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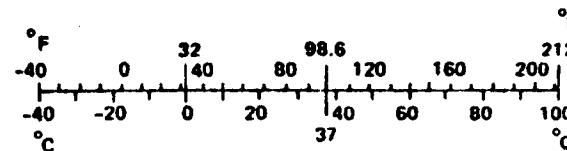
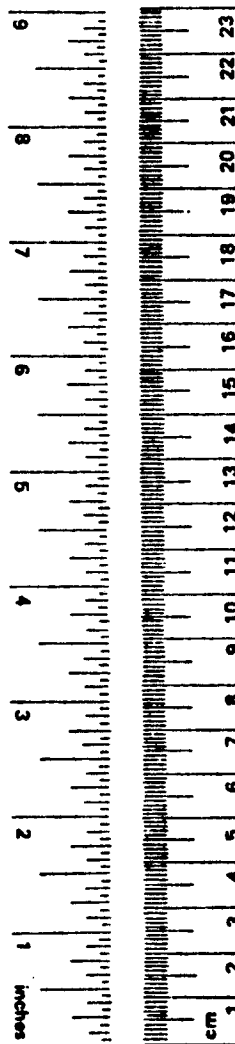
## METRIC CONVERSION FACTORS

### Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
<b>AREA</b>				
in <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
	acres	0.4	hectares	ha
<b>MASS (weight)</b>				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
<b>VOLUME</b>				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

### Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
<b>AREA</b>				
cm <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
km <sup>2</sup>	square kilometers	0.4	square miles	mi <sup>2</sup>
ha	hectares (10,000 m <sup>2</sup> )	2.5	acres	
<b>MASS (weight)</b>				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
<b>VOLUME</b>				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m <sup>3</sup>	cubic meters	35	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.3	cubic yards	yd <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



\* 1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10:286.

**AN ANALYSIS OF SURVEY DATA FROM THE KATY AND NORTH TRANSITWAYS**

BY

Diane L. Bullard  
Assistant Research Planner

Research Report 484-4

An Evaluation of the Impact of Permitting Carpools  
to Use the Katy Transitway  
Research Study 2-10-85-484

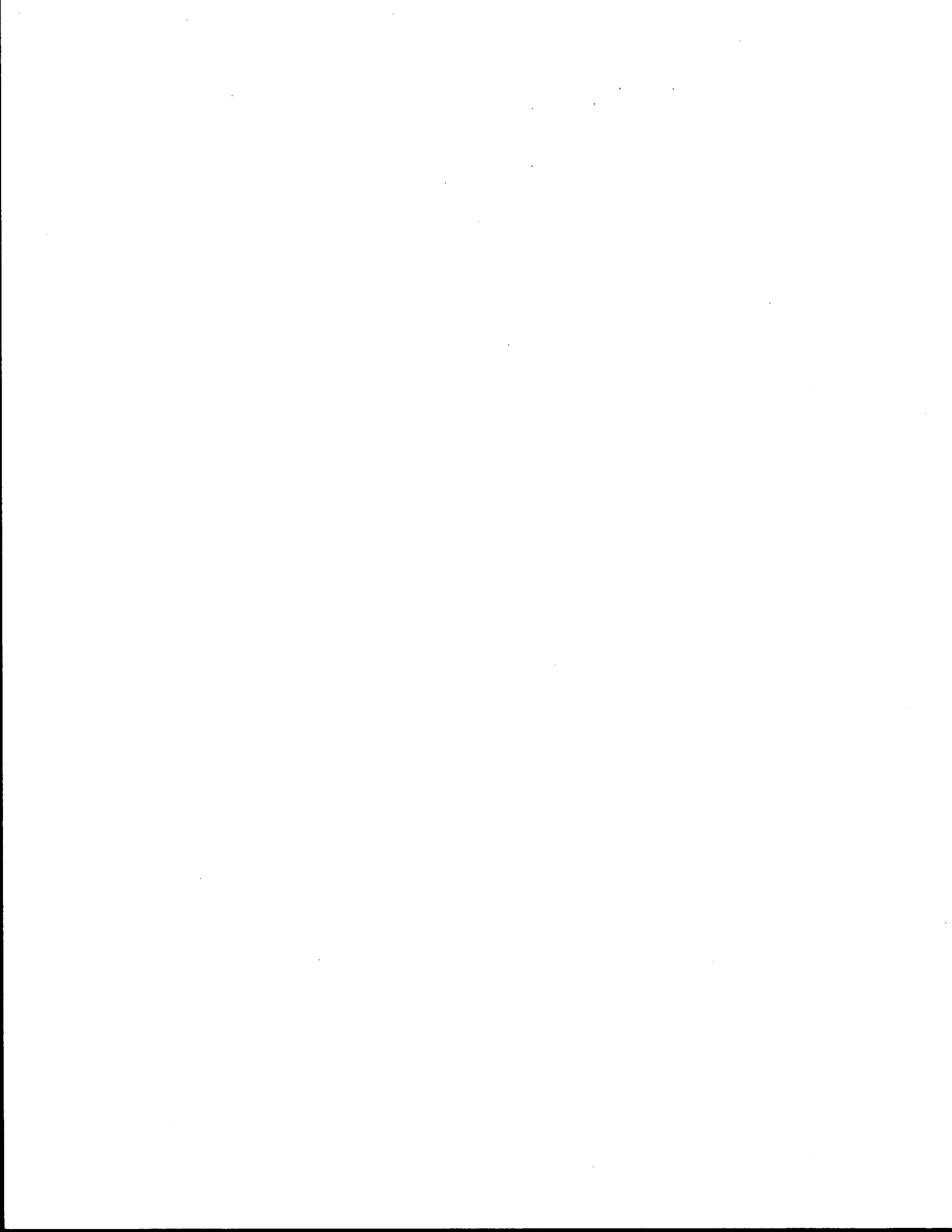
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March 1987



## ABSTRACT

A major commitment has been made in the Houston metropolitan area to develop physically separated authorized vehicles lanes (AVLs) or transitways in the medians of the existing freeway system. These lanes are reserved for high-occupancy vehicles. To date, portions of two transitways are operational -- one on the Katy Freeway in West Houston and one on the North Freeway serving North Houston. This report presents the results of transitway user and nonuser surveys performed in the Katy and North Freeway corridors. In addition to obtaining socioeconomic, demographic and travel information, the surveys were designed to: 1) determine perceptions of the level of utilization of the transitways; 2) identify why individuals have chosen their present travel mode; and 3) assess attitudes and impacts pertaining to the transitways.

Key Words: Authorized Vehicle Lanes, Transitways, High-Occupancy Vehicle Lanes, Transit, Park-and-Ride, Vanpools, Carpools, Busways, Priority Treatment

## **IMPLEMENTATION STATEMENT**

Since there is relatively little experience with operating exclusive, reversible high-occupancy vehicle lanes, many of the operating procedures and approaches to be used in Houston are being developed through experience. This study was undertaken to assist the Metropolitan Transit Authority of Harris County and the Texas State Department of Highways and Public Transportation in the implementation and operation of the authorized vehicle lanes (AVLs) or transitways. The information presented in this report on transitway user and nonuser characteristics and attitudes should enhance the cost-effectiveness of future transitway improvements.

## **DISCLAIMER**

The contents of this report reflect the views of the author who is responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Texas State Department of Highways and Public Transportation, the Metropolitan Transit Authority of Harris County, or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

## SUMMARY

A major commitment has been made in the Houston metropolitan area to develop physically separated authorized vehicle lanes (AVLs) or transitways in the median of the existing freeway system. These lanes are reserved for high-occupancy vehicles. To date, portions of two AVLs are operational -- one on the Katy Freeway in West Houston and one on the North Freeway serving North Houston. This report presents the results of AVL user and nonuser surveys performed in the Katy and North Freeway corridors. In addition to obtaining socioeconomic, demographic and travel information, the surveys were designed to: 1) determine perceptions of the level of utilization of the AVLs; 2) identify why individuals have chosen their present travel mode; and 3) assess attitudes and impacts pertaining to the AVLs.

The Katy AVL surveys were performed in March 1985, 5 months after the opening of the AVL and again in April 1986, after 18 months of operation. A special carpool survey was also undertaken in October 1985. The North AVL surveys were performed in January 1986, approximately 1 year after the North AVL replaced the North Freeway contraflow lane.

### Personal and Trip Characteristics of AVL Users and Nonusers

In several respects, the characteristics of the current AVL users and nonusers are similar (Tables S-1 and S-2). Occupation, education, trip purpose and trip frequency all exhibit similarities. The transit users on the AVLs are somewhat younger and consist of a greater percent of females.

The AVL users and nonusers have, to a significant extent, similar trip origins (home zip codes). However, trip destinations indicate a possible reason why more trips aren't being served on the AVL.

During the peak period, less than half of the total trips (AVL user and nonuser) are destined to downtown Houston. Yet, essentially all bus service caters to downtown trips. Vanpools and carpools demonstrate more capability to serve trips to destinations other than the downtown.

Table S-1: Personal Characteristics of Users and Nonusers of the Katy and North AVLs

Characteristic	AVL Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
<b>Age (years)</b>				
<u>Katy Freeway</u>	(n=568)	(n=442)	(n=193)	(n=726)
50th Percentile	32	37	40	40
<u>North Freeway</u>	(n=1226)	(n=1532)	----	(n=404)
50th Percentile	34	39	----	36
<b>Sex</b>				
<u>Katy Freeway</u>	(n=565)	(n=420)	(n=192)	(n=706)
Male	44%	51%	62%	66%
Female	56%	49%	38%	34%
<u>North Freeway</u>	(n=1203)	(n=1538)	----	(n=408)
Male	44%	55%	----	61%
Female	56%	45%	----	39%
<b>Education (years)</b>				
<u>Katy Freeway</u>	(n=570)	(n=451)	(n=194)	(n=715)
Average	15.4	15.3	15.3	15.9
<u>North Freeway</u>	(n=1214)	(n=1523)	----	(n=397)
Average	14.9	15.0	----	14.8
<b>Occupation</b>				
<u>Katy Freeway</u>	(n=550)	(n=417)	(n=192)	(n=711)
Professional	46%	58%	45%	42%
Managerial	20%	14%	23%	26%
Clerical	26%	23%	15%	9%
Sales	4%	3%	6%	14%
Other	4%	2%	11%	9%
<u>North Freeway</u>	(n=1190)	(n=1512)	----	(n=392)
Professional	38%	45%	----	38%
Managerial	23%	24%	----	21%
Clerical	30%	23%	----	15%
Sales	3%	7%	----	13%
Other	6%	1%	----	13%



Table S-2: Trip Characteristics of Users and Nonusers of the Katy and North AVLs

Trip Characteristic	AVL Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
<b>Trip Purpose</b>				
<u>Katy Freeway</u>	(n=580)	(n=59)	(n=65)	(n=741)
% Work	97%	100% *	100% *	91%
<u>North Freeway</u>	(n=1256)	(n=202)	----	(n=425)
% Work	99%	100% *	----	90%
<b>Trip Frequency (days/wk)</b>				
<u>Katy Freeway</u>	(n=579)	(n=59)	(n=65)	(n=722)
5 or more	89%	100%	97%	84%
<u>North Freeway</u>	(n=1251)	(n=202)	----	(n=415)
5 or more	95%	100%	----	83%
<b>Trip Destination</b>				
<u>Katy Freeway</u>	(n=575)	(n=58)	(n=65)	(n=728)
Downtown	95%	60%	49%	33%
Galleria	0%	12%	15%	10%
Texas Medical Center	1%	7%	3%	3%
Greenway Plaza	0%	5%	----	4%
Other	4%	16%	33%	50%
<u>North Freeway</u>	(n=1252)	(n=199)	----	(n=425)
Downtown	94%	61%	----	31%
Galleria	1%	7%	----	7%
Texas Medical Center	1%	8%	----	4%
Greenway Plaza	2%	4%	----	4%
Other	2%	20%	----	54%

\* Assumed

## Mode Choice Considerations

In looking at previous travel modes (Table S-3) of the bus patrons and vanpoolers in the Katy and North Freeway corridors, the largest percentage previously drove alone.

In the Katy Freeway corridor, the park-and-ride and express bus service has attracted 11% of its ridership from carpools or vanpools. The vanpools have attracted 15% of their ridership from buses and 17% from carpools. The carpools attracted 8% of their ridership from buses and 4% from vanpools.

In the North Freeway corridor, transit service has attracted 17% of its ridership from carpools or vanpools. The vanpools have attracted 14% of their members from transit and 21% from carpools.

Most commuters (except Katy AVL carpoolers) receive some sort of monetary incentive from their employer for using the mode. The employer generally pays all or part of the cost of a bus pass, van operations, or downtown parking. Not too surprisingly, the primary reasons AVL users chose an AVL mode of travel was: 1) avoid freeway traffic/driving; 2) save time; 3) time to relax; and 4) reliable travel schedule. Motorists traveling in the mixed-flow freeway lanes chose to do so because of: 1) the convenience/flexibility; 2) need car for work; and 3) no bus or van is available.

### Impacts of the AVLs on Mode Choice

The Katy and North AVLs appear to have at least some effect on mode choice (Table S-4). While sizable percentages of AVL users indicated that they would be using their current mode even if there were no AVL, between 12% and 26% of the Katy AVL users and between 27% and 41% of the North AVL users said they would not. Furthermore, 16% to 36% of the Katy AVL users and 68% to 76% of the North AVL users stated that the AVL was "very important" in their decision to use their current mode.

Table S-3: Previous Travel Mode and Reasons for Selecting Current Travel Mode

Reason/Characteristic	AVL Users			Non-AVL Users
	Transit	Vanpool	Carpool	Motorists
<b>Previous Travel Mode</b>				
<u>Katy Freeway</u>	(n=573)	(n=433)	(n=191)	----
Drove Alone	35%	36%	46%	----
Carpooled	5%	17%	18%	----
Vanpooled	6%	12%	4%	----
Park-and-Ride Bus	18%	8%	} 8%	----
Regular Route Bus	16%	7%		----
Didn't Make Trip	18%	19%	18%	----
Other	2%	1%	6%	----
<u>North Freeway</u>	(n=1240)	(n=1622)	----	----
Drove Alone	35%	30%	----	----
Carpooled	10%	21%	----	----
Vanpooled	7%	12%	----	----
Park-and-Ride Bus	18%	12%	----	----
Regular Route Bus	4%	2%	----	----
Didn't Make Trip	25%	21%	----	----
Other	1%	2%	----	----
<b>Primary Reasons for Selecting Current Travel Mode</b>				
<u>Katy Freeway</u>	(n=1945)	(n=1656)	(n=969)	(n=838)
Freeway Traffic	20%	19%	25%	----
Save Time	16%	20%	26%	2%
Time to Relax	18%	14%	7%	----
Reliable Travel Schedule	14%	12%	10%	----
Cost	14%	14%	10%	----
Dislike Driving	11%	9%	---	----
Need Car for Job	---	---	---	25%
Convenience/Flexibility	---	---	---	26%
No Bus or Van Available	---	---	---	21%
<u>North Freeway</u>	(n=4407)	(n=7036)	---	(n=498)
Freeway Traffic	23%	20%	---	---
Save Time	20%	20%	---	2%
Time to Relax	15%	13%	---	---
Reliable Travel Schedule	15%	13%	---	---
Cost	12%	15%	---	---
Dislike Driving	10%	8%	---	---
Need Car for Job	---	---	---	15%
Convenience/Flexibility	---	---	---	16%
No Bus or Van Available	---	---	---	20%
<b>% Having at Least Part of Bus Fare, Vanpool Cost, Carpool Cost, or Parking Cost Paid by Employer</b>				
<u>Katy Freeway</u>	(n=574)	(n=425)	(n=129)	(n=693)
Percent	56%	39%	19%	47%
<u>North Freeway</u>	(n=1247)	(n=1623)	---	(n=384)
Percent	63%	39%	---	46%

Table S-4: Impact of AVLs on Mode Choice

Impact	AVL Users		
	Transit	Vanpool	Carpool
<b>How Important is the AVL in Your Decision to Use Bus, Vanpool or Carpool</b>			
<u>Katy Freeway</u>	(n=573)	(n=435)	(n=197)
Very Important	57%	41%	56%
Somewhat Important	27%	20%	8%
Not Important	16%	39%	36%
<u>North Freeway</u>	(n=1250)	(n=1618)	----
Very Important	76%	68%	----
Somewhat Important	17%	18%	----
Not Important	7%	14%	----
<b>Would You Ride in Bus, Vanpool or Carpool if There Was No AVL</b>			
<u>Katy Freeway</u>	(n=575)	(n=436)	(n=197)
Yes	43%	72%	59%
No	26%	12%	25%
Not Sure	31%	16%	16%
<u>North Freeway</u>	(n=1247)	(n=1632)	----
Yes	23%	43%	----
No	41%	27%	----
Not Sure	36%	30%	----

**Perceptions of AVL Utilization**

At least 80% of the North AVL users but only 26% of the nonusers felt the AVL was sufficiently utilized to justify the project (Table S-5).

In 1985 (before carpools were allowed on the Katy AVL), 30% of the AVL vanpoolers and 49% of the AVL transit users felt the Katy AVL was sufficiently utilized to justify by the project, whereas 90% of the non AVL motorists felt it was not sufficiently utilized. In 1986 (after carpools were introduced), between 41% and 66% of the AVL users felt the Katy AVL was sufficiently utilized, yet 92% of the non AVL motorists still felt it was not (Table S-5).

Table S-5: Perceptions of AVL Utilization

Measure of Effectiveness	AVL Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
<b>Is the AVL Sufficiently Utilized</b>				
<u>Katy Freeway</u>	(n=567)	(n=429)	(n=193)	(n=742)
Yes	66%	41%	45%	3%
No	14%	34%	32%	92%
Not Sure	20%	25%	23%	5%
<u>North Freeway</u>	(n=1129)	(n=1616)	----	(n=418)
Yes	81%	84%	----	26%
No	6%	7%	----	56%
Not Sure	13%	9%	----	18%
<b>Is the AVL a Good Improvement</b>				
<u>Katy Freeway</u>	----	----	----	(n=733)
Yes	----	----	----	36%
No	----	----	----	43%
Not Sure	----	----	----	21%
<u>North Freeway</u>	----	----	----	(n=417)
Yes	----	----	----	62%
No	----	----	----	20%
Not Sure	----	----	----	18%

Thus, it appears that most of those individuals who are using and benefitting from the AVLs perceive they are sufficiently utilized, while those who are not able to take advantage of the AVLs generally perceive they are underutilized. It is interesting to note, however, that while 92% of the Katy Freeway motorists and 57% of the North Freeway motorists felt the AVL was underutilized, 36% of the Katy Freeway motorists and 62% of the North Freeway motorists felt the AVL was a good transportation improvement (Table S-5).

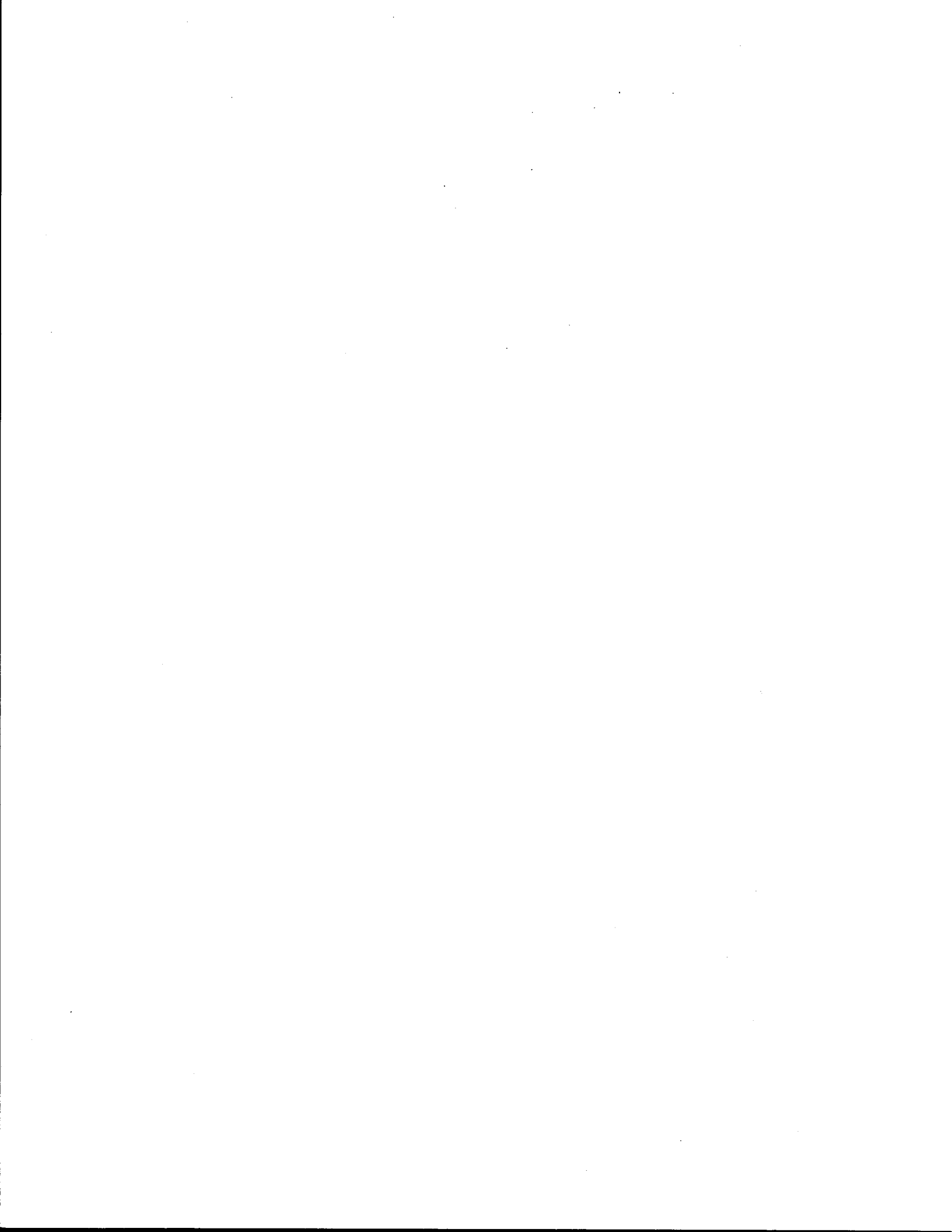


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## INTRODUCTION

In an effort to improve mobility in the Houston metropolitan area, the Metropolitan Transit Authority of Harris County and the Texas State Department of Highways and Public Transportation have committed to developing an extensive system of transitways on the city's freeways. Houston's commitment to freeway transitways is more extensive than that of any city in the United States. More than 40 miles of transitways are currently under construction with another 23 miles in the final planning and design stages. The current commitment is ultimately expected to result in over 100 miles of transitways in operation at a total capital cost of more than \$1 billion. The current status of the committed transitway system is illustrated in Figure 1.

Relatively little experience exists in the planning, design, and operation of these transitways. These transitways are typically located in the freeway median, are one-lane reversible, are approximately 20-foot wide, and are separated from the mixed-flow lanes by concrete median barriers. This design is different in several respects from the design of other permanent busways.

As a result, throughout the planning and design stage, it has been necessary to develop planning and design guidelines as the project progressed.

A major issue that is being addressed is the determination of the type(s) of vehicles that will be permitted to use the transitways. Based on the experience on the I-45 North Freeway contraflow lane, the Katy Authorized Vehicle Lane (AVL) opened in October 1984 with only buses and vans allowed to be eligible users. While this approach offered the potential to move large volumes of people, it did not result in moving large volumes of vehicles and the AVL therefore, appeared to be underutilized. As a result, the decision was made to permit 4+ carpools to use the Katy AVL on a test basis.

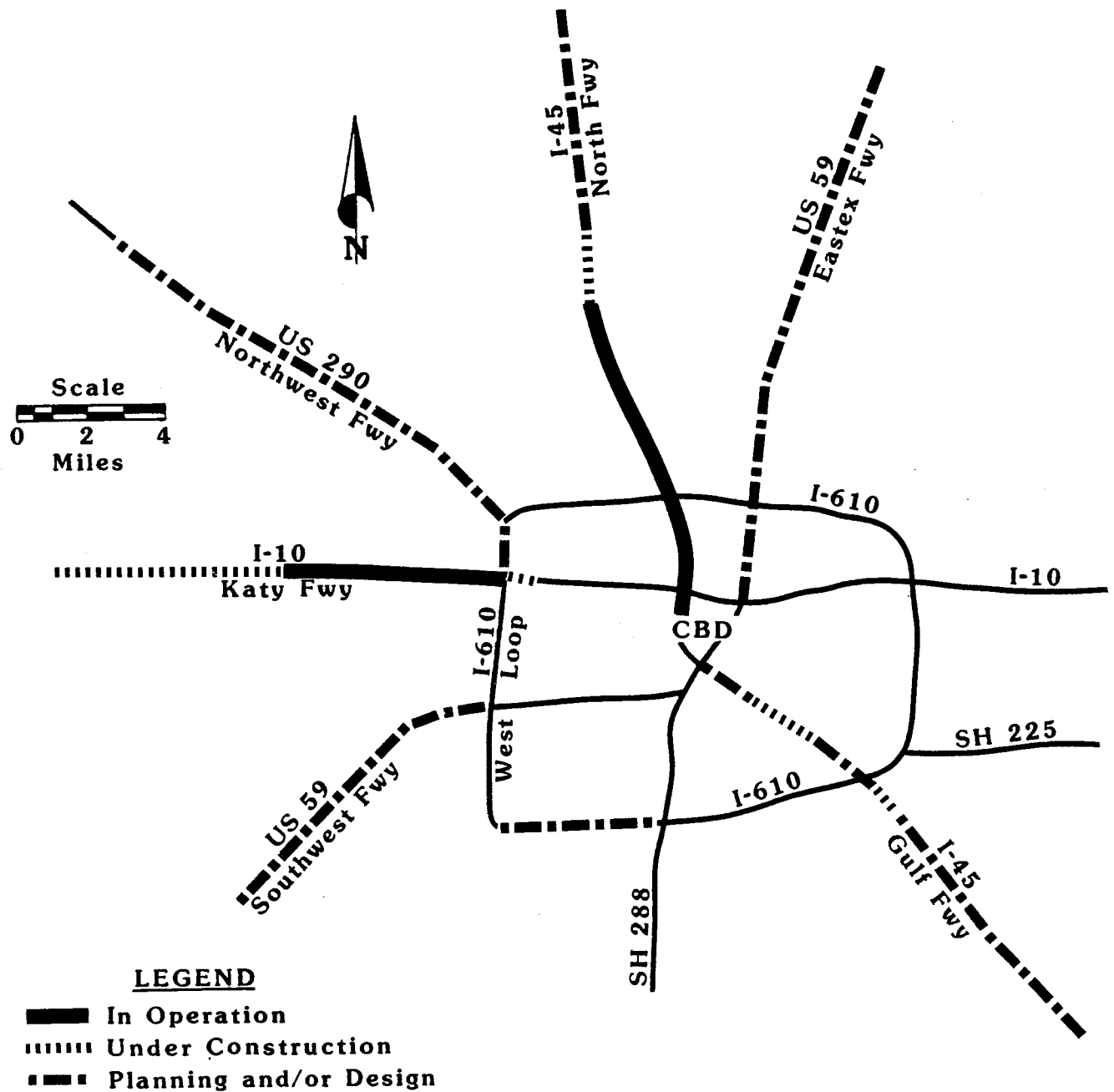


Figure 1: Current Status of the Committed Transitway System, Houston

On April 1, 1985, 4+ carpools were allowed to begin using the Katy AVL. This study was established to comprehensively assess the impacts of allowing carpools onto the AVL.

A major "before carpools" evaluation (which included AVL user and nonuser surveys) was performed in March 1985, the results of which are documented in Research Report 484-1. A major 6-month "after carpools" evaluation (similar in scope to the "before carpools" evaluation) was originally scheduled for the fall of 1985. However, due to the relatively low carpool volumes (less than 50 carpools per peak period), it was decided to delay the "after" study until the spring of 1986. In order to have some data on AVL carpool utilization at an earlier date, a special survey of carpools using the Katy AVL was undertaken in October 1985. The results of that survey are documented in Research Report 484-2. Immediately after the October 1985 survey effort, the passenger requirement for eligible carpools was lowered to 3 persons to encourage increased utilization of the AVL.

In addition to the carpool evaluation surveys being performed on the Katy AVL, surveys of users and nonusers along the North and Gulf AVLS are also being undertaken. These evaluations are designed to complement other research efforts by collecting important information on AVL user and nonuser characteristics, travel patterns and attitudes.

Phase I of the North AVL, which replaced the North Freeway contraflow lane, became operational in September 1984. A major "after" AVL implementation survey effort was performed in January 1986, approximately 1 year after the opening of the North AVL.

A second major survey effort along the Katy AVL was performed in April 1986. This research report documents the results of both the January 1986 North AVL surveys and the April 1986 Katy AVL surveys and compares them to the results of previous (March 1985 and October 1985) Katy AVL surveys.

The Katy and North Freeway study corridors are illustrated in Figure 2.

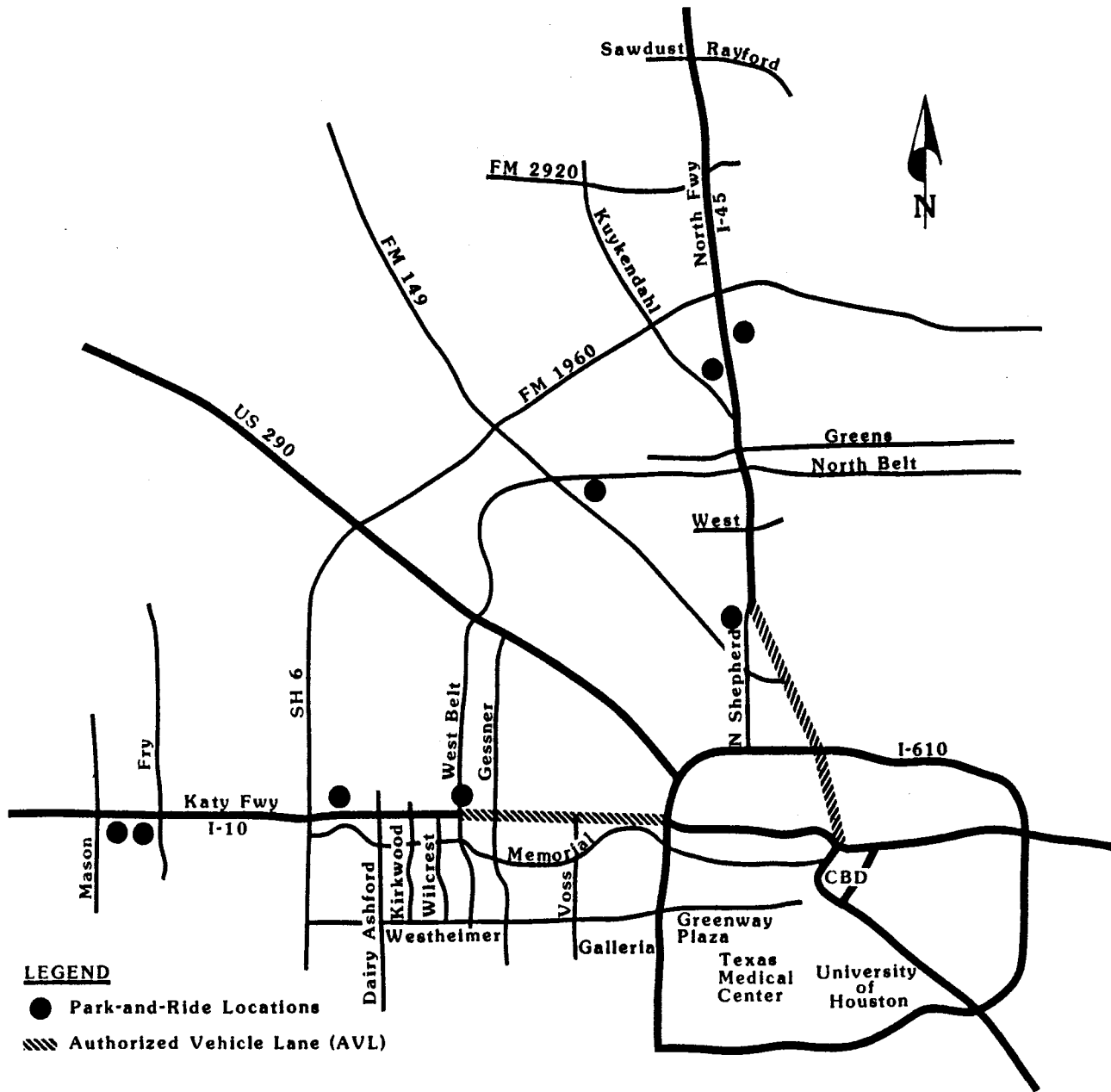


Figure 2. Katy and North Freeway Study Corridors

## Surveys of AVL Users and Nonusers

Surveys of both users and nonusers of the authorized vehicle lanes were undertaken including:

- Patrons on transit buses using the Katy and North AVLs;
- Vanpool drivers and passengers using the Katy and North AVLs;
- Carpool drivers and passengers using the Katy AVL; and
- Motorists on the Katy and North Freeways not using the AVLs.

