

# Analysis of Carpool Survey Data from the Katy, Northwest, and Gulf Transitways in Houston, Texas

DIANE L. BULLARD

Within the Houston metropolitan area, a major commitment has been made to implement a system of high-occupancy vehicle lanes (known locally as transitways) in the medians of the existing freeway network. These lanes are reserved for the exclusive use of high-occupancy vehicles. As of October 1989, carpools were permitted to use three of the four transitways in operation. This paper presents the results of transitway carpool surveys performed on the Katy, Northwest, and Gulf Transitways in the fall of 1989. The primary intent of the surveys was to (a) identify why individuals have chosen to carpool; (b) assess what effect the transitways have had on the decision to carpool; (c) determine perceptions of transitway use with carpools present; and (d) assess carpooler attitudes and impacts pertaining to the transitways. From the results of the carpool surveys, it appears that carpoolers generally perceive they are receiving a number of benefits from carpooling on the transitway. In fact, between 19 and 42 percent of the current transitway carpoolers stated that they would not be ridesharing if not for the transitway in their area. Carpool survey data also indicate that (a) between 45 and 61 percent of the total transitway carpools may have been created as a result of the transitways and (b) perhaps carpools are remaining in existence longer because of the transitways. In addition, it appears that permitting carpools to use the transitways has proven successful in increasing both the actual and perceived use of the facilities without attracting a substantial number of persons away from other transitway modes. Furthermore, between 63 and 71 percent of the freeway motorists (nontransitway users) feel that the transitways are good transportation improvements.

In an effort to address the increasing traffic congestion problem and provide improved mobility within the Houston metropolitan area, a major commitment has been made to implement an extensive system of transitways in the medians of the city's freeway network. These lanes are reserved for exclusive use by high-occupancy vehicles. As of October 1989, carpools were permitted to use three of the four transitways in operation. The results of the most recent carpool surveys performed on the Katy, Northwest, and Gulf Transitways in the fall of 1989 are summarized. In addition to obtaining socioeconomic, demographic, and travel information, the surveys were designed to

1. Identify why individuals have chosen to carpool,
2. Assess what effect the transitways have had on the decision to carpool,

3. Determine perceptions of transitway use with carpools present, and
4. Assess carpooler attitudes and impacts pertaining to the transitways.

Also presented are data from surveys of motorists (nontransitway users) concerning why they have chosen to drive on the freeway mainlanes rather than travel in a bus or carpool on the transitway. In addition, motorists' attitudes regarding transitway use and the desirability of the transitway as a transportation improvement are briefly discussed. In some instances, data from previous carpool and motorist surveys are highlighted for comparative purposes.

## OVERVIEW OF THE HOUSTON TRANSITWAY SYSTEM

The system of transitways being developed in Houston is a joint effort between the Metropolitan Transit Authority of Harris County (METRO) and the Texas State Department of Highways and Public Transportation (SDHPT). A total of 95.5 mi of transitways will ultimately be constructed on six of the city's freeways. By the end of 1989, approximately 36 mi of transitways on four separate freeways were operational (Figure 1). These lanes are typically located in the median of the freeway, are approximately 20 ft wide, are one-lane reversible, and are separated from the mixed-flow traffic lanes by concrete median barriers.

An area of critical importance to the success of the transitway project is the designation of the types of vehicles that are permitted to use these special lanes. On the basis of the highly successful operation of the I-45 North Freeway contraflow lane in north Houston, only authorized buses and 8+ passenger vanpools (truly high-occupancy vehicles) were initially envisioned to be eligible users of the transitway system. In order to become authorized, vanpools (and later carpools) had to have (a) certified drivers, (b) valid Texas vehicle inspection stickers no more than 6 months old, (c) the minimum state insurance coverage, (d) some familiarity with the transitway geometrics before actually driving in the facility, and (e) a visual inspection of the vehicle by METRO. Once these requirements were satisfied, the carpool or vanpool vehicles were issued authorization decals to be displayed on the front and rear windshields. Only vehicles that displayed the special

