I	Day-of-Week	1	1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday
TIME	I	Stated Duration of Trip	4	0-999 Minutes

Variable	Type	Description	Bytes	Valid Codes
LENGTH	I	Trip Length	6.2	.00-999.00 Miles
SPEED	I	Speed	3	0-999 m.p.h. (model calculated)
TRIP PURPOSE 1	I	Trip Purpose	1	1 = Home-Based Work 2 = Home-Based Nonwork 3 = Nonhome-Based
TRIP PURPOSE 2	I	Trip Purpose	1	1 = Home-Based Work 2 = Home-Based Shop 3 = Home-Based School 4 = Home-Based Other 5 = Nonhome-Based
LINK FLAG	I	Linking Indicator	1	1 = Linked Trip 0 = Not Linked
LINKCD	I	Number of Recorders Linked	1	1-9

CITY CODES

0020 - Addison	1085 - Dallas
0052 - Aledo	1090 - Dalworthington Gardens
0065 - Allen	1100 - Dawson
0067 - Alma	1110 - Decatur
0085 - Alvarado	1140 - Denton
0095 - Alvord	1155 - DeSoto
0127 - Angus	1209 - Double Oak
0130 - Anna	1220 - Dublin
0132 - Annetta	1230 - Duncanville
0133 - Annetta North	1269 - Eastvale
0134 - Annetta South	1285 - Edgecliff
0170 - Argyle	1350 - Emhouse
0175 - Arlington	1370 - Ennis
0205 - Aubrey	1380 - Euless
0207 - Aurora	1395 - Everman
0230 - Azle	1411 - Fairview (Wise County)
0250 - Balch Springs	1413 - Fairview (Collin County)
0280 - Bardwell	1425 - Farmers Branch
0290 - Barry	1430 - Farmersville
0303 - Bartonville	1440 - Fate
0330 - Bedford	1450 - Ferris
0380 - Benbrook	1467 - Flower Mound
0455 - Blooming Grove	1480 - Forest Hill
0470 - Blue Mound	1485 - Forney
0475 - Blue Ridge	1497 - Fort Wolters
0525 - Boyd	1500 - Fort Worth
0563 - Briar Oaks	1540 - Frisco
0570 - Bridgeport	1550 - Frost
0620 - Buckingham	1580 - Garland
0660 - Burleson	1585 - Garrett
0675 - Caddo Mills	1627 - Glenn Heights
0698 - Campbell	1630 - Glen Rose
0740 - Carrollton	1635 - Godley
0765 - Cedar Hill	1657 - Goodlow
0770 - Celeste	1660 - Gordon
0775 - Celina	1675 - Graford
0805 - Chico	1685 - Granbury
0860 - Cleburne	1695 - Grand Prairie
0895 - Cockrell Hill	1705 - Grandview
0910 - Colleyville	1720 - Grapevine
0937 - Combine	1724 - Grays Prairie
0945 - Commerce	1725 - Greenville
0958 - Cool	1800 - Haltom City
0970 - Coppell	1837 - Haslet
0976 - Copper Canyon	1847 - Heath
0977 - Corinth	1851 - Hebron
0983 - Corral City	1889 - Hickory Creek
0990 - Corsicana	1905 - Highland Park
1005 - Crandall	1915 - Highland Village
1037 - Crossroads	
1045 - Crowley	

1989 -	Hudson Oaks		3268 -	Pilot Point
2015 -	Hurst		3310 -	Plano
2020 -	Hutchins		3322 -	Ponder
2060 -	Irving		3367 -	Post Oak Bend
2065 -	Italy		3383 -	Powell
2130 -	Josephine		3410 -	Princeton
2135 -	Joshua		3415 -	Prosper
2150 -	Justin		3445 -	Quinlan
2165 -	Kaufman		3490 -	Red Oak
2170 -	Keene		3507 -	Reno
2175 -	Keller		3509 -	Retreat
2190 -	Kemp		3510 -	Rhome
2200 -	Kennedale		3515 -	Rice
2205 -	Kerens		3520 -	Richardson
2278 -	Krugerville		3525 -	Richland
2280 -	Krum		3530 -	Richland Hills
2327 -	Lake Bridgeport		3565 -	Rio Vista
2332 -	Lake Dallas		3575 -	River Oaks
2349 -	Lakeside		3580 -	Roanoke
2361 -	Lakewood Village		3630 -	Rockwall
2365 -	Lake Worth		3685 -	Rowlett
2385 -	Lancaster		3695 -	Royse City
2406 -	Lavon		3703 -	Runaway Bay
2413 -	Lawrence		3720 -	Sachse
2450 -	Lewisville		3725 -	Saginaw
2463 -	Lincoln Park		3737 -	Saint Paul
2480 -	Lipan		3780 -	Sanger
2483 -	Little Elm		3815 -	Sansom Park
2520 -	Lone Oak		3865 -	Seagoville
2562 -	Lowrey Crossing		3897 -	Shady Shore
2567 -	Lucas		4005 -	Southlake
2593 -	Mabank		4045 -	Springtown
2610 -	McKinney		4075 -	Stephenville
2617 -	McLendon-Chisholm		4100 -	Strawn
2650 -	Mansfield		4105 -	Streetman
2730 -	Maypearl		4130 -	Sunnyvale
2745 -	Melissa		4215 -	Terrell
2795 -	Mesquite		4242 -	The Colony
2815 -	Midlothian		4285 -	Tolar
2825 -	Milford		4358 -	University Park
2828 -	Millsap		4395 -	Venus
2835 -	Mineral Wells		4436 -	Walnut Grove
2845 -	Mingus		4452 -	Watauga
2940 -	Murphy		4455 -	Waxahachie
2942 -	Mustang		4460 -	Weatherford
2980 -	Newark		4515 -	Westlake
3003 -	New Hope		4525 -	Westminster
3017 -	Neylandville		4529 -	Weston
3043 -	North Lake		4535 -	Westover Hills
3050 -	North Richland Hills		4537 -	West Tawakoni
3057 -	Oak Grove		4545 -	Westworth
3059 -	Oak Leaf		4564 -	White City
3062 -	Oak Point		4590 -	White Settlement
3064 -	Oak Ridge		4612 -	Willow Park
3147 -	Ovilla		4620 -	Wilmer
3170 -	Palmer		4665 -	Wolfe City
3185 -	Pantego		4674 -	Wooded Hills
3197 -	Parker		4705 -	Wylie
3238 -	Pelican Bay			

TABLE K-13

COUNTY CODES

085 -	Collin		257 -	Kaufman
113 -	Dallas		349 -	Navarro
121 -	Denton		363 -	Palo Pinto
139 -	Ellis		367 -	Parker
143 -	Erath		397 -	Rockwall
221 -	Hood		425 -	Somervell
231 -	Hunt		439 -	Tarrant
251 -	Johnson		497-	Wise

APPENDIX L

WORKPLACE SURVEY
TRIP-LINKING PROCEDURE

APPENDIX L

WORKPLACE SURVEY
TRIP-LINKING PROCEDURE

The results of the Workplace Survey analysis were all based on linked trips. The purpose of trip linking was to more accurately account for the purpose of reported trips. Unlike the Home Interview Survey, separate linked and unlinked trip data sets could not be generated for the Workplace Survey. The linking logic was included in the programs used to analyze the Survey. The trip-linking methodology was similar to the one used in the analysis of the Home Interview Survey. The following rules were used in the trip-linking process:

- Trips which ended with a purpose of "serve passenger" were linked out. Example: the trips a person made from home to drop off his/her child at school and then to the place of employment would be linked and considered as one HBW trip rather than one HNW and one NHB trip. It should be noted that the Survey did not provide any information on whether the respondent had stopped to change mode of travel on the way to the surveyed establishment; therefore, no linking could be performed on trips with a "change mode" leg (7.68 percent of the trips linked out in the Home Interview Survey were change mode linkages).

- Only the HBW and HNW trips were linked. Linking of the NHB trips tended to eliminate trips which should have been accounted for. For example, a trip originating from work with the purpose of serving a passenger and ending back at the workplace would be linked to a work-to-work trip, and become a candidate for elimination. In reality, however, two NHB trips

L.1

were made by that trip maker. As NHB trips did not constitute a high share of transit trips, not linking such trips did not introduce a major error in mode choice modelling.

APPENDIX M

WORKPLACE SURVEY
DATA SET EXPANSION

WORKPLACE SURVEY
DATA SET EXPANSION

Expansion of the Workplace Survey data involved a two-step process. The first step factored the questionnaires returned from a particular establishment to the total employment of that establishment. The second step expanded the sampled establishments to the regional employment. Each of these steps is described below.

Step One - Expansion to the Surveyed Establishment: The results of the employee survey were first expanded to the total employment of the surveyed establishments using the relationship outlined below. This step accounted for absent employees, employees who were not surveyed due to the size of the establishment, and employees who received the questionnaire but failed to return it. Table M-1 lists the employee expansion factor for each surveyed establishment. The total number of employees in each establishment is also listed in this table.

Employee Expansion Factor = Total Employment/Number of Employee
                            Questionnaires Returned

The results of the nonemployee survey were expanded to the total number of nonemployees entering the surveyed establishments. These factors are shown in Table M-2 by place of employment.

Nonemployee Expansion Factor = Total Nonemployee/Number of Nonemployee
                               Arrival Counts   Questionnaires Returned

Sample Number	Factor	Emp.	Sample Number	Factor	Emp.	Sample Number	Factor	Emp.	Sample Number	Factor	Emp.
A38	1.21	40	046	2.92	362	133	1.48	31	209	9.44	85
A40	1.67	5	048	1.38	65	134	1.29	9	211	1.00	7
A54	1.00	8	050	4.31	125	135	1.71	12	212	2.00	10
A58	1.08	13	051	8.80	44	136	3.33	30	215	1.41	45
A60	1.54	20	052	2.44	319	137	0.00	160	216	5.56	400
D01	3.46	45	054	0.00	20	139	1.49	100	219	1.55	17
D02	2.89	26	055	1.50	15	141	3.85	250	220	0.00	15
D03	4.00	200	057	1.50	3	142	6.25	100	221	1.71	12
D04	6.25	25	058	1.20	6	144	4.57	105	223	0.00	4
D05	7.14	50	059	4.00	4	146	5.93	800	226	1.51	98
D06	1.25	5	060	5.56	150	147	3.03	500	227	3.95	75
D07	5.06	450	061	9.25	74	148	3.47	350	230	1.00	2
D08	3.21	61	062	1.58	71	149	1.00	1	233	0.00	35
D09	0.00	1	063	3.13	25	150	5.33	48	234	1.00	15
D10	2.20	11	064	6.88	220	152	2.86	80	236	1.00	5
D11	1.17	7	068	5.00	20	154	1.00	1	238	1.37	85
D12	1.16	36	069	0.00	4	155	4.00	20	239	95.00	475
D13	1.71	12	070	1.17	7	156	1.00	18	240	1.20	6
D14	1.83	110	071	0.00	28	157	4.33	26	242	3.75	60
D15	2.00	60	074	1.77	200	158	1.90	150	244	3.16	60
D16	26.67	80	077	2.88	600	159	1.57	165	245	1.22	22
D17	1.52	35	078	3.00	700	160	4.46	125	247	1.21	70
D18	2.43	90	079	1.20	275	161	3.09	300	249	0.00	40
D19	1.86	65	080	5.26	200	162	1.80	9	250	20.00	20
D20	6.00	60	081	5.71	40	163	1.50	60	253	2.00	8
D21	1.50	9	082	4.17	100	165	1.96	300	262	4.00	40
D22	0.00	2	083	1.64	100	166	4.46	700	263	2.00	8
D23	1.13	9	084	6.82	75	167	1.39	25	265	1.21	17
D24	3.64	40	085	1.08	13	169	1.50	42	266	1.28	50
D25	7.59	1200	086	3.08	120	170	10.87	1000	267	2.50	10
001	1.63	80	087	2.86	80	171	2.45	350	272	1.78	160
003	7.69	100	089	1.00	3	172	1.50	3	273	2.00	2
005	22.03	1300	090	202.70	7500	173	3.35	650	274	1.35	112
007	4.48	300	091	1.56	153	175	0.00	100	275	1.25	10
011	1.80	18	093	1.67	150	177	14.29	100	276	1.75	7
015	1.33	8	094	1.38	11	178	1.00	8	277	1.57	260
019	3.40	537	096	2.78	25	179	1.22	28	278	2.21	95
020	1.73	300	097	1.14	24	181	7.00	35	279	2.79	315
024	2.92	800	098	1.46	280	182	1.00	3	281	13.14	1196
025	1.25	5	099	2.11	160	183	1.83	99	282	2.86	200
028	1.64	100	100	2.60	13	184	1.41	24	284	2.79	39
029	3.05	1300	104	1.41	24	185	10.11	1800	285	1.63	26
030	4.08	1000	105	1.00	5	186	6.32	600	287	7.00	7
031	6.96	2400	106	1.00	4	189	1.33	20	291	2.00	2
032	10.33	475	107	30.30	3000	191	10.33	31	292	36.07	2200
033	4.46	500	108	2.00	2	192	1.11	20	293	2.00	4
034	1.30	100	112	2.85	225	194	3.49	702	294	1.50	15
035	4.71	80	113	1.04	53	195	5.03	850	295	1.81	125
037	1.46	35	114	1.35	140	196	2.27	400	296	1.86	110
039	1.09	185	117	1.50	9	197	1.61	50	297	1.00	21
040	3.95	75	123	1.52	150	199	4.09	650	300	26.11	470
041	3.00	30	126	3.13	50	203	1.14	8	303	1.03	80
042	1.00	11	127	1.67	5	204	18.58	2100	304	1.76	150
044	4.38	1400	128	1.09	24	205	1.11	60	305	1.50	3
045	2.67	350	131	1.50	3	208	0.00	60	306	157.89	6000

Sample Number	Factor	Emp.	Sample Number	Factor	Emp.	Sample Number	Factor	Emp.	Sample Number	Factor	Emp.
307	1.29	40	407	0.00	18	509	3.57	400	636	5.29	37
310	1.15	30	408	0.00	10	517	1.45	80	638	7.45	350
311	1.09	50	409	1.20	6	519	5.31	1433	640	4.09	278
312	8.57	600	414	3.53	300	520	20.00	300	644	4.00	4
314	2.94	50	415	1.68	37	531	3.49	475	645	1.14	8
317	5.16	800	416	1.47	50	534	7.35	1000	649	1.00	3
318	2.50	70	418	1.46	35	538	1.00	6	651	2.10	130
322	0.00	10	419	1.50	6	545	1.82	144	652	1.00	8
323	1.32	25	420	1.50	21	552	1.00	9	657	1.38	11
325	1.72	250	424	3.57	100	553	1.57	11	658	1.36	15
326	1.25	5	425	2.35	40	554	1.25	40	660	1.32	25
327	2.78	50	426	1.00	8	555	5.00	10	662	0.00	2
328	2.65	45	427	0.00	9	556	1.24	26	664	1.33	8
330	1.17	14	429	12.50	300	557	1.93	52	666	1.14	80
337	25.00	50	430	1.94	126	561	4.44	200	667	7.00	14
340	1.00	5	433	1.74	40	562	1.00	2	671	0.00	7
341	6.28	1200	439	2.08	25	564	1.65	145	676	1.00	15
342	3.33	20	440	3.18	35	565	1.25	10	692	1.36	190
343	1.35	130	441	1.33	4	567	1.30	56	693	6.00	12
346	2.00	14	442	2.00	18	570	1.00	4	694	2.00	10
348	2.07	120	443	1.00	4	571	1.23	150	695	1.38	40
350	1.00	5	447	1.20	6	572	1.78	96	696	2.98	500
357	3.60	36	451	2.26	70	574	1.25	15	698	2.71	65
358	1.08	14	452	1.28	37	575	1.00	5	702	1.06	38
359	1.00	9	453	1.06	19	576	5.88	1000	703	1.92	25
363	0.00	50	454	1.97	300	578	0.00	6	707	1.36	15
364	1.13	17	456	2.13	190	579	1.10	11	710	0.00	3
365	0.00	2	458	0.00	23	580	2.00	8	711	0.00	4
367	2.00	6	460	1.45	224	581	1.33	16	716	0.00	25
369	3.09	105	461	1.00	29	585	0.00	7	720	1.00	3
370	2.15	200	462	5.44	87	589	1.40	7	721	1.29	9
373	1.94	225	464	3.64	120	590	1.14	8	724	0.00	16
375	1.13	250	466	10.00	1800	596	3.57	100	725	1.00	5
376	1.47	63	470	1.00	1	597	1.45	16	726	1.98	91
377	1.00	4	471	1.30	60	598	1.67	5	728	1.43	10
378	2.30	46	472	1.05	20	599	2.00	2	729	0.00	4
380	2.50	45	474	1.17	14	600	1.18	90	730	0.00	40
381	8.57	1500	476	1.20	6	603	4.86	695	733	1.33	4
382	3.77	400	478	8.75	35	604	2.00	2	737	3.00	9
383	4.83	87	479	1.13	36	606	2.17	50	738	1.25	10
384	1.13	115	481	3.48	160	609	0.00	6	740	1.20	6
390	1.43	40	482	1.00	4	610	2.00	200	749	1.00	6
391	2.36	85	485	0.00	8	611	1.67	5	750	1.54	20
394	1.50	200	487	4.44	550	613	1.10	11	754	4.03	500
395	1.13	125	489	1.00	5	614	0.00	20	757	13.67	41
396	1.00	2	490	3.16	300	615	2.11	40	759	2.25	9
397	7.59	1320	492	1.47	125	619	0.00	1	760	3.00	30
398	1.15	90	493	1.08	13	621	1.67	10	761	1.58	57
399	2.68	450	494	6.52	150	622	0.00	1	762	1.80	18
400	1.00	26	495	32.50	130	624	1.00	2	767	2.00	20
401	2.00	70	498	5.88	500	628	2.76	80	769	2.50	15
402	1.17	7	499	1.07	15	629	3.04	225	781	2.27	34
403	1.00	7	505	1.63	150	630	2.08	50	782	2.18	96
404	0.00	70	507	6.38	1200	632	1.18	13	789	1.15	39
405	2.00	4	508	0.00	3	635	1.00	3	805	1.33	4

Sample Number	Factor	Emp.
806	1.00	1
807	1.00	4
808	0.00	4
809	2.00	2
816	1.71	29
835	1.55	90
836	1.37	155
849	0.00	5
850	1.29	9
851	1.00	1
853	1.43	10
855	1.89	89
859	2.33	7
860	1.25	5
872	0.00	7
874	0.00	7
875	2.33	35
878	2.00	4
883	1.67	5
886	0.00	5
888	1.00	3
893	1.24	31
899	0.00	2
918	1.00	3
930	1.00	1
932	10.00	10
937	0.00	3
938	1.00	10
940	1.20	30
950	1.00	3
957	1.00	3
961	0.00	10
985	3.10	90
996	0.00	9