While the surveys collected data concerning general travel characteristics and demographic data, the surveys were primarily intended to: 1) determine perceptions of the level of utilization of the AVLs; 2) identify why individuals have chosen their present travel mode; and 3) assess attitudes and impacts concerning the AVLs.

All survey data were collected by TTI personnel. As mentioned previously, comprehensive Katy AVL data were collected in March 1985, 5 months after the opening of the AVL and again in April 1986, after 18 months of operation. A special carpool survey was also undertaken in October 1985. North AVL data were collected in January 1986, approximately 16 months after the North AVL replaced the North Freeway contraflow lane.

### On-Board Transit User Surveys, AVL Users

On-board transit user surveys were conducted on all METRO routes using the Katy and North AVLs during the a.m. operating period. For each route, the objective was to survey 100% of the seated passengers on approximately 30% of the bus runs. Katy AVL transit service was provided on one express route and from 3 park-and-ride lots; North AVL transit service was provided by 1 express route and from 4 park-and-ride lots. TTI staff were present on all buses surveyed to distribute and collect the surveys. Survey response rates by route are summarized in Table 1. An example of the survey instrument is included in the Appendix.

Table 1: On-Board Transit User Survey Distribution, Katy and North AVL Routes

Route	Number of Surveys Distributed	Number of Surveys Completed	Response Rate
<u>Katy AVL, March 1985</u>			
Katy-Mason Park-and-Ride	81	73	90%
Addicks Park-and-Ride	96	94	98%
West Belt Park-and-Ride	55	55	100%
Memorial Limited Express	<u>137</u>	<u>136</u>	<u>99%</u>
Total	369	358	97%
<u>North AVL, January 1986</u>			
Kuykendahl Park-and-Ride	582	557	96%
North Shepherd Park-and-Ride	212	208	98%
Spring Park-and-Ride	246	234	95%
Seton Lake Park-and-Ride	151	144	95%
FM 1960 Express	<u>104</u>	<u>104</u>	<u>100%</u>
Total	1295	1247	97%
<u>Katy AVL, April 1986</u>			
Kingsland Park-and-Ride <sup>1</sup>	106	104	98%
Addicks Park-and-Ride	219	211	96%
West Belt Park-and-Ride	100	99	99%
Memorial Limited Express	<u>169</u>	<u>167</u>	<u>99%</u>
Total	594	581	98%

<sup>1</sup>Kingsland Park-and-Ride replaced the Katy-Mason Park-and-Ride.

### Vanpool Surveys, AVL Users

AVL vanpools were surveyed during the p.m. operating period. All vanpools were stopped at the entrances to the Katy and North AVLs by METRO police. TTI staff distributed the surveys to the vanpoolers. One survey was given to each vanpool driver and a different survey was given to each passenger. The driver survey requested more detailed data than did the passenger survey. Postage-paid return envelopes were included with the

surveys and the vanpoolers were requested to return the completed questionnaires by mail. Examples of the vanpool driver and passenger surveys are included in the Appendix. Response rates to the surveys are presented in Table 2.

Table 2: Vanpool Survey Distribution, Katy and North AVL Vanpool Surveys

Survey Group	Number of Surveys Distributed	Number of Surveys Completed	Response Rate
<u>Katy AVL, March 1985</u>			
Vanpool Drivers	85	66	78%
Vanpool Passengers	<u>604</u>	<u>399</u>	<u>66%</u>
TOTAL	689	465	67%
<u>North AVL, January 1986</u>			
Vanpool Drivers	251	202	80%
Vanpool Passengers	<u>2072</u>	<u>1435</u>	<u>69%</u>
TOTAL	2323	1637	70%
<u>Katy AVL, April 1986</u>			
Vanpool Drivers	80	59	74%
Vanpool Passengers	<u>603</u>	<u>380</u>	<u>63%</u>
TOTAL	683	439	64%

### Carpool Surveys, Katy AVL Users

Katy AVL carpool surveys were also conducted during the p.m. operating period. The survey procedures followed were essentially identical to those described above for the vanpool surveys, with one exception. Several of carpool passengers were small children; these children were not surveyed. Response rates to the carpool surveys are presented in Table 3. Examples of the carpool driver and passenger surveys are included in the Appendix.

Table 3: Carpool Survey Distribution, Katy AVL Carpool Surveys

Survey Group	Number of Surveys Distributed	Number of Surveys Completed	Response Rate
<u>Katy AVL, October 1985</u>			
Carpool Drivers	41	27	66%
Carpool Passengers	<u>80</u>	<u>54</u>	<u>68%</u>
TOTAL	121	81	67%
<u>Katy AVL, April 1986</u>			
Carpool Drivers	98	65	66%
Carpool Passengers	<u>196</u>	<u>133</u>	<u>68%</u>
TOTAL	294	198	67%

**Motorist Surveys, Non AVL Users**

During the 6:00-9:00 a.m. peak period, license plates of motorists traveling inbound on the Katy and North Freeways were recorded by TTI observers. The Department of Public Safety license plate files were accessed to obtain addresses. A survey was mailed to each address (excluding corporate addresses and leasing agencies). Postage-paid envelopes were included with each of the surveys. The motorists were asked to complete the survey and return it to TTI. An example of the survey instrument used is included in the Appendix. Table 4 summarizes the responses to the motorist surveys.

Table 4: Motorist (Non AVL User) Survey Distribution, Katy and North Freeway Surveys

Motorists	Number of License Plates Read (6-9 a.m.)	Number of Surveys Mailed	Number Returned Address Unknown or Vehicle Not On Freeway	Number of Completed Surveys	Response Rate (% of Surveys Mailed)
Katy Freeway, Mar. 85	2,090	1,435	121	454	32%
North Freeway, Jan. 86	2,470	1,585	154	422	27%
Katy Freeway, Apr. 86	2,817	1,714	106	744	43%



### Comparison to Previous Data

Some of the questions used in the Katy and North AVL user and nonuser surveys are similar those used in surveys of park-and-ride users and nonusers along the Katy and North Freeway conducted by TTI in 1981 and 1984. When possible, for comparative purposes, the 1981 and 1984 data are also presented. During the 1981 and 1984 survey efforts, no priority treatment of any form was available along the Katy Freeway. On the North Freeway, however, a contraflow lane was available for authorized buses and vanpools at the time of the 1981 and 1984 surveys.



## AVL TRANSIT USER SURVEYS

Generally speaking, the responses from the patrons at the park-and-ride lots along each freeway corridor are similar. The responses from the one express route surveyed in each corridor differ in some respects from the park-and-ride responses and are, therefore, presented separately.

The questions contained on the Katy and North AVL transit user surveys generally fall into 3 areas: 1) personal characteristics; 2) travel patterns and trip characteristics; and 3) attitudes and impacts pertaining to the AVLs.

### Personal Characteristics

Questions concerning age, sex, occupation and last year of school completed were asked.

#### Age

The median age of the park-and-ride patrons surveyed is in the early 30's (Table 5). These data are consistent with previous on-board transit park-and-ride surveys conducted in 1981 and 1984. The median ages for the patrons on the express routes which utilize the Katy and North AVLs are 4 to 9 years higher, however.

#### Sex

Between 53% and 60% of the ridership on the park-and-ride routes is female (Table 5). Again, this is in general agreement with previous park-and-ride survey data. By contrast, between 53% and 74% of the ridership on the express routes is male.

Table 5: Personal Characteristics of AVL Transit Users,  
Katy and North AVL Transit User Surveys

Characteristic	Total Sample		Park-and-Ride Routes		Express Routes	
	1985	1986	1985	1986	1985	1986
<b>Age (years)</b>						
<u>Katy AVL</u>	(n=351)	(n=568)	(n=219)	(n=409)	(n=132)	(n=159)
50th Percentile	33	32	33	31	37	37
<u>North AVL</u>	----	(n=1226)	----	(n=1129)	----	(n= 97)
50th Percentile	---	34	----	33	----	42
<b>Sex</b>						
<u>Katy AVL</u>	(n=351)	(n=565)	(n=218)	(n=402)	(n=133)	(n=163)
Male	49%	44%	47%	40%	53%	54%
Female	51%	56%	53%	60%	47%	46%
<u>North AVL</u>	----	(n=1203)	----	(n=1105)	----	(n= 98)
Male	----	44%	----	41%	----	74%
Female	----	56%	----	59%	----	26%
<b>Occupation</b>						
<u>Katy AVL</u>	(n=343)	(n=550)	(n=215)	(n=391)	(n=128)	(n=159)
Professional	56%	46%	57%	47%	54%	45%
Managerial	13%	20%	13%	20%	14%	22%
Clerical	21%	26%	22%	28%	20%	19%
Sales	4%	4%	4%	3%	4%	4%
Student	3%	3%	1%	1%	5%	6%
Other	3%	1%	3%	1%	3%	4%
<u>North AVL</u>	----	(n=1140)	----	(n=1092)	----	(n= 98)
Professional	----	38%	----	38%	----	41%
Managerial	----	23%	----	22%	----	34%
Clerical	----	30%	----	32%	----	12%
Sales	----	3%	----	3%	----	6%
Student	----	1%	----	0%	----	3%
Other	----	5%	----	5%	----	4%
<b>Education (years)</b>						
<u>Katy AVL</u>	(n=346)	(n=570)	(n=215)	(n=409)	(n=131)	(n=161)
Average	15.6	15.4	15.4	15.4	16.0	15.5
<u>North AVL</u>	----	(n=1214)	----	(n=1112)	----	(n=102)
Average	----	14.9	----	14.9	----	15.8

## Occupation

The greatest number of riders on all routes serving both AVLs are classed as "professional." A significant ridership component is also drawn from "managerial" and "clerical" job positions (Table 5). At least 60% of the total ridership is "professional" or "managerial."

## Education

As has been found in previous park-and-ride surveys, users of this type of bus service are highly educated. The average Katy AVL transit patron has completed over 3.4 years of college; the average North AVL transit user has completed 2.9 years of college.

## Travel Patterns and Trip Characteristics

Questions were asked concerning trip purpose, days per week the trip is made, trip origin, trip destination, whether the employer pays for part of the bus fare, and whether a car was available for the trip.

### Trip Purpose

The overwhelming majority of all the transit trips surveyed are work trips (Table 6).

### Trip Frequency

As would be expected for a transit service catering to work trips, virtually all the trips are made 5 days a week or more (Table 6).

Table 6: Trip Characteristics of AVL Transit Users,  
Katy and North AVL Transit User Surveys

Trip Characteristic	Total Sample		Park-and-Ride Routes		Express Routes	
	1985	1986	1985	1986	1985	1986
<b>Trip Purpose</b>						
<u>Katy AVL</u>	(n=358)	(n=580)	(n=222)	(n=412)	(n=136)	(n=168)
Work	99%	97%	100%	98%	96%	96%
School	1%	2%	0%	2%	3%	3%
Other	0%	1%	0%	0%	1%	1%
<u>North AVL</u>	----	(n=1256)	----	(n=1152)	----	(n=104)
Work	----	99%	----	99%	----	97%
School	----	1%	----	1%	----	3%
<b>Trip Frequency (days/wk)</b>						
<u>Katy AVL</u>	(n=355)	(n=579)	(n=219)	(n=411)	(n=136)	(n=168)
0-1	1%	1%	1%	1%	0%	1%
2	1%	2%	1%	2%	2%	2%
3	2%	3%	1%	3%	2%	3%
4	5%	5%	5%	4%	6%	7%
5 or more	91%	89%	92%	90%	90%	87%
<u>North AVL</u>	----	(n=1251)	----	(n=1147)	----	(n=104)
0-1	----	1%	----	1%	----	2%
2	----	0%	----	0%	----	1%
3	----	1%	----	1%	----	1%
4	----	3%	----	3%	----	4%
5 or more	----	95%	----	95%	----	92%
<b>Trip Destination</b>						
<u>Katy AVL</u>	(n=357)	(n=575)	(n=222)	(n=409)	(n=135)	(n=166)
Downtown	96%	95%	97%	96%	94%	90%
Galleria	----	0%	----	0%	----	1%
Texas Medical Center	1%	1%	1%	1%	1%	2%
Greenway Plaza	0%	0%	----	----	1%	1%
Univ. of Houston	3%	1%	2%	1%	4%	1%
Other	----	3%	----	2%	----	5%
<u>North AVL</u>	----	(n=1252)	----	(n=1149)	----	(n=103)
Downtown	----	94%	----	95%	----	91%
Galleria	----	1%	----	1%	----	1%
Texas Medical Center	----	1%	----	1%	----	1%
Greenway Plaza	----	2%	----	2%	----	----
Other	----	2%	----	1%	----	7%

## Trip Origin

The origin of the trip, by zip code, was requested. Data for the Katy AVL routes are illustrated in Figures 3-6 and summarized in Table 7; data for the North AVL routes are presented in Figures 7-11 and summarized in Table 8. The park-and-ride route origin data are consistent with market areas as defined in previous surveys.

**Katy AVL Routes.** Both the West Belt and Addicks Park-and-Ride lots are located north of the Katy Freeway. In 1985, approximately 60% of the ridership for the West Belt Lot originated north of the freeway. In 1986, however, the north/south ridership split was 50%-50%. For the Addicks Lot, 70% of the 1985 ridership and 64% of the 1986 ridership originated from north of the freeway.

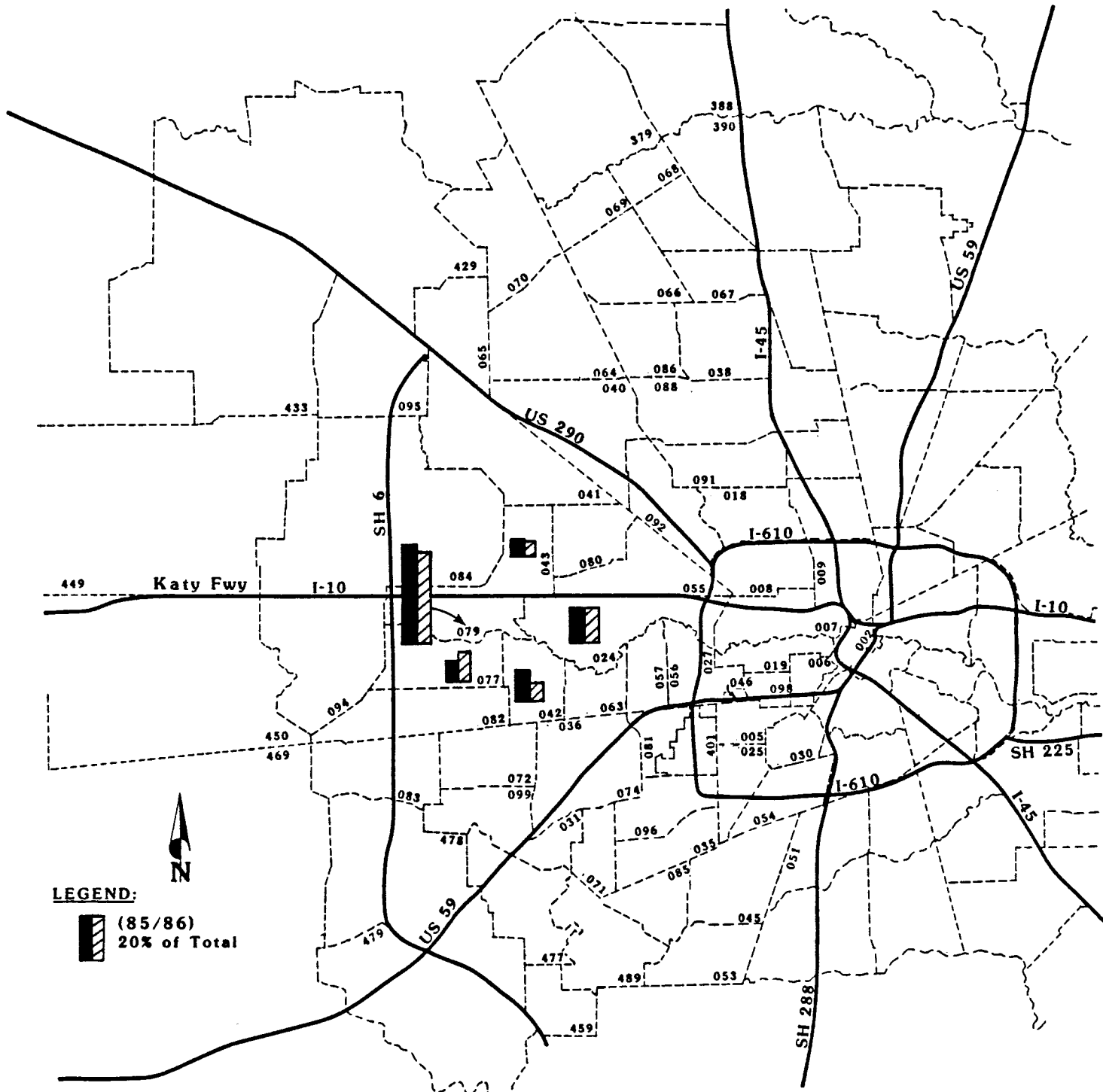
Both the Mason Road Lot and the Kingsland Lot (which replaced the Mason Road Lot) are located south of the Katy Freeway. More than 60% of the 1985 and 1986 ridership from this area originated from south of the freeway.

The 1985 and 1986 ridership on the Memorial Limited primarily originates from zip codes immediately adjacent to Memorial Drive.

**North AVL Routes.** The Kuykendahl, North Shepherd and Seton Lake Park-and-Ride Lots are located west of the North Freeway; and the majority of the transit ridership originates from zip codes west of the freeway. In fact, 100% of the Seton Lake ridership; more than 70% of the North Shepherd ridership and at least 75% of the Kuykendahl ridership originates from the west side of the freeway.

The Spring Park-and-Ride Lot is located on the east side of the North Freeway and more than 62% of its ridership originates from east of the freeway.

The ridership on the FM 1960 Express route primarily originates from zip codes immediately adjacent to FM 1960.



NOTE: All Zip Codes Begin with 77.

Figure 3: Home Origins of Patrons of the Memorial Limited Express Bus Route



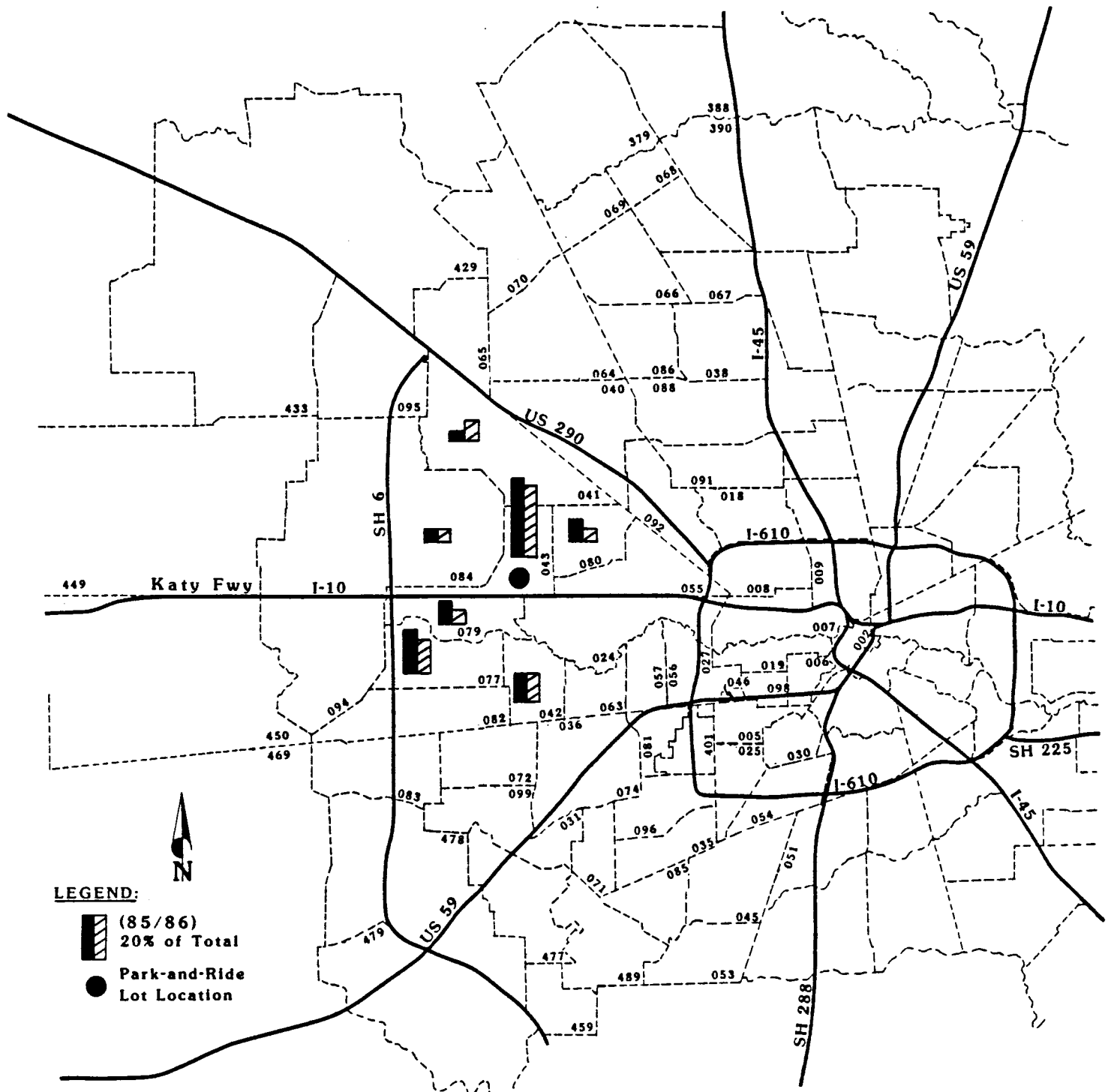


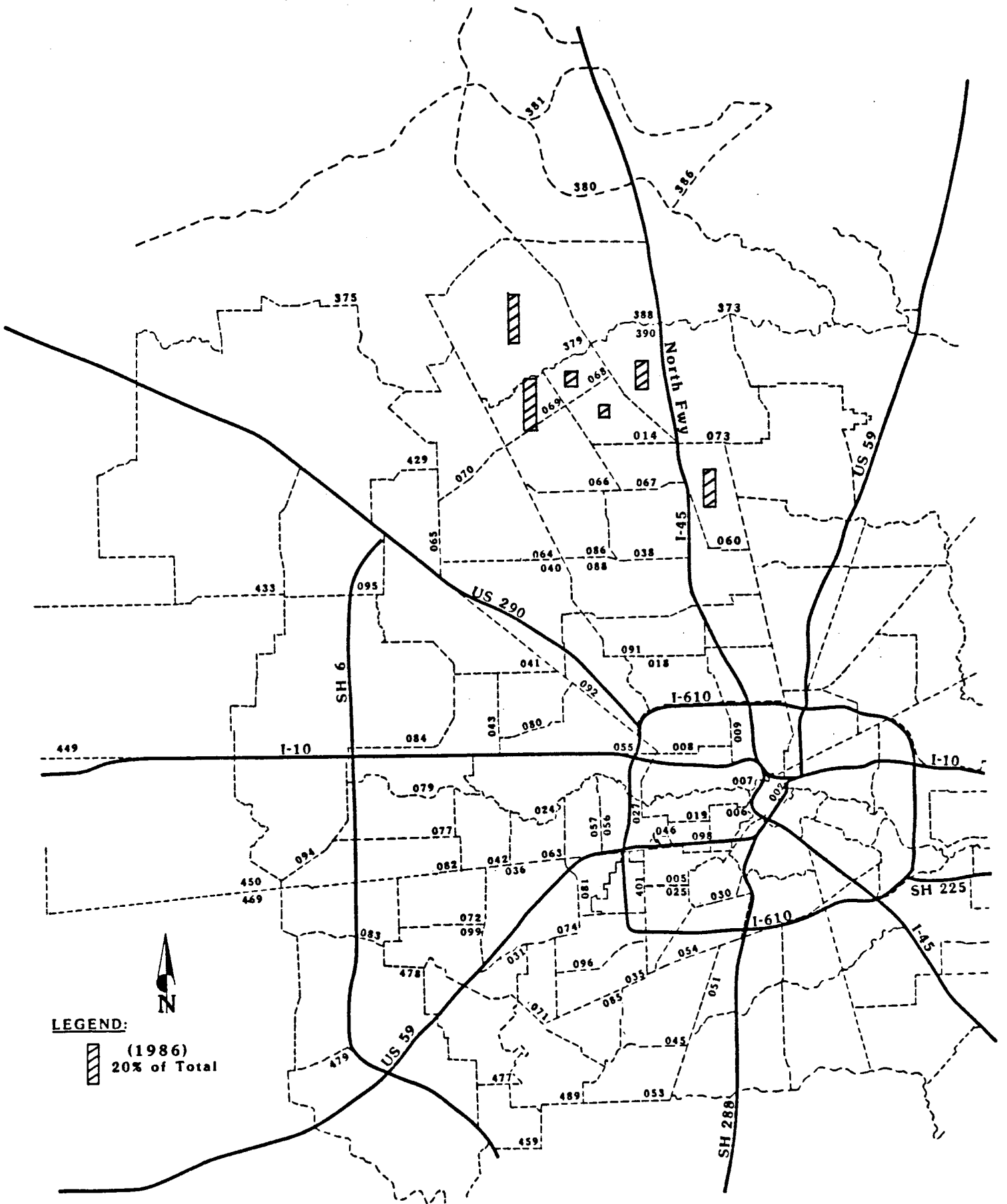
Figure 4: Home Origins of Patrons at the West Belt Park-and-Ride Lot






Table 7: Zip Codes of Origin for Katy AVL Transit Trips, Katy AVL Transit User Surveys

Katy AVL Bus Route	Zip Code	Location Relative to Katy Freeway	% of Total Origins	
			1985	1986
Memorial Limited	77079	----	41%	38%
	77024	----	15%	15%
	77042	----	13%	8%
	77077	----	9%	12%
	77043	----	7%	6%
	Other	----	15%	21%
West Belt P/R	77043	North	33%	29%
	77077	South	18%	14%
	77042	South	13%	13%
	77041	North	4%	8%
	77079	South	10%	6%
	77080	North	9%	5%
	77084	North	5%	5%
	Other	----	8%	20%
Mason P/R (1985) Kingsland P/R (1986)	77450	South	62%	64%
	77449	North	29%	28%
	77084	North	8%	3%
	Other	----	1%	5%
Addicks P/R	77084	North	43%	47%
	77077	South	15%	12%
	77449	North	14%	10%
	77082	South	6%	12%
	Other	----	22%	19%



