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16. Abstract

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This report is the second in a series of reports analyzing carpool utilization of the Katy Transitway. The following report has also been prepared as part of this research project.

"The Impacts of Carpool Utilization on the Katy Freeway Authorized Vehicle Lane, 'Before ' Data." Research Report 484-1, July, 1985.

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
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^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
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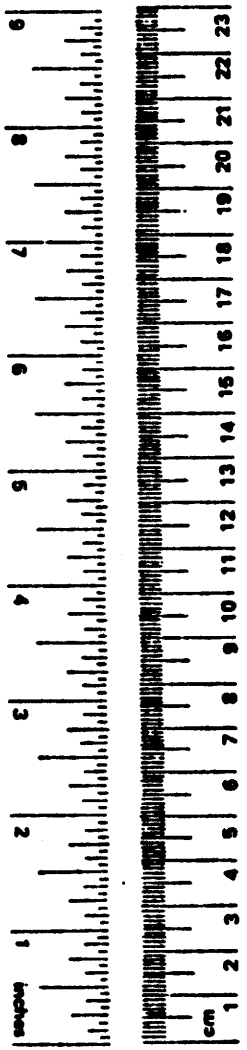
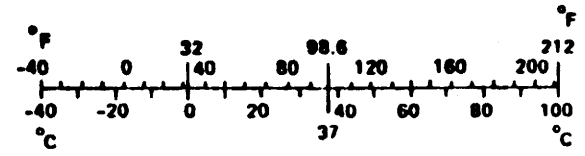


*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
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
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
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^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



THE IMPACTS OF CARPOOL UTILIZATION ON THE KATY FREEWAY AUTHORIZED VEHICLE LANE INITIAL CARPOOL SURVEYS

by
Dennis L. Christiansen
Research Engineer

Research Report 484-2

An Evaluation of the Impact of Permitting Carpools to Use the Katy Transitway

Research Study Number 2-10-85-484

Sponsored by
Metropolitan Transit Authority of Harris County
and
State Department of Highways and Public Transportation

Texas Transportation Institute
The Texas A&M University System
College Station, Texas 77843

November 1985

ABSTRACT

In order to increase the perceived level of utilization of the Katy Freeway authorized vehicle lane (AVL) in Houston, carpools were allowed to begin using that facility in April 1985. In October 1985, the carpools using the AVL were surveyed. The results of those surveys are summarized in this report.

This report is the second in a series of reports analyzing carpool utilization of the Katy Transitway. The following report has also been prepared as part of this research project.

"The Impacts of Carpool Utilization on the Katy Freeway Authorized Vehicle Lane, 'Before' Data." Research Report 484-1, July 1985.

Key Words: High-Occupancy Vehicle Lanes, Transitways, Busways, Carpools, HOV Facilities, Authorized Vehicle Lanes

SUMMARY

Carpools began using the Katy authorized vehicle lane in April 1985. This study, jointly funded by the State Department of Highways and Public Transportation and the Metropolitan Transit Authority of Harris County, was established to comprehensively assess the impacts of allowing carpools onto the AVL.

A major "before" evaluation was performed in March 1985, and the results are documented in Research Report 484-1. A major "after" evaluation is scheduled for the Spring of 1986. The carpool survey documented in this report was undertaken in order to have some information available on AVL carpooling prior to the Spring of 1986. On the afternoon of this carpool survey, 42 carpools used the lane transporting 147 persons, for an average occupancy of 3.5 persons per vehicle.

Carpooling On the Katy AVL

On April 1, 4+ authorized carpools were allowed to begin using the Katy AVL. Vehicles and drivers had to be authorized to be allowed onto the AVL, and at least 4 persons had to be in the vehicle. Fewer than 10 carpools per peak period used the AVL under this procedure.

In June 1985, procedures were somewhat altered. The 4+ designation was still required for authorization, but the vehicle could use the AVL if only 3 occupants were present in the vehicle. This resulted in an increase in carpooling, but, in October 1985, fewer than 50 carpools were using the AVL per peak period.

Procedures are currently being changed so that authorized 3+ carpools are being allowed to use the AVL. This became effective in October 1985.

Surveys of Transitway Users and Non Users

Data presented in this section are from both the March and October 1985 surveys. Surveys were conducted of: 1) AVL transit patrons; 2) AVL

vanpoolers; 3) AVL carpoolers; and 4) motorists on the Katy Freeway mixed-flow lanes not using the transitway.

Mode Choice

In many respects, the personal and trip characteristics of transitway users and non-users are similar (Table S-1). An important difference lies in trip destinations. It is apparent that, by allowing carpools onto the AVL, the AVL facility is serving trips to destinations not well served by either buses or vanpools.