TABLE M-2

1984 WORKPLACE SURVEY
NONEMPLOYEE EXPANSION FACTORS

Sample Number	Factor	Sample Number	Factor	Sample Number	Factor	Sample Number	Factor
A38	6.980	083	0.000	177	7.410	295	0.000
A40	18.290	084	1.000	179	0.000	297	0.000
A54	0.000	085	0.000	181	1.000	303	1.000
A58	0.000	086	0.000	182	0.000	304	0.000
A60	0.000	087	786.560	183	0.000	307	0.000
D08	0.000	090	0.000	184	3.700	310	0.000
D10	0.000	091	0.000	185	12.680	318	0.000
D11	0.000	093	108.550	191	2.330	322	4.280
D12	1.000	094	9.310	192	2.460	323	1.870
D15	1.000	096	5.690	194	41.520	325	1.000
D21	0.000	098	0.000	195	124.220	328	0.000
001	7.830	099	7.030	199	0.000	330	5.490
003	31.900	100	20.630	203	6.720	340	4.330
005	0.000	105	30.000	204	0.000	342	0.000
007	0.000	112	1.000	208	0.000	346	4.750
011	0.000	113	4.520	209	18.600	348	5.240
019	6.040	114	1.000	211	1.500	350	1.930
020	32.160	117	0.000	212	0.000	357	10.740
024	0.000	123	3.890	215	4.290	358	2.490
030	10.020	126	3.090	216	0.000	359	1.060
031	0.000	127	2.180	219	0.000	363	111.560
032	0.000	128	0.000	220	3.040	364	5.320
034	0.000	133	1.000	221	5.010	367	15.440
035	0.000	134	1.000	223	10.710	369	16.300
037	0.000	135	177.000	226	1.000	370	1.000
039	1.000	136	16.180	227	72.500	375	1.000
040	0.000	137	9.080	230	1.470	378	15.230
041	0.000	141	15.330	233	32.000	380	0.000
042	3.610	142	26.970	236	1.000	381	1.000
044	0.000	144	4.970	238	5.270	382	2.750
045	0.000	146	0.000	239	9.250	383	33.520
046	0.000	147	0.000	240	8.600	390	1.000
048	0.000	148	12.800	242	5.890	391	0.000
050	1.000	149	2.800	244	0.000	394	1.000
051	4.760	150	14.700	247	5.290	395	0.000
054	11.950	152	0.000	249	25.000	396	1.000
059	2.470	154	0.000	250	21.930	397	11.420
060	20.160	155	0.000	253	1.000	398	0.000
061	15.680	156	2.600	262	0.000	400	12.000
062	1.160	159	0.000	265	5.060	401	0.000
063	0.000	160	0.000	267	1.000	403	6.310
064	5.420	162	2.340	272	0.000	404	207.930
068	31.500	163	0.000	273	0.000	405	4.500
069	5.860	165	0.000	274	0.000	408	4.230
070	2.250	166	0.000	275	0.000	409	1.550
071	4.970	167	0.000	276	0.000	414	1.000
074	13.130	169	0.000	277	0.000	415	6.080
080	0.000	170	1.670	281	33.710	416	5.260
081	0.000	171	0.000	292	0.000	418	0.000
082	0.000	173	0.000	294	0.000	419	11.200

Sample Number	Factor	Sample Number	Factor	Sample Number	Factor
420	19.380	581	0.000	725	1.000
424	1.020	585	52.670	728	4.140
425	0.000	589	0.000	729	3.670
426	1.000	590	6.860	730	71.000
427	4.140	596	1.000	733	44.680
430	1.000	597	1.910	737	0.000
433	5.240	598	1.000	740	12.060
439	1.000	599	1.760	749	1.000
440	4.420	600	19.220	750	1.620
443	0.000	606	0.000	757	1.000
447	1.300	609	16.000	759	0.000
451	1.000	610	6.820	760	0.000
453	0.000	611	8.330	761	2.210
454	0.000	613	2.520	762	0.000
460	1.000	614	7.560	767	3.260
462	52.350	615	13.050	769	1.980
464	58.530	619	0.000	782	22.110
466	1.000	621	7.370	789	0.000
470	1.000	624	2.220	805	0.000
471	0.000	632	0.000	806	2.500
472	0.000	635	3.470	807	6.080
474	0.000	636	45.950	808	0.000
476	1.000	644	1.170	809	0.000
478	4.960	645	0.000	816	1.000
479	13.950	649	34.430	835	5.230
481	0.000	651	1.000	836	1.000
482	0.000	652	19.600	850	0.000
485	0.000	657	1.470	851	0.000
487	0.000	658	3.190	853	1.000
494	0.000	660	1.000	855	1.180
495	0.000	662	9.000	859	15.250
499	1.000	664	3.200	860	5.650
508	0.000	666	1.350	872	0.000
545	0.000	667	2.040	874	26.500
553	12.540	671	5.070	875	8.760
554	1.000	676	1.000	878	3.400
555	0.000	692	36.240	883	1.630
556	1.000	693	28.060	886	7.500
557	0.000	694	2.730	888	1.860
561	19.190	695	0.000	893	0.000
562	1.500	696	1.000	899	74.000
564	0.000	698	0.000	918	4.800
565	4.000	702	1.000	930	2.300
567	0.000	703	2.480	937	1.860
570	0.000	707	4.590	938	1.840
571	1.000	710	0.000	940	1.000
572	1.000	711	3.000	950	23.750
575	0.000	716	3.840	957	1.000
576	1.000	720	1.000	961	0.000
580	3.330	721	0.000	985	5.130
				996	0.000

Where:

Total Nonemployee Arrival Counts = Total Arrival Counts -

[Attendance + Returns of Surveyed Employees to Work x

(Attendance/Number of Employee Questionnaires Returned)]

Step Two - Expansion to Regional Employment: The second phase of the
expansion involved factoring the sample to the total employment of the
NCTCOG Transportation Study Area (TSA). A marginal weighting program was
used to calculate the expansion factors based on the 1984 TSA employment
and the employment of the sampled establishments. The expansion factors
for HBW trips were tabulated by employment type, income quartile, and area
type; whereas, those used for HNW and NHB trips were cross-classified by
area type and employment type alone. Tables M-3A, M-3B, and M-3C summarize
the HBW expansion factors by basic, retail, and service employment
categories.   Table M-4 lists expansion factors cross-classified by
employment category and area type for use in the HNW and NHB models.

TABLE M-3A

1984 WORKPLACE SURVEY
HOME-BASED WORK EXPANSION FACTORS
BY AREA TYPE/INCOME QUARTILE

SERVICE EMPLOYMENT

INCOME QUARTILE	AREA TYPE				
	1	2	3	4	5
1	62.51	60.81	35.56	39.84	20.08
2	44.53	45.81	29.12	20.45	8.98
3	92.27	62.13	33.98	18.91	13.24
4	105.51	115.35	45.71	17.46	18.33

<u>TABLE M-3B</u>

1984 WORKPLACE SURVEY
HOME-BASED WORK EXPANSION FACTORS
BY AREA TYPE/INCOME QUARTILE

RETAIL EMPLOYMENT

INCOME QUARTILE	AREA TYPE				
	1	2	3	4	5
1	272.11	25.53	32.09	24.37	16.38
2	296.00	19.44	34.86	24.79	22.95
3	278.20	32.57	39.89	32.16	18.18
4	648.75	76.65	73.48	67.37	30.87

1984 WORKPLACE SURVEY
HOME-BASED WORK EXPANSION FACTORS
BY AREA TYPE/INCOME QUARTILE

BASIC EMPLOYMENT

INCOME QUARTILE	AREA TYPE				
	1	2	3	4	5
1	15.76	115.36	73.10	23.01	26.36
2	7.85	149.92	29.79	9.69	21.95
3	11.73	218.74	30.43	13.74	38.34
4	9.98	323.73	13.06	10.96	124.55

TABLE M-4

1984 WORKPLACE SURVEY
EXPANSION FACTORS
HOME-BASED NONWORK--NONHOME-BASED
BY AREA TYPE/EMPLOYMENT

AREA TYPE	EMPLOYMENT		
	BASIC	RETAIL	SERVICE
1	10.29	349.02	71.36
2	198.25	30.54	66.26
3	22.23	40.90	35.86
4	12.18	28.90	20.53
5	36.53	21.30	13.82

APPENDIX N

WORKPLACE SURVEY
TRIP ATTRACTION RATES

1984 WORKPLACE SURVEY
HBW ATTRACTION RATES
(Including HBW-Related Trips)

Basic Employment

Income Quartile	Area Type				
	1	2	3	4	5
1	1.677	1.384	1.413	1.312	1.389
2	1.695	1.454	1.160	1.277	1.464
3	1.545	1.421	0.980	1.260	1.530
4	1.378	1.296	1.024	1.388	1.521

Retail Employment

Income Quartile	Area Type				
	1	2	3	4	5
1	1.000	1.486	1.643	2.049	1.455
2	1.167	1.363	2.060	2.295	2.310
3	1.467	1.435	1.736	1.634	1.884
4	0.875	1.202	1.344	1.358	1.286

Service Employment

Income Quartile	Area Type				
	1	2	3	4	5
1	1.732	1.296	1.424	1.402	1.422
2	3.042	1.322	1.430	1.295	1.388
3	2.497	1.341	1.365	1.456	1.566
4	1.704	1.258	1.265	1.323	1.244

1984 WORKPLACE SURVEY
HBW ATTRACTION RATES
PERSON TRIPS/EMPLOYEE
(Excluding HBW-Related Trips)

Basic Employment

Income Quartile	Area Type				
	1	2	3	4	5
1	1.501	1.384	1.402	1.312	1.389
2	1.288	1.434	1.160	1.277	1.425
3	1.375	1.416	0.974	1.260	1.519
4	1.377	1.296	1.024	1.388	1.521

Retail Employment

Income Quartile	Area Type				
	1	2	3	4	5
1	1.000	1.455	1.317	1.376	1.366
2	1.000	1.319	1.414	1.555	1.328
3	1.467	1.375	1.348	1.468	1.395
4	0.750	1.194	1.250	1.358	1.246

Service Employment

Income Quartile	Area Type				
	1	2	3	4	5
1	1.420	1.263	1.401	1.383	1.311
2	1.468	1.242	1.289	1.231	1.099
3	1.512	1.334	1.278	1.369	1.284
4	1.447	1.258	1.265	1.316	1.190

1984 WORKPLACE SURVEY
HNW ATTRACTION RATES
(Including HBW-Related Trips)

Area Type	Basic Employment	Retail Employment	Service Employment	Households*
1	0.685	0.773	1.936	0.300
2	0.449	1.053	0.790	0.224
3	0.039	8.069	1.980	0.511
4	NA	7.422	0.766	0.627
5	0.165	5.871	1.402	0.682

Source: NCTCOG 1984 Home Interview Survey

HNW "residential" trip attraction is defined as follows:

- If the land use of both the trip origin and trip destination are residential and the destination TSZ ≠ Home TSZ, then trip destination is taken to represent a residential attraction.

- If the land use of both the trip origin and trip destination are residential and the origin TSZ ≠ Home TSZ, then trip origin is taken to represent a residential attraction.

TABLE N-4

1984 WORKPLACE SURVEY
HNW ATTRACTION RATES
(Excluding HBW-Related Trips)

Area Type	Basic Employment	Retail Employment	Service Employment	Households*
1	0.453	0.705	1.049	0.300
2	0.442	0.995	0.670	0.224
3	0.033	7.649	1.725	0.511
4	NA	7.009	0.706	0.627
5	0.139	5.360	1.208	0.682

Source: NCTCOG 1984 Home Interview Survey

HNW "residential" trip attraction is defined as follows:

- If the land use of both the trip origin and trip destination are residential and the destination TSZ ≠ Home TSZ, then trip destination is taken to represent a residential attraction.

- If the land use of both the trip origin and trip destination are residential and the origin TSZ ≠ Home TSZ, then trip origin is taken to represent a residential attraction.

TABLE N-5

1984 WORKPLACE SURVEY
NHB ATTRACTION RATES

Area Type	Basic Employment	Retail Employment	Service Employment	Households*
1	1.049	1.636	1.639	0.100
2	0.680	1.626	0.924	0.104
3	0.863	4.970	1.282	0.216
4	0.589	4.332	1.316	0.261
5	0.627	3.423	1.174	0.235

*Source: NCTCOG 1984 Home Interview Survey

NHB "residential" trip attraction is defined as follows:

- If neither trip end is at the home and the TSZ of the trip destination has a residential land use, then the destination represents the residential attraction.

TABLE N-6

1984 WORKPLACE SURVEY
OTHER* TRIP ATTRACTIONS
PERSON TRIPS PER EMPLOYEE

Area Type	Basic Employment	Retail Employment	Service Employment
CBD	0.100**	0.150**	0.020**
OBD	0.113	0.209	0.036
URBAN RES.	0.150**	0.300**	0.144
SUB. RES.	0.185	0.368	0.200**
RURAL	0.382	0.400**	0.302

* Truck trips only.

** Adjustments have been made to these cells to correct for outliers or missing observations.

TABLE N-7

1984 WORKPLACE SURVEY
OTHER* TRIP ATTRACTIONS
PERSON TRIPS PER EMPLOYEE

Area Type	Basic Employment	Retail Employment	Service Employment	Households
CBD	0.135**	0.192**	0.055**	0.299
OBD	0.148	0.251	0.071	0.299
URBAN RES.	0.185**	0.342**	0.179	0.299
SUB. RES.	0.220	0.410	0.235**	0.299
RURAL	0.417	0.442**	0.337	0.299

* Includes trucks, taxis, rental cars, internal-external, external-internal, and external-external trips.

** Adjustments have been made to these cells to correct for outliers or missing observations.

APPENDIX O

WORKPLACE SURVEY
INCOME QUARTILE DEFINITIONS

APPENDIX O

WORKPLACE SURVEY
INCOME QUARTILE DEFINITIONS

Definitions:

Quartile	Range (Dollars)	WPS Income Code
1	under 15,000	1, 2, 3
2	15,000-29,999	4, 5, 6
3	30,000-39,999	7, 8
4	40,000 and over	9, 0

Assumptions:

The following assumptions were used in assigning income quartiles to records with missing income data using the information on the number of cars owned by the respondents:

- If no information regarding the employee's household income and car ownership was reported, then that record was ignored in the HBW analysis process.

- If auto = 0, then an income range of $5,000-$9,999 was assumed (Quartile = 1).

- If auto = 1, then an income range of $15,000-$19,999 was assumed (Quartile = 2).

- If auto $\geq$ 2, then an income range of $30,000-$34,999 was assumed (Quartile = 3).

APPENDIX P

WORKPLACE SURVEY
DALLAS/FORT WORTH AIRPORT
NONEMPLOYEE WORKPLACE SURVEY RESULTS

TABLE P-1

DALLAS/FORT WORTH AIRPORT
NONEMPLOYEE WORKPLACE SURVEY RESULTS
AVERAGE AUTO OCCUPANCY BY PURPOSE

General Trip Purpose	Frequency	Percent	Average Auto Occupancy
Home-Based Nonwork	861	55.4	1.88
Nonhome-Based	692	44.6	1.93

Source: North Central Texas Council of Governments

DALLAS/FORT WORTH AIRPORT
NONEMPLOYEE WORKPLACE SURVEY RESULTS
PASSENGERS PICKED UP/DROPPED OFF

Trip Purpose: Pick Up Passengers

Number of Passengers Picked Up	Frequency	Percent
1	369	86.0
2	49	11.4
3	8	1.9
4	2	0.5
6	1	0.2
Total	429	100.0

Trip Purpose: Drop Off Passengers

Number of Passengers Dropped Off	Frequency	Percent
1	228	72.9
2	57	18.2
3	19	6.1
4	5	1.6
5	2	0.6
6	1	0.3
9	1	0.3
Total	313	100.0

Source: North Central Texas Council of Governments

DALLAS/FORT WORTH AIRPORT
NONEMPLOYEE WORKPLACE SURVEY RESULTS
TRIP PURPOSE FREQUENCY

TRIP PURPOSE	FREQUENCY	PERCENT
DEPARTING - BUSINESS FLIGHT	440	27.6
DEPARTING - PERSONAL FLIGHT	104	6.5
WORK RELATED	70	4.4
PICK UP PASSENGERS	446	27.9
DROP OFF PASSENGERS	336	21.1
EAT A MEAL	7	0.4
DRIVE NON-STOP THROUGH AIRPORT	119	7.5
OTHER	74	4.6

Source: North Central Texas Council of Governments

D/FW AIRPORT NONEMPLOYEE SURVEY

TRIP PURPOSE

OTHER (4.6%)

DRIVE THRU NONSTOP (7.5%)

EAT A MEAL (0.4%)

DEPART/BUSINESS (27.6%)

P. DROPOFF (21.1%)

DEPART/PRSNL (6.5%)

WORK RELATED (4.4%)

P. PICKUP (27.9%)
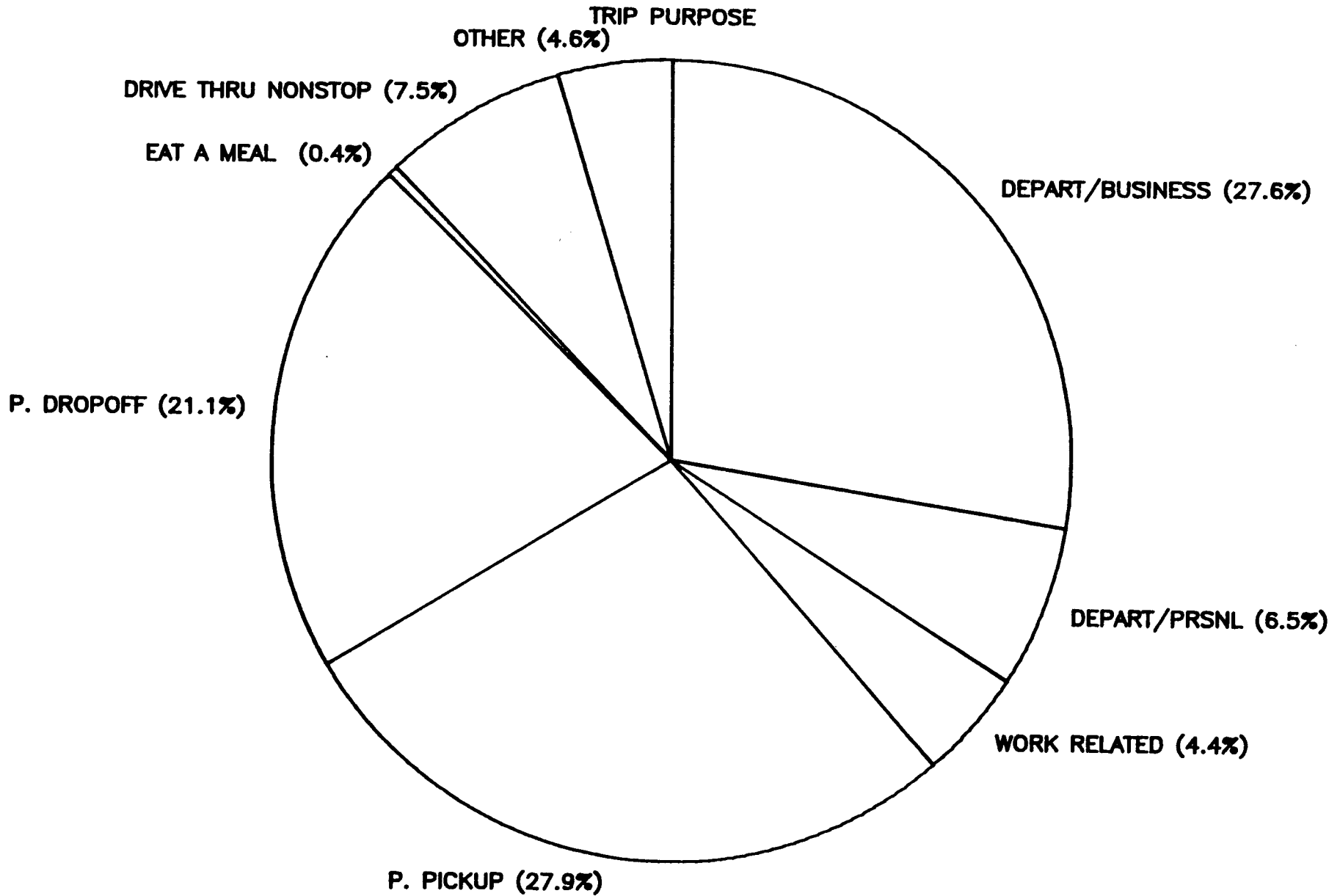
DALLAS/FORT WORTH AIRPORT
NONEMPLOYEE SURVEY RESULTS
MODE OF TRAVEL

MODE OF TRAVEL	TRIPS INCLUDING PASS THROUGH	PERCENT INCLUDING PASS THROUGH	TRIPS EXCLUDING PASS THROUGH	PERCENT EXCLUDING PASS THROUGH
PRIVATE AUTO, TRUCK, OR VAN	1294	81.2	1181	80.1
RENTAL CAR	138	8.7	133	9.0
TAXI	97	6.1	97	6.6
LIMOUSINE	15	0.9	15	1.0
COURTESY VAN	27	1.7	27	1.9
OTHER	22	1.4	21	1.4
TOTAL	1593	100.0	1474	100.0

Source: North Central Texas Council of Governments

D/FW AIRPORT NONEMPLOYEE SURVEY

MODE OF TRAVEL

OTHER (1.4%)

RENTAL CAR (8.7%)

COURTESY VAN (1.7%)

TAXI (6.1%)

LIMOUSINE (0.9%)