**LEGEND:**


 (1986)  
 20% of Total

**NOTE:** All Zip Codes Begin with 77.

Figure 7: Home Origins of Patrons of the FM 1960 Express Route

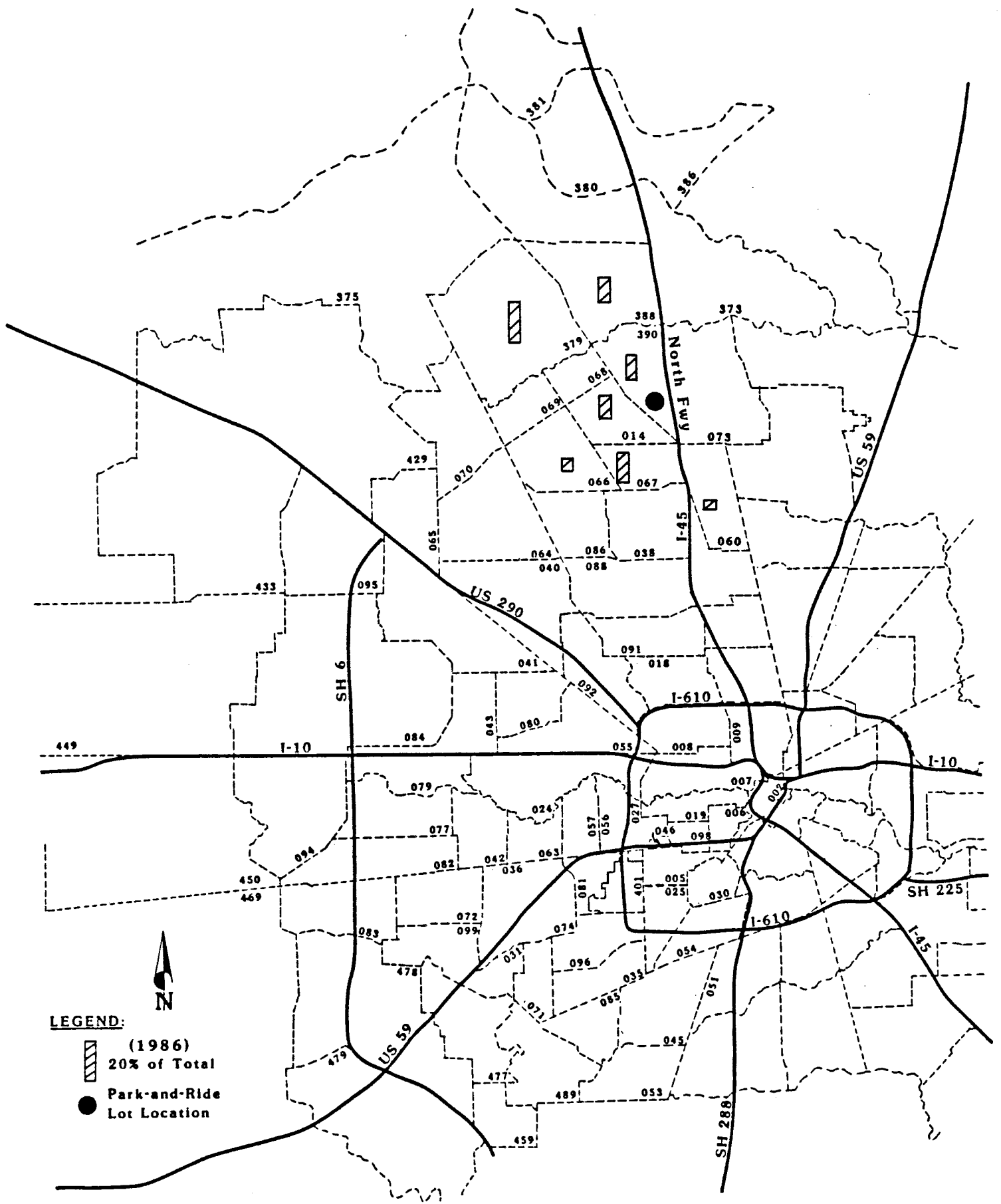


Figure 8: Home Origins of Patrons of the Kuykendahl Park-and-Ride Lot

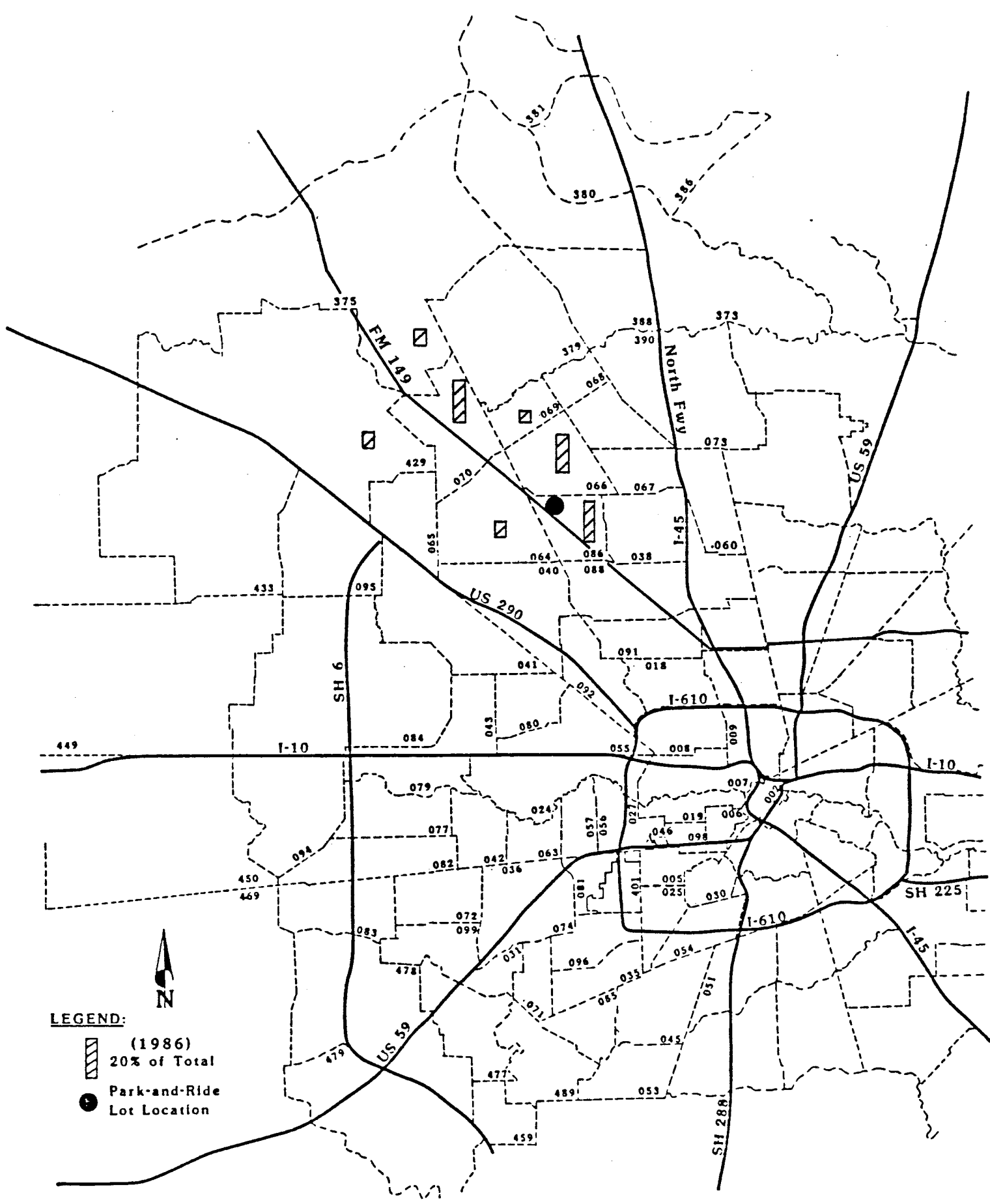


Figure 10: Home Origins of Patrons of the Seton Lake Park-and-Ride Lot

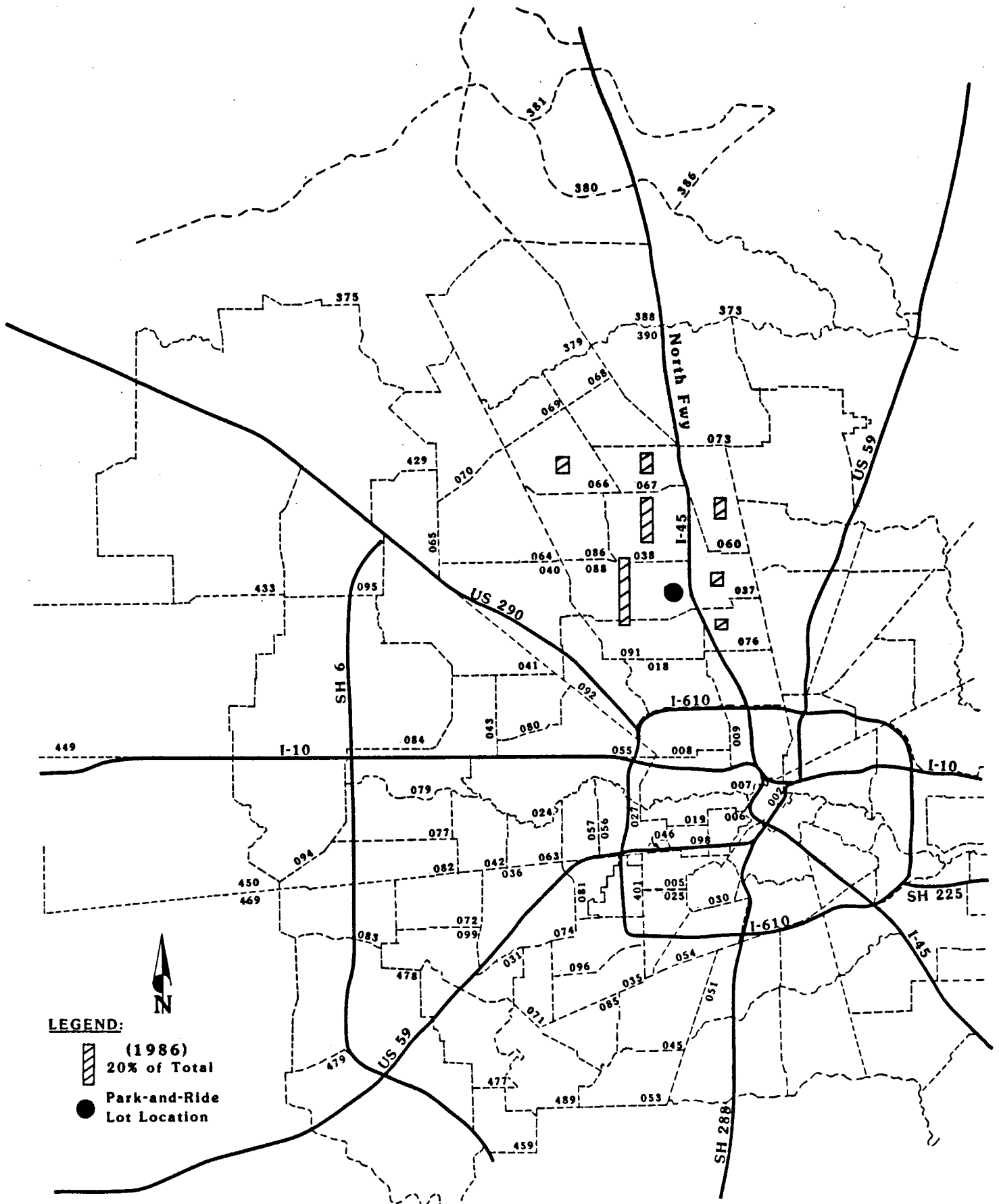
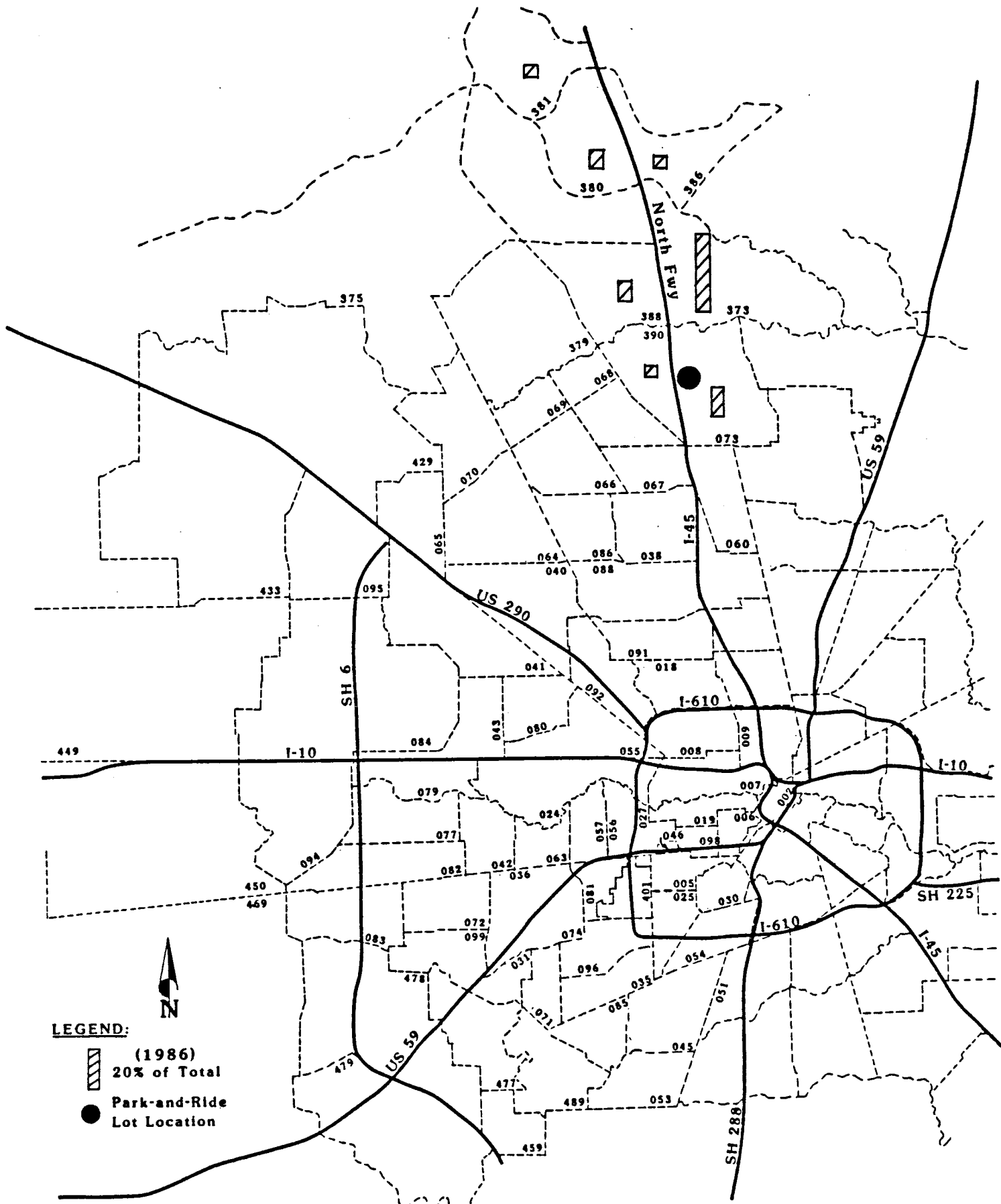


Figure 9: Home Origins of Patrons of the N. Shepherd Park-and-Ride Lot





NOTE: All Zip Codes Begin with 77.

Figure 11: Home Origins of Patrons of the Spring Park-and-Ride Lot

Table 8: Zip Code Origin for North AVL Transit Trips, North AVL Transit User Survey

North AVL Bus Route	Zip Code	Location Relative to North Freeway	% of Total Origins
FM 1960 Express	77069	----	23%
	77379	----	22%
	77060	----	18%
	77090	----	13%
	77068	----	7%
	77014	----	6%
	Other	----	11%
Kuykendahl P/R	77379	West	18%
	77067	West	14%
	77090	West	12%
	77388	West	11%
	77014	West	11%
	77066	West	5%
	77060	East	4%
Other	----	25%	
North Shepherd P/R	77088	West	30%
	77038	West	20%
	77060	East	9%
	77067	West	9%
	77066	West	7%
	77037	East	7%
	77076	East	5%
Other	----	13%	
Spring P/R	77373	East	36%
	77073	East	13%
	77380	West	8%
	77388	West	8%
	77386	East	6%
	77090	West	6%
	77381	West	5%
Other	----	18%	
Seton Lake P/R	77070	West	21%
	77086	West	21%
	77066	West	18%
	77064	West	7%
	77375	West	6%
	77429	West	6%
	77069	West	5%
Other	----	16%	

## Trip Destinations

The only destination served directly by the Katy AVL bus operation is the downtown; virtually all Katy AVL transit trips being served are downtown trips (Table 6). Although the North AVL primarily serves the downtown, limited service is also provided to the Texas Medical Center, the Galleria area and Greenway Plaza. Nevertheless, more than 90% of all transit trips being served by the North AVL are downtown trips.

## Auto Availability

The riders of the Katy and North AVL transit routes are "choice" riders; the vast majority have an auto available for the trip, but choose to ride a bus instead (Table 9).

**Table 9: Travel Characteristics of AVL Transit Users,  
Katy and North AVL Transit User Surveys**

Trip Characteristic	Total Sample		Park-and-Ride Routes		Express Routes	
	1985	1986	1985	1986	1985	1986
<b>Auto Available for Trip</b>						
<u>Katy AVL</u>	(n=354)	(n=575)	(n=220)	(n=410)	(n=134)	(n=165)
No	7%	7%	5%	5%	11%	12%
Yes, but Inconvenient	10%	7%	8%	6%	13%	11%
Yes, but Prefer Bus	83%	86%	87%	89%	76%	77%
<u>North AVL</u>	----	(n=1246)	----	(n=1142)	----	(n=104)
No	----	5%	----	5%	----	10%
Yes, but Inconvenient	----	5%	----	4%	----	17%
Yes, but Prefer Bus	----	90%	----	91%	----	73%
<b>Employer Payment of Bus Fare</b>						
<u>Katy AVL</u>	(n=355)	(n=574)	(n=221)	(n=408)	(n=134)	(n=166)
Pays all	19%	15%	21%	18%	17%	7%
Pays part	38%	41%	45%	46%	26%	31%
Pays none	43%	44%	34%	36%	57%	62%
<u>North AVL</u>	----	(n=1247)	----	(n=1144)	----	(n=103)
Pays all	----	17%	----	18%	----	9%
Pays part	----	46%	----	47%	----	39%
Pays none	----	37%	----	35%	----	52%

## Employer Contribution to Transit Fare

For almost one-fifth of the transit ridership on both Katy and North AVLS, the employer pays the entire cost of the transit fare (Table 9). On the park-and-ride routes, approximately two-thirds of the riders have all or part of their fares paid by the employer; less than half of the ridership on the express routes has part of its fare paid the employer.

## Attitudes and Impacts Pertaining to the AVLS

Slightly more than half of the survey questions focused on data concerning the AVLS. For presentation purposes, these responses can be grouped into the following four categories: 1) travel time savings and duration of AVL use; 2) modal selection and prior mode; 3) impacts of the AVL on mode choice; and 4) perception of the level of AVL utilization.

## Time Savings and Duration of AVL Use

Travel Time Savings. The transit users perception of time saved by using the Katy or North AVL is presented in Table 10. As indicated by this table, Katy AVL Park-and-Ride users perceived a greater time savings in 1986 than 1985. This may be attributed to the fact that the western terminus of the AVL was extended 1.7 miles from Gessner to West Belt after the 1985 survey.

Due to the "backtracking" required in the route, users of the Memorial Limited Express route do not perceive the same p.m. savings as do the park-and-ride patrons (in 1985 or 1986). Because there is not sufficient distance available to safely maneuver from the Gessner exit of the AVL (across three mainlanes) to the Gessner exit of the Katy Freeway, Memorial Limited patrons must exit the AVL at Gessner, exit the Katy Freeway at West Belt and then "backtrack" to Gessner.

In general, users of the North AVL perceive a greater time savings than do users of the Katy AVL. This is to be expected since the North AVL is 9.6

miles in length, whereas the Katy AVL is 6.4 miles in length. Greater travel time savings should, therefore, be realized on the North AVL.

Table 10: Characteristics of AVL Utilization and Previous Mode of Travel, Katy and North AVL Transit User Surveys

Characteristic	Total Sample		Park-and-Ride Routes		Express Routes	
	1985	1986	1985	1986	1985	1986
<b>Perceived AVL Time Savings (minutes)</b>						
<u>Katy AVL</u>	(n=328)	(n=530)	(n=208)	(n=388)	(n=120)	(n=142)
a.m. (50th percentile)	9	15	10	15	8	15
p.m. (50th percentile)	13	20	15	20	7	15
<u>North AVL</u>	----	(n=1147)	----	(n=986)	----	(n= 94)
a.m. (50th percentile)	----	20	----	20	----	15
p.m. (50th percentile)	----	25	----	25	----	20
<b>Duration of AVL Use</b>						
<u>Katy AVL</u>	(n=352)	(n=562)	(n=222)	(n=405)	(n=130)	(n=157)
% of riders using AVL since opened	71%	40%	68%	35%	75%	51%
<u>North AVL</u>	---	(n=1240)	----	(n=1138)	----	(n=102)
% of riders using AVL since opened	---	75%	----	77%	----	76%
<b>Previous Travel Mode</b>						
<u>Katy AVL</u>	(n=355)	(n=573)	(n=222)	(n=409)	(n=133)	(n=164)
Drove Alone	24%	35%	30%	37%	14%	30%
Carpooled	5%	5%	4%	5%	6%	6%
Vanpooled	4%	6%	6%	7%	1%	3%
Park-and-Ride Bus	23%	18%	36%	23%	1%	5%
Regular/Express Bus	31%	16%	9%	6%	66%	42%
Did not make trip	12%	18%	14%	19%	11%	13%
Other	1%	2%	1%	3%	1%	1%
<u>North AVL</u>	----	(n=1240)	----	(n=1137)	----	(n=103)
Drove Alone	----	35%	----	35%	----	34%
Carpooled	----	10%	----	9%	----	19%
Vanpooled	----	7%	----	8%	----	1%
Park-and-Ride Bus	----	18%	----	19%	----	13%
Regular/Express Bus	----	4%	----	3%	----	8%
Did not make trip	----	25%	----	25%	----	25%
Other	----	1%	----	1%	----	0%

Frequency distributions of perceived time savings along the Katy and North AVLS are presented Figures 12 and 13.

**Duration of AVL Use.** In 1985, approximately 71% of the Katy AVL transit ridership had used the AVL since it opened (it had been opened 5 months at the time of this survey). In 1986, only 40% had used the AVL since it opened (it has been opened 18 months at the time of the 1986 survey).

Approximately 75% of the North AVL transit patrons have used the AVL since it opened (it had been opened 16 months at the time of the survey).

### **Previous Travel Mode**

Transit riders using the Katy and North AVLS were asked to identify how they normally made the trip prior to using transit on the AVL. Their responses are summarized in Table 10. On the Katy AVL routes, approximately 33% of 1985 ridership and 46% of the 1986 ridership either drove alone, carpooled or vanpooled. An additional 54% of 1985 ridership and 34% of the 1986 ridership rode either a park-and-ride, express route or regular route bus. (Note: Park-and-ride service was available in the Katy Freeway Corridor prior to the opening of the Katy AVL.)

On the North AVL, slightly more than half of the transit patrons had previously driven alone, carpooled or vanpooled. Twelve percent reported that they traveled by transit, and 25% did not previously make the trip. (Note: Park-and-ride service in the North Freeway Corridor did not exist prior to the opening of the North Freeway contraflow lane.)

### **Reasons for Choosing the Bus Mode**

Transit users were asked why they chose to ride a bus on the AVL. They were able to check more than one reason. The major reasons listed by bus riders on both AVLS were freeway traffic congestion, time to relax, saves time, reliable travel schedule and costs less (Table 11).

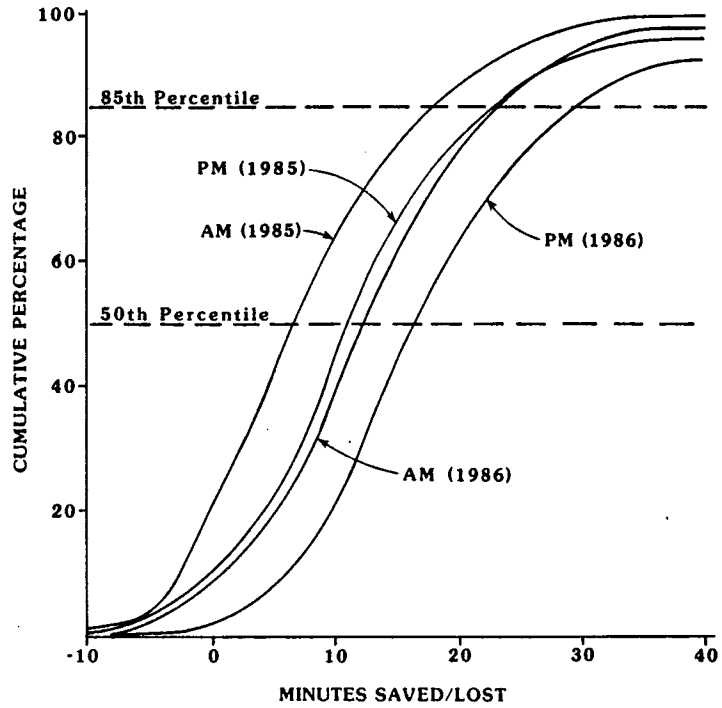


Figure 12: Perceived Katy AVL Travel Time Savings, Katy AVL Transit User Surveys

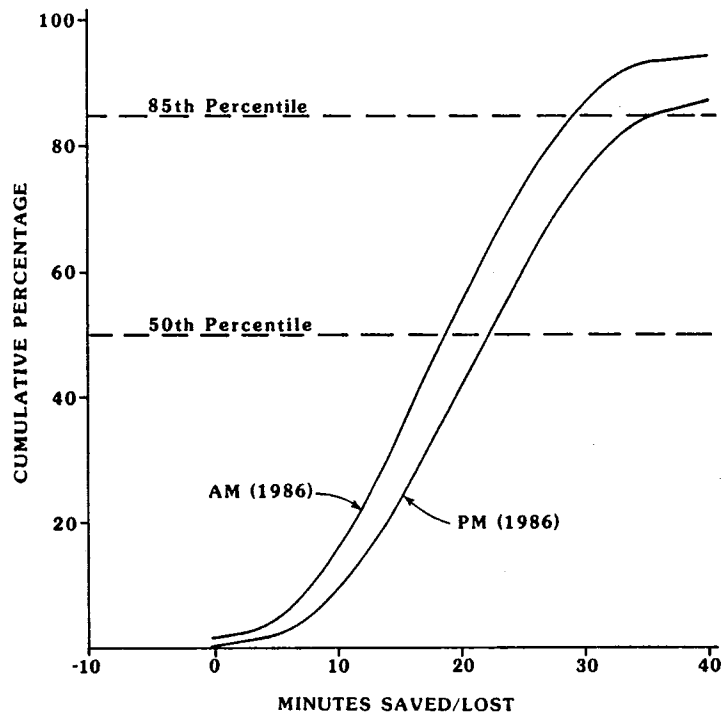


Figure 13: Perceived North AVL Travel Time Savings, North AVL Transit User Surveys

Table 11: Reasons for Selecting the Bus Mode on the AVL,  
Katy and North AVL Transit User Surveys

Reasons	Total Sample		Park-and-Ride Routes		Express Routes	
	1985	1986	1985	1986	1985	1986
<b>Why Use Bus on AVL<sup>1</sup></b>						
<u>Katy AVL</u>	(n=1175)	(n=1945)	(n=747)	(n=1424)	(n=428)	(n=521)
Freeway too congested	18%	20%	21%	22%	13%	16%
Saves time	14%	16%	15%	16%	13%	15%
Time to relax	17%	18%	18%	19%	15%	16%
Reliable travel schedule	14%	14%	14%	13%	14%	15%
Costs less	15%	14%	13%	12%	19%	18%
Dislike driving	13%	11%	12%	12%	14%	10%
Someone else use car	4%	3%	3%	3%	5%	5%
Carpool/vanpool broke up	2%	1%	1%	1%	4%	1%
No other way available	1%	1%	1%	1%	1%	2%
Other	2%	2%	2%	1%	2%	2%
<u>North AVL</u>	----	(n=4407)	----	(n=4030)	----	(n=377)
Freeway too congested	----	23%	----	24%	----	22%
Saves time	----	20%	----	20%	----	16%
Time to relax	----	15%	----	15%	----	15%
Reliable travel schedule	----	15%	----	14%	----	16%
Costs less	----	12%	----	12%	----	11%
Dislike driving	----	10%	----	10%	----	11%
Someone else use car	----	2%	----	2%	----	5%
Carpool/vanpool broke up	----	1%	----	1%	----	1%
No other way available	----	1%	----	1%	----	2%
Other	----	1%	----	1%	----	1%
<b>Why Bus Rather Than Other AVL Mode(s)<sup>1</sup></b>						
<u>Katy AVL</u>	(n=417)	(n=755)	(n=237)	(n=508)	(n=180)	(n=247)
More convenient	63%	54%	72%	59%	51%	44%
Costs less	18%	16%	11%	10%	28%	30%
Carpool not available <sup>2</sup>	----	12%	----	13%	----	10%
Vanpool not available	16%	11%	15%	10%	16%	11%
Other	3%	7%	2%	8%	5%	5%
<u>North AVL</u>	----	(n=1526)	----	(n=1400)	----	(n=126)
More convenient	----	61%	----	62%	----	56%
Costs less	----	13%	----	13%	----	10%
Vanpool not available	----	13%	----	12%	----	19%
Flexible schedule	----	8%	----	8%	----	10%
Other	----	5%	----	5%	----	5%

<sup>1</sup>On these questions, it was possible to check more than one reason. Thus, the "n" value is the total number of reasons checked, not the number of surveys completed.

<sup>2</sup>Carpools were not allowed on the Katy AVL at the time of the 1985 survey.



Bus riders were also asked to specify why they selected the bus rather than a vanpool (or carpool in the case of the Katy AVL). Again, more than one reason could be checked. The convenience of riding a bus was cited as the overwhelming reason by both the Katy and North AVL transit users.

### Impact of the AVL On Mode Choice

Another question was intended to determine whether the individuals would be riding a bus if the AVL was not available. Their responses are included in Table 12. In 1985, 69% of the Katy AVL bus riders said yes. This is

Table 12: Perceived Impacts of AVL on Mode Choice, Katy and North AVL AVL Transit User Surveys

Attitude	Total Sample		Park-and-Ride Routes		Express Routes	
	1985	1986	1985	1986	1985	1986
<b>Ride Bus if no AVL</b>						
<u>Katy AVL</u>	(n=356)	(n=575)	(n=221)	(n=410)	(n=135)	(n=165)
Yes	69%	43%	62%	37%	79%	56%
No	15%	26%	22%	31%	5%	14%
Not Sure	16%	31%	16%	32%	16%	30%
<u>North AVL</u>	----	(n=1247)	----	(n=1145)	----	(n=102)
Yes	----	23%	----	22%	----	34%
No	----	41%	----	42%	----	28%
Not Sure	----	36%	----	36%	----	38%
<b>How Important was AVL in Decision to Ride Bus</b>						
<u>Katy AVL</u>	(n=357)	(n=573)	(n=222)	(n=409)	(n=135)	(n=164)
Very Important	39%	57%	47%	62%	25%	44%
Somewhat Important	26%	27%	27%	25%	24%	30%
Not Important	35%	16%	26%	13%	51%	26%
<u>North AVL</u>	----	(n=1250)	----	(n=1146)	----	(n=104)
Very Important	----	76%	----	76%	----	72%
Somewhat Important	----	17%	----	17%	----	12%
Not Important	----	7%	----	7%	----	16%

consistent with their responses to the previous question in which more than half reported they rode a bus prior to the opening of the AVL. In 1986, however, only 43% said yes, indicating that the AVL had become more important to them. On the North AVL, 41% of the bus riders stated they would not ride bus if the AVL had not opened, and an additional 36% were not sure.

A related question asked how important the AVL is in their decision to ride a bus. Their responses to this question (Table 12) are consistent with their responses to the previous question. In 1985, 39% of the Katy AVL bus riders indicated that the AVL was "very important" in their decision; in 1986, this percentage increased to 57%. For the North AVL, 76% stated that the AVL was "very important."

### Perception of AVL Utilization

One of the most important issues of the transit user surveys (and also the vanpool, carpool and motorist surveys) involves commuter perception of AVL utilization. One of the main reasons for permitting carpools on the Katy AVL was to increase the perception of utilization. Transit patrons were asked whether they felt the AVL was sufficiently utilized to justify the project. Their responses are presented in Table 13.

Table 13: Perception of AVL Utilization, Katy and North AVL Transit User Surveys

Reasons	Total Sample		Park-and-Ride Routes		Express Routes	
	1985	1986	1985	1986	1985	1986
<b>Is AVL Sufficiently Utilized to Justify the Project</b>						
<u>Katy AVL</u>	(n=348)	(n=567)	(n=218)	(n=104)	(n=130)	(n=163)
Yes	49%	66%	55%	71%	37%	53%
No	33%	14%	26%	11%	46%	21%
Not Sure	18%	20%	19%	18%	17%	26%
<u>North AVL</u>	----	(n=1129)	----	(n=101)	----	(n=1230)
Yes	----	81%	----	79%	----	81%
No	----	6%	----	5%	----	6%
Not Sure	----	13%	----	16%	----	13%

In considering their responses, it must be noted that the typical transit user sees the AVL from inside a crowded bus. He does not have a clear idea of the number of vehicles utilizing the lane, and he is more likely to think in terms of the number of persons moved per bus.

About half of the Katy AVL bus riders surveyed in 1985 felt the AVL was sufficiently utilized. When surveyed again in 1986 (one year after carpools were permitted on the AVL), 66% of the transit patrons felt the use of the Katy AVL was sufficient to justify the project.

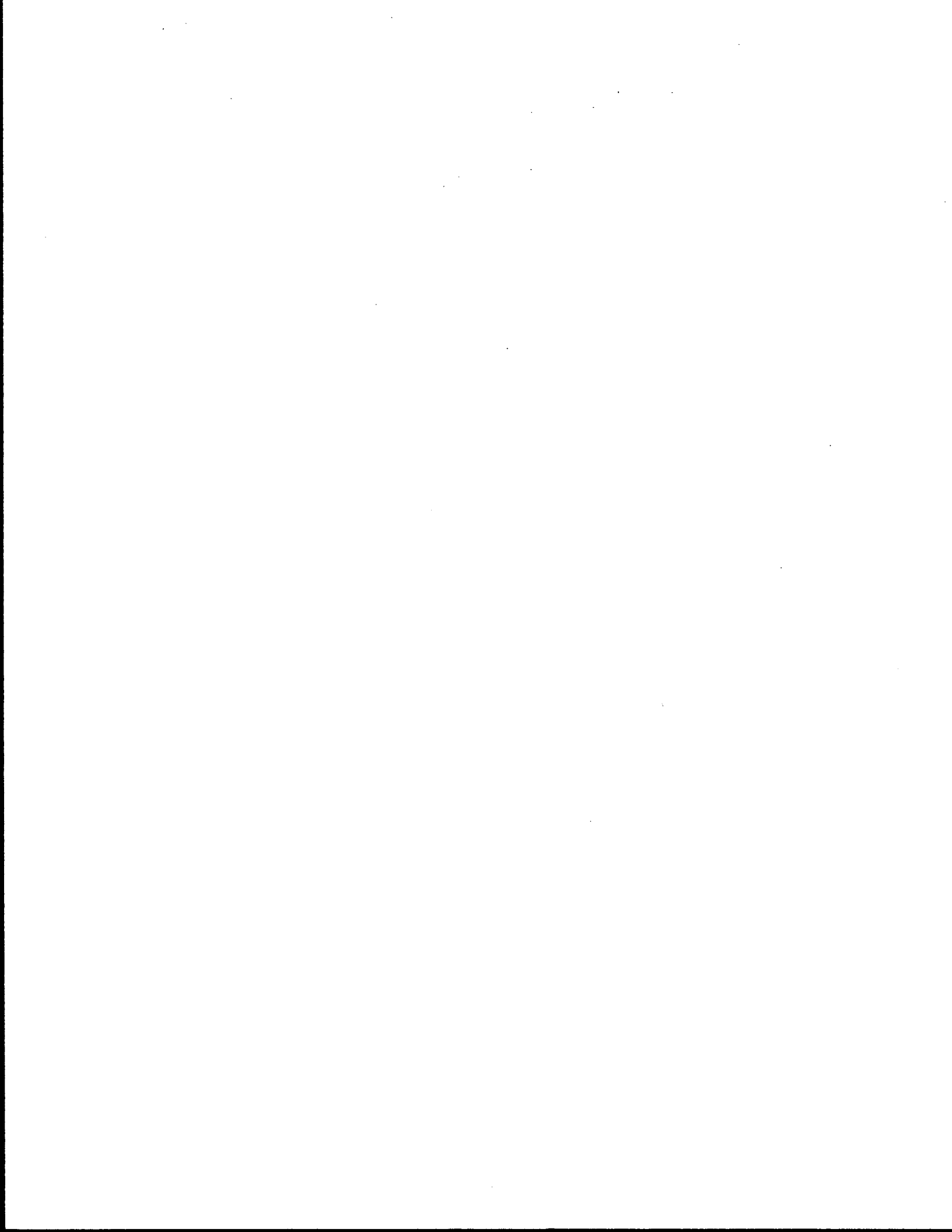
More than 80% of the North AVL transit users surveyed felt their AVL was sufficiently utilized.

### Comments

Survey participants were encouraged to use the back of the forms for additional comments. Approximately 20-25% of the participants did provide comments. Their comments are summarized in Table 14.