Table S-1. Personal and Trip Characteristics of Survey Respondents

Characteristic	Transitway Users			Non Transitway Users
	Transit	Vanpool	Carpool	Motorists
Age, years (50th percentile)	33	36	41	40
Sex, % Male	49%	52%	71%	64%
Education, years (average)	15.6	15.4	15	15.7
Occupation				
% Professional	56%	55%	58%	51%
% Managerial	13%	21%	20%	19%
% Clerical	21%	20%	11%	9%
% Sales	4%	2%	2%	12%
Trip Purpose, Percent Work	99%	100%	NA	94%
Trip Frequency (5 or more days/week)	91%	95%	100%	84%
Trip Destination				
Downtown	96%	70%	29%	38%
Galleria/City Post Oak	0%	11%	13%	24%
Texas Medical Center	1%	5%	3%	9%
Greenway Plaza	0%	3%	13%	8%
University of Houston	3%	0%	3%	2%
Percent of Home Zip Codes (origin) in 77079, 77084, or 77449	46%	44%	58%	31%

Table S-2. Factors Influencing Mode Choice, Survey Respondents

Factor	Transitway Users			Non Transitway Users
	Transit	Vanpool	Carpool	Motorists
Previous Mode of Travel				
Drove Alone	44%	34%	50%	----
Carpool or Vanpool	16%	35%	28%	----
Bus	10%	15%	2%	----
Didn't make trip	27%	16%	20%	----
Primary Reasons for Selecting Mode				
Convenience	23%	17%	47%	17%
Traffic/don't like to drive	28%	13%	26%	0%
Cost	18%	31%	16%	2%
Need car for job	----	----	----	22%
No bus or van available	----	----	5%	22%
% Having at least part of bus fare, van cost, carpool cost, or parking cost paid by employer	57%	50%	25%	54%
How important is the transitway in your decision to bus, van or carpool				
Very Important	39%	25%	47%	----
Somewhat important	26%	16%	10%	----
Not important	35%	59%	43%	----
Would you bus, van, or carpool if there were no transitway				
Yes	69%	87%	70%	----
No	15%	6%	16%	----
Not sure	16%	7%	14%	----

A major concern associated with allowing carpools on the transitway is the number of transit and vanpool patrons that will switch to carpools. To date, that switch has not been significant. Of the carpoolers using the AVL, 5% previously used either a bus (3%) or a vanpool (2%) on the AVL.

Over 40% of the carpools indicated that the number of persons in the carpool increased in order to be able to use the AVL. Of those vehicles having an increased occupancy, the average occupancy increased from 2.1 to 3.5.

Pertinent data addressing issues such as previous mode of travel and impact of the AVL on mode choice are summarized in Table S-2.

Perceived Utilization of the Transitway

The surveys confirm that a general perception exists, especially among non bus riders, that the transitway is not sufficiently utilized (Table S-3). A major intent of allowing the carpools onto the AVL is to address this perception of underutilization.

Table S-3. Perceptions of the Level of Utilization of the Katy Transitway

Measure of Effectiveness or Success	Transitway Users			Non Transitway Users
	Transit	Vanpool	Carpool	Motorists
Is the transitway sufficiently utilized				
Yes	49%	30%	34%	3%
No	33%	51%	43%	90%
Not sure	18%	19%	23%	7%
Is the transitway a good improvement				
Yes	----	----	----	41%
No	----	----	----	35%
Not sure	----	----	----	24%

IMPLEMENTATION STATEMENT

Since there is relatively little experience with operating exclusive, reversible high-occupancy vehicle lanes, many of the operating procedures to be used in Houston will be developed through experience. A key operating issue involves the type of vehicles that will be allowed to utilize the special lanes.

This study was specifically undertaken to assist the Metropolitan Transit Authority and the State Department of Highways and Public Transportation in the implementation and operation of the authorized vehicle lanes. The study, through analyses and comparison of both "before" and "after" data, assesses the impacts of permitting authorized carpools to utilize the special high-occupancy vehicle lanes.

DISCLAIMER

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INTRODUCTION

In an effort to increase the perceived utilization of the Katy Freeway authorized vehicle lane (AVL), carpools are now being permitted to use that facility. Beginning in April 1985, authorized 4+ carpools were allowed on the AVL. In June 1985, a 4+ carpool was necessary for authorization, but the authorized vehicle could use the AVL with only 3 occupants. In October 1985, 3+ authorized vehicles were allowed to use the AVL. Authorization procedures are described in Research Report 484-1. Trends in AVL utilization are shown in Figure 1.

As part of this research project, a major 6-month "after" evaluation (similar in scope to the "before" evaluation documented in Research Report 484-1) had originally been scheduled for late fall 1985. However, due to the relatively low carpool volumes (Figure 1), it was decided to delay that "after" study to the spring of 1986. In order to have some data on AVL carpool utilization at an earlier date, a special survey of the carpools using the Katy AVL was undertaken in October 1985. This report documents the findings of the special Katy AVL carpool study.