PRIVATE AUTO (81.2%)
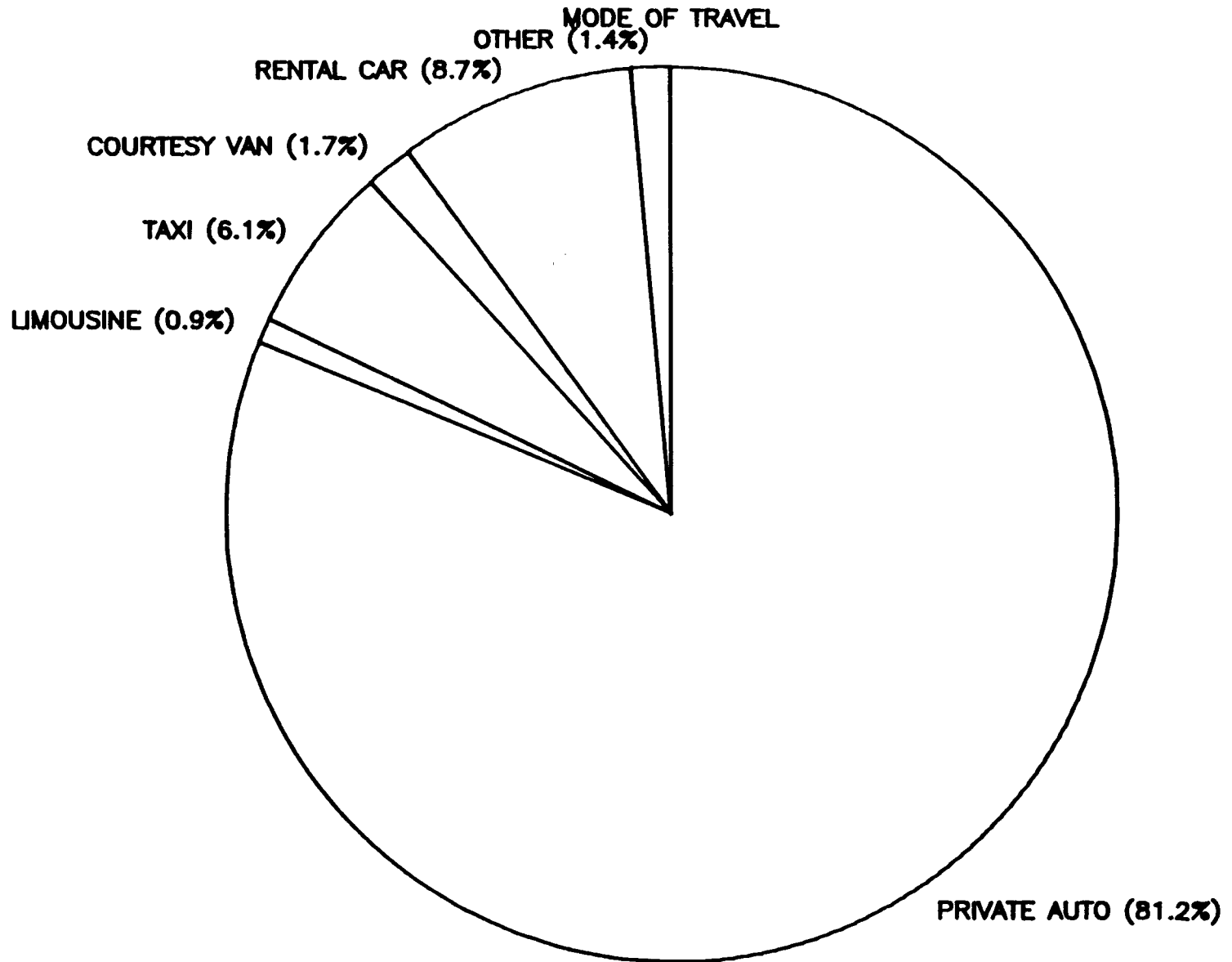
TABLE P-5

DALLAS/FORT WORTH AIRPORT
NONEMPLOYEE SURVEY RESULTS
ARRIVAL TIME FREQUENCY

ARRIVAL TIME	FREQUENCY INCLUDING PASS THROUGH	PERCENT INCLUDING PASS THROUGH	FREQUENCY EXCLUDING PASS THROUGH	PERCENT EXCLUDING PASS THROUGH
BEFORE 7 A.M.	35	2.2	32	2.2
7 - 9 A.M.	137	8.6	115	7.8
9 - 3 P.M.	571	35.9	528	35.9
3 - 6 P.M.	615	38.7	576	39.1
AFTER 6 P.M.	232	14.6	220	15.0
TOTAL	1590	100.0	1471	100.0

Source: North Central Texas Council of Governments

D/FW AIRPORT NONEMPLOYEE ARRIVALS

PERCENT DISTRIBUTION INCL. PASS THRU

BEFORE 7 AM (2.2%)

AFTER 6 PM (14.6%)

7 - 9 AM (8.6%)

9 AM - 3 PM (35.9%)

3 - 6 PM (38.7%)
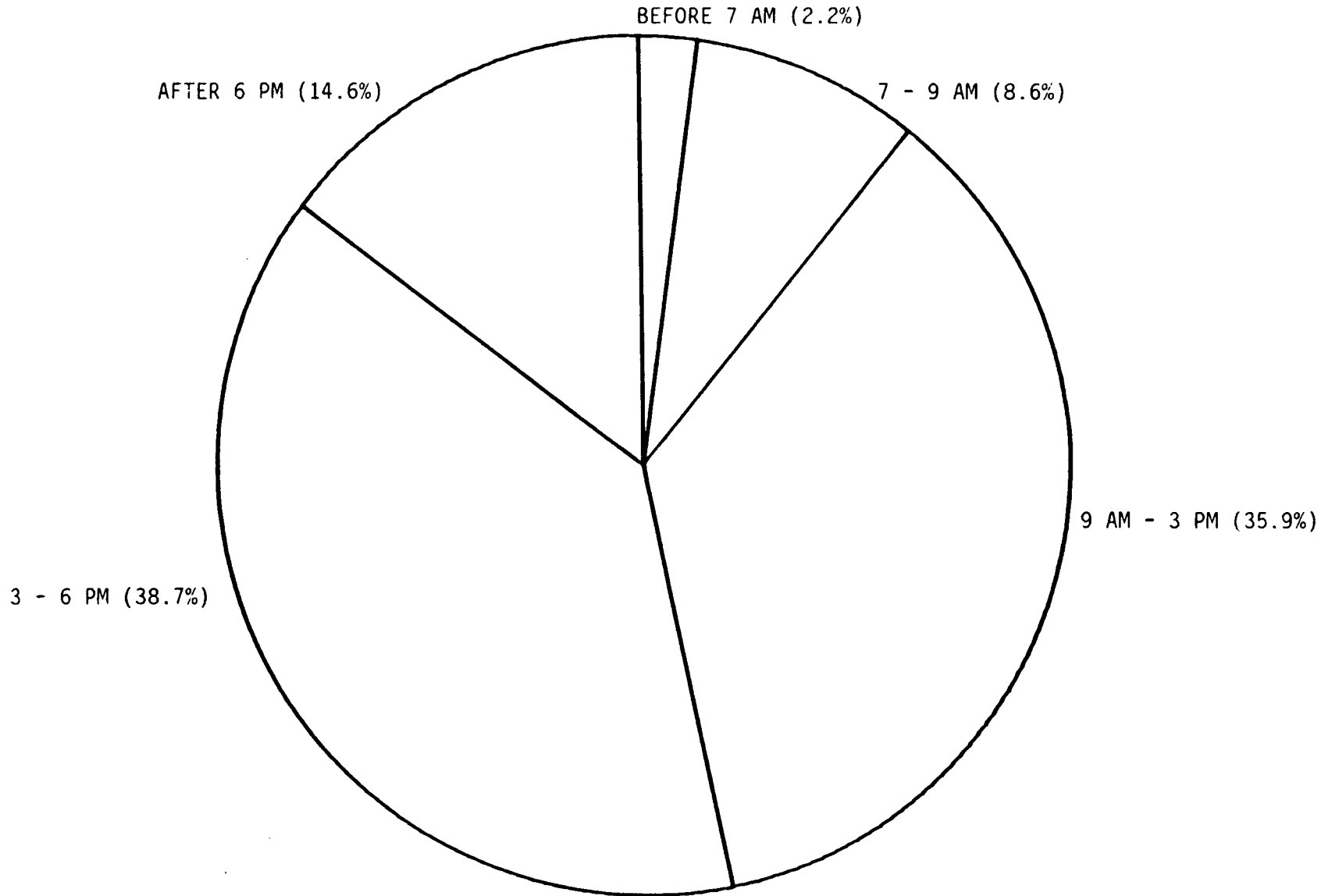
DALLAS/FORT WORTH AIRPORT
NONEMPLOYEE SURVEY RESULTS
PARKING TIME

PARKING TIME	FREQUENCY INCLUDING PASS THROUGH	PERCENT INCLUDING PASS THROUGH	FREQUENCY EXCLUDING PASS THROUGH	PERCENT EXCLUDING PASS THROUGH
LESS THAN 1 HOUR	460	28.9	460	31.2
1 - 5 HOURS	160	10.1	160	10.9
5 - 15 HOURS	28	1.7	28	1.9
MORE THAN 15 HRS	219	13.8	219	14.9
DID NOT PARK	725	45.5	606	41.1
TOTAL	1592	100.0	1473	100.0

Source: North Central Texas Council of Governments

DALLAS/FORT WORTH AIRPORT
NONEMPLOYEE SURVEY RESULTS
PARKING LOCATIONS

PARKING LOCATIONS	FREQUENCY INCLUDING PASS THROUGH	PERCENT INCLUDING PASS THROUGH	FREQUENCY EXCLUDING PASS THROUGH	PERCENT EXCLUDING PASS THROUGH
DID NOT PARK	651	40.8	532	36.0
RENTAL CAR RETURN	115	7.2	115	7.8
NORTH REDUCED RATE (LOT 1W)	16	1.0	16	1.0
SOUTH REDUCED RATE (LOT SE)	21	1.3	21	1.4
WEST REDUCED RATE (LOT 4W)	44	2.8	44	3.0
TERMINAL 2W	81	5.0	81	5.5
TERMINAL 2E	229	14.3	229	15.5
TERMINAL 3E	295	18.5	295	20.0
TERMINAL 4E	103	6.5	103	7.0
AMFAC HOTEL EAST	29	1.8	29	2.0
AMFAC HOTEL WEST	12	0.8	12	0.8
TOTAL	1596	100.0	1477	100.0

Source: North Central Texas Council of Governments

APPENDIX Q

WORKPLACE SURVEY
FILE FORMATS

NCTCOG 1984 WORKPLACE SURVEY RECORD FORMAT

RECORD TYPE: SURVEY LOG
FILENAME: @TS.WORKPL.FINAL.LOG
SORT: BY SAMP_NUM

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE*	DESCRIPTION
RECTYPE	Record Type	1	1	I	Record Type = 5
SAMP_NUM	Sample Number+	3	2-4	C	Business Sample Number
SUR_DATE	Survey Date	4	5-8	C	Enter Date Surveyed
TRUCK_CT	Truck Count?	1	9	I	No=1 Yes=2
BUS_NAME	Business Name	10	10-19	C	Abbreviated Business Name
LOCATION	Location	5	20-24	I	Business TSZ
ATTNDNCE	Attendance	4	25-28	I	Business Attendance on Survey Day
TOT_EMPL	Total Employment	4	29-32	I	Total Employment of Business
BUS_TYPE*	Business Type	1	33	C	See Business Type Codes
AREATYPE*	Area Type	1	34	C	See Area Type Codes
FLR_AREA	Floor Area	6	35-40	I	Floor Area Units
FLRA_CD	Floor Area Code	1	41	C	See Floor Area Unit Codes
EMP_RETN	Employee Q'aires Returned	4	42-45	I	Number of Employee Questionnaires Returned
NE_RETN	Nonemployee Q'aires Returned	4	46-49	I	Number of Nonemployee Questionnaires Returned
EMPQDTRB	Employee Q'aires Distributed	4	50-53	I	Number of Employee Questionnaires Distributed
NEQ_DTRB	Nonemployee Q'aires Dist'd	4	54-57	I	Number of Employee Questionnaires Distributed
FST_COM*	First Comment	1	58	C	Comment on some aspect of a Survey or Count for a Particular Business
SEC_COM*	Second Comment	1	59	C	Additional Comment if Applicable
CHCD_BFS	Change Before Survey	1	60	C	Change in Business Type Code Before Survey
CHCD_AFS	Change After Survey	1	61	C	Changed in Business Type Code After Survey
ARR_CNT	Arrival Count?	1	62	I	Yes=1, No=2
TSZ_ATP	TSZ-Based Area Type	1	63	C	Area Type Based on TSZ
SUR_TYPE	Survey Type	1	64	I	Survey Status
AREATP	Area Type	1	65	I	See Area Type Definition
ORIG_BTS	Original Bus-Type	1	66	C	Original Business Type (B,R,S)
ITE_CODE	ITE Code	3	67-69	I	Institute of Transportation Engineering Land-Use Codes
B_TYPE	Building Type	2	70-71	C	See Structure Type Codes
LAND_USE	Land Use	1	72	C	See Land-Use Codes Associated with Structure Type
TAPZ	Tap Zone	3	73-75	I	TAP Zone of Establishment

* I=Integer C=Character

TABLE Q-2

CODES FOR SURVEY LOG

NAME	CODE DESCRIPTION
Business Type Codes:	A - Airport
	B - Basic
	G - Special Generator
	R - Retail
	S - Service

Area Type Codes:
- A - CBD/OBD
- B - Urban Residential
- C - Suburban Residential/Rural

Floor Area Codes:
- 0 - No Information Given
- 1 - Net Square Footage
- 2 - Gross Square Footage
- 3 - Acres
- X - Square Feet - Unknown If Net
     or Gross

Survey Status:
- 1 - Good
- 2 - Good EXCEPT No Nonemployee Survey
- 3 - Good EXCEPT No Arrival Count
- 4 - Good EXCEPT No Employee Survey
- 5 - Bad

Comment Codes:

D Employee survey was conducted. Nonemployee was refused.

E Both employee and nonemployee surveys were conducted, but no nonemployee questionnaires were returned.

F Both employee and nonemployee surveys were conducted, but no employee questionnaires were returned.

G Only employee survey was conducted and no questionnaires were returned.

H Both employee and nonemployee surveys were conducted, but no questionnaires were returned for either survey.

I Employee survey was conducted. It appears the nonemployee was not, but there is no record of nonemployee refusal.

K Questionable or partial arrival counts taken by surveyors.

N Questionable truck counts.

O Originally agreed to survey and were interviewed then refused. This applies mostly to employee but also occurred in at least one nonemployee survey.

P No range listed for employee questionnaires.

Q No nonemployee because of zero or few customers.

Z Arrival count done after the survey date. "Recount"

Before Survey/After Survey
Business Type Code Changes:
- 0 - No Change
- 1 - From B to R
- 2 - From B to S
- 3 - From S to B
- 4 - From S to R
- 5 - From R to B
- 6 - From R to S

Area Type Definition: Zonal attributes computed from demographic density

```
                              1 -Central Business District (greater than or equal to 125 per
                              2 -Outer Business District (equal to 18 to 25 per acre)
                              3 -Urban Residential (equal to 7.5 to 18 per acre)
                              4 -Suburban Residential (equal to 1.8 to 7.5 per acre)
                              5 -Rural (less than or equal to 1.8 per acre)
```

Original Business Type
Original Business Type Based

```
                              B: 0 - 5199
                              R: 5200 - 5999
                              S: 6000 and above
```

Structure Type Codes
And Land-Use Codes

B_TYPE	LAND_USE	
0	0	Unknown
10	3	Office/Showroom
11	3	Storage Warehouse
12	3	Distribution Warehouse
13	3	Mini-Warehouse
14	3	Cold Storage
15	3	Shipping Dock/Truck Terminal
16	4	Parking Garage
17	4	Loft Building
18	4	Hangar
19	4	T-Hangar
20	4	Basement
21	1	Office Building
22	1	Bank/Savings and Loan
23	1	Drive-in Bank
24	1	Medical Office Building
25	1	Governmental Building
26	4	Hospital
27	4	Convalescent Hospital/Nursing Home
28	4	Dispensary
29	4	Veterinary Hospital
30	2	Convenience Store
31	2	Department Store
32	2	Discount Store
33	2	Supermarket
34	2	Free Standing Retail Store
35	2	Retail Strip
36	2	Shopping Center
37	2	Shopping Mall
38	2	Mall Area
39	4	Laundromat
40	4	Barber Shop/Beauty Shop
41	4	Church Building
42	4	Auditorium
43	4	Theater
44	4	Fraternal Building
45	4	Recreation Building
46	4	Funeral Home
47	4	Bowling Alley
48	4	Country Club
49	4	Health Spa
51	4	Hotel
52	4	Motel
53	4	Apartment (Frame Exterior)
54	4	Apartment (Brick Exterior)
55	4	School
56	4	Dormitory
57	4	Day Nursery
60	3	Light Industrial
61	3	Technical Building
62	3	Heavy Industrial
63	4	Automotive Service
64	4	Automotive Display

65	3	Food Processing
66	4	Car Wash
67	4	Service Station
68	4	Bayless Service Station
69	4	Canopy Service Station
71	2	Drive-In Restaurant
72	2	Fast Food Restaurant
73	2	Restaurant
74	2	Theme Restaurant
75	2	Cocktail Lounge
81	4	Converted Service Station
82	4	Converted Residence (Frame Exterior)
83	4	Converted Residence (Brick Exterior)
84	4	Greenhouse
85	4	Canopy
86	4	Barn
87	4	Residential Garage
88	4	Pool
89	4	Tennis Court
90	4	Utility Building
91	4	Airports
92	3	Bus Terminal
99	4	Special

Land-Use Codes Associated
with Structure Type:

1 - Office
2 - Retail
3 - Warehouse/Industrial
4 - Commercial (Includes All Uses Not Described in 1, 2, or 3)

TABLE Q-3

NCTCOG 1984 WORKPLACE SURVEY RECORD FORMAT

```
RECORD TYPE:   TRUCK COUNT
FILENAME:      @TS.WORKPL.FINAL.TRUCK.COUNT
SORT:          SAMPLE NUMBER
```

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE*	DESCRIPTION
RECTYPE	Record Type	1	1	I	Record Type = 4
SOURCE	Source	1	2	I	See Count Source Codes
SAMP_NUM	Sample Number	3	3-5	C	Sample Number of Business
SUR_DATE	Survey Date	4	6-9	C	Survey Date
NUM_ENT	Number of Entrances	1	10	C	Number of Entrances
LOCATION	Location	4	11-14	C	Business TSZ
BUS_TYPE	Business Type	1	15	C	See Business Type Codes
LT_1	Light Truck:Period 1	2	16-17	I	See Truck Type Codes
HTS_1	Heavy Trk Single:P 1	2	18-19	I	See Truck Type Codes
HTM_1	Heavy Trk Multi:P 1	2	20-21	I	See Truck Type Codes
ODT_1	Otner D'lvry Trk:P 1	2	22-23	I	See Truck Type Codes
TOT_1	Total Count:Period 1	3	24-26	I	Total Truck Count:12 M to 7 AM
LT_2	Light Truck:Period 2	2	27-28	I	See Truck Type Codes
HTS_2	Heavy Trk Single:P 2	2	29-30	I	See Truck Type Codes
HTM_2	Heavy Trk Multi:P 2	2	31-32	I	See Truck Type Codes
ODT_2	Other D'lvry Trk:P 2	2	33-34	I	See Truck Type Codes
TOT_2	Total Count:Period 2	3	35-37	I	Total Truck Count:7 AM to 9 AM
LT_3	Light Truck:Period 3	2	38-39	I	See Truck Type Codes
HTS_3	Heavy Trk Single:P 3	2	40-41	I	See Truck Type Codes
HTM_3	Heavy Trk Multi:P 3	2	42-43	I	See Truck Type Codes
ODT_3	Other D'lvry Trk:P 3	2	44-45	I	See Truck Type Codes
TOT_3	Total Count:Period 3	3	46-48	I	Total Truck Count:9 AM to 12 Noon
LT_4	Light Truck:Period 4	2	49-50	I	See Truck Type Codes
HTS_4	Heavy Trk Single:P 4	2	51-52	I	See Truck Type Codes
HTM_4	Heavy Trk Multi:P 4	2	53-54	I	See Truck Type Codes
ODT_4	Other D'lvry Trk:P 4	2	55-56	I	See Truck Type Codes
TOT_4	Total Count:Period 4	3	57-59	I	Total Truck Count:12 Noon to 3 PM
LT_5	Light Truck:Period 5	2	60-61	I	See Truck Type Codes
HTS_5	Heavy Trk Single:P 5	2	62-63	I	See Truck Type Codes
HTM_5	Heavy Trk Multi:P 5	2	64-65	I	See Truck Type Codes
ODT_5	Other D'lvry Trk:P 5	2	66-67	I	See Truck Type Codes
TOT_5	Total Count:Period 5	3	68-70	I	Total Truck Count:3 PM to 6 PM
LT_6	Light Truck:Period 6	2	71-72	I	See Truck Type Codes
HTS_6	Heavy Trk Single:P 6	2	73-74	I	See Truck Type Codes
HTM_6	Heavy Trk Multi:P 6	2	75-76	I	See Truck Type Codes
ODT_6	Other D'lvry Trk:P 6	2	77-78	I	See Truck Type Codes
TOT_6	Total Count:Period 6	3	79-81	I	Total Truck Count:6 PM to 9 PM
LT_7	Light Truck:Period 7	2	82-83	I	See Truck Type Codes
HTS_7	Heavy Trk Single:P 7	2	84-85	I	See Truck Type Codes
HTM_7	Heavy Trk Multi:P 7	2	86-87	I	See Truck Type Codes
ODT_7	Other D'lvry Trk:P 7	2	88-89	I	See Truck Type Codes
TOT_7	Total Count:Period 7	3	90-92	I	Total Truck Count:6 PM to 9 PM
LT_T	Light Truck:Total	2	93-94	I	See Truck Type Codes
HTS_T	H'vy Trk Single:Total	3	95-97	I	See Truck Type Codes
HTM_T	Heavy Trk Multi:Total	2	98-99	I	See Truck Type Codes
ODT_T	Other D'lvry Trk:Total	2	100-101	I	See Truck Type Codes
TOT_T	Total Count:All Periods	3	102-104	I	Grand Total of Truck Counts
BUSOP_FR	Business Operating From	5	105-109	I	Business Operating Hours From
BUSOP_TO	Business Operating To	5	110-114	I	Business Operating Hours To
COMMENTS	Comments	1	115	I	Comments on Truck Count? (Yes = 1, No = 2,

```
*  I=Integer   C=Cnaracter
```