Table 14: Additional Comments, Katy and North AVL Transit User Surveys

Comment	Percent of Total Comments	
	1985	1896
<u>Katy AVL</u>		
Extend the AVL	22%	5%
Provide more peak buses	16%	13%
Poor AVL entry/exit design	16%	7%
Lose time doubling back (Memorial Route)	8%	7%
Bus fare too high	7%	2%
Good job METRO	3%	13%
Other	28%	53%
<u>North AVL</u>		
Extend AVL	----	23%
Provide more p.m. buses	----	14%
Open AVL more hours	----	10%
AVL/Park-and-Ride is great	----	7%
Good job METRO	----	7%
Dislike old buses	----	5%
Bus fare too high	----	4%
Other	----	30%



## AVL VANPOOL USER SURVEYS

As was the case with the transit user surveys, the vanpool driver and passenger surveys primarily addressed the following 3 areas: 1) personal characteristics; 2) travel characteristics; and 3) attitudes and impacts pertaining to the AVLs.

In general, the responses from the drivers and passengers are similar. The responses from the Katy AVL vanpoolers and the North AVL vanpoolers are also generally similar.

### Personal Characteristics

Vanpool drivers and passengers were asked questions concerning their age, sex, occupation and level of education.

#### Age

The average age of both Katy and North AVL vanpoolers is in the upper 30's (Table 15).

#### Sex

Almost two-thirds of the Katy AVL vanpool drivers are male, while about half of the passengers are male (Table 15). Over 75% of the north AVL vanpool drivers are male, whereas 52% of the passengers are male.

#### Occupation

Between 67% and 81% of the vanpoolers surveyed are employed in professional or managerial positions (Table 15).

Table 15: Personal Characteristics of AVL Vanpoolers, Katy and North AVL Surveys

Personal Characteristic	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1985	1985	1986	1985	1986
<b>Age (years)</b>						
<u>Katy AVL</u>	(n=449)	(n=442)	(n=64)	(n=57)	(n=385)	(n=365)
50th Percentile	36	37	33	36	37	37
<u>North AVL</u>	---	(n=1532)	---	(n=197)	---	(n=1335)
50th Percentile	---	39	---	40	---	39
<b>Sex</b>						
<u>Katy AVL</u>	(n=452)	(n=420)	(n=63)	(n=59)	(n=389)	(n=363)
Male	52%	51%	65%	67%	50%	49%
Female	48%	49%	35%	33%	50%	51%
<u>North AVL</u>	---	(n=1538)	---	(n=196)	---	(n=1342)
Male	---	55%	---	77%	---	52%
Female	---	45%	---	23%	---	48%
<b>Occupation</b>						
<u>Katy AVL</u>	(n=446)	(n=417)	(n=63)	(n=57)	(n=383)	(n=360)
Professional	55%	58%	46%	60%	56%	58%
Managerial	21%	14%	30%	21%	19%	13%
Sales	2%	3%	0%	5%	3%	3%
Clerical	20%	23%	19%	12%	20%	25%
Operative	1%	---	2%	---	1%	---
Laborer	1%	---	3%	---	0%	---
Other	0%	2%	0%	2%	1%	1%
<u>North AVL</u>	---	(n=1512)	---	(n=195)	---	(n=1317)
Professional	---	45%	---	41%	---	45%
Managerial	---	24%	---	39%	---	22%
Sales	---	7%	---	5%	---	7%
Clerical	---	23%	---	13%	---	24%
Operative	---	0%	---	---	---	0%
Laborer	---	0%	---	1%	---	0%
Other	---	1%	---	1%	---	2%
<b>Education (years)</b>						
<u>Katy AVL</u>	(n=445)	(n=421)	(n=63)	(n=57)	(n=382)	(n=364)
Average	15.4	15.3	15.2	15.5	15.4	16.0
<u>North AVL</u>	---	(n=1523)	---	(n=197)	---	(n=1326)
Average	---	15.0	---	15.1	---	15.0

## Education

The average vanpooler has completed more than 3 years of college (Table 15).

## Travel Patterns and Trip Characteristics

Vanpool drivers and passengers were asked a series of questions concerning the formation and operation of the vanpool on the AVLs. Other questions related to travel patterns and AVL trip characteristics.

## Formation of the Vanpool

The majority of the Katy and North AVL vanpools were formed by the employer, and the employer is also the primary provider of the vans (Table 16).

## Vanpool Occupancies

The actual occupancies of the vanpools entering the Katy and North AVLs are shown in Table 16, along with the number of registered vanpool members. Average occupancy of Katy AVL vans was 8.1 members in 1985 and 9.0 members in 1986. There was an average of 11.5 registered members per van in 1985 and 11.4 registered members in 1986. Actual occupancy was 70% of registered members in 1985, and 79% in 1986.

Average occupancy of North AVL vanpools was 9.7 members and there was an average of 11.9 registered members per van. Actual North AVL occupancy was almost 82% of registered members.

Table 16: Characteristics of Vanpools Traveling on the Katy and North AVLs, 1985 and 1986

Vanpool Characteristic	Katy AVL Vanpools		North AVL Vanpools
	1985	1986	1986
<b>How Was Vanpool Organized</b>	(n=64)	(n=59)	(n=201)
By Employer	78%	61%	58%
I Found the Riders	11%	24%	21%
METRO Vanshare	3%	3%	5%
Residential Developer	0%	---	9%
Other	8%	12%	7%
<b>Who Owns/Leases Vans</b>	(n=66)	(n=59)	(n=201)
Employer Provides Van	80%	70%	60%
Third Party Provides Van	17%	27%	32%
I Own Van	2%	3%	3%
Other	1%	---	5%
<b>Registered Vanpool Members</b>	(n=66)	(n=57)	(n=202)
Less than 7	---	5%	1%
7	3%	2%	2%
8	3%	12%	8%
9	11%	9%	6%
10	20%	16%	8%
11	12%	9%	12%
12	21%	11%	22%
More Than 12	30%	36%	41%
<b>Actual Vanpool Occupancy</b>	(n=66)	(n=58)	(n=202)
Less Than 6	9%	12%	3%
6	14%	10%	7%
7	14%	7%	9%
8	23%	17%	14%
9	21%	7%	13%
10	3%	12%	16%
11	8%	12%	9%
12	6%	10%	17%
More Than 12	2%	13%	12%
<b>Authorized Vanpool Drivers</b>	(n=66)	(n=59)	(n=202)
1	3%	9%	3%
2	36%	24%	19%
3	50%	56%	45%
4	11%	10%	22%
5	---	1%	8%
More Than 5	---	---	3%
<b>Duration of AVL Use</b>	(n=66)	(n=59)	(n=199)
% of Vanpools Using AVL Since Opening Day	89%	70%	94%



### **Authorized Vanpool Drivers**

Driver training is required to operate a vanpool on the AVLs. The driver must carry a license authorizing him or her to drive on the lane. The number of persons authorized to drive on the Katy and North AVLs is shown in Table 16. On the Katy AVL, authorized drivers per vanpool averaged 2.6 in 1985 and 2.7 in 1986. North AVL authorized drivers per van averaged 3.2.

### **Duration of AVL Use**

In 1985, approximately 89% of the Katy AVL vanpools reported using the AVL since it opened (it has been open 5 months at the time of the 1985 survey). In 1986, 70% had used the lane since opening day (it had been open 18 months at the time of the 1986 survey).

In 1986, approximately one year after the North AVL replaced the contra-flow lane, 94% of the North AVL vanpoolers reported using the AVL since opening day.

### **Vanpool Staging Points**

Between 87% and 90% of the vanpool drivers pick up passengers at common vanpool staging points (Table 17). At least 70% of the vanpool passengers drive their cars to the pickup points. Therefore, no additional auto is typically left at home. Even when an auto is left at home due to vanpooling, it is not commonly used.

### **AVL Trip Frequency**

Virtually all vanpools use the Katy/North AVL five days per week (Table 17).

Table 17: Characteristics of Vanpool Operation, Katy and North AVL Vanpool Surveys

Trip Characteristic	Katy AVL Vanpools		North AVL Vanpools
	1985	1986	1986
<b>Do Drivers Pick Up Passengers</b>	(n=61)	(n=53)	(n=200)
At Home	10%	8%	13%
At Common Staging Point(s)	90%	92%	87%
<b>Do Passengers Drive Car to Pick Up Point</b>	(n=397)	(n=377)	(n=1431)
Yes	76%	78%	76%
No, Dropped Off	6%	9%	6%
No, Picked Up At Their Door	18%	13%	18%
<b>When Passengers Leave Car at Home, Is It Used By Others</b>	(n=391)	(n=371)	(n=1416)
Yes	14%	14%	17%
No	40%	41%	37%
Not Applicable (car left at pickup point)	46%	45%	46%
<b>AVL Trip Frequency</b>	(n=66)	(n=59)	(n=202)
% Vanpools Using Daily	100%	98%	100%
<b>Percent Vanpools Using AVL</b>	(n=66)	(n=59)	(n=202)
a.m.	83%	86%	97%
p.m.	100%	98%	99%
<b>Freeway Entrance Ramp (a.m.)</b>			
<u>Katy Freeway</u>	(n=49)	(n=51)	---
Gessner	29%	14%	---
West Belt	29%	62%	---
Fry	17%	---	---
SH 6	10%	4%	---
Mason	7%	---	---
Kirkwood	---	6%	---
Wilcrest	5%	12%	---
Other	3%	2%	---
<u>North Freeway</u>	---	---	(n=171)
West Road	---	---	25%
N. Shepherd	---	---	22%
Kuykendahl	---	---	8%
Rayford/Sawdust	---	---	5%
Conroe	---	---	5%
FM 1960	---	---	5%
Woodlands	---	---	5%
Greens Road	---	---	5%
Other	---	---	20%
<b>Destination of Vanpools</b>	(n=64)	(n=58)	(n=199)
Downtown	70%	60%	61%
Galleria	11%	12%	7%
Texas Medical Center	5%	7%	8%
Greenway Plaza	3%	5%	4%
Other	11%	16%	20%

### Percent of Vanpools Using the AVL by Time Period

Vanpool volume counts have revealed that vanpool utilization of both AVLs is slightly higher in the afternoons than in the mornings. This was confirmed by the surveys. Between 83% and 86% of the Katy AVL vans and 97% of the North AVL vans surveyed in the p.m. indicated that they used the AVL in the a.m. Of the vans that do not use the AVL during both peak periods, their most frequently listed reasons for not doing so was because: 1) the AVL takes more time or is inconvenient in a.m. (the regular freeway lanes are faster); and 2) the AVL does not open soon enough in the afternoon.

### Freeway Entrance Ramp

The highest percentages of Katy AVL vanpools enter the Katy Freeway at either Gessner or West Belt in the mornings (Table 17), thus indicating that they do not have far to travel on the regular lanes before entering the AVL. The largest percentage of North AVL vanpools enter the North Freeway at either West Road or North Shepherd. Those entering at North Shepherd are able to enter the AVL shortly after accessing the North Freeway.

### Home Zip Codes

When asked for their home zip code, Katy AVL vanpoolers listed 30 different zip codes in 1985 and 15 in 1986. Almost 90% of the Katy AVL vanpoolers (in both 1985 and 1986) reside in one of 9 zip code areas (Table 18, Figure 14).

North AVL vanpoolers listed 75 different home zip codes. Nearly 60% of the North AVL vanpoolers reside in one of 8 zip code areas (Table 18, Figure 15).

Table 18: Home Zip Codes of Vanpools, Katy and North AVL Vanpool Surveys

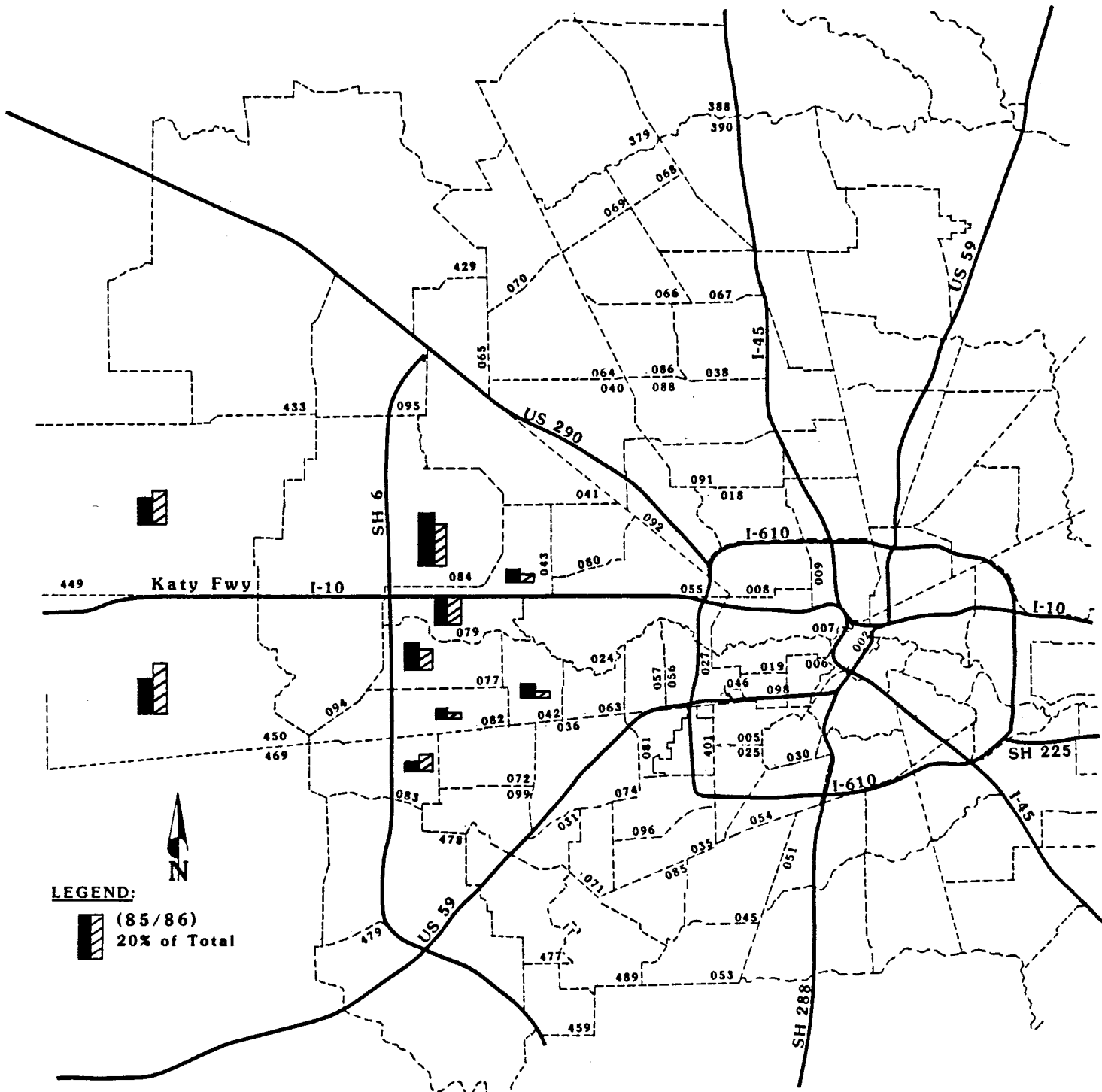
Home Zip Codes	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
<u>Katy AVL</u>	(n=454)	(n=426)	(n=64)	(n=59)	(n=390)	(n=367)
77084	22%	18%	20%	17%	23%	18%
77450	15%	22%	17%	22%	15%	22%
77079	12%	12%	9%	12%	13%	11%
77077	11%	9%	8%	12%	12%	9%
77449	10%	14%	13%	10%	10%	14%
77042	6%	3%	5%	2%	6%	4%
77043	5%	3%	8%	---	4%	3%
77082	4%	2%	5%	5%	4%	2%
77083	4%	6%	6%	7%	3%	5%
Other	11%	11%	9%	13%	10%	12%
<u>North AVL</u>	---	(n=1554)	---	(n=198)	---	(n=1356)
77373	---	11%	---	10%	---	11%
77380	---	10%	---	12%	---	10%
77379	---	9%	---	11%	---	9%
77381	---	8%	---	6%	---	8%
77388	---	8%	---	8%	---	7%
77090	---	5%	---	3%	---	5%
77066	---	4%	---	5%	---	4%
77073	---	3%	---	3%	---	3%
Other	---	42%	---	42%	---	43%

### Vanpool Trip Destinations

While 60% to 70% of the Katy and North AVL vanpool destinations are in the downtown, the downtown area is not as dominant of a destination as it was in the transit user surveys. As summarized in Table 17, several other destinations also attract vanpool trips.

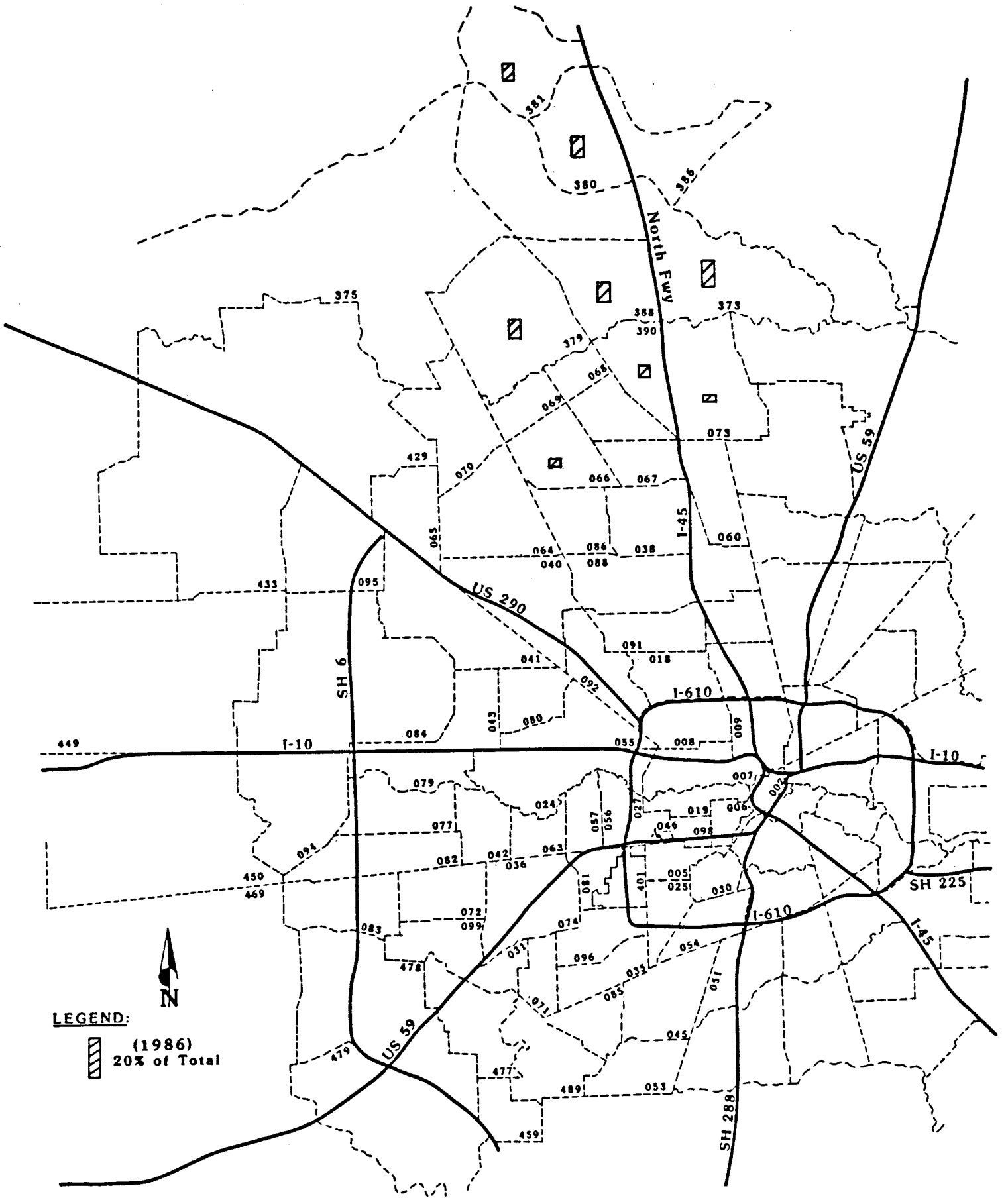
### Trip Length

Vanpoolers were asked how long their round trip would be if they drove alone and how much longer their round trip is because they vanpool. Trip length frequencies for the Katy and North AVL vanpoolers are illustrated in Figures 16 and 17, respectively. The 50th percentile responses are presented



NOTE: All Zip Codes Begin with 77.

Figure 14: Home Origins of Vanpoolers Using the Katy AVL



**LEGEND:**  
 (1986)  
 20% of Total

**NOTE:** All Zip Codes Begin with 77.

Figure 15: Home Origins of Vanpoolers Using the North AVL

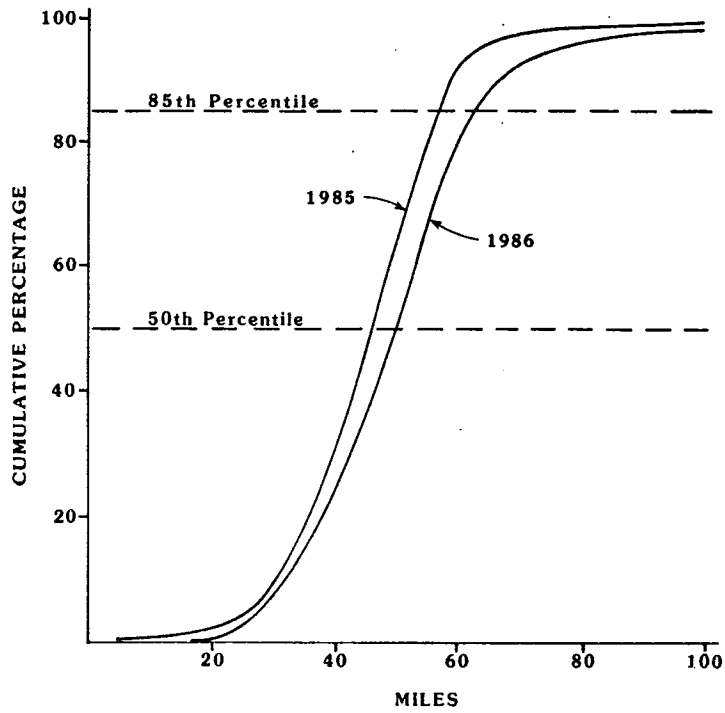


Figure 16: Round Trip Mileage for Katy AVL Vanpools

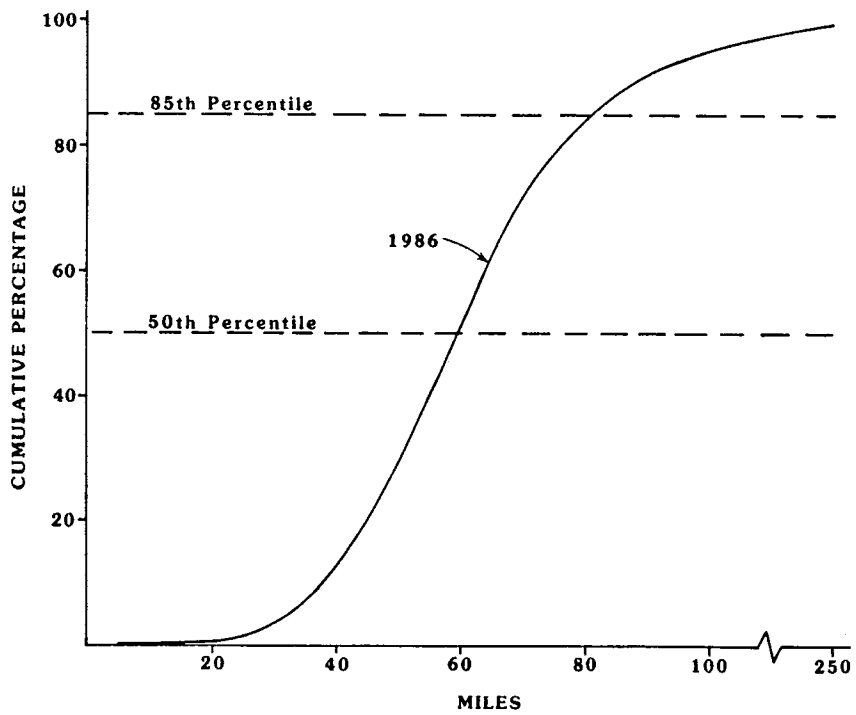


Figure 17: Round Trip Mileage for North AVL Vanpools

in Table 19. The average one-way vanpool trip along the Katy AVL is in excess of 20 miles; the average one-way vanpool trip along the North AVL is more than 30 miles.

**Table 19: Impacts of Vanpooling on Trip Length, Katy and North AVL Vanpool Surveys**

Characteristic	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
<b>Round Trip Distance if Drove Alone (miles)</b>						
<u>Katy AVL</u>	(n=450)	(n=435)	(n=64)	(n=58)	(n=386)	(n=377)
50th Percentile	45	50	49	50	44	50
Average	44	49	46	49	44	49
<u>North AVL</u>	---	(n=1617)	---	(n=198)	---	(n=1419)
50th Percentile	---	58	---	60	---	58
Average	---	60	---	62	---	59
<b>Extra Miles to Vanpool</b>						
<u>Katy AVL</u>	(n=428)	(n=428)	(n=61)	(n=58)	(n=367)	(n=370)
50th Percentile	0	0	1	3	0	0
Average	2.2	2.3	4.6	4.4	1.8	2.0
<u>North AVL</u>	---	(n=1601)	---	(n=198)	---	(n=1403)
50th Percentile	---	0	---	1.5	---	0
Average	---	2.5	---	3.5	---	2.3

**Year Joined Vanpool**

The year Katy and North AVL vanpoolers joined their present vanpool is presented in Table 20. The "average" Katy AVL vanpooler has been traveling in his/her current vanpool 2 years; the "average" North AVL vanpooler has been with his/her present vanpool 3 years.

**Previous Mode of Travel**

Before joining their present vanpool, the majority of the vanpoolers previously drove alone or carpoled (Table 20).



Table 20: Year Joined Vanpool and Previous Mode of Travel,  
Katy and North AVL Vanpool Surveys

Characteristic	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
<b>Year Joined Vanpool</b>						
<u>Katy AVL</u>	(n=439)	(n=433)	(n=60)	(n=59)	(n=379)	(n=374)
Before 1980	9%	6%	17%	14%	7%	5%
1980	10%	7%	12%	14%	10%	5%
1981	10%	6%	18%	10%	9%	5%
1982	14%	5%	16%	3%	14%	5%
1983	15%	10%	8%	15%	16%	10%
1984	32%	14%	27%	17%	33%	14%
1985	10%	39%	2%	20%	11%	42%
1986	---	13%	---	7%	---	14%
<u>North AVL</u>	---	(n=1600)	---	(n=191)	---	(n=1409)
Before 1980	---	11%	---	16%	---	9%
1980	---	9%	---	22%	---	8%
1981	---	11%	---	16%	---	10%
1982	---	10%	---	14%	---	10%
1983	---	10%	---	9%	---	10%
1984	---	14%	---	8%	---	15%
1985	---	32%	---	15%	---	35%
1986	---	3%	---	0%	---	3%
<b>Previous Travel Mode</b>						
<u>Katy AVL</u>	(n=461)	(n=433)	(n=66)	(n=59)	(n=395)	(n=374)
Drove Alone	34%	36%	36%	36%	33%	36%
Carpooled	22%	17%	17%	27%	22%	15%
Didn't Make Trip	16%	19%	9%	7%	18%	21%
Different Vanpool	13%	12%	21%	8%	12%	13%
Regular Bus	8%	7%	11%	14%	8%	6%
Park-and-Ride Bus	7%	8%	5%	8%	7%	8%
Other	0%	1%	1%	0%	0%	1%
<u>North AVL</u>	---	(n=1622)	---	(n=202)	---	(n=1420)
Drove Alone	---	30%	---	30%	---	30%
Carpooled	---	21%	---	35%	---	19%
Didn't Make Trip	---	21%	---	13%	---	22%
Different Vanpool	---	12%	---	9%	---	12%
Regular Bus	---	2%	---	1%	---	2%
Park-and-Ride Bus	---	12%	---	10%	---	12%
Other	---	2%	---	2%	---	3%

### Why Joined Vanpool

When vanpoolers were asked why they began vanpooling, the most common responses were more economical, convenience, dislike driving and moved to either a new job or a new residential location where vanpooling became possible (Table 21).

### Employer Contribution to Vanpool Costs

The majority of the Katy AVL vanpool drivers have all or part of their vanpooling costs paid by their employer (Table 21). Conversely, the majority of Katy AVL vanpool passengers and the majority of the North AVL vanpool drivers and passengers have none of their vanpooling expenses paid by their employer.

### Attitudes and Impacts Pertaining to the AVLs

Approximately one-third of the survey questions were intended to collect data concerning attitudes and travel patterns as impacted by the AVLs.

### Modal Selection

The primary reasons for selecting the vanpool mode on the AVLs was: 1) the level of congestion on the Katy and North Freeways; 2) to save time; 3) to save money; 4) to have time to relax. Vanpooling was selected instead of the bus primarily because: 1) vanpooling is more convenient; 2) vanpooling costs less; and 3) no bus service is available to the destination. These data are summarized in Table 22.

### Impacts of the AVLs on Mode Choice

A question was asked to determine whether individuals would be vanpooling if the AVL had not opened. The majority of Katy AVL vanpoolers

Table 21: Reasons for Joining Vanpool and Employer Contribution Toward Vanpool Cost, Katy and North AVL Vanpool Surveys

Characteristic	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
<b>Why Joined Vanpool<sup>1</sup></b>						
<u>Katy AVL</u>	(n=642)	(n=577)	(n=90)	(n=77)	(n=552)	(n=500)
More Economical	27%	24%	31%	30%	27%	23%
Convenience	12%	14%	17%	18%	11%	14%
New Job or Residential						
Location	12%	19%	2%	9%	13%	21%
Dislike Driving	9%	13%	0%	9%	11%	13%
Saves Auto Wear	7%	5%	10%	5%	7%	5%
No Traffic on AVL	4%	1%	4%	4%	3%	0%
Co. Started Vanpool	3%	4%	4%	3%	2%	4%
Carpool Broke Up	3%	2%	2%	1%	3%	2%
To Save Time	2%	2%	2%	0%	2%	3%
Only Own 1 Car	1%	1%	6%	0%	1%	1%
Other	20%	15%	22%	21%	20%	14%
<u>North AVL</u>	---	(n=2218)	---	(n=302)	---	(n=1916)
More Economical	---	24%	---	32%	---	22%
Convenience	---	15%	---	10%	---	16%
New Job or Residential						
Location	---	17%	---	10%	---	18%
Dislike Driving	---	15%	---	6%	---	16%
Saves Auto Wear	---	4%	---	3%	---	4%
No Traffic On AVL	---	1%	---	6%	---	1%
Co. Started Vanpool	---	8%	---	6%	---	8%
Carpool Broke Up	---	1%	---	2%	---	1%
To Save Time	---	6%	---	10%	---	5%
Only Own 1 Car	---	1%	---	2%	---	1%
Other	---	8%	---	13%	---	8%
<b>Employer Portion of Vanpool Cost</b>						
<u>Katy AVL</u>	(n=461)	(n=425)	(n=65)	(n=57)	(n=396)	(n=368)
Pays All	8%	4%	25%	16%	5%	2%
Pays Part	42%	35%	40%	39%	42%	35%
Pays None	50%	61%	35%	45%	53%	63%
<u>North AVL</u>	---	(n=1623)	---	(n=200)	---	(n=1423)
Pays All	---	4%	---	13%	---	3%
Pays Part	---	35%	---	32%	---	35%
Pays None	---	61%	---	55%	---	62%

<sup>1</sup> Respondents were able to check more than one reason: Thus "n" refers to the number of reasons checked, not the number of surveys completed.