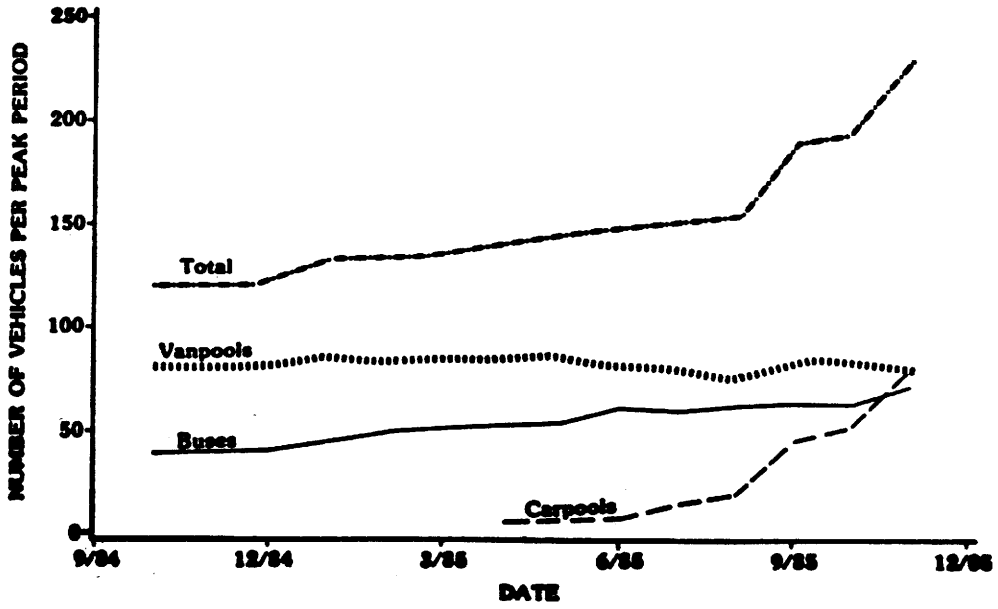

Figure 1. Trends in Utilization of the Katy Freeway Authorized Vehicle Lane

SURVEY PROCEDURES

The carpool survey was conducted during the p.m. peak period on Thursday, October 10, 1985. All carpools were stopped at the entrance to the AVL. TTI staff distributed surveys. A separate survey was given to the drivers; that survey requested more detailed data than did the passenger survey. A different survey was given to each passenger. Postage-paid return envelopes were included with the surveys, and both drivers and passengers were requested to return the surveys in the mail. The survey instruments used are included in Appendix A.

Table 1 summarizes the survey response rate.

Table 1. Carpool Survey Distriction, Katy AVL Carpool Survey

Survey Group	No. of Surveys Distributed	No. of Surveys Completed	Response Rate
Carpool Drivers	41	27	66%
Carpool Passengers	80	54	68%
TOTAL	121	81	67%

The surveys were distributed between 3:30 p.m. and 7:00 p.m. During that period, 42 carpools entered the AVL. Forty-one of those carpools stopped and received the surveys.

Carpool Surveys

The surveys of the AVL carpools are similar to survey forms used in March for the AVL vanpool users (refer to Research Report 484-1). The surveys addressed 3 primary 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 age, sex, occupation, and last year of school completed.

Age

The median age of persons in carpools is 41 (Table 2).

Table 2. Personal Characteristics of Katy AVL Carpool Users

Characteristic	Total Sample	Carpool Drivers	Carpool Passengers
Age (years), 50th percentile	41 (n=90)	43 (n=31)	40 (n=59)
Sex	(n=90)	(n=31)	(n=59)
% Male	71%	58%	78%
% Female	29%	42%	22%
Occupation	(n=87)	(n=28)	(n=59)
% Professional	58%	50%	61%
% Managerial	20%	21%	18%
% Clerical	11%	14%	10%
% Sales	2%	4%	2%
% Homemaker	2%	7%	0%
% Student	1%	4%	0%
% Operative	5%	0%	7%
% Unemployed	1%	0%	2%
Education (years)	(n=90)	(n=31)	(n=59)
50th percentile	15	15	15

Sex

Over two-thirds of the persons in carpools are male (Table 2).

Occupation

Nearly 80% of carpoolers are considered to be "professional" or "managerial" (Table 2). Some persons using the AVL are driving their children to school or day care centers.

Education

The average carpooler has completed 3 years of college (Table 2).

Travel Patterns and Trip Characteristics

Questions were asked regarding formation and operation of the carpool, days per week the trip is made, trip origin, and trip destination.

Formation and Operation of the Carpool

Several questions were asked relating to various aspects of carpool formation and operation. These have been divided into the following categories: 1) formation of carpool; 2) trip length; 3) occupancy of carpool; 4) employer contribution to carpool costs; and 5) impact on personal car use.

Formation of Carpool

In almost every instance, the persons in the carpool formed the carpool with no assistance from any person or agency. The majority of the carpoolers joined the pool in 1985, although some carpools have existed for over 15 years.

When asked why the carpoolers began carpooling, the most common responses involved saving time, saving money, and convenience. Nearly 75% of the carpoolers previous mode was either drive alone or another carpool. Approximately 5% of the carpoolers used either the AVL bus or van prior to travelling in the carpool.

These responses are summarized in Table 3.

Trip Length

Carpoolers were asked how long their round trip would be if they drove and how much longer their round trip is because they carpool. The median round trip length is in excess of 40 miles. The average round trip length is less than 2 miles longer due to carpooling (Table 4).