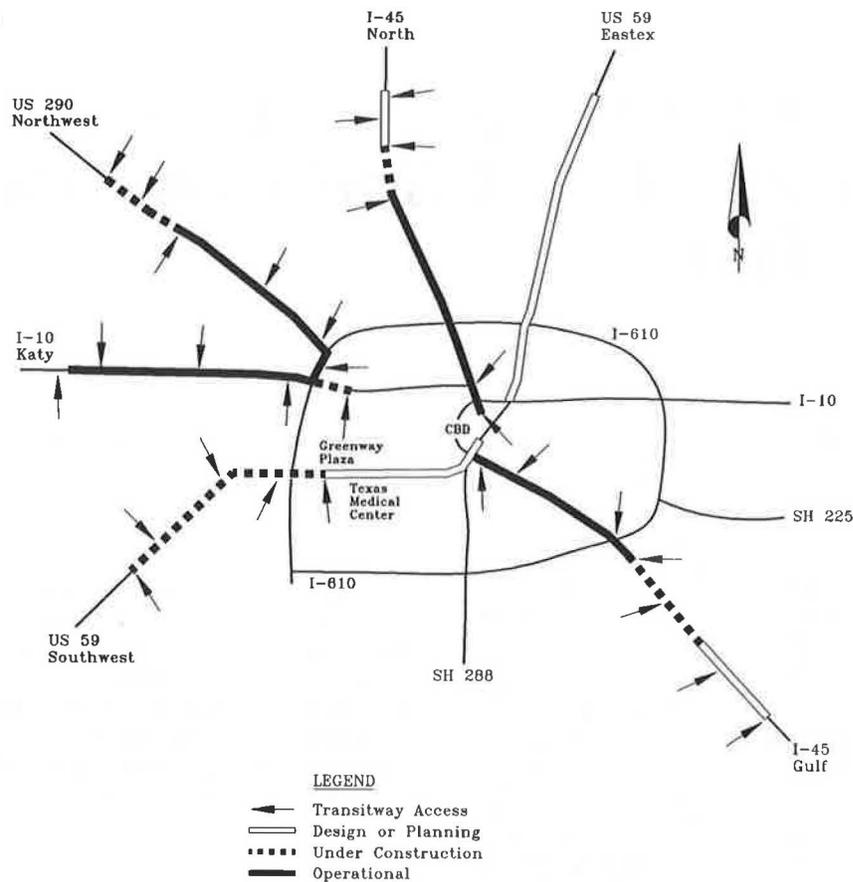


FIGURE 1 Status of the Houston Transitway Development, October 1989.

authorization permits were permitted access to the transitways by METRO transit police.

Consequently, when the first transitway opened in October 1984 on the Katy Freeway, its use was also limited to authorized buses and 8+ vanpools. Although this approach offered the potential to move large volumes of people, it did not result in moving large volumes of vehicles (or people). In fact, fewer than 150 vehicles per peak period traveled the transitway during its initial months of operation, giving the facility the appearance of being underused. To encourage increased vehicular use, the decision was made to permit authorized 4+ carpools on the transitway beginning April 1, 1985. This action only resulted in adding an average of five vehicles to the transitway during the peak period. Therefore, in October 1985, authorized 3+ carpools were permitted on the lane. Even with the 3+ designation, however, peak-hour carpool volumes remained less than 100 vehicles per hour, and the perception of underuse remained. As a result, in August 1986, the minimum passenger requirement for eligible vehicles was lowered to two persons and all authorization requirements were eliminated; METRO and the SDHPT agreed that both actions (lowering the carpool occupancy requirement and eliminating the authorization procedures) were necessary to encourage a substantial increase in transitway use.

However, by the fall of 1988 traffic volumes on the transitway during the a.m. peak hour (7:00 to 8:00 a.m.) increased

to levels exceeding 1,500 vehicles per hour, normally assumed to be the capacity of the facility. This dramatic increase was beginning to have a negative effect on the facility's a.m. operation (lower travel speeds, increased travel times, and unreliable travel times). To relieve this peak-hour congestion, the minimum carpool occupancy requirement was raised from two to three persons between 6:45 and 8:15 a.m. effective October 17, 1988; two-person carpools were still permitted on the facility in the mornings before 6:45 a.m. or after 8:15 a.m. and during the entire p.m. operating period. Following this action, a.m. peak-hour traffic volumes on the transitway dropped to less than 1,000 vehicles per hour, resulting in improved transitway operation. Morning peak-hour person movement also declined (16 percent) as a result of raising the occupancy requirement.