Table 22: Reasons for Selecting the Vanpool Mode on the AVL,  
Katy and North AVL Vanpool Surveys

Reason	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
<b>Reasons for Vanpooling<sup>1</sup></b>						
<u>Katy AVL</u>	(n=1667)	(n=1656)	(n=192)	(n=177)	(n=1475)	(n=1479)
Freeway Too Congested	18%	19%	23%	28%	17%	18%
Saves Time	17%	20%	26%	29%	16%	18%
Costs Less	16%	14%	18%	10%	15%	15%
Time to Relax	14%	14%	0%	0%	15%	15%
Reliable Schedule	13%	12%	18%	16%	12%	12%
Dislike Driving	12%	9%	0%	0%	13%	11%
No Bus to Destination	3%	5%	4%	9%	3%	5%
Car Used by Others	3%	3%	3%	1%	3%	3%
Carpool Broke Up	1%	1%	1%	1%	1%	1%
No Other Way Available	1%	1%	1%	0%	1%	1%
Other	2%	2%	6%	6%	4%	1%
<u>North AVL</u>	---	(n=7036)	---	(n=740)	---	(n=6296)
Freeway Too Congested	---	20%	---	23%	---	19%
Saves Time	---	20%	---	25%	---	19%
Costs Less	---	15%	---	20%	---	15%
Time to Relax	---	13%	---	0%	---	15%
Reliable Schedule	---	13%	---	17%	---	12%
Dislike Driving	---	8%	---	0%	---	9%
No Bus to Destination	---	5%	---	6%	---	5%
Car Used by Others	---	3%	---	6%	---	3%
Carpool Broke Up	---	1%	---	1%	---	1%
No Other Way Available	---	1%	---	0%	---	1%
Other	---	1%	---	2%	---	1%
<b>Why Vanpool Rather Than Other AVL Mode(s)<sup>1</sup></b>						
<u>Katy AVL</u>	(n=282)	(n=805)	(n=115)	(n=100)	(n=667)	(n=705)
More Convenient	42%	39%	42%	39%	42%	39%
Costs Less	29%	27%	36%	27%	28%	28%
No Bus to Destination	13%	12%	11%	13%	13%	12%
Too Far from Home to Park-and-Ride or Bus Stop	8%	6%	3%	6%	8%	6%
Carpool Not Available	---	9%	---	4%	---	10%
Other	8%	7%	8%	11%	9%	5%
<u>North AVL</u>	---	(n=3114)	---	(n=385)	---	(n=2724)
More Convenient	---	38%	---	40%	---	38%
Costs Less	---	27%	---	29%	---	27%
No Bus to Destination	---	14%	---	10%	---	14%
Too Far from Home to Park & Ride or Bus Stop	---	17%	---	16%	---	17%
Other	---	4%	---	5%	---	4%

<sup>1</sup>On these questions, it was possible to check more than one reason. Thus, the "n" value is the total number of reasons checked, not the number of surveys completed.

responded "yes" (Table 23). This is consistent with the previous finding that the majority of the vanpools were operating at the time the AVL opened.

Conversely, the majority of North AVL vanpoolers responded either "no" or "not sure" (Table 23). This response is to be expected since North AVL vanpoolers were able to take advantage of the North Freeway contraflow lane

Table 23: Perceived Impacts of the AVL An Mode Choice and Time Savings, Katy and North AVL Vanpool Surveys

Impact	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
<b>How Important Was AVL in Decision to Vanpool</b>						
<u>Katy AVL</u>	(n=457)	(n=435)	(n=64)	(n=59)	(n=393)	(n=376)
Very Important	26%	41%	27%	46%	24%	40%
Somewhat Important	16%	20%	8%	12%	18%	22%
Not Important	59%	39%	65%	42%	58%	38%
<u>North AVL</u>	---	(n=1618)	---	(n=200)	---	(n=1418)
Very Important	---	68%	---	73%	---	67%
Somewhat Important	---	18%	---	15%	---	18%
Not Important	---	14%	---	12%	---	15%
<b>Would You Vanpool if No AVL</b>						
<u>Katy AVL</u>	(n=461)	(n=436)	(n=65)	(n=58)	(n=396)	(n=378)
Yes	87%	72%	92%	71%	86%	73%
No	6%	12%	6%	14%	6%	11%
Not Sure	7%	16%	2%	15%	8%	16%
<u>North AVL</u>	---	(n=1632)	---	(n=202)	---	(n=1430)
Yes	---	43%	---	42%	---	44%
No	---	27%	---	30%	---	26%
Not Sure	---	30%	---	28%	---	30%
<b>Perceived AVL Time Savings (minutes)</b>						
<u>Katy AVL</u>	(n=417)	(n=401)	(n=55)	(n=51)	(n=362)	(n=350)
a.m. (50th percentile)	6	10	6	10	5	10
p.m. (50th percentile)	10	15	12	15	10	17
<u>North AVL</u>	---	(n=1595)	---	(n=199)	---	(n=1396)
a.m. (50th percentile)	---	20	---	20	---	20
p.m. (50th percentile)	---	30	---	25	---	30

for 4 years prior to the opening of the North AVL; the majority of North AVL vanpools were formed after the opening of the contraflow lane.

### Perceived AVL Time Savings

In general, the perceived time savings in the a.m. are less than in the p.m. for both Katy and North AVL vanpoolers (Table 23). On the Katy AVL, many of the vans that enter at Gessner in the a.m. perceive they lose more time by backtracking to use the AVL than they gain by using the AVL. The remaining Katy AVL vans and North AVL vans apparently do not perceive a.m. freeway traffic congestion is as severe as p.m. traffic congestion, and therefore, do not perceive as great a time savings in the a.m. as in the p.m. Frequency distributions of perceived time savings by Katy and North AVL vanpoolers are presented in Figures 18 and 19, respectively.

### Are the AVLs Sufficiently Utilized

Vanpoolers on both the Katy and North AVLs were asked whether they felt the AVL they used was sufficiently utilized to justify the project. Their responses are summarized in Table 24.

Table 24: Perception of AVL Utilization, Katy and North AVL Vanpool Surveys

Attitude	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
<b>Is AVL Sufficiently Utilized to Justify the Project</b>						
<u>Katy AVL</u>	(n=448)	(n=429)	(n=62)	(n=59)	(n=386)	(n=370)
Yes	30%	41%	47%	46%	27%	40%
No	51%	34%	35%	32%	54%	34%
Not Sure	19%	25%	18%	22%	19%	26%
<u>North AVL</u>	---	(n=1616)	---	(n=198)	---	(n=1418)
Yes	---	84%	---	94%	---	82%
No	---	7%	---	2%	---	8%
Not Sure	---	9%	---	4%	---	10%

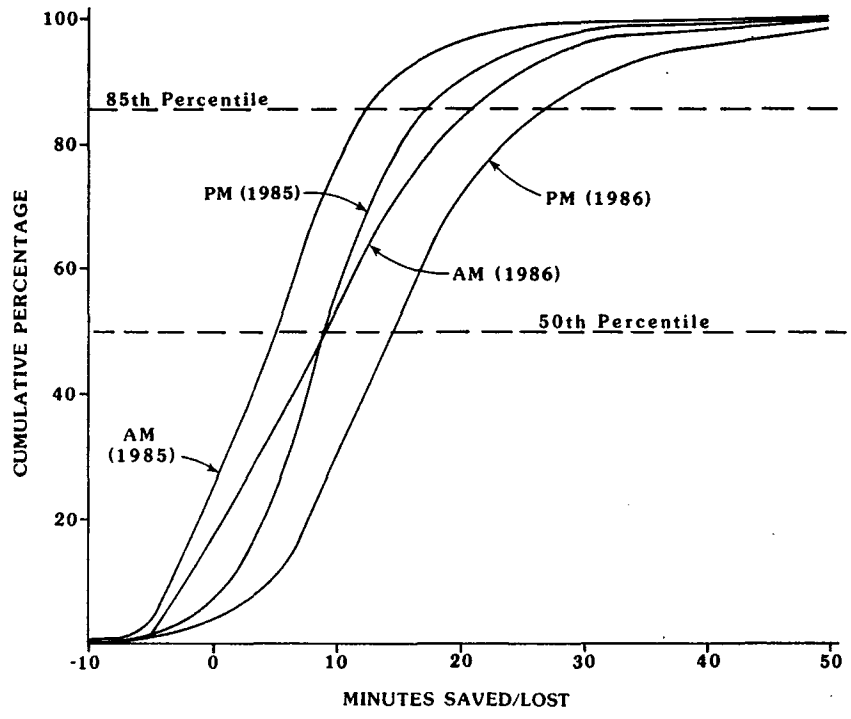


Figure 18: Perceived AVL Travel Time Savings, Katy AVL Vanpool Surveys

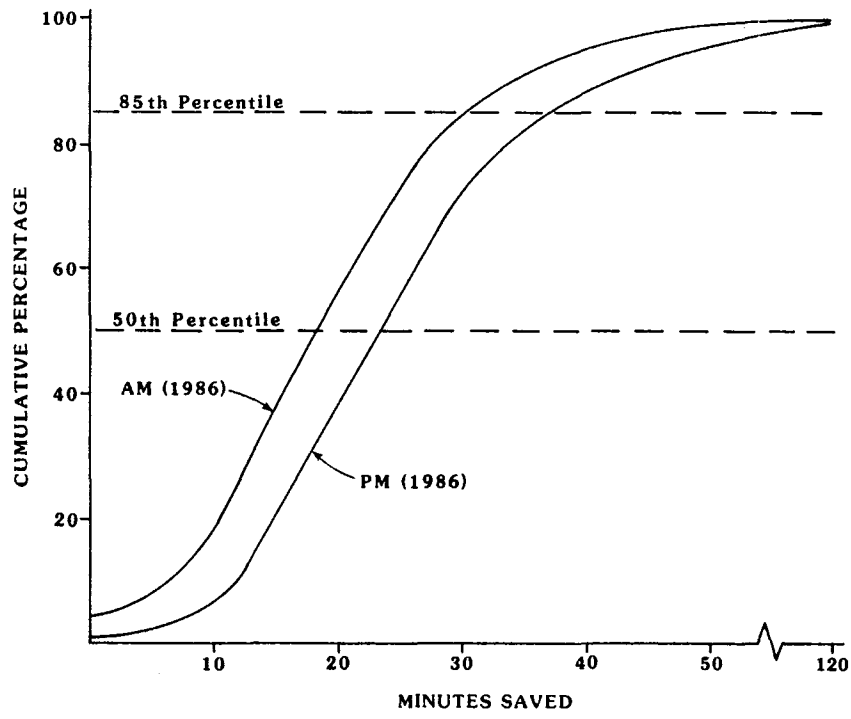


Figure 19: Perceived AVL Travel Time Savings, North AVL Vanpool Surveys

**Katy AVL.** The 1985 (before carpools were allowed on the AVL), there were significant differences in the responses between the vanpool drivers and passengers. More drivers, those responsible for the operation of the vehicle on the AVL, felt the AVL was sufficiently utilized than felt it was not. Conversely, twice as many passengers indicated that they felt it was not sufficiently utilized as compared to those stating they felt it was sufficiently utilized.

One of the main reasons for allowing carpools to use the AVL is to increase the perception of utilization. In 1986, one year after carpools were permitted to use the AVL, the driver's perception of AVL utilization was virtually identical to their perception of utilization before carpools were allowed. However, the number of vanpool passengers who perceived the AVL was sufficiently utilized increased from 27% in 1985 to 40% in 1986.

**North AVL.** Approximately 94% of the vanpool drivers and 82% of the passengers felt the North AVL was sufficiently utilized to justify the project.

### **Comments**

Vanpoolers were encouraged to offer additional comments. More than half of the Katy and North AVL vanpoolers did provide additional comments. Their comments are summarized in Table 25.



Table 25: Additional Comments, Katy and North AVL Vanpool Surveys

Comment	Percent of Total Comments	
	1985	1986
<u>Katy AVL</u>		
Extend the AVL	28%	15%
Poor entry/exit design	13%	10%
Carpools on AVL good idea	6%	2%
AVL good idea	5%	17%
Open AVL earlier in p.m.	4%	7%
AVL is underutilized	4%	10%
Other	40%	39%
<u>North AVL</u>		
Extend AVL	---	29%
AVL good idea	---	16%
Keep AVL open longer hours	---	10%
Need concrete median barriers the entire length of AVL	---	8%
Enjoy vanpooling	---	8%
Allow carpools on AVL	---	5%
Other	---	24%



## KATY AVL CARPOOL SURVEYS

The forms used for the surveys of Katy AVL carpoolers are similar to those used for the Katy and North AVL vanpoolers. Katy AVL carpooler surveys primarily addressed the following 3 areas: 1) personal characteristics; 2) travel patterns and trip characteristics and 3) attitudes and impacts pertaining to the AVL.

### Personal Characteristics

Questions were asked to identify the age, sex, occupation and educational level of carpoolers.

#### Age

The median age of persons in Katy AVL carpools was 41 in 1985 and 40 in 1986 (Table 26).

#### Sex

The majority of the persons in carpools are male (Table 26).

#### Occupation

Nearly 80% of the carpoolers surveyed in 1985 and almost 70% of those surveyed in 1986 are considered to be "professional" or "managerial" (Table 26). Some persons using the AVL are driving their children to school or day care centers.

#### Education

The average carpooler has completed 3-4 years of college.

Table 26: Personal Characteristics of AVL Carpoolers,  
Katy AVL Carpool Surveys

Personal Characteristic	Total Sample		Carpool Drivers		Carpool Passengers	
	1985	1986	1985	1986	1985	1986
Age (years)	(n=90)	(n=193)	(n=31)	(n=63)	(n=59)	(n=130)
50th Percentile	41	40	43	39	40	40
Sex	(n=90)	(n=192)	(n=31)	(n=63)	(n=59)	(n=129)
Male	71%	62%	58%	60%	78%	63%
Female	29%	38%	42%	40%	22%	37%
Occupation	(n=87)	(n=192)	(n=28)	(n=63)	(n=59)	(n=130)
Professional	58%	45%	50%	45%	61%	45%
Managerial	20%	23%	21%	27%	18%	21%
Clerical	11%	15%	14%	13%	10%	17%
Sales	2%	6%	4%	3%	2%	7%
Homemaker	2%	1%	7%	3%	0%	---
Student	1%	8%	4%	7%	0%	9%
Operative	5%	---	0%	---	7%	---
Service Worker	---	1%	---	2%	---	---
Retired	---	1%	---	---	---	1%
Unemployed	1%	---	0%	---	2%	---
Education (years)	(n=90)	(n=194)	(n=31)	(n=63)	(n=59)	(n=131)
Average	16.1	15.3	15.8	15.5	16.4	15.2

### Travel Patterns and Trip Characteristics

Carpool drivers and passengers were asked a series of questions pertaining to formation and operation of the carpool. Additional questions sought information on travel patterns and trip characteristics.

#### Formation of Carpool

In most instances, the persons in the carpool formed the carpool with no assistance from any person or agency (Table 27).

Table 27: Characteristics of Carpools Traveling on the Katy AVL, 1985 and 1986

Carpool Characteristic	Katy AVL Carpools	
	1985	1986
<b>How Was Carpool Organized</b>	(n=31)	(n=64)
I Found The Riders	95%	78%
METRO CarShare	0%	3%
Residential Developer	5%	---
Employer	---	2%
Other	---	17%
<b>Registered Carpool Members</b>	(n=31)	(n=65)
3	7%	44%
4	71%	48%
5	19%	8%
6	3%	---
<b>Actual Carpool Occupancy</b>	(n=31)	(n=65)
1	3%	---
2	0%	3%
3	52%	55%
4	39%	39%
5	3%	3%
6	3%	---
<b>Authorized Carpool Drivers</b>	(n=31)	(n=65)
1	23%	32%
2	13%	25%
3	6%	17%
4	52%	21%
5	6%	5%
<b>Percent of Carpools Using AVL Since It Opened to Carpools (April 1985)</b>	(n=26)	(n=65)
Percent of Total	42%	22%

**Carpool Occupancy**

The actual carpool occupancies are shown in Table 27. On the day of the 1985 survey, the average occupancy per carpool was 3.5. On the 1986 survey date, the average occupancy was 3.4 persons. There was an average of 4.2

registered members per car in 1985 and 3.6 registered members in 1986. Actual occupancy was 83% of registered members in 1985 and 94% in 1986.

### **Authorized Carpool Drivers**

At the time of the 1985 and 1986 surveys, driver training was required to operate a carpool on the AVL. The driver was also required to carry a license authorizing him or her to drive on the lane. Most carpools rotate the car that is used as well as the driver. As a result, most carpools have numerous authorized drivers (Table 27).

### **Duration of AVL Use**

In 1985, 42% of the Katy AVL carpools reported using the lane since it opened to carpools (Table 27). In 1986, only 22% reported using the AVL since carpools were first allowed.

### **Carpool Staging Points**

Slightly less than half of the drivers surveyed in 1985 and almost 60% of those surveyed in 1986 reported that they pick up passengers at common carpool staging points (Table 28). The majority of passengers reported that they are picked up at their door (either by the carpool driver or another passenger). Even when passengers leave a car at home, it is frequently not used.

### **Employer Incentive to Carpool**

Between 21% and 25% of the carpool passengers surveyed reported that their employer provided some sort of incentive for them to carpool (Table 28). The incentives provided include: 1) subsidized parking; 2) share in car and/or gasoline costs; 3) permit flexible working hours.

Table 28: Characteristics of Carpool Operation,  
Katy AVL Carpool Surveys

Trip Characteristic	Katy AVL Carpools	
	1985	1986
Do Drivers Pick Up Passengers	(n=31)	(n=59)
At Home	52%	41%
At Common Pickup Point(s)	48%	59%
Do Passengers Drive to Pickup Point	(n=59)	(n=132)
Yes	42%	36%
No, dropped off by someone else	4%	4%
No, pick up at my door	54%	60%
When Passengers Leave Car at Home, Is It Used by Others	(n=58)	(n=128)
Yes	9%	23%
No	69%	55%
Not Applicable (car left at pickup point)	22%	22%
Are There Employer Incentives for Passengers to Carpool	(n=59)	(n=129)
Yes	25%	21%
No	75%	79%
AVL Trip Frequency	(n=31)	(n=64)
% Carpools Using Daily	100%	97%
Percent Carpools Using AVL	(n=31)	(n=65)
a.m.	94%	89%
p.m.	100%	100%

### AVL Trip Frequency

As would be expected for a mode which primarily serves work or school trips, virtually all carpools use the AVL five days per week (Table 28).

### Percent of Carpools Using AVL by Time Period

Most all carpools use the AVL in both the a.m. and p.m. (Table 28). Those which do not use the AVL in the a.m. indicated that they left before

the AVL opened in the morning or that used a different travel route in the morning.

**Trip Origin**

Two questions were asked which related to the origin of the morning trips: 1) home zip code and 2) freeway entrance ramp.

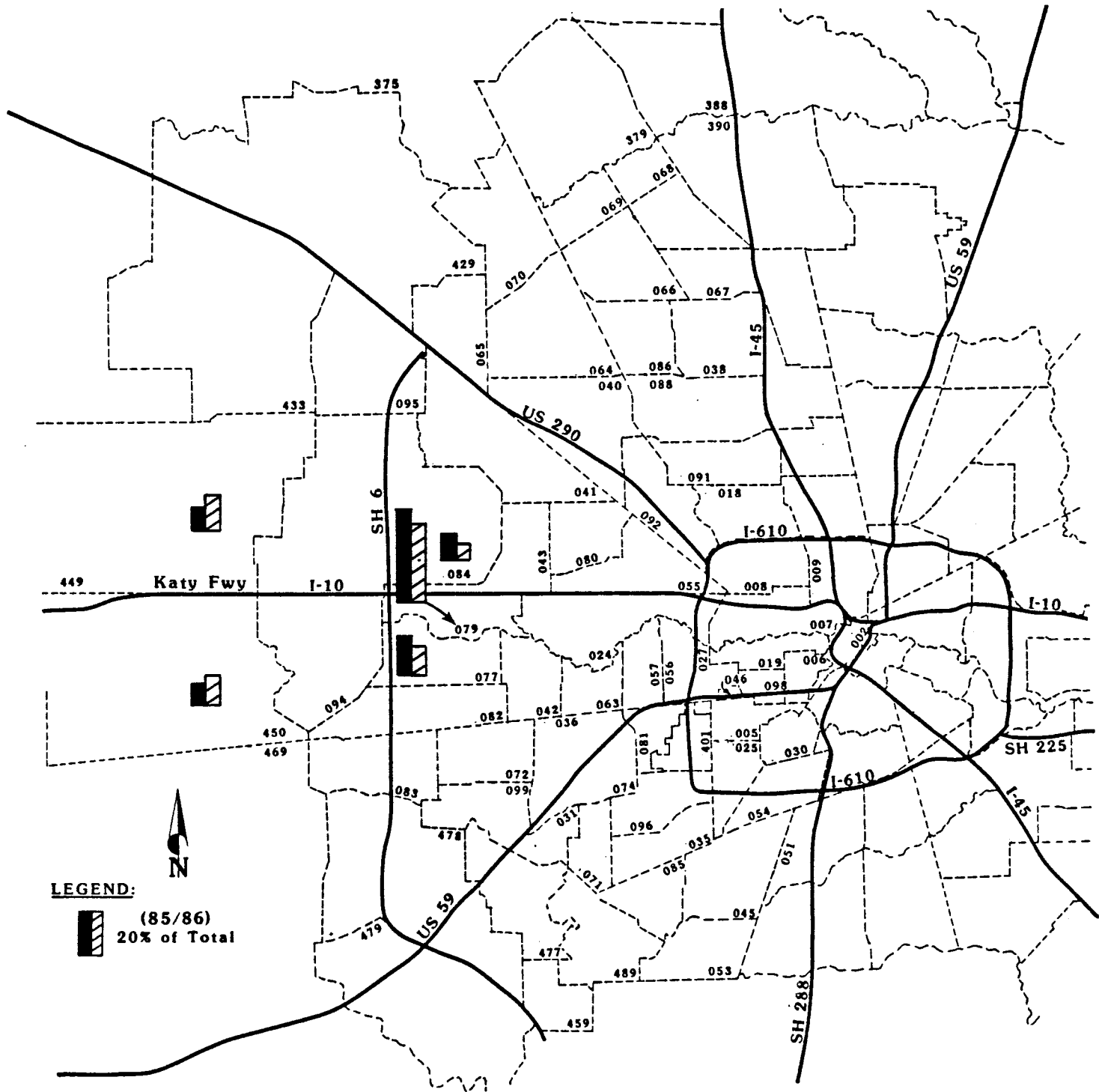
**Home Zip Code.** Approximately 80% of the Katy AVL carpoolers reside in one of 5 zip code areas. These are illustrated in Figure 20 and summarized in Table 29. At least one-third of the carpoolers homes are in zip code 77079, located just east of SH 6 and just south of the Katy Freeway.

Table 29: Home Zip Codes of Carpoolers, Katy AVL Carpool Surveys


Home Zip Code	Total Sample		Carpool Drivers		Carpool Passengers	
	1985	1986	1985	1986	1985	1986
Zip Code	(n=90)	(n=195)	(n=31)	(n=64)	(n=59)	(n=131)
77079	37%	33%	29%	33%	41%	33%
77077	16%	13%	23%	14%	12%	12%
77084	11%	7%	13%	8%	10%	7%
77449	10%	15%	10%	14%	10%	15%
77450	9%	11%	3%	11%	12%	11%
Other	17%	21%	22%	20%	15%	22%

**Freeway Entrance Ramp Used.** For the morning trip, the vast majority of carpools enter the Katy Freeway at either West Belt, Wilcrest or Gessner. These data are presented in Table 30.





**LEGEND:**

 (85/86)  
20% of Total

**NOTE:** All Zip Codes Begin with 77.

Figure 20: Home Origins of Katy AVL Carpoolers

Table 30: Freeway Entrance Ramp (a.m.) and Destination of Carpools, Katy AVL Carpool Surveys

Carpool Operation Characteristic	1985	1986
<b>Freeway Entrance Ramp (a.m.)</b>	(n=29)	(n=60)
West Belt	69%	65%
Wilcrest	17%	17%
Gessner	11%	8%
Sealy	3%	---
Fry Road	---	3%
SH 6	---	2%
Barker-Cypress	---	3%
Mason Road	---	2%
<b>Destination of Carpools</b>	(n=31)	(n=65)
Downtown	29%	49%
Galleria	13%	15%
Greenway Plaza	13%	---
Post Oak School	10%	---
Texas Medical Center	3%	3%
University of Houston	3%	2%
Other	29%	31%

### Trip Destination

As was the case with AVL vanpoolers, the destinations of the carpoolers are dispersed. The largest single attractor is the downtown. In fact, 20% more carpools were destined to the downtown area in 1986 than were in 1985.

### Year Joined Carpool

The year Katy AVL carpoolers joined their present carpool is presented in Table 31. The "average" carpooler in 1985 had been traveling in his/her current carpool less than 1 year; the "average" carpooler in 1986 has been with his/her present carpool about 2 1/2 years.

Table 31: Year and Reasons Joined Carpool, Previous Mode of Travel and Impacts of Carpooling on Trip Distance, Katy AVL Carpool Surveys

Characteristic	Total Sample		Carpool Drivers		Carpool Passengers	
	1985	1986	1985	1986	1985	1986
<b>Year Joined Carpool</b>	(n=88)	(n=195)	(n=30)	(n=63)	(n=58)	(n=132)
Before 1970	5%	5%	3%	8%	5%	4%
1970-1975	10%	8%	14%	6%	9%	9%
1976-1980	7%	6%	3%	3%	8%	8%
1981-1984	23%	13%	13%	11%	30%	14%
1985	55%	38%	67%	35%	48%	38%
1986	---	30%	---	37%	---	27%
<b>Why Joined Carpool<sup>1</sup></b>	(n=101)	(n=257)	(n=34)	(n=81)	(n=67)	(n=176)
Saves Time or Money	38%	40%	41%	37%	37%	41%
More Convenient	12%	12%	9%	11%	13%	12%
Share Driving	9%	8%	9%	5%	9%	9%
Take Advantage of AVL	7%	6%	6%	5%	8%	7%
Traffic Congestion	5%	5%	6%	9%	5%	3%
Started Working	5%	7%	6%	2%	5%	9%
Take Children to School	4%	1%	12%	2%	0%	0%
Other	20%	21%	11%	29%	23%	19%
<b>Previous Mode of Travel</b>	(n=88)	(n=191)	(n=30)	(n=61)	(n=58)	(n=130)
Drove Alone	50%	46%	50%	52%	50%	42%
Other Carpool	24%	18%	27%	20%	22%	18%
Didn't Make Trip	20%	18%	23%	10%	19%	21%
Vanpool	4%	4%	0%	3%	5%	5%
Bus	2%	8%	0%	2%	4%	11%
Other	---	6%	---	13%	---	3%
<b>Before Carpooling, Did you Use AVL</b>	(n=90)	(n=197)	(n=31)	(n=65)	(n=59)	(n=132)
Yes, bus	3%	7%	0%	3%	5%	9%
Yes, van	2%	7%	0%	8%	3%	7%
No	95%	86%	100%	89%	92%	84%
<b>Did Carpool Size Increase To Be Able To Use AVL</b>	(n=90)	(n=194)	(n=31)	(n=65)	(n=59)	(n=129)
Yes	44%	42%	48%	45%	42%	41%
No	56%	58%	52%	55%	58%	59%
<b>Round Trip Distance If Drove Alone (miles)</b>	(n=87)	(n=189)	(n=30)	(n=61)	(n=59)	(n=128)
50th Percentile	42	40	39	40	42	40
Average	44	45	42	43	45	46
<b>Extra Miles to Carpool</b>	(n=87)	(n=184)	(n=30)	(n=58)	(n=59)	(n=126)
50th Percentile	0	0	0	1	0	0
Average	1.2	1.4	0.9	1.8	1.4	1.6

### **Why Joined Carpool**

When asked why the carpoolers began carpooling, the most common responses involved saving time or money, convenience and sharing the task of driving (Table 31).

### **Previous Mode of Travel**

Before joining their present carpool, the majority of the carpoolers previously drove alone or traveled in a different carpool (Table 31).

### **Prior Use of AVL**

Carpoolers were asked whether they used another AVL mode prior to carpooling on the AVL. Although the majority of the respondents responded "no," 7% of those surveyed in 1986 had previously used a bus and an additional 7% had previously used a van which traveled on the AVL.

### **Increase in Carpool Occupancy**

Approximately 44% of those surveyed in 1985 and 42% of those questioned in 1986 indicated that the size of the carpool increased after the AVL opened in order to be eligible to use the AVL (Table 31).

### **Trip Length**

Carpoolers were asked how long their round trip would be if they drove alone and how much longer their round trip is because they carpool. Trip length frequencies for the carpoolers are shown in Figure 21. The 50th percentile responses are presented in Table 31. The average one-way carpool trip is in excess of 20 miles.

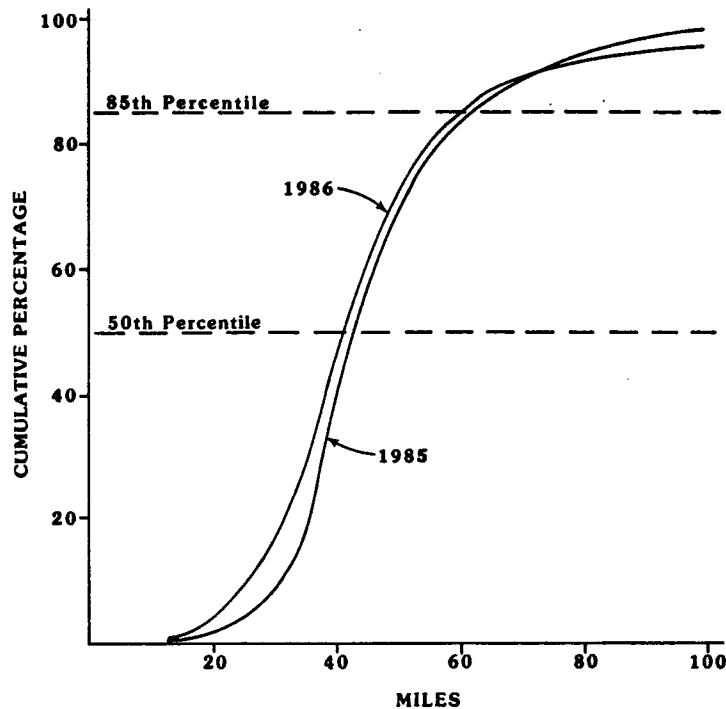


Figure 21: Round Trip Mileage for Katy AVL Carpools

### Attitudes and Impacts Pertaining to the AVL

A number of questions were intended to collect information concerning attitudes toward and impacts of implementing the AVL. These responses can be categorized as follows: 1) modal selection; 2) impacts of AVL on modal selection; 3) perceived time savings as a results of using the AVL; and 4) perception of AVL utilization.

#### Modal Selection

As indicated by Table 32, the carpool was selected as a travel mode primarily because: 1) carpooling saves time; 2) the freeway is too congested; and 3) carpooling costs less. Convenience and cost were also cited as the primary reasons for selecting the carpool mode rather than a vanpool or bus.

Table 32: Reasons for Selecting the Carpool Mode on the AVL,  
Katy AVL Carpool Surveys

Reason	Total Sample		Carpool Drivers		Carpool Passengers	
	1985	1986	1985	1986	1985	1986
<b>Why Carpool on the AVL<sup>1</sup></b>	(n=328)	(n=969)	(n=104)	(n=210)	(n=224)	(n=486)
Saves Time	27%	26%	29%	28%	26%	25%
Freeway Too Congested	26%	25%	29%	29%	25%	23%
Costs Less	16%	10%	17%	3%	16%	14%
Reliable Schedule	13%	10%	14%	14%	12%	9%
Time to Relax	6%	7%	0%	3%	9%	9%
No Bus to Destination	5%	7%	4%	11%	5%	5%
Car Used by Others	4%	6%	5%	7%	4%	5%
Other	3%	9%	2%	5%	3%	10%
<b>Why Carpool Rather than Bus or Van<sup>1</sup></b>	(n=151)	(n=363)	(n=45)	(n=121)	(n=106)	(n=242)
More Convenient	47%	39%	47%	40%	46%	39%
Costs Less	23%	19%	20%	18%	25%	19%
No Bus to Destination	14%	13%	13%	12%	14%	13%
No Vanpool Available	11%	13%	16%	12%	9%	14%
Too Far to Park-and-Ride or Bus Stop	5%	8%	4%	8%	6%	8%
Other	0%	8%	0%	10%	0%	7%

<sup>1</sup>On these questions, it was possible to check more than reason. Thus, the "n" value is the total number of reasons checked, not the number of surveys completed.

### Impacts of the Katy AVL on Mode Choice

A question was asked to determine whether individuals would be carpooling if the AVL had not opened operation to carpools. Seventy percent of those surveyed in 1985, but only 59% of those surveyed in 1986 said "yes" (Table 33).

A related question asked how important the Katy AVL was in the decision to carpool. While most respondents indicated that they would be carpooling even if the AVL had not opened to carpools, 57% of those surveyed in 1985 and 64% of those surveyed in 1986 said the AVL was either "very important" or "somewhat important" in their decision to carpool (Table 33).