Q.5

CODES FOR TRUCK COUNTS

Count Source Codes:
      1 - Count by Surveyor
      2 - Count Obtained Through
         In Person Interview with Business
      3 - Count Obtained from Phone Interview
         with Business

Business Type Codes:
      A - Airport
      B - Basic
      G - Special Generator
      R - Retail
      S - Service

Truck Type Codes:
      LT - Light Truck (Pickups, Vans, etc.)
     HTS - Heavy Truck, Single Unit
     HTM - Heavy Truck, Multiunit
     ODT - Other Delivery Vehicles

Time Period Codes:
    Period 1 - 12 Midnight to 7 AM
       "   2 - 7 AM to 9 AM
       "   3 - 9 AM to 12 Noon
       "   4 - 12 Noon to 3 PM
       "   5 - 3 PM to 6 PM
       "   6 - 6 PM to 9 PM
       "   7 - 9 PM to 12 Midnight

NCTCOG 1984 WORKPLACE SURVEY RECORD FORMAT

RECORD TYPE: EMPLOYEE QUESTIONNAIRE
FILENAME: @TS.WORKPL.QUEST.EMP.ALL
SORT: SAMPLE NUMBER

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE*	DESCRIPTION
RECTYPE	Record Type	1	1	I	Emp. Ques = 2
SER_NUM	Serial Number	5	2-6	I	Printed @ Top Right of Q'aire
ARRIVAL	Arrival Time	5	7-11	C	Enter Time
MODE	Mode of Travel	1	12	C	See Mode (I) Codes
AUTO_OC	Auto Occupancy	1	13	C	Enter Number
PARK_PAY	Park/Pay	5	14-18	C	Free=F or Enter Amt. Paid
PKG_DIST	Parking Distance	1	19	C	See Parking Distance Codes
BUS_ACC	Access Mode to Bus	1	20	C	See Access Mode/Bus Codes
TO_STOP	To Work..Stops?	1	21	C	No=1 Yes=2
TO_STOP1	Purpose/1st Stop	1	22	C	See Trip Purpose (II) Codes
TO_STOP2	Purpose/2nd Stop	1	23	C	See Trip Purpose (II) Codes
TO_STOP3	Purpose/3rd Stop	1	24	C	See Trip Purpose (II) Codes
TO_STOP4	Purpose/4th Stop	1	25	C	See Trip Purpose (II) Codes
FROM_STOP	From Work..Stops?	1	26	C	No=1 Yes=2
FROM_STOP1	Purpose/1st Stop	1	27	C	See Trip Purpose (II) Codes
FROM_STOP2	Purpose/2nd Stop	1	28	C	See Trip Purpose (II) Codes
FROM_STOP3	Purpose/3rd Stop	1	29	C	See Trip Purpose (II) Codes
FROM_STOP4	Purpose/4th Stop	1	30	C	See Trip Purpose (II) Codes
TDW	Trips During Work?	1	31	C	No=1 Yes=2
TDW1_PUR	1st Trip/Purpose	1	32	C	See Trip Purpose (III) Codes
TWD1_MOT	1st Trip/Mode	1	33	C	See Mode (II) Codes
TWD1_AND	1st Trip/And Then	1	34	C	Back to Work=1 To 2nd Trip=2
TDW2_PUR	2nd Trip/Purpose	1	35	C	See Trip Purpose (III) Codes
TWD2_MOT	2nd Trip/Mode	1	36	C	See Mode (II) Codes
TWD2_AND	2nd Trip/And Then	1	37	C	Back to Work=1 To 3rd Trip=2
TDW3_PUR	3rd Trip/Purpose	1	38	C	See Trip Purpose (III) Codes
TWD3_MOT	3rd Trip/Mode	1	39	C	See Mode (II) Codes
TWD3_AND	3rd Trip/And Then	1	40	C	Back to Work=1 To 4th Trip=2
TDW4_PUR	4th Trip/Purpose	1	41	C	See Trip Purpose (III) Codes
TWD4_MOT	4th Trip/Mode	1	42	C	See Mode (II) Codes
TWD4_AND	4th Trip/And Then	1	43	C	Back to Work=1 To Next Trip=2
AUTOS	Autos Available	1	44	C	Enter Number
OCCUP	Occupation	1	45	C	See Occupation Codes
TRP_ORCD	Trip Origin Code	1	46	C	See Trip Origin Codes
ORIGIN	Home Address Zone	5	47-51	C	Traffic Survey Zone
INCOME	Household Income	1	52	C	See Income Codes
LVL_CD	Level Code	1	53	C	See Level Codes
SAMP_NUM	Sample Number+	3	54-56	C	Business Sample Number

* I=Integer C=Character
Note : Unless otherwise specified, an "x" value for any of the character
variables indicates no response to that question on the questionnaire.

TABLE Q-6

NCTCOG 1984 WORKPLACE SURVEY RECORD FORMAT

RECORD TYPE: NONEMPLOYEE QUESTIONNAIRE
FILENAME: @TS.WORKPL.QUEST.NONEMP.ALL
SORT: SAMPLE NUMBER

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE*	DESCRIPTION
RECTYPE	Record Type	1	1	I	Non-Emp. Ques = 1
SER_NUM	Serial Number	5	2-6	I	Printed @ Top Right
REG_PL	Regular Place of Employment	1	7	C	Yes=1 No=2
ARRIVAL	Arrival Time	1	8	C	See Time Period Codes
TRP_ORCD	Trip Origin Code	1	9	C	See Trip Origin Codes
ORIGIN	Trip Origin Zone	5	10-14	C	Traffic Survey Zone**
HOME	Home Based Trip?	1	15	C	Yes=1 No=2
MODE	Mode of Travel	1	16	C	See Mode (I) Codes
AUTO_OC	Auto Occupancy	1	17	C	Enter Number
PKG_DIST	Parking Distance	1	18	C	See Parking Distance Codes
BUS_ACC	Access Mode to Bus	1	19	C	See Access Mode/Bus Codes
TRP_PUR	Trip Purpose	1	20	C	See Trip Purpose (I) Codes
LVL_CD	Level Code	1	21	C	See Level Codes
SAMP_NUM	Sample Number	3	22-24	C	Business Sample Number

* I=Integer C=Character
** Zones out of Transportation Study Area = 9999

Note :   Unless otherwise specified, an "x" value for any of the character
          variables indicates no response to that question on the questionnaire.

CODES FOR EMPLOYEE AND NONEMPLOYEE QUESTIONNAIRES

Time Period Codes:
1 - Before 7 AM
2 - 7 AM to 9 AM
3 - 9 AM to 3 PM
4 - 3 PM to 6 PM
5 - After 6 PM

Trip Origin Codes:
1 - Standard Address
2 - Intersection
3 - Place
4 - Other
5 - Pre-Geocoded
6 - Address Insufficient
7 - Code Not Used
8 - TSZ Estimate
9 - Out of Area
X - No Address Specified

Mode (I) Codes:
1 - Drove by Self
2 - Drove Car with Others
    as Passengers
3 - Passenger in Car
    Driven by Someone Else
4 - Walked or Bicycled
5 - Motorcycled
6 - Vanpooled
7 - Rode in Taxi
8 - Rode in Bus

Mode (II) Codes:
1 - Auto
2 - Bus
3 - Other

Parking Distance Codes:
1 - One or Fewer Blocks
2 - Two Blocks
3 - Three Blocks
4 - Four Blocks
5 - More than Four Blocks

Access Mode/Bus Codes:
1 - Drove by Self
2 - Drove Car with Others
    as Passengers
3 - Passenger in Car
    Driven by Someone Else
4 - Walked or Bicycled
5 - Motorcycled
6 - Vanpooled
7 - Rode in Taxi

Trip Purpose (I) Codes:

1 - Trip to Work
2 - Work Related
3 - Shopping
4 - School
5 - Social/Recreational
6 - Personal Business
7 - Eat Meal
8 - Pick up/Drop off Passenger

Trip Purpose (II) Codes:

1 - Work Related
2 - Shopping
3 - School
4 - Social/Recreational
5 - Personal Business
6 - Eat Meal
7 - Pick up/Drop off Passenger

Trip Purpose (III) Codes:

1 - Work Related
2 - Shopping
3 - School
4 - Social/Recreational
5 - Personal Business
6 - Eat Meal
7 - Pick up/Drop off Passenger
8 - Home

Occupation Codes:

1 - Professional/Semi-Professional
2 - Proprietors/Managers/Officials
3 - Store and Office Clerks/Salesmen
       (exclude traveling)
4 - Traveling Salesmen/Agents
5 - Craftsmen/Foremen/Skilled Laborers
6 - Operatives and Semi-skilled Worker
7 - Laborers and Unskilled Workers
8 - Protective Service
9 - Personal Service Workers
A-F - Miscellaneous

Income Codes:

1 - Less than $5,000
2 - $ 5,000 - $ 9,999
3 - $10,000 - $14,999
4 - $15,000 - $19,999
5 - $20,000 - $24,999
6 - $25,000 - $29,999
7 - $30,000 - $34,999
8 - $35,000 - $39,999
9 - $40,000 - $50,000
0 - More than $50,000

Level Codes for
  Geocoding Method:

1. Computer geocoded by match of
   a. Street Number
   b. Street Name
   c. Direction (ie. north, south)
   d. Street Type (ie. Rd, Ave...)
2. Computer geocoded by match of
   a,b, & c above
3. Hand geocoded after unsuccessful
   match by methods 1 & 2 above
4. Computer geocoded by match
   of street intersections
5. Hand geocoded after unsuccessful
   computer match by street
   intersections
6. Hand geocoded - Insufficient
   address to attempt
   computer match

NCTCOG 1984 WORKPLACE SURVEY RECORD FORMAT

RECORD TYPE: NONEMPLOYEE AIRPORT QUESTIONNAIRE
FILENAME: @TS.WORKPL.NONEMP.AIRPORT.ALL
SORT: SAMPLE NUMBER

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE*	DESCRIPTION
RECTYPE	Record Type	1	1	I	Record type is 6
SER_NUM	Serial Number	6	2-7	I	Printed @ Top Right
REG_PL	Regular Place of Employment	1	8	C	Yes=1 No=2
ARRIVAL	Arrival Time	1	9	C	See Time Period Codes
TRP_ORCD	Trip Origin Code	1	10	C	See Trip Origin Codes
ORIGIN	Trip Origin Zone	5	11-15	C	Traffic Survey Zone**
HOME	Is This Home?	1	16	C	Yes=1 No=2
MODE	Mode of Travel	1	17	C	See Mode Code
AUTO_OC	Auto Occupancy	1	18	C	Enter Number
PKG_LOC	Parking Location	1	19	C	See Parking Location Codes
PKG_TM	Parking Time	1	20	C	See Parking Time Codes
TRP_PUR	Trip Purpose	1	21	C	See Trip Purpose Codes
PASS_PD	Passengers Picked Up or Dropped Off	2	22-23	C	See Passenger Pickup/ Dropoff Codes
LVL_CD	Level Code	1	24	I	See Level Codes

*   I=Integer C=Character
** Zones out of Transportation Study Area = 9999

Note :   Unless otherwise specified, an "x" value for any of the character
           variables indicates no response to that question on the questionnaire.

CODES FOR D/FW NONEMPLOYEE QUESTIONNAIRES

Time Period Codes:
1 - Before 7 AM
2 - 7 AM to 9 AM
3 - 9 AM to 3 PM
4 - 3 PM to 6 PM
5 - After 6 PM

Trip Origin Codes:
1 - Standard Address
2 - Intersection
3 - Place
4 - Other
5 - Pre-Geocoded
6 - Address Insufficient
7 - Code Not Used
8 - TSZ Estimate
9 - Out of Area
X - No Address Specified

Mode Codes:
1 - Private Auto, Truck, or V
2 - Rental Car
3 - Taxi
4 - Limousine
5 - Courtesy Van
6 - Other

Parking Location Codes:
1 - North Reduced Rate (Lot 1
2 - South Reduced Rate (Lot S
3 - West Reduced Rate (Lot 4W
4 - Terminal 2W
5 - Terminal 2E
6 - Terminal 3E
7 - Terminal 4E
8 - Amfac Hotel East
9 - Amfac Hotel West
0 - Rental Car Return
X - Did Not Park

Parking Time Codes:
1 - Less than One Hour
2 - One to Five Hours
3 - Five to 15 Hours
4 - More than 15 Hours
5 - Will Not Park

Trip Purpose Codes:
1 - Departing on Flight for
    Business Reasons
2 - Departing on Flight for
    Personal Reasons
3 - I work here
4 - Work Related
5 - Picking Up Passengers
6 - Dropping Off Passengers
7 - Eat A Meal
8 - Driving Through Airport
    Without Stopping

Passenger Pickup/Dropoff
Codes (Answered only if
Trip Purpose=5 or 6):

Enter Number of Passengers
Picked Up or Dropped Off
  or
99 If Trip Purpose
Is 5 or 6 But No Number of
Passengers was Entered

Level Codes for
 Geocoding Method:

1. Computer geocoded by match of
   a. Street Number
   b. Street Name
   c. Direction (ie. north, south)
   d. Street Type (ie. Rd, Ave...)
2. Computer geocoded by match of
   a,b, & c above
3. Hand geocoded after unsuccessful
   match by methods 1 & 2 above
4. Computer geocoded by match
   of street intersections
5. Hand geocoded after unsuccessful
   computer match by street
   intersections .
6. Hand geocoded - Insufficient
   address to attempt
   computer match

TABLE Q-10

NCTCOG 1984 WORKPLACE SURVEY RECORD FORMAT

RECORD TYPE: ARRIVAL COUNT
FILENAME: @TS.WORKPL.FINAL.ARRIVAL.COUNT
SORT: SAMPLE NUMBER

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE*	DESCRIPTION
RECTYPE	Record Type	1	1	I	Record Type = 3
POSITION	Position	1	2	I	Position of Counter
SAMP_NUM	Sample Number	3	3-5	C	Sample Number of Business
SUR_DATE	Survey Date	4	6-9	C	Survey Date
LOCATION	Location	4	10-13	I	Business TSZ
NUM_POS	Number of Positions	1	14	I	Total Number of Count Positions for Business
BUS_TYPE	Business Type	1	15	C	See Business Type Codes
Q_DISTRB	Q'aires Distributed	3	16-18	C	Number of Nonemployee Questionnaires Distributed
CT_12M_7	Count 12M - 7AM	4	19-22	I	Arrival Count from 12 Midnight to 7 am
CT_7_9	Count 7AM - 9AM	4	23-26	I	Arrival Count from 7 am to 9 am
CT_9_12N	Count 9AM - 12N	4	27-30	I	Arrival Count from 9 am to 12 Noon
CT_12N_3	Count 12N - 3PM	4	31-34	I	Arrival Count from 12 Noon to 3 pm
CT_3_6	Count 3PM - 6PM	4	35-38	I	Arrival Count from 3 pm to 6 pm
CT_6_9	Count 6PM - 9PM	4	39-42	I	Arrival Count from 6 pm to 9 pm
CT_9_12M	Count 9PM - 12M	4	43-46	I	Arrival Count from 9 pm to 12 Midnight
BUSOP_FR	Bus. Operating From	5	47-51	I	Business Operating Hours From
BUSOP_TO	Bus. Operating To	5	52-56	i	Business Operating Hours To
PCT_QDIS	Percent Q'aires Dist	2	57-58	C	Percent Questionnaires Distributed
COMMENTS	Comments	1	59	C	Comments of Arrival Count (Yes=1, No=2, New Count=Z)

*   I=Integer   C=Character
** Zones out of Transportation Study Area = 9999

TABLE Q-11

CODES FOR ARRIVAL COUNTS

Business Type Codes:

A - Airport
B - Basic
G - Special Generator
R - Retail
S - Service

APPENDIX R

ON-BOARD TRANSIT SURVEY

LINKED TRIP DATA

- Distributions by Transit System

- Cross Tabulations

UNLINKED TRIP DATA

- Distributions by Transit System

- Cross Tabulations

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

REGIONAL TRANSIT TRIP LENGTH
BY TRIP PURPOSE

TYPE OF TRIP	TRIP PURPOSE			
	HBW	HNW	NHB	TOTAL
LINKED (MILES)	7.5	5.9	5.5	6.9
UNLINKED (MILES)	6.2	4.8	4.3	5.6

TABLE R-2

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

TRANSIT TRIP LENGTH
BY TRANSIT SYSTEM

TYPE OF TRIP	TRANSIT SYSTEM				REGION
	CITRAN	DTS	TRAILWAYS	TBL	
LINKED (MILES)	5.4	6.5	16.3	21.6	6.9
UNLINKED (MILES)	4.8	5.3	14.4	18.5	5.6

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

PERCENT TRANSFERS

TRIP PURPOSE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
HOME-BASED WORK INCOME QUARTILE 1	15.3%	21.9%	8.9%	0.0%	21.0%
HOME-BASED WORK INCOME QUARTILE 2	11.9%	12.8%	1.4%	0.0%	12.4%
HOME-BASED WORK INCOME QUARTILE 3	11.5%	7.2%	0.6%	0.0%	6.8%
HOME-BASED WORK INCOME QUARTILE 4	3.8%	3.9%	0.6%	0.0%	3.2%
HOME-BASED WORK	14.6%	13.3%	1.2%	0.0%	13.8%
HOME-BASED NONWORK	17.6%	17.0%	4.2%	0.0%	17.0%
NONHOME-BASED	7.5%	15.1%	0.6%	0.0%	13.9%
TOTAL	15.1%	13.5%	1.2%	0.0%	14.4%

TABLE R-4

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

AGE BY NUMBER OF TRANSFERS
ALL SYSTEMS COMBINED

AGE GROUP		NUMBER OF TRANSFERS			
		0	1	2	TOTAL
1 - 18	PERCENT	7.1	1.8	0.1	
	ROW PER	79.5	19.8	0.7	8.9
	COL PER	8.4	11.0	15.3	
19 - 24	PERCENT	18.2	4.1	0.1	
	ROW PER	81.2	18.3	0.5	22.4
	COL PER	21.7	25.6	29.9	
25 - 34	PERCENT	27.5	4.8	0.1	
	ROW PER	85.0	14.7	0.3	32.3
	COL PER	32.9	29.9	26.3	
35 - 44	PERCENT	14.7	2.4	0.1	
	ROW PER	85.6	14.1	0.4	17.2
	COL PER	17.6	15.1	15.8	
45 - 54	PERCENT	7.3	1.3	0.0	
	ROW PER	85.1	14.6	0.3	8.6
	COL PER	8.8	7.9	6.2	
55 - 64	PERCENT	5.8	1.0	0.0	
	ROW PER	85.5	14.1	0.3	6.7
	COL PER	6.9	6.0	5.9	
65 +	PERCENT	3.2	0.7	0.0	
	ROW PER	81.2	18.7	0.1	3.9
	COL PER	3.8	4.6	0.6	
TOTAL		83.7	15.9	0.4	100.0