Because of the success in permitting carpools on the Katy Transitway, METRO and the SDHPT agreed to permit 2+ carpools on the Gulf and Northwest Transitways when they became operational in May and August 1988, respectively.

By the end of 1989, peak-hour vehicle throughput in the Katy Freeway corridor (freeway and transitway) had increased 60 percent over pretransitway levels, and the number of persons moved increased 85 percent. Even in the newest transitway corridor, the Northwest, vehicle throughput increased 21 percent and person throughput increased 39 percent over pretransitway levels. Carpool use of the transitways

can be credited for much of the success of these facilities. In fact, as of October 1989, carpools represented at least 94 percent of the vehicles and carried more than 60 percent of the persons moved on the Katy Transitway during both a.m. and p.m. peak periods. On the Northwest Transitway, carpools accounted for approximately 97 percent of the peak-period vehicles and moved 74 percent of the peak-period persons. In the Gulf corridor, 90 percent of the peak-period vehicles traveling the Gulf Transitway were carpools; these carpools moved approximately 45 percent of the transitway users.

The Texas Transportation Institute (TTI) is currently monitoring the effects of allowing carpools to use the transitways. In addition, TTI is also engaged in the assessment of public attitudes concerning the transitways. This assessment is being accomplished through the periodic distribution of survey questionnaires to both transitway users and nonusers. Comprehensive survey efforts have been performed on five separate occasions in the Katy Freeway corridor (once yearly beginning in 1985) and on two separate occasions in the Northwest and Gulf Freeway corridors (once yearly beginning in 1988).

The results of the most recent carpool surveys conducted on the Katy, Northwest, and Gulf Transitways in October 1989 (approximately 4.5 years after carpools were allowed on the Katy Transitway, 14 months after the Northwest Transitway was completed, and 17 months after the Gulf Transitway became operational) are presented.

## SURVEY METHODOLOGY

For the 1989 transitway carpool surveys, license plate numbers of carpools traveling inbound on each transitway during the a.m. operating period were recorded by TTI staff. The SDHPT Division of Motor Vehicles license plate files were accessed

to obtain addresses. A survey was mailed to each address (excluding out-of-town addresses, corporate addresses, and leasing agencies). A postage-paid return envelope was included with each of the surveys. Carpool drivers were asked to complete the survey and return it to TTI. Response rates to the transitway carpool surveys are presented in Table 1.

During the 6:00 to 9:30 a.m. peak period, license plate numbers of motorists traveling inbound on the Katy, Northwest, and Gulf Freeway mainlanes were also recorded by TTI observers. SDHPT Division of Motor Vehicles license plate files were accessed to obtain addresses. A survey was mailed to each address (excluding out-of-town addresses, corporate addresses, and leasing agencies). Motorists were asked to complete the survey and return it to TTI in the postage-paid envelope provided. Response rates to the freeway motorist surveys are also presented in Table 1.

## CARPOOL SURVEY FINDINGS

For presentation purposes, responses to the transitway carpool user surveys can be grouped into the following three categories:

1. Personal characteristics;
2. Travel patterns and trip characteristics; and
3. Attitudes and impacts pertaining to the transitways.

### Personal Characteristics

In many respects, the characteristics of the current Katy, Northwest, and Gulf Transitway carpools are similar (see Table 2). In some instances, the characteristics of transitway

TABLE 1 TRANSITWAY CARPOOL AND FREEWAY MOTORIST SURVEY DISTRIBUTIONS, 1989

Survey Group	License Plates		Surveys Returned	Response Rate (% of Surveys Mailed)	
	Read	Mailed	Address Unknown or Vehicle Not on Freeway/Transitway	Surveys Completed	Surveys Mailed
<b>Transitway Carpoolers</b>					
Katy Transitway	2,204	1,507	91	590	39%
Northwest Transitway	917	596	42	253	42%
Gulf Transitway	567	367	19	122	33%
<b>Freeway Motorists</b>					
Katy Freeway	4,876	3,069	207	1,135	37%
Northwest Freeway	5,045	3,271	215	1,133	35%
Gulf Freeway	3,820	2,290	172	656	29%

carpoolers are similar to the characteristics of the motorists traveling in the adjacent freeway mainlanes.