Table 33: Perceived Impacts of AVL on Mode Choice and Time Savings, Katy AVL Carpool Surveys

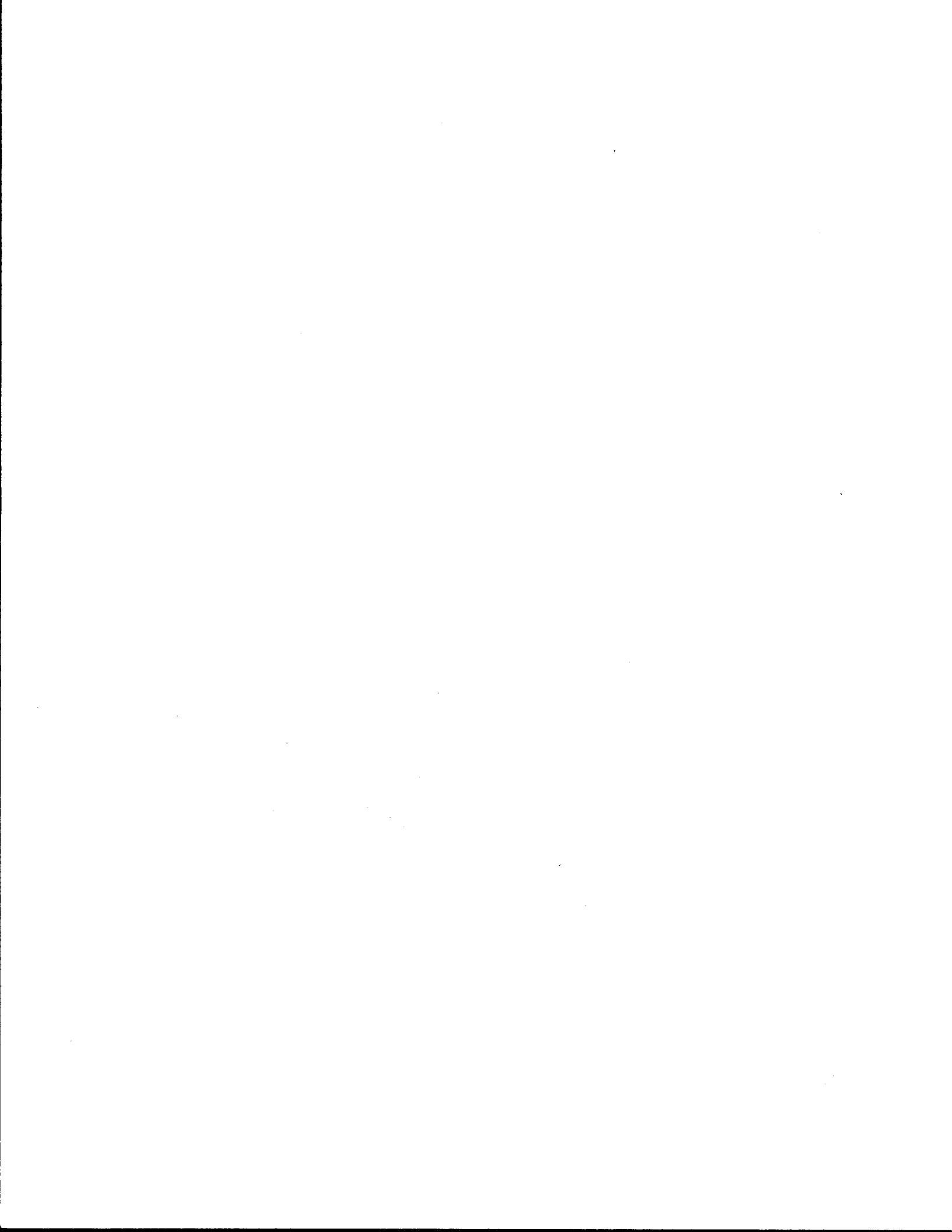
Impact	Total Sample		Carpool Drivers		Carpool Passengers	
	1985	1986	1985	1986	1985	1986
Would You Carpool if No AVL	(n=90)	(n=197)	(n=31)	(n=65)	(n=59)	(n=132)
Yes	70%	59%	71%	57%	69%	60%
No	16%	25%	13%	28%	17%	24%
Not Sure	14%	16%	16%	15%	14%	16%
How Important Was AVL in Decision to Carpool	(n=90)	(n=197)	(n=31)	(n=65)	(n=59)	(n=132)
Very Important	47%	56%	58%	63%	41%	53%
Somewhat Important	10%	8%	13%	5%	8%	10%
Not Important	43%	36%	29%	32%	51%	37%
Perceived AVL Time Savings (minutes)	(n=90)	(n=187)	(n=31)	(n=62)	(n=59)	(n=125)
a.m. (50th Percentile)	9	15	12	15	7	10
p.m. (50th Percentile)	17	20	14	20	17	20

### Perceived AVL Time Savings

As was the case with Katy AVL vanpoolers, Katy AVL carpoolers perceive a greater travel time savings in the p.m. than in the a.m. (Table 33). Like the vanpoolers, carpoolers apparently do not perceive the a.m. freeway traffic congestion as being as severe as the p.m. congestion.

As to be expected, perceived travel time savings in 1986 (after the Katy AVL was extended) are greater than those of 1985.

Frequency distributions of 1985 and 1986 carpooler perceived travel time savings are presented in Figure 22.





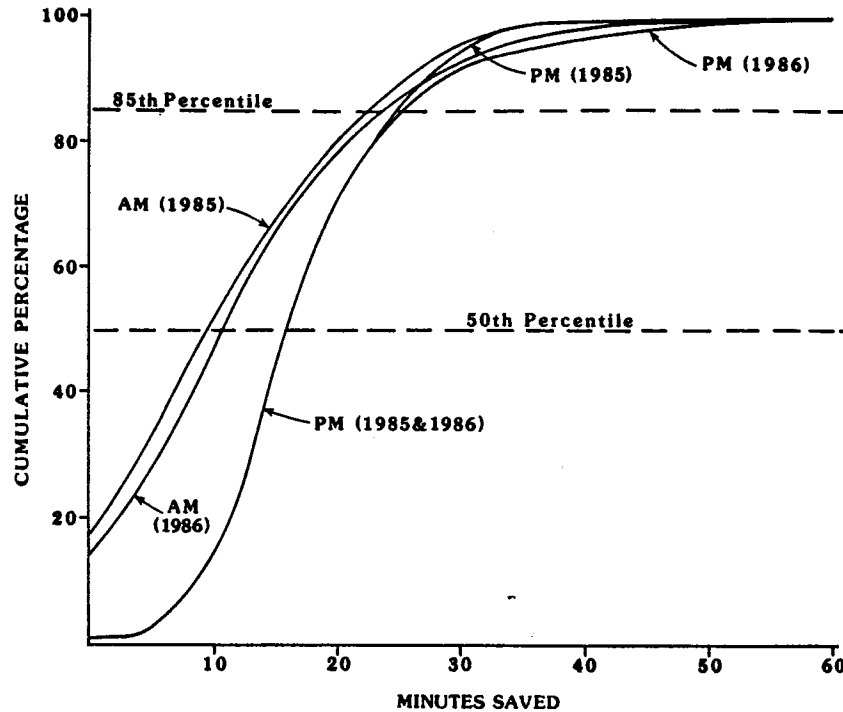


Figure 22: Perceived AVL Travel Time Savings, Katy AVL Carpool Surveys

### Is the AVL Sufficiently Utilized

One of the main reasons for allowing carpools to use the AVL is to increase the perception of utilization. Carpoolers were asked whether they felt the AVL was sufficiently utilized to justify the project. In 1985, more responses (43%) indicated that the AVL was not sufficiently utilized than felt it was sufficiently utilized (34%). In 1986, however, just the opposite was true; 45% felt the AVL was sufficiently utilized, while 32% felt it was not sufficiently utilized to justify the project. Those data are presented in Table 34.

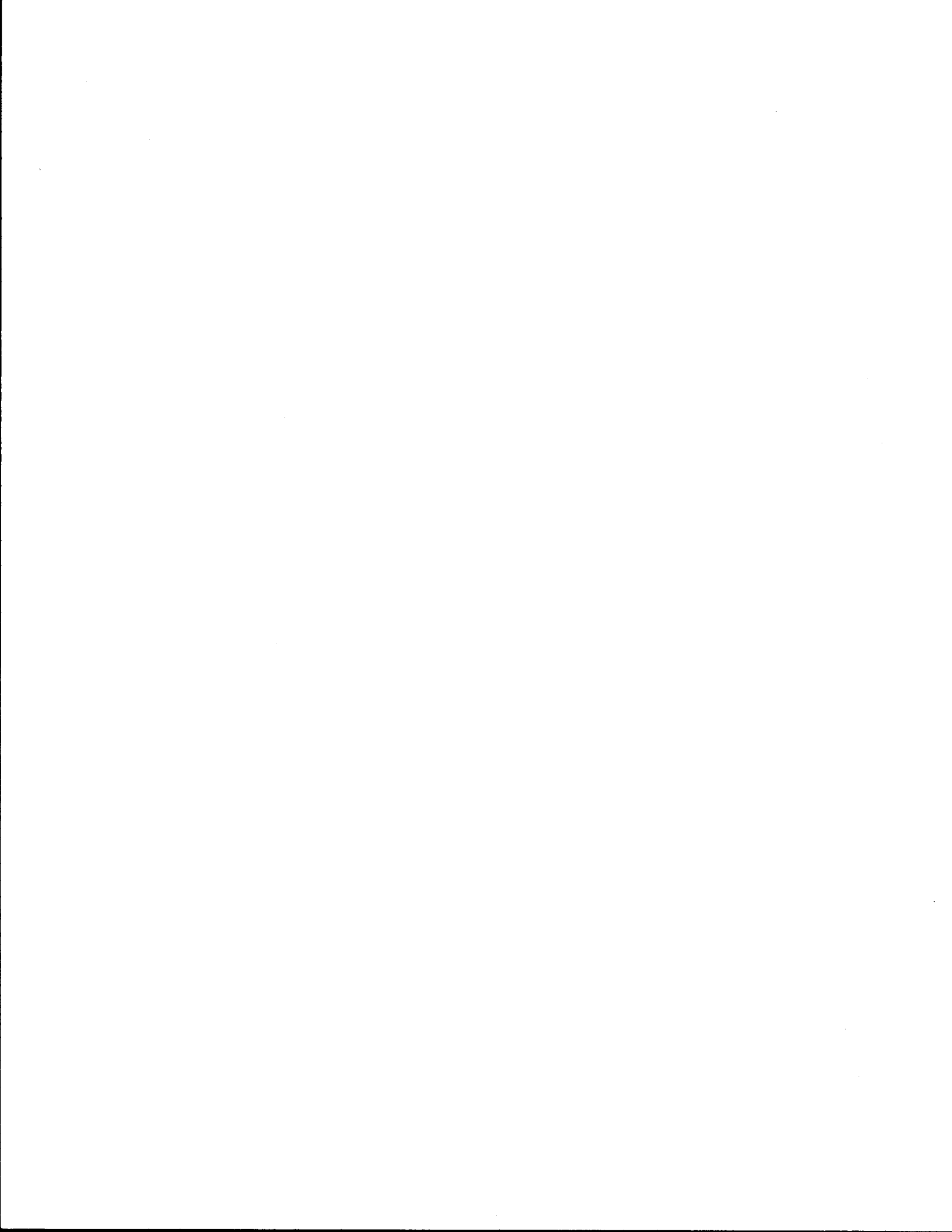


Table 34: Perception of AVL Utilization, Katy AVL Carpool Surveys

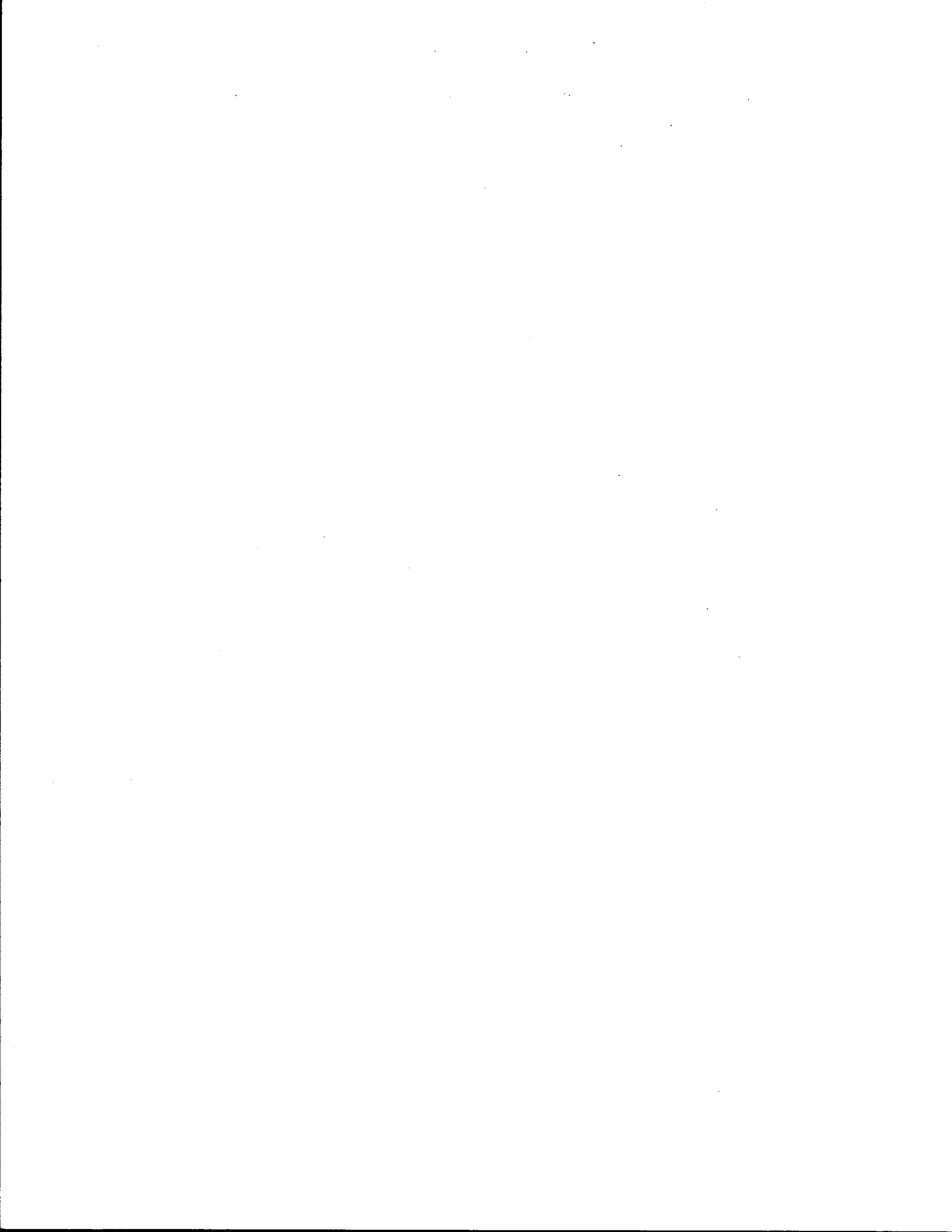
Attitude	Total Sample		Vanpool Drivers		Vanpool Passengers	
	1985	1986	1985	1986	1985	1986
Is the AVL Sufficiently Utilized to Justify the Project	(n=86)	(n=193)	(n=29)	(n=63)	(n=57)	(n=130)
Yes	34%	45%	35%	44%	33%	45%
No	43%	32%	41%	35%	44%	31%
Not Sure	23%	23%	24%	21%	23%	24%

Comments

Carpoolers were encouraged to offer additional comments; 75 comments were received in 1985 and 214 were received in 1986. These comments can generally be summarized as shown in Table 35.

Table 35: Additional Comments, Katy AVL Carpool Surveys

Comment	Percent of Total Comments	
	1985	1986
AVL is convenient and good improvement	23%	25%
Extend AVL to the west	16%	11%
AVL is underutilized	8%	8%
3-person carpools a good move	5%	2%
Reduce carpool passenger requirements	5%	16%
Poor AVL entrances/exits	5%	4%
Other	38%	34%



## NON AVL USERS, MOTORIST SURVEYS

Surveys were conducted of motorists using the Katy and North Freeway mainlanes during the a.m. AVL operating periods. As was the case with the other surveys discussed previously, the motorist surveys were designed to address 3 primary areas: 1) personal characteristics; 2) travel patterns and trip characteristics; and 3) attitudes and impacts pertaining to the AVLs.

### Personal Characteristics

Questions were asked to identify age, sex, occupation and last year of school completed. The responses to these questions are summarized in Table 36. Also summarized in Table 36 are data collected from previous motorist surveys conducted before the Katy and North AVLs were opened. In most instances the "before" and "after" data are similar.

#### Age

The median Katy Freeway motorist's age is 40; the median age of the North Freeway motorist is 36.

#### Sex

The majority of the Katy and North Freeway motorists are male.

#### Occupation

As was the case with AVL users, the majority of the motorists surveyed in 1985 and 1986 have occupations which are classified as either "professional" or "managerial."

Table 36: Personal Characteristics of Motorists on the Katy and North Freeway

Personal Characteristic	Before AVL <sup>1</sup>		After AVL	
	1981	1984	1985	1986
<b>Age</b>				
<u>Katy Freeway</u>	--	(n=81)	(n=445)	(n=726)
50th Percentile	--	32-41	40	40
<u>North Freeway</u>	(n=449)	(n=52)	--	(n=404)
50th Percentile	40	32-41	--	36
<b>Sex</b>				
<u>Katy Freeway</u>	--	(n=81)	(n=437)	(n=706)
Male	--	56%	64%	66%
Female	--	44%	36%	34%
<u>North Freeway</u>	(n=482)	(n=52)	--	(n=400)
Male	80%	56%	--	61%
Female	20%	44%	--	39%
<b>Occupation</b>				
<u>Katy Freeway</u>	--	(n=80)	(n=431)	(n=711)
Professional	--	39%	51%	42%
Managerial	--	29%	19%	26%
Sales	--	14%	12%	14%
Clerical	--	11%	9%	9%
Craftsman	--	3%	3%	1%
Service Worker	--	3%	2%	2%
Student	--	1%	2%	2%
Other	--	---	2%	4%
<u>North Freeway</u>	--	(n=51)	--	(n=392)
Professional	--	18%	--	38%
Managerial	--	10%	--	21%
Sales	--	0%	--	13%
Clerical	--	39%	--	15%
Craftsman	--	18%	--	3%
Service Worker	--	8%	--	3%
Student	--	2%	--	3%
Other	--	5%	--	4%
<b>Education (years)</b>				
<u>Katy Freeway</u>	--	(n=80)	(n=439)	(n=715)
Average	--	15.0	15.7	15.9
<u>North Freeway</u>	(n=444)	(n=52)	--	(n=397)
Average	15.4	14.5	--	14.8

<sup>1</sup>No priority treatment was available in the Katy Freeway Corridor at the time of the 1984 survey. A contraflow lane was available for authorized high-occupancy vehicles in the North Freeway Corridor during the 1981 and 1984 surveys.

## **Education**

Katy and North Freeway motorists are a well-educated group. On the average, Katy Freeway motorists have completed almost 4 years of college; North Freeway motorists have completed almost 3 years of college.

## **Travel Patterns and Trip Characteristics**

Questions were asked regarding the selection of the auto mode, trip purpose, trip frequency, vehicle occupancy, trip origin, trip destination employer incentives, and awareness of METRO services. Several of these questions are similar to questions asked in previous Katy and North Freeway motorist surveys. When possible, for comparative purposes, data from the previous surveys are also presented in this section.

### **Trip Purpose**

As was the case with the transit, vanpool and carpool surveys, virtually all of the peak period motorist trips are to work (Table 37).

### **Trip Frequency**

More than 80% of the trips surveyed occurred at least 5 days per week (Table 37).

### **Vehicle Occupancy**

On the Katy Freeway, peak-period vehicle occupancies (persons/vehicle) averaged 1.2 in both 1985 and 1986. On the North Freeway, vehicle occupancies also averaged 1.2 persons per vehicle (Table 37).

Table 37: Trip Purpose, Trip Frequency and Vehicle Occupancy, Katy and North Freeway Motorist Surveys

Trip Characteristic	1985	1986
<b>Trip Purpose</b>		
<u>Katy Freeway</u>	(n=451)	(n=741)
Work	94%	91%
School	3%	2%
Other	3%	7%
<u>North Freeway</u>	--	(n=425)
Work	--	90%
School	--	3%
Other	--	7%
<b>Trip Frequency (days/week)</b>		
<u>Katy Freeway</u>	(n=442)	(n=722)
1 or Less	5%	6%
2	4%	3%
3	3%	3%
4	4%	4%
5 or More	84%	84%
<u>North Freeway</u>	--	(n=415)
1 or Less	--	9%
2	--	2%
3	--	3%
4	--	3%
5 or More	--	83%
<b>Vehicle Occupancy (persons/vehicles)</b>		
<u>Katy Freeway</u>	(n=445)	(n=734)
1	83%	89%
2	12%	7%
3	3%	2%
4 or More	2%	2%
<u>North Freeway</u>	--	(n=420)
1	--	84%
2	--	13%
3	--	2%
4 or More	--	1%



## **Trip Origin**

Two questions were asked concerning trip origin. One asked for the home zip code, and the second asked for the freeway entrance ramp that was used in the a.m.

The 1985 Katy Freeway motorist survey was conducted at locations between Campbell and Voss. Because the Katy AVL had been extended prior to the 1986 survey, the 1986 Katy Freeway motorist survey was conducted at locations between Wilcrest and Dairy Ashford. The North Freeway motorist survey was conducted between Greens Road and FM 1960.

**Home Zip Codes.** Katy Freeway motorists surveyed listed 50 different home zip codes in 1985 and 42 different zip codes in 1986. The most commonly listed zip code in both 1985 and 1986 was 77079 (Table 38, Figure 23) with 20% of the 1985 motorists and 35% of the 1986 motorists indicating trip origins from this zip code.

Sixty-five different zip codes were listed by North Freeway motorists. The most frequently listed North Freeway area zip codes were 77090 and 77067 (Table 38, Figure 24).

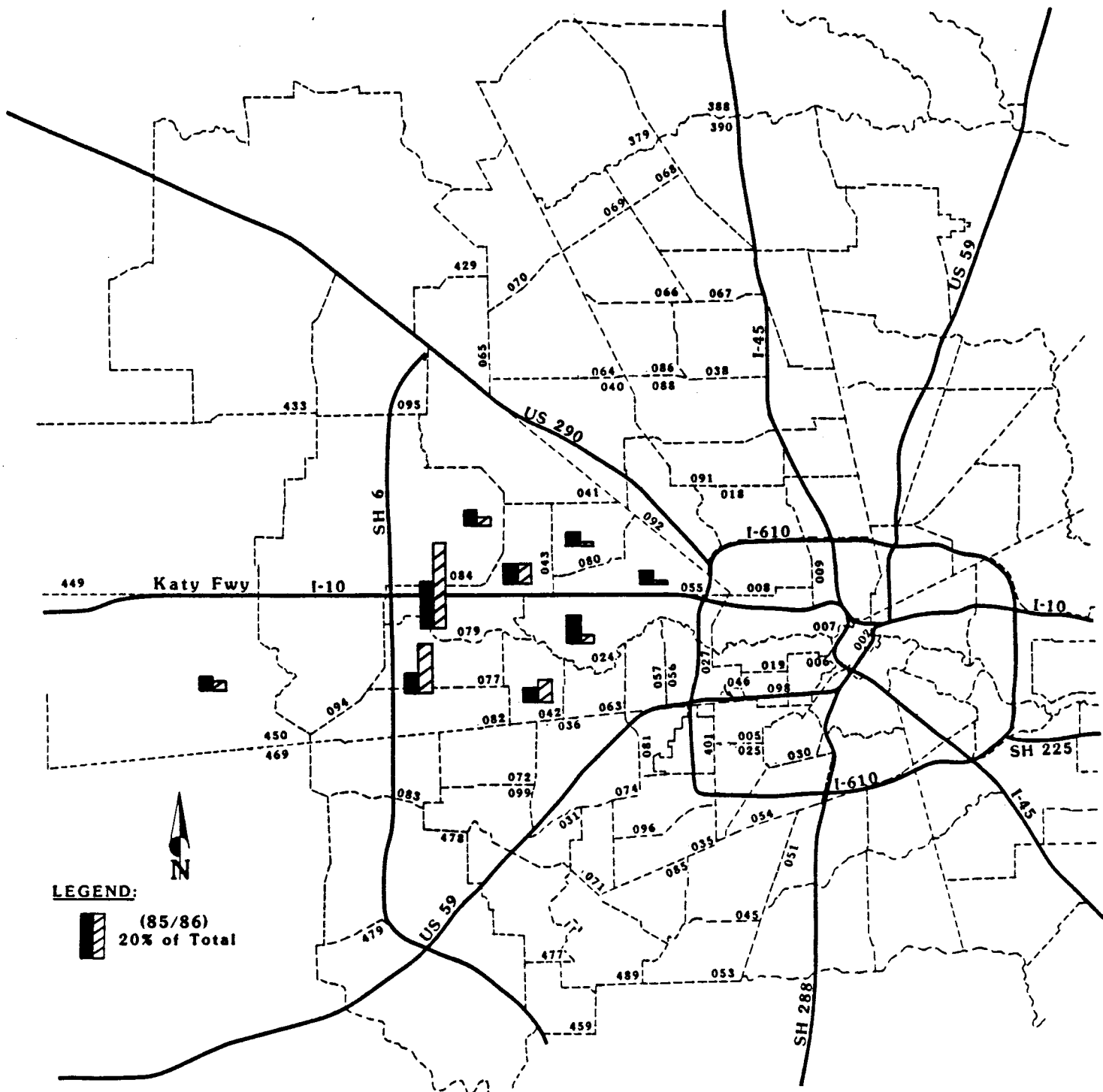
**Freeway Entrance Ramp.** The most common entrance ramps used to access the Katy Freeway were Gessner and Wilcrest in 1985 and Wilcrest, Dairy Ashford and West Belt in 1986 (Table 38). The most common entrance ramps to the North Freeway were FM 1960, FM 149 and Greens Road.

## **Reasons for Choosing the Auto Mode**

The reasons most often given for using an auto in the mixed-flow lanes rather than a high-occupancy vehicle in the Katy/North AVL were: 1) need car for job; 2) convenience and flexibility of an auto; 3) no bus available; 4) work odd hours; and 5) no van available. Of those surveyed in 1985 and 1986, over 95% either drive alone or carpool on a regular basis.

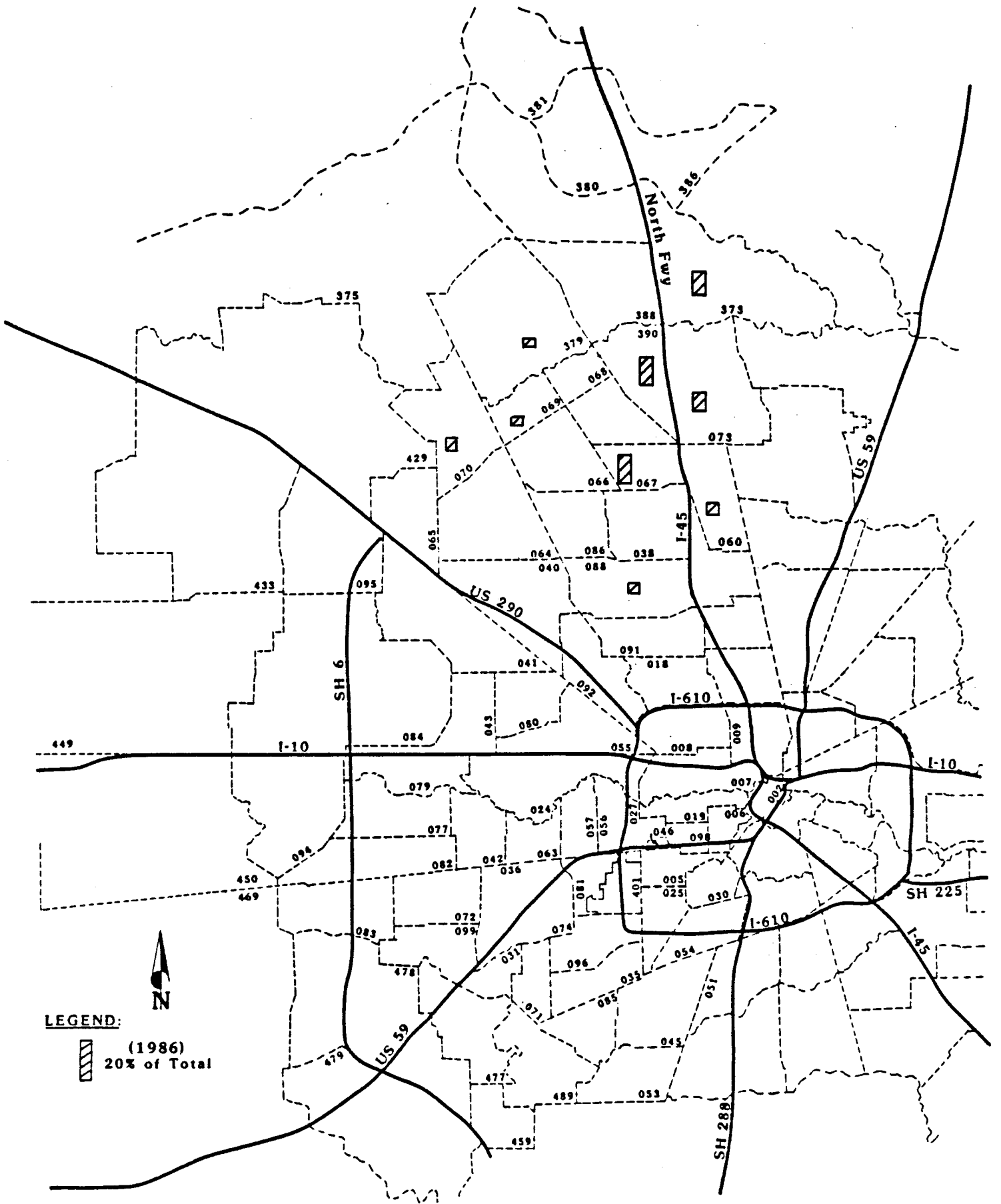
Table 38: Characteristics of Trip Origins, Katy and North Freeway Motorist Surveys


Trip Origin Characteristic	1985	1986
<b>Home Zip Code</b>		
<u>Katy Freeway</u>	(n=444)	(n=729)
77079	20%	35%
77024	12%	3%
77043	9%	9%
77077	7%	21%
77080	7%	1%
77084	6%	3%
77042	6%	9%
77055	5%	1%
77450	5%	3%
Other	23%	15%
<u>North Freeway</u>	---	(n=407)
77090	---	14%
77067	---	13%
77373	---	10%
77073	---	8%
77088	---	5%
77060	---	5%
77070	---	5%
77379	---	3%
77069	---	3%
Other	---	34%
<b>Freeway Entrance Ramp (a.m.)</b>		
<u>Katy Freeway</u>	(n=438)	(n=726)
Gessner	13%	2%
Wilcrest	12%	40%
Blalock	10%	1%
West Belt	9%	15%
Dairy Ashford	9%	20%
Bunker Hill	9%	1%
SH 6	8%	4%
Kirkwood	8%	5%
Fry Road	6%	3%
Mason	4%	1%
Barker-Cypress	3%	1%
Other	9%	7%
<u>North Freeway</u>	---	(n=406)
FM 1960	---	32%
FM 149	---	21%
Greens Road	---	16%
Kuykendahl	---	5%
North Belt	---	4%
West Road	---	3%
FM 2920	---	3%
Hidden Valley	---	3%
Other	---	13%



NOTE: All Zip Codes Begin with 77.

Figure 23: Home Origins of Katy Freeway Motorists



**LEGEND:**  
 (1986)  
 20% of Total

**NOTE:** All Zip Codes Begin with 77.

Figure 24: Home Origins of North Freeway Motorists

Between 69% and 75% of the current Katy and North Freeway motorists stated their job requires an auto either "always" or "sometimes."

These responses are summarized in Table 39.

### Trip Destination

While the downtown was the predominant destination for AVL users, less than 40% of the motorists surveyed on the Katy and North Freeway locations are destined to downtown (Table 40). A significant number of trips are also destined to the Galleria, Greenway Plaza, and the Texas Medical Center.