Occupancy of Carpool

The actual occupancy of the carpools is shown in Table 4. On the day of the survey, the average occupancy per carpool was 3.5.

Carpoolers were asked if the size of the carpool increased after the AVL opened in order to be eligible to use the AVL. Over 40% of the carpools indicated that carpool occupancy did increase. The median occupancy of these pools prior to the AVL was 2.1 persons. Given a current average of 3.5, roughly 44% of the carpools, on average, increased occupancy by 1.4 persons in order to be able to use the lane. Viewed in a different manner, of the 42 carpools using the AVL on the survey day, an additional 26 people were in those carpools as a result of allowing carpools on the AVL.

These data are shown in Table 4.

Employer Incentives For Carpooling

Of the carpools on the AVL, 25% have some sort of employer incentive to carpool (Table 4). The incentives provided are: 1) subsidized parking (73%); 2) share in car and/or gas costs (20%); and 3) permit flexible work hours.

Table 3. Characteristics of the Formation and Operation of the Carpool, Katy AVL Carpool Users

Characteristic	Total Sample	Carpool Drivers	Carpool Passenger
How was carpool organized			
I found the riders	----	95%	----
METRO Carshare	----	0%	----
Residential developer	----	5%	----
Year Joined Carpool	(n=88)	(n=30)	(n=58)
Before 1970	5%	3%	5%
1970-1975	10%	14%	9%
1975-1980	7%	3%	8%
1981-1984	23%	13%	30%
1985	55%	67%	48%
Why Joined Carpool			
Saves time or money	38%	41%	37%
More convenient	12%	9%	13%
Share driving	9%	9%	9%
Take advantage of AVL	7%	6%	8%
Traffic congestion	5%	6%	5%
Started working	5%	6%	5%
Take children to school	4%	12%	0%
Previous Mode of Travel	(n=88)	(n=30)	(n=58)
Drove alone	50%	50%	50%
Other carpool	24%	27%	22%
Didn't make trip	20%	23%	19%
Vanpool	4%	0%	5%
Bus	2%	0%	4%
Before carpooling, did you use AVL	(n=90)	(n=31)	(n=59)
Yes, bus	3%	0%	5%
Yes, van	2%	0%	3%
No	95%	100%	92%

Table 4. Characteristics of Trip Length, Occupancy, Payment, and Impact On Personal Auto Use of Carpooling on the Katy AVL

Characteristic	Total Sample	Carpool Drivers	Carpool Passenger
Round trip distance if drove alone (miles)	(n=87)	(n=30)	(n=59)
50th percentile	42	39	42
Round trip average	44	42	45
Extra miles to carpool	(n=87)	(n=30)	(n=59)
50th percentile	0	0	0
Average	1.2	0.9	1.4
Actual carpool occupancy		(n=31)	
1	----	3%	----
2	----	0%	----
3	----	52%	----
4	----	39%	----
5	----	3%	----
6	----	3%	----
Registered carpool members		(n=31)	
3	----	7%	----
4	----	71%	----
5	----	19%	----
6	----	3%	----
Did carpool size increase to be able to use AVL	(n=90)	(n=31)	(n=59)
Yes	44%	48%	42%
No	56%	52%	58%
Are there employer carpool incentives			(n=59)
Yes	----	----	25%
No	----	----	75%
When car left at home, is it used			(n=58)
Yes	----	----	9%
No	----	----	69%
Not applicable (car left at pickup point)	----	----	22%

Use of Auto Left At Home

Fewer than 10% of the autos left at home as a result of carpooling are used during the day (Table 4). Over 40% of the carpoolers drive to a pickup location (Table 5).

Trip Frequency

As would be expected for a mode serving a work or school trip, all the carpools surveyed use the facility five days per week.

Trip Origin

Several questions were asked relating to the origin of the morning trip. For presentation purposes, these are grouped into the following categories: 1) freeway ramp used; and 2) home zip code.

Freeway Ramp Used

For the morning trip, virtually all carpools entered the Katy Freeway at either West Belt (69%), Wilcrest (17%), or Gessner (11%). These data are presented in Table 5.

Home Zip Code

Over 80% of the carpoolers reside in one of 5 zip codes. These are depicted in Figure 2 and Table 5. Over a third of the carpoolers homes are in zip code 77079, located just east of SH 6 and just south of the Katy Freeway.

Trip Destination

The destinations of the carpoolers are dispersed. The largest single attractor is the downtown (Table 5); however, only 29% of carpoolers are destined to downtown. Several trips are to schools.