### Age and Sex

The median age of the Katy, Northwest, and Gulf Transitway carpoolers is in the middle to upper 30s. At least half of the Katy and Northwest carpoolers are male, whereas 60 percent of the Gulf Transitway carpoolers are female.

### Occupation

More than half of the transitway carpoolers are employed in positions which can be classified as either professional or managerial. An additional 15 to 28 percent are employed in clerical positions. The high percentage (28 percent) of clerical workers in the Gulf Transitway corridor may correlate to the high percentage (60 percent) of females in that corridor.

### Education

In general, transitway carpoolers are a well-educated group. The average Katy Transitway carpooler has completed at least 3 years of college, and the average Northwest and Gulf Transitway carpooler has completed more than 2 years of college.

## Travel Characteristics

### Year Joined Present Carpool

As presented in Table 3, 60 percent of the Gulf Transitway carpoolers and 65 percent of the Northwest Transitway carpoolers reported joining their present pool after the opening of the transitway in their area. (The Gulf Transitway had been open 17 months and the Northwest Transitway had been open 14 months at the time of the 1989 survey.) As to be expected from the lengthy time the Katy Transitway has been in operation, 91 percent of those in the Katy corridor reported joining their present carpool after the transitway opened. (The Katy Transitway had been open to carpools for 54 months at the time of the 1989 survey.)

### Number of Months Carpools Have Existed

Initial carpool surveys conducted on the Katy, Northwest, and Gulf Transitways just after the transitways opened found that the median age of carpools was 4, 3, and 6 months, respectively. Subsequent surveys (performed in 1989 after each of the transitways had been in operation at least a year) found the median age of carpools to be 13 months on the Katy Transitway, 9 months on the Northwest Transitway, and 12 months on the Gulf Transitway (Table 3). Thus, data are beginning to suggest that carpools may remain in existence longer as a result of the transitways.

TABLE 2 PERSONAL CHARACTERISTICS OF TRANSITWAY CARPOOLERS AND PEAK-PERIOD FREEWAY MOTORISTS, 1989

Characteristic	Katy	Katy	Northwest	Northwest	Gulf	Gulf
	Transitway Carpoolers	Freeway Motorists	Transitway Carpoolers	Freeway Motorists	Transitway Carpoolers	Freeway Motorists
Age (years)	(n=537)	(n=1119)	(n=242)	(n=1124)	(n=112)	(n=648)
50th Percentile	37	41	36	37	38	37
Sex	(n=534)	(n=1096)	(n=240)	(n=1105)	(n=111)	(n=632)
Male	55%	61%	50%	61%	40%	49%
Female	45%	39%	50%	39%	60%	51%
Occupation	(n=513)	(n=1067)	(n=232)	(n=1081)	(n=112)	(n=625)
Professional	45%	45%	45%	38%	45%	30%
Managerial	19%	21%	19%	25%	15%	22%
Clerical	15%	7%	17%	14%	28%	20%
Sales	7%	13%	9%	11%	4%	6%
Other	14%	14%	10%	12%	8%	22%
Education (years)	(n=525)	(n=1101)	(n=237)	(n=1106)	(n=111)	(n=634)
Average	15.3	15.9	14.8	15.0	14.4	14.2

TABLE 3 CHARACTERISTICS OF TRANSITWAY CARPOOLS, 1989

Characteristic	Katy	Northwest	Gulf
	Transitway	Transitway	Transitway
<b>Year Present Carpool Was Formed</b>	(n=430)	(n=196)	(n=97)
Before 1985	9%	7%	18%
1985	1%	3%	2%
1986	6%	3%	3%
1987	17%	8%	8%
1988	31%	27%	23%
1989	36%	52%	46%
<b>Joined Present Carpool</b>	(n=430)	(n=196)	(n=97)
Before transitway opened	9%	35%	40%
After transitway opened	91%	65%	60%
<b>No. Months Carpools Have Existed *</b>	(n=430)	(n=196)	(n=97)
Average	20	17	29
Median	13	9	12
<b>No. of Months Transitway Has Been Open</b>	54	14	17

\* The discrepancy that exists between the average and median number of months carpools have existed is due to a few carpools being formed in the early 1970s (and one carpool in the Gulf corridor that was formed in 1963) which skews the averages. Thus, the median figures (rather than the average figures) are more representative of "typical" conditions.