Table 40: Trip Destination of Motorists, Katy and North Freeway Motorist Surveys

Destination	Before AVL	After AVL	
	1981	1985	1986
<u>Katy Freeway</u>		(n=302)	(n=728)
Downtown	---	38%	33%
Galleria	---	24%	10%
Greenway Plaza	---	8%	4%
Medical Center	---	9%	3%
Other	---	21%	50%
<u>North Freeway</u>	(n=482)	---	(n=421)
Downtown	26%	---	31%
Galleria	9%	---	37%
Greenway Plaza	2%	---	4%
Medical Center	0%	---	4%
Other	63%	---	54%

### Employer Incentives

Several questions were asked to determine what types of incentives employers provided which might influence the selection of a particular travel mode. These questions centered around the employer's contribution toward parking, bus fare, and vanpooling costs. Responses to these questions are summarized in Table 41.

Table 39: Reasons for Selecting the Auto Travel Mode,  
Katy and North Freeway Motorist Surveys

Travel Mode Characteristic	Before AVLs		After AVLs	
	1981	1984	1985	1986
<b>Why Did You Choose Auto<sup>1</sup></b>				
<u>Katy Freeway</u>	----	----	(n=564)	(n=838)
Need Car for Job	----	----	22%	25%
Convenience and Flexibility	----	----	17%	26%
No Bus Available	----	----	15%	15%
Work Odd Hours	----	----	10%	10%
No Vanpool Available	----	----	7%	6%
Don't Work in CBD	----	----	6%	3%
Car Is Faster	----	----	3%	2%
Other	----	----	20%	13%
<u>North Freeway</u>	----	----	----	(n=498)
Need Car for Job	----	----	----	15%
Convenience and Flexibility	----	----	----	16%
No Bus Available	----	----	----	13%
Work Odd Hours	----	----	----	9%
No Vanpool Available	----	----	----	7%
Don't Work in CBD	----	----	----	7%
Car Is Faster	----	----	----	2%
Other	----	----	----	31%
<b>How Do You Usually Make This Trip</b>				
<u>Katy Freeway</u>	----	(n=81)	(n=445)	(n=738)
Drive Alone	----	83%	88%	90%
Carpool	----	10%	8%	6%
Vanpool	----	6%	1%	1%
Other	----	1%	3%	3%
<u>North Freeway</u>	(n=482)	(n=52)	----	(n=423)
Drive Alone	56%	58%	----	87%
Carpool	15%	27%	----	8%
Vanpool	11%	9%	----	1%
Other	18%	6%	----	4%
<b>Does Your Job Require a Car</b>				
<u>Katy Freeway</u>	----	(n=81)	(n=441)	(n=714)
Yes, Always	----	56%	37%	36%
Yes, Sometimes	----	1%	37%	39%
No,	----	43%	26%	25%
<u>North Freeway</u>	(n=482)	(n=52)	----	(n=403)
Yes, Always	47%	36%	----	36%
Yes, Sometimes	15%	2%	----	32%
No	38%	62%	----	32%

<sup>1</sup> Respondents were able to give more than one reason. Thus, "n" refers to the number of reasons given, not the number surveys completed.

Table 41: Employer Incentives for Mode Choice,  
Katy and North Freeway Motorist Surveys

Employer Incentive	Before AVLs		After AVLs	
	1981	1984	1985	1986
<b>Pays All or Part of Parking Expense</b>				
<u>Katy Freeway</u>	----	(n=81)	(n=414)	(n=693)
Yes, Pays All	----	48%	46%	39%
Yes, Pays Part	----	9%	8%	8%
No	----	43%	46%	53%
<u>North Freeway</u>	(n=482)	(n=52)	----	(n=384)
Yes, Pays All	38%	35%	----	39%
Yes, Pays Part	14%	11%	----	7%
No	48%	54%	----	54%
<b>Pays All or Part of Bus Fare</b>				
<u>Katy Freeway</u>	----	(n=81)	(n=415)	(n=673)
Yes, Pays All	----	11%	2%	5%
Yes, Pays Part	----	9%	3%	5%
No	----	71%	87%	82%
Don't Know	----	9%	8%	8%
<u>North Freeway</u>	----	(n=52)	----	(n=368)
Yes, Pays All	----	25%	----	3%
Yes, Pays Part	----	13%	----	9%
No	----	50%	----	83%
Don't Know	----	12%	----	5%
<b>Pays All or Part of Van Cost</b>				
<u>Katy Freeway</u>	----	----	(n=411)	(n=636)
Yes, Pays All	----	----	2%	3%
Yes, Pays Part	----	----	7%	6%
No	----	----	83%	80%
Don't Know	----	----	8%	11%
<b>Any Special Carpool Incentives</b>				
<u>Katy Freeway</u>	----	----	(n=420)	(n=655)
Yes	----	----	11%	11%
No	----	----	89%	89%
<u>North Freeway</u>	----	----	----	(n=385)
Yes	----	----	----	10%
No	----	----	----	90%

In general, a sizable percentage (39%) of the current Katy and North Freeway motorists surveyed have all of their parking costs paid by the employer. Conversely, at least 80% do not receive any employer contribution toward the cost of bus or vanpool fares and 90% stated that their employer offers no incentives to carpool. Of those who said their employer did provide incentives to carpool, the principal incentives were: 1) special parking; 2) carpool matching and 3) minor subsidy.

Thus, even after the implementation of the AVLS, most motorists perceive their employer is providing an incentive to drive their car by paying at least part of the parking cost. Almost all motorists claim their employer is not providing any incentives to switch any type of ridesharing mode.

### **Awareness of METRO Services**

Katy and North Freeway motorists were also asked if they were aware of the special services provided by METRO to encourage ridesharing. Between 68% and 79% of the respondents had heard of METRO CarShare; of those that had heard of the program, only 2% - 6% had used it (Table 42).

More than 90% of the current Katy and North Freeway motorists are familiar with the park-and-ride service provided by METRO in their area. Of that percentage, only 8% of the Katy Freeway motorists have used park-and-ride, whereas 22% of the North Freeway motorists have used the service.

### **Attitudes and Impacts Pertaining to the AVLS**

A final set of survey questions were designed to identify attitudes toward, and impacts associated with, the AVLS.



Table 42: Awareness and Use of METRO Services,  
Katy and North Freeway Motorist Surveys

Awareness and Use of METRO Services	Before AVLs		After AVLs	
	1981	1984	1985	1986
<b>Familiar with CarShare</b>				
<u>Katy Freeway</u>	----	----	(n=440)	(n=721)
Yes	----	----	68%	72%
No	----	----	32%	28%
<u>North Freeway</u>	----	----	----	(n=404)
Yes	----	----	----	79%
No	----	----	----	21%
<b>Used CarShare Services</b>				
<u>Katy Freeway</u>	----	----	(n=292)	(n=504)
Yes	----	----	5%	2%
No	----	----	95%	98%
<u>North Freeway</u>	----	----	----	(n=313)
Yes	----	----	----	6%
No	----	----	----	94%
<b>Familiar with Park-and-Ride</b>				
<u>Katy Freeway</u>	----	(n=68)	(n=437)	(n=722)
Yes	----	92%	84%	93%
No	----	8%	16%	7%
<u>North Freeway</u>	(n=482)	(n=52)	----	(n=404)
Yes	91%	83%	----	93%
No	9%	17%	----	7%
<b>Used Park-and-Ride</b>				
<u>Katy Freeway</u>	----	(n=82)	(n=363)	(n=630)
Yes	----	17%	7%	8%
No	----	83%	93%	92%
<u>North Freeway</u>	(n=482)	(n=52)	----	(n=370)
Yes	28%	19%	----	22%
No	72%	81%	----	78%

### Are the AVLs Sufficiently Utilized

The perception of whether or not the AVLs are sufficiently utilized is a major concern of both the SDHPT and METRO. This is particularly true of the Katy AVL since fewer than 150 vehicles per peak period typically used the lane during its first 6 months of operation. (Approximately 460 vehicles were using the North AVL at the time it replaced the contraflow lane). In fact, one of the major reasons for allowing carpools to use the Katy AVL is to increase the public's perception of AVL utilization.

Katy and North Freeway motorists were asked whether, in terms of both person movement and vehicle movement, they felt the AVL was sufficiently utilized. On the Katy Freeway, the responses were overwhelmingly negative -- both before and after carpools were allowed (no carpools were present on the AVL at the time of 1985 survey; approximately 100 carpools typically used the lane at the time of the 1986 survey). Although the responses from the North Freeway motorists were more favorable, 57% still thought the North AVL was underutilized.

Motorists were also asked if they felt the Katy/North AVL was a good transportation improvement. In 1985, most (but not a majority of) motorists replied "yes." In 1986, however, (after carpools were added to the lane) most replied "no." On the North Freeway, more than 60% of the motorists felt the North AVL was a good transportation improvement.

These responses are summarized in Table 43.

### Modal Use of the Katy AVL

Because carpools are allowed on the Katy AVL and because METRO and the SDHPT were considering lowering the passenger requirements for eligible carpools, the Katy Freeway motorist survey contained an additional series of questions which dealt with attitudes toward the types and occupancy of vehicles which should be allowed to use the Katy AVL.

Table 43: Perceptions of Utilization and Desirability of  
 AVL Improvement, Katy and North Freeway Motorist  
 Surveys

Measure of Effectiveness or Success	1985	1986
<b>In Terms of Vehicles, Is the AVL Sufficiently Utilized</b>	(n=451)	(n=742)
<u>Katy Freeway</u>		
Yes	3%	3%
No	90%	92%
Not Sure	7%	5%
<u>North Freeway</u>	----	(n=418)
Yes	----	26%
No	----	56%
Not Sure	----	18%
<b>In Terms of Persons Moved, Is the AVL Sufficiently Utilized</b>		
<u>Katy Freeway</u>	(n=451)	(n=741)
Yes	4%	4%
No	85%	86%
Not Sure	11%	10%
<u>North Freeway</u>	----	(n=422)
Yes	----	23%
No	----	57%
Not Sure	----	20%
<b>Is the AVL a Good Transportation Improvement</b>		
<u>Katy Freeway</u>	(n=441)	(n=733)
Yes	41%	36%
No	35%	43%
Not Sure	24%	21%
<u>North Freeway</u>	----	(n=417)
Yes	----	62%
No	----	20%
Not Sure	----	18%

In 1985, almost all motorists felt that buses, vanpools and 4+ carpools should be allowed to use the AVL. In 1986, almost all motorists felt that 3+ carpools should also be allowed and almost 70% felt that 2+ carpools should be able to travel on the Katy AVL (Table 44). These findings are consistent with the previous findings where the majority Katy freeway motorists felt the Katy AVL was underutilized.

Table 44: Attitudes Concerning the Vehicles Allowed on the Katy AVL, Katy Freeway Motorist Surveys

Attitude	1985	1986
Buses should be allowed to use Katy AVL	(n=449)	(n=736)
Agree	97%	97%
Disagree	2%	2%
Neutral	1%	1%
Vanpools should be allowed to use Katy AVL	(n=450)	(n=736)
Agree	96%	97%
Disagree	3%	2%
Neutral	1%	1%
4+ Carpools should be allowed to use Katy AVL	(n=451)	----
Agree	88%	----
Disagree	7%	----
Neutral	5%	----
3+ Carpools should be allowed to use Katy AVL	----	(n=731)
Agree	----	93%
Disagree	----	4%
Neutral	----	3%
2+ Carpools should be allowed to use Katy AVL	----	(n=723)
Agree	----	68%
Disagree	----	17%
Neutral	----	15%

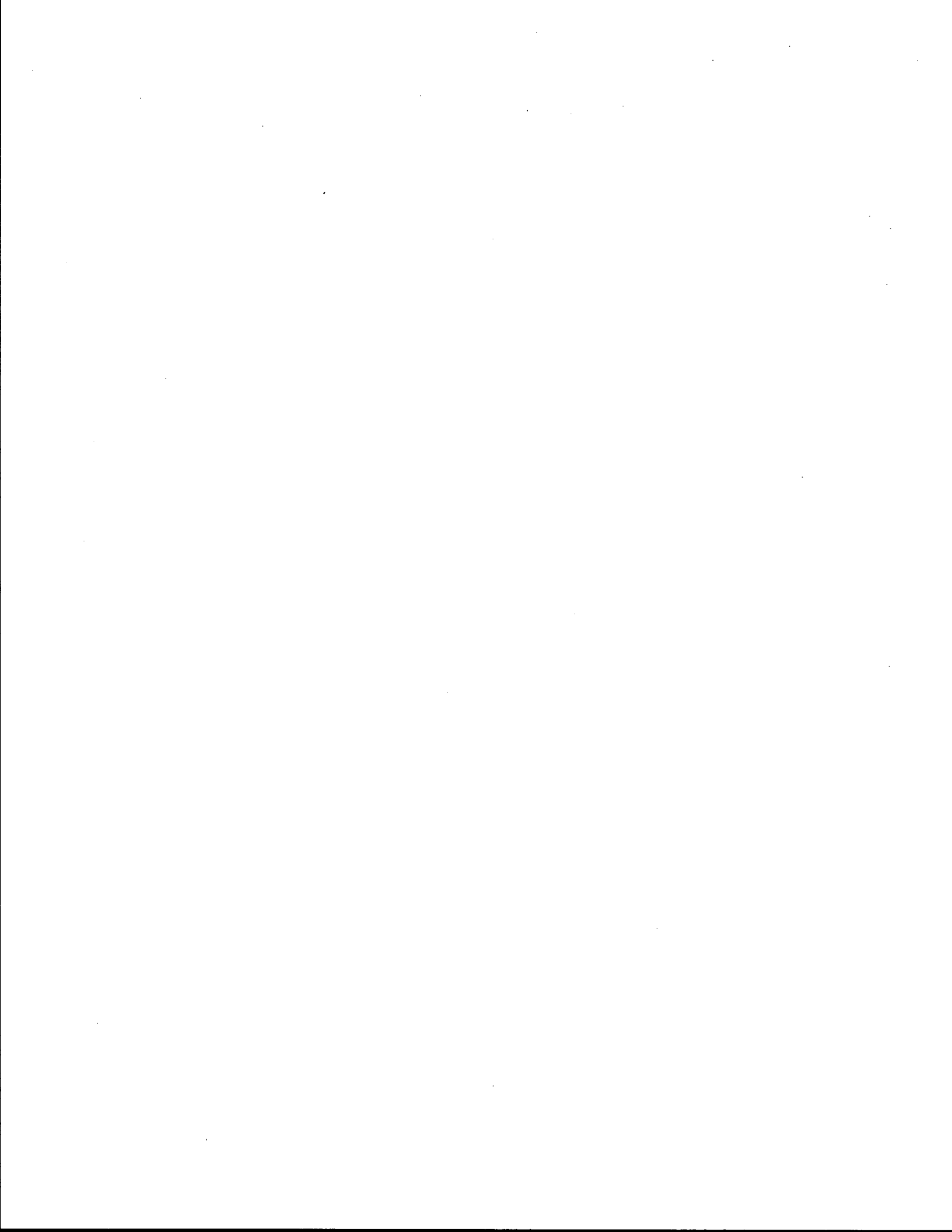
### Comments

Katy and North Freeway motorists were encouraged to offer additional comments. Katy Freeway motorists responded with more than 460 comments in 1985 and more than 375 in 1986. North Freeway motorists listed more than 375 comments in 1986. The motorists' comments are summarized in Table 45.

Table 45: Additional Comments, Katy and North Freeway Motorist Surveys

Comment	Percent of Total Comments	
	1985	1986
<u>Katy Freeway</u>		
AVL is a waste of money	14%	13%
AVL is underutilized	12%	20%
Open the AVL to All	8%	6%
Allow carpools on the AVL	7%	5% *
Ban trucks on I-10	5%	4%
AVL is a good idea	5%	6%
Need more freeway lanes	4%	10%
Extend the AVL	3%	1%
Advertise the AVL	3%	2%
Provide more bus routes	3%	3%
Congestion is no better	3%	5%
Other	33%	25%
<u>North Freeway</u>		
AVL is a waste of money	---	3%
AVL is underutilized	---	6%
Open the AVL to All	---	6%
Allow carpools on the AVL	---	10%
Ban trucks on I-45	---	2%
AVL is a good idea	---	11%
Need more freeway lanes	---	5%
Extend/expand the AVL	---	1%
Need a rail system	---	4%
Provide more bus routes	---	3%
Congestion is no better	---	5%
Must drive - only way available	---	8%
Park-and-Ride is great if you can use it	---	10%
Reconstruction is a mess	---	8%
Other	---	18%

\* Allow 2+ carpools on AVL



## COMPARISON OF MOST RECENT SURVEY FINDINGS

The preceding 4 sections of this report present considerable data derived from the surveys of transit users, vanpoolers, carpoolers and motorists on the Katy and North Freeways. Those data are cross classified in a variety of manners.

For purposes of this study, perhaps the most important are recent (1986) data that relate to choice of commuting mode and perceptions of the authorized vehicle lanes.

### Personal and Trip Characteristics of AVL Users and Non Users

In several respects, the characteristics of the current AVL users and nonusers are similar (Tables 46 and 47). Occupation, education, trip purpose and trip frequency all exhibit similarities. The transit users on the AVLs are somewhat younger and consist of a greater percent of females.

The AVL users and nonusers have, to a significant extent, similar trip origins (home zip codes). However, trip destinations indicate a possible reason why more trips aren't being served on the AVL.

During the peak period, less than half of the total trips (AVL user and nonuser) are destined to downtown Houston. Yet, essentially all bus service caters to downtown trips. Vanpools and carpools demonstrate more capability to serve trips to destinations other than the downtown.

### Mode Choice Considerations

In looking at previous travel modes (Table 48) of the bus patrons and vanpoolers in the Katy and North Freeway corridors, the largest percentage previously drove alone.

Table 46: Personal Characteristics of Users and Nonusers of the Katy and North AVLs

Characteristic	AVL Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
<b>Age (years)</b>				
<u>Katy Freeway</u>	(n=568)	(n=442)	(n=193)	(n=726)
50th Percentile	32	37	40	40
<u>North Freeway</u>	(n=1226)	(n=1532)	----	(n=404)
50th Percentile	34	39	----	36
<b>Sex</b>				
<u>Katy Freeway</u>	(n=565)	(n=420)	(n=192)	(n=706)
Male	44%	51%	62%	66%
Female	56%	49%	38%	34%
<u>North Freeway</u>	(n=1203)	(n=1538)	----	(n=408)
Male	44%	55%	----	61%
Female	56%	45%	----	39%
<b>Education (years)</b>				
<u>Katy Freeway</u>	(n=570)	(n=451)	(n=194)	(n=715)
Average	15.4	15.3	15.3	15.9
<u>North Freeway</u>	(n=1214)	(n=1523)	----	(n=397)
Average	14.9	15.0	----	14.8
<b>Occupation</b>				
<u>Katy Freeway</u>	(n=550)	(n=417)	(n=192)	(n=711)
Professional	46%	58%	45%	42%
Managerial	20%	14%	23%	26%
Clerical	26%	23%	15%	9%
Sales	4%	3%	6%	14%
Other	4%	2%	11%	9%
<u>North Freeway</u>	(n=1190)	(n=1512)	----	(n=392)
Professional	38%	45%	----	38%
Managerial	23%	24%	----	21%
Clerical	30%	23%	----	15%
Sales	3%	7%	----	13%
Other	6%	1%	----	13%



Table 47: Trip Characteristics of Users and Nonusers of the Katy and North AVLs

Trip Characteristic	AVL Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
<b>Trip Purpose</b>				
<u>Katy Freeway</u>	(n=580)	(n=59)	(n=65)	(n=741)
% Work	97%	100% *	100% *	91%
<u>North Freeway</u>	(n=1256)	(n=202)	----	(n=425)
% Work	99%	100% *	----	90%
<b>Trip Frequency (days/wk)</b>				
<u>Katy Freeway</u>	(n=579)	(n=59)	(n=65)	(n=722)
5 or more	89%	100%	97%	84%
<u>North Freeway</u>	(n=1251)	(n=202)	----	(n=415)
5 or more	95%	100%	----	83%
<b>Trip Destination</b>				
<u>Katy Freeway</u>	(n=575)	(n=58)	(n=65)	(n=728)
Downtown	95%	60%	49%	33%
Galleria	0%	12%	15%	10%
Texas Medical Center	1%	7%	3%	3%
Greenway Plaza	0%	5%	----	4%
Other	4%	16%	33%	50%
<u>North Freeway</u>	(n=1252)	(n=199)	----	(n=425)
Downtown	94%	61%	----	31%
Galleria	1%	7%	----	7%
Texas Medical Center	1%	8%	----	4%
Greenway Plaza	2%	4%	----	4%
Other	2%	20%	----	54%

\* Assumed

Table 48: Previous Travel Mode and Reasons for Selecting Current Travel Mode

Reason/Characteristic	AVL Users			Non-AVL Users
	Transit	Vanpool	Carpool	Motorists
<b>Previous Travel Mode</b>				
<u>Katy Freeway</u>	(n=573)	(n=433)	(n=191)	----
Drove Alone	35%	36%	46%	----
Carpooled	5%	17%	18%	----
Vanpooled	6%	12%	4%	----
Park-and-Ride Bus	18%	8%	} 8%	----
Regular Route Bus	16%	7%		----
Didn't Make Trip	18%	19%	18%	----
Other	2%	1%	6%	----
<u>North Freeway</u>	(n=1240)	(n=1622)	----	----
Drove Alone	35%	30%	----	----
Carpooled	10%	21%	----	----
Vanpooled	7%	12%	----	----
Park-and-Ride Bus	18%	12%	----	----
Regular Route Bus	4%	2%	----	----
Didn't Make Trip	25%	21%	----	----
Other	1%	2%	----	----
<b>Primary Reasons for Selecting Current Travel Mode</b>				
<u>Katy Freeway</u>	(n=1945)	(n=1656)	(n=969)	(n=838)
Freeway Traffic	20%	19%	25%	----
Save Time	16%	20%	26%	2%
Time to Relax	18%	14%	7%	----
Reliable Travel Schedule	14%	12%	10%	----
Cost	14%	14%	10%	----
Dislike Driving	11%	9%	---	----
Need Car for Job	---	---	---	25%
Convenience/Flexibility	---	---	---	26%
No Bus or Van Available	---	---	---	21%
<u>North Freeway</u>	(n=4407)	(n=7036)	---	(n=498)
Freeway Traffic	23%	20%	---	---
Save Time	20%	20%	---	2%
Time to Relax	15%	13%	---	---
Reliable Travel Schedule	15%	13%	---	---
Cost	12%	15%	---	---
Dislike Driving	10%	8%	---	---
Need Car for Job	---	---	---	15%
Convenience/Flexibility	---	---	---	16%
No Bus or Van Available	---	---	---	20%
<b>% Having at Least Part of Bus Fare, Vanpool Cost, Carpool Cost, or Parking Cost Paid by Employer</b>				
<u>Katy Freeway</u>	(n=574)	(n=425)	(n=129)	(n=693)
Percent	56%	39%	19%	47%
<u>North Freeway</u>	(n=1247)	(n=1623)	---	(n=384)
Percent	63%	39%	---	46%

In the Katy Freeway corridor, the park-and-ride and express bus service had attracted 11% of its ridership from carpools or vanpools. The vanpools had attracted 15% of their ridership from buses and 17% from carpools. The carpools attracted 8% of their ridership from buses and 4% from vanpools.

In the North Freeway corridor, transit service had attracted 17% of its ridership from carpools or vanpools. The vanpools had attracted 14% of their members from transit and 21% from carpools.

Most commuters (except Katy AVL carpoolers) receive some sort of monetary incentive from their employer for using the mode. The employer generally pays all or part of the cost of a bus pass, van operations, or downtown parking. Not too surprisingly, the primary reasons AVL users chose an AVL mode of travel was: 1) avoid freeway traffic/driving; 2) save time; 3) time to relax; and 4) reliable travel schedule. Motorists traveling in the mixed-flow freeway lanes chose to do so because of: 1) the convenience/flexibility; 2) the need of a car for work; and 3) no bus or van available to their destination.

### **Impacts of the AVLs on Mode Choice**

The Katy and North AVLs appear to had at least some effect on mode choice (Table 49). While sizable percentages of AVL users indicated that they would be using their current mode even if there were no AVL, between 12% and 26% of the Katy AVL users and between 27% and 41% of the North AVL users said they would not. Thus, it would appear that the AVLs have encouraged at least some individuals to switch travel modes. Furthermore, 16% to 36% of the Katy AVL users and 68% to 76% of the North AVL users stated that the AVL was "very important" in their decision to use their current mode.

In the Katy Freeway corridor, the park-and-ride and express bus service had attracted 11% of its ridership from carpools or vanpools. The vanpools had attracted 15% of their ridership from buses and 17% from carpools. The carpools attracted 8% of their ridership from buses and 4% from vanpools.

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### Impacts of the AVLs on Mode Choice

The Katy and North AVLs appear to have had at least some effect on mode choice (Table 49). While sizable percentages of AVL users indicated that they would be using their current mode even if there were no AVL, between 12% and 26% of the Katy AVL users and between 27% and 41% of the North AVL users said they would not. Thus, it would appear that the AVLs have encouraged at least some individuals to switch travel modes. Furthermore, 16% to 36% of the Katy AVL users and 68% to 76% of the North AVL users stated that the AVL was "very important" in their decision to use their current mode.

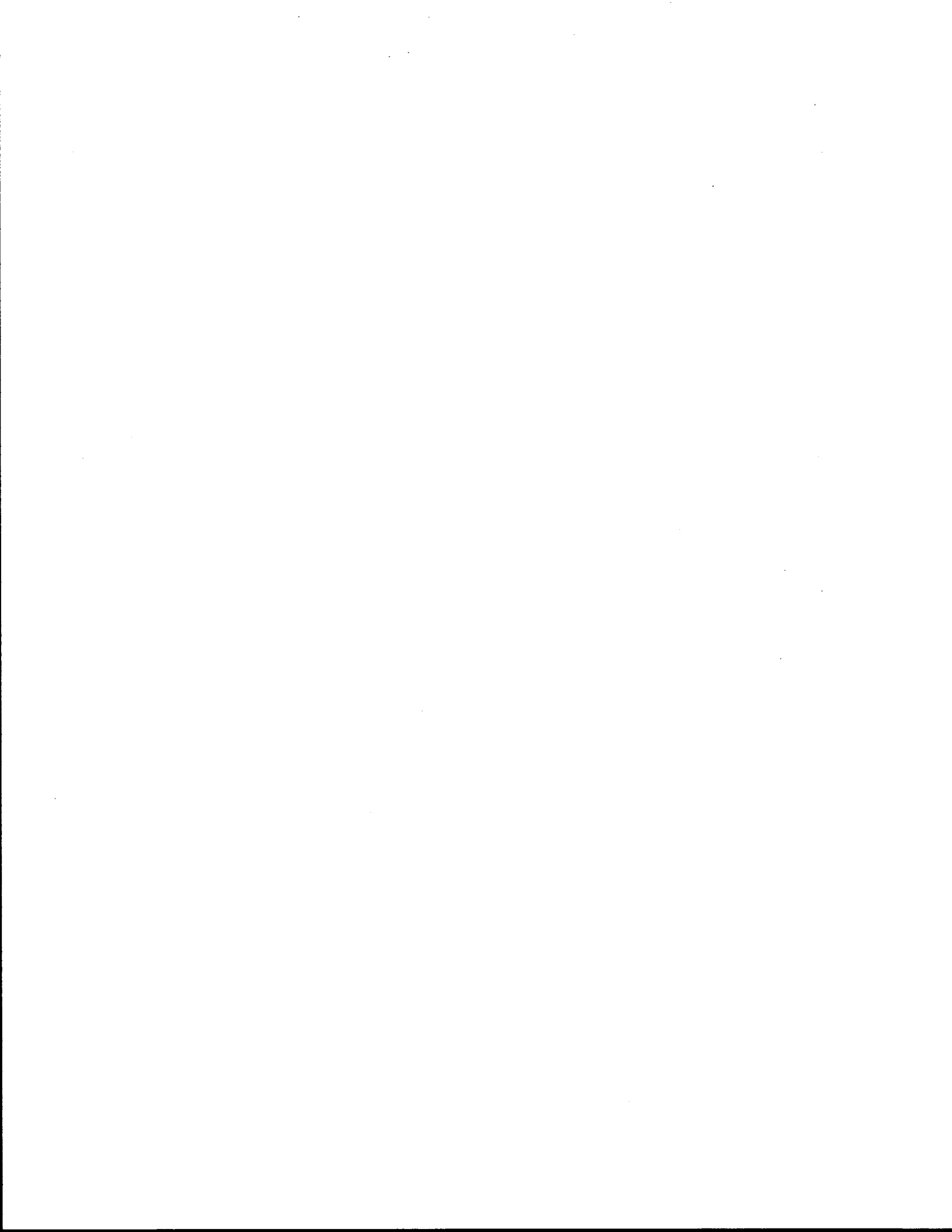
Table 49: Impact of AVLs on Mode Choice

Impact	AVL Users		
	Transit	Vanpool	Carpool
<b>How Important is the AVL in Your Decision to Use Bus, Vanpool or Carpool</b>			
<u>Katy Freeway</u>	(n=573)	(n=435)	(n=197)
Very Important	57%	41%	56%
Somewhat Important	27%	20%	8%
Not Important	16%	39%	36%
<u>North Freeway</u>	(n=1250)	(n=1618)	----
Very Important	76%	68%	----
Somewhat Important	17%	18%	----
Not Important	7%	14%	----
<b>Would You Ride in Bus, Vanpool or Carpool if There Was No AVL</b>			
<u>Katy Freeway</u>	(n=575)	(n=436)	(n=197)
Yes	43%	72%	59%
No	26%	12%	25%
Not Sure	31%	16%	16%
<u>North Freeway</u>	(n=1247)	(n=1632)	----
Yes	23%	43%	----
No	41%	27%	----
Not Sure	36%	30%	----

**Perceptions of AVL Utilization**

At least 80% of all North AVL users but only 26% of the nonusers felt the AVL was sufficiently utilized to justify the project (Table 50).

In 1985 (before carpools were allowed on the Katy AVL), 30% of the AVL vanpoolers and 49% of the AVL transit users felt the Katy AVL was sufficiently utilized to justify the project, whereas 90% of the non AVL motorists felt it was not sufficiently utilized. In 1986 (after carpools



were introduced), between 41% and 66% of the AVL users felt the Katy AVL was sufficiently utilized, yet 92% of the non AVL motorists still felt it was not (Table 50).