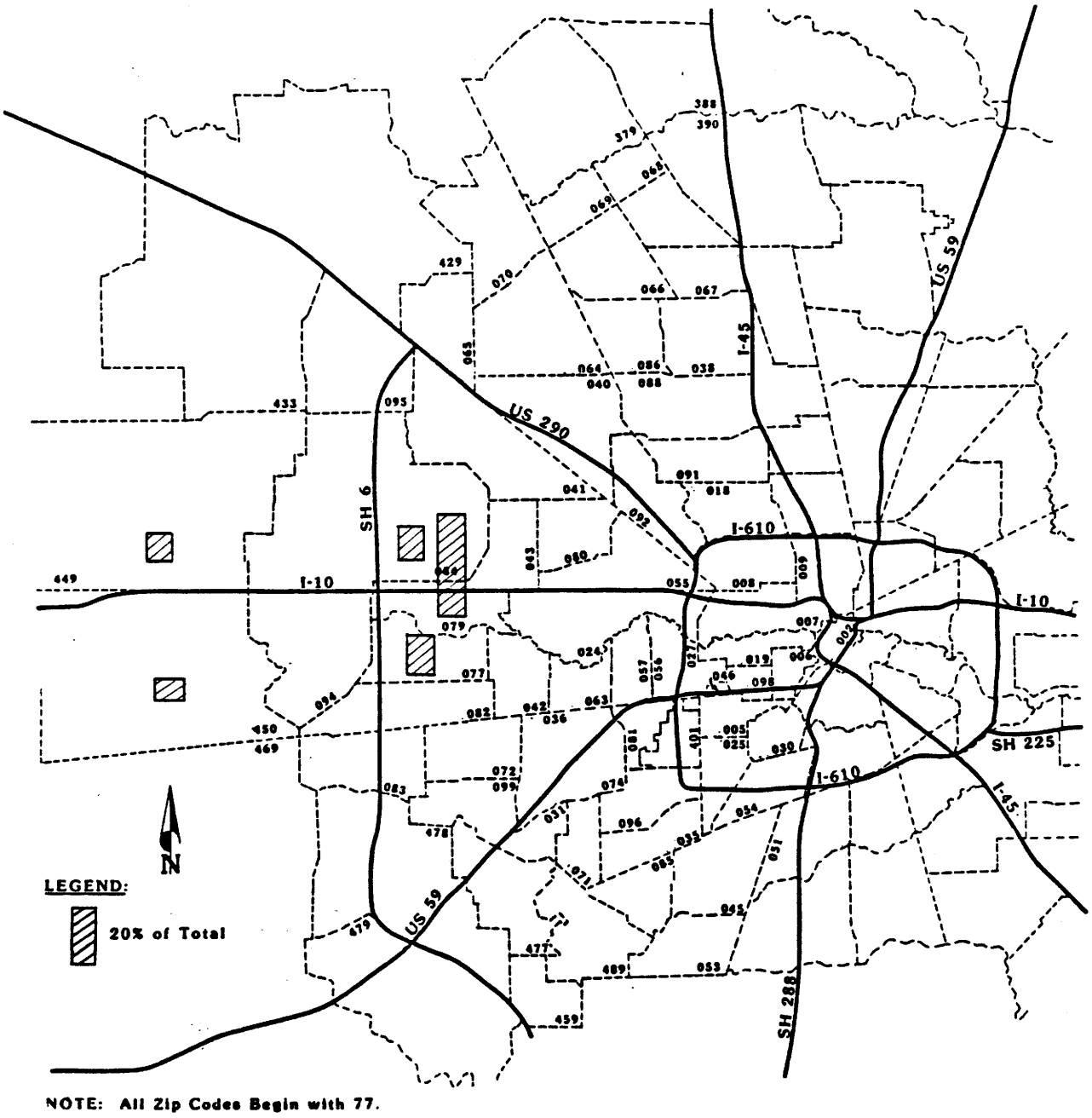

Figure 2. Home Zip Code Locations of Carpoolers Using the Katy Transitway

Table 5. Characteristics of Trip Frequency, Trip Origin, and Carpool Pickup Point, Katy AVL Carpool Survey

Characteristic	Total Sample	Carpool Drivers	Carpool Passengers
Katy AVL Trip Frequency		(n=31)	
% using daily	----	100%	----
Do you pick up riders		(n=31)	
at home	----	52%	----
at common staging point(s)	----	48%	----
Do you drive your car to pickup point			(n=59)
Yes	----	----	42%
No, dropped off by someone else	----	----	4%
No, picked up at my door	----	----	54%
A.M. freeway entrance ramp		(n=29)	
West Belt	----	69%	----
Wilcrest	----	17%	----
Gessner	----	11%	----
Sealy	----	3%	----
Home zip code of carpoolers	(n=90)	(n=31)	(n=59)
77079	37%	29%	41%
77077	16%	23%	12%
77084	11%	13%	10%
77449	10%	10%	10%
77450	9%	3%	12%
Destination of carpoolers		(n=31)	
Downtown	----	29%	----
Galleria	----	13%	----
Greenway Plaza	----	13%	----
Post Oak School	----	10%	----
5000 Gulf Freeway	----	7%	----
Texas Medical Center	----	3%	----
University of Houston	----	3%	----
Other	----	22%	----

Attitudes and Impacts Pertaining to the AVL

Approximately half the survey questions were intended to collect data concerning attitudes and travel patterns as impacted by the Katy AVL. For purposes of presentation, these responses are divided into the following categories: 1) AVL carpool operating procedures and time savings; 2) modal selection; 3) impacts of AVL on mode choice; 4) AVL impacts on ridesharing and freeway congestion; and 5) perception of utilization.