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

INCOME BY NUMBER OF TRANSFERS
ALL SYSTEMS COMBINED

INCOME RANGE	PERCENT	NUMBER OF TRANSFERS			
		0	1	2	TOTAL
UNDER 5,000	PERCENT ROW PCT COL PCT	11.0 74.6 13.2	3.7 24.8 23.0	0.1 0.6 21.1	14.8
5,000 - 9,999	PERCENT ROW PCT COL PCT	9.3 74.7 11.2	3.1 24.8 19.5	0.1 0.5 16.0	12.5
10,000 - 14,999	PERCENT ROW PCT COL PCT	7.9 76.5 9.4	2.3 22.7 14.6	0.1 0.8 21.3	10.3
15,000 - 19,999	PERCENT ROW PCT COL PCT	16.0 82.6 19.1	3.3 17.0 20.6	0.1 0.4 18.6	19.4
20,000 - 24,999	PERCENT ROW PCT COL PCT	10.4 86.5 12.4	1.6 13.2 10.0	0.0 0.3 9.6	12.0
25,000 - 29,999	PERCENT ROW PCT COL PCT	4.4 93.1 5.2	0.3 6.4 1.9	0.0 0.5 5.8	4.7
30,000 - 34,999	PERCENT ROW PCT COL PCT	5.9 92.4 7.1	0.5 7.6 3.0	0.0 0.0 0.3	6.4
35,000 - 39,999	PERCENT ROW PCT COL PCT	7.3 91.4 8.7	0.7 8.3 4.1	0.0 0.3 6.3	7.9
40,000 - 50,000	PERCENT ROW PCT COL PCT	5.4 93.7 6.4	0.4 6.3 2.3	0.0 0.0 0.0	5.7
OVER 50,000	PERCENT ROW PCT COL PCT	6.1 97.3 7.4	0.2 2.6 1.0	0.0 0.1 1.0	6.3
TOTAL		83.7	15.9	0.4	100.0

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

TRANSIT TRIP PURPOSE - GENERAL CLASSIFICATION
LINKED TRIPS

TRIP PURPOSE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
HOME-BASED WORK INCOME QUARTILE 1	32.3%	23.4%	3.6%	6.6%	23.4%
HOME-BASED WORK INCOME QUARTILE 2	16.6%	25.0%	20.4%	28.4%	24.0%
HOME-BASED WORK INCOME QUARTILE 3	4.9%	9.3%	22.2%	24.9%	9.5%
HOME-BASED WORK INCOME QUARTILE 4	4.1%	8.2%	40.9%	40.1%	9.3%
HOME-BASED WORK	57.9%	65.9%	87.1%	100.0%	66.2%
HOME-BASED NONWORK	25.7%	18.6%	1.9%	0.0%	18.5%
NONHOME-BASED	16.4%	15.5%	11.0%	0.0%	15.3%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

TRANSIT TRIP PURPOSE - SURVEY CLASSIFICATION
LINKED TRIPS

TRIP PURPOSE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
WORK RELATED	66.4%	75.3%	96.3%	100.0%	75.4%
SHOPPING	7.3%	4.4%	0.4%	0.0%	4.5%
SCHOOL	10.3%	7.2%	0.5%	0.0%	7.2%
SOCIAL/ RECREATIONAL	3.1%	1.5%	1.0%	0.0%	1.7%
PERSONAL BUSINESS	7.9%	7.4%	0.9%	0.0%	7.1%
EAT A MEAL	1.5%	0.8%	0.0%	0.0%	0.8%
OTHER	3.5%	3.4%	0.9%	0.0%	3.3%

TABLE R-8

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

TRANSIT AM ACCESS MODE DISTRIBUTION
LINKED TRIPS

ACCESS MODE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
AUTO/ PARKED	3.8%	11.1%	77.4%	96.7%	13.6%
AUTO/ DROP OFF	4.5%	4.2%	9.7%	3.3%	4.9%
WALKED	90.8%	84.6%	10.2%	0.0%	81.6%
OTHER	0.9%	0.1%	2.7%	0.0%	0.3%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

TRANSIT AM EGRESS MODE DISTRIBUTION
LINKED TRIPS

ACCESS MODE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
AUTO/ PARKED	1.1%	1.2%	1.9%	0.0%	1.2%
AUTO/ DROP OFF	2.0%	3.3%	1.9%	0.0%	3.1%
WALKED	96.2%	95.2%	91.6%	100.0%	95.2%
OTHER	0.7%	0.3%	4.6%	0.0%	0.5%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

AGE DISTRIBUTION
LINKED TRIPS

AGE GROUP	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
1 - 18	12.4%	8.9%	0.5%	0.0%	8.9%
19 - 24	21.3%	23.0%	11.1%	19.1%	22.4%
25 - 34	25.4%	32.8%	38.2%	50.7%	32.3%
35 - 44	15.1%	16.9%	27.9%	16.8%	17.2%
45 - 54	9.9%	8.2%	14.0%	7.8%	8.6%
55 - 64	9.3%	6.5%	6.8%	5.6%	6.7%
65 +	6.6%	3.7%	1.5%	0.0%	3.9%

TABLE R-11

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

DISTRIBUTION OF TRANSIT RIDERSHIP BY SEX
LINKED TRIPS

SEX	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
MALE	35.0%	36.2%	43.9%	40.2%	36.4%
FEMALE	65.0%	63.8%	56.1%	59.8%	63.6%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

INCOME DISTRIBUTION
LINKED TRIPS

INCOME RANGE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
UNDER 5,000	26.2%	14.1%	1.0%	1.1%	14.8%
5,000 - 9,999	17.8%	12.5%	1.1%	1.1%	12.5%
10,000 - 14,999	11.9%	10.5%	2.5%	4.4%	10.3%
15,000 - 19,999	15.0%	20.5%	7.9%	7.7%	19.4%
20,000 - 24,999	8.0%	12.7%	7.7%	13.0%	12.0%
25,000 - 29,999	4.9%	4.5%	6.5%	7.7%	4.7%
30,000 - 34,999	4.6%	6.4%	10.1%	8.7%	6.4%
35,000 - 39,999	3.7%	8.1%	15.4%	16.2%	7.9%
40,000 - 50,000	4.0%	5.2%	20.6%	18.4%	5.7%
OVER 50,000	3.9%	5.5%	27.2%	21.7%	6.3%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

ETHNIC GROUP DISTRIBUTION
LINKED TRIPS

ETHNIC GROUP	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
WHITE	41.0%	41.0%	91.3%	92.3%	43.3%
BLACK	50.1%	48.6%	3.3%	4.4%	46.7%
HISPANIC	7.3%	8.3%	2.9%	1.1%	7.9%
ASIAN	1.3%	1.2%	2.5%	2.2%	1.3%
NATIVE	0.0%	0.2%	0.0%	0.0%	0.2%
OTHER	0.3%	0.7%	0.0%	0.0%	0.6%

TABLE R-14

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

AUTOS AVAILABLE IN TRANSIT RIDER'S HOUSEHOLD
LINKED TRIPS

AUTOS AVAILABLE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
0	38.5%	30.6%	3.1%	3.3%	30.2%
1	32.8%	36.5%	24.4%	33.8%	35.6%
2	19.5%	24.0%	54.1%	45.7%	24.9%
3	6.1%	6.5%	14.7%	16.1%	6.8%
4 +	3.0%	2.4%	3.7%	1.1%	2.5%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

HOUSEHOLD SIZE DISTRIBUTION
LINKED TRIPS

HOUSEHOLD SIZE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
1	18.9%	17.2%	13.8%	16.3%	1.7%
2	23.8%	27.8%	39.7%	42.3%	27.9%
3	19.1%	18.7%	19.2%	22.8%	18.8%
4	16.6%	16.8%	18.8%	12.0%	16.8%
5	10.7%	10.7%	6.5%	6.6%	10.5%
6	5.6%	4.7%	1.4%	0.0%	4.7%
7	2.5%	1.8%	0.6%	0.0%	1.8%
8 +	2.8%	2.3%	0.0%	0.0%	2.3%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

ROUNDTRIPS PER WEEK
LINKED TRIPS

ROUND TRIPS	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
0	4.9%	2.9%	10.3%	0.0%	3.4%
1	5.7%	5.5%	2.5%	0.0%	5.3%
2-4	21.7%	17.3%	9.1%	13.0%	17.4%
5-7	27.0%	42.0%	56.6%	66.2%	41.2%
8 +	40.7%	32.3%	21.5%	20.8%	32.7%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

TYPE OF FARE PAYMENT
LINKED TRIPS

FARE TYPE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
CASH	69.1%	45.9%	29.9%	20.1%	47.6%
TOKEN	7.2%	0.1%	0.1%	0.0%	0.8%
MONTHLY PASS	19.4%	43.9%	63.0%	3.3%	42.1%
PUNCH CARD	0.1%	6.1%	6.0%	0.0%	5.4%
HANDICAPPED	0.2%	0.8%	0.0%	0.0%	0.7%
SENIOR CITIZEN	0.9%	2.5%	0.1%	0.0%	2.2%
OTHER	3.1%	0.7%	0.9%	76.6%	1.2%

TABLE R-18

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

A.M. ACCESS MODE BY TRIP PURPOSE
ALL SYSTEMS COMBINED - LINKED TRIPS

ACCESS MODE		HBW INCOME QUARTILE 1	HBW INCOME QUARTILE 2	HBW INCOME QUARTILE 3	HBW INCOME QUARTILE 4	HNW	NHB	TOTAL
AUTO/ PARKED	PERCENT	0.9	4.1	2.9	3.8	0.7	1.2	13.6
	ROW PCT	6.7	30.0	21.0	28.2	5.2	8.9	
	COL PCT	4.2	16.7	29.0	38.5	3.9	8.0	
AUTO/ DROP OFF	PERCENT	0.6	1.2	0.4	0.5	0.7	1.2	4.5
	ROW PCT	12.8	27.0	7.9	11.1	15.4	25.8	
	COL PCT	2.6	5.0	3.6	5.0	3.8	7.7	
WALKED	PERCENT	20.6	19.2	6.7	5.6	17.0	12.6	81.6
	ROW PCT	25.3	23.5	8.2	6.9	20.8	15.4	
	COL PCT	93.1	78.3	67.4	56.3	92.1	83.0	
OTHER	PERCENT	0.0	0.0	0.0	0.0	0.1	0.2	0.3
	ROW PCT	9.1	4.1	1.0	3.8	17.3	64.8	
	COL PCT	0.1	0.1	0.0	0.1	0.3	1.4	
TOTAL		22.1	24.4	9.9	10.0	18.4	15.2	100.0

TABLE R-19

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

A.M. EGRESS MODE BY TRIP PURPOSE
ALL SYSTEMS COMBINED – LINKED TRIPS

EGRESS MODE		HBW INCOME QUARTILE 1	HBW INCOME QUARTILE 2	HBW INCOME QUARTILE 3	HBW INCOME QUARTILE 4	HNW	NHB	TOTAL
AUTO/ PARKED	PERCENT ROW PCT COL PCT	0.1 8.1 0.5	0.3 21.6 1.1	0.1 6.2 0.8	0.1 11.6 1.4	0.1 5.2 0.4	0.6 47.3 3.7	1.2
AUTO/ DROP OFF	PERCENT ROW PCT COL PCT	0.4 14.2 2.0	0.6 19.0 2.4	0.3 9.0 2.7	0.1 2.6 0.8	1.1 34.3 5.9	0.6 20.8 4.1	3.1
WALKED	PERCENT ROW PCT COL PCT	21.4 22.5 97.4	23.5 24.7 96.5	9.8 10.3 96.2	9.7 10.2 97.8	16.6 17.4 93.1	14.2 14.9 90.2	95.2
OTHER	PERCENT ROW PCT COL PCT	0.1 8.9 0.2	0.0 1.2 0.0	0.0 6.3 0.3	0.0 0.5 0	0.1 22.2 0.7	0.3 61.0 2.1	0.5
TOTAL		22.0	24.3	10.2	10.0	17.8	15.7	100.0

TABLE R-20

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

ACCESS MODE BY EGRESS MODE (AM)
ALL SYSTEMS COMBINED - LINKED TRIPS

ACCESS MODE		AUTO PARKED	AUTO DROPPED OFF	WALKED	OTHER	TOTAL
AUTO/ PARKED	PERCENT	0.0	0.2	14.6	0.0	14.7
	ROW PCT	0.0	1.0	99.0	0.0	
	COL PCT	0.0	5.3	15.3	0.0	
AUTO/ DROP OFF	PERCENT	0.1	0.7	3.8	0.2	4.7
	ROW PCT	1.4	15.0	80.2	3.4	
	COL PCT	6.0	25.2	3.9	28.3	
WALKED	PERCENT	1.0	1.9	77.0	0.3	80.2
	ROW PCT	1.3	2.4	95.9	0.4	
	COL PCT	94.0	69.1	80.5	53.3	
OTHER	PERCENT	0.0	0.0	0.3	0.1	0.4
	ROW PCT	0.0	2.4	69.1	28.4	
	COL PCT	0.0	0.3	0.3	18.4	
TOTAL		1.1	2.8	95.5	0.6	100.0

TABLE R-21

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

SEX BY SURVEY TRIP PURPOSE
ALL SYSTEMS COMBINED - LINKED TRIPS

SEX		WORK RELATED	SHOPPING	SCHOOL	SOCIAL/ RECREATION	PERSONAL BUSINESS	EAT A MEAL	OTHER	TOTAL
MALE	PERCENT	26.7	1.2	2.8	0.8	3.1	0.5	1.3	36.4
	ROW PCT	73.3	3.2	7.7	2.2	8.6	1.4	3.6	
	COL PCT	35.5	26.9	37.8	48.5	43.4	60.2	39.7	
FEMALE	PERCENT	48.5	3.2	4.6	0.9	4.1	0.3	2.0	63.6
	ROW PCT	76.3	5.0	7.2	1.4	6.4	0.5	3.2	
	COL PCT	64.5	73.2	62.2	51.5	56.7	39.8	60.3	
TOTAL		75.2	4.3	7.4	1.7	7.2	0.9	3.3	100.0

The table header "TRIP PURPOSE" spans all the trip purpose columns.

TABLE R-22

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

ETHNIC GROUP BY SURVEY TRIP PURPOSE
ALL SYSTEMS COMBINED - LINKED TRIPS

ETHNIC GROUP		TRIP PURPOSE							TOTAL
		WORK RELATED	SHOPPING	SCHOOL	SOCIAL/ RECREATION	PERSONAL BUSINESS	EAT A MEAL	OTHER	
WHITE	PERCENT	35.5	1.6	2.0	0.7	2.2	0.4	1.0	43.3
	ROW PCT	82.0	3.6	4.6	1.6	5.0	1.0	2.3	
	COL PCT	47.1	37.2	26.8	38.3	30.5	49.0	30.6	
BLACK AMERICAN	PERCENT	32.7	2.3	4.3	0.9	4.4	0.3	1.9	46.8
	ROW PCT	69.9	4.9	9.1	2.0	9.5	0.6	4.0	
	COL PCT	43.4	55.1	57.7	52.9	62.2	31.0	57.1	
HISPANIC AMERICAN	PERCENT	5.7	0.3	0.9	0.2	0.4	0.0	0.3	7.8
	ROW PCT	72.7	3.8	12.0	2.0	4.7	0.6	4.3	
	COL PCT	7.5	7.2	12.7	8.8	5.1	5.1	10.0	
ASIAN AMERICAN	PERCENT	0.8	0.0	0.2	0.0	0.1	0.1	0.1	1.3
	ROW PCT	64.5	0.9	12.7	0.0	5.9	10.0	6.1	
	COL PCT	1.1	0.3	2.2	0.0	1.0	14.9	2.3	
NATIVE AMERICAN	PERCENT	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.2
	ROW PCT	85.6	0.0	8.1	0.0	6.3	0.0	0.0	
	COL PCT	0.2	0.0	0.2	0.0	0.2	0.0	0.0	
OTHER	PERCENT	0.5	0.0	0.0	0.0	0.1	0.0	0.0	0.6
	ROW PCT	82.8	2.4	4.4	0.0	10.4	0.0	0.0	
	COL PCT	0.7	0.4	0.4	0.0	0.9	0.0	0.0	
TOTAL		75.3	4.2	7.4	1.8	7.1	0.9	3.3	100.0

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

INCOME BY GENERAL TRIP PURPOSE
ALL SYSTEMS COMBINED - LINKED TRIPS

INCOME RANGE		GENERAL PURPOSE			
		HOME-BASED WORK	HOME-BASED NONWORK	NONHOME-BASED	TOTAL
UNDER 5,000	PERCENT	7.9	4.7	2.2	14.8
	ROW PCT	53.4	31.7	14.9	
	COL PCT	12.0	25.4	14.4	
5,000 - 9,999	PERCENT	8.2	2.7	1.6	12.6
	ROW PCT	65.8	21.5	12.7	
	COL PCT	12.4	14.4	10.3	
10,000 - 14,999	PERCENT	7.3	1.4	1.6	10.3
	ROW PCT	70.9	13.7	15.4	
	COL PCT	11.0	7.6	10.3	
15,000 - 19,999	PERCENT	12.7	3.5	3.3	19.5
	ROW PCT	65.3	17.8	17.0	
	COL PCT	19.2	18.7	21.6	
20,000 - 24,999	PERCENT	7.9	2.6	1.6	12.0
	ROW PCT	65.4	21.7	13.0	
	COL PCT	11.9	14.0	10.2	
25,000 - 29,999	PERCENT	3.5	0.5	0.8	4.7
	ROW PCT	72.9	10.1	17.0	
	COL PCT	5.2	2.6	5.2	
30,000 - 34,999	PERCENT	4.2	1.0	1.1	6.3
	ROW PCT	67.1	15.9	17.1	
	COL PCT	6.4	5.4	7.1	
35,000 - 39,999	PERCENT	5.2	1.2	1.3	7.7
	ROW PCT	67.6	15.7	16.7	
	COL PCT	7.9	6.6	8.4	
40,000 - 50,000	PERCENT	4.4	0.7	0.7	5.8
	ROW PCT	76.1	11.6	12.3	
	COL PCT	6.7	3.6	4.7	
OVER 50,000	PERCENT	4.8	0.3	1.2	6.3
	ROW PCT	75.8	5.1	19.1	
	COL PCT	7.3	1.8	7.9	
TOTAL		66.1	18.5	15.4	100.0

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

INCOME BY ROUND TRIPS PER WEEK
ALL SYSTEMS COMBINED - LINKED TRIPS

INCOME RANGE		ROUND TRIPS PER WEEK					
		0	1	2 - 4	5 - 7	8 +	TOTAL
UNDER 5,000	PERCENT	0.3	0.9	3.1	4.3	6.2	14.7
	ROW PCT	2.1	5.9	20.9	29.4	41.8	
	COL PCT	8.9	16.2	17.7	10.5	19.0	
5,000 - 9,999	PERCENT	0.2	0.3	2.1	4.1	5.7	12.3
	ROW PCT	1.5	2.7	17.0	32.9	45.9	
	COL PCT	5.5	6.2	12.1	9.8	17.4	
10,000 - 14,999	PERCENT	0.3	0.4	1.6	4.1	3.8	10.3
	ROW PCT	3.1	4.1	15.8	39.9	37.1	
	COL PCT	9.5	8.0	9.4	10.0	11.8	
15,000 - 19,999	PERCENT	0.7	1.3	3.2	7.3	6.9	19.4
	ROW PCT	3.6	6.8	16.6	37.6	35.4	
	COL PCT	20.5	24.8	18.4	17.6	21.1	
20,000 - 24,999	PERCENT	0.4	0.7	2	5.8	3.2	12.1
	ROW PCT	3.4	5.8	16.4	48.1	26.2	
	COL PCT	12.2	13.1	11.4	14.1	9.8	
25,000 - 29,999	PERCENT	0.1	0.2	0.7	2.3	1.2	4.7
	ROW PCT	2.3	3.4	15.5	54.2	24.7	
	COL PCT	3.2	3.0	4.2	6.2	3.6	
30,000 - 34,999	PERCENT	0.2	0.5	1.5	2.9	1.3	6.4
	ROW PCT	3.7	8.1	22.6	44.6	21.0	
	COL PCT	7.0	9.7	8.3	6.9	4.1	
35,000 - 39,999	PERCENT	0.3	0.5	1.2	3.8	2.2	8.0
	ROW PCT	3.7	5.6	15.1	48.1	27.5	
	COL PCT	8.6	8.4	6.9	9.3	6.7	
40,000 - 50,000	PERCENT	0.4	0.2	1.1	3.1	1.0	5.8
	ROW PCT	6.7	3.4	18.5	54.0	17.4	
	COL PCT	11.4	3.7	6.1	7.6	3.1	
OVER 50,000	PERCENT	0.5	0.4	1.0	3.4	1.1	6.3
	ROW PCT	7.2	6.0	15.3	54.0	17.6	
	COL PCT	13.3	7.0	5.5	8.2	3.4	
TOTAL		3.4	5.3	17.4	41.4	32.5	100.0