### Carpool Make-Up

Transitway carpoolers were asked to identify the composition of their carpool group. As indicated below, between 56 and 69 percent of those responding are carpooling with family members; an additional 24 to 32 percent carpool with coworkers. It is of interest to note that the Katy Transitway (which has been open the longest) has the highest percentage of carpools composed of coworkers and neighbors.

Transitway	Carpool Membership (%)		
	Family Members	Coworkers	Neighborhood Friends
Katy	56	32	12
Northwest	69	24	7
Gulf	66	27	7

A cross tabulation of survey data further revealed that carpools composed of family members formed earlier than those composed of coworkers or neighbors. In fact, virtually all carpools formed before 1985 are composed of family members. Data also seem to indicate that transitways encourage the formation of carpools with nonfamily members.

### Trip Purpose

It has been hypothesized that the majority of trips served by the transitways during the a.m. peak period are work or school trips. As indicated in the following list, the results of the transitway carpool surveys confirm this theory.

Transitway	Trip Purpose (%)		
	Work	School	Other (Shopping, Personal Business, etc.)
Katy	85	10	5
Northwest	93	6	1
Gulf	97	3	

### Vehicle Occupancies

As mentioned previously, at the time of the 1989 survey, the Katy Transitway was restricted to vehicles carrying three or more persons between the hours of 6:45 and 8:15 a.m. Two-person carpools were still allowed to use the transitway during all other hours of operation. The average a.m. peak period occupancy of carpools observed traveling the Katy Transitway

was 2.3 persons; the average occupancy of carpools surveyed was 2.6 persons (Table 4).

Both the Gulf and Northwest Transitways were open to 2+ vehicles during all operating hours. The average a.m. peak-period occupancy of Northwest carpools was observed to be 2.1 persons (compared to 2.2 persons from the surveys), and the average occupancy of carpools observed on the Gulf Transitway was 2.1 persons (compared to 2.5 persons from the surveys) (Table 4).

### Trip Destinations

The downtown area is the single largest attractor of transitway carpool trips (Table 4). In fact, 40 percent of the carpools using the Katy Transitway, 41 percent of those using the Northwest Transitway, and 77 percent of those using the Gulf Transitway were destined to the downtown area. However, carpools have also demonstrated the capability of serving trips to numerous locations other than downtown, as evidenced by the large number of trips to the Galleria, Texas Medical Center, Greenway Plaza, and other locations.

TABLE 4 TRAVEL CHARACTERISTICS OF TRANSITWAY CARPOOLERS, 1989

Characteristic	Katy	Northwest	Gulf
	Transitway	Transitway	Transitway
<b>Vehicle Occupancy</b>	(n=536)	(n=244)	(n=115)
2	61%	80%	74%
3	26%	18%	16%
4 or more	13%	2%	10%
Average	2.6	2.2	2.5
<b>Trip Destination</b>	(n=532)	(n=243)	(n=115)
Downtown	40%	41%	77%
Galleria	20%	22%	6%
Greenway Plaza	5%	4%	2%
Texas Medical Center	5%	2%	4%
Other	30%	31%	11%
<b>Previous Travel Mode</b>	(n=523)	(n=237)	(n=110)
Drove alone	50%	43%	40%
Carpool	27%	46%	46%
Bus or van	12%	6%	9%
Didn't make trip	11%	5%	5%

Note: The Galleria, Greenway Plaza, and the Texas Medical Center are three major employment/activity centers outside the downtown area (see Figure 1).