AVL Operating Procedures and Time Savings

Driver training is required to operate a carpool on the AVL. The driver must carry a license authorizing him 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 6).

Table 6. Characteristics of AVL Operating Procedures, AVL Time Savings, and Duration of AVL Utilizatiod, Katy AVL Carpool Survey

Characteristic	Total Sample	Carpool Drivers	Carpool Passengers
Number of authorized carpool drivers		(n=31)	
1	----	23%	----
2	----	13%	----
3	----	6%	----
4	----	52%	----
5	----	6%	----
Percent of carpools using AVL	----	(n=31)	----
a.m.	----	94%	----
p.m.	----	100%	----
Perceived AVL time savings (min.)	(n=90)	(n=31)	(n=59)
50th percentile			
a.m.	9	12	7
p.m.	17	14	17

Most all carpools use the AVL in both the a.m. and p.m. The small number that do not use the AVL in the a.m. indicated they left before the AVL opened in the morning.

Perceived AVL Time Savings

Perceived time savings in the a.m. are about half of those in the p.m. The time savings perceived by the carpools are 50% to 100% greater than those identified in the vanpool and transit surveys (Research Report 484-1). Perceived time savings are shown in Table 6.

Modal Selection

The carpool was selected as a travel mode primarily because: 1) saves time; 2) freeway too congested; and 3) costs less. Cost and convenience were cited as the primary reasons for selecting the carpool rather than a vanpool or bus (Table 7).

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. Over two-thirds of the respondents said "yes" (Table 8).

A related question asked how important the Katy AVL was in the decision to carpool. While most respondents had indicated they would be carpooling even if there were no AVL, nearly 60% said the AVL was either "very important" or "somewhat important" in their decision to carpool (Table 8).

Perceived Impacts of the AVL on Ridesharing and Congestion

Carpoolers were asked a series of questions to help determine their perceptions concerning the AVL. Over 40% of the respondents felt the AVL had been successful in increasing carpooling, vanpooling, and transit utilization. Virtually everyone felt the AVL had reduced travel times for

Table 7. Reasons for Selecting the Carpool Mode on the AVL, Katy AVL Carpool Survey

Reason for Carpooling	Total Sample	Carpool Drivers	Carpool Passengers
Main reasons for carpooling on AVL			
Saves time	27%	29%	26%
Freeway too congested	26%	29%	25%
Costs less	16%	17%	16%
Reliable schedule	13%	14%	12%
Time to relax	6%	0%	9%
No bus to destination	5%	4%	5%
Car used by others	4%	5%	4%
Why carpool rather than bus or van			
More convenient	47%	47%	46%
Costs less	23%	20%	25%
No bus to destination	14%	13%	14%
No vanpool available	11%	16%	9%
Too far to park-and-ride or bus	5%	4%	6%

Table 8. Perceived Impacts of the AVL on Mode Choice, Katy AVL Carpool Survey

Aspect of Mode Choice	Total Sample	Carpool Drivers	Carpool Passengers
Would you carpool if no AVL	(n=90)	(n=31)	(n=59)
Yes	70%	71%	69%
No	16%	13%	17%
Not sure	14%	16%	14%
How important was AVL in decision to carpool	(n=90	(n=31)	(n=59)
Very important	47%	58%	41%
Somewhat important	10%	13%	8%
Not important	43%	29%	51%

authorized vehicles. About one-third of the respondents felt the AVL had reduced traffic congestion on the Katy Freeway.

Attitudinal questions indicated the following: 1) over three-quarters disagreed that carpooling takes more time than driving alone; 2) nearly everyone agreed that carpooling was cheaper than driving alone; 3) over 80% felt carpooling was more pleasant than driving alone, and a similar percentage indicated they enjoyed riding with other people. These responses are summarized in Tables 9 and 10.

Table 9. Perceptions of Carpoolers Regarding the Impacts of the AVL on Ridesharing and Congestion, Katy AVL Carpool Survey

Effectiveness Measure	Total Sample	Carpool Drivers	Carpool Passengers
Has the Katy AVL	(n=90)	(n=31)	(n=59)
Increased carpooling			
Yes	52%	58%	49%
No	17%	23%	14%
Not sure	31%	19%	37%
Increased vanpooling			
Yes	43%	50%	40%
No	8%	14%	5%
Not sure	49%	36%	55%
Increased transit ridership			
Yes	43%	50%	40%
No	6%	7%	5%
Not sure	51%	43%	55%
Reduced travel time for AVL's			
Yes	99%	100%	98%
No	0%	0%	0%
Not sure	1%	0%	2%
Reduced freeway congestion			
Yes	33%	33%	32%
No	29%	33%	27%
Not sure	38%	34%	41%

Table 10. Attitude Concerning Vanpooling, Carpooling, Transit Riding, Driving Alone, and Level of Utilization, Katy AVL Carpool Survey