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

INCOME BY TYPE OF FARE PAYMENT
ALL SYSTEMS COMBINED - LINKED TRIPS

INCOME RANGE		FARE PAYMENT							
		CASH	TOKEN	MONTHLY PASS	PUNCH CARD	HANDI-CAPPED	SENIOR CITIZEN	OTHER	TOTAL
UNDER 5,000	PERCENT	9.0	0.2	3.6	0.9	0.3	0.6	0.1	
	ROW PCT	18.9	20.1	8.4	17.0	40.6	26.8	6.3	14.5
	COL PCT	61.9	1.1	24.4	6.4	1.9	4.0	0.5	
5,000 - 9,999	PERCENT	7.1	0.2	4.1	0.7	0.1	0.3	0	
	ROW PCT	14.8	20.0	9.8	13.5	11.8	13.8	2.9	12.5
	COL PCT	56.5	1.3	33.0	5.9	0.7	2.4	0.3	
10,000 - 14,999	PERCENT	5.1	0.1	4.4	0.4	0	0.2	0.1	
	ROW PCT	10.7	9.5	10.4	6.5	3.7	9.9	9.7	10.2
	COL PCT	49.5	0.7	42.8	3.5	0.3	2.1	1.1	
15,000 - 19,999	PERCENT	10.0	0.1	7.9	0.8	0.1	0.3	0.1	
	ROW PCT	20.9	11.9	18.7	14.2	16.5	14.4	11.2	19.3
	COL PCT	51.7	0.5	40.9	4.0	0.6	1.6	0.7	
20,000 - 24,999	PERCENT	4.2	0.1	6.3	0.9	0.1	0.4	0.2	
	ROW PCT	8.8	8.8	15.0	16.3	14.9	20.2	13.6	12.2
	COL PCT	34.4	0.6	52.0	7.3	0.8	3.6	1.3	
25,000 - 29,999	PERCENT	1.8	0.0	2.5	0.2	0.0	0.1	0.0	
	ROW PCT	3.7	5.4	5.8	4.2	0.0	2.6	5.4	4.7
	COL PCT	37.9	0.9	52.3	5.0	0.0	1.2	0.9	
30,000 - 34,999	PERCENT	3.1	0.1	2.8	0.3	1.0	0.1	0.1	
	ROW PCT	6.5	6.1	6.7	6.2	9.6	2.1	6.1	6.5
	COL PCT	47.3	0.8	43.4	5.2	1.0	0.7	0.8	
35,000 - 39,999	PERCENT	3.2	0.1	4.0	0.4	0.0	0.1	0.1	
	ROW PCT	6.8	6.3	9.4	7.2	3.1	3.9	6.3	7.9
	COL PCT	41.0	0.6	50.6	5.0	0.3	1.1	0.6	
40,000 - 50,000	PERCENT	2.3	0.0	3.0	0.2	0.0	0.1	0.0	
	ROW PCT	4.9	4.3	7.2	4.4	0.0	5.4	4.3	5.8
	COL PCT	40.0	0.6	51.5	4.1	0.0	2.0	0.6	
OVER 50,000	PERCENT	1.9	0.1	3.6	0.6	0.0	0.0	0.1	
	ROW PCT	4.0	7.7	8.6	10.6	0.0	1.0	7.7	6.4
	COL PCT	29.9	1.0	56.7	9.0	0.0	0.4	1.0	
TOTAL		47.5	0.8	42.1	5.5	0.7	2.2	1.2	100.0

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

TRANSIT TRIP PURPOSE - GENERAL CLASSIFICATION
UNLINKED TRIPS

TRIP PURPOSE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
HOME-BASED WORK INCOME QUARTILE 1	32.9%	25.4%	4.0%	6.6%	25.3%
HOME-BASED WORK INCOME QUARTILE 2	16.3%	24.4%	20.4%	28.4%	23.5%
HOME-BASED WORK INCOME QUARTILE 3	4.8%	8.5%	22.1%	24.9%	8.7%
HOME-BASED WORK INCOME QUARTILE 4	3.7%	7.2%	40.6%	40.1%	8.2%
HOME-BASED WORK	57.7%	65.5%	87.1%	100.0%	65.7%
HOME-BASED NONWORK	27.0%	19.0%	1.9%	0.0%	19.1%
NONHOME-BASED	15.3%	15.5%	11.0%	0.0%	15.2%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

TRANSIT TRIP PURPOSE - SURVEY CLASSIFICATION
UNLINKED TRIPS

TRIP PURPOSE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
WORK RELATED	65.7%	74.8%	96.3%	100.0%	74.7%
SHOPPING	7.1%	4.1%	0.4%	0.0%	4.3%
SCHOOL	11.0%	7.1%	0.5%	0.0%	7.2%
SOCIAL/ RECREATIONAL	3.1%	1.5%	1.0%	0.0%	1.7%
PERSONAL BUSINESS	8.2%	8.0%	0.9%	0.0%	7.8%
EAT A MEAL	1.5%	0.9%	0.0%	0.0%	0.9%
OTHER	3.4%	3.6%	0.9%	0.0%	3.4%

TABLE R-28

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

TRANSIT AM ACCESS MODE DISTRIBUTION
UNLINKED TRIPS

ACCESS MODE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
AUTO/ PARKED	3.1%	8.7%	76.7%	96.7%	10.8%
AUTO/ DROP OFF	3.8%	3.4%	9.8%	3.3%	3.7%
WALKED	78.7%	71.7%	10.1%	0.0%	69.9%
TRANSFER	13.7%	16.1%	0.8%	0.0%	15.3%
OTHER	0.7%	0.1%	2.6%	0.0%	2.6%

TABLE R-29

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

TRANSIT AM EGRESS MODE DISTRIBUTION
UNLINKED TRIPS

ACCESS MODE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
AUTO/ PARKED	0.9%	1.1%	1.8%	0.0%	1.1%
AUTO/ DROP OFF	1.8%	3.0%	1.9%	0.0%	2.8%
WALKED	82.5%	79.9%	90.2%	100.0%	80.6%
TRANSFER	14.2%	15.7%	1.6%	0.0%	15.0%
OTHER	0.6%	0.3%	4.5%	0.0%	0.5%

TABLE R-30

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

AGE DISTRIBUTION
UNLINKED TRIPS

AGE GROUP	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
1 - 18	13.1%	9.1%	0.6%	0.0%	9.2%
19 - 24	21.5%	23.5%	11.2%	19.1%	22.8%
25 - 34	25.2%	32.4%	38.0%	50.7%	32.0%
35 - 44	14.9%	16.7%	27.8%	16.8%	16.9%
45 - 54	9.5%	8.2%	14.0%	7.8%	8.5%
55 - 64	9.2%	6.3%	6.8%	5.6%	6.6%
65 +	6.6%	3.8%	1.6%	0.0%	4.0%

TABLE R-31

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

DISTRIBUTION OF TRANSIT RIDERSHIP BY SEX
UNLINKED TRIPS

SEX	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
MALE	34.9%	35.5%	44.1%	40.2%	35.8%
FEMALE	65.1%	64.5%	55.9%	59.8%	64.2%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

INCOME DISTRIBUTION
UNLINKED TRIPS

INCOME RANGE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
UNDER 5,000	26.9%	15.3%	1.1%	1.1%	16.0%
5,000 - 9,999	18.3%	13.5%	1.1%	1.1%	13.5%
10,000 - 14,999	11.7%	11.2%	2.8%	4.4%	11.0%
15,000 - 19,999	15.1%	20.5%	7.9%	7.7%	19.5%
20,000 - 24,999	7.9%	12.3%	7.7%	13.0%	11.7%
25,000 - 29,999	4.8%	4.1%	6.5%	7.7%	4.3%
30,000 - 34,999	4.5%	5.9%	10.1%	8.7%	5.9%
35,000 - 39,999	3.6%	7.5%	15.3%	16.2%	7.4%
40,000 - 50,000	3.7%	4.8%	20.5%	18.4%	5.2%
OVER 50,000	3.5%	4.8%	27.0%	21.7%	5.5%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

ETHNIC GROUP DISTRIBUTION
UNLINKED TRIPS

ETHNIC GROUP	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
WHITE	39.0%	37.7%	91.2%	92.3%	39.9%
BLACK	52.1%	51.9%	3.4%	4.4%	50.0%
HISPANIC	7.3%	8.3%	2.9%	1.1%	8.0%
ASIAN	1.4%	1.2%	2.5%	2.2%	1.2%
NATIVE	0.0%	0.1%	0.0%	0.0%	0.2%
OTHER	0.2%	0.8%	0.0%	0.0%	0.7%

TABLE R-34

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

AUTOS AVAILABLE IN TRANSIT RIDER'S HOUSEHOLD
UNLINKED TRIPS

AUTOS AVAILABLE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
0	39.4%	33.0%	3.4%	3.3%	32.5%
1	32.6%	36.0%	24.5%	33.8%	35.2%
2	19.0%	22.4%	53.8%	45.7%	23.3%
3	6.0%	6.3%	14.6%	16.1%	6.6%
4 +	3.0%	2.3%	3.7%	1.1%	2.4%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

HOUSEHOLD SIZE DISTRIBUTION
UNLINKED TRIPS

HOUSEHOLD SIZE	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
1	18.8%	16.3%	13.9%	16.3%	16.4%
2	22.9%	27.4%	39.6%	42.3%	27.4%
3	19.1%	18.7%	19.3%	22.8%	18.7%
4	16.9%	16.9%	18.7%	12.0%	17.0%
5	11.3%	11.1%	6.4%	6.6%	11.0%
6	5.8%	5.1%	1.4%	0.0%	5.1%
7	2.5%	1.9%	0.6%	0.0%	1.9%
8 +	2.7%	2.6%	0.1%	0.0%	2.5%

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

ROUNDTRIPS PER WEEK
UNLINKED TRIPS

ROUND TRIPS	TRANSIT SYSTEM				
	CITRAN	DTS	TRAILWAYS	TBL	REGION
0	4.5%	2.8%	10.2%	0.0%	3.2%
1	5.3%	5.2%	2.4%	0.0%	5.1%
2-4	21.9%	17.1%	9.1%	13.0%	17.3%
5-7	26.7%	41.0%	56.5%	66.2%	40.2%
8 +	41.6%	33.9%	21.8%	20.8%	34.2%

TABLE R-37

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

A.M. ACCESS MODE BY TRIP PURPOSE
ALL SYSTEMS COMBINED - UNLINKED TRIPS

ACCESS MODE		HBW INCOME QUARTILE 1	HBW INCOME QUARTILE 2	HBW INCOME QUARTILE 3	HBW INCOME QUARTILE 4	HNW	NHB	TOTAL
AUTO/ PARKED	PERCENT	0.7	3.3	2.3	3.0	0.6	0.9	10.8
	ROW PCT	6.8	30.2	20.8	28.1	5.5	8.7	
	COL PCT	2.9	13.9	25.8	37.2	3.1	6.2	
AUTO/ DROP OFF	PERCENT	0.5	1.0	0.3	0.4	0.6	0.9	3.7
	ROW PCT	13.6	28.0	7.7	10.8	15.0	24.9	
	COL PCT	2.0	4.4	3.3	4.9	2.9	6.1	
WALKED	PERCENT	18.6	16.2	5.3	4.4	14.8	10.1	69.9
	ROW PCT	26.6	23.2	7.6	6.4	21.2	15.1	
	COL PCT	73.4	69.1	61.4	54.3	77.3	69.6	
OTHER	PERCENT	0.0	0.0	0.0	0.0	0.0	0.2	0.3
	ROW PCT	9.5	4.0	1.0	3.8	17.2	64.5	
	COL PCT	0.1	0.0	0.1	0.1	0.2	1.1	
TRANSFER	PERCENT	5.5	2.9	0.8	0.3	3.2	2.6	15.3
	ROW PCT	35.9	19.2	5.4	1.9	20.6	17.0	
	COL PCT	21.7	12.5	9.5	3.6	16.5	17.1	
TOTAL		25.4	23.4	8.7	8.2	19.1	15.2	100.0

TABLE R-38

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

A.M. EGRESS MODE BY TRIP PURPOSE
ALL SYSTEMS COMBINED - UNLINKED TRIPS

| EGRESS MODE | | TRIP PURPOSE | | | | | | TOTAL |
		HBW INCOME QUARTILE 1	HBW INCOME QUARTILE 2	HBW INCOME QUARTILE 3	HBW INCOME QUARTILE 4	HNW	NHB	
AUTO/ PARKED	PERCENT	0.1	0.2	0.1	0.2	0.1	0.5	1.1
	ROW PCT	11.5	18.9	5.3	17.1	4.7	42.6	
	COL PCT	0.5	0.9	0.7	2.4	0.3	3.2	
AUTO/ DROP OFF	PERCENT	0.4	0.6	0.4	0.1	0.1	0.5	2.8
	ROW PCT	13.6	20.5	12.5	2.3	32.8	18.4	
	COL PCT	1.5	2.5	4.0	0.8	4.8	3.4	
WALKED	PERCENT	19.0	19.6	7.9	7.7	14.3	12.2	80.7
	ROW PCT	23.6	24.3	9.8	9.5	17.8	15.1	
	COL PCT	75.0	83.4	90.8	93.6	74.9	80.0	
OTHER	PERCENT	0.1	0.0	0.0	0.0	0.1	0.3	0.4
	ROW PCT	11.4	1.3	6.0	0.5	22.5	58.4	
	COL PCT	0.2	0.0	0.3	0.0	0.5	1.8	
TRANSFER	PERCENT	5.8	3.1	0.4	0.3	3.7	1.8	15.0
	ROW PCT	38.4	20.6	2.4	1.8	24.8	12.1	
	COL PCT	22.8	13.2	4.2	3.21	19.5	11.9	
TOTAL		25.3	23.4	8.7	8.2	19.1	15.3	100.0

TABLE R-39

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

ACCESS MODE BY EGRESS MODE (AM)
ALL SYSTEMS COMBINED - UNLINKED TRIPS

ACCESS MODE		AUTO PARKED	AUTO DROPPED OFF	WALKED	OTHER	TRANSFER	TOTAL
				EGRESS MODE			
AUTO/ PARKED	PERCENT	0.0	0.1	10.3	0.0	0.4	10.8
	ROW PCT	0.0	1.0	95.2	0.0	3.8	
	COL PCT	0.0	3.7	12.8	0.0	2.8	
AUTO/ DROP OFF	PERCENT	0.1	0.5	2.3	0.1	0.4	3.7
	ROW PCT	1.3	13.4	71.8	3.0	10.5	
	COL PCT	4.1	17.6	3.3	25.7	2.6	
WALKED	PERCENT	0.7	1.4	54.4	0.2	13.3	69.9
	ROW PCT	1.1	2.0	77.7	0.3	19.0	
	COL PCT	64.9	48.4	67.5	48.4	88.2	
OTHER	PERCENT	0.0	0.0	0.2	0.1	0.0	0.3
	ROW PCT	0.0	2.4	68.6	28.2	0.8	
	COL PCT	0.0	0.2	0.2	16.7	0.0	
TRANSFER	PERCENT	0.4	0.9	13.1	0.0	1.0	15.3
	ROW PCT	2.3	5.5	85.6	0.3	6.3	
	COL PCT	31.0	30.1	16.3	9.2	6.4	
TOTAL		1.1	2.8	80.7	0.4	15.0	100.0

TABLE R-40

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

INCOME BY GENERAL TRIP PURPOSE
ALL SYSTEMS COMBINED - UNLINKED TRIPS

INCOME RANGE		HOME-BASED WORK	HOME-BASED NONWORK	NONHOME-BASED	TOTAL
		GENERAL PURPOSE			
UNDER 5,000	PERCENT	8.5	5	2.4	16.0
	ROW PCT	53.4	31.4	15.2	
	COL PCT	13.0	26.3	15.9	
5,000 - 9,999	PERCENT	9.0	2.6	1.8	13.5
	ROW PCT	66.8	19.6	13.6	
	COL PCT	13.7	13.8	12.0	
10,000 - 14,999	PERCENT	7.8	1.4	1.7	10.8
	ROW PCT	71.2	13.2	15.6	
	COL PCT	11.9	7.6	11.2	
15,000 - 19,999	PERCENT	12.7	3.7	3.3	19.7
	ROW PCT	64.6	18.8	16.7	
	COL PCT	19.3	19.3	21.5	
20,000 - 24,999	PERCENT	7.7	2.3	1.5	11.7
	ROW PCT	65.4	22.1	12.5	
	COL PCT	11.7	13.6	9.6	
25,000 - 29,999	PERCENT	3.1	0.5	0.7	4.4
	ROW PCT	71.1	11.9	17.0	
	COL PCT	4.7	2.7	4.9	
30,000 - 34,999	PERCENT	3.9	1.0	1.0	5.8
	ROW PCT	66.9	16.7	16.4	
	COL PCT	5.6	5.1	6.3	
35,000 - 39,999	PERCENT	4.8	1.2	1.1	7.2
	ROW PCT	66.8	17.3	15.9	
	COL PCT	7.3	6.5	7.5	
40,000 - 50,000	PERCENT	4.0	0.7	0.7	5.3
	ROW PCT	75.3	12.5	12.2	
	COL PCT	6.1	3.5	4.3	
OVER 50,000	PERCENT	4.2	0.3	1.1	5.6
	ROW PCT	75.1	6.0	18.9	
	COL PCT	6.4	1.7	6.9	
TOTAL		65.6	19.1	15.3	100.0

TABLE R-41

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

SEX BY SURVEY TRIP PURPOSE
ALL SYSTEMS COMBINED - UNLINKED TRIPS

SEX		WORK RELATED	SHOPPING	SCHOOL	SOCIAL/ RECREATION	PERSONAL BUSINESS	EAT A MEAL	OTHER	TOTAL
MALE	PERCENT ROW PCT COL PCT	26.0 72.7 34.8	1.1 3.2 27.3	2.8 7.7 37.0	0.8 2.3 49.2	3.3 9.2 42.7	0.5 1.4 56.5	1.3 3.6 37.0	35.8
FEMALE	PERCENT ROW PCT COL PCT	48.7 75.8 65.2	3.0 4.7 72.7	4.7 7.3 63.0	0.9 1.3 50.8	4.4 6.9 57.3	0.4 0.6 43.5	2.2 3.4 63.0	64.2
TOTAL		74.6	4.2	7.4	1.7	7.7	0.9	3.5	100.0