### Previous Travel Mode

In order to estimate the number of new carpools created as a result of the transitway, carpools were asked to identify their previous mode of travel; that is, how was the trip made before carpooling on the transitway. Survey data suggest that somewhere between 40 and 50 percent of the current carpools on the transitway previously drove alone (Table 4). An additional 5 to 11 percent of those surveyed reported they did not make the trip before carpooling on the transitway. The sum of the drove alone plus new trips, which was in the range of 45 to 61 percent of the total carpools, could be considered as an initial indication of the volume of new carpools created as a result of the transitway.

A major concern of permitting carpools (particularly two-person carpools) to use the transitways was that they might simply attract riders from buses or vans, thereby moving no more people but requiring many more vehicles. However, such does not appear to be the case; 1989 survey data indicate that only 6 percent of the Northwest Transitway carpools, 9 percent of the Gulf Transitway carpools, and 12 percent of the Katy Transitway carpools formerly used a bus or van on the transitway. Thus, opening the transitways to carpools has attracted only a limited number of trips away from other transitway modes.

### Reasons for Carpooling on the Transitways

Initial surveys performed in each transitway corridor found that the main reasons persons chose to carpool on the transitway were to (a) save time; (b) avoid freeway congestion; (c) reduce driving costs; and (d) have a reliable travel schedule. Three of these reasons relate specifically to benefits associated with being able to use a transitway.

### Attitudes and Impacts Pertaining to the Transitways

#### Perceived Transitway Travel Time Savings

One of the primary reasons for implementing the transitways is to offer riders of high-occupancy vehicles both a travel time advantage and travel time reliability over traveling in the regular freeway lanes. Transitway carpools generally do perceive a travel time savings as a result of being able to use the priority lane (Table 5). In 1989, median travel time savings perceived by transitway carpools were in the range of 12 to 20 min in the a.m. and 15 to 20 min in the p.m. It is of interest to note that the travel time savings perceived by carpools can be several times greater than actual savings (if any) measured in the field.

#### Impacts of the Transitway on Mode Choice

In all likelihood, at least some of the carpools using the transitways would have formed regardless of whether a transitway

TABLE 5 PERCEIVED IMPACTS OF THE TRANSITWAYS ON TRAVEL TIME SAVINGS, 1989

Impact	Katy	Northwest	Gulf
	Transitway	Transitway	Transitway
<b>Perceived Transitway Travel</b>			
<b>Time Savings (minutes)</b>	(n=531)	(n=238)	(n=114)
a.m. (median)	20	15	12
p.m. (median)	20	15	15
<b>Actual Transitway Travel</b>			
<b>Time Savings (minutes)<sup>a</sup></b>			
a.m. (6:00-9:30 a.m.)	7.9	-4.6	3.1
p.m. (3:30-7:00 p.m.)	1.1	-5.7	-3.1

<sup>a</sup> Source: TTI Research Report 484-12 and TTI travel time studies.

Note: In 1989, actual transitway travel time savings were low or negative in some instances due (in large part) to problems encountered in accessing the transitways. Many of these problems have since been resolved resulting in positive peak period travel time savings in most instances.

existed. In an effort to identify this portion of carpool demand, carpools in each corridor were asked questions that related to the transitway's role in their mode choice decision. The first question asked how important the transitway was in their decision to carpool. The responses (Table 6) suggest that the transitway was either very important or somewhat important to at least two-thirds of the carpools in each transitway corridor. As might be expected, this percentage is high-

est (88 percent) on the most mature of the transitways—the Katy—which is also the transitway that presently offers the greatest travel time savings.

A second question asked whether individuals would be carpooling if the transitways had not opened. Initial surveys performed in the Katy, Northwest, and Gulf Transitway corridors indicate strong similarities. Between 70 and 75 percent of the individuals surveyed in the Katy Transitway corridor in 1985 and in the Northwest and Gulf Transitway corridors in 1988 responded "yes." By 1989, however, 42 percent of the Katy Transitway carpools said that they would not. Thus it appears that the Katy Transitway has played a greater role in influencing mode choice decisions in its later years of operation. This same trend is being observed in the Northwest and Gulf Transitway corridors. Accordingly, it follows that the transitway can be credited with encouraging individuals to rideshare.