Attitude	Total Sample	Carpool Drivers	Carpool Passengers
Carpooling takes more time than driving alone	(n=90)	(n=31)	(n=59)
agree/disagree/neutral	10%/79%/11%	10%/77%/13%	10%/80%/10%
Vanpooling takes more time than driving alone	(n=78)	(n=27)	(n=51)
agree/disagree/neutral	24%/30%/46%	26%/19%/55%	24%/35%/41%
Bus riding takes more time than driving alone	(n=78)	(n=27)	(n=51)
agree/disagree/neutral	53%/15%/32%	48%/7%/45%	55%/20%/25%
Carpooling is cheaper than driving alone	(n=88)	(n=29)	(n=59)
agree/disagree/neutral	96%/1%3%	97%/0%/3%	95%/2%/3%
Vanpooling is cheaper than driving alone	(n=76)	(n=27)	(n=49)
agree/disagree/neutral	65%/5%/30%	67%/4%/29%	63%/6%/31%
Bus riding is cheaper than driving alone	(n=76)	(n=26)	(n=50)
agree/disagree/neutral	59%/12%/29%	58%/8%/34%	60%/14%/26%
Carpooling is more pleasant than driving alone	(n=89)	(n=30)	(n=59)
agree/disagree/neutral	84%/4%/12%	80%/3%/17%	87%/3%/10%
Vanpooling is more pleasant than driving alone	(n=76)	(n=26)	(n=50)
agree/disagree/neutral	42%/9%/49%	50%/4%/46%	38%/12%/50%
Bus riding is more pleasant than driving alone	(n=76)	(n=26)	(n=50)
agree/disagree/neutral	32%/14%/54%	38%/4%/58%	28%/20%/52%
I enjoy riding with other people	(n=89)	(n=31)	(n=58)
agree/disagree/neutral	82%/2%/16%	81%/0%/19%	83%/3%/14%
Is the AVL sufficiently utilized	(n=86)	(n=29)	(n=57)
Yes	34%	35%	33%
No	43%	41%	44%
Not sure	23%	24%	23%

Is the AVL Sufficiently Utilized

One of the main reasons for allowing carpools onto the AVL is to increase the perception of utilization. Carpoolers were asked whether they

felt the AVL was sufficiently utilized to justify the project. More responses (43%) indicated the AVL was not sufficiently utilized than felt it was sufficiently utilized (34%). These responses are summarized in Table 10.

Comments

Survey participants were encouraged to offer comments, and 75 comments were received. The comments can generally be summarized as shown below.

Comment	Percent of Total Comments
1. AVL a convenience and a good improvement	23%
2. Extend AVL to the West	16%
3. AVL underutilized	8%
4. 3-person carpools a good move	5%
5. Reduce carpool passenger requirements	5%
6. Poor entrances and exits	5%

COMPARISON OF SURVEY FINDINGS

The previous section of this report summarizes responses to the AVL carpool survey conducted in October 1985. In March 1985, surveys were conducted of AVL vanpoolers and transit patrons. Surveys were also conducted at that time of motorists using the Katy Freeway during hours of AVL operation. These data are summarized in this section.

Personal Characteristics and Trip Characteristics

Many of the characteristics of AVL users and non users are similar (Tables 11 and 12). Occupation, education, trip purpose and trip frequency all exhibit similarities. The freeway motorists and AVL carpoolers are somewhat older than AVL vanpoolers and transit patrons; the freeway motorists and AVL carpoolers are also more likely to be male.

Table 11. Personal Characteristics of Users and Non Users of the Katy AVL

Characteristic	Authorized Vehicle Lane Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
Age (years), 50th percentile	33	36	41	40
Sex				
% Male	49%	52%	71%	64%
% Female	51%	48%	29%	36%
Education (years), avg.	15.6	15.4	15	15.7
Occupation				
% Professional	56%	55%	58%	51%
% Managerial	13%	21%	20%	19%
% Clerical	21%	20%	11%	9%
% Sales	4%	2%	2%	12%
% Other	6%	2%	9%	9%

Note: Transit, vanpool and non AVL motorist surveys conducted in March 1985. AVL carpool survey conducted in October 1985.

Table 12. Trip Characteristics of Users and Non Users of the Katy AVL

Trip Characteristics	Authorized Vehicle Lane Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
Trip purpose				
% Work	99%	100%	NA**	94%
Trip frequency (days/wk)				
5 or more	91%	95%	100%	84%
Trip destination				
Downtown	96%	70%	29%	38%
Galleria/City Post Oak	0%	11%	13%	24%
Medical Center	1%	5%	3%	9%
Greenway Plaza	0%	3%	13%	8%
University of Houston	3%	---	3%	2%
Other	0%	11%	39%	19%
Percent of home zip codes (origins)				
in 77079, 77084,or 77449	46%	44%	58%	31%

*Assumed

**Approximately 25% of the carpools had children in the carpool; most of these trips were work trips that included dropping off or picking up a child.

Note: Transit, vanpool, and non AVL motorists surveys conducted in March 1985. AVL carpool conducted in October 1985.

The AVL users and non users have, to a significant extent, similar trip origins (home zip codes). However, the freeway motorists and AVL carpoolers have considerably different destinations than do the AVL vanpoolers and transit patrons. This might indicate that, by allowing carpools onto the AVL, that facility has the potential to serve more trips to more diverse locations.