Table 50: Perceptions of AVL Utilization

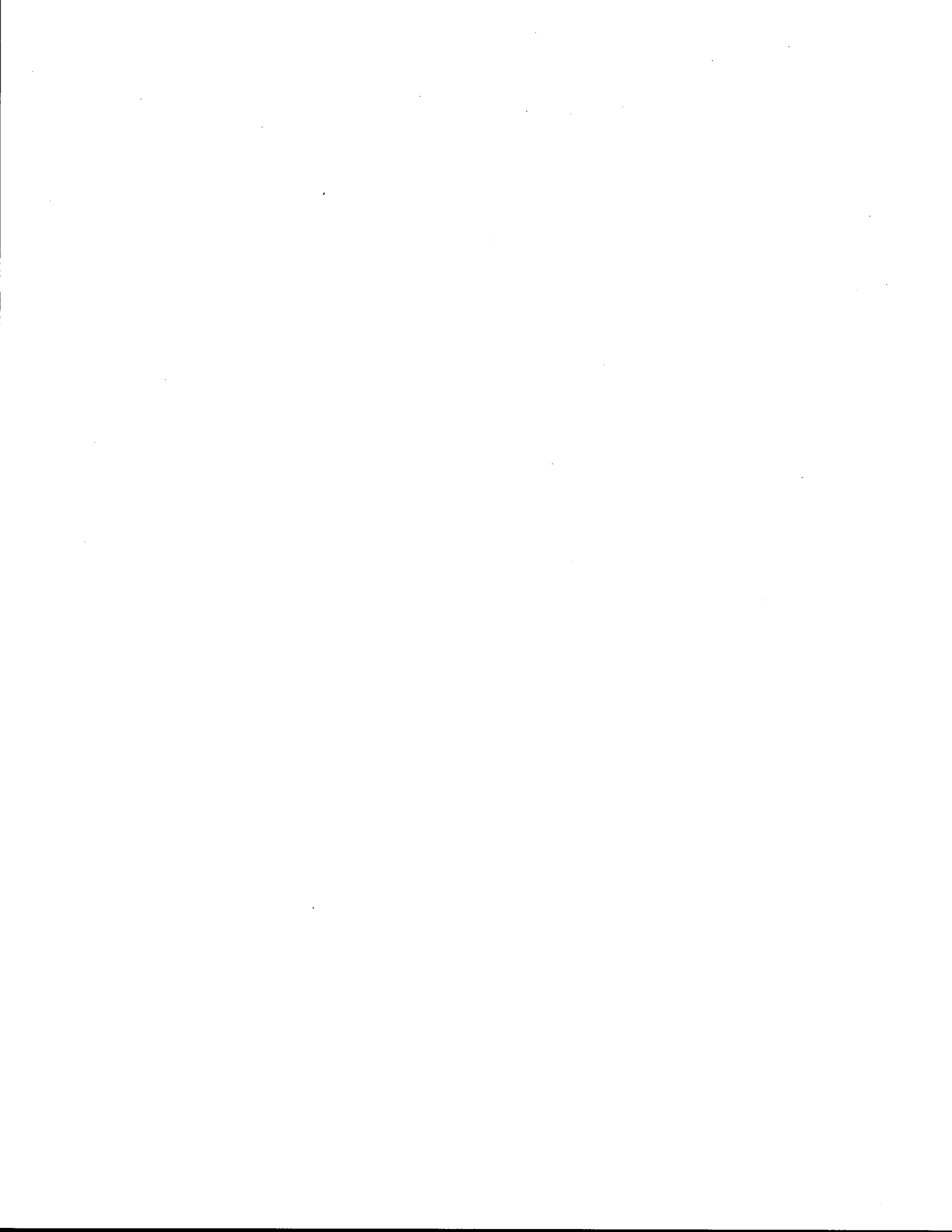
Measure of Effectiveness	AVL Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
<b>Is the AVL Sufficiently Utilized</b>				
<u>Katy Freeway</u>	(n=567)	(n=429)	(n=193)	(n=742)
Yes	66%	41%	45%	3%
No	14%	34%	32%	92%
Not Sure	20%	25%	23%	5%
<u>North Freeway</u>	(n=1129)	(n=1616)	----	(n=418)
Yes	81%	84%	----	26%
No	6%	7%	----	56%
Not Sure	13%	9%	----	18%
<b>Is the AVL a Good Improvement</b>				
<u>Katy Freeway</u>	----	----	----	(n=733)
Yes	----	----	----	36%
No	----	----	----	43%
Not Sure	----	----	----	21%
<u>North Freeway</u>	----	----	----	(n=417)
Yes	----	----	----	62%
No	----	----	----	20%
Not Sure	----	----	----	18%

Thus, it appears that most of those individuals who are using and benefitting from the AVLs perceive they are sufficiently utilized, while those who are not able to take advantage of AVLs generally perceive they are underutilized. It is interesting to note, however, that while 92% of the Katy Freeway motorists and 57% of the North Freeway motorists felt the AVL was underutilized, 36% of the Katy motorists and 62% of the North motorists felt the AVL was a good transportation improvement (Table 50).



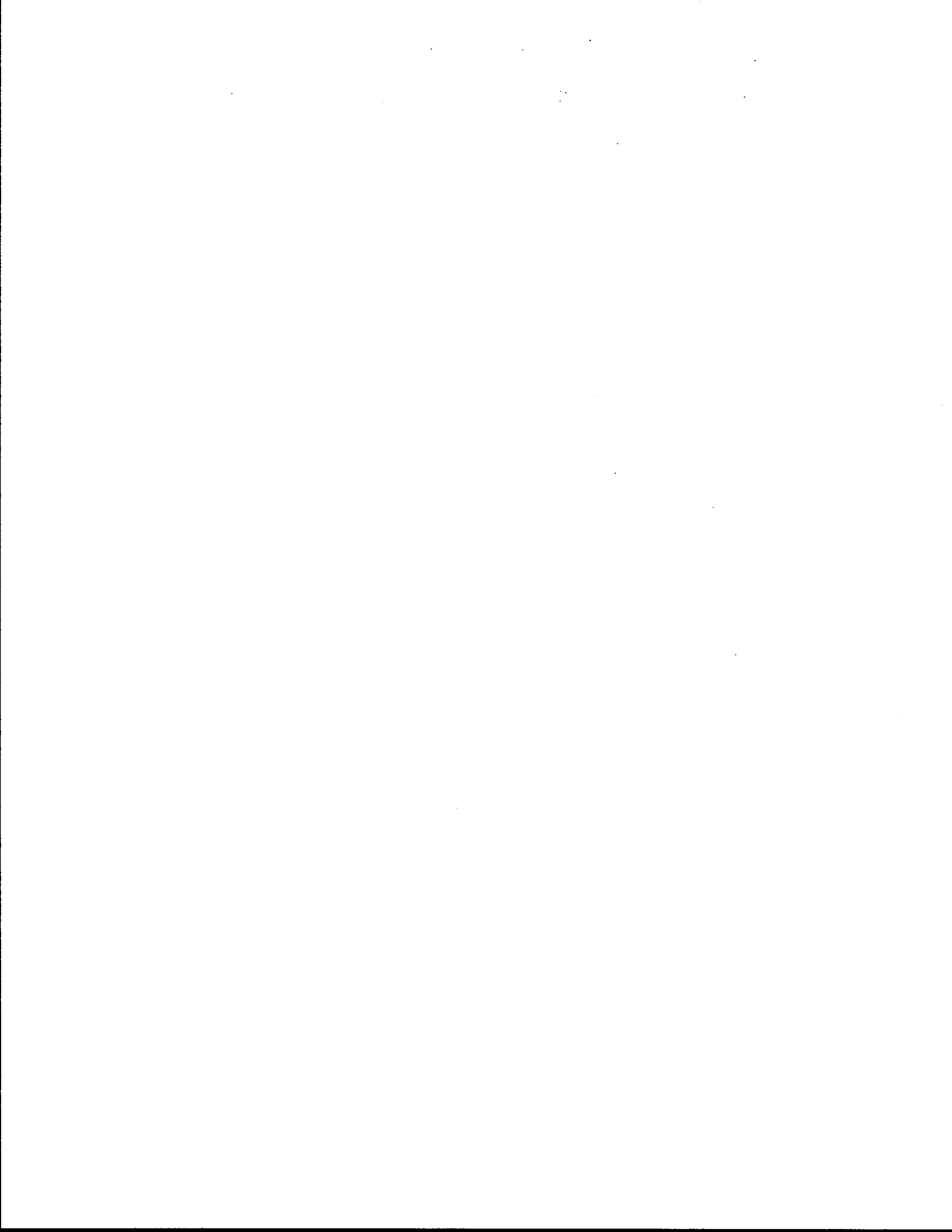


**APPENDIX**



## APPENDIX

Presented in this appendix are examples of the survey instruments and cover letters used in the surveys of Katy and North AVL users and nonusers.



# Katy Authorized Vehicle Lane (AVL) Transit User Survey

This survey is being conducted by Texas Transportation Institute, the State Department of Highways and Public Transportation and METRO in order to obtain important information about your use of the Katy AVL. Please take a few minutes to answer the questions below and return this form to the survey taker before leaving the bus.

1. What is the purpose of your bus trip this morning?       Work       School  
 Shopping       Recreational       Other (specify) \_\_\_\_\_
  
2. How many days per week do you normally make this trip? \_\_\_\_\_
  
3. What is the Zip Code of the area where this trip began? (For example, if this trip began from your home this morning, you would list your home Zip Code.) \_\_\_\_\_
  
4. What is your final destination on this trip?       Downtown       Galleria/City Post Oak  
 Texas Medical Center       Greenway Plaza       Other (specify Zip Code) \_\_\_\_\_
  
5. What are your main reasons for using the bus on the Katy Authorized Vehicle Lane (AVL)? (check one or more)  
 No other way available       Dislike driving       Carpool broke up  
 Freeway too congested       Gives me time to relax       Vanpool broke up  
 Saves time       Allows someone else to use car       Other (specify) \_\_\_\_\_  
 Reliable travel schedule       Costs less      \_\_\_\_\_
  
6. Since you use the Katy AVL, why have you decided to ride a bus rather than a carpool or vanpool?  
 Bus is more convenient       Bus costs less       Vanpool not available  
 Carpool not available       Other (specify) \_\_\_\_\_
  
7. How important was the opening of the Katy AVL in your decision to ride the bus?  
 Very important       Somewhat important       Not important
  
8. If the Katy AVL had not opened, would you be riding a bus now?       Yes       No       Not sure
  
9. How many minutes, if any, do you believe this bus presently saves by using the Katy AVL instead of the regular traffic lanes?       Minutes in the morning       Minutes in the evening
  
10. How long have you been a regular user of the Katy AVL? \_\_\_\_\_
  
11. Does your employer pay for any part of your bus pass?       Yes, pays all       Yes, pays part       No
  
12. Was a car (or other vehicle) available to you for this trip? (check one)  
 No, bus was only practical means       Yes, but with considerable inconvenience to others  
 Yes, but I prefer to take the bus
  
13. Before you began using the Katy AVL, how did you normally make this trip? (check one)  
 Drove alone       Rode a park-and-ride bus on the regular freeway lanes  
 Carpooled       Rode a regular route or express bus  
 Vanpooled       Did not make this trip prior to using the Katy AVL  
 Other (specify) \_\_\_\_\_
  
14. Do you feel that the Katy AVL is, at present, being sufficiently utilized to justify the project?  
 Yes       No       Not sure
  
15. What is your...      Age? \_\_\_\_\_      Sex? \_\_\_\_\_      Occupation? \_\_\_\_\_
  
16. What is the last level of school you have completed? \_\_\_\_\_

Please use the back of this form for additional comments. Thank you for your cooperation.





COMMISSION

ROBERT C. LANIER, CHAIRMAN  
THOMAS M. DUNNING  
RAY STOKER, JR.

**STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION**

ENGINEER-DIRECTOR  
MARK G. GOODE

IN REPLY REFER TO  
FILE NO.

Dear Vanpooler:

We need your help in a special study of the Katy Authorized Vehicle Lane (AVL) being conducted by the Texas Transportation Institute, The Texas A&M University System. Because the Katy AVL is the first of its kind to operate in Texas, it is extremely important that we determine how it is being used and by whom.

Please take a few minutes to answer the enclosed survey questionnaire. Your answers will provide valuable information concerning vanpooling on the Katy AVL. Because of the small number of participants in this survey, your specific reply is essential to insure the success of the project. All information you provide will remain strictly confidential. Only a summary of the survey results will be available for review.

Your cooperation and timely return of the completed questionnaire in the enclosed postage-paid envelope will be greatly appreciated. Thank you for your time and assistance in this important undertaking.

Sincerely,

A handwritten signature in cursive script that reads "Phillip L. Wilson".

Phillip L. Wilson  
State Transportation Planning Engineer

PLW:DLB:d11

Enclosures







# Katy Authorized Vehicle Lane (AVL) Vanpool Driver Survey

Undertaken by the Texas Transportation Institute, The Texas A&M University System, in cooperation with the Texas State Department of Highways and Public Transportation, METRO, and the U.S. Department of Transportation

1. Which days does your vanpool usually travel on the Katy Authorized Vehicle Lane (AVL)?  
 Mon     Tue     Wed     Thu     Fri     Less than once a week
2. Which commuting periods does your vanpool use the Katy AVL?     a.m.     p.m.  
If not both a.m. and p.m., why? \_\_\_\_\_
3. How many members are registered in your vanpool (including yourself)? \_\_\_\_\_
4. How many riders were in your vanpool today (including yourself)? \_\_\_\_\_
5. How many of the vanpool members (including yourself) are authorized to drive on the Katy AVL? \_\_\_\_\_
6. How long have you been a regular user of the Katy AVL? \_\_\_\_\_
7. How was the vanpool group first organized?  
 By my employer     I found the riders     Other (specify) \_\_\_\_\_  
 METRO VanShare     Residential developer    \_\_\_\_\_
8. What is the owning/leasing arrangement for this van?  
 Employer provides van     A third party (not employer or driver) provides van  
 I own the van     Other (specify) \_\_\_\_\_
9. Which on-ramp did you use to enter the Katy Freeway for the a.m. trip? \_\_\_\_\_
10. What is your vanpool destination?     Downtown     Galleria/City Post Oak     Greenway Plaza  
 Texas Medical Center     Other (specify Zip Code) \_\_\_\_\_
11. When did you join this vanpool?    Month: \_\_\_\_\_    Year: \_\_\_\_\_
12. Why did you begin vanpooling when you did? \_\_\_\_\_
13. Does your employer pay for "all" or "part" of your vanpool fare?  
 Yes, pays all     Yes, pays part     No
14. How important was the opening of the Katy AVL in your decision to vanpool?  
 Very important     Somewhat important     Not important
15. If the Katy AVL had not opened to vanpools, would you be vanpooling now?  
 Yes     No     Not sure
16. Since you use the Katy AVL, why have you decided to vanpool rather than carpool or ride a METRO bus?  
 Vanpooling is more convenient     Too far to nearest park-and-ride lot or bus stop  
 Vanpooling costs less     None of the buses stop near my destination  
 No carpool available     Other (specify) \_\_\_\_\_
17. Before you joined this vanpool, how did you usually make this trip? (check one)  
 Used a different vanpool     Rode a METRO regular route or express bus  
 Drove alone     Did not make this trip  
 Carpooled     Used another means (specify) \_\_\_\_\_  
 Rode a METRO park-and-ride bus    \_\_\_\_\_

18. How many minutes, if any, do you believe your vanpool saves by using the Katy AVL instead of the regular traffic lanes? \_\_\_\_\_ Minutes in the morning \_\_\_\_\_ Minutes in the evening

19. What are your main reasons for vanpooling on the Katy AVL? (You may check more than one.)  
\_\_\_\_\_ No other way available \_\_\_\_\_ Allows someone else to use car \_\_\_\_\_ Other (specify) \_\_\_\_\_  
\_\_\_\_\_ Freeway too congested \_\_\_\_\_ No bus service to my destination \_\_\_\_\_  
\_\_\_\_\_ Saves time \_\_\_\_\_ Costs less \_\_\_\_\_  
\_\_\_\_\_ Reliable travel schedule \_\_\_\_\_ Carpool broke up \_\_\_\_\_

20. Do you feel that the Katy AVL is, at present, sufficiently utilized to justify the project?  
\_\_\_\_\_ Yes \_\_\_\_\_ No \_\_\_\_\_ Not sure

21. If you drove alone, how many miles long would your daily round trip be? \_\_\_\_\_ miles

22. How many miles longer is your round trip as a result of your participation in this vanpool? \_\_\_\_\_ miles

23. Do you have a common point (or points) where vanpool members meet to depart for work each morning?

\_\_\_\_\_ No, I pick up each member at his or her door  
\_\_\_\_\_ Yes, I pick up vanpool members at the following location(s):  
(list street intersection or subdivision name below)

\_\_\_\_\_ Zip code? \_\_\_\_\_  
\_\_\_\_\_ Zip code? \_\_\_\_\_  
\_\_\_\_\_ Zip code? \_\_\_\_\_  
\_\_\_\_\_ Zip code? \_\_\_\_\_  
\_\_\_\_\_ Zip code? \_\_\_\_\_

24. What is your... Age? \_\_\_\_\_ Sex? \_\_\_\_\_ Occupation? \_\_\_\_\_

25. What is the last level of school you have completed? \_\_\_\_\_

26. What is your home Zip Code? \_\_\_\_\_

We would appreciate your additional comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

THANK YOU FOR YOUR COOPERATION.

Please return this form at your earliest convenience in the postage-paid envelope.

# Katy Authorized Vehicle Lane (AVL) Vanpool Passenger Survey

Undertaken by the Texas Transportation Institute, The Texas A&M University System  
in cooperation with the Texas State Department of Highways and Public Transportation,  
the Metropolitan Transit Authority, and the U.S. Department of Transportation

1. On the mornings you are a vanpool passenger, do you use your car to drive to a pick-up point?  
 Yes       No, I am dropped off by someone else       No, I am picked up at my door
2. When your car is left at home, is it used by a driver who otherwise has no car?  
 Yes       No       Not applicable (my car is always parked at the pick-up point)
3. When did you join this vanpool?      Month: \_\_\_\_\_      Year: \_\_\_\_\_
4. Why did you begin vanpooling when you did? \_\_\_\_\_  
\_\_\_\_\_
5. Does your employer pay for "all" or "part" of your vanpool fare?  
 Yes, pays all       Yes, pays part       No
6. How important was the opening of the Katy Authorized Vehicle Lane (AVL) in your decision to vanpool?  
 Very important       Somewhat important       Not important
7. If the Katy AVL had not opened to vanpools, would you be vanpooling now?  
 Yes       No       Not sure
8. Since you use the Katy AVL, why have you decided to vanpool rather than carpool or ride a METRO bus?  
 Vanpooling is more convenient       Too far to nearest park-and-ride lot or bus stop  
 Vanpooling costs less       None of the buses stop near my destination  
 No carpool available       Other (specify) \_\_\_\_\_
9. Before you joined this vanpool, how did you usually make this trip? (check one)  
 Used a different vanpool       Rode a METRO regular route or express bus  
 Drove alone       Did not make this trip  
 Carpooled       Used another means (specify) \_\_\_\_\_  
 Rode a METRO park-and-ride bus      \_\_\_\_\_
10. How many minutes, if any, do you believe your vanpool saves by using the Katy AVL instead of the regular traffic lanes?  
\_\_\_\_\_ Minutes in the morning      \_\_\_\_\_ Minutes in the evening
11. What are your main reasons for vanpooling on the Katy AVL? (You may check more than one.)  
 No other way available       Gives me time to relax       Carpool broke up  
 Freeway too congested       Allows someone else to use car       Dislike driving  
 Saves time       No bus service to my destination       Other (specify) \_\_\_\_\_  
 Reliable travel schedule       Costs less      \_\_\_\_\_
12. Do you feel that the Katy AVL is, at present, being sufficiently utilized to justify the project?  
 Yes       No       Not sure
13. If you drove alone, how many miles long would your daily round trip be? \_\_\_\_\_ miles
14. How many miles longer is your round trip as a result of your participation in this vanpool? \_\_\_\_\_ miles

15. What is your... Age? \_\_\_\_\_ Sex? \_\_\_\_\_ Occupation? \_\_\_\_\_
16. What is the last level of school you have completed? \_\_\_\_\_
17. What is your home Zip Code? \_\_\_\_\_

We would appreciate your additional comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

THANK YOU FOR YOUR COOPERATION.

Please return this form at your earliest convenience in the postage-paid envelope.



COMMISSION

ROBERT C. LANIER, CHAIRMAN  
THOMAS M. DUNNING  
RAY STOKER, JR.

**STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION**

ENGINEER-DIRECTOR  
MARK G. GOODE

IN REPLY REFER TO  
FILE NO.

Dear Carpooler:

We need your help in a special study of the Katy Authorized Vehicle Lane (AVL) being conducted by the Texas Transportation Institute, The Texas A&M University System. Because the Katy AVL is the first of its kind to operate in Texas, it is extremely important that we determine how it is being used and by whom.

Please take a few minutes to answer the enclosed survey questionnaire. Your answers will provide valuable information concerning carpooling on the Katy AVL. Because of the small number of participants in this survey, your specific reply is essential to insure the success of the project. All information you provide will remain strictly confidential. Only a summary of the survey results will be available for review.

Your cooperation and timely return of the completed questionnaire in the enclosed postage-paid envelope will be greatly appreciated. Thank you for your time and assistance in this important undertaking.

Sincerely,

A handwritten signature in cursive script that reads "Phillip L. Wilson".

Phillip L. Wilson  
State Transportation Planning Engineer

PLW:DLB:d11

Enclosures





# Katy Authorized Vehicle Lane (AVL) Carpool Driver Survey

Undertaken by the Texas Transportation Institute, The Texas A&M University System in cooperation with the Texas State Department of Highways and Public Transportation, METRO, and the U.S. Department of Transportation

1. Which days does your carpool usually travel on the Katy Authorized Vehicle Lane (AVL)?  
 Mon     Tue     Wed     Thu     Fri     Less than once a week
2. Which commuting periods does your carpool use the Katy AVL?  a.m.     p.m.  
 If not both a.m. and p.m., why? \_\_\_\_\_
3. How many members are regularly in your carpool (including yourself)? \_\_\_\_\_
4. How many riders were in your carpool today (including yourself)? \_\_\_\_\_
5. How many of the carpool members (including yourself) are authorized to drive on the Katy AVL? \_\_\_\_\_
6. How long have you been a regular user of the Katy AVL? \_\_\_\_\_
7. How was the carpool group first organized?  
 By my employer     I found the riders     Other (specify) \_\_\_\_\_  
 METRO CarShare     Residential developer    \_\_\_\_\_
8. Which on-ramp did you use to enter the Katy Freeway for the a.m. trip? \_\_\_\_\_
9. What is your carpool destination?     Downtown     Galleria/City Post Oak     Greenway Plaza  
 Texas Medical Center     Other (specify Zip Code) \_\_\_\_\_
10. When did you join this carpool?    Month: \_\_\_\_\_    Year: \_\_\_\_\_
11. Why did you begin carpooling when you did? \_\_\_\_\_  
 \_\_\_\_\_
12. How important was the opening of the Katy AVL in your decision to carpool?  
 Very important     Somewhat important     Not important
13. If the Katy AVL had not opened to carpools, would you be carpooling now?  
 Yes     No     Not sure
14. Did the number of persons in your carpool increase to make it eligible to use the AVL?  Yes     No  
 If yes, how many persons (including yourself) were previously in the carpool? \_\_\_\_\_
15. Since you use the Katy AVL, why have you decided to carpool rather than vanpool or ride a METRO bus?  
 Carpooling is more convenient     Too far to nearest park-and-ride lot or bus stop  
 Carpooling costs less     None of the buses stop near my destination  
 No vanpool available     Other (specify) \_\_\_\_\_
16. Before you joined this carpool, how did you usually make this trip? (check one)  
 Vanpool     Rode a METRO regular route or express bus  
 Drove alone     Did not make this trip  
 Used a different carpool     Used another means (specify) \_\_\_\_\_  
 Rode a METRO park-and-ride bus    \_\_\_\_\_
17. Before you began using this carpool on the AVL, did you travel in a bus or van that used the AVL?  
 Yes, bus     Yes, van     No
18. How many minutes, if any, do you believe your carpool saves by using the Katy AVL instead of the regular traffic lanes?  
     Minutes in the morning     Minutes in the evening

19. What are your main reasons for carpooling on the Katy AVL? (you may check more than one.)
- |   |   |  |
|---|---|--|
| <input type="checkbox"/> No other way available   | <input type="checkbox"/> Allows someone else to use car | <input type="checkbox"/> Other (specify) |
| <input type="checkbox"/> Freeway too congested    | <input type="checkbox"/> No bus service to destination  | _____                                    |
| <input type="checkbox"/> Saves time               | <input type="checkbox"/> Costs less                     | _____                                    |
| <input type="checkbox"/> Reliable travel schedule | <input type="checkbox"/> Vanpool broke up               | _____                                    |

20. Do you feel that the Katy AVL is, at present, sufficiently utilized to justify the project?  
 Yes     No     Not sure

21. If you drove alone, how many miles long would your daily round trip be? \_\_\_\_\_ miles

22. How many miles longer is your round trip as a result of your participation in this carpool? \_\_\_\_\_ miles

23. Do you have a common point (or points) where carpool members meet to depart for work each morning?

No, I pick up each member at his or her door  
 Yes, I pick up carpool members at the following location(s):  
 (list street intersection or subdivision name below)

_____	Zip Code?	_____
_____	Zip Code?	_____
_____	Zip Code?	_____
_____	Zip Code?	_____
_____	Zip Code?	_____

24. What is your... Age? \_\_\_\_\_ Sex? \_\_\_\_\_ Occupation? \_\_\_\_\_

25. What is the last level of school you have completed? \_\_\_\_\_

26. What is your home Zip Code? \_\_\_\_\_

We would appreciate your additional comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

THANK YOU FOR YOUR COOPERATION.

Please return this form at your earliest convenience in the postage-paid envelope.



# Katy Authorized Vehicle Lane (AVL) Carpool Passenger Survey

Undertaken by the Texas Transportation Institute, The Texas A&M University System  
in cooperation with the Texas State Department of Highways and Public Transportation,  
the Metropolitan Transit Authority, and the U.S. Department of Transportation

1. On the mornings you are a carpool passenger, do you use your car to drive to a pick-up point?  
 Yes, use car       No, I am dropped off by someone else       No, I am picked up at my door
2. When your car is left at home, is it used by a driver who otherwise has no car?  
 Yes       No       Not applicable (my car is always parked at the pick-up point)
3. When did you join this carpool?      Month: \_\_\_\_\_      Year: \_\_\_\_\_
4. Why did you begin carpooling when you did? \_\_\_\_\_  
\_\_\_\_\_
5. Does your employer provide any incentives to carpool?       Yes       No      If yes, what incentives are provided? \_\_\_\_\_
6. How important was the opening of the Katy Authorized Vehicle Lane (AVL) in your decision to carpool?  
 Very important       Somewhat important       Not important
7. If the Katy AVL had not opened to carpools, would you be carpooling now?  
 Yes       No       Not sure
8. Did the number of persons in your carpool increase to make it eligible to use the AVL?       Yes       No  
If yes, how many persons (including yourself) were previously in the carpool? \_\_\_\_\_
9. Since you use the Katy AVL, why have you decided to carpool rather than vanpool or ride a METRO bus?  
 Carpooling is more convenient       Too far to nearest park-and-ride lot or bus stop  
 Carpooling costs less       None of the buses stop near my destination  
 No vanpool available       Other (specify) \_\_\_\_\_
10. Before you joined this carpool, how did you usually make this trip? (check one)  
 Vanpool       Rode a METRO regular route or express bus  
 Drove alone       Did not make this trip  
 Used a different carpool       Used another means (specify) \_\_\_\_\_  
 Rode a METRO park-and-ride bus
11. Before you began using this carpool on the AVL, did you travel in a bus or van that used the AVL?  
 Yes, bus       Yes, van       No
12. How many minutes, if any, do you believe your carpool saves by using the Katy AVL instead of the regular traffic lanes?      \_\_\_\_\_ Minutes in the morning      \_\_\_\_\_ Minutes in the evening
13. What are your main reasons for carpooling on the Katy AVL? (You may check more than one.)  
 No other way available       Gives me time to relax       Vanpool broke up  
 Freeway too congested       Allows someone else to use car       Dislike driving  
 Saves time       No bus service to my destination  
 Reliable travel schedule       Costs less  
 Other (specify) \_\_\_\_\_

14. Do you feel that the Katy AVL is, at present, being sufficiently utilized to justify the project?  
\_\_\_\_\_ Yes          \_\_\_\_\_ No          \_\_\_\_\_ Not sure
15. If you drove alone, how many miles long would your daily round trip be? \_\_\_\_\_ miles
16. How many miles longer is your round trip as a result of your participation in this carpool? \_\_\_\_\_ miles
17. What is your ... Age? \_\_\_\_\_ Sex? \_\_\_\_\_ Occupation? \_\_\_\_\_
18. What is the last level of school you have completed? \_\_\_\_\_
19. What is your home Zip Code? \_\_\_\_\_

We would appreciate your additional comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

THANK YOU FOR YOUR COOPERATION.

Please return this form at your earliest convenience in the postage-paid envelope.



COMMISSION

ROBERT C. LANIER, CHAIRMAN  
THOMAS M. DUNNING  
RAY STOKER, JR.

**STATE DEPARTMENT OF HIGHWAYS  
AND PUBLIC TRANSPORTATION**

ENGINEER-DIRECTOR  
MARK G. GOODE

IN REPLY REFER TO  
FILE NO.

Dear Motorist:

We need your help in a special study being conducted by the Texas Transportation Institute, The Texas A&M University System. As you are aware, the Katy Freeway is becoming increasingly more congested. To relieve some of this congestion, the State Department of Highways and Public Transportation and the Metropolitan Transit Authority have constructed the Katy Authorized Vehicle Lane (AVL) for use by buses, carpools and vanpools. Authorized vehicles using the lane travel inbound toward downtown in the morning and outbound in the afternoon. The Katy AVL has been constructed within the median of the freeway and is protected from other traffic by concrete barriers. The location of the AVL in the median has not reduced the number of general traffic lanes available to motorists.

Because the Katy AVL is the first of its kind to operate in Texas, we need your help to determine how it is working and what effect it has had on your travel. Please take a few minutes to answer the enclosed survey questionnaire. The questions on this survey concern your routine trips made on the Katy Freeway in the mornings, from 6:00 a.m. to 9:00 a.m. Because of the small number of motorists contacted, your specific reply is essential to insure the success of the project. Your answers will remain strictly confidential. Only a summary of the survey results will be available for review.

Please complete the requested information and return it in the enclosed postage-paid envelope at your earliest convenience. Thank you for your time and assistance. The information you provide will assist in determining the most efficient means of operating the Katy AVL, and will be of value in the planning, design and operation of future authorized vehicle lanes in Houston.

Again, thank you for your help.

Sincerely,

A handwritten signature in cursive script that reads "Phillip L. Wilson".

Phillip L. Wilson  
State Transportation Planning Engineer

PLW:DLB:d11

Enclosures





# KATY FREEWAY MOTORIST SURVEY

Undertaken by the Texas Transportation Institute, The Texas A&M University System,  
in cooperation with the Texas State Department of Highways and Public Transportation,  
the Metropolitan Transit Authority, and the U.S. Department of Transportation

Your vehicle was observed traveling eastbound on the Katy Freeway between 6:00 and 9:00 a.m. the week of April 7. To the best of your recollection, please complete this survey as it pertains to that trip.

1. What was the purpose of your trip?  
 Work                                       Shopping                                       Other (specify) \_\_\_\_\_  
 School                                       Recreational                                      \_\_\_\_\_
  
2. Rather than a bus, carpool or vanpool in the Katy Authorized Vehicle Lane (AVL), what were your reasons for choosing an auto for this trip? \_\_\_\_\_  
 \_\_\_\_\_
  
3. How many days per week do you normally make this trip? \_\_\_\_\_
  
4. How do you usually make this trip?  
 Drive alone                                       Vanpool                                       METRO regular route or express bus  
 Carpool                                       METRO Park-and-Ride bus                                       Other (specify) \_\_\_\_\_
  
5. How many people (including yourself) were in your vehicle for this trip? \_\_\_\_\_
  
6. Which on-ramp did you use to enter the Katy Freeway for this trip? \_\_\_\_\_
  
7. What was the destination of your trip?  
 Downtown                                       Texas Medical Center                                       Other (specify Zip Code below)  
 Galleria/City Post Oak                                       Greenway Plaza                                      \_\_\_\_\_
  
8. Do you agree or disagree that the following vehicles should be allowed to use the Katy AVL?  

Buses (park-and-ride, express, intercity, etc.)	<input type="checkbox"/> Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Neutral
Vanpools	<input type="checkbox"/> Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Neutral
Carpools (with 3 or more persons)	<input type="checkbox"/> Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Neutral
Carpools (with 2 or more persons)	<input type="checkbox"/> Agree	<input type="checkbox"/> Disagree	<input type="checkbox"/> Neutral
  
9. Based on your observation of the number of vehicles using the Katy AVL, do you feel that it is being sufficiently utilized?  
 Yes                       No                       Not sure
  
10. Based on your perception of the number of persons being moved on the Katy AVL, do you feel that it is being sufficiently utilized?  
 Yes                       No                       Not sure
  
11. Do you feel that the Katy AVL was a good transportation improvement?  
 Yes                       No                       Not sure
  
12. Does your employer pay for "all" or "part" of your parking expense?  
 Yes (pays all)                       Yes (pays part)                       No
  
13. Does your employer pay for "all" or "part" of your bus fare if you ride a bus?  
 Yes (pays all)                       Yes (pays part)                       No                       Don't know

14. Does your employer pay for "all" or "part" of your vanpool fare if you ride in a vanpool?  
 Yes (pays all)       Yes (pays part)       No       Don't know
15. Does your employer give any special treatment to encourage carpools?       Yes       No  
 If "yes", please describe \_\_\_\_\_  
 \_\_\_\_\_
16. Does your job require that you have a car available during the day?  
 Yes (always)       Yes (sometimes)       No
17. Have you ever heard of METRO RideShare (the carpool & vanpool matching service)?       Yes       No  
 If "yes", have you ever used their services?       Yes       No
18. Are you familiar with the park-and-ride service provided by METRO along the Katy Freeway?  
 Yes       No  
 If "yes," have you ever used park-and-ride?       Yes       No
19. What is your...      Age? \_\_\_\_\_      Sex? \_\_\_\_\_      Occupation? \_\_\_\_\_
20. What is the last level of school that you have completed? \_\_\_\_\_
21. What is your home Zip Code? \_\_\_\_\_

We would appreciate your additional comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

THANK YOU FOR YOUR COOPERATION.

Please return this form at your earliest convenience in the postage-paid envelope.