TABLE R-42

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

ETHNIC GROUP BY SURVEY TRIP PURPOSE
ALL SYSTEMS COMBINED - UNLINKED TRIPS

ETHNIC GROUP		WORK RELATED	SHOPPING	SCHOOL	SOCIAL/ RECREATION	PERSONAL BUSINESS	EAT A MEAL	OTHER	TOTAL
					TRIP PURPOSE				
WHITE	PERCENT	32.3	1.4	1.9	0.6	2.1	0.4	1.0	39.9
	ROW PCT	81.2	3.6	4.8	1.6	5.4	0.9	2.6	
	COL PCT	43.3	36.0	25.7	33.9	27.8	0.9	30.2	
BLACK AMERICAN	PERCENT	35.2	2.2	4.4	1.0	5.0	0.3	2.0	50.1
	ROW PCT	70.3	4.5	8.8	2.0	9.9	0.6	4.0	
	COL PCT	47.1	4.5	59.2	55.0	64.4	35.5	58.0	
HISPANIC AMERICAN	PERCENT	5.6	0.3	0.9	0.2	0.4	0	0.3	7.9
	ROW PCT	71.5	3.9	11.8	2.6	5.3	0.7	4.3	
	COL PCT	7.5	7.7	12.5	11.0	5.4	5.8	9.8	
ASIAN AMERICAN	PERCENT	0.8	0.0	0.2	0.0	0.1	0.2	0.1	1.2
	ROW PCT	64.2	0.8	11.7	0.0	5.3	12.4	5.6	
	COL PCT	1.1	0.2	2.0	0.0	0.9	17.2	2.0	
NATIVE AMERICAN	PERCENT	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	ROW PCT	86.9	0.0	6.7	0.0	6.4	0.0	0.0	
	COL PCT	0.2	0.0	0.2	0.0	0.2	0.0	0.0	
OTHER	PERCENT	0.6	0.0	0.0	0.0	0.1	0.0	0.0	0.7
	ROW PCT	78.1	1.8	4.9	0.0	15.1	0.0	0.0	
	COL PCT	0.7	0.3	0.5	0.0	1.4	0.0	0.0	
TOTAL		74.7	4.0	7.4	1.8	7.8	0.9	3.4	100.0

NCTCOG 1984 ON-BOARD TRANSIT SURVEY

INCOME BY ROUND TRIPS PER WEEK
ALL SYSTEMS COMBINED - UNLINKED TRIPS

INCOME RANGE		ROUND TRIPS PER WEEK					TOTAL
		0	1	2 - 4	5 - 7	8 +	
UNDER 5,000	PERCENT	0.3	0.9	3.3	4.5	6.9	16.0
	ROW PCT	2.0	5.8	20.9	28.1	43.2	
	COL PCT	9.9	18.0	19.2	11.1	20.2	
5,000 - 9,999	PERCENT	0.2	0.4	2.1	4.4	6.2	13.2
	ROW PCT	1.5	2.8	16.0	33.1	46.6	
	COL PCT	6.2	7.2	12.2	10.8	18.1	
10,000 - 14,999	PERCENT	0.3	0.4	1.7	4.4	4.1	11.0
	ROW PCT	2.8	3.7	15.8	40.2	37.6	
	COL PCT	9.5	8.0	10.0	11.0	12.1	
15,000 - 19,999	PERCENT	0.6	1.3	3.2	7.3	7.2	19.6
	ROW PCT	3.3	6.5	16.3	37.1	36.9	
	COL PCT	20.0	24.9	18.4	18.0	21.2	
20,000 - 24,999	PERCENT	0.4	0.6	1.9	5.6	3.3	11.8
	ROW PCT	3.2	5.3	16.4	47.4	27.8	
	COL PCT	11.7	12.3	11.2	13.9	9.6	
25,000 - 29,999	PERCENT	0.1	0.2	0.7	2.3	1.1	4.3
	ROW PCT	2.3	3.8	15.6	53.2	25.1	
	COL PCT	3.1	3.2	3.9	5.7	3.2	
30,000 - 34,999	PERCENT	0.2	0.5	1.3	2.6	1.3	5.9
	ROW PCT	3.6	7.6	22.5	44.0	22.3	
	COL PCT	6.6	8.8	7.7	6.4	3.9	
35,000 - 39,999	PERCENT	0.3	0.4	1.2	3.6	2.0	7.4
	ROW PCT	4.3	5.2	15.8	48.0	26.6	
	COL PCT	10.0	7.6	6.8	8.9	5.8	
40,000 - 50,000	PERCENT	0.4	0.2	1.0	2.8	1.0	5.3
	ROW PCT	6.6	3.2	18.4	52.8	19.1	
	COL PCT	10.7	3.3	5.6	6.9	3.0	
OVER 50,000	PERCENT	0.4	0.3	0.9	2.9	1.0	5.5
	ROW PCT	7.2	6.1	15.3	53.2	18.2	
	COL PCT	12.3	6.6	4.9	7.3	3.0	
TOTAL		3.2	5.1	17.3	40.3	34.1	100.0

APPENDIX S

ON-BOARD TRANSIT SURVEY
DATA SET EXPANSION AND TRIP LINKING

APPENDIX S

ON-BOARD TRANSIT SURVEY
DATA SET EXPANSION AND TRIP LINKING

The following documents the methodology used to expand (factor) the On-Board Transit Survey (OBTS) data to regional ridership. Factoring or increasing the value of a returned survey questionnaire builds a sample to a representation of the characteristics of all riders and accounts for those people who were given a questionnaire and did not respond.

The factoring methodology involved two separate stages. The first factor was developed to expand returned questionnaires to the number issued. The second factor expanded the issued questionnaires to observed ridership.

Each stage is described below:

Stage 1

● Issued and returned questionnaires were summed by route as well as by peak and off-peak time periods (note: peak period = coded time periods 1, 2, and 4; off-peak period = coded time periods 3 and 5).

● The first expansion factor was calculated by dividing the number of issued questionnaires by the number of returned questionnaires for a particular route and time period. The following example illustrates this calculation.

Route	Time Period	Issued	Returned	Expansion Factor 1
100	Peak	100	50	2.000
	Off-Peak	50	10	5.000

- In the above case, all questionnaires for peak-period trips on Route 100 would be assigned a factor of 2.000. All off-peak Route 100 trips would be given a factor of 5.000.

All four transit systems were expanded in the manner described above.

Stage 2

- This stage expanded the issued questionnaires to observed ridership.

- Questionnaires issued were summed by line group.

- Observed ridership for CITRAN and DTS was obtained from each of the transit systems. The data was provided by line group. Table S-1 lists the CITRAN and DTS line groups used in Stage 2 of expansion, along with their observed ridership. Table S-2 contains a line group/bus route equivalency table.

- A breakdown of observed ridership into peak and off-peak volumes was obtained using point-check data for DTS and 1983 ride-check data for CITRAN.

- The expansion factor (Factor 2) was then calculated by dividing the observed line group data for a particular time period by the number of questionnaires issued for that line group during the same time period. The following example shows the input data for this process as well as the resulting factor.

Line Group No.	Routes in Line Group	Time Period	Observed Ridership	Questionnaires Issued	Expansion Factor 2
100	100,110,120	Peak	130	100	1.300
		Off-Peak	90	50	1.800

NCTCOG 1984 ON-BOARD TRANSIT SURVEY
TRANSIT RIDERSHIP BY LINE GROUP

TRANSIT SYSTEM	LINE GROUP NUMBER	LINE GROUP NAME	RIDERS
DTS	101	BELMONT	4204
	102	ERVAY	3386
	103	JUNIUS	1275
	104	BISHOP	1406
	105	TYLER	801
	106	FAIR OAKS EXP	2421
	107	HARWOOD	866
	108	OAK LAWN	2311
	109	CROSSTOWN(KING-MEDIC)	2093
	110	SUNSET	4800
	112	SECOND	4674
	115	MARSALIS	6365
	117	HOP-A-BUS	5290
	118	PARKVIEW	660
	119	ABRAMS	6213
	121	SMU	2006
	122	BECKLEY	3970
	124	CAPITAL	3570
	126	HINES	6572
	127	VILLAGE EXP	1492
	128	NW HWY	250
	129	MAPLE	3051
	131	MIDWAY	3578
	132	ROYAL HILLS	1448
	133	BALTIMORE	500
	136	PRESTON HOLLOW	3118
	137	URBANDALE	2386
	138	LISBON	8158
	139	LOVE FIELD	2426
	140	BROCKBANK	3121
	141	CEDAR CREST	549
	142	ELMWOOD	1062
	144	OAKLAND	6388
	146	MEADOW	756
	147	MOORE	766
	148	WESTMORELAND	2050
	149	BROOKHOLLOW	583
	150	PIEDMONT	855
	152	SINGLETON	4755
	154	BEVERLY HILLS	1272
	155	LANCASTER	7166
	156	CLUB OAKS	905
	157	THOMAS	776
	159	LEDBETTER	1503
	160	WHITE ROCK	3634

TRANSIT SYSTEM	LINE GROUP NUMBER	LINE GROUP NAME	RIDERS
DTS CONT.	161	GLEN OAKS	3162
	163	INDUSTRIAL	1476
	164	FERGUSON	4645
	165	PLEASANT GROVE	2556
	168	WESTERN HILLS	1624
	169	LAKE RIDGE	1738
	172	N. TOLLWAY	522
	173	SPRING CREEK	2502
	175	MURDOCK	1549
	177	N. CENTR. P&R	1961
	178	RED BIRD P&R	462
	182	RICHLAND P&R	3217
	183	PRESTONWOOD EXP	2464
	188	CASA LINDA SHUTT	16
	189	OAK CLIFF SHUTTL	68
CITRAN	201	BUTLER HOUSING	273
	202	HEMPHILL/N.MAIN	3112
	203	EVANS AVE	1368
	204	LAKEVIEW/C.SAMLS	654
	205	TCU	827
	206	POLY COMO	2122
	207	SOUTH SUMMIT	560
	208	ROSEDALE/C.BOWIE	3046
	209	EL CAMPO/RVRCRST	196
	210	COLLEGE/WHITE ST	754
	211	MITCHELL BLVD	466
	212	ANGLE AVE	84
	213	CITY LOOP	1441
	214	WOODHAVEN/MEDBRK	103
	215	E. LANCASTER	762
	216	HALLMARK	56
	217	TANGLEWOOD	54
	218	CANDLERIDGE	129
	219	NORMANDALE	61
	220	COOKES MEADOW	49
	221	CROSSTOWN	907
	233	SYLVANIA/RVERSDE	577
	297	AIRPORTER	309

TABLE S-2

NCTCOG 1984 ON-BOARD TRANSIT SURVEY
TRANSIT LINE GROUP
TABLE OF EQUIVALENCY

LINE GROUP NUMBER	LINE GROUP NAME	TRANSIT SYSTEM	BUS ROUTE NUMBER
101	BELMONT	DTS	01
101	BELMONT		20
102	ERVAY		02
103	JUNIUS		03
104	BISHOP		04
105	TYLER		05
106	FAIR OAKS EXP		06
107	HARWOOD		07
108	OAKLAWN		08
109	CROSSTOWN		09
110	SUNSET		10
110	SUNSET		11
110	SUNSET		16
112	SECOND		12
112	SECOND		14
115	MARSALIS		15
115	MARSALIS		30
117	HOP-A-BUS		17
118	PARKVIEW		18
119	ABRAMS		19
119	ABRAMS		23
119	ABRAMS		25
121	SMU		21
122	BECKLEY		22
122	BECKLEY		62
124	CAPITOL		24
124	CAPITOL		34
126	HINES		26
127	VILLAGE EXP		27
128	NW HWY		28
129	MAPLE		29
131	MIDWAY		31
131	MIDWAY		51
132	ROYAL HILLS		32
132	ROYAL HILLS		67
133	BALTIMORE		33
136	PRESTON HOLLOW		36
137	URBANDALE		37
138	LISBON		38
139	LOVE FIELD		39
140	BROCKBANK/PK FOR		40
140	BROCKBANK/PK FOR		43
141	CEDAR CREST		41
142	ELMWOOD		42
144	OAKLAND		44
146	MEADOW		46
147	MOORE		47
148	WESTMORELAND		48
149	BROOK HOLLOW		49
150	PIEDMONT		50

LINE GROUP NUMBER	LINE GROUP NAME	TRANSIT SYSTEM	BUS ROUTE NUMBER
152	SINGLETON	DTS	52
154	BEVERLY HILLS	CONT.	54
155	LANCASTER		55
156	CLUB OAKS		56
157	THOMAS		57
159	LEDBETTER		59
160	WHITE ROCK		60
161	GLEN OAKS		61
163	INDUSTRIAL		63
164	FERGUSON		64
165	PLEASANT GROVE		65
168	WESTERN HILLS		68
169	LAKE RIDGE		69
172	N. TOLLWAY		72
173	SPRING CREEK		73
175	MURDOCK		75
177	N. CENTR. P&R		77
178	RED BIRD P&R		78
182	RICHLAND P&R		82
183	PRESTONWOOD EXP		83
188	CASA LINDA SHUTT		88
189	OAK CLIFF SHUTTL		89
201	BUTLER HOUSING	CITRAN	10
202	HEMPHILL/N.MAIN		38
202	HEMPHILL/N.MAIN		73
203	EVANS AVE		36
204	LAKEVIEW/C.SAMLS		35
204	LAKEVIEW/C.SAMLS		72
205	TCU		53
206	POLY COMO		33
206	POLY COMO		57
207	SOUTH SUMMIT		52
208	ROSEDALE/C.BOWIE		32
208	ROSEDALE/C.BOWIE		58
208	ROSEDALE/C.BOWIE		59
209	EL CAMPO/RVRCRST		56
209	EL CAMPO/RVRCRST		71
209	EL CAMPO/RVRCRST		75
210	COLLEGE/WHITE ST		51
210	COLLEGE/WHITE ST		70
211	MITCHELL BLVD		34
212	ANGLE AVE		74
213	CITY LOOP		90
214	WOODHAVEN/MEDBRK		12
214	WOODHÁVEN/MEDBRK		30

LINE GROUP NUMBER	LINE GROUP NAME	TRANSIT SYSTEM	BUS ROUTE NUMBER
215	E. LANCASTER	CITRAN	31
216	HALLMARK	CONT.	50
217	TANGLEWOOD		55
218	CANDLERIDGE		54
219	NORMANDALE		61
220	COOKES MEADOW		14
221	CROSSTOWN		91
233	SYLVANIA/RVERSDE		11
297	AIRPORTER		99

- In the above case, all questionnaires for peak-period trips on Routes 100, 110, and 120 would be assigned a second expansion factor of 1.300. All off-peak trips for these routes would be given a factor of 1.800.

At the end of the expansion process, each transit trip record (questionnaire) had two factors attached to it; the first expanded returned questionnaires to the number issued, and the second factored the number issued to observed ridership. In the case of Trailways and Texas Bus Lines, which were Census surveys, the number of issued questionnaires was equal to the observed ridership. Thus, the second phase expansion factor for all trip records from these two systems was 1.000.

The above process created an expanded data set for unlinked transit trips. To create a data set for linked trips, a linking factor was developed for each returned questionnaire (trip record). This factor was:

Number of Transfers for
Trip Record   + 1

For example, if a particular trip record indicated one transfer was made, the linking factor was 2. If the trip record showed no transfers, the linking factor was 1.

Multiplying expansion factor 1 by expansion factor 2 provided the number of unlinked transit trips each returned questionnaire represented. The number of linked transit trips represented by each questionnaire was calculated by multiplying factor 1 by factor 2 and dividing the product by the linking factor.

APPENDIX T

ON-BOARD TRANSIT SURVEY
TRANSIT ROUTES INCLUDED IN SURVEY

ON-BOARD TRANSIT SURVEY
TRANSIT ROUTES INCLUDED IN SURVEY

Transit System	Route Number	Route Extension	Route Name
DTS	1	0	BELMONT
	1	1	BELMONT-FOREST LANE
	1	2	BELMONT-GREENVILLE
	2	0	ERVAY
	2	1	ERVAY-CENTRAL
	3	0	JUNIUS
	4	0	BISHOP
	5	0	TYLER
	6	0	FAIR OAKS
	7	0	HARWOOD
	8	1	OAK LAWN-ARMSTRONG
	8	2	OAK LAWN-GREENWAY
	9	0	CROSSTOWN
	10	0	SUNSET
	11	0	HAMPTON
	11	1	HAMPTON-ILLINOIS
	12	0	SECOND
	14	0	LAGOW
	15	1	RAMONA
	15	2	RAMONA-SWINGING HILLS
	16	0	SOUTHWOOD EXPRESS
	17	1	HOP-A-BUS RED
	17	2	HOP-A-BUS BLUE
	18	1	PARKVIEW-NORTH
	18	2	PARKVIEW-SOUTH
	19	0	ABRAMS
	19	1	ABRAMS-MOCKINGBIRD
	19	2	ABRAMS-NORTHWEST HWY
	20	0	SKILLMAN
	21	0	S.M.U.
	22	0	BECKLEY
	23	0	LAKEWOOD
	24	0	CAPITOL
	25	0	WESTSHORE
	26	1	HINES-BURBANK
	26	2	HINES-MOCKINGBIRD
	26	3	HINES-REGAL PARK
	26	4	HINES-SHORT LINE
	27	0	VILLAGE EXPRESS
	28	0	NORTHWEST HWY
	29	0	MAPLE
	30	0	MARSALIS
	30	1	MARSALIS-POLK TERRACE
	31	1	MIDWAY
	32	0	ROYAL HILLS

Transit System	Route Number	Route Extension	Route Name
DTS (Cont'd)	33	0	BALTIMORE
	34	0	VICKERY
	36	0	PRESTON HOLLOW-VALLEY VIEW
	37	1	URBANDALE-BRUTON
	37	2	URBANDALE-NORTH
	37	3	URBANDALE-SOUTH
	38	1	LISBON-EAST
	38	2	LISBON-WEST
	39	0	LOVE FIELD-AIRPORT
	40	0	BROCKBANK
	41	0	CEDAR CREST
	42	0	ELMWOOD
	43	0	PARK FOREST
	44	0	OAKLAND
	44	1	SOUTH LAMAR
	46	0	MEADOW
	47	0	MOORE
	48	0	WESTMORELAND-KIMBALL
	49	0	BROOK HOLLOW
	50	0	PIEDMONT
	51	0	WALNUT HILL
	52	0	SINGLETON
	54	0	BEVERLY HILLS
	55	1	LANCASTER-SOUTH
	55	2	LANCASTER-BISHOP COLLEGE
	55	3	LANCASTER-ALTA MESA
	56	0	CLUB OAKS
	57	0	THOMAS
	59	0	LEDBETTER
	60	1	WHITE ROCK-CENTRAL
	60	2	WHITE ROCK-NORTH
	60	3	WHITE ROCK-SOUTH
	60	4	WHITE ROCK-EAST
	60	5	WHITE ROCK-SHORT LINE
	61	0	GLEN OAKS
	62	0	WYNNEWOOD
	63	0	INDUSTRIAL
	64	1	FERGUSON-NORTH
	64	2	FERGUSON-SOUTH
	64	3	FERGUSON-EXPRESS
	65	1	PLEASANT GROVE-NORTH
	65	2	PLEASANT GROVE-SOUTH
	67	0	BOEDEKER
	68	0	WESTERN HILLS
	69	0	LAKE RIDGE EXPRESS
	72	0	NORTH TOLLWAY EXPRESS
	73	0	SPRING CREEK
	,73	1	SPRING CREEK-EAST

Transit System	Route Number	Route Extension	Route Name
DTS (Cont'd)	73	2	SPRING CREEK-WEST
	75	0	MURDOCK EXPRESS
	77	0	NORTH CENTRAL PARK & RIDE
	78	0	RED BIRD PARK & RIDE
	82	1	RICHLAND EXPRESS-EAST
	82	2	RICHLAND EXPRESS-WEST
	83	0	PRESTONWOOD EXPRESS
	88	0	CASA LINDA-PLEASANT GROVE SHUTTLE
	89	0	OAK CLIFF-RED BIRD SHUTTLE
CITRAN	10	0	BUTLER HOUSING
	11	1	SYLVANIA/OAKHURST
	11	2	RIVERSIDE
	11	3	RIVERSIDE/LASALLE
	11	4	SYLVANIA/RIVERSIDE
	12	0	WHITELAKE HILLS
	14	0	COOKE'S MEADOW
	30	0	MEADOWBROOK
	31	1	E. LANCASTER/HANDLEY
	31	2	E. LANCASTER/BECKWOOD-HITSON
	32	1	E. ROSEDALE/BERRY-VILLAGE CREEK
	32	2	E. ROSEDALE/ARMADA-VEL
	32	3	E. ROSEDALE/RAMEY-STALLCUP
	33	1	POLY/EDGEWOOD
	33	2	POLY/MARTIN
	33	3	POLY/COMBINATION
	34	0	MITCHELL BLVD/TCJC SOUTH
	35	0	LAKEVIEW
	36	1	EVANS/EAST
	36	2	EVANS/WEST
	36	3	EVANS/COMBINATION
	38	1	HEMPHILL
	38	2	HEMPHILL/HIGHLAND HILLS
	50	0	HALLMARK
	51	1	COLLEGE AVE
	51	2	COLLEGE AVE/I-20-CROWLEY
	52	1	SO. SUMMIT HEIGHTS/WALTON-ODESSA
	52	2	SO. SUMMIT HEIGHTS/WESTCREEK
	53	1	T.C.U.
	53	2	T.C.U./HULEN-ALTAMESA
	54	0	CANDLERIDGE
	55	0	TANGLEWOOD
	56	0	EL CAMPO
	57	0	ARLINGTON HEIGHTS
	58	1	CAMP BOWIE BLVD/WESTERN HILLS
	58	2	CAMP BOWIE BLVD/RIDGMAR MALL
	59	0	WYCLIFF
	61	0	NORMANDALE