Mode Choice Considerations

One concern involving carpool utilization is the number of bus or van patrons that will change to carpooling. These survey results suggest that about 5% of AVL carpoolers previously used either a bus or van on the AVL. Whether the percentage will remain that low after carpool volumes increase significantly is not known. "Drove alone" is the most common previous mode of travel for users of the AVL.

In comparison to users of other travel modes, fewer AVL carpoolers have an employer incentive for selecting their mode. The majority of AVL transit patrons, vanpoolers, and non AVL motorists have some sort of employer incentive for the mode selection.

These data are summarized in Table 13.

Impacts of the AVL on Mode Choice

The AVL appears to have had at least some impact on mode choice (Table 14). While 69% of the AVL transit patrons, 87% of the AVL vanpool patrons, and 70% of the AVL carpool patrons indicated they would be using that mode even if there were no AVL, 15% of transit patrons, 6% of vanpoolers, and 16% of carpoolers said they would not. Furthermore, 39% of transit patrons, 25% of vanpoolers, and 47% of carpoolers felt the AVL was very important in the decision to select the mode.

It should also be realized that these surveys were conducted shortly after the various modes were allowed onto the AVL. The bus and van surveys were conducted 5 months after the AVL opened; the carpool survey was conducted 6 months after the first carpoolers were allowed onto the AVL. Thus, many of these persons were already using their current mode before the AVL opened. The impact of the AVL on mode choice will be better identified when subsequent "after" evaluations are performed.

Table 13. Reasons for Selecting Current Commuting Mode

Reason or Characteristic	Authorized Vehicle Lane Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
Previous travel mode				
Drove alone	44%	34%	50%	----
Carpooled	9%	22%	24%	----
Vanpool	7%	13%	4%	----
P/R Bus	----	7%	0%	----
Regular route bus	10%	8%	2%	----
Didn't make trip	27%	16%	20%	----
Other	3%	0%	0%	----
Primary reasons for selecting mode				
Convenience	23%	17%	47%	17%
Don't like to drive	16%	9%	----	0%
Cost	18%	31%	23%	2%
Traffic	12%	4%	----	0%
Need car for job	----	----	----	22%
No bus or van available	----	----	30%	22%
% Having at least part of bus fare, van cost, carpool cost, or parking cost paid by employer	57%	50%	25%	54%
Will you change to AVL carpool				
Continue present mode	86%	93%	----	76%
Change to carpool	0%	1%	----	5%
Not sure	14%	6%	----	19%

Note: Transit, vanpool, and non AVL motorist surveys conducted in March 1985. AVL carpool surveys conducted in October 1985.

Table 14. Impact of the Katy AVL on Mode Choice

Impact on Mode Choice	Authorized Vehicle Lane Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
How important is the AVL in your decision to bus, van or carpool				
Very important	39%	25%	47%	----
Somewhat important	26%	16%	10%	----
Not important	35%	59%	43%	----
Would you bus/van/carpool if there were no AVL				
Yes	69%	87%	70%	----
No	15%	6%	16%	----
Not sure	16%	7%	14%	----
Has the AVL increased transit ridership				
Yes	69%	35%	43%	28%
No	7%	14%	6%	26%
Not sure	24%	51%	51%	46%
Increased vanpool ridership				
Yes	18%	32%	43%	20%
No	11%	26%	8%	39%
Not sure	71%	42%	49%	41%
Reduced freeway congestion				
Yes	40%	29%	33%	14%
No	25%	36%	29%	70%
Not sure	35%	35%	38%	16%
Reduced AVL travel times				
Yes	79%	80%	99%	61%
No	11%	11%	0%	12%
Not sure	10%	9%	1%	27%

Note: Transit, vanpool, and non AVL motorist surveys were conducted in March 1985. AVL carpool surveys were conducted in October 1985.

Perceived Impact of the AVL on Ridesharing and Congestion

The perceived impacts of the AVL on ridesharing and congestion are not clear (Table 14). There is general agreement that travel times for users of the AVL have been reduced. Opinions as to whether freeway congestion had been reduced differed. As to whether the AVL had increased vanpooling or transit ridership, the greatest percentage response tended to be "not sure."

Perceived Utilization of the AVL

A major reason for allowing carpools to use the AVL was that it was felt a perception existed that the AVL, with only bus and vanpool operation, was underutilized. The surveys confirmed that such a perception does exist (Table 15).

Table 15. Perceptions of the Level of Utilization of the Katy Authorized Vehicle Lane

Measure of Effectiveness of Success	Authorized Vehicle Lane Users			Non AVL Users
	Transit	Vanpool	Carpool	Motorists
Is the AVL sufficiently utilized				
Yes	49%	30%	34%	3%
No	33%	51%	43%	90%
Not sure	18%	19%	23%	7%
Is the AVL a good improvement				
Yes	----	----	----	41%
No	----	----	----	35%
Not sure	----	----	----	24%

Note: Transit, vanpool, and non AVL motorist surveys were conducted in March 1985. AVL carpool surveys were conducted in October 1985.