#### Perception of Transitway Use

One of the primary reasons for permitting carpools to use the Katy, Northwest, and Gulf Transitways is to maximize both the actual and perceived use of the facilities. Carpoolers were asked whether they felt the transitway they travel is sufficiently used to justify the project.

As might be expected, on the Katy Transitway, as actual transitway use has increased (1985–1987), so has the perception of use. In fact, in 1987 when a.m. peak-period vehicular use was approximately 2,400 vehicles, 82 percent of the carpools surveyed felt the transitway was sufficiently used. In 1988 (after the use of the transitway was restricted to 3+ vehicles between 6:45 and 8:15 a.m.), both the actual and perceived use of the facility declined; less than half of those surveyed in 1988 felt the transitway was sufficiently used with the 3+ restriction (although there were approximately 2,000 vehicles on the lane during the a.m. peak period). However,

TABLE 6 PERCEIVED IMPACTS OF THE TRANSITWAYS ON MODE CHOICE

Impact	Katy Transitway		Northwest Transitway		Gulf Transitway	
	1985	1989	1988	1989	1988	1989
<b>Importance of Transitway</b>						
<b>in Decision to Carpool</b>	(n=90)	(n=525)	(n=253)	(n=242)	(n=122)	(n=114)
Very important	47%	74%	53%	57%	43%	48%
Somewhat important	10%	14%	15%	19%	22%	19%
Not important	43%	12%	32%	24%	35%	33%
<b>Carpool If No Transitway</b>	(n=90)	(n=528)	(n=255)	(n=242)	(n=122)	(n=114)
Yes	70%	42%	70%	51%	75%	69%
No	16%	42%	21%	30%	14%	19%
Not sure	14%	16%	9%	19%	11%	12%

in 1989 both actual and perceived use increased; more than three-fourths of the Katy Transitway carpoolers now feel the transitway is sufficiently used to justify the project (Table 7).

Most recent (1989) survey results in the other transitway corridors are also very favorable. Approximately three-fourths of the Northwest and Gulf Transitway carpoolers felt these facilities are sufficiently used to justify the projects.

### MOTORISTS' ATTITUDES CONCERNING THE TRANSITWAYS

The perception of whether or not the transitways are sufficiently used and the acceptance of the transitways as worthwhile transportation improvements are major concerns of METRO and the SDHPT. This is particularly true of the Katy Transitway, because fewer than 150 vehicles per peak period used the priority lane during its first 6 months of operation.

In the Northwest and Gulf Freeway corridors, less than one-third of the motorists traveling on the freeway mainlanes (nontransitway users surveyed) felt that the transitways are sufficiently used to justify the projects. Nevertheless, 71 percent of the Northwest Freeway motorists and 63 percent of the Gulf Freeway motorists surveyed did feel the transitways are good transportation improvements (Table 8).

In the Katy Freeway corridor, as transitway use has increased, acceptance of the transitway by freeway motorists has also increased significantly. In 1985 (before carpools were allowed on the transitway and a.m. peak-period vehicle volumes were less than 150), only 3 percent of the nontransitway motorists felt that the lane was sufficiently used to justify the project. The percentage of favorable responses did not increase the following year (1986, when only authorized 3+ carpools were permitted on the lane and a.m. peak-period vehicle volumes numbered 250). However, by 1989 (when a.m. peak-period transitway volumes rose to almost 2,200

TABLE 7 CARPOOLERS' PERCEPTION OF TRANSITWAY USE, 1989

Perception	Katy	Northwest	Gulf
	Transitway <sup>a</sup>	Transitway <sup>b</sup>	Transitway <sup>b</sup>
<b>Is Transitway Sufficiently Utilized?</b>	(n=530)	(n=239)	(n=112)
Yes	77%	75%	72%
No	14%	11%	15%
Not sure	9%	14%	13%
<b>Transitway Vehicle Volumes</b>			
(A.M. Peak Period) <sup>c</sup>	2186	1464	1139

<sup>a</sup> 3+ vehicles, no authorization between 6:45 a.m. and 8:15 a.m.; 2+ vehicles, no authorization at all other times.

<sup>b</sup> 2+ vehicles, no authorization.