Transit System	Route Number	Route Extension	Route Name
CITRAN (Cont'd)	70	0	WHITE SETTLEMENT ROAD
	71	0	RIVERCREST
	72	0	CENTRAL/SAMUELS
	73	1	N. MAIN/ROSEN HEIGHTS
	73	2	N. MAIN/DIAMOND HILL
	73	3	N. MAIN/DIAMOND HILL-TANDY
	74	1	ANGLE AVE/LONG-ROSEN
	74	2	ANGLE AVE/F.A.A.-MEACHAM
	99	0	AIRPORTER
	75	0	GREENWAY
	90	1	MID-CITY LOOP/EAST ON BERRY
	90	2	MID-CITY LOOP/WEST ON BERRY
	91	1	CROSSTOWN LOOP/EAST ON SEMINARY
	91	2	CROSSTOWN LOOP/WEST ON SEMINARY
TRAILWAYS	8	1	GARLAND
	20	0	PLANO
	20	1	RICHARDSON
	20	2	LOS COLINAS
	20	4	CARROLLTON
	20	5	ADDISON
	11	1	MARKET CENTER
	22	2	DALLAS CBD
	33	3	NORTH DALLAS
	44	4	NORTH CENTRAL DALLAS
TEXAS BUS LINES	1	0	GRAND PRAIRIE; BUS STATION
	2	0	GRAND PRAIRIE; I-20 & COOPER RD
	3	0	ARLINGTON STADIUM

APPENDIX U

ON-BOARD TRANSIT SURVEY
FILE INFORMATION

APPENDIX U

ON-BOARD TRANSIT SURVEY
FILE INFORMATION

FILE NAME

TS.OBTS.ALLSYS.HBW.PA.LINKED.TRIPS
TS.OBTS.ALLSYS.HBW.PA.UNLINKED TRIPS
TS.OBTS.ALLSYS.HNW.PA.LINKED.TRIPS
TS.OBTS.ALLSYS.HNW.PA.UNLINKED.TRIPS
TS.OBTS.ALLSYS.NHB.PA.LINKED.TRIPS
TS.OBTS.ALLSYS.NHB.PA.UNLINKED.TRIPS

TS.OBTS.ALLSYS.PA.LINKED.TRIPS
TS.OBTS.ALLSYS.PA.UNLINKED.TRIPS

TS.OBTS.CITRAN.PA.LINKED.TRIPS
TS.OBTS.CITRAN.PA.UNLINKED.TRIPS

TS.OBTS.DTS.PA.LINKED.TRIPS
TS.OBTS.DTS.PA.UNLINKED.TRIPS

TS.OBTS.TRAILWYS.PA.LINKED.TRIPS
TS.OBTS.TRAILWYS.PA.UNLINKED.TRIPS

TS.OBTS.TBL.PA.LINKED.TRIPS
TS.OBTS.TBL.PA.UNLINKED.TRIPS

File Name Key

ALLSYS = All transit systems combined

Unlinked = Unlinked transit trips with origin being where a person boarded the bus on which they were surveyed (survey question 1) and destination being where they alighted from the same bus (survey question 3)

Linked = Linked transit trips with origin being the true beginning of their trip (survey question 2) and destination being the true end of their trip (survey question 4) with all transfers removed

TBL = Texas Bus Lines

All trip tables are 800 by 800 matrices using the NCTCOG Regional Travel Forecast TAP zones.

All files are in production-attraction format.

Record Length = 1,604
Block Size = 17,648

NCTCOG 1984 ON-BOARD TRANSIT SURVEY FILE FORMATS

FILENAME: @TS.OBTS.REVISED.PURPOSE.COMBINE
SORTED BY: SYSTEM AND ROUTE NUMBER
* NOTE: FILE HAS BEEN CONVERTED TO P-A FORMAT

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
BDG_LOC	Boarding Location	5	1- 5	I	Valid TSZ
TSZ_OR	Origin Zone	5	6-10	I	Valid TSZ
HOME_OR	Is Origin Home?	1	11	I	1=Yes; 2=No
ALT_LOC	Alighting Location	5	12-16	I	Valid TSZ
TSZ_DS	Destination Zone	5	17-21	I	Valid TSZ
HOME_DS	Is Destination Home?	1	22	I	1=Yes; 2=No
TRIP_PUR	Trip Purpose	1	23	I	1 = Work Related 2 = Shopping 3 = School 4 = Social/Recreational 5 = Personal Business 6 = Eat A Meal 7 = Other 9 = No Response
ACC_MODE	Access Mode (2-part code)	7	24-30		
	Part 1	1	24	I	1 = Auto/Parked 2 = Auto/Dropped Off 3 = Walked 4 = Other 5 = Transfer 9 = No Response
	Part 2	6	25-30	I	* If transfer, code up to two route numbers, three digits each, right justified. If transfered from only one route: code 000 as last 3 digits * Code 999999 = Transferred but no route number given * Code 000000 = Access mode was NOT a transfer

I=Integer   R=Real   C=Character

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
EGR_MODE	Egress Mode (2-part code)	7	31-37		
	Part 1	1	31	I	* Same as ACC_MODE, Part 1
	Part 2	6	32-37	I	* Same as ACC_MODE, Part 2
FARE	Fare Paid (2-part code)	5	38-42		
	Part 1	2	38-39	I	01 = Cash
					02 = Token
					03 = Transfer
					04 = Other
					05 = Monthly Pass/Adult Zone 1
					06 = Monthly Pass/Adult Zone 2
					07 = Monthly Pass/Adult Zone 3
					08 = Senior Citizen
					09 = Handicapped
					10 = Punch Card/Adult Zone 1
					11 = Punch Card/Adult Zone 2
					12 = Punch Card/Adult Zone 3
					13 = Punch Card/Student
					99 = No Response
	Part 2	3	40-42	I	* If fare paid in cash, then amount paid is coded with no decimal point
					* 999 = Cash fare but amount not indicated
					* 000 = NOT cash fare

I=Integer   R=Real   C=Character

U.3

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
ROUNDTRP	Round Trips Per Week	1	43	I	0 = 0 1 = 1 2 = 2 - 4 3 = 5 - 7 4 = 8 or more 9 = No Response
CARS	Autos Available	1	44	I	0 = None 1 = 1 2 = 2 3 = 3 4 = 4 or more 9 = No Response
HHOLD	Household Size	1	45	I	1 = 1 2 = 2 3 = 3 4 = 4 5 = 5 6 = 6 7 = 7 8 = 8 or more 9 = No Response
AGE	Age	2	46-47	I	Age of Respondent 99 = No Response
SEX	Sex	1	48	I	1 = Male 2 = Female 9 = No Response

I=Integer   R=Real   C=Character

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
ETHNIC	Ethnic Group	1	49	I	1 = White 2 = Black 3 = Hispanic 4 = Asian 5 = Native Americans 6 = Other 9 = No Response
INCOME	Household Income	2	50-51	I	01 = Less than $ 5,000 02 = $ 5,000 - $ 9,999 03 = $10,000 - $14,999 04 = $15,000 - $19,999 05 = $20,000 - $24,999 06 = $25,000 - $29,999 07 = $30,000 - $34,999 08 = $35,000 - $39,999 09 = $40,000 - $50,000 10 = More than $50,000 99 = No Response
SYSTEM	Transit System	1	52	I	1 = Dallas Transit System 2 = CITRAN 3 = Trailways 4 = Texas Bus Lines
SER_NUM	Serial Number	6	53-58	I	Questionnaire Serial Number
ROUTE	Route Number	3	59-61	I	First two digits of route = trunk
DIR	Direction	1	62	I	1 = Inbound; 2 = Outbound

I=Integer   R=Real   C=Character

U.5

U.6

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
TIME_PER	Time Period - Military Time	1	63	I	1 = 0400 - 0700 2 = 0700 - 0900 3 = 0900 - 1500 4 = 1500 - 1800 5 = 1800 - Pull-In
LV_TIME	Bus Trip Leave Time	4	64-67	I	Actual Time
AR_TIME	Bus Trip Arrive Time	4	68-71	I	Actual Time
ASN_NUM	Assignment Number	3	72-74	I	Number
DAY	Day Surveyed	1	75	I	1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday
ISSUED	Questionnaires Issued	3	76-78	I	Number
RETURN	Questionnaires Returned	3	79-81	I	Number
SER_FR	Serial Number - From	6	82-87	I	Number
SER_TO	Serial Number - To	6	88-93	I	Number
C_REC_N	Control Record Sequence Number	4	94-97	I	Control record sequence number when sorted by SER_NUM
ROUTE_CH	Route Change Flag	1	98	I	0 = No route change 1 = Route number changed during data set editing
EXP_FAC1	Expansion Factor 1	6.3	99-104	R	Expansion factor - questionniares issued to questionnaires returned

I=Integer   R=Real   C=Character

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
EXP_FAC2	Expansion Factor 2	6.3	105-110	R	Expansion factor - questionnaires returned to observed ridership
LNK_FAC	Linking Factor	1	111	I	Number of transfers + 1
GEN_PUR	General Trip Purpose	3	112-114	C	HBW = Home-based work HNW = Home-based nonwork NHB = Nonhome-based
PURPOSE	Trip Purpose	1	115	I	1 = Home-based work, Income quartile 1 2 = Home-based work, Income quartile 2 3 = Home-based work, Income quartile 3 4 = Home-based work, Income quartile 4 5 = Home-based nonwork 6 = Nonhome-based

I=Integer R=Real C=Character

NCTCOG 1984 ON-BOARD TRANSIT SURVEY FILE FORMATS

FILENAME: @TS.OBTS.REVISED.FACTORED.COMBINE
SORTED BY: SYSTEM AND ROUTE NUMBER

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
BDG_LOC	Boarding Location	5	1- 5	I	Valid TSZ
TSZ_OR	Origin Zone	5	6-10	I	Valid TSZ
HOME_OR	Is Origin Home?	1	11	I	1=Yes; 2=No
ALT_LOC	Alighting Location	5	12-16	I	Valid TSZ
TSZ_DS	Destination Zone	5	17-21	I	Valid TSZ
HOME_DS	Is Destination Home?	1	22	I	1=Yes; 2=No
TRIP_PUR	Trip Purpose	1	23	I	1 = Work Related 2 = Shopping 3 = School 4 = Social/Recreational 5 = Personal Business 6 = Eat A Meal 7 = Other 9 = No Response
ACC_MODE	Access Mode (2-part code)	7	24-30		
	Part 1	1	24	I	1 = Auto/Parked 2 = Auto/Dropped Off 3 = Walked 4 = Other 5 = Transfer 9 = No Response
	Part 2	6	25-30	I	* If transfer, code up to two route numbers, three digits each, right justified. If transfered from only one route: code 000 as last 3 digits * Code 999999 = Transferred but no route number given * Code 000000 = Access mode was NOT a transfer

I=Integer   R=Real   C=Character

U.8

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
EGR_MODE	Egress Mode (2-part code)	7	31-37		
	Part 1	1	31	I	* Same as ACC_MODE, Part 1
	Part 2	6	32-37	I	* Same as ACC_MODE, Part 2
FARE	Fare Paid (2-part code)	5	38-42		
	Part 1	2	38-39	I	01 = Cash
					02 = Token
					03 = Transfer
					04 = Other
					05 = Monthly Pass/Adult Zone 1
					06 = Monthly Pass/Adult Zone 2
					07 = Monthly Pass/Adult Zone 3
					08 = Senior Citizen
					09 = Handicapped
					10 = Punch Card/Adult Zone 1
					11 = Punch Card/Adult Zone 2
					12 = Punch Card/Adult Zone 3
					13 = Punch Card/Student
					99 = No Response
	Part 2	3	40-42	I	* If fare paid in cash, then amount paid is coded with no decimal point
					* 999 = Cash fare but amount not indicated
					* 000 = NOT cash fare

I=Integer R=Real C=Character

U.9

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
ROUNDTRP	Round Trips Per Week	1	43	I	0 = 0 1 = 1 2 = 2 - 4 3 = 5 - 7 4 = 8 or more 9 = No Response
CARS	Autos Available	1	44	I	0 = None 1 = 1 2 = 2 3 = 3 4 = 4 or more 9 = No Response
HHOLD	Household Size	1	45	I	1 = 1 2 = 2 3 = 3 4 = 4 5 = 5 6 = 6 7 = 7 8 = 8 or more 9 = No Response
AGE	Age	2	46-47	I	Age of Respondent 99 = No Response
SEX	Sex	1	48	I	1 = Male 2 = Female 9 = No Response

I=Integer   R=Real   C=Character

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
ETHNIC	Ethnic Group	1	49	I	1 = White 2 = Black 3 = Hispanic 4 = Asian 5 = Native Americans 6 = Other 9 = No Response
INCOME	Household Income	2	50-51	I	01 = Less than $ 5,000 02 = $ 5,000 - $ 9,999 03 = $10,000 - $14,999 04 = $15,000 - $19,999 05 = $20,000 - $24,999 06 = $25,000 - $29,999 07 = $30,000 - $34,999 08 = $35,000 - $39,999 09 = $40,000 - $50,000 10 = More than $50,000 99 = No Response
SYSTEM	Transit System	1	52	I	1 = Dallas Transit System 2 = CITRAN 3 = Trailways 4 = Texas Bus Lines
SER_NUM	Serial Number	6	53-58	I	Questionnaire Serial Number
ROUTE	Route Number	3	59-61	I	First two digits of route = trunk
DIR	Direction	1	62	I	1 = Inbound; 2 = Outbound

I=Integer R=Real C=Character

U.11

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
TIME_PER	Time Period - Military Time	1	63	I	1 = 0400 - 0700 2 = 0700 - 0900 3 = 0900 - 1500 4 = 1500 - 1800 5 = 1800 - Pull-In
LV_TIME	Bus Trip Leave Time	4	64-67	I	Actual Time
AR_TIME	Bus Trip Arrive Time	4	68-71	I	Actual Time
ASN_NUM	Assignment Number	3	72-74	I	Number
DAY	Day Surveyed	1	75	I	1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday
ISSUED	Questionnaires Issued	3	76-78	I	Number
RETURN	Questionnaires Returned	3	79-81	I	Number
SER_FR	Serial Number - From	6	82-87	I	Number
SER_TO	Serial Number - To	6	88-93	I	Number
C_REC_N	Control Record Sequence Number	4	94-97	I	Control record sequence number when sorted by SER_NUM
ROUTE_CH	Route Change Flag	1	98	I	0 = No route change 1 = Route number changed during data set editing
EXP_FAC1	Expansion Factor 1	6.3	99-104	R	Expansion factor - questionniares issued to questionnaires returned

I=Integer   R=Real   C=Character

U.12

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
EXP_FAC2	Expansion Factor 2	6.3	105-110	R	Expansion factor - questionnaires returned to observed ridership
LNK_FAC	Linking Factor	1	111	I	Number of transfers + 1

I=Integer   R=Real   C=Character

NCTCOG 1984 ON-BOARD TRANSIT SURVEY FILE FORMATS

FILENAME: @TS.OBTS.QUEST.PHASEI
SORTED BY: SYSTEM AND ROUTE NUMBER

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
BDG_LOC	Boarding Location	5	1- 5	I	Valid TSZ
TSZ_OR	Origin Zone	5	6-10	I	Valid TSZ
HOME_OR	Is Origin Home?	1	11	I	1=Yes; 2=No
ALT_LOC	Alighting Location	5	12-16	I	Valid TSZ
TSZ_DS	Destination Zone	5	17-21	I	Valid TSZ
HOME_DS	Is Destination Home?	1	22	I	1=Yes; 2=No
TRIP_PUR	Trip Purpose	1	23	I	1 = Work Related 2 = Shopping 3 = School 4 = Social/Recreational 5 = Personal Business 6 = Eat A Meal 7 = Other 9 = No Response
ACC_MODE	Access Mode (2-part code)	7	24-30		
	Part 1	1	24	I	1 = Auto/Parked 2 = Auto/Dropped Off 3 = Walked 4 = Other 5 = Transfer 9 = No Response
	Part 2	6	25-30	I	* If transfer, code up to two route numbers, three digits each, right justified. If transfered from only one route: code 000 as last 3 digits * Code 999999 = Transferred but no route number given * Code 000000 = Access mode was NOT a transfer

I=Integer   R=Real   C=Character

U.14

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
EGR_MODE	Egress Mode (2-part code)	7	31-37		
	Part 1	1	31	I	* Same as ACC_MODE, Part 1
	Part 2	6	32-37	I	* Same as ACC_MODE, Part 2
FARE	Fare Paid (2-part code)	5	38-42		
	Part 1	2	38-39	I	01 = Cash
					02 = Token
					03 = Transfer
					04 = Other
					05 = Monthly Pass/Adult Zone 1
					06 = Monthly Pass/Adult Zone 2
					07 = Monthly Pass/Adult Zone 3
					08 = Senior Citizen
					09 = Handicapped
					10 = Punch Card/Adult Zone 1
					11 = Punch Card/Adult Zone 2
					12 = Punch Card/Adult Zone 3
					13 = Punch Card/Student
					99 = No Response
	Part 2	3	40-42	I	* If fare paid in cash, then amount paid is coded with no decimal point
					* 999 = Cash fare but amount not indicated
					* 000 = NOT cash fare

I=Integer   R=Real   C=Character

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
ROUNDTRP	Round Trips Per Week	1	43	I	0 = 0 1 = 1 2 = 2 - 4 3 = 5 - 7 4 = 8 or more 9 = No Response
CARS	Autos Available	1	44	I	0 = None 1 = 1 2 = 2 3 = 3 4 = 4 or more 9 = No Response
HHOLD	Household Size	1	45	I	1 = 1 2 = 2 3 = 3 4 = 4 5 = 5 6 = 6 7 = 7 8 = 8 or more 9 = No Response
AGE	Age	2	46-47	I	Age of Respondent 99 = No Response
SEX	Sex	1	48	I	1 = Male 2 = Female 9 = No Response

I=Integer R=Real C=Character

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
ETHNIC	Ethnic Group	1	49	I	1 = White 2 = Black 3 = Hispanic 4 = Asian 5 = Native Americans 6 = Other 9 = No Response
INCOME	Household Income	2	50-51	I	01 = Less than $ 5,000 02 = $ 5,000 - $ 9,999 03 = $10,000 - $14,999 04 = $15,000 - $19,999 05 = $20,000 - $24,999 06 = $25,000 - $29,999 07 = $30,000 - $34,999 08 = $35,000 - $39,999 09 = $40,000 - $50,000 10 = More than $50,000 99 = No Response
SYSTEM	Transit System	1	52	I	1 = Dallas Transit System 2 = CITRAN 3 = Trailways 4 = Texas Bus Lines
SER_NUM	Serial Number	6	53-58	I	Questionnaire Serial Number

I=Integer   R=Real   C=Character

TABLE U-4

NCTCOG 1984 ON-BOARD TRANSIT SURVEY FILE FORMATS

FILENAME: @TS.OBTS.CONTROL.PHASEI
SORTED BY:

VARIABLE NAME	FIELD NAME	BYTES	POSITION	VARIABLE TYPE	VALID CODES
ROUTE	Route Number	4	1- 4	I	First digit = system; second two digits = trunk
DIR	Direction	1	5	I	1 = Inbound; 2 = Outbound
TIME_PER	Time Period - Military Time	1	6	I	1 = 0400 - 0700 2 = 0700 - 0900 3 = 0900 - 1500 4 = 1500 - 1800 5 = 1800 - Pull-In
LV_TIME	Bus Trip Leave Time	4	7-10	I	Actual Time
AR_TIME	Bus Trip Arrive Time	4	11-14	I	Actual Time
ASN_NUM	Assignment Number	3	15-17	I	Number
DAY	Day Surveyed	1	18	I	1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday
ISSUED	Questionnaires Issued	3	19-21	I	Number
RETURN	Questionnaires Returned	3	22-24	I	Number
SER_FR	Serial Number - From	6	25-30	I	Number
SER_TO	Serial Number - To	6	31-36	I	Number

I=Integer   R=Real   C=Character

U.18