<sup>c</sup> Source: TTI Research Report 484-12 and TTI transitway volume counts.

TABLE 8 FREEWAY MOTORISTS' ATTITUDES TOWARDS TRANSITWAYS, 1989

Attitude	Katy	Northwest	Gulf
	Transitway <sup>a</sup>	Transitway <sup>b</sup>	Transitway <sup>b</sup>
<b>Is Transitway Sufficiently Utilized?</b>	(n=1123)	(n=1109)	(n=643)
Yes	30%	22%	21%
No	53%	58%	61%
Not sure	17%	20%	18%
<b>Transitway Vehicle Volumes</b>			
(A.M. Peak Period) <sup>c</sup>	2186	1464	1139
<b>Is Transitway a Good Transportation Improvement?</b>			
	(n=1110)	(n=1109)	(n=647)
Yes	66%	71%	63%
No	20%	13%	21%
Not sure	14%	16%	16%

<sup>a</sup> 3+ vehicles, no authorization between 6:45 a.m. and 8:15 a.m.; 2+ vehicles, no authorization at all other times.

<sup>b</sup> 2+ vehicles, no authorization.

<sup>c</sup> Source: TTI Research Report 484-12 and TTI transitway volume counts.

vehicles), 30 percent of the nontransitway freeway motorists felt the transitway was sufficiently used. Furthermore, 66 percent of the motorists surveyed in 1989 stated the transitway is a good transportation improvement (Table 8). This percentage is up from 41 percent in 1985 and 36 percent in 1986. Thus, it appears that permitting carpools on the Katy Transitway has increased both the actual and perceived use of the priority facility.

TABLE 9 REASONS FREEWAY MOTORISTS SELECTED AUTOMOBILE TRAVEL MODE ON FREEWAY, 1989

Reasons for Selecting Auto Travel Mode on Freeway <sup>a</sup>	Katy	Northwest	Gulf
	Transitway	Transitway	Transitway
	(n=1176)	(n=1629)	(n=934)
Need car for job	24%	19%	17%
Convenience/flexibility	21%	22%	27%
No bus/carpool/vanpool available	16%	21%	20%
Work odd hours	22%	21%	21%
Don't work in area served by transitway	4%	5%	3%
Other	13%	12%	12%

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

## **REASONS FOR SELECTING THE AUTOMOBILE TRAVEL MODE ON THE FREEWAY**

The reasons most often given for using an automobile in the mixed-flow lanes of the freeway rather than a carpool or other high-occupancy vehicle in the transitway are presented in Table 9. In general, most individuals stated they used an automobile because of the following reasons: (a) needed for job; (b) convenience and flexibility; (c) no convenient carpool, vanpool, or bus available; and (d) irregular work hours. Those individuals needing an automobile available during the day for business purposes would not be likely candidates for ride-sharing programs.

## **CONCLUSIONS**

From the results of the transitway carpool surveys, it appears that carpoolers generally perceive they are receiving a number of benefits from carpooling on the transitway (saving time, saving money, avoiding freeway traffic, and having a reliable travel schedule). In fact, between 19 and 42 percent of the current transitway carpoolers stated they would not be carpooling if not for the transitway in their area. Carpool survey data also indicate that (a) between 45 and 61 percent of the total transitway carpools may have been created as a result of the transitways; and (b) perhaps carpools are remaining in existence longer as a result of transitways. In addition, it appears that permitting carpools to use the transitways has proven successful in increasing both the actual and perceived use of the facilities without attracting a substantial number of persons away from other transitway modes. Furthermore, be-

tween 63 and 71 percent of the freeway motorists (nontransitway users) feel the transitways are good transportation improvements (even though they are not eligible to use the facilities).

## **STATUS OF CURRENT RESEARCH**

Comprehensive surveys of Houston transitway users and non-users (similar to those performed in 1989) were begun in October 1990. In addition, published survey data from other HOV operations in the United States are presently being collected for comparative purposes. Analyses of the Houston data (including a comparison of the 1990 data to that which was collected in previous years and a comparison of the Houston data to survey data from other HOV facilities) are scheduled for completion by August 1991